



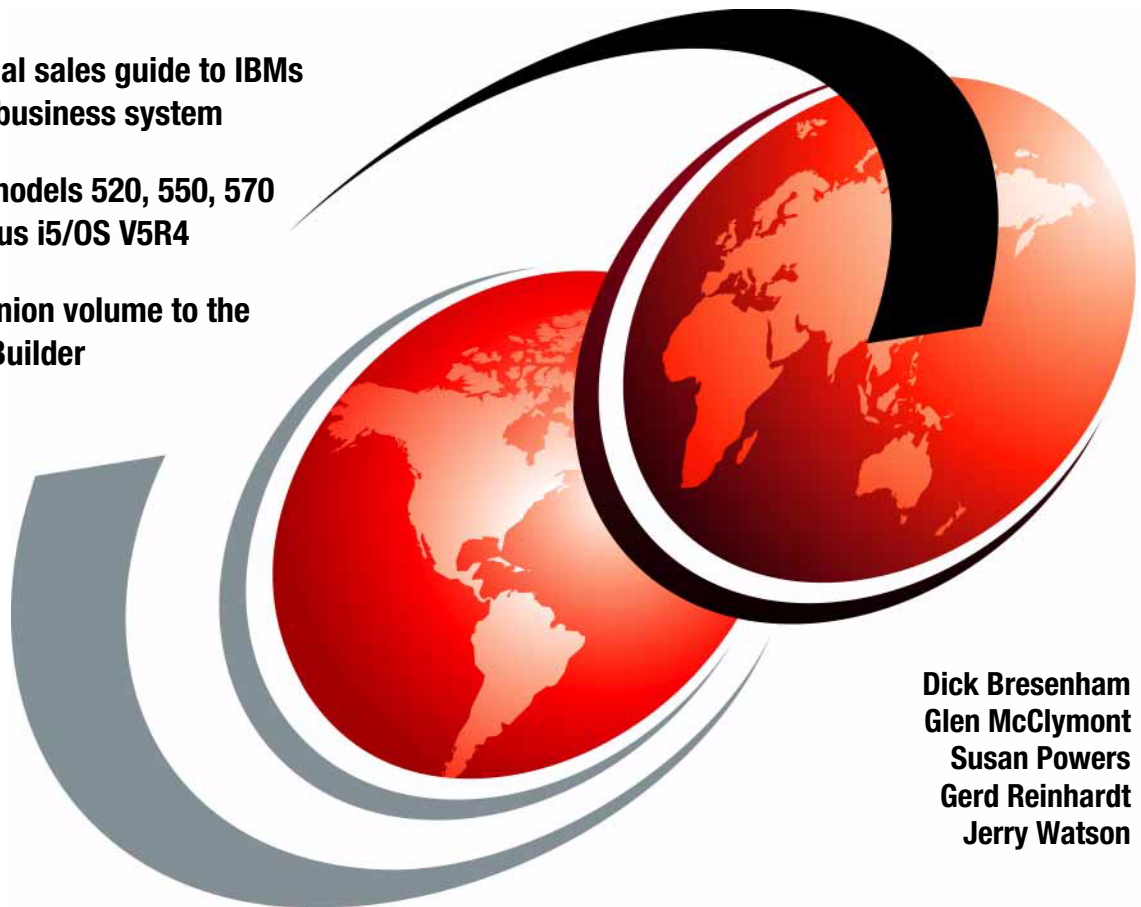
# IBM System i5 Handbook

IBM i5/OS Version 5 Release 4 January 2006 **DRAFT**

The essential sales guide to IBMs  
integrated business system

Featuring models 520, 550, 570  
and 595, plus i5/OS V5R4

The companion volume to the  
i5 System Builder



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International Technical Support Organization

**i5 Handbook**

**IBM i5/OS Version 5 Release 4    January 2006**

**Note:** Before using this information and the product it supports, read the information in “Notices” on page xiii.

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# Preface

The IBM System systems extend the IBM System i5 family. They are the first servers in the industry based on the leading-edge IBM POWER5+™ 64-bit microprocessor. Today's i5 systems give the flexibility to move from one generation of technology to another without disrupting a company's business. IBM i5/OS® Version 5 Release 4, the next generation of OS/400®, features support for multiple operating systems and application environments on a single, simplified platform. System i5 does more with less.

This first edition of the *IBM System i5 Handbook*, distributed and respected worldwide, supports these latest iSeries announcements. It provides a product and feature overview of the newest Models 520, 550, 570, and 595. It describes the newest release of operating system software, i5/OS V5R4. Information is introduced to present all aspects of today's i5 servers, from the architectural foundation to performance considerations.

This Handbook is written for IBM System Specialists, Marketing Representatives, Business Partners, and Clients to answer first-level questions. It offers a comprehensive guide to System i5 models, associated hardware, and i5/OS-related software currently marketed by IBM representatives.

This IBM Redbook is one of several books produced by the IBM International Technical Support Organization (ITSO) to highlight the System i5 product line. Use this handbook as a reference for the options that are available. Then, refer to the companion manual *IBM System i5, @server i5, and iSeries System Builder*, SG24-2155, for more detailed information and configuration rules. You may also refer to *IBM @server iSeries Migration: A Guide to Upgrades and Migrations to POWER Technology*, SG24-7200, for details about upgrading to the IBM @server i5 models. The Hardware Service Manager is described in *Logical Partitions on the IBM PowerPC: A Guide to Working with LPAR on POWER5 for IBM @server i5 Servers*, SG24-8000.

Refer to IBM online publications and systems, such as ViewBlue and PartnerInfo (or their equivalent outside of the United States), and your IBM marketing and support representative for final confirmation.

To order a copy or copies of this handbook, see "Related publications" on page 395.

## The team that wrote this redbook

This redbook was produced by a worldwide team of specialists working at the ITSO, Rochester Center.

**Dick Bresenham** is a Senior iSeries Techline Specialist on the Western Area team in Dallas providing iSeries pre-sales technical marketing support. Prior to joining IBM Techline, he was a System/36, System/38, and AS/400/iSeries Systems Engineer. He joined IBM as a process engineer in Austin and has 21 years of service with IBM.

**Glen McClymont** is a Senior AS/400 Techline Specialist with IBM in Canada. Since 1988, he has worked with the iSeries server in customer hardware support, software support, and most recently in pre-sales marketing support. Glen has over 30 years with IBM. He is an alumni resident for the ITSO from previous Handbook and Builder residencies, providing expertise between updates.

**Susan Powers** is a Consulting I/T Specialist at the ITSO, Rochester Center. Prior to joining the ITSO in 1997, she was an AS/400 Technical Advocate in the IBM Support Center with a variety of communications, performance, and work management assignments. Her IBM career began as a program support representative and systems engineer in Des Moines, Iowa. She holds a degree in mathematics, with an emphasis in education, from St. Mary's College of Notre Dame. She is the project manager for the iSeries Handbook and System Builder suite of IBM Redbooks™.

**Dick Bresenham** is a Hardware Support Center Specialist for i5, iSeries, and AS/400 midrange systems in IBM Germany. He has a certificate in electronics and holds an advanced technical college certificate. He received a diploma in Business Administration from the academy of Bad Harzburg. He joined the Regional Front End Team Germany in 1997 providing support to customers located in Austria, Germany and Switzerland, specializing in hardware technical support and problem determination. In April 2004 he joined the EMEA Virtual Front End Team providing Level 2 Support for clients located throughout Europe.

**Harold Distler**, is an iSeries Systems Specialist who has been with IBM United Kingdom for 21 years. Currently with Techline Europe based in Leeds supporting the UK, South Africa and the Nordics, he previously worked supporting customers in London and the south-east of England as an AS/400 Systems Engineer. His participation in the production of this publication goes back to V4R1.

We appreciate contributions from the iSeries Information Center. And we thank the following developers, engineers, and product managers who provided

technical validation, consultation, and information about the content and message of this handbook:

- ▶ For input on iSeries processors and features:

Gerald Allen  
Denis Nizinski  
Jeff Trachy  
Jesus Villarreal  
Dave Wells, team leader

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Ian Jarman, IBM @server iSeries Brand Manager

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IBM Corporation, International Technical Support Organization  
Dept. JLU Building 107-2  
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# Introduction

# Introduction



## The System i5® arrives

System i5 servers are designed and built as a *complete and total system*, fully integrating the hardware and system software components that a business demands today. As a general-purpose business and network system, the System i5 family is optimized to be the single system providing for business because:

- ▶ The System i5 supports a wide range of applications
- ▶ The System i5 can automatically manage changing business needs
- ▶ The System i5 delivers an integrated system capable of running multiple operating systems
- ▶ The System i5 is quickly and easily deployable

Together, this gives the System i5 outstanding versatility and ease of use. The self managing capabilities help reduce administration time and expense and the innovative design and industry-leading advanced POWER5 processor technology help maintain high reliability and availability of critical applications. The System i5 family will help you simplify a complex IT environment to deliver improved business productivity for today's On Demand Business.

The System i5 brings you these unique benefits:

- ▶ System i5 architecture is a brilliant, technology-neutral architecture. It enables businesses to readily exploit the latest hardware and software technologies, typically without causing disruption to existing application software.

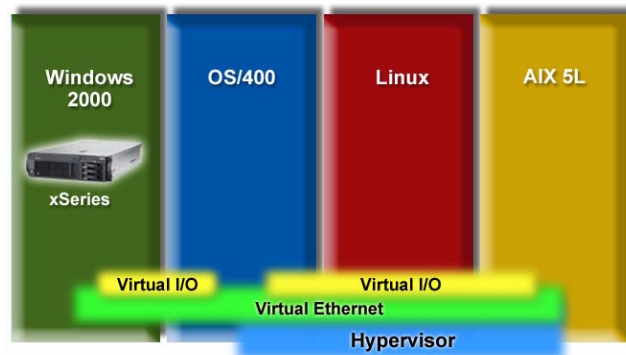
- ▶ The single purpose pervading each aspect of the System i5 architecture is to *empower a business* with the most advanced technology available, *without encumbering it* with the complexities that such technologies inevitably contain. The System i5 allows you to rapidly deploy advanced business applications and facilitates business growth.
- ▶ Clients typically decide on the required application software first and then select an environment in which to run it. System i5 models have thousands of client/server applications written by IBM Business Partners across the globe. In addition, the System i5 provides excellent platforms for Windows, Lotus Domino, and Linux applications. System i5 models have national language support for over 50 languages, available in 140 countries or regions. IBM support across the world is provided by an impressive network of global partners.

IBM System i5® offers excellent scalability with new System i5 POWER5+ servers. The System i5 family exhibits excellence in design and development and manufacturing. Today's System i5 gives you the flexibility to move from one generation of technology to another without disrupting your business.

## Simplicity in an on demand world


Today's on demand world is high-pressure and fast moving. Business demands change constantly. To gain a competitive edge, companies, regardless of how big or small, must be able to react instantly to clients' changing needs. It means having a flexible IT infrastructure that can

grow and dynamically adapt to these demands. All too frequently, this adaptation can mean running multiple servers, which often means greater complexity and increased management costs. Because complex infrastructures are not agile and do not respond well to rapid change, it may also mean lost business opportunities.



The System i5 demonstrates a unique design that delivers the benefits of today's innovative technology without complexity. It is a highly integrated, reliable server platform that allows businesses to run multiple operating environments

simultaneously. It dynamically adjusts to the changing requirements of an On Demand Business.



The System i5 offers an integrated architecture combined with legendary availability, high security, easy management, and mainframe-class technology. Because of this, the System i5 is uniquely positioned to play a leadership role in this modern way of computing, providing simplicity in an on demand world.





## **System i5 architecture: Fundamental strength of the IBM System i5**

The accelerating rate of change of both hardware and software technologies necessitates that the server you select is designed with the future in mind. The System i5 accommodates inevitable, rapid, and dramatic technology changes with relatively minimal effort required by clients, to allow them to meet their on demand requirements.

Paradoxically, the characteristic of the most advanced design and technology is that you do not notice it; you are not meant to do so. It accommodates rapidly-changing hardware and software technologies in stride, permitting you to fully exploit the latest technologies on demand.

The System i5 and supporting software offer important advanced capabilities in key areas such as On Demand Business, Java, Web serving, Lotus Domino, integration with Windows, managed availability, database, and Business Intelligence solutions. To gain an appreciation of these technologies and of the particular strength of the System i5 in delivering them, this chapter provides a summary of each prime element.

## System i5 architecture

This section describes aspects of the System i5 server architecture that contribute most to the server's success as the *system of choice*.

### Single-level storage

The System i5 server delivers tremendous capacity growth in its product line. The iSeries Layer (also known as Technology Independent Machine Interface) has made it possible to completely change the underlying hardware with minimum, if any, impact to System i5 applications. TIMI helps condition the System i5 to bring the newest technology to market. Application programs on an System i5 server are unaware of the underlying hardware characteristics.

The concept of single-level storage means that an application does not deal with processor technology nor device specifics. The knowledge of the underlying characteristics of hardware devices (in this case, main storage and disk storage) reside in the System Licensed Internal Code (SLIC). All of the storage is automatically managed by the system. No user intervention is ever needed to take full advantage of any storage technology.

The System i5 server address size is vast. System i5 models can address the number of bytes that 64 bits allows it to address. The value 2<sup>64</sup> is equal to 18,446,744,073,709,551,616. Therefore, the System i5 models can address 18,446,744,073,709,551,616 bytes, or 18.4 quintillion bytes. To put this into more meaningful terms, it is twice the number of millimeters in a light year. Light travels at approximately 6,000,000,000,000 miles in one year.

??find home for above writeup on address space??

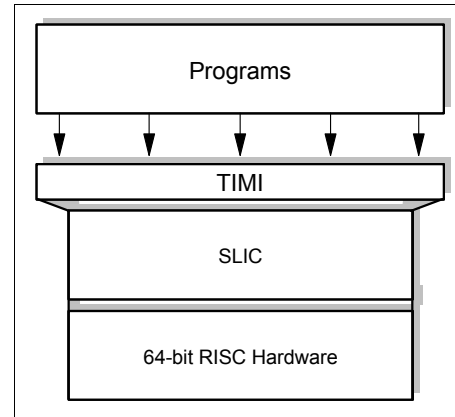
### Technology Independent Machine Interface

System i5 servers are atypical in that they are defined by software, not by hardware. When a program presents instructions to the machine interface for execution, it *thinks* that the interface is the system hardware, but it is not. This interface is known as Technology Independent Machine Interface. The instructions presented to TIMI pass through a layer of microcode before they are “understood” by the hardware itself.

This comprehensive design insulates application programs and their users from changing hardware characteristics. When a different hardware technology is deployed, IBM rewrites sections of the microcode to absorb the fluctuations in hardware characteristics. As a result, the interface presented to the client remains the same.



The microcode layer is known as the System Licensed Internal Code. Many of the frequently-executed routines run in SLIC. Supervisory resource management functions in SLIC include validity and authorization checks. On a customary system, these routines reside in the operating system. Because SLIC is closer to the silicon, routines performed there are faster than routines placed “higher” in the machine.



TIMI and SLIC take technology in stride. New architectural features are exploited to fully accommodate post-RISC technologies, which may incorporate 96-bit or 128-bit processors or shifts to different processor technologies.

You can find further information about TIMI on the Web at:

<http://www-1.ibm.com/servers/enable/site/porting/iseriew/overview/overview.html>

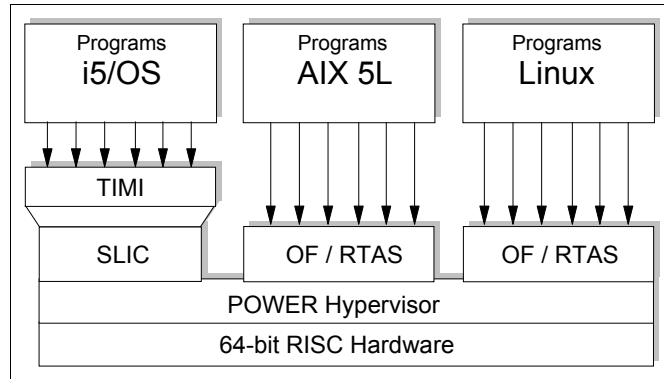
## POWER Hypervisor

IBM System i5 servers work with a different structure when compared to the previous technologies used with the System i5 servers. Above the POWER5 technology-based hardware is a code layer called the *POWER™ Hypervisor*.

This code is part of the firmware shipped with the System i5 hardware. The POWER Hypervisor resides in flash memory on the Service Processor. This firmware performs the initialization and configuration of the System i5 hardware, as well as the virtualization support required to run up to 254 partitions concurrently on the System i5 servers.

The layers above the POWER Hypervisor are different for each supported operating system.

For i5/OS, TIMI and the layers above the POWER Hypervisor are still in place. SLIC, however, is changed and enabled for interfacing with the POWER Hypervisor. The POWER Hypervisor code is based on the System i5 Partition Licensed Internal Code (PLIC) code that is enhanced for use with the @server i5 hardware. The PLIC is now part of the POWER Hypervisor.



For the AIX 5L and Linux operating systems, the layers above the POWER Hypervisor are similar, but their content is characteristic for each operating system. The layers of code supporting Linux and AIX 5L consist of System Firmware and Run-Time Abstraction Services (RTAS).

The System i5 layered code structure makes the System i5 platform more flexible. It also enables easy accommodation of different operating systems.

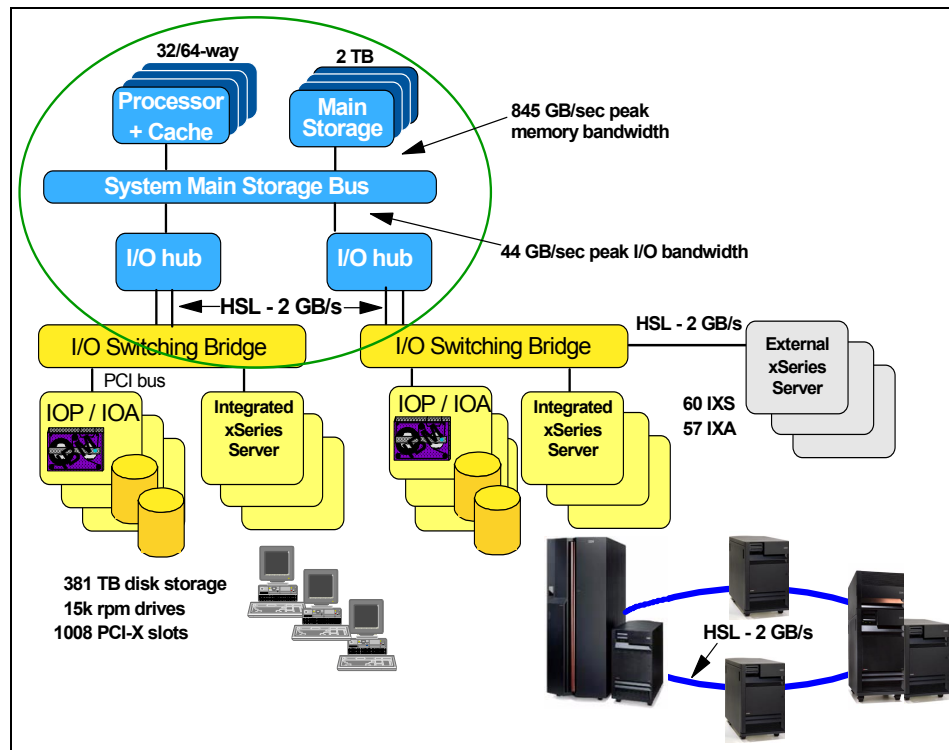
The POWER Hypervisor allows for multiple operating systems to run on System i5 hardware. i5/OS, Linux, and AIX 5L are supported in logical partitions (LPARs) on the System i5. No additional investment is required to bring existing applications running on the System i5 today, with an earlier supported OS/400 release, to i5/OS or to the new System i5 hardware.

## Hierarchy of microprocessors

System i5 servers are designed for business computing. One of the fundamental characteristics of that environment is that it is I/O-intensive, rather than compute-intensive. In addition to outstanding performance in the business environment, the microprocessor design hierarchy gives the System i5 server an elegant method of integrating diverse environments into a single, harmonious client solution.

The microprocessors that look after a particular I/O device are accommodated on I/O cards that fit into slots on the system buses. One of these cards may be the Integrated xSeries Server. This is a PC on a card that enables the System i5 server to run a Windows server™, for example.

The following figure shows a highly simplified view of the balanced architecture of the System i5. The maximum configuration values in the diagram represent a 1.65 GHz 64-way Model 595.



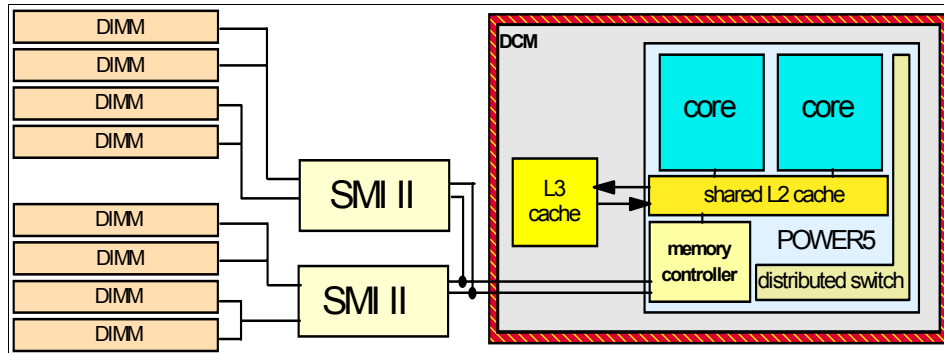
High performance on an System i5 server is achieved by using many individual high performance microprocessors, I/O devices, and interconnect technologies. Key to the System i5 high performance is the POWER5 distributed switch that supports enormous bandwidth between processors, cache, memory, and I/O. While programs run on POWER5 microprocessors, movement of data is handled by high performance I/O adapters and I/O processors. Data moves between I/O towers and to Integrated xSeries Adapter PC servers across HSL at 2 GB/s. Storage area network (SAN) disk and tape devices are supported at 2 Gbps over Fibre Channel.

In the IBM @server Model 520 without L3 cache the POWER5 chip is packaged into a cost-effective Single Chip Module (SCM) package.

In the IBM @server Model 520 with L3 cache, and all Model 550 and 570 systems, the POWER5 chip is packaged with the L3 cache chip into a cost-effective Dual Chip Module (DCM) package. Each processor card has a

single DCM containing a POWER5 processor chip and a 36 MB L3 module. A DCM and its associated L3 cache and memory are packaged on a single processor card.

The following figure illustrates a two-way @server Model 520 processor with DDR1 memory and DCM.



The multichip modules (MCMs) contain eight processors each. In such an MCM, there are four physical copper SOI chips with two processor cores. Each core is capable of running symmetric multi-threading that to the operating system looks like two separate processors. Each chip contains 276 million transistors forming two processors running at a speed in excess of 1.5GHz. The 8-way MCM is the building block for the system. It is only available with four chips, each with its attached L3 cache. A single processor on a chip has all of the L2 and L3 cache resources attached to the module (144 MB per MCM).

On an System i5 Model 595, a 64-way symmetric multiprocessing (SMP) configuration is implemented with eight MCMs, with each MCM containing four dual core POWER5 chips running at speeds greater than 1.5 GHz.

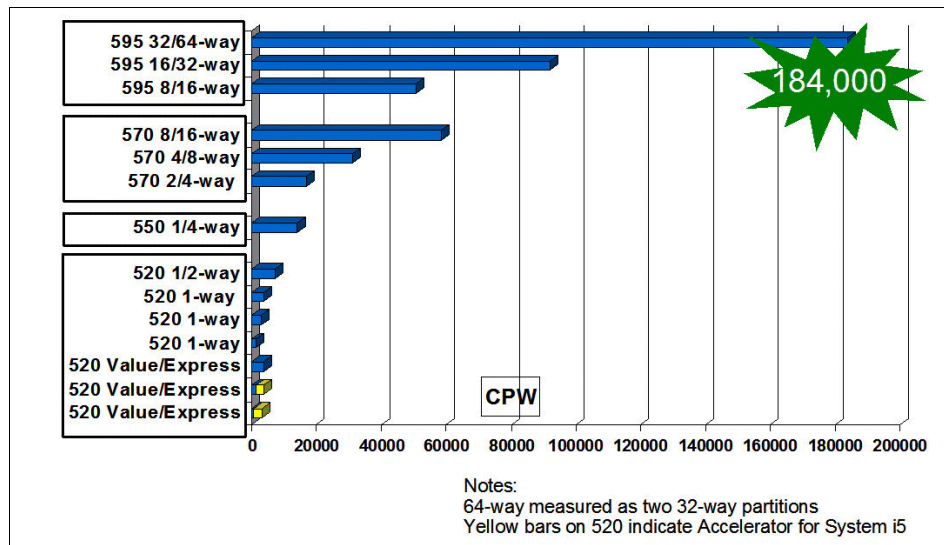
A single large System i5 configuration can have well over 650 processors. The main system processor complex (can be comprised of 64 separate processors) can encounter a request for data to be read from or written to any I/O device. That request for data is delegated to the particular microprocessor dedicated to that I/O device. Meanwhile, the main system processor continues executing another application program. Nanoseconds ( $10^{-9}$  second) is the unit of time used to measure main storage access times. I/O operations are measured in milliseconds ( $10^{-3}$  second).

## Microprocessor excellence

The iSeries server was the first server with Silicon-On-Insulator (SOI) technology. The POWER4™, POWER5 and POWER5+ technology-based processors are an extension of that technology at 0.18, 0.13, and 0.09 micron levels.

The first AS/400e models based on the 64-bit RISC PowerPC® AS processors were announced in June 1995. In 1997, the 12-way AS/400e system was delivered using Power PCA35 microprocessors. Known as Apache technology, the Power PCA35 microprocessors provided a growth of 4.6 times. In September 1998, a 12-way AS/400e system was delivered using the Power PCA50 microprocessor. Known as code name Northstar, the Power PCA50 microprocessors nearly doubled the high-end capacity. This set of processors provided the fourth generation since the AS/400 system's inception in 1988 with 64-bit AS/400 Power PC® microprocessors. The latest generation of POWER5 processors is 4.4 times as powerful as its predecessor POWER4 generation of microprocessors.

The following figure shows the advance in processor technology.



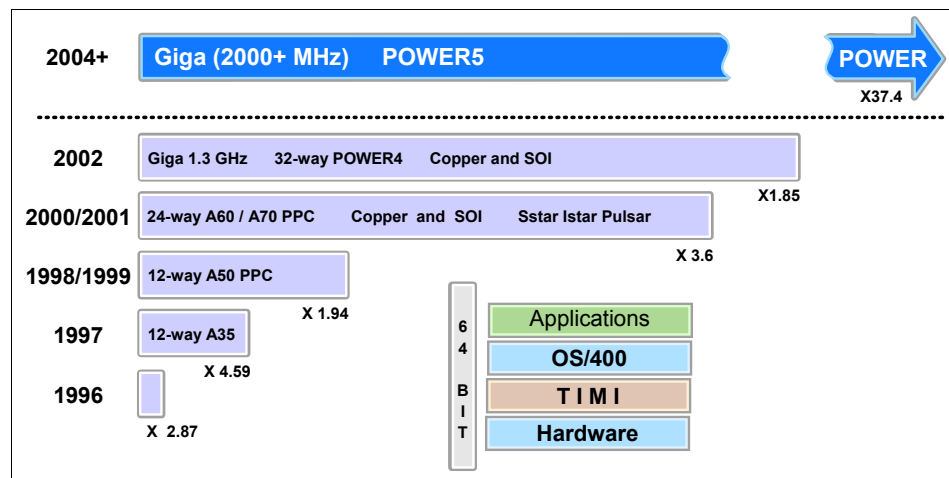
Pulsar, ISTAR, and SSTAR processors use on-chip copper-wiring technology. The Pulsar processors integrate IBM CMOS7S technology. ISTAR and SSTAR processors integrate CMOS8S technology. Previously, Northstar technology used aluminum for on-chip wiring. Copper's better conductivity permits thinner wires to be used, which enables the transistors to be packed closer together. The denser technology permits additional micro-architecture methods to improve performance.

Delivered in 2002, the next evolution of IBM @server microprocessors was POWER4 fabricated in CMOS8S technology. Keeping multiple levels of high speed cache is still necessary to keep the processors busy. Denser processor technology permits more on-chip cache.

Continuing this industry-leading technology is POWER5 in CMOS9S today. The improved density with CMOS9S technology allows for larger caches, and for cache-controllers and memory controllers to be on-chip, resulting in higher processor performance.

This growth and implementation of new technology is possible because of the System i5 TIMI layer. TIMI allows the system to incorporate significant the newest hardware technology quickly and transparently. The ease with which clients have migrated to these powerful systems is a testimony to the fundamental strength of the server's architecture.

The following figure shows this change of hardware processor technology and previews what is planned in future generations.



The summary charts in “Today’s System i5 summary” on page 47 indicate the processor technology used in each System i5 server.

## Simultaneous multithreading explained

Although an operating system gives the impression that it is concurrently executing a large number of tasks, each processor in a symmetric multiprocessor (SMP) traditionally executes a single task's instruction stream at any moment. Multithreading minimizes the processor wait or idle time.

In general, multithreading allows a single processor to process multiple threads in a different fashion than a single processor without this capability. There are several distinct differences between different types of multithreading implemented in the industry. We restrict our discussion to IBM technologies only.

The QPRCMLTTSK system value controls whether to enable the individual SMP processors to concurrently execute multiple instruction streams. Each instruction stream belongs to separate tasks or threads. When enabled, each individual processor concurrently executes multiple tasks at the same time. The effect of its use will likely increase the performance capacity of a system or improve the responsiveness of a multi threaded application. Running multiple instruction streams at the same time does not improve the performance of any given task. Since this is the case with any performance recommendations, results vary in different environments.

The way that multithreading is done depends on the hardware model, and therefore, the performance capacity gains vary. System i5 and IBM @server i5 Models 520, 550, 570, and 595 support this approach through a concept called simultaneous multithreading (SMT). With SMT active, instructions of two different threads can be issued per single cycle.

Older iSeries processors use an approach called *hardware multithreading* (HMT). In the hardware multithreading approach, the hardware automatically switches between the tasks on any long processing delay event, for example, a cache miss.

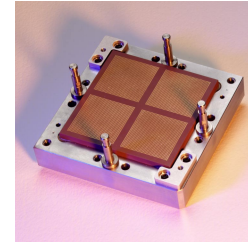
Testing indicates a major performance improvement over the multithreading algorithm used in the hardware multithreading (HMT) of the SSTAR technology processors. Internal laboratory testing indicates that commercial applications see a 25% to 35% throughput improvement compared to no multithreading implementation and about 10% for HMT.

Some models do not support any form of multithreading, which means the QPRCMLTTSK system value has no performance effect. Because the system value enables the parallel use of shared processor resources, the performance gains depend highly on the application and the model. In some exceptional cases, some applications are better served by disabling simultaneous multithreading.

Refer to the *iSeries Performance Capabilities Reference*, SC41-0607, for guidelines about what performance gains you may expect through its use.

## POWER4

POWER4 cannot be considered only a chip, but rather an architecture of how a set of chips is designed together to build a system. As such, POWER4 can be considered a technology in its own right. The interconnect topology, referred to as a *Distributed Switch*, was introduced to the industry with POWER4. In that light, systems built by interconnecting POWER4 chips form up to 32-way symmetric multiprocessors. The reliability, availability, and serviceability (RAS) design incorporated into POWER4 is pervasive throughout the system and is as much a part of the design. POWER4 is the chip technology used in the iSeries Models 825, 870, and 890.

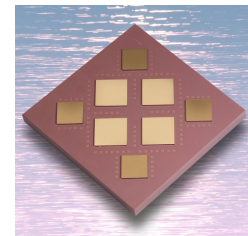


The POWER4 design can handle a varied and robust set of workloads. This is especially important as the On Demand Business world evolves and data intensive demands on systems merge with commercial requirements. The need to satisfy high performance computing requirements with its historical high bandwidth demands and commercial requirements, along with data sharing and SMP scaling requirements, dictate a single design to address both environments.

## POWER5

POWER5 technology is the ninth generation of 64-bit architecture.

Although the hardware is based on POWER4, POWER5 is much more than an improvement in processor or chip design. Operating at f, the chip circuit technology is a complete architectural change, creating a much more efficient superscalar processor complex. For example, the high performance distributed switch is enhanced. POWER5 technology is implemented in the IBM @server i5 Models 520, 550, 570, and 595.



As with previous hardware technology, POWER5 technology-based processors have two load/store, two arithmetic, and one branch unit. The *processor complex* design is built in such a way that it can most efficiently execute multiple instruction streams concurrently.

xxThe POWER5 concept is a step further into autonomic computing.

The full system design approach is required to maintain balanced utilization of hardware resources and high availability of the IBM @server i5 systems. Along with increased redundant components, POWER5 processor technology



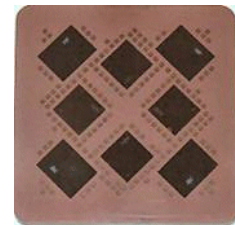
incorporates modern technological high standards, such as special ways to reduce junction temperatures.

IBM designed the @server i5 system processor, caching mechanisms, memory allocation methods, and the RIO-G adapters for performance and availability. Memory and CPU sharing, a dual clock, and dual service processors with failover capability are examples of the full system design approach. In addition, advanced error correction and low power consumption circuitry are improved with thermal management.

Multiprocessor POWER5 technology-based servers have multiple autonomic computing features for higher availability compared with single processor servers. If a processor is running, but is experiencing a high rate of correctable soft errors or is failing a periodic floating point self test, it can be *deconfigured dynamically*. Its workload can be picked up automatically by the remaining processor or processors without an IPL. If there is an unused IBM @server Capacity Upgrade on Demand (CUoD) processor or if one processor unit of unused capacity in a shared processor pool is available, the deconfigured processor can be replaced dynamically by the unused processor capacity to maintain the same level of processor performance.

## POWER5+

An innovative design with more muscle in a smaller package, POWER5+ 64-bit processor technology is the tenth generation microprocessor. POWER5+ chips take processing capabilities to new levels of benchmark record chip performance with lower levels of power consumption to save clients money. The POWER5+ microprocessor is available in Quad-Core Module (QCM) packaging, two dual-core POWER5+ chips on the same substrate. This first four core microprocessor package allows almost twice the computing power per module. Built with .90nanometer (nm) technology, the POWER5+ is almost 40 percent smaller than its POWER5 predecessor. With speeds up to 1.9GHz, POWER5+ is implemented in the newest IBM System i5 520, 550, 570, and 595 models.



## The future

“Power Architecture™ is more than just a technology, but rather a movement for change. It’s time for architecture that enables innovation to flourish. It’s time for Power Everywhere™.”

– Nick Donofrio, IBM Senior VP

For the future, Power Architecture microprocessors are being designed to keep running through many hard processor failures. The processor state will be maintained and switched to a hot standby processor. Reliability and availability characteristics associated only with IBM *eServer zSeries*® class machines will be incorporated into the IBM System i5.

## PCI-X

PCI-X is a higher speed version of the conventional PCI standard and enables function and performance for System i5 servers beyond that of PCI. The PCI-X standard keeps pace with the demands of high-bandwidth business-critical applications such as Fibre Channel, RAID, networking and SCSI. PCI-X adapters also run in PCI slots, but at a slower PCI speed.

## High-speed links

High speed link provides a fast data transportation mechanism. The RIO-G structure provides performance improvements and future system growth. RIO-G architecture is flexible and powerful. A RIO-G design provides:

- ▶ 2 GB/s technology
- ▶ A simplified and flexible implementation that supports:
  - Loop technology for redundancy
  - Multiple towers per loop: Mix and match the RIO-attached I/O towers on the loop
  - Migration to PCI I/O and HSL-attached I/O towers

Refer to (web site) for additional information about RIO-G.

## System i5 integration with the Windows Server

System i5 servers include the ability to manage Intel-based Windows servers via the Integrated xSeries Server or the Integrated xSeries Adapter. Up to 60 Integrated xSeries Servers are supported on selected System i5 models. System

i5 servers support the attachment of external 1-way to 8-way IBM @server xSeries servers via the high-speed link.

With the Integrated xSeries Adapter, selected xSeries servers running a Windows Server can help to extend Windows application scalability. At the same time, they can retain the same storage consolidation and systems management advantages of the Integrated xSeries Server has on the System i5.

Virtual storage management enables an administrator to dynamically add storage to a running Windows server.

## Reliable, managed availability

The System i5 server has a reliable history of designing key functions into the hardware and software. High availability is one reason to select a managed availability approach. Other reasons include minimal disruptive backup solutions, and the ability to nondisruptively install and pre-test new versions, releases, or software fixes to make optimum use of all company and system resources.

Hallmarks of System i5 availability include redundant internal hardware features, such as RAID-5 and mirroring. The robustness and stability of OS/400 extends into its multiple, subsystem support (batch, interactive, multi-language, and applications). The System i5 server offers managed availability to ensure that it is ready to do business when you are.

System i5 managed availability software is also called cross-system mirroring. It provides:

- ▶ The ability to have one system act as a hot backup system to one or more primary systems  
The primary and secondary systems do not have to be the same size or model.
- ▶ A rapid switchover to the secondary machine in the event of an emergency
- ▶ The ability to update software versions and releases (OS/400 and associated software), or fixes on the secondary system, while the primary system continues to function  
Testing can occur on the secondary system before nondisruptively updating the primary system.

System i5 servers offer superior technology, service, and support in each of five critical components of availability:

- ▶ Single system reliability: Architecture and baseline design make the System i5 server one of the most reliable servers in the world. From its inception, the System i5 architecture inherits a design where reliability and availability are

equivalent to features such as processor speed, memory capability, and number of disk arms when planning for reliability.

The System i5 design and development resources that enable high levels of availability in a single system environment are useful for prevention of unplanned outages. The single-system System i5 remains the core building block to repeat and extend functions into other areas of the business.

- ▶ Single-system availability management: System i5 servers have high-availability facilities that are not only fast and automated, but are easy to use. Planned and unplanned outages are reduced with high availability facilities which include:
  - Automated journal management
  - Access path protection
  - Batch journal caching
  - Save-while-active
  - Parallel save and restore
  - Backup Recovery and Media Services (BRMS) for iSeries
  - RAID-5 disk parity protection
  - Disk mirroring protection
- ▶ Clusters: Cluster technology is implemented to reduce downtime caused by planned outages and site disasters. System availability during planned outages contributes to an increase coverage of unplanned outage. Refer to “System i5 clustering” on page 229.
- ▶ Cluster-enabled applications: A high availability solution for the System i5 server involves an active participation of cluster middleware providers. IBM Business Partners provide advanced cluster management and data resiliency tools. Solution developers design applications to maintain the state of an application across an outage.
- ▶ Availability services and support: As a world-leading enterprise computing vendor, IBM has a collection of products and services to assist the client to develop and maintain a high availability environment. The on demand capabilities of the System i5 servers include High Availability and Capacity BackUp business continuity offerings.

## **Clustering with switchable DASD and IASP**

IASPs and switched disk clusters provide the ability to access content on a set of disk units from a second system. Support for both planned and unplanned outages is improved when the system currently using a switchable disk experiences an outage. Operations are continued on a system even when an isolated controller or disk unit fails.

Data availability is improved with IASPs or switched disk clustering. Upon an outage within a cluster, users can be switched to an alternate node in the cluster (another System i5 server). Integrated file system (IFS) data and operating system library objects residing in an IASP can be switched to another System i5 server without an IPL. This enables one System i5 to take over data and an I/O controller in a disk tower from another System i5.

The primary function in the early stages of clustering is to offer coverage for planned upgrades and maintenance on the production system without affecting users accessing data from the switched disk towers, for the user-defined file system (UDFS) only. Cluster management middleware, shipped as part of OS/400 option 41 (HA Switchable Resources), manages the switchover. For high availability purposes, it ensures that no two systems access the disks (data) at the same time.

A properly designed switched disk cluster can offer advantages over a data replication cluster. Because a switched disk cluster does not use data replication, there is less overhead on the systems and, therefore, more resource available to process transactions. A switched disk cluster can be simpler to operate. The application is critical to the design of a true continuously available environment.

## **Cross-site mirroring**

Cross-site mirroring (XSM), sometimes called geographic mirroring, enables you to mirror data on disks at sites that can be separated by a significant geographic distance. You use this technology to extend the functionality of a device cluster resource group (CRG) beyond the limits of physical component connection.

Geographic mirroring provides the ability to replicate changes made to the production copy of an independent disk pool to a mirror copy of that independent disk pool. As data is written to the production copy of an independent disk pool, the operating system mirrors that data to a second copy of it through another system. This process keeps multiple identical copies of the data.

Through the device CRG, should a failover or switchover occur, the backup node can seamlessly take on the role of the primary node. The server or servers that act as backups are defined in the recovery domain. The backup nodes can be at the same or different physical location as the primary.

When an outage occurs on the server defined as the primary node in the recovery domain and a switchover or failover is initiated, the node designated as the backup in the recovery domain becomes the primary access point for the resource and then owns the production copy of the independent disk pool. Therefore, you can gain protection from the single point of failure associated with switchable resources.

## Virtualization technology

Virtual technology enables resource sharing in an integrated, flexible computing environment on a single server. This section discusses key virtual technologies that are available with each System i5 server.

### Virtualization Engine

Virtualization Engine is the name for a technology that describes the ability to see, access and manage system and storage resources across a computing environment. The resources are available virtually, as single pool. rather than by physical location. The IBM Virtualisation Engine provides the technologies and system services to simplify IT resource management by virtualizing data, application servers and network resources. By binding these individual resources into one integrated infrastructure, the IBM Virtualization Engine delivers the following benefits:

- ▶ Simplifies network infrastructure
- ▶ Reduces cost and complexity by optimizing resource utilization
- ▶ Increases the business value of IT investments.

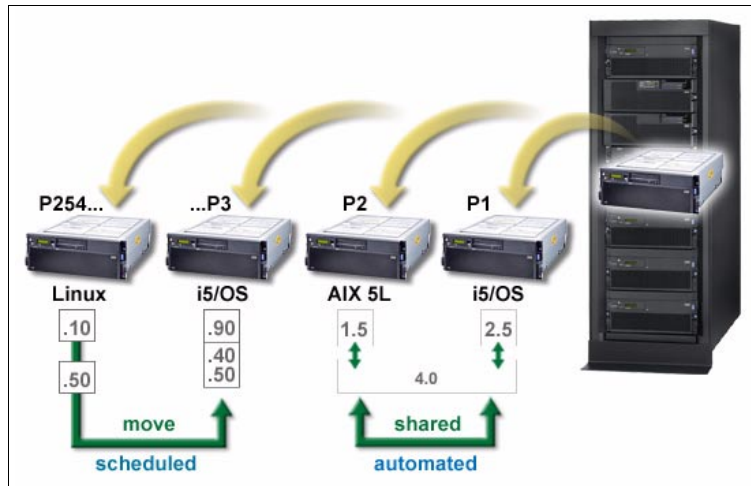
IBM delivers products with i5/OS V5R4 that support Virtualization Engine. All System i5 Editions now ship with IBM Director Multiplatform. This is designed to provide a consistent systems management infrastructure so that heterogeneous systems and their resources may be managed together. IBM Enterprise Workload Manager (EWLM) ships with Enterprise Editions (except the Model 520) to provides a cross platform end-to-end view of goal-orientated performance management for enterprise applications. It enables the monitoring and management of multiple workloads and operating environments within a single partitioned system or across multiple systems in a distributed environment. Initially performance monitoring of applications such as WebSphere Application Server, IBM HTTP Server (powered by Apache) and DB2 are supported.

### Dynamic logical partitioning

Logical partitioning enhances the role of the System i5 as a consolidated server. With LPAR, companies have both the power and flexibility to address multiple system requirements in a single machine.

*Server virtualization*, a term often used with partitioning, is accomplished on the System i5 through the use of Hypervisor technology. Hypervisor encompasses a combination of both hardware features and control code. @server i5 servers use POWER Hypervisor, as described in “POWER Hypervisor” on page 9, to deliver this virtualization support.

LPAR, as implemented on the System i5, extends the original architectural design concept of application execution by allowing OS/400, Linux or AIX to run in a given partition. Extensive dynamic and granular resource sharing is allowed across processors (SMP configurations), memory, disk, tape, and other devices, including Virtual Ethernet, which are covered in the next section. Multiple partitions are supported for selected System i5 uni-processor models. The following figure illustrates resource sharing across partitions.



With i5/OS, partitions can be defined as capped or uncapped. Capped partitions cannot exceed their assigned processor resources. Uncapped partitions can use automatically extra unused processing power in a shared pool. For a detailed description, refer to “LPAR capped and uncapped partitions” on page 33.

For more information about LPAR, see “Logical partitions” on page 226.

## Virtual Ethernet

Virtual Ethernet (also referred to as Virtual LAN (VLAN)) provides the ability to provide multiple communication paths between applications that are executed in each LPAR. More importantly, Virtual Ethernet allows high-speed bus-to bus communication between *selected* OS/400 partitions and Linux partitions. It is possible to tie in each of the multiple communication paths between partitions to a specific application. Integrated xSeries Servers and Integrated xSeries Adapters can be connected via Virtual Ethernet.

IBM @server i5 hardware provides an IEEE 802.1Q VLAN Virtual Ethernet switch as part of the POWER Hypervisor. Up to 4094 VLANs are available with i5/OS V5R3 running on @server i5 hardware. For systems prior to the POWER5

technology-based models, up to 16 independent high-speed internal bus-to-bus communication paths are supported between LPARs.

The enablement and setup of Virtual Ethernet is easy and does not require an IPL or any special hardware or software. When a virtual communications port is enabled for a given partition, a communication resource (CMNxx) is created for that partition. The user can then create a high-speed 1 Gb Ethernet line description over this resource and set up TCP/IP configuration appropriately to start communicating to another partition. A maximum of 16 virtual ports can be enabled for high-speed communications per partition for systems prior to the POWER5 technology-based models. For i5/OS V5R3 partitions running on @server i5 hardware, thousands of virtual ports can be created per partition.

## AIX 5L for System i5

AIX 5L is rapidly emerging as the preferred platform for UNIX users and independent software vendors. AIX 5L delivers industrial strength UNIX reliability, availability and security while offering flexible system administration and ease of integration with Linux. With innovative virtualization and micro-partitioning, AIX 5L helps you avoid compromises and accept no limits in the on demand world.

AIX 5L is an open standards-based operating system. It is designed to conform with the Open Group's Single UNIX Specification Version 3. It provides fully integrated support for 32- and 64-bit applications running concurrently, in their range of scalability. It also supports IBM System i5, p5, pSeries, and RS/6000 server product lines, and IntelliStation® POWER and RS/6000 workstations.

With AIX on the System i5 you can:

- ▶ Simplify your infrastructure
  - Consolidate UNIX servers
  - Extend i5/OS with complementary AIX 5L applications
- ▶ Optimize your investments
  - Share processor and memory resources
  - Move resources to where they are needed
  - Exploit i5/OS storage subsystem
  - Leverage skills and best practices

With the support of AIX on System i5 models, comparisons of System i5 to p5 servers is inevitable. In general, the System i5 models offer an integrated approach, while @server p5 servers provide a la carte functionality. Some



functions integrated in the System i5 or i5/OS are either add-ons or not available for @server p5 servers, for example:

- ▶ DB2 Universal Database (DB2 UDB)
- ▶ Micro partitioning
- ▶ Virtual storage hosting
- ▶ Virtual Ethernet hosting
- ▶ Virtual CD/DVD and tape hosting

For additional information about AIX 5L on @server i5, refer to this Web site:

<http://www-1.ibm.com/servers/eserver/series/aix/>

Version 5.3 is the latest version of AIX 5L, taking on demand computing to the next level. AIX 5L Version 5.3 offers simultaneous multi-threading on POWER5 systems to deliver industry leading throughput and performance levels. With support for advanced virtualization, AIX 5L V5.3 helps you to dramatically increase your server utilization and consolidate workloads for more efficient management. AIX 5L V5.3 represents the latest advance in a long record of IBM operating system innovation and helps clients to accelerate their On Demand Business.

AIX 5L is licensed by processor and by processor group on the System i5. AIX 5L V5.2 licenses for a pSeries system can be transferred to the System i5.

To estimate the amount of server capacity needed to run AIX 5L applications on logically partitioned @server i5 servers, refer to the paper *Sizing IBM @server i5 Servers for AIX 5L Applications* at:

[http://www-1.ibm.com/servers/eserver/series/aix/pdf/sizing\\_for\\_aix5l\\_apps.pdf](http://www-1.ibm.com/servers/eserver/series/aix/pdf/sizing_for_aix5l_apps.pdf)

For additional information about AIX 5L Version 5.3, go to:

<http://www-1.ibm.com/servers/aix/os/53desc.html>

## Linux for System i5

One of the most important developments in business computing in recent years is the arrival of Linux, an open-source implementation of UNIX. Linux is rapidly becoming the de facto standard for such fundamental infrastructure applications as Web servers, firewalls, file servers, and e-mail servers. Now, thanks to the powerful combination of the scalability, reliability and manageability System i5 models and the flexibility of Linux, businesses can simplify their IT infrastructure and expand their application environment, with the potential to greatly reduce cost.

Linux supports an array of open source solutions to run your infrastructure. In addition, IBM is working with leading Linux solution providers to expand the set of business applications and solutions available for System i5.

The System i5 family of servers can combine business applications and solutions for On Demand Business with Linux applications on a single server. A Linux server can be set up with as little as 10% of an System i5 processor. Each partition supports its own independent operating system image and can be isolated from other partitions. This allows business applications to run securely alongside Internet solutions. Processor resources can be dynamically moved between partitions to support changing business demands. System i5 supports automatic processor movement.

The System i5 award-winning Linux implementation exploits the i5/OS advanced storage architecture by leveraging the storage resources in the i5/OS partition. The 64-bit environments can offer more scalability through larger memory and address more spaces than traditional 32-bit Linux environments. Up to 10 Linux partitions per processor are supported, with a system maximum of 254 partitions running on POWER5 technology-based servers, and 31 on POWER4 and SSTAR processors. Linux distributions from Novell, Inc. and Red Hat, Inc. support the System i5 family of servers.

See “Linux on System i5” on page 208 (web site) for further information about Linux.

## Summary

The System i5 server architecture has been extremely successful in delivering on its design goals. And because it is an extensible architecture, it will continue to evolve to exploit technology for the benefit of the commercial IT marketplace in an on dcontinually changing world.



## Workload, capacity, and performance

Workload and performance are critical considerations in selecting a computing system. The performance that users see with their System i5 models depends on many factors that often involve:

- ▶ The type and number of disk devices
- ▶ The amount of memory
- ▶ The system model and processor
- ▶ The application being run

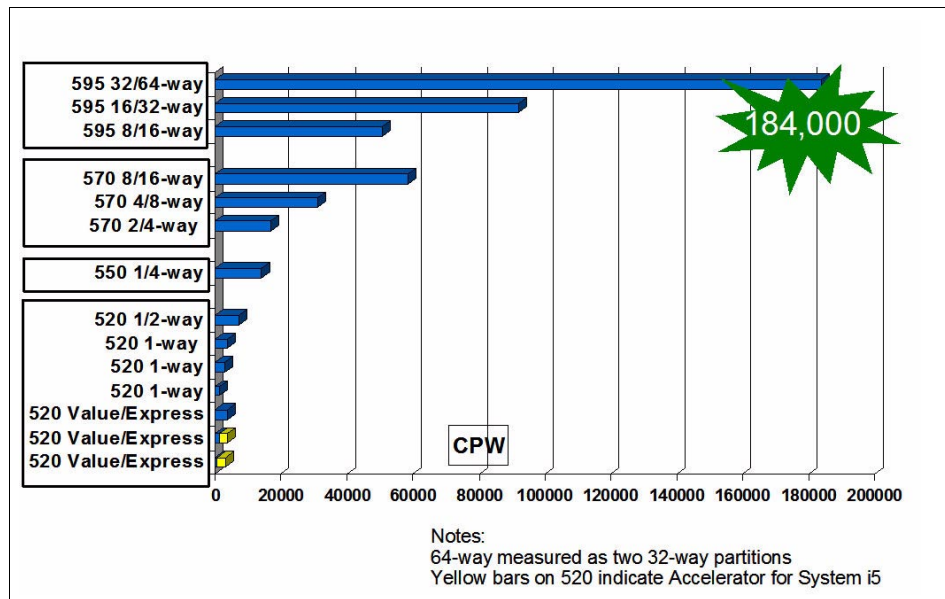
We recommend that you order sufficient memory to balance memory across processors. For sizing recommendations for the System i5 models, consult your IBM Marketing Representative and service provider. You can find detailed performance information in *iSeries Performance Capabilities Reference*, SC41-0607.

This chapter discusses some of the performance measurements to consider. This includes workload ratings and processor positioning. This chapter also discusses the tools that are available to measure and size the workload.

## Commercial processing workload

The performance capacity of all System i5 servers is represented by a workload measurement called commercial processing workload. CPW values are given to all System i5 processors. They are derived by performing various monitored and measured workloads on System i5 servers. The results (reported values) can be used to compare relative performance characteristics of processor features offered for System i5 servers. The reported values for CPW do not represent a guaranteed level of capacity to perform a given workload. They can serve as a quick means to compare performance.

With the addition of the Model 595 to the IBM @server product line, the CPW figures are represented in the following chart.



Several IBM and non-IBM tools are available to do performance analysis and sizing. IBM tools include the IBM Performance Tools for iSeries licensed program product (LPP) (5722-PT1) for analysis and sizing and the IBM @server Workload Estimator (WLE) that can be found on the support Web site. Refer to "IBM Performance Tools for iSeries (5722-PT1)" on page 322 and "IBM eServer Workload Estimator" on page 35 for further information.

## 5250 CPW

5250 CPW is an approximate value that represents the amount of processing power to be used to perform 5250 OLTP work.

**Note:** 5250 CPW is known as Interactive CPW on earlier servers.

To learn more about how these features influence system performance, refer to *Aiming for Zero Interactive on iSeries*, which discusses 5250 OLTP:

<http://www.ibm.com/servers/eserver/series/perfmgmt/pdf/ZeroInteractive.pdf>

## 5250 devices

The System i5 servers support a family of displays and emulation adapters that are known as *5250*. The supported data stream is known as a *5250 data stream*. Throughput considerations for these workstations account for the flow of the character stream. There is a maximum of 300 shared sessions per I/O processor (IOP).

Refer to Technote *Twinaxial Attached Device Throughput for Twinaxial Devices*, TIPS-0358, to determine the types of sessions that count toward the maximum. It also discusses the 5250 Express Data Stream capabilities relative to twinaxial workstation adapters.

## pSeries performance

System i5 POWER5 server models that run AIX can be expected to produce the same performance as equivalent pSeries models given the same memory, disk, I/O, and workload configurations.

The capacity of pSeries servers is often expressed in terms of *rPerf*. You can find the definition of rPerf and the performance ratings for @server p5 and pSeries servers in the *IBM eServer™ p5, pSeries, OpenPower™ and IBM RS/6000 Performance Report* on the Web at:

[http://www-1.ibm.com/servers/eserver/pseries/hardware/system\\_perf.html](http://www-1.ibm.com/servers/eserver/pseries/hardware/system_perf.html)

More information on rPerf can be found at:

<http://www-1.ibm.com/servers/eserver/pseries/hardware/rperf.html>

## Mail and Calendar Users

MCU is a relative performance measurement derived by performing mail and calendar functions using Domino and Notes clients. The MCU workload is

significantly more complex than the Simple Mail Users (SMU) measured workload.

The MCU workload represents concurrent users on a Notes client who are reading, updating, or deleting documents in an e-mail database. It also represents users who are performing lookups in the Domino Directory, and scheduling calendar appointments and invitations. Reported values reflect 70% processor utilization to allow for growth and peak loads in excess of client workload estimates.

See “Today’s System i5 summary” on page 47 for a listing of the MCU rating for each iSeries for Domino server.

## Capacity on Demand

Capacity on Demand (permanent or temporary) offers the ability to nondisruptively activate one or more additional central processors on the IBM System i5 Models 550, 570 and 595. Any and all of the inactive processors installed in the server can be activated as additional permanent or temporary capacity. This is of significant value for clients who want to add capacity without disruption.

IBM System i5 570 and 595 models have the ability to activate memory on demand. To take advantage of Capacity on Demand and On Demand Memory, you must purchase a configuration that includes the inactive processor capacity or memory. See “Capacity on Demand upgrades” on page 173 for considerations involving Capacity on Demand upgrades. For additional information about IBM @server resource functions available with i5/OS V5R4, see “LPAR capped and uncapped partitions” on page 33.

All System i5 Models 550, 570 and 595 come with extra processor capacity built into the server. This extra capacity, known as *inactive (or standby) processors*, can be activated permanently or temporarily.

Appropriately configured 570 and 595 System i5 models also have extra memory capacity that can be activated permanently or temporarily.

For more information about Capacity on Demand, refer to:

<http://www.ibm.com/servers/eserver/series/ondemand/cod/>

### Capacity Upgrade on Demand (permanent capacity)

IBM @server Capacity Upgrade on Demand (CUoD) is the System i5 offering for permanently activate processors or memory. When one or more activation features are ordered, an activation code is generated and shipped to the client

(mailed and posted on the Web). The activation code (think of it as a capacity key) must be entered on the proper server screen, and the newly activated processors are ready to use. No initial program load (IPL) is required. The permanently activated capacity needs to be assigned to a partition prior to use, regardless of whether the server is configured for logical partitioning.

The activation code is mailed to the client and is posted at the following Web site:

<http://www.ibm.com/servers/eserver/iseries/ondemand/cod/>

Activating additional processors also requires an additional OS/400 license entitlement to be purchased for every processor or part of processor used by OS/400. This is ordered via a chargeable feature of OS/400 (5722-SS1). Processors activated solely for Linux, AIX 5L, or both do not require an OS/400 license entitlement.

The OS/400 license key is mailed to the client and is posted on the Web at:

<http://www.ibm.com/servers/eserver/iseries/wkms>

Refer to “OS/400 terms and conditions changes” on page 297 for more information about OS/400 and license entitlements.

### **On/Off Capacity on Demand (temporary capacity)**

On/Off Capacity on Demand is the System i5 offering to temporarily activate capacity and memory. It is used to temporarily activate capacity for the @server i5 Model 570. Temporary capacity can be turned on and off to match peak periods. It allows a variable number of days and processors to be requested (processor days). The capacity is effective immediately. An IPL is not required.

An enablement code allows up to 360 processor days of temporary capacity for the @server i5 550, 570 or 595 server, or 192 processor days on other servers. When the limit is reached, a new enablement feature must be ordered, and a new enablement code entered. Every time a new enablement code is entered, the limit of processor days that can be requested is reset.

When temporary capacity is needed, the OS/400 temporary capacity screen on the server is used to specify the memory or number of inactive processors that are required to be temporarily activated, and the number of days. That is, the processor day is equal to the number of processors multiplied by the number of days. The activated processors simply need to be assigned to a partition prior to use, regardless of whether the server is configured for LPAR. Activating additional processors does not require any additional OS/400 license entitlement to be purchased for the temporarily activated processors.

**Note:** Additional licensing charges may apply for software that is priced by processor. Refer to the software vendor for further information.

## Reserve Capacity on Demand (prepaid capacity)

IBM @server Reserve Capacity on Demand delivers great flexibility in meeting peak demands. This option is also ideal for spikes in needed capacity (peak loads). But unlike On/Off CoD, a Prepaid Activation Feature is purchased up-front that sets a value on the server representing the number of processor days that can be used as reserve CoD capacity. It is not necessary to contract or report to IBM when paying in advance for the reserve capacity.

Reserve CoD represents an automatic way to activate temporary capacity. Reserve CoD enables the user to place a quantity of inactive processors into the server's shared processor pool, which then becomes available to the pool's resource manager. When the server recognizes that the number of base (purchased/active) processors which are assigned across uncapped partitions is 100% used, and at least 10% of an additional processor is needed (based on multiple hits over the measured period), then a processor day is charged against the reserve CoD account balance. The processor day is good for 24 hours.

Reserve CoD is an effective way to handle peak loads that occur on a limited basis. Unlike On/Off CoD, contracts and reporting to IBM is not required. The purchase of reserve CoD activation time is prepaid in blocks of 30 processor days. Multiple blocks of activations can be loaded at a time.

## Trial Capacity on Demand (no charge capacity)

IBM @server Trial Capacity on Demand offering can be used for trial processor capacity or trial memory capacity, or for both. Trial capacity is offered at no additional charge.

IBM provides you with a code (a *key*) to start the trial. The code is good for 30 consecutive powered-on days, after it is entered at the server console.

To request or start a trial, go to:

<http://www.ibm.com/servers/eserver/iserries/ondemand/cod>



**Note:** Each model offers a number of *startup processors* that are in *active* status and a set of *inactive processors* that are in *standby* status. To permanently activate one or more inactive processor, place an MES order for the desired quantity of the model-specific activation code.

Ordering a CoD activation feature generates an activation code, which is posted on a Web site and mailed to the client. This activation code must be entered on the System i5 server console.

For further details, refer to the planning guides for CUoD or On/Off Capacity on Demand on the Web at:

<http://www.ibm.com/servers/eserver/series/ondemand/cod>

## LPAR capped and uncapped partitions

Partitions use processing resources. Dedicated processing resources cannot be used by any other partition while the partition is active. However, with i5/OS V5R3 on the Model 520 and 570, when the partition is shut down, its processors become available by any partition using the uncapped sharing mode.

Partitions in a shared processing pool can have a sharing mode of capped or uncapped. A *capped partition* indicates that the logical partition (LPAR) will never exceed its assigned processing capacity. *Uncapped partitions* increase the processing power for a partition and the workload demand needed at a particular time assuming you have free resources in a shared pool.

Use capped mode when a software application never requires more than a certain amount of processing power. Any unused processing resource is used only by the uncapped partitions in the shared processing pool.

For a discussion about partitions in a shared processing pool, see:

[http://publib.boulder.ibm.com/infocenter/eserver/v1r2s/en\\_US/index.htm?info/iphathat/iphathsharedproc.htm](http://publib.boulder.ibm.com/infocenter/eserver/v1r2s/en_US/index.htm?info/iphathat/iphathsharedproc.htm)

### Shared uncapped processors

Processors using the uncapped sharing mode are also assigned from the shared pool. The partition is guaranteed the use of the total processor capacity assigned to it if it needs it (such as shared capped). However, if the workload requires it, the shared uncapped partition can acquire additional processing capacity. This additional processor capacity can be taken from the shared processor pool from which that partition is using resources.

For more information about, and a demonstration for, uncapped processors, see the Capacity on Demand section in the iSeries Information Center at:

[http://publib.boulder.ibm.com/infocenter/eserver/v1r2s/en\\_US/index.htm?info/iphath/iphathsharedproc.htm](http://publib.boulder.ibm.com/infocenter/eserver/v1r2s/en_US/index.htm?info/iphath/iphathsharedproc.htm)

## Memory

Memory used by the POWER5 technology-based processors is moved in blocks known as a *logical memory block* (LMB). Also regarded as a memory region, an LMB is the smallest memory unit managed by the POWER5 processors. The LMB size on Models 520, 550, 570 and 595 is 16 MB. The LMB size on Models 800, 810, 825, 870, and 890 is 1 MB. Dynamic memory movement between LPARs is on LMB boundaries (1 MB or 16 MB depending on the model).

Configurable and default memory block sizes is documented in the IBM Information Center at:

[http://publib.boulder.ibm.com/infocenter/iseries/v1r2s/en\\_US/info/iphath/iphathlparmemory.htm#iphathlparmemory](http://publib.boulder.ibm.com/infocenter/iseries/v1r2s/en_US/info/iphath/iphathlparmemory.htm#iphathlparmemory)

## Workload measurement and sizing tools

Capacity planning and performance management tools, which are available to work with IBM i5/OS V5R3, include:

- ▶ IBM @server Workload Estimator
- ▶ IBM Performance Management for iSeries
- ▶ IBM Performance Tools for iSeries
- ▶ PATROL for iSeries – Predict
- ▶ IBM WebFacing Tool
- ▶ IBM Disk Magic for Windows

The IBM @server Workload Estimator is a Web-based estimation tool. It recommends a system that best fits overall system needs. It is described in the following section.

Use PM @server iSeries (formerly called PM/400) to gather performance information and pass the performance statistics to the IBM eServer Workload Estimator for projecting future needs of installed workloads.

For more information about PM @server iSeries, see:

<http://www.ibm.com/servers/eserver/iseries/pm/>

You can use Performance Tools for iSeries to measure resource utilization. Refer to “IBM Performance Tools for iSeries (5722-PT1)” on page 322 for more information.

Use PATROL for iSeries – Predict to perform detailed capacity planning and “what-if” scenarios. For more information, see “PATROL for iSeries – Predict (5620-FIF)” on page 323.

Use the IBM WebFacing Tool to convert 5250 source applications to applications to run with the WebSphere Application Server. The IBM WebFacing Tool is discussed in “IBM WebFacing Tool” on page 37.

Use Disk Magic for iSeries when IBM TotalStorage Enterprise Storage Server® (ESS) disk drives are in the configuration. See “Disk Magic for iSeries” on page 36 for more information.

## IBM eServer Workload Estimator

The IBM @server Workload Estimator is a Web-based estimation tool that automates the manual calculations previously required from paper sizers. It allows the user the option to enter data for multiple workloads, from which a machine recommendation is made that best fits overall system needs.

You can learn more about IBM @server Workload Estimator on the Web at:  
<http://www-912.ibm.com/supporthome.nsf/document/16533356>

When you reach this site, select **Sizing Tools**.

## Disk arm requirements

A physical disk drive (and the processing through the disk controller) performs a specific number of disk accesses each second. The configuration of disk units influences the overall performance of the system. Newer disk arms and controllers provide better performance than previous disk drives. Therefore, fewer disk drives (disk arms or actuators) can typically be used, yet provide comparable performance.

You can provide for the best obtainable disk subsystem performance and enable the best possible overall system performance. To do so, it is important to size an System i5 server with an appropriate number of disk arms. The white paper *iSeries Disk Arm Requirements* discusses this concept. You can find it on the Web at:

<http://www.ibm.com/servers/eserver/series/perfmgmt/pdf/V5R2FiSArmct.pdf>

PM @server iSeries and IBM @server Workload Estimator include disk arm statistics and arm requirements for sizing. Use PM @server iSeries or IBM eServer Workload Estimator to help size the minimum number of disk arms required for a given System i5 processor. Performance Tools for iSeries provides detailed reports on collected performance data.

Solution developers and other application solution providers also have recommendations for a minimum configuration as it relates to their solution.

To ensure that you have sufficient disk arms to meet the needed workload, it is best to have performance runs from your current system run at a time when the disk workload is heavy. These can then be used as input to various tools including the IBM @server Workload Estimator and PATROL for iSeries – Predict.

You can also use the reports to determine the number of disk requests/second that are happening on your current system, as reported in the System Performance Report and other Performance Tools reports.

Disk workload is measured in terms of operations/second. Depending on the speed or vintage of the disk drives and controllers, average service time should be somewhere in the 3.5 to 10 millisecond range (lower for newer, higher for older 7200 rpm disks). Numbers higher than these can indicate a disk bottleneck and therefore stored demand. Use such tools as PATROL for iSeries – Predict to determine the stored demand. Note that the tools assume a properly tuned system. If a bottleneck exists, the system cannot be properly tuned.

For disk-related performance information, refer to Chapter 14, “DASD Performance Management,” in *iSeries Performance Capabilities Reference*, SC41-0607.

### **Disk Magic for iSeries**

The IBM Disk Magic for iSeries product is intended for modeling ESS disk drives on System i5 servers. Configuration and workload details are entered into the tool. Algorithms support calibration, configuration changes, workload changes, and automatic cache modeling. The output is available in tabular and graphic reports.

Performance analysis is based on limited measurement data. Disk Magic for iSeries is most useful to obtain rough performance estimates of ESS drives on System i5 servers.

You can find the tool on the Web at:

<http://w3.ibm.com/sales/systems/portal>  
<https://www-1.ibm.com/partnerworld/sales/systems/portal>

## Refacing options for the System i5 client

Several products are available for the System i5 to reface (browser-enable) 5250 application software. Some of the products available from IBM include:

- ▶ IBM WebFacing Tool: Part of WebSphere Development Studio (5722-WDS)
- ▶ Host Access Transformation Services Toolkit: Part of WebSphere Development Studio (5722-WDS)
- ▶ WebSphere Host Access Transformation Server (HATS Studio): Part of Host Access Client Package for iSeries (5733-A78)
- ▶ WebSphere Host Access Transformation Server Limited Edition (HATS LE): Part of iSeries Access Family (5722-XW1)
- ▶ iSeries Access for Web: Part of iSeries Access Family (5722-XW1)
- ▶ WebSphere Host on Demand: Part of Host Access Client Package for iSeries (5733-A78)
- ▶ WebSphere Host Publisher: Part of iSeries Access Family and WebSphere Integration Offering V1.0 (5722-XW1 and 5733-A53)

**Note:** The iSeries Access Family product (5722-XW1) no longer includes WebSphere Host Publisher as of 6 August 2004. Users are encouraged to migrate to WebSphere HATS.

The unique requirements of the client application determine the best solution for a client environment. You can find a comparison of functions for many of the IBM products on the Web at:

[http://www-1.ibm.com/servers/eserver/series/access/web/web\\_to\\_host\\_comparisons.html](http://www-1.ibm.com/servers/eserver/series/access/web/web_to_host_comparisons.html)

## IBM WebFacing Tool

The IBM WebFacing Tool, provided in the IBM WebSphere Development Studio for iSeries, creates a Web-ready GUI to 5250 applications. The applications can then be made available in a familiar GUI format recognized by any Web user to anyone with a browser.

To create the interface, the IBM WebFacing Tool works from Data Description Specification (DDS) display files and User Interface Manager (UIM) help files. The interface which is generated consists of Java Servlets, JavaServer™ Pages™ (JSPs), JavaBeans™, and JavaScript. The interface runs under WebSphere - Express for iSeries, WebSphere Application Server V5, or WebSphere Application Server V4. These WebFaced applications do not require 5250 CPW capacity when run on the Model 520, 550, 570, 595.

Applications that are Web-enabled using the IBM WebFacing Tool generally perform better than applications refaced with other tools. Most other tools convert the 5250 data stream to a Web interface in a run-time conversion. This impacts the execution performance of these refaced applications.

Use IBM @server Workload Estimator to help predict the system characteristics for these applications that are enhanced by the IBM WebFacing Tool. You can access the tool on the Web at:

<http://www-912.ibm.com/wle/EstimatorServlet>

Refer to “IBM WebSphere Development Studio Client for iSeries, V6.0” on page 392 to read more about the IBM WebFacing Tool and WebSphere.



## System i5 direction

This chapter outlines future directions of the IBM System i5. By communicating these future plans, IBM intends to help our clients plan for better use of their system.

You can find further information about product previews, statements of direction, and plans for products that are no longer supported on a release, on the iSeries planning information Web site at:

<http://www.ibm.com/servers/eserver/support/series/planning/index.html>

## Product Previews

Product Previews identify specific functions that IBM has committed to incorporate into future System i5 hardware or software releases. Understanding them can provide insight into IBM plans and directions for future System i5 hardware or software releases. The information released represents the current intent of IBM. They represent goals and objectives only. All statements regarding the plans, directions, and intent of IBM are subject to change or withdrawal without notice.

Statements of Direction identify the commitment of IBM to direct System i5 servers toward a given design or technology. Understanding them can provide insight into the design and technology plans of IBM. All statements regarding IBM plans, directions, and intent are subject to change or withdrawal without notice.

### Product Preview: Open

IBM intends to extend its integrated xSeries solutions in 2006 by leveraging industry-standard iSCSI technology to attach selected xSeries systems and BladeCenter to the System i5 platform.

New iSCSI Host Bus Adapters (HBA) will enable you to exploit System i5 virtual storage, networking and tape resources to help simplify the operations of your Windows Server System infrastructure.

System i5 integration with xSeries systems and BladeCenter via iSCSI will be supported on V5R4 and will be able to coexist with Integrated xSeries Servers and xSeries systems attached via Integrated xSeries Adapters.

For more information about integrated xSeries offerings for the System i5 platform, see

<http://www.ibm.com/servers/eserver/series/integratedxseries/>

### Statement of Direction: Open

DB2 SQL support of National Language Sort Sequence: In V5R4, some DB2 SQL features are not enabled for use with National Language Sort Sequence (NLSS). IBM intends to deliver NLSS support for these DB2 SQL features in the next release of DB2 SQL for iSeries.



## Planning information

As business grows, the information systems needs of a business change, and technology changes to allow more efficient and cost-effective methods to solve business problems. As the System i5 models and i5/OS are enhanced, new technology is introduced. Other technology reaches a point where no further enhancements, functions, or maintenance is planned. This section helps clients to plan for these changes and to protect their investment as their business needs change:

- ▶ **i5/OS support of selected iSeries models:** IBM plans for i5/OS V5R4 to be the final release to be supported on iSeries Models 270, 820, 830, 840, SB2 and SB3.

The next release of i5/OS is planned to be supported on Models 520, 550, 570, 595, 800, 810, 825, 870 and 890.

- ▶ **iSeries Access Family:** IBM plans to discontinue shipping the WebSphere Host Access Transformation Services Limited Edition (HATS LE) product from the iSeries Access Family on 01 May 2006.

HATS LE will continue to be serviced with iSeries Access Family (OS/400 V5R2 and i5/OS V5R3) until these releases reach their end-of-service dates. Therefore, users can continue using the current HATS LE product after 01 May 2006.

- ▶ **iSeries Access for Windows data transfer for Excel:** IBM plans for iSeries Access for Windows V5R4 to be the final release to support Excel 95 and Excel 97 with the data transfer add-in support. Only Excel 2000 and later will be supported for data transfers in the release after i5/OS V5R4.
- ▶ **Apache Tomcat:** IBM plans for i5/OS V5R4 to be the final release to ship Apache Tomcat (jsp/servlet) support in HTTP Server, which is shipped with i5/OS.
- ▶ **Enhanced Netware Integration:** IBM plans for i5/OS V5R4 to be the final release to support Enhanced Netware Integration (5722-SS1 Option 25).
- ▶ **Tivoli Management Agent:** IBM plans for i5/OS V5R4 to be the final release to include Tivoli Management Agent with i5/OS shipments.
- ▶ **System/36 and System 38 Environment:** IBM plans to continue supporting the System/36 and System/38 environment within i5/OS in the next release of i5/OS.
- ▶ **RPG and COBOL System/36 and System 38 Environment compatible compilers:** IBM plans for WebSphere Development Studio for iSeries V5R4 to be the final release to ship and support the following System/36 and System/38 compiler options. i5/OS V5R4 will be the final release to include

these compilers in the Software Maintenance or Software Subscription contract.

- 5722-WDS option 32 - System/36 Compatible RPG II
  - 5722-WDS option 33 - System/36 Compatible RPG III
  - 5722-WDS option 42 - System/36 Compatible COBOL
  - 5722-WDS option 43 - System/38 Compatible COBOL
- **Cryptographic Support for AS/400 (5722-CR1):** IBM plans to support this product for one release beyond i5/OS V5R3, after which it will be discontinued. Clients looking for a cryptographic API set should consider the following alternatives:
- IBM i5/OS Cryptographic Services API
  - Common Cryptographic Architecture (CCA) API for the iSeries Cryptographic Coprocessor feature
  - Java Cryptographic Extension (JCE)

## Withdrawn products and end-of-support

It is recommended to periodically upgrade to the latest to help ensure the highest quality and reliability, as well as to make the newest functions available. Each release of IBM software has a finite support period. After the end of that support period, IBM no longer accepts problems for defect analysis.

The following table lists the dates that OS/400 and associated licensed programs were *withdrawn from marketing* and program support.

Version/release/modification	General availability	End of marketing	End of program support	Fee-based support extension
R7.5 SSP	8 March 1996	9 February 1999	31 May 2000	n/a
V3R0.5	3 June 1994	11 February 1997	31 May 1997	n/a
V3R1	30 June 1995	11 February 1997	31 October 1998	n/a
V3R2	21 June 1996	10 February 1998	31 May 2000	n/a
V3R6	29 September 1995	19 August 1997	31 October 1998	n/a
V3R7	8 November 1996	1 September 1998	30 June 1999	n/a
V4R1	29 August 1997	9 February 1999	31 May 2000	n/a
V4R2	27 February 1998	9 February 1999	31 May 2000	31 January 2001
V4R3	11 September 1998	15 February 2000	31 January 2001	n/a
V4R4	21 May 1999	31 May 2001	31 May 2000	30 November 2001
V4R5	28 July 2000	2 July 2002	31 December 2002	n/a

V5R1	25 May 2001	21 November 2003	30 September 2005	n/a
V5R2	30 August 2002	1 October 2005	30 April 2007	n/a
V5R3	2004	---	*	n/a
V5R4	14 February 2006	---	*	n/a
* Actual termination date is declared with a minimum of 12-months advanced notice.				

Refer to the Planning Web site for information on features and devices not supported with i5/OS V5R4:

<http://www.ibm.com/servers/eserver/series/support/series/planning/index.html>

You can find information about withdrawn and earlier iSeries and AS/400e products and features by referencing the *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155, or searching for a legacy editions of the *IBM @server i5 and iSeries System Handbook*, GA19-5486, which are available on the following Web site:

<http://publib.boulder.ibm.com/pubs/html/as400/online/chgfrm.htm>

Refer to “Products and features no longer marketed by IBM” on page 370 for a list of the recommended replacements for many withdrawn features and products.



# Hardware

# Hardware



# Today's System i5 summary

## Server structure and terminology

The System i5 models 520, 550, 550, 570, and 595 include a Processor feature and an Edition feature:

- ▶ **Processor feature:** Feature code by which the *processor* is ordered
- ▶ **Edition feature:** Feature code by which the *package* of features is ordered
- ▶ **Server feature:** Feature code by which the processor *configuration* is ordered

System i5 models offer two commercial processing workload (CPW) ratings:

- ▶ **Processor CPW:** Represents maximum relative performance running commercial processing workloads (CPWs) for a processor configuration

Use this value to compare relative performance between models with the same or different number of processors.

Use the tables and information in this chapter as a quick reference of capacities and processor feature structure of today's System i5 servers.

- ▶ **5250 CPW:** Represents the relative performance available to perform 5250 online transaction processing (OLTP, interactive) workloads

**Important:** Limited 5250 CPW is always available for a system administrator to use 5250 display device input/output (I/O) to manage various aspects of the server. Multiple administrative jobs quickly exceed this limited 5250 capacity.

The tables in this chapter show the processor, server, and edition feature structure for latest System i5 models. See Chapter 28, “Summary of earlier AS/400, AS/400e, and iSeries models” on page 449 for earlier processors.

## Editions

System i5 Editions are flexible-options packages that help simplify choices and maximize business value. System i5 models are offered with Editions that provide you with some of IBM’s most popular middleware in an integrated package, yet have the ability to run traditional OLTP applications that require 5250 CPW. Each System i5 edition incorporates a set of software licensing and hardware features designed to help meet the specific demands of small, medium, and large enterprises.

Edition content varies by the processor and server features that are selected. Each edition offers a different level of capacity, power, and functionality. Some editions support 5250 OLTP applications.

All System i5 Editions include:

- ▶ Support for multiple operating systems (i5/OS or OS/400), Linux, IBM AIX 5L)
- ▶ Support for Web modernization with enhanced IBM WebFacing Tool support (the ability to deploy IBM WebFaced applications without 5250 OLTP CPW)
- ▶ Support for Virtualization Engine Systems Technologies, including dynamic logical partitioning
- ▶ Licensing for i5/OS (WebSphere Express is integrated with i5/OS as part of i5/OS V5R3)

## Enterprise Edition

The Enterprise Edition is designed for clients who require the highest level of flexibility. It is designed as a total system, fully integrating and exploiting all of the fundamental hardware and software all On Demand Businesses need. The Enterprise Edition is featured for clients with dynamic business environments who need to respond immediately to fluctuating, unpredictable On Demand Business needs.



The Enterprise Edition offering includes everything in the Standard Edition and more. The Enterprise Edition leverages the widest range of IBM middleware while still having the ability to run traditional OLTP applications without first being WebFaced by the IBM WebFacing Tool of WebSphere Development Studio.

The Enterprise Edition provides maximum 5250 CPW for 5250 OLTP workloads. The Enterprise also provides support for Capacity on Demand (permanent and temporary).

## Standard Edition

The Standard edition is attractively priced to drive new workloads that do not require 5250 OLTP CPW on the System i5 models. The Standard Edition is featured for a wide variety of solutions for On Demand Business and client server.

The Standard Edition provides limited 5250 CPW for 5250 OLTP workloads. The Standard Edition also provides support for Capacity on Demand (permanent and temporary), if activated.

**Note:** 5250 OLTP applications modernized (WebFaced) using the IBM WebFacing Tool of IBM WebSphere Development Studio can be used with the Standard Edition.

## Value Edition

The Value Edition for System i5 Model 520 is tailored specifically to small enterprises and is available on select System i5 520 models. Minimum hardware requirements apply.

## Express configurations

The System i5 Model 520 Express configurations offer a choice of several pre-packaged offerings that provide small and medium enterprises with the basic infrastructure for running their core business applications. The 520 Express configurations simplify your decision process by delivering the key elements of your IT infrastructure in a single server with supporting hardware, software, maintenance, and support at an aggressive price.

All Express configuration offerings include hardware and i5/OS. Edition offerings are available on initial order as desk side servers. They can be converted at a later time to a rack-mount configuration, or additional features can be added on chargeable upgrade orders.

All System i5 Model 520 Express configurations are shipped from IBM with the system console on twinax workstation controller as the default setting.

**Note:** The System i5 9405 520 Express configurations are packaged under machine type 9405.

## Domino/Workplace Edition

The System i5 Domino Edition is designed for organizations of all sizes, where e-mail and electronic collaboration are increasingly becoming important applications with the same requirements for availability and security as line-of-business applications.

The Domino Edition continues the tradition established by the iSeries Dedicated Server for Domino (the DSD) and the iSeries for Domino. That is, the price and performance are targeted for Lotus workloads combined with the reliability, manageability, and low cost of ownership that have made iSeries a highly successful Domino server. In addition to the two processors that are standard on the System i5 Domino Edition, you have the option to activate one or two more processors with built-in Capacity on Demand. Optionally, you can create LPARs and run Linux or AIX on the additional processors.

## Solution Edition

The Solution Edition is designed for clients with qualifying ISV solutions to provide a more attractively priced total solution. Like the Enterprise Edition, one Enterprise Enablement feature is included, providing one processor authorization of 5250 CPW.

The Solution Edition leverages IBM middleware and can run traditional OLTP applications without first being WebFaced by the IBM WebFacing Tool of WebSphere Development Studio.

The Solution Edition supports up to 10 partitions per processor (LPAR), 5250 OLTP, and Capacity on Demand (including CoD and On/Off Capacity on Demand). Additional hardware and software is included with the Solution Edition.

## Capacity BackUp Edition (CBU)

The Capacity BackUp Edition is designed for clients who require an off-site disaster recovery system. It provides everything the Enterprise Edition provides, except it is shipped with a minimal set of software content because IBM software licensing can allow the primary System i5 server's licensing to be transferred to a

backup System i5 server in case the primary server is out of production. The server has a minimum set of startup processors that can be used for any purpose and a large number of inactive processors that can be activated temporarily at no charge in the event of a disaster. The inactive processors cannot be permanently activated.

The Capacity BackUp (CBU) Edition is offered for the System i5 570 and 595, and iSeries Models 825, 870, and 890.

**Note:** The Capacity BackUp server is not intended for a backup server for 24 x 7 high availability solutions that require day-to-day full operation of the backup server. Such utilization can require a significant number of chargeable processor days.

On demand memory features are not activated for no-charge during a disaster.

The Capacity BackUp Edition provides maximum 5250 CPW for 5250 OLTP workloads, if activated. The Capacity BackUp Edition also provides support for Capacity on Demand (permanent and temporary).

## High Availability Edition (HA)

The High Availability Edition provides everything the Enterprise Edition provides (including hardware that is physically identical to the equivalent Enterprise Edition hardware), except it is shipped with less software content. It is designed for clients who require 24 x 7 availability.

You can connect multiple System i5 servers together with high-function third-party software for role swapping and running production on both primary and secondary servers. In this multiple System i5 server environment, the System i5 for high availability is an attractively priced model linked with a model of equal or higher CPW.

The High Availability Edition provides maximum 5250 CPW for 5250 OLTP workloads, if activated. The High Availability Edition also provides support for Capacity on Demand (permanent and temporary).

The tables in the following sections reflect the specific components that are included with each System i5 shipped with V5R3 and V5R4 of i5/OS. For more information regarding System i5 and i5/OS edition content, see:

<http://www-1.ibm.com/servers/eserver/iseries/hardware/editions/>  
<http://www.redbooks.ibm.com/redpapers/pdfs/redp3916.pdf>

The components for the Enterprise, Standard, Solution, Domino, High Availability, and Capacity BackUp editions are represented in the following table.

	Standard				Enterprise				Domino	Solution		HA			CBU	
	520	550	570	595	520	550	570	595	550	520	550	520	570	595	570	595
<b>Features</b>																
Support for multiple operating systems	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Support for Web modernization	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Support for LPAR	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Support for Capacity on Demand		Y	Y	Y		Y	Y	Y	Y		Y	Y	Y	Y	Y	Y
Support for 5250 OLTP					Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y
<b>Software license or licenses</b>																
IBM i5/OS V5R3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
IBM i5/OS V5R4				Y				Y						Y		Y

See “Edition upgrades” on page 173 for considerations when upgrading editions.

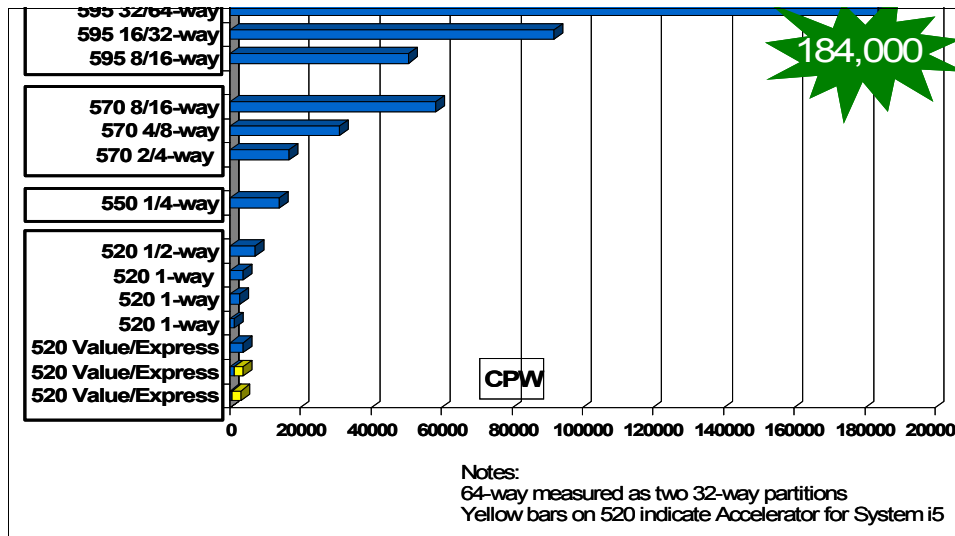
You can find product brochures for the System i5 editions at:

<http://www.ibm.com/servers/eserver/series/literature/index.html>

## Capacity tables

The tables in this chapter summarize the resource capabilities and performance characteristics of the System i5 processors in the current product line of System i5 servers. Processor and performance characteristics are included, along with the maximum capacities for main storage, disk, local area network (LAN), communication lines, workstations, tape devices, CD devices, and other input/output (I/O) components. Edition content structure is described and summarized for the packages offered for today’s System i5 servers.

The following graphic depicts the commercial processing workload (CPW) ratings of each of the currently marketed System i5 servers.



The capacities of System i5 processors that are no longer marketed are summarized in Chapter 28, “Summary of earlier AS/400, AS/400e, and iSeries models” on page 449, and in the *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155.

You can find information about i5/OS V5R4 operating system limits, such as the maximum members in a database file, maximum objects in a library, and jobs on the system, in the iSeries Information Center at:

<http://www.ibm.com/eserver/series/infocenter>

then under Systems Management, select the **Availability** topic, and then click **OS/400 Maximum Capacities**.

**Note:** In the following tables, the values in the columns with the darker shaded heading represent the base configuration of the system. The capacities shown may require prerequisites. Some combinations of features are not valid.

## Summary of the System i5 Model 520+ (9405 and 9406)

The following table provides the 9405 and 9406 Model 520+ system minimum and maximum capacities.

9405/9406 Model 520+										
Processor Feature	Server Feature	Edition Feature	Processor/5250 CPW <sup>5</sup>			MCU <sup>2a</sup>			LPAR	
			Base	with Accelerator <sup>12b</sup>	2-way with max 5250	Base	with Accelerator <sup>12b</sup>	2-way	Base	with Accelerator <sup>12b</sup>
#8325	#0970	#7140 Express	600/30	3100/30	-	n/r <sup>2a</sup>	6600	-	2	10
		#7141 Express	600/30	3100/30	-	n/r <sup>2a</sup>	6600	-	2	10
		#7142 Express	600/30	3100/30	-	n/r <sup>2a</sup>	6600	-	2	10
	#0975	#7350 Value	600/30	3100/30	-	n/r <sup>2a</sup>	6600	-	2	10
#8327	#0970	#7143 Express	1200/60	3800/60	-	2600	8200	-	3	10
		#7148 Express	1200/60	3800/60	-	2600	8200	-	3	10
		#7144 Express	3800/60	-	-	8200	-	-	10	-
		#7152 Express	3800/60	-	-	8200	-	-	10	-
	#0975	#7352 Value	1200/60	3800/60	-	2600	8200	-	3	10
	#0906	#7366 Solution	1200/1200	-	-	2600	-	-	3	-
		#7373 High Availability	1200/1200	-	-	2600	-	-	3	-
		#7374 High Availability	2800/2800	-	-	6100	-	-	7	-
		#7734 Enterprise	1200/1200	-	-	2600	-	-	3	-
		#7735 Enterprise	2800/2800	-	-	6100	-	-	7	-
#7784 Standard	3800/0	-	-	8200	-	-	10	-		
#8330	#0906	#7375 High Availability	3800/3800	-	7100/7100	8200	-	15600	10/pro-processor	
		#7736 Enterprise	3800/3800	-	7100/7100	8200	-	15600	10/pro-processor	
		#7785 Standard	3800/0	-	7100/0	8200	-	15600	10/pro-processor	



9405/9406 Model 520+			
Processor feature	#8325	#8327	#8330
Number/type/speed of processor	1/POWER5+/1.9 GHz	1/POWER5+/1.9 GHz	1/2-way POWER5+ /1.9 GHz
L2 Cache (MB)	1.9	1.9	1.9
L3 Cache (MB)	0	36	36
Main storage (GB min/max)	1/32	1/32	1/32
Main storage DIMMs (min/max)	2/8	2/8	2/8
Minimum i5/OS / LIC level	V5R3/V5R3M5	V5R3/V5R3M5	V5R3/V5R3M5
Software group <sup>6a</sup>	P05	P10	P20

The following table provides the 9405 Model 520 system minimum and maximum capacities.

Processor feature	9405 Model 520		
	#8950	#8951	#8972
Server feature <sup>9</sup>	#0900	#0901	#0912
Number/type/speed of processor	1/POWER5/1.5 GHz	1/POWER5/1.5 GHz	1/POWER5/1.5 GHz
Relative system performance <sup>1, 2</sup>			
Processor CPW	500	1000	2400
Mail and Calendar Users <sup>2a</sup>		2300	5500
5250 CPW <sup>5</sup>			
Express <sup>6a</sup>	30	60	60
L2 Cache (MB)	1.88	1.88	1.88
L3 Cache (MB)	0	0	0
Main storage (GB min/max)	1/32	2/32	4/32
Main storage DIMMs (minimum/maximum)	4/8	4/8	4/8?
Logical partitions (LPAR)	2	4	10
Minimum i5/OS level	V5R3	V5R3	V5R3
Software group <sup>6a</sup>	P05	P10	P10

To review the footnotes for this table, see “Notes for System i5 capacity tables” on page 74.



The following table provides the 9406 Model 520 system minimum and maximum capacities.

	9406 Model 520						
Processor feature	#8950	#8951	#8952	#8953	#8954	#8955	#8972
Server feature <sup>9</sup>	#0900	#0901	#0902	#0903	#0904	#0905	#0912
Number/ type/ speed of processor	1/ POWER5/ 1.5 GHz	1/ POWER5/ 1.5 GHz	1/ POWER5/ 1.5 GHz	1 /POWER5 /1.5 GHz	1/ POWER5/ 1.65 GHz	2/ POWER5/ 1.65 GHz	1/ POWER5/ 1.5 GHz
Relative system performance <sup>1, 2</sup>							
Processor CPW	500	1000	1000	2400	3300	6000	2400
Mail and Calendar Users <sup>2a</sup> 5250 CPW <sup>5</sup>	---	2300	2300	5500	7300	13300	5500
Value <sup>6a</sup>	30	60	-	-	-	-	60
Express <sup>6a</sup>	30	60	-	-	-	-	60
Standard <sup>6a</sup>	-	-	0	0	0	0	-
Solution <sup>6a</sup>	-	-	1000	-	-	-	-
Enterprise <sup>6a</sup>	-	-	1000	2400	3300	6000	-
High Availability <sup>6a</sup>	-	-	1000	2400	3300	6000	-
L2 Cache (MB)	1.88	1.88	1.88	1.88	1.88	1.88	1.88
L3 Cache (MB)	0	0	0	0	36	36	0
Main storage (GB min/max)	0.5/32	1/32	1/32	1/32	1/32	1/32	1/32
Main storage DIMMs (minimum/maximum)	2/8	4/8	4/8	4/8	4/8	4/8	4/8
Logical partitions (LPAR)	2	4	4	10	10	20	10
Minimum i5/OS level	V5R3	V5R3	V5R3	V5R3	V5R3	V5R3	V5R3
Software group <sup>6a</sup>	P05	P10	P10	P10	P20	P20	P10

Numbers are for all 9405 and 9406 520 processor features	Base system unit	System maximum
Disk storage (GB)		
Integrated minimum <sup>7b</sup>	0	-
Integrated maximum <sup>7a</sup>	1129	39234
Total maximum <sup>7, 7a</sup>		39234
DASD arms maximum	8	278
Internal arms	8	278
External LUNs	-	278
Physical packaging		
Rack design - EIA units	4	4
External HSL-2/RIO-G ports	0/2	2
External HSL-2/RIO-G loops	0/1	1
PCI/PCI-X Expansion Tower	6	6
External xSeries Servers	8	8
PCI card slots <sup>10a</sup>	6	90
Communication lines <sup>3</sup>	8	192
LAN ports (includes embedded)	5	36
Integrated xSeries Servers	1	18
Twinaxial workstation controllers	3	48
Twinaxial workstations	120	1920
Internal tape/CD/DVD <sup>4</sup>	1 tape / /2 DVD	13 tapes / 14 CD/DVD
External tape/optical/CD/DVD (single partition maximum)	0	18
External tape/optical/CD/DVD (system maximum)	0	36
Cryptographic coprocessor	0	8
Cryptographic accelerator	0	2

**Note:** The values in the previous table are package dependent.

To review the footnotes for this table, see “Notes for System i5 capacity tables” on page 74.

The Model 520+ Express configurations and Value Editions provide limited 5250 CPW but can use the Accelerator for System i5 option to increase the processor CPW if needed.

The following table summarizes the On Demand feature codes for the Model 520. Features included with each Model 520 (base features) are shaded in gray.

Model 520				Processor activations							Enterprise Enablement (5250 OLTP)	
Processor feature	Server feature	Edition feature	n-way	Base i5/OS Licenses (5722-SS1)	#8410 Base Processors	On Demand					#9299 Base 5250	Additional 5250 (per processor)
						Accelerator	CoD purchased	On/Off CoD Enablement	On/Off CoD (Billing)	Reserve CoD (Prepaid)		
								360 days	1 day	30 days		
<b>Express configurations</b>												
#8325	#0970	#7140	uni	1	-	#7680	-	-	-	-	Note 1	-
		#7141	uni	1	-	#7681	-	-	-	-	Note 1	-
		#7142	uni	1	-	#7682	-	-	-	-	Note 1	-
#8327	#0970	#7143	uni	1	-	#7354	-	-	-	-	Note 2	-
		#7148	uni	1	-	#7687	-	-	-	-	Note 2	-
		#7144	uni	1	-	-	-	-	-	-	Note 2	-
		#7152	uni	1	-	-	-	-	-	-	Note 2	-
<b>Value Edition</b>												
#8325	#0975	#7350	uni	1	-	#7355	-	-	-	-	Note 1	-
#8327	#0975	#7352	uni	1	-	#7357	-	-	-	-	Note 2	-
<b>Standard Edition</b>												
#8327	#0906	#7784	uni	1	-	-	-	-	-	-	-	-
#8330	#0906	#7785	1/2	1	1	-	#7320	#7620	#7621	#7622	-	-
<b>High Availability Edition</b>												
#8327	#0906	#7373	uni	1	-	-	-	-	-	-	Note 3	-
		#7374	uni	1	-	-	-	-	-	-	Note 3	-
#8330	#0906	#7375	1/2	1	1	-	#7320	#7620	#7621	#7622	1	#7256

Model 520				Processor activations							Enterprise Enablement (5250 OLTP)	
Processor feature	Server feature	Edition feature	n-way	Base i5/OS Licenses (5722-SS1)	#8410 Base Processors	On Demand					#9299 Base 5250	Additional 5250 (per processor)
						Accelerator	CoD purchased	On/Off CoD Enablement	On/Off CoD (Billing)	Reserve CoD (Prepaid)		
								360 days	1 day	30 days		
<b>Enterprise Edition</b>												
#8327	#0906	#7734	uni	1		-	-	-	-	-	Note 3	-
		#7735	uni	1		-	-	-	-	-	Note 3	-
#8330	#0906	#7736	1/2	1	1	-	#7320	#7620	#7621	#7622	1	#7256
<b>Solution Edition</b>												
#8327	#0906	#7366	uni	1	-	-	-	-	-	-	Note 3	-
Note 1: This Edition includes 30 OLTP (5250) CPW with no feature code.												
Note 2: This Edition includes 60 OLTP (5250)CPW with no feature code.												
Note 3: This Edition includes OLTP (5250) CPW up to the amount of processor CPW available with no feature code.												

## Summary of the System i5 Model 550

The following table provides the Model 550 system minimum and maximum capacities.

	Model 550+	Model 550
<b>Processor feature</b>	<b>#8312</b>	<b>#8958</b>
<b>Server feature<sup>9</sup></b>	<b>#0910</b>	<b>#0915</b>
Number/type/speed of processor	1/4/POWER5+/1.9 GHz	1/4/POWER5/1.65 GHz
Relative system performance <sup>1, 2</sup>		
Processor CPW	3800/14000	3300/12000
Mail and Calendar Users <sup>2a</sup>	8200/30000	7300/26600
5250 CPW <sup>5</sup>		
Standard <sup>6b</sup>	0	0
Enterprise <sup>6b</sup>	Maximum	Maximum
Solution <sup>6b</sup>	Maximum	Maximum
Solution Edition for PeopleSoft Enterprise One <sup>6b</sup>	Maximum	Maximum
Domino <sup>6b</sup>	0	0
C2CRM (Clear Technology with Domino)	Maximum	Maximum
SAP 2-way	0	0
SAP 4-way	0	0
L2 Cache (MB)	1.9	1.9
L3 Cache (MB)	36	36
Main storage (GB min/max)	2/64	2/64
Main storage DIMMs (minimum/maximum)	4/16	4/16
LPAR	10-40	10-40
Minimum i5/OS level	V5R3	V5R3
Software group <sup>6b</sup>	P20	P20

Numbers are for all 550 processor features	Base system unit	System maximum
Disk storage (GB)		
Integrated minimum <sup>7b</sup>	0	
Integrated maximum <sup>7a</sup>	1129	77051
Total maximum <sup>7, 7a</sup>		77051
DASD arms maximum		
Internal arms	8	548
External LUNs	-	548
Physical packaging		
Rack design - EIA units	4	4
External HSL-2/RIO-G ports	2	4
External HSL-2/RIO-G loops	1	2
PCI/PCI-X Expansion Tower	6	12
External xSeries Servers	8	16
PCI card slots <sup>10</sup>	5	172
Communication lines <sup>3</sup>		320
LAN ports (includes embedded)	5	96
Integrated xSeries Servers	1	36
Twinaxial workstation controllers	2	133
Twinaxial workstations	80	5320
Internal CD/DVD/tape <sup>4</sup>	2	26
External tape/optical/CD/DVD (LPAR)	2(2)	18 (36)
Cryptographic coprocessor	1	8
Cryptographic accelerator	1	4

To review the footnotes for this table, see “Notes for System i5 capacity tables” on page 74.

The following table summarizes the On Demand feature codes for the Model 550. Edition Content will vary by processor and server features selected. For more information on Editions see “Editions” on page 176.

Features included with each Model 550 (base features) are shaded in gray.

Model 550 1/4-way			Processor activations						Enterprise Enablement (5250 OLTP)		
Server feature	Edition feature	n-way	Base i5/OS Licenses (5722-SS1)	#8450/#8413 Base Processors	On Demand				Base 5250	Additional 5250 (per processor)	100% CPU (initial order only)
					CoD purchased	On/Off CoD Enablement	On/Off CoD (Billing)	Reserve CoD (Prepaid)			
						360 days	1 day	90 days			
<b>Standard Editions</b>											
#0910	#7154	1/4	1	1	#7323	#7930	#7341	#7741	N/A	N/A	N/A
#0915	#7462	1/4	1	2	#7871	#7930	#7931	#7934	N/A	N/A	N/A
<b>Enterprise Editions</b>											
#0910	#7155	1/4	1	1	#7323	#7930	#7341	#7741	#9299 x1	#7257	N/A
#0915	#7463	1/4	1	2	#7871	#7930	#7931	#7934	#9286 x1	#7576	N/A
<b>Domino Editions</b>											
#0910	#7629	1/4	2	2	#7323	#7930	#7341	#7741	N/A	N/A	N/A
#0915	#7530	1/4	2	2	#7871	#7930	#7931	#7934	N/A	N/A	N/A
<b>High Availability Edition</b>											
#0910	#7551	1/4	1	1	#7323	#7930	#7341	#7741	#9299 x1	#7257	N/A
<b>Solution Editions</b>											
#0910	#7630	1/4	1	1	#7323	#7930	#7341	#7741	#9299 x1	#7257	N/A
	#7631	1/4	1	1	#7323	#7930	#7341	#7741	#9299 x1	#7257	N/A
	#7632	1/4	1	1	#7323	#7930	#7341	#7741	#9299 x1	#7257	N/A
	#7640	2	2	2	#7323	#7930	#7341	#7741	N/A	N/A	N/A
	#7941	4	4	4	#7323	#7930	#7341	#7741	N/A	N/A	N/A

Model 550 1/4-way			Processor activations						Enterprise Enablement (5250 OLTP)		
Server feature	Edition feature	n-way	Base i5/OS Licenses (5722-SS1)	#8450/#8413 Base Processors	On Demand				Base 5250	Additional 5250 (per processor)	100% CPU (initial order only)
					CoD purchased	On/Off CoD Enablement	On/Off CoD (Billing)	Reserve CoD (Prepaid)			
						360 days	1 day	90 days			
#0915	#7531	1/4	1	2	#7871	#7930	#7931	#7934	1	#7576	N/A
	#7532	1/4	1	2	#7871	#7930	#7931	#7934	1	#7576	N/A
	#7533 2-way	2	2	2	#7871	#7930	#7931	#7934	N/A	N/A	N/A
	#7534 4-way	4	4	4	#7871	#7930	#7931	#7934	N/A	N/A	N/A
	#7558	1/4	1	2	#7871	#7930	#7931	#7934	1	#7576	N/A

## Summary of the System i5 Model 570+ and i5 Model 570

The following table provides the Model 570 and 570+ system minimum and maximum capacities.

Model 570 and Model 570+										
Processor feature	#8971	#8971	#8971	#8971	#8971	#8971	#8338	#8338	#8338	#8338
Server feature	#0930	#0921	#0922	#0924	#0926	#0928	#0934	#0935	#0936	#0937
Number/ type/ speed of processor	1/2/ POWER5/ 1.65 GHz	2/4/ POWER5/ 1.65 GHz	5/8/ POWER5/ 1.65 GHz	9/12/ POWER5/ 1.65 GHz	13/16/ POWER5/ 1.65 GHz	2/16/ POWER5/ 1.65 GHz	2/4/ POWER5+/ 2.2GHz	4/8/ POWER5+/ 2.2 GHz	8/16/ POWER5+/ 2.2GHz	2/16/ POWER5+/ 2.2 GHz
Processor CPW	3300/ 6000	6350/ 12000	15200/ 23500	25500/ 33400	36300/ 44700	6350/ 44700	8400/ 16000	16700/ 31100	31100/ 58500	8100/ 58500
Relative system performance <sup>1</sup>										
Mail and Calendar Users <sup>2a</sup>	7300/ 13300	14100/ 26600	33600/ 52500	57300/ 77000	83600/ 102000	14100/ 102000	18200/ 34500	35500/ 67500	67500/ 130000	18200/ 130000
5250 CPW <sup>5</sup>										



Model 570 and Model 570+										
Processor feature	#8971	#8971	#8971	#8971	#8971	#8971	#8338	#8338	#8338	#8338
Server feature	#0930	#0921	#0922	#0924	#0926	#0928	#0934	#0935	#0936	#0937
Standard <sup>6c</sup>	0	0	0	0	0	-	0	0	0	0
Enterprise <sup>6c</sup>	Max.	Max.	Max.	Max.	Max	-	Max.	Max.	Max.	-
High Availability <sup>6c</sup>	Max.	Max.	Max.	Max.	Max.	-	Max.	Max.	Max.	-
Capacity BackUp <sup>6c</sup>	-	-	-	-	-	Max.	-	-	-	Max.
L2 Cache (MB)/chip	1.9	1.9	1.9	1.9	1.9	19	1.9	1.9	1.9	1.9
L3 Cache (MB)/processor	36	36	36	36	36	36	36	36	36	36
Main storage (GB minimum/maximum)	2/64	4/128	8/256	12/384	16/512	16/512	4/128	8/256	16/512	16/512
Main storage DIMMs	4/8	8/16	16/32	24/48	32/64	32/64	8/16	16/32	32/64	32/64
LPAR <sup>12</sup>	10/20	20/40	50/80	90/120	120/160	20/160	20/40	40/80	80/160	20/160
Minimum i5/OS level <sup>8</sup>	V5R3	V5R3	V5R3	V5R3	V5R3	V5R3	V5R3	V5R3	V5R3	V5R3
Software group <sup>6c</sup>	P30	P30	P40	P40	P40	P30	P30	P40	P40	P40
Disk storage (GB)										
Integrated minimum <sup>7b</sup>	0	0	0	0	0	0	0	0	0	0
Total maximum <sup>7a</sup>	38949	77051	116000	154949	193898	193898	77051	116000	193898	193898
DASD arms maximum	276	546	822	1098	1374	1374	546	822	1374	1374
Internal arms	276	546	822	1098	1374	1374	546	822	1374	1374
External LUNs	276	546	822	1098	1374	1374	546	822	1374	1374
Physical packaging										
Rack design - EIA units	4	4	8	12	16	16	4	8	16	16
Ext. RIO-G ports	2	4	8	12	16	16	4	8	16	16
Ext. RIO-G loops	1	2	4	6	8	8	2	4	8	8
PCI-X Expansion Tower	6	12	24	36	48	48	12	24	48	48
Ext. xSeries Servers (IXA) PCI card slots <sup>12</sup>	8	16	32	48	57	57	16	32	57	57
Communication lines <sup>3</sup>	278	320	480	480	480	480	320	480	480	480

Model 570 and Model 570+										
Processor feature	#8971	#8971	#8971	#8971	#8971	#8971	#8338	#8338	#8338	#8338
Server feature	#0930	#0921	#0922	#0924	#0926	#0928	#0934	#0935	#0936	#0937
LAN ports (includes Integrated xSeries)	74	96	128	128	128	128	96	128	128	128
Twinaxial workstation	69	134	204	274	334	334	134	204	334	334
Twinaxial	2760	5360	7200	7200	7200	7200	5360	7200	7200	7200
Internal DVD-ROM/DVD-RAM <sup>4</sup>	1	1	2	3	4	4	1	2	4	4
Internal	0	0	0	0	0	0	0	0	0	0
I/O Tower Tape/CD-ROM/DVD	13 (13)	18 (25)	26 (36)	26 (48)	26 (48)	26 (48)	18 (25)	26 (36)	26 (48)	26 (48)
External tape	18 (36)	18 (36)	26 (48)	26 (48)	26 (48)	26 (48)	18 (36)	26 (48)	26 (48)	26 (48)
External optical/CD/DVD	26 (48)	26 (48)	26 (48)	26 (48)	26 (48)	26 (48)	26(48)	26 (48)	26 (48)	26 (48)
Cryptographic coprocessor (combined system)	8	8	8 (32)	8 (32)	8 (32)	8 (32)	8	8 (32)	8 (32)	8 (32)
Cryptographic accelerator (combined system)	4 (8)	4 (8)	4 (8)	4 (8)	4 (8)	4 (8)	4 (8)	4 (8)	4 (8)	4 (8)

To review the footnotes for this table, see “Notes for System i5 capacity tables” on page 74.

The Standard, Enterprise and High Availability Editions also provide support for Capacity on Demand (permanent and temporary). The Capacity on Demand Edition provides support for temporary capacity only.

The following table summarizes the On Demand feature codes for the Model 570. Features included with each Model 570 (base features) are shaded in gray.

Model 570			i5/OS	Processor activations				Enterprise Enablement (5250 OLTP)			
Server feature	Edition feature	N-way	Licenses per CPU	Base Processors	On Demand				Base	Additional CPU	All CPU (initial order only)
			5722-SS1		Capacity Upgrade on Demand	on Demand Enablement	Billing (per CPU-day)	Reserve prepaid (per CPU-day)			
<b>Standard Edition</b>											
#0934	#7757	2/4	1 x 5722-SS1	2 x #7738	#7618	#7951	#7624	#7728	N/A	N/A	N/A
#0935	#7758	4/8	1 x 5722-SS1	4 x #7738							
#0936	#7759	8/16	1 x 5722-SS1	8 x #7738							
#0930	#7490	1/2	1 x 5722-SS1	1 x #8452	#7897	#7951	#7952	#7956	N/A	N/A	N/A
#0921	#7494	2/4	1 x 5722-SS1	2 x #8452	#7897	#7951	#7952	#7956	N/A	N/A	N/A
#0922	#7471	5/8	1 x 5722-SS1	5 x #8452							
#0924	#7473	9/12	1 x 5722-SS1	9 x #8452							
#0926	#7475	13/16	1 x 5722-SS1	13 x #8452							
<b>Enterprise and High Availability Editions *</b>											

Model 570			i5/OS	Processor activations				Enterprise Enablement (5250 OLTP)			
Server feature	Edition feature	N-way	Licenses per CPU	Base Processors	On Demand				Base	Additional CPU	All CPU (initial order only)
			5722-SS1		Capacity Upgrade on Demand	on Demand Enablement	Billing (per CPU-day)	Reserve prepaid (per CPU-day)			
							1 day	30 days			
#0934	#7747	2/4	1 x 5722-SS1	2 x #7738	#7618	#7951	#7624	#7728	1 x #9299	#7260	#7258
#0934	#7763	2/4	1 x 5722-SS1	2 x #7738							
#0935	#7748	4/8	1 x 5722-SS1	4 x #7738							
#0935	#7764	4/8	1 x 5722-SS1	4 x #7738							
#0936	#7749	8/16	1 x 5722-SS1	8 x #7738							
#0936	#7765	8/16	1 x 5722-SS1	8 x #7738							

Model 570			i5/OS	Processor activations					Enterprise Enablement (5250 OLTP)		
Server feature	Edition feature	N-way	Licenses per CPU	Base Processors	On Demand				Base	Additional CPU	All CPU (initial order only)
			5722-SS1		Capacity Upgrade on Demand	on Demand Enablement	Billing (per CPU-day)	Reserve prepaid (per CPU-day)			
							1 day	30 days			
#0930	#7491/ #7559	1/2	1 x 5722-SS1	2 x #8452	#7897	#7951	#7952	#7956	2 x #9286	#7577	#7597
#0921	#7495/ #7560	2/4	1 x 5722-SS1	3 x #8452					4 x #9286		
#0922	#7472/ #7561	5/8	1 x 5722-SS1	6 x #8452					4 x #9286		
#0924	#7474/ #7562	9/12	1 x 5722-SS1	10 x #8452					4 x #9286		
#0926	#7476/ #7563	13/ 16	1 x 5722-SS1	14 x #8452					4 x #9286		
* Includes a processor activation for Linux											
<b>Capacity Backup Editions</b>											
#0937	#7760	2/16	2 x 5722-SS1	2 x #7738	n/a	#7951	#7624	#7728	2 x #9299	Max.	Max.
#0928	#7570	2/16	2 x 5722-SS1	2 x #8452	n/a	#7951	#7952	#7956	2 x #9286	Max.	Max.

## Summary of the System i5 and eServer i5 Model 595

The Model 595 1.9 GHz and 595 system minimum and maximum capacities are provided in the following table.

	Model 595 1.9GHz			
Processor feature	#8966	#8966 x 2	#8966 x 4	#8966 x 2
Server feature	#0940	#0941	#0943	#0944
Number/type/speed of processor	8/16 /POWER5/ 1.9 GHz	16/32 /POWER5/ 1.9 GHz	32/64 /POWER5/ 1.9 GHz	4/32/POWER5/ 1.9 GHz
Relative system performance <sup>1, 2</sup>				
Processor CPW	26700/50500	51000/92000	92000/184000	13600/92000
Mail and Calendar Users <sup>2a</sup>	60500/114000	115000/213000 <sup>2c</sup>	213000/405000 <sup>2c</sup>	31500/213000 <sup>2c</sup>
5250 CPW <sup>5</sup>				
Standard <sup>6d</sup>	0	0	0	0
Enterprise <sup>6d</sup>	Maximum	Maximum	Maximum	-
High Availability <sup>6d</sup>	Maximum	Maximum	Maximum	-
Capacity BackUp <sup>6</sup>	-	-	-	Maximum
L2 Cache (MB per processor)	1.9	1.9	1.9	1.9
L3 Cache (MB per processor)	36	36	36	36
Main storage (GB minimum/maximum) <sup>11</sup>	8/512	16/1024	32/2048	16/1024
Main storage DIMMs (minimum/maximum)	4/16	4/32	4/64	4/32
Logical partitions (LPAR) <sup>12</sup>	160	254	254	254
Minimum i5/OS level <sup>8</sup>	V5R3	V5R3	V5R3	V5R3
Software group <sup>6d</sup>	P50	P50	P60	P50
Disk storage (GB)				
Integrated minimum <sup>7b</sup>	0	0	0	0
Total maximum <sup>7a</sup>	228614	381024	381024	381024
DASD arms maximum <sup>7c</sup>	1620	2700	2700	2700
Internal arms	1620	2700	2700	2700
External LUNs	1620	2700	2700	2700
Physical packaging				
Rack design - EIA units	18	18	18	18
External RIO-G ports	14	30	62	24
External RIO-G loops	7	15	31	12
PCI/PCI-X Expansion Tower	36	72	96	72
External xSeries Servers	48	57	57	57
PCI card slots <sup>10</sup>	504	1008	1152	1008
Communication lines <sup>3</sup>	600	600	600	600
LAN ports (includes embedded)	160	160	160	160
Integrated xSeries Servers	60	60	60	60

	Model 595 1.9GHz			
Processor feature	#8966	#8966 x 2	#8966 x 4	#8966 x 2
Server feature	#0940	#0941	#0943	#0944
Twinaxial workstation controllers	180	180	180	180
Twinaxial workstations	7200	7200	7200	7200
Internal DVD-ROM/DVD-RAM <sup>4</sup>	2	2	2	2
Internal CD-ROM/Tape	0	0	0	0
Feature I/O Tower Tape/CD-ROM/DVD (combined)	26 (60)	26 (60)	26 (60)	26 (60)
External tape	26 (60)	26 (60)	26 (60)	26 (60)
External optical/CD/DVD	26 (60)	26 (60)	26 (60)	26 (60)
Cryptographic coprocessor (combined system partition)	8 (32)	8 (32)	8 (32)	8 (32)
Cryptographic accelerator (combined system partition)	4 (16)	4 (16)	4 (16)	4 (16)

	Model 595		
Processor feature	#8981	#8981x2	#8981x4
Server feature	#0946	#0947	#0952
Number/type/speed of processor	8/16 /POWER5/ 1.65 GHz	16/32 /POWER5/ 1.65 GHz	32/64 /POWER5/ 1.65 GHz
Relative system performance <sup>1, 2</sup>			
Processor CPW	24500/45500	46000/85000	86000/165000
Mail and Calendar Users <sup>2a</sup>	104000	194000	375000
5250 CPW <sup>5</sup>			
Standard <sup>6d</sup>	0	0	0
Enterprise <sup>6d</sup>	Maximum	Maximum	Maximum
High Availability <sup>6d</sup>	Maximum	Maximum	Maximum
Capacity BackUp <sup>6</sup>	-	-	-
L2 Cache (MB per processor) MCM	1.88	1.88	1.88
L3 Cache (MB per processor) MCM	36	36	36
Main storage (GB minimum/maximum) <sup>11</sup>	8/512	16/1024	32/2048
Main storage DIMMs (minimum/maximum)	4/16	4/32	4/64
Logical partitions (LPAR) <sup>12</sup>	160	254	254
Minimum i5/OS level <sup>8</sup>	V5R3	V5R3	V5R3
Software group <sup>6d</sup>	P50	P50	P60
Disk storage (GB)			
Integrated minimum <sup>7b</sup>	0	0	0

	Model 595		
Processor feature	#8981	#8981x2	#8981x4
<b>Server feature</b>	<b>#0946</b>	<b>#0947</b>	<b>#0952</b>
Total maximum <sup>7a</sup>	228614	381024	381024
DASD arms maximum <sup>7c</sup>	1620	2700	2700
Internal arms	1620	2700	2700
External LUNs	1620	2700	2700
Physical packaging			
Rack design - EIA units	18	18	18
External HSL-2/RIO-G ports	14	30	62
External HSL-2/RIO-G loops	7	15	31
PCI/PCI-X Expansion Tower	36	72	96
External xSeries Servers (IXA)	48	57	57
PCI card slots <sup>10</sup>	504	1008	1152
Communication lines <sup>3</sup>	600	600	600
LAN ports (includes embedded)	160	160	160
Integrated xSeries Servers	60	60	60
Twinaxial workstation controllers	180	180	180
Twinaxial workstations	7200	7200	7200
Internal DVD-ROM/DVD-RAM <sup>4</sup>	2	2	2
Internal CD-ROM/Tape	0	0	0
Feature I/O Tower Tape/CD-ROM/DVD	26 (60)	26 (60)	26 (60)
External tape	26 (60)	26 (60)	26 (60)
External optical/CD/DVD	26 (60)	26 (60)	26 (60)
Cryptographic coprocessor (combined system partition maximum)	8 (32)	8 (32)	8 (32)
Cryptographic accelerator (combined system partition maximum)	4 (16)	4 (16)	4 (16)

To review the footnotes for this table, see “Notes for System i5 capacity tables” on page 74.



The following table summarizes the On Demand feature codes for the Model 595. Features included with each Model 595 (base features) are shaded in gray.

Model 595			i5/OS licenses	Capacity on Demand				Enterprise Enablement (5250 OLTP)			
Server feature	Edition feature	n-way	Base Processor licenses	Base Processor activation	CUoD (permanent activation)	on/off CoD Enablement	on/off CoD billing	Reserve CoD (prepay)	Base processors	Additional processors	All processors (initial order only)
							1 day	30 days			
<b>Standard Edition</b>											
#0940	#7480	8/16	4 x 5722-SS1	8 x #8457	#7815	#7971	#7972	#7975	N/A	N/A	N/A
#0941	#7482	16/32		16 x #8457							
0943	#7486	16/32		32 x #8457							
#0946	#7496	8/16	4 x 5722-SS1	8 x #8461	#7925	#7839	#7993	#7926	N/A	N/A	N/A
#0947	#7489	16/32		16 x #8461							
#0952	#7984	32/64		32 x #8461							
<b>Enterprise Edition and High Availability Editions*</b>											
#0940	#7481	8/16	4 x 5722-SS1	8 x #8457	#7815	#7971	#7972	#7975	4 x #9299	#7261	#7259
#0941	#7483	16/32		16 x #8457					4 x #9299		
#0943	#7487	32/64		32 x #8457					4 x #9299		
* Includes a processor activation for Linux on systems with processor #8981.											

Model 595			i5/OS licenses	Capacity on Demand					Enterprise Enablement (5250 OLTP)		
Server feature	Edition feature	n-way	Base Processor licenses	Base Processor activation	CUoD (permanent activation)	on/off CoD Enablement	on/off CoD billing	Reserve CoD (prepay)	Base processors	Additional processors	All processors (initial order only)
							1 day	30 days			
#0946	#7497	8/16	4 x 5722-SS1	9 x #8461	#7925	#7839	#7993	#7926	4 x #9286	#7579	#7598
#0947	#7499	16/32		17 x #8461					4 x #9286		
#0952	#7985	32/64		33 x #8461					4 x #9286		
<b>Capacity BackUp Edition</b>											
#0944	#7590	4/32	4 x 5722-SS1	4 x #8457	N/A	#7971			4 x #9299	Max	Max
* Includes a processor activation for Linux on systems with processor #8981.											

## Notes for System i5 capacity tables

<b>Note 1</b>	Commercial Processing Workload (CPW) is used to measure the performance of all System i5 processors announced from September 1996 onward. The CPW value is measured on maximum configurations. The type and number of disk devices, the number of workstation controllers, the amount of memory, the system model, other factors, and the application running determine what performance is achievable.
<b>Note 2</b>	Processor performance represents the relative performance (maximum capacity) of a processor feature running CPW in a client/server environment. Processor capacity is achievable when the commercial workload is not constrained by main storage and direct access storage device (DASD). Performance of the 5250 CPW represents the relative performance available to perform host-centric workloads. The amount of 5250 CPW capacity consumed reduces the available processor capacity by the same amount.
<b>Note 2a</b>	Mail and Calendar Users (MCU) is a relative performance measurement derived by performing mail and calendar functions using Domino and Notes clients. The MCU workload represents users on a Notes client who are reading, updating or deleting documents in an e-mail database. It also represents users who are performing lookups in the Domino directory and scheduling calendar appointments and invitations. Reported values reflect 70% processor utilization to allow for growth and peak loads in excess of customer workload estimates. n/r = not recommended.
<b>Note 2c</b>	The MCU rating is a projected value.

<b>Note 3</b>	One line is used if #5544 System Console on Operations Console is used. One line might be used if #5546 System Console on 100 Mbps Token Ring or #5548 System Console on 100 Mbps Ethernet is selected and the #0367 Operations Console PCI Cable must be connected. The numbers include the ECS line.
<b>Note 4</b>	There must be one DVD-ROM or DVD-RAM per system. For Models 870 and 890, there must be one DVD-RAM or DVD-ROM in the #9094 Base PCI I/O Enclosure.
<b>Note 5</b>	<p>5250 CPW (Interactive) is an approximate value that reflects the amount of Processor CPW that can be used for workloads performing 5250-based tasks. Remember that:</p> <ul style="list-style-type: none"> <li>▶ The iSeries Enterprise Edition provides maximum 5250 CPW support (up to 100% of the capacity of the active processor CPW).</li> <li>▶ The iSeries Standard Edition provides zero CPW for 5250 work. Limited 5250 CPW is available for a system administrator to use 5250 display device I/O to manage various aspects of the server. Multiple administrative jobs exceed this capability.</li> <li>▶ A task submitted through a 5250 session (5250 device or 5250 emulation) that does display or printer I/O requires 5250 CPW.</li> <li>▶ A task submitted through a 5250 session (5250 device or 5250 emulation) as a "batch" job is not considered 5250 OLTP work and does not require any 5250 CPW unless the task does display or printer I/O.</li> <li>▶ Maximum 5250 CPW is equivalent to the Processor CPW for the active processor.</li> </ul>
<b>Note 6a Model 520</b>	<p>Software group is determined by the combination of processor feature and edition feature. Display the QPRCFEAT system value or DSPHDWRSC TYPE(*AHW) to display the processor feature code value. This value is also shown for the Capacity Card CCIN value when using SST to perform a Capacity Upgrade on Demand. This table provides a cross reference.</p> <p>For Model 520 2-way processors shipped prior to 10 December 2004 that have keyed products installed, update the server firmware to accept the lower P20 software tier.</p> <ul style="list-style-type: none"> <li>▶ Apply PTF MH00199 on servers using i5/OS to apply the firmware.</li> <li>▶ Apply SF222_075 on servers using HMC to apply the firmware. Order PTF MH00201 to receive a CD that can be applied via the HMC. Update HMC code to the latest V4R3 level before updating the server firmware. See the following Web site for the latest HMC updates: <a href="http://techsupport.services.ibm.com/server/hmc/power5">http://techsupport.services.ibm.com/server/hmc/power5</a></li> </ul>

Note 6a Model 520 (cont.)	Processor	Server feature	Edition feature	Software group	Processor feature code or QPRCFEAT value
	#8325	#0970	#7140 Express	P05	7140
			#7141 Express	P05	7141
			#7142 Express	P05	7142
		#0975	#7350 Value	P05	7350
	#8327	#0970	#7143 Express	P10	7143
			#7148 Express	P10	7148
			#7144 Express	P10	7144
			#7152 Express	P10	7152
		#0975	#7352 Value	P10	7352
		#0906	#7784 Standard	P10	7784
			#7734 Enterprise	P10	7734
			#7735 Enterprise	P10	7735
			#7373 High Availability	P10	7373
			#7374 High Availability	P10	7374
			#7366 Solution	P10	7366
	#8330	#0906	#7785 Standard	P20	7785
			#7736 Enterprise	P20	7736
			#7375 High Availability	P20	7375
	#8950	#0900	#7390 Express	P05	7390
			#7391 Express	P05	7391
			#7393 Express	P05	7393
#7411 Express			P05	7411	
#7413 Express			P05	7413	
#7417 Express			P05	7417	
#7450 Value			P05	7450	

<b>Note 6a Model 520 (cont.)</b>	#8951	#0901	#7392 Express	P05	7392
			#7394 Express	P05	7392
			#7414 Express	P10	7414
			#7420 Express	P10	7420
			#7451 Value	P10	7451
	#8952	#0902	#7458 Standard	P10	7458
			#7459 Enterprise	P10	7459
			#7541 Solution	P10	7541
			#7552 High Availability	P10	7459
	#8953	#0903	#7452 Standard	P10	7452
			#7453 Enterprise	P10	7453
			#7553 High Availability	P10	7453
	#8954	#0904	#7454 Standard	P20	7454
			#7455 Enterprise	P20	7455
			#7554 High Availability	P20	7455
	#8955	#0905	#7456 Standard	P20	7456
			#7457 Enterprise	P20	7457
			#7555 High Availability	P20	7457
	#8972	#0912	#7395 Express	P10	7395
			#7396 Express	P10	7395
			#7397 Value	P10	7397

<b>Note 6b Model 550</b>	Software group is determined by the combination of processor feature and edition feature. Display the QPRCFEAT system value or DSPHDWRSC TYPE(*AHW) to display the processor feature code value. This value is also shown for the Capacity Card CCIN value when using SST to perform a Capacity Upgrade on Demand. This table provides a cross reference.				
	Processor	Server feature	Edition feature	Software group	Processor feature code or QPRCFEAT value
	#8312	#0910	#7154 Standard	P20	7154
			#7155 Enterprise	P20	7155
			#7551 High Availability	P20	7551
			#7629 Domino	P20	7629
			#7630 Solution	P20	7630
			#7631 Oracle JDE E1	P20	7631
			#7632 C2CRM	P20	7632
			#7640 2-way SAP	P20	7640
			#7641 4-way SAP	P20	7641
	#8958	#0915	#7462 Standard	P20	7462
			#7463 Enterprise	P20	7463
			#7530 Domino	P20	7462
			#7558 Solution	P20	7463
			#7531 Solution Edition for PeopleSoft Enterprise E1	P20	7463
			#7532 C2CRM Solution Edition with Domino	P20	7463
			#7533 2-Way SAP Solution Edition	P20	7462
			#7534 4-Way SAP Solution Edition	P20	7462

**Note 6c  
Models  
570+ 570**

Software group is determined by the combination of processor feature and edition feature. Display the QPRCFEAT system value or DSPHDWRSC TYPE(\*AHW) to display the processor feature code value. This value is also shown for the Capacity Card CCIN value when using SST to perform a Capacity Upgrade on Demand. This table provides a cross reference.

Processor	Server feature	Edition feature	Software group	Processor feature code or QPRCFEAT value
#8338	#0934	#7757 Standard	P30	7757
		#7747 Enterprise	P30	7747
		#7763 High Availability	P30	7763
	#0935	#7758 Standard	P40	7758
		#7748 Enterprise	P40	7748
		#7764 High Availability	P40	7764
	#0936	#7759 Standard	P40	7759
		#7749 Enterprise	P40	7749
		#7765 High Availability	P40	7765
	#0937	#7760 Capacity BackUp	P30	7760
#8961	#0919	#7488 Standard	P30	7450
		#7489 Enterprise	P30	7451
	#0920	#7469 Standard	P30	7458
		#7470 Enterprise	P30	7459

<b>Note 6c Models 570+ 570 (cont.)</b>	#8971	#0921	#7494 Standard	P30	7494
			#7495 Enterprise	P30	7495
			#7560 High Availability	P30	7495
		#0922	#7471 Standard	P40	7441
			#7472 Enterprise	P40	7472
			#7561 High Availability	P40	7472
		#0924	#7473 Standard	P40	7473
			#7474 Enterprise	P40	7474
			#7562 High Availability	P40	7474
		#0926	#7475 Standard	P40	7475
			#7476 Enterprise	P40	7476
			#7563 High Availability	P40	7476
		#0928	#7570 Capacity BackUp	P30	7570
		#0930	#7490 Standard	P30	7490
			#7491 Enterprise	P30	7491
			#7559 High Availability	P30	7491



<b>Note 6d Model 595</b>	Software group is determined by the combination of processor feature and edition feature. Display the QPRCFEAT system value or DSPHDWRSC TYPE(*AHW) to display the processor feature code value. This value is also shown for the Capacity Card CCIN value when using SST to perform a Capacity Upgrade on Demand. This table provides a cross reference.					
	Processor	Server feature	Edition feature	Software group	Processor feature code or QPRCFEAT value	
	#8966	#0940	#7480 Standard	P50	7480	
			#7481 Enterprise	P50	7481	
			#7580 High Availability	P50	7481	
		#0941	#7482 Standard	P50	7482	
			#7483 Enterprise	P50	7483	
			#7581 High Availability	P50	7483	
		#0943	#7486 Standard	P60	7486	
			#7487 Enterprise	P60	7487	
			#7583 High Availability	P60	7487	
		#0944	#7590 Capacity BackUp	P50	7590	
		#8981	#0946	#7496 Standard	P50	7496
				#7497 Enterprise	P50	7497
	#0947		#7498 Standard	P50	7498	
			#7499 Enterprise	P50	7499	
	#0952		#7984 Standard	P60	7984	
			#7985 Enterprise	P60	7985	
	<b>Note 7</b>	External DASD cannot exceed the maximum system capacity or the maximum number of disk arms.				
	<b>Note 7a</b>	Total maximum DASD capacity assumes 141.12 GB Disk Drives, which were announced in July 2005. External DASD cannot exceed the maximum system capacity or the maximum number of disk arms.				
<b>Note 7b</b>	With the Announcement of SAN Boot there is no longer a requirement for an internal Disk. San Boot requires #2847.					
<b>Note 7c</b>	Maximum of 2000 DASD arms in a single i5/OS partition.					
<b>Note 8</b>	i5/OS V5R3 with the latest level of LIC and Cumulative PTF package available. For the latest information, refer to: <a href="http://www-912.ibm.com/e_dir/eServerPrereq.nsf/UpgradeCategories/Hardware?opendocument">http://www-912.ibm.com/e_dir/eServerPrereq.nsf/UpgradeCategories/Hardware?opendocument</a> for the IBM System i5 520+ with a 1.9 GHz processor i5/OS V5R3 and LIC V5R3M5 is required as minimum.					
<b>Note 9</b>	The Server features used for iSeries for Domino specify the minimum amount of disk, memory, and Domino licenses required for an initial order.					

<b>Note 10</b>	When a second RIO-G loop is required, one PCI card slot is used for the RIO-G adapter.
<b>Note 10a</b>	The 520+ models have one PCI-X 2.0 card slot (P1-C4) that is for IOP-less cards only
<b>Note 11</b>	One terabyte (TB) of memory can be ordered after 28 October 2004. Two TB are planned to be available in 2005.
<b>Note 12</b>	A maximum of 64 i5/OS partitions applies.
<b>Note 12b</b>	The optional Accelerator for System i5 feature provides a dramatic boost in processor CPW for additional workloads and partitions. (was 2b)
<b>Note 13</b>	Rack containing the system unit is a 42U, 24-inch rack. The bulk power supplies are installed in 8U leaving 16U empty.

## Summary of the System i5 expansion units and towers capacity tables

This section identifies the maximum capacities of expansion units and towers supported by Models 520, 550, 570, and 595.

	#5094	#5095	#5088	#5294	#0588*	#0595	#5790
Disk storage							
DASD arms maximum	45	12	N/A	2x 45	N/A	12	N/A
Disk grouping	5	6	N/A	2x 5	N/A	6	N/A
# of supported Controllers	9		N/A	2x 9	N/A		N/A
Maximum Disk storage GB	3164.4	843.84	N/A	6328.8	N/A	843.84	N/A
Physical packaging	Tower	Tower	Tophat	Rack	Drawer	Drawer	Drawer
Rackable			No		Yes	Yes	Yes
EIA Units	18	N/A	8	36	8	5	4
Internal CD/DVD/tape	2		N/A		N/A		0
Dual Power Cords	#5115	optional	yes	#5116	yes		yes
Redundant Power Supply	yes	#5138		yes	yes	#5138	yes
Slim line media bays	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Number of busses							
Base IOP	0	0	0	0	0	0	0
PCI Slots	14	7	14	2x 14	14	7	6
Integrated xSeries Server	2		2	4			2
Minimum i5/OS level	V5R3	V5R3	V5R3	V5R3	V5R3	V5R3	V5R3

\* There is limited support of the higher speed HSL interface on the #5088 PCI-X Expansion Unit and #0588 PCI-X Expansion Unit in Rack as of June 2005. Convert the existing HSL interface to the higher speed HSL interface (#6417 HSL-2/RIO-G Bus Adapter).  
The #0588/#5088 is implemented like the #5094/#5294. You can purchase new with a #9517 Base HSL-2/RIO-G Bus Adapter.  
Prerequisite: RPQ 847204  
The e-config and LVT configurator tools do not support this RPQ. Configurations must be managed without the benefit of the configurator tools.

Copper RIO-G adapters *	#9517	#9517	#9877	#9517	#9417 #9517	#9517	#9531
Optical RIO-G	#9876	#9876	#9876	#9876	#9876	#9876	
<p>* There is limited support of the higher speed HSL interface on the #5088 PCI-X Expansion Unit and #0588 PCI-X Expansion Unit in Rack as of June 2005. Convert the existing HSL interface to the higher speed HSL interface (#6417 HSL-2/RIO-G Bus Adapter).</p> <p>The #0588/#5088 is implemented like the #5094/#5294. You can purchase new with a #9517 Base HSL-2/RIO-G Bus Adapter.</p> <p>Prerequisite: RPQ 847204</p> <p>The e-config and LVT configurator tools do not support this RPQ. Configurations must be managed without the benefit of the configurator tools.</p>							



## IBM System i5 Model 520+

The IBM System i5 Model 520+ is designed for small to mid-sized businesses. These are clients that need power and capacity to run traditional core business applications, with the freedom and scalability to add new applications to the same system. The advanced POWER5 processor models come with faster POWER5+ processors that deliver improved scalability and have noticeably improved capacity for solutions using Java or WebSphere.

The 9406 Model 520+ now has more flexibility with Capacity on Demand for a 1/2-way processor in the Standard, Enterprise, Solution and High Availability Editions.

The Model 520 Value Editions and the 9405 Model 520 Express configurations that are based on them, can use a new Accelerator for System i5 to conveniently provide more processor CPW if required.

All of the 520 models have the capability to simultaneously run multiple operating environments and dynamically distribute processing resources.



## Editions and configurations

### 9405 Model 520 Value Edition

The Value Edition is tailored specifically to small enterprises and is available in two offerings as shown in the following table:

9405 Model 520+		
Processor feature	#8325	#8327
Server feature	#0975	#0975
Edition feature	#7350	#7352
Number/type/speed of processor	1/POWER5+/1.9 GHz	1/POWER5+/1.9 GHz
Processor/OLTP CPW	600/30	1200/60
Processor/OLTP CPW with Accelerator	3100/30	3800/60
L2 Cache/L3 Cache (MB)	1.9/0	1.9/36
Main storage (GB minimum/maximum)	1/32	1/32
Disk (GB - system minimum/maximum)	0/39234	0/39234
LPAR/LPAR with Accelerator	2/10	3/10
Minimum i5/OS / LIC level	V5R3/V5R3M5	V5R3/V5R3M5
Software group	P05	P10

### 9405 Model 520 Express Configurations

The 9405 Model 520 Express configurations provide ready-to-run, fixed configurations as shown in the following table. The Express configurations are based on the 9406 Value Editions.

9405 Model 520 Express Configurations							
Configuration	Entry	Entry Plus	Entry Plus with RAID	Growth	Growth with RAID	Turbo	Turbo with RAID
CPW	600	600	600	1200	1200	3800	3800
CPW with Accelerator	3100	3100	3100	3800	3800	n/a	n/a
OLTP CPW	30	30	30	60	60	60	60
LPAR	2/10	2/10	2/10	3/10	3/10	10	10
Server feature	0970	0970	0970	0970	0970	0970	0970
Processor	8325	8325	8325	8327	8327	8327	8327
Configuration	7140	7141	7142	7148	7143	7144	7152
Disk	2x#9256 (2x35GB)	2x#9256 (2x35GB)	4x#9256 (4x35GB)	2x#9256 (2x35GB)	4x#9256 (4x35GB)	2x#9256 (2x35GB)	4x#9256 (4x35GB)

9405 Model 520 Express Configurations							
Disk protection	0040 Mirror	0040 Mirror	0041 RAID-5	0040 Mirror	0041 RAID-5	0040 Mirror	0041 RAID-5
Cache/RAID	None	None	9510	None	9510	None	9510
Console	5540 Twinax	5540 Twinax	5540 Twinax	5540 Twinax	5540 Twinax	5540 Twinax	5540 Twinax
RIO loops	0	0	0	0	0	0	0
DDR2 memory	9548 (1GB)	9548 (1GB)	9548 (1GB)	9549 (2GB)	9549 (2GB)	9553 (4GB)	9553 (4GB)
30GB QIC tape	9653	9653	9653	9653	9653	9653	9653
DVD-ROM	9540	9540	9540	9540	9540	9540	9540
Modem	9793/9794	9793/9794	9793/9794	9793/9794	9793/9794	9793/9794	9793/9794
Base IOP	9844	9844	9844	9844	9844	9844	9844
Twinax	9746	9746	9746	9746	9746	9746	9746
Software group	P05	P05	P05	P10	P10	P10	P10

### 9406 Model 520 Standard Edition

The Standard Edition is designed for clients who require more capacity and flexibility than is available in the Value Edition and who do not require any OLTP (5250) CPW. 5250 OLTP applications modernized using the WebFacing tool of IBM WebSphere Development Studio can be run on this edition.

9406 Model 520+		
Processor feature	#8327	#8330
Server feature	#0906	#0906
Edition feature	#7784	#7785
Number/type/speed of processor	1/POWER5+/1.9 GHz	1/2-way POWER5+/1.9 GHz
Processor/OLTP CPW	3800	3800/7100
OLTP (5250) CPW	0	0
LPAR	10	10 per processor
L2 Cache/L3 Cache (MB)	1.9/36	1.9/36
Main storage (GB minimum/maximum)	1/32	1/32
Disk (GB - system minimum/maximum)	0/39234	0/39234
Minimum i5/OS/LIC level	V5R3/V5R3M5	V5R3/V5R3M5
Software group	P10	P20

## 9406 Model 520 Enterprise, High Availability and Solution Editions

The Enterprise Edition is ideal for clients with dynamic business environments who need to respond immediately to fluctuating, unpredictable On Demand Business needs. It is shipped with advanced tools for managing mixed workloads. The Enterprise Edition provides base 5250 CPW authorization up to the processor CPW value. On the 1/2-way, an additional Enterprise Enablement feature can be purchased if additional 5250 CPW is required.

The High Availability (HA) Edition is for those clients who need 24x7 availability. The 520 HA Edition must be equal in size or smaller than the primary processor to which it is linked by specific high-availability software provided by a qualified ISV. The HA Edition is physically identical to the equivalent CPW size Enterprise Edition. Different content is shipped with the HA Edition than with the Enterprise edition.

The following table summarizes the Enterprise, High Availability and Solution Editions:

9406 Model 520+							
Processor feature	#8327					#8330	
Server feature	#0906					#0906	
Edition feature	#7366 Solution	#7373 HA	#7374 HA	#7734 Enterprise	#7735 Enterprise	#7375 HA	#7736 Enterprise
Processor CPW	1200	1200	2800	1200	2800	3800/7100	3800/7100
OLTP (5250) CPW	1200	1200	2800	1200	2800	max	max
LPAR	3	3	7	3	7	10 per processor	
Number/type/speed of processor	1/POWER5+/1.9 GHz					1/2-way/POWER5+/1.9 GHz	
L2 Cache/L3 Cache (MB)	1.9/36					1.9/36	
Main storage (GB min/max)	1/32					1/32	
Disk (GB - system min/max)	17.54/39234					17.54/39234	
Minimum i5/OS/LIC level	V5R3/V5R3M5					V5R3/V5R3M5	
Software group	P10					P20	

## Model overview

The Model 520 initial installation is Customer Setup (CSU). IBM Service Representatives perform the processor upgrades within models.



This section takes a closer look at the processor features, minimum functional server, required features, and optional features of the Model 520. Refer to *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155 for schematics.

## PCI cards and features

The number of PCI cards supported by the total system depends on the input/output (I/O) towers that are attached. PCI card placement rules and LPAR configuration considerations also affect the number of slots supported.

See the table on page 48 for the number of maximum features supported by the total system and in the Model 520 system unit. See Chapter 20, “System i5 PCI and PCI-X I/O processors” on page 271, and Chapter 11, “System i5 I/O adapters and controllers” on page 135, for full descriptions of the features that are supported.

**Note:** The placement of PCI cards follows special rules. Refer to *PCI Card Placement Rules for the IBM @server iSeries Server Version 5 Release 3*, REDP-4011.

## Processor features

The Model 520 POWER5+ system supports a single processor card. The processor card supports eight Dual InLine Memory Module (DIMM DDR2) memory positions that allow memory to be plugged in the processor card (direct attach). Memory is plugged in pairs of DIMMs.

The processor cards are the:

- ▶ #8325 520 1.9GHz Processor (?-way)
  - 1.9MB L2 cache
  - no L3 cache
- ▶ #8327 520 1.9GHz Processor (?-way)
  - 1.9MB L2 cache
  - 36MB L3 cache
- ▶ #8330 520 1.9GHz Processor 0/2-way
  - 1.9MB L2 cache
  - 36MB L3 cache
- ▶ Three media bays and one operator panel bay

The three media bays consist of one half-height and two slimline bays. The half-height bay is for SCSI tape devices.

The top slimline bay is usable by IBM i5/OS for the required DVD-ROM or DVD-RAM. The second slimline bay is straight IDE and is usable only with AIX 5L or Linux partitions on 9406 Model 520 systems.

- ▶ Two system and two USB 2.0 ports
  - Neither USB port is usable by i5/OS.
  - Only system port T2 is usable by i5/OS (for #1827 Serial-UPS Conversion Cable)
- ▶ Two 10/100/1000 Mbps Ethernet ports
  - One of these Ethernet ports is usable for a local area network (LAN) console.
- ▶ Base Service Processor
- ▶ Two Hardware Management Console (HMC) ports and two SPCN ports

Refer to “Summary of the System i5 Model 520+ (9405 and 9406)” on page 53 to find the capacity and configuration maximums.

## Required features

The *required* features for the 520 system unit include:

- ▶ Specific combinations of the Processor feature, Edition feature, and Server feature.
- ▶ Main storage
- ▶ Load source disk unit - internal or external (SAN load source)
- ▶ DVD-ROM or DVD-RAM
- ▶ System console attachment specify

**Note:** A Hardware Management Console (HMC) is required to manage specific configurations. See “Hardware Management Console” on page 315 for more information.

- ▶ Rack Mount or Deskside specify.

Refer to *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155 for description of other features available for Model 520.

## Optional features

The *optional* features for the 520 system unit include:

- ▶ #2888 RIO-G Ports - 2 Copper
- ▶ #5159 850 Watt Power Supply

- ▶ #5727 Integrated Cache 40MB  
The #5727 provides a card which augments the base integrated disk controller of the model 520 with 40MB of write cache and also enables RAID-5 capability for the internal disk drives of the system unit.
- ▶ #6585 Disk Locking Kit
- ▶ #6574 - 4-Disk Slot Expansion Base Controller
- ▶ #6594 4-Disk Slot Expansion  
The #6594 cannot be controlled by the integrated base disk controller and requires a feature disk controller.
- ▶ #6598 Disk Slot Filler
- ▶ Internal tape unit

### **High-speed link on Model 520**

The Model 520 does not include as base a RIO-G port. If a RIO-G loop is required, an optional feature #2888 RIO-G Ports - 2 Copper can be added. The maximum rated speed of RIO-G is 2 GB/s (full duplex).

For more information, see *High-speed Link Loop Architecture for the IBM @server iSeries Server: OS/400 Version 5 Release 2*, REDP-3652, and the HSL Rules presentation available at:

<http://www-1.ibm.com/servers/eserver/series/ha/systemdesign.html>

### **External towers**

Refer to Chapter 10, “Towers, racks, mirroring packages, high-speed link, and i5/OS on p5” on page 117, for information about supported towers for the Model 520. See “Summary of the System i5 expansion units and towers capacity tables” on page 82 for a table of configuration maximums.

### **Model 520 upgrades**

Supported model upgrades for the Model 520 are identified in the *Upgrade* topic of the Find and Compare Tool (FACT) at:

<http://www-919.ibm.com/servers/eserver/fact/>



## System i5 Model 550+

The System i5 Model 550 is a mid-sized IBM POWER5+ server which supports the On Demand Business. It has the ability to simultaneously run multiple operating environments and dynamically distribute processing resources. This system is designed for small to mid-sized businesses, which need power and capacity to run traditional core business applications and to support IBM i5/OS applications together with Linux, Windows, AIX applications.

The Model 550 is offered as a desktop tower and a rack mounted configuration with one to four POWER5+ processors active. It provides an integrated set of hardware capabilities including two integrated 1 Gbps Ethernet ports and an integrated Small Computer System Interface (SCSI) controller. Hot-plugging is supported for PCI-X card slots, disk slots, and redundant fans. In addition, the System i5 model 550 can have input/output (I/O) towers and drawers added concurrently and have xSeries servers attached by using the Integrated xSeries Adapters to increase its capabilities.



## Model overview

This section gives an overview and takes a closer look at the minimum functional server, required features, and optional features of the System i5 model 550.

System i5 Model 550	
<b>Processor Feature</b>	<b>#8312</b>
<b>Server Feature</b>	<b>#0910</b>
Number/Type/Speed of Processors	1/4-way/POWER5+/1.9 GHz
L2 Cache/L3 Cache (MB)	1.9/36
Processor CPW / OLTP CPW	3800-14000 / 0-14000
Main Storage (GB minimum/maximum)	2/64
Maximum disk (MB)	77339
LPAR	10/40
Minimum i5/OS level	V5R3
Software group	P20

Refer to *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155 for schematics of the Model 550.

## Editions

There are five Edition offerings for the model 550: Standard, Enterprise, High Availability, Domino and Solution.

The Editions of the 550+ come with fewer licenses of i5/OS than previous 550 Editions. Most Editions on the 550+ include only one license to allow maximum flexibility in choosing the operating systems required to be deployed. The exceptions are the Domino Edition and the two SAP Solution Editions which ship with more i5/OS licences.

### **Standard Edition (#7154)**

The Standard Edition is ideal for a wide variety of On Demand Business and client/server solutions. 5250 OLTP applications modernized using the WebFacing tool of IBM WebSphere Development Studio can be run on this Edition. There is no native 5250 OLTP processing capability

### **Enterprise Edition (#7155)**

The Enterprise Edition provides additional processing support over the Standard Edition for those with traditional 5250 OLTP applications.

The Enterprise Edition includes a Base Enterprise Enablement feature which provides one processor authorization of 5250 CPW. Further Enterprise Enablement features can be purchased if additional 5250 CPW capacity is required.

The Enterprise Edition also ships with additional advanced software tools for managing mixed workloads and virtual workplace software.

System i5 Optimum Care is available upon request with the Enterprise Edition.

### **High Availability (HA) Edition (#7551)**

If 24x7 availability is needed, multiple System i5 units can be linked using with high-function third-party software. Role swapping and production on both primary and secondary servers is typical. The HA Edition is attractively priced for this purpose.

The 550 HA Edition must be equal or smaller than the primary processor to which it is linked, and the primary server must have 5250 OLTP capability. Both the primary and secondary servers must use specific high-availability software provided by a qualified ISV.

The HA Edition is physically identical to the equivalent Model 550 Enterprise Edition except different content is shipped with the High Availability Edition than with the Enterprise Edition.

### **Domino Edition (#7629)**

The Domino Edition supports many Lotus solutions as well as other client/server applications. 5250 OLTP applications are supported when modernized by tools like Webfacing.

The Domino Edition requires proof of license for two Domino Enterprise Servers and Lotus Client licenses as defined on the Domino Edition website.

### **Solution Editions (#7630 with #7631, #7632, #7640, #7641)**

Solution Editions are used with qualified ISV software to provide attractively priced solutions. Specific Solution Editions are available for some application providers.

For more information on the configuration content and a more complete definition of the service and education offerings, see:

<http://www.ibm.com/eserver/series/hardware/editions.html>

## PCI cards and features

The total number of PCI cards supported in a System i5 model 550 depends on the I/O towers that are attached. PCI card placement rules and LPAR configuration considerations also affect the number of slots that are supported.

See the table on page 48 for the number of maximum features supported by the total system and in the model 550 system unit. See Chapter 20, “System i5 PCI and PCI-X I/O processors” on page 271, and Chapter 11, “System i5 I/O adapters and controllers” on page 135, for full descriptions of the features that are supported.

**Note:** The placement of PCI cards follows special rules. Refer to *PCI Card Placement Rules for the IBM eServer iSeries Server Version 5 Release 3*, REDP-4011.

## Processor features

The Model 550 POWER5+ 1/4-way system has two 0/2-way processor cards. Each processor card consists of a #8312 550 1.9GHz Processor 0/2-way with:

- ▶ 1.9MB L2 cache
- ▶ 36MB L3 cache

## Memory features

Each processor card supports eight Dual InLine Memory Modules (DIMM DDR2) memory positions that allow memory to be plugged in the processor card (direct attach). A memory feature must be present on each processor card for a minimum of two features.

Each memory feature consists of two DIMMs. Best performance is achieved with equally sized DIMMs.

## Model 550 Capacity on Demand

The System i5 model 550 offers Capacity on Demand options that make it possible to activate additional processor resource. On Demand features are available as:

- ▶ Capacity Upgrade on Demand (Permanent)
- ▶ On/Off Capacity on Demand (Temporary)



- ▶ Reserve Capacity on Demand (Prepaid)
- ▶ Trial Capacity on Demand (Temporary)

See the following Web site for more information about Capacity on Demand:

<http://www-1.ibm.com/servers/eserver/series/ondemand/cod/>

### **Minimum functional server**

A minimum functional server consists of the base server unit and selected priced features. The base server includes:

- ▶ Five hot-plug PCI-X card slots
- ▶ Operator panel
- ▶ Base 1475W Power Supply and line cord
- ▶ Base direct access storage device (DASD) cage
- ▶ Base SCSI controller

This controller is integrated with the backplane and does not take up one of the PCI-X slots. It provides support for up to eight disk units, the required internal DVD feature and optional internal feature DVDs, and feature tapes.

- ▶ Three media bays and one operator panel bay

The three media bays consist of one half-height bay and two slimline bays. The half-height bay is for SCSI media devices. The top slimline bay is usable by i5/OS for the required DVD-ROM or DVD-RAM. The second slimline bay is only usable with AIX 5L or LINUX partitions.

- ▶ Two system and two USB 2.0 ports

One system port can be used for the UPS. Otherwise these ports are not usable by i5/OS.

- ▶ Two 10/100/1000 Mbps Ethernet ports

One of these ports can be used for a local area network (LAN) console.

- ▶ Base Service Processor
- ▶ Two Hardware Management Console (HMC) ports and two SPCN ports
- ▶ Two high-speed link (RIO-G) ports

### **Required features**

The *required* features for the 550 system unit include:

- ▶ Specific combinations of the Processor feature, Edition feature, and Server feature.
- ▶ Main storage

Two memory features are required. The minimum memory is 2GB.

- ▶ Load source disk unit - internal or external (Load source on SAN)
- ▶ DVD-ROM or DVD-RAM
- ▶ System console attachment adapter specifier

**Note:** A Hardware Management Console (HMC) is required as a console for specific configurations. See “Hardware Management Console” on page for more information.

- ▶ Disk protection specifier
- ▶ Rack Mount (default) or Deskside specify

Refer to *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155 for description of other features available for Model 550.

### Optional features

The *optional* features for the System i5 Model 550 system unit include:

- ▶ #5727 Integrated Cache 40MB

The #5727 provides a card which augments the Base Integrated Disk Controller of a model 550 with 40MB of write cache and also enables the RAID-5 capability for the disk drives situated in the system unit.

- ▶ Additional RIO-G port
- ▶ Internal tape unit
- ▶ #7889 1475W Power Supply
- ▶ #6592 4-Disk Slot Expansion
- ▶ #6593 4-Disk Slot Expansion

The #6593 cannot be controlled by the integrated base disk controller and requires a further feature disk controller.

- ▶ #6598 Disk Slot Filler

The model 550 initial installation is IBM installed. Processor upgrades within models are performed by IBM Service Representatives.

## High-speed link on Model 550

Expansion units and towers are supported using RIO-G cabling. The Model 550 supports two RIO-G loops. The maximum rated speed of the RIO-G is 2 GB/s.

For more information, see *High-speed Link Loop Architecture for the IBM @server iSeries Server: OS/400 Version 5 Release 2*, REDP-3652, and in the HSL Rules presentation available at:

<http://www-1.ibm.com/servers/eserver/series/ha/systemdesign.html>

## External towers

Refer to Chapter 10, “Towers, racks, mirroring packages, high-speed link, and i5/OS on p5” on page 117, for information about supported towers for the model 550, and “Summary of the System i5 expansion units and towers capacity tables” on page 82 for a table of configuration maximums.

## Model 550 upgrades

Supported model upgrades for the Model 550 are identified in the *Upgrade* topic of the Find and Compare Tool (FACT) at:

<http://www-919.ibm.com/servers/eserver/fact/>



A stylized graphic of a globe, rendered in a light gray tone, with several overlapping circular bands that create a sense of motion or connectivity. The globe shows the continents of North and South America.

## System i5 Model 570+

The System i5, originally introduced as the IBM @server iSeries, was the industry's first POWER5 processor-based system and is now offered with the faster 2.2 GHz POWER5+ processor. The System i5 model 570+ is designed for the complex requirements of medium to large enterprises. It can help businesses reduce datacenter complexity, simplify IT infrastructures, and effectively manage IT service level commitments.



## Highlights

Simplify your IT infrastructure, run multiple applications and even multiple operating systems simultaneously, including IBM i5/OS, Linux, IBM AIX 5L, Microsoft Windows Server, WebSphere, and Lotus Domino software on a single highly flexible, resilient System i5 570+. The 570+ offers built-in Capacity on Demand for more performance when your business needs it.

Dynamic Logical Partitioning (LPAR) allows the System i5 resources to be grouped into logically separate systems within the same physical footprint. With capabilities like “uncapped partitions,” System i5 processors can be shared between partitions (defined via policies). Micropartitioning allow you to allocate less than a full processor to a logical partition.

System i5 model 570 and i5/OS adapt to disruptive technology changes while helping to protect your business from the expense of changing or recompiling your applications.

A highly scalable, upgradable, industry-standard rack-optimized building block architecture helps support balanced growth from 2/4-way to 8/16-way systems.

## Model overview

This section provides an overview and takes a closer look at the minimum functional server, required features, and optional features.

Model 570+				
Processor feature	#8338 x 2	#8338 x 4	#8338 x 8	#8338 x 8
Server feature	#0934	#0935	#0936	#0937
Number/type/speed of processor	2/4/ POWER5+/ 2.2GHz	4/8/ POWER5+/ 2.2 GHz	8/16/ POWER5+/ 2.2GHz	2/16/ POWER5+/ 2.2 GHz
Processor CPW	8400/16000	16700/31100	31100/58500	8100/58500
Mail and Calendar Users	18200/34500	35500/67500	67500/130000	18200/130000
Main storage (GB min/max)	4/128	8/256	16/512	16/512
Logical partitions (LPAR)	20/40	40/80	80/160	20/160
Minimum i5/OS level	V5R3	V5R3	V5R3	V5R3
Software group	P30	P40	P40	P40
Disk storage (GB) system maximum	77051	116000	193898	193898
DASD arms maximum	546	822	1374	1374
External RIO-G loops	2	4	8	8
PCI/PCI-X Expansion Tower	12	24	48	48

The Model 570+ initial installation and processor upgrades within models are performed by IBM Service Representatives.

The Model 570+ is offered as a rack mounted configuration. It provides an integrated set of hardware capabilities that include two integrated 1 Gbps Ethernet ports and an integrated Small Computer System Interface (SCSI) controller for the enclosure's disk and DVD slots. Also incorporated are hot-plug PCI-X card slots and disk slots, redundant hot-plug power supplies, dual power cords, redundant hot-plug cooling fans. Hot-plugging of removable media devices is not supported.

## Editions

Editions for the 570+ comes with one license of i5/OS. This offers you greater flexibility in choosing which operating system you wish to deploy.

Four editions are offered to simplify your decision and maximize your business value: Standard, Enterprise, High Availability, and Capacity BackUp.

### **Standard Edition (#7757/#7758/#7759)**

Order the Standard Edition if you do not need the maximum flexibility of the Model 570 Enterprise Edition. The Standard Edition is featured for a wide variety of On Demand Business and client/server solutions. 5250 OLTP applications WebFaced using the WebFacing tool of IBM WebSphere Development Studio can be run with no 5250 CPW requirement.

### **Enterprise Edition (#7747/#7748/#7749)**

Order the Enterprise Edition if you need a higher level of flexibility on the model 570+. It is ideal for clients with dynamic business environments who need to respond immediately to fluctuating, unpredictable On Demand Business needs.

The Enterprise Edition includes a Base Enterprise Enablement feature which provides one processor authorization of 5250 CPW. One Enterprise Enablement feature is included in the Enterprise Edition. Purchase additional Enterprise Enablement features if you require additional 5250 CPW capacity.

The Enterprise Edition starts with the Standard Edition content and builds on it. As a total system, it integrates and exploits fundamental hardware and software for e-businesses. It is shipped with advanced tools for managing mixed workloads and virtual workplace software.

System i5 Optimum Care is available upon request with the Enterprise Edition.

### **High Availability Edition (#7763/#7764/#7765)**

If you need 24x7 availability, you can tie multiple System i5 units together with high-function third-party software. Role swapping and production on both primary and secondary servers is typical. In this multiple System i5 environment, the System i5 model for high availability is an attractively priced model 520, 550, 570, or 595 linked with a model 520, 550, 570, 595, 810, 825, 870, or 890, of equal or higher CPW.

These systems are physically identical to the equivalent Enterprise Edition model 570 except different content is shipped with the High Availability Edition than with the Enterprise Edition.

### **Capacity BackUp Edition (#7760)**

A System i5 for Capacity BackUp can give you an off-site disaster recovery machine at an affordable price. A 2/16-way model 570+ leverages On/Off Capacity on Demand capabilities into an effective backup server. Two processors can be permanently activated and used for any workload. Fourteen standby processors can be used at no-charge in the event of a disaster for an extended period of time, but cannot be permanently activated.



The Capacity BackUp Edition contains a minimal set of software content because IBM software licensing can allow the primary server's licensing to be transferred to a backup server in case the primary server is out of production.

For more information on configuration content and a more complete description of the service and education offerings, see:

<http://www.ibm.com/eserver/iseriess/hardware/editions.html>

<http://www-03.ibm.com/servers/eserver/iseriess/hardware/is4ha/>

<http://www-03.ibm.com/servers/eserver/iseriess/hardware/is4cbu/>

## PCI-X cards and features

The number of PCI-X cards that can be supported in a Model 570+ depends on whether an I/O tower is attached and the number of PCI-X slots. PCI-X card placement rules and LPAR configuration considerations also affect the number of slots supported.

See the table on page “Summary of the System i5 Model 570+ and i5 Model 570” on page 64 for the number of maximum features supported by the total system and in the Model 570 system unit. See Chapter 20, “System i5 PCI and PCI-X I/O processors” on page 271, and Chapter 11, “System i5 I/O adapters and controllers” on page 135, for full descriptions of the features that are supported.

**Note:** The placement of PCI cards follows special rules. Refer to *PCI Card Placement Rules for the IBM @server iSeries Server Version 5 Release 3*, REDP-4011.

### Processor features

The System i5 Model 570+ 2.2GHz DCM processor card #8338 is offered as a 2/4-way, 4/8-way or 8/16-way system. There is also a 2/16-way model 570+ designed for disaster recovery usage.

The model 570 processor is housed in a four EIA-unit rack-optimized processor enclosure. Each enclosure holds up to four processors (two 0/2-way processor features). Thus a 2/4-way has one processor enclosure.

Additional single processor activations are orderable with #7897.

Refer to “Summary of the System i5 Model 570+ and i5 Model 570” on page 64 to find the capacity and configuration maximums.

## Main storage

Each 2.2GHz DCM #8338 processor card supports eight Dual InLine Memory Module (DIMM DDR2) memory positions that allow memory to be plugged in the processor card. Supported memory features for the Model 570+ are available in 512MB, 1GB, 2GB, 4GB, 8GB, and 16 GB options.

Performance measurements have determined that optimal performance requires both the spreading of memory across processors and balancing memory across processors. Balance memory by having the same or similar size memory features for all processor features.

Refer to *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155 for memory rules for Model 570+.

## Model 570+ Capacity on Demand

The System i5 Model 570+ offers Capacity on Demand options that make it possible to activate additional processor resource. CUoD, On/Off Capacity on Demand, Reserve Capacity on Demand, and Trial Capacity on Demand are available for the Model 570+. Available On Demand features include:

- ▶ Capacity Upgrade on Demand (Permanent)
- ▶ On/Off Capacity on Demand (Temporary)
- ▶ Reserve Capacity on Demand (Prepaid)
- ▶ Trial Capacity on Demand

See the following Web site for more information about Capacity on Demand:

<http://www-1.ibm.com/servers/eserver/iseries/ondemand/cod/>

## Minimum functional server

A minimum functional server consists of the base server unit and selected priced features. The base server includes:

- ▶ Two base power supplies
- ▶ Base CEC enclosure including CEC backplane, a CPU Regulator, sixteen memory slots
- ▶ I/O Backplane, which includes:
  - Two USB Type A
    - Supported by specific releases of AIX 5L and specific Linux distributions. Not supported on IBM i5/OS.
  - An integrated 1 Gps/100 Mbps/ 10 Mbps UTP Ethernet LAN adapter with two ports.
    - Supported with i5/OS V5R4 for local area network (LAN) console.

- One RIO-G loop with two RIO-G ports
- One system connection port (for Service Processor flex cable connection)
- Six hot-plug PCI-X card slots
- ▶ Service Processor
  - Includes two SPCN ports, two HMC ports
- ▶ One Rack Indicator Port
- ▶ Two System ports
- ▶ System VPD card
- ▶ Direct access storage device (DASD) backplane
  - Six disk slots (three enabled with an optional Integrated Cache feature)
- ▶ A slot to add an optional card for CEC Integrated Cache and RAID-5 capability.
- ▶ Removable media backplane
  - Two slots for slimline DVD drives. i5/OS supports only one slimline removable media slot for the required DVD-ROM/RAM.
- ▶ Base I/O adapters (IOAs) or I/O processors (IOPs)
- ▶ Operator Panel

**Note:** A Hardware Management Console (HMC) is required to manage specific configurations. See “Hardware Management Console” on page 315 for more information.

## Required features

The *required* features for the 570+ system unit include:

- ▶ Specific combinations of the Processor feature, Edition feature, and Server feature. See the Model 570+ Edition Table on page 94.
- ▶ Main storage
- ▶ One internal DVD-ROM or DVD-RAM
- ▶ Load source disk unit internal or external (SAN Load source)
- ▶ A load source specify code
- ▶ A disk protection specify code
- ▶ A system console specify code

## Optional features

The model 570 offers outstanding configuration flexibility with base or included features and a large selection of optional features, the #8453 Base Customer Placement.

The #8453 places hardware components as directed by information from the LPAR Verification Tool (LVT). The client is responsible for submitting LVT information. Hardware placement can be provided at the customer site by IBM Global Services for a fee if #8453 is not on the initial order.

Refer to *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155 for description of other optional features available for Model 570+.

## High-speed link on Model 570+

The Model 570+ supports up to eight RIO-G loops with a maximum of 48 towers across all loops. The speed of the RIO-G is 2 GB/s compared to the previous high-speed link adapters that operated at 1 GB/s.

See *High-speed Link Loop Architecture for the IBM @server iSeries Server: OS/400 Version 5 Release 2*, REDP-3652, and the HSL Rules presentation available at:

<http://www-1.ibm.com/servers/eserver/series/ha/systemdesign.html>

## External towers

Refer to Chapter 10, “Towers, racks, mirroring packages, high-speed link, and i5/OS on p5” on page 117, for information about supported towers for the Model 570+, and “Summary of the System i5 expansion units and towers capacity tables” on page 82 for a table of configuration maximums.

## Model 570+ upgrades

Supported model upgrades for the Model 570 are identified in the *Upgrade* topic of the Find and Compare Tool (FACT) at:

<http://www-919.ibm.com/servers/eserver/fact/>



## eServer i5 Model 595

The System i5 Model 595 is the largest and most powerful member of the POWER5 technology-based servers with four processor points, an 8/16-way, a 16/32-way, a 32/64-way, and a 4/32-way. Performance has increased to a maximum rating of 184,000 commercial processing workload (CPW). A new Capacity BackUp Edition has been added to provide a cost effective, disaster recovery solution.

The Model 595 consists at a minimum of two enclosures: a two-meter system unit enclosure and an I/O tower about one meter in height.



## Highlights

Simplify your IT environments by enabling your business to deploy multiple applications and even multiple operating systems simultaneously, including IBM i5/OS, Linux, IBM AIX 5L, Microsoft Windows Server, WebSphere, and Lotus Domino software on a single highly flexible, resilient System i5 595.

Built-in Capacity on Demand features allow your business to dynamically respond to unexpected demands for CPU and/or memory and to meet constantly changing business priorities.

Dynamic Logical Partitioning (LPAR) allows the IBM System i5 resources to be grouped into logically separate systems within the same physical footprint. With capabilities like “uncapped partitions”, System i5 processors can be shared between partitions (defined via policies). Micropartitioning allows the allocation of less than a full processor to a logical partition.

System i5 595 and i5/OS adapt to disruptive technology changes while helping to protect your business from the expense of changing or recompiling your applications.

Unmatched scalable, upgradeable, building block architecture supports balanced growth from 8/16-way to 32/64-way systems.

# Model overview

This section has an overview table and takes a closer look at the minimum functional server, required features, and optional features.

Model 595				
Processor feature	#8966	#8966 x 2	#8966 x 4	#8966 x 2
Server feature	#0940	#0941	#0943	#0944
Number/type/speed of processor	8/16 /POWER5/ 1.9 GHz	16/32 /POWER5/ 1.9 GHz	32/64 /POWER5/ 1.9 GHz	4/32/POWER 5/1.9GHz
Relative system performance				
Processor CPW	26700/50500	51000/92000	92000/184000	13600/92000
Mail and Calendar Users	60500/114000	115000/213000	213000/405000	31500/213000
Main storage (GB minimum/maximum)	8/512	16/1024	32/2048	16/1024
Logical partitions (LPAR)	160	254	254	254
Disk storage (GB)				
Total maximum	228614	381024	381024	381024
DASD arms maximum	1620	2700	2700	2700
Physical packaging				
External RIO-G loops	7	15	31	12
PCI/PCI-X Expansion Tower	36	72	96	72
Software group	P50	P50	P60	P50
Minimum i5/OS level	V5R3	V5R3	V5R3	V5R3

The Model 595 initial installation and processor upgrades within models are performed by IBM Service Representatives.

Refer to *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155 for schematics of the Model 595.

## Editions

Four Editions are offered: Standard, Enterprise, High Availability, and Capacity BackUp. All editions for the Model 595 come with four licenses of i5/OS.

### Standard Edition (#7480/#7482/#7486)

The Standard Edition is ideal for a wide variety of On Demand Business and client/server solutions. 5250 OLTP applications modernized using the WebFacing tool of IBM WebSphere Development Studio can be run on this Edition.

### **Enterprise Edition (#7481/#7483/#7487)**

The Enterprise Edition provides additional processing support over the Standard Edition for those with traditional 5250 OLTP applications.

The Enterprise Edition includes a Base Enterprise Enablement feature which provides four processor authorizations of 5250 CPW. Further Enterprise Enablement features may be purchased if additional 5250 CPW capacity is required. The Enterprise Edition also ships with additional advanced software tools for managing mixed workloads and virtual workplace software.

Upon request System i5 Optimum Care is available with this edition.

### **High Availability (HA) Edition (#7580, #7581, #7583)**

If 24x7 availability is needed, multiple System i5 units can be linked using with high-function third-party software. Role swapping and production on both primary and secondary servers is typical.

The 595 HA Edition must be smaller than or equal in size (CPW) to the primary processor to which it is linked, and the primary server must have 5250 OLTP capability. Both the primary and secondary servers must use specific high-availability software provided by a qualified ISV.

These systems are physically identical to the equivalent Enterprise Edition model 595 except different content is shipped with the High Availability Edition than with the Enterprise Edition.

### **Capacity BackUp (CBU) Edition (#7590)**

A System i5 model for Capacity BackUp can give you an offsite, disaster recovery machine at an affordable price. A 4/32-way model 595 leverages On/Off Capacity on Demand capabilities into an effective backup server. I/O and memory minimums and maximums are the same as the 16/32-way 595 server. The 28 standby processors of the 595 Capacity BackUp server cannot be permanently activated.

The System i5 for Capacity BackUp server is not intended for, or priced as, a backup server for 24x7 high availability solutions that require day-to-day full operation of the backup server.

For more information on the edition's content and a complete definition of the service and education offerings, see:

<http://www.ibm.com/eserver/series/hardware/editions.html>

<http://www.ibm.com/eserver/series/hardware/is4ha>



## Model 595 PCI cards and features

The number of PCI cards that can be supported in a Model 595 depends on the number of I/O tower is attached and the number of PCI slots. PCI card placement rules and LPAR configuration considerations also affect the number of slots supported.

See the Summary table on page 109 for the number of maximum features supported by the total system and in the Model 595 system unit.

**Note:** The placement of PCI cards follows special rules. Refer to *PCI Card Placement Rules for the IBM @server iSeries Server Version 5 Release 3*, REDP-4011 before you propose any configuration.

### Processor features

The Model 595 POWER5 system supports from one to four processor books. Each #8966 595 1.9Ghz Processor 0/16-way processor book has two 8-way Multi Chip Modules (MCM). Each processor book supports sixteen Dual InLine Memory Module (DIMM DDR1) memory positions that allow memory to be plugged in the processor card (direct attach). Each processor MCM has 36 MB of L3 cache and 1.9 MB of L2 cache.

Refer to “Summary of the System i5 and eServer i5 Model 595” on page 69 to find the capacity and configuration maximums.

### Main Storage

Refer to *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155 for memory options and placement rules.

### Model 595 Capacity on Demand

The System i5 Model 595 offers Capacity on Demand options that make it possible to activate additional processor resource on either a permanent or temporary basis. The options are:

- ▶ Capacity Upgrade on Demand (Permanent)
- ▶ On/Off Capacity on Demand (Temporary)
- ▶ Reserve Capacity on Demand (Prepaid)
- ▶ Trial Capacity on Demand (Temporary)

See the following Web site for more information about Capacity on Demand:

<http://www-1.ibm.com/servers/eserver/series/ondemand/cod/>

### **Minimum functional server**

A minimum functional server consists of the base server unit and selected priced features. The Model 595 supports hot plug and concurrent add of PCI cards, disk units, and removable media devices.

Included in the base server are the physical package and power elements as follows:

- ▶ System unit (also known as the Central Electronics Complex or CEC)
- ▶ #9194 Base PCI-X Expansion Tower
- ▶ Line cords
- ▶ Power Assemblies
- ▶ CEC Rack Front and Rear Doors
- ▶ #3757 Service Shelf Toolkit
- ▶ Up to four 16-way processor books (each has two 8-way MCMs)
- ▶ Sixteen main storage card slots in each processor book
- ▶ Seven slots for feature RIO-G adapters in first processor book, eight slots in each of the second, third and fourth processor books.
- ▶ Two #7818 RIO-G 2-port Copper
- ▶ One #9844 Base PCI IOP

**Note:** A Hardware Management Console (HMC) is required to manage specific configurations. See “Hardware Management Console” on page 315 for more information.

- ▶ Two Service Processors

## Required features

The *required* features for the 595 system unit include:

- ▶ Supported specific combinations of the Processor feature, Edition feature, and Server feature. See Model 595 Edition Table on page 95.
- ▶ Main storage
- ▶ PCI disk controller (SCSI or Fibre IOA)
  - The SCSI IOA supports the DVD-ROM, DVD-RAM, migrated CD-ROM, internal tape, and disk units in the base PCI enclosure.
  - #2757 PCI-X Ultra RAID Disk Controller
  - #2780 PCI-X Ultra RAID Disk Controller (the base default)
  - #2847 PCI IOP for SAN Load Source with #2787 or #5760 PCI-X Fibre Channel Disk Controller
  - #5580 #2780 Controller with Auxiliary Write Cache
  - #5581 #2757 Controller with Auxiliary Write Cache
- ▶ Removable optical device
- ▶ Internal Load Source or SAN Load Source and associated Load Source Specify Code
- ▶ Disk protection specify code
- ▶ System console
  - #5540 System Console on Twinaxial Workstation IOA
  - #5544 System Console on Operations Console
  - #5546 System Console on 100 Mbps Token Ring
  - #5548 System Console on 100 Mbps Ethernet
  - #5550 System Console On HMC
  - #5557 System Console Ethernet No IOP
- ▶ Communications adapter

Refer to *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155 for description of other features available for Model 595.

## High-speed link on Model 595

The Model 595 supports up to a maximum of 31 RIO-G loops with a maximum of 96 I/O towers across all loops. The speed of the RIO-G is 2 GB/s compared to the previous high-speed link adapters that operated at 1 GB/s.

See *High-speed Link Loop Architecture for the IBM @server iSeries Server: OS/400 Version 5 Release 2*, REDP-3652, and in the HSL Rules presentation available at:

<http://www-1.ibm.com/servers/eserver/series/ha/systemdesign.html>

## External towers

Refer to Chapter 10, “Towers, racks, mirroring packages, high-speed link, and i5/OS on p5” on page 117, for details about supported towers for the Model 595, and “Summary of the System i5 expansion units and towers capacity tables” on page 82 for a table of configuration maximums.

### **#9194 Base PCI-X Expansion Tower**

The #9194 Base PCI-X Expansion Tower is the base PCI I/O enclosure shipped with a Model 595 server. It has 15 disk unit slots and can be expanded to a total of 45 disk unit slots with the addition of the optional. One #9844 Base PCI IOP and one #9793 Base PCI 2-Line WAN w/Modem are included.

### **#8294 Optional Base 1.8M Rack**

The #8294 Optional Base 1.8M Rack is a racking option for a Model 595 and can be substituted for #9194 Base PCI-X Expansion Tower. It has 90 disk unit slots, 28 PCI-X slots, four removable media slots, and is the equivalent to two I/O towers.

The #8294 is a 1.8m rack with two enclosures; a bottom enclosure and a top enclosure. The bottom enclosure is basically a #9194 Base PCI-X Expansion Tower with the optional #5168 30 disk unit expansion enclosure feature while the top enclosure is basically a #5094 PCI-X Expansion Tower with optional #5108 30 disk unit expansion enclosure feature. The #5168 and #5108 optional 30 disk unit expansion enclosure features are not required for a #8294

Included with the bottom enclosure are a #9517 Base HSL-2/RIO-G Bus Adapter and a #9844 Base PCI IOP. The top enclosure comes with a #9517 Base HSL-2/RIO-G Bus Adapter and no #9844 Base PCI IOP.

Each enclosure supports 45 disk units for a total of 90 disk units.

## Model 595 upgrades

Supported model upgrades for the Model 595 are identified in the *Upgrade topic* of the Find and Compare Tool (FACT) at:

<http://www-919.ibm.com/servers/eserver/fact/>

## Customization options

Customer specified card placement, rack placement, partition initialization, and operating system preload (currently limited to i5/OS and AIX5L) into defined partitions options are available for new systems. You can find detailed information at the following web site:

<http://www-1.ibm.com/servers/eserver/power/csp/series.html>

## Towers, racks, mirroring packages, high-speed link, and i5/OS on p5

To house components beyond the capability of the system unit, towers are added. Expansion towers are offered for new or migrated PCI features. Rack mounting options are available for select systems and towers. Towers and rack-mounted devices are connected to each other using high-speed links (HSL), either HSL or HSL-2/RIO-G.



For information about the software required to support towers and input/output (I/O) on System i5 servers, refer to Informational APAR II13440 on the Web at:

[http://www-912.ibm.com/n\\_dir/nas4apar.nsf/nas4aparhome](http://www-912.ibm.com/n_dir/nas4apar.nsf/nas4aparhome)

To learn about planning for System i5 racks, including PDU specifications, the number of PCI cards supported, and the number of EIA units, refer to the iSeries racking presentation at:

<http://www-1.ibm.com/servers/eserver/support/series/planning/pdf/seriesracking.pdf>

For configuration rules for tower and migration, see *IBM @server iSeries Migration: System Migration and Upgrades at V5R1 and V5R2*, SG24-6055, and *IBM @server iSeries Migration: A Guide to Upgrades and Migrations to POWER Technology*, SG24-7200. Refer to the *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155, for detailed information about each migration tower.

**Note:** The @server i5 520, 550, 570, and 595 do not support migration towers or SPD hardware.

## PCI and PCI-X expansion towers

Expansion towers provide System i5 servers with the ability to support additional I/O and disk units. For information about the number and types of towers supported by each System i5 server, see Chapter 5, “Today’s System i5 summary” on page 47.

### #5088 PCI-X Expansion Unit

The #5088 is an eight-EIA-unit-high “top hat” installed on top of a #5074/#5094 expansion tower, or on top of a #9079 Base I/O Tower or #9094 Base PCI I/O Enclosure. The #5088 has 14 PCI-X slots for PCI IOPs and IOAs. Disk units and removable media are not supported by the #5088. A 5088 cannot be converted to a #0588.

For a schematic of the #5088, see the *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155.

### #0588 PCI-X Expansion Unit in Rack

The #0588 is the equivalent of a #5088 PCI-X Expansion Unit, but the #0588 is mounted in a rack. A #0588 is eight EIA units high and has 14 PCI-X slots for PCI IOPs and IOAs. Disk units and removable media are not supported by the #0588. An #0588 can be on initial, upgrade, or MES orders, but cannot be converted to a #5088.

### #5094 PCI-X Expansion Tower

The #5094 PCI-X Expansion Tower has 15 disk unit slots, with an additional 30 slots available when using feature #5108 Disk Unit Expansion. The 45 disk unit positions are in groups of 15. The #5094 has two removable media slots and 14 PCI-X card slots.

### **#5108 30 Disk Expansion Feature**

The #5108 is a disk unit expansion enclosure feature for a #5094 Base I/O Expansion Tower and the #9094 Base PCI I/O Enclosure. It includes two 15 disk unit enclosures, one 840-watt power supply, backplanes, and cables.

A schematic of the #5094 PCI-X Expansion Tower can be found in *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155.

### **#5115 Dual Line Cords - Tower**

The #5115 is a dual line cord enabler for the upper unit in a #8094 Optional 1.8 M I/O Rack, and for the #5094 PCI-X Expansion Tower.

## #5095 PCI-X Expansion Tower

The #5095 PCI-X Expansion Tower has seven PCI-X IOP/IOA slots and supports up to 12 disk units. A #5095 cannot be converted to a #0595.

A schematic of the #5095 PCI-X Expansion Tower can be found in *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155.

## #0595 PCI-X Tower Unit in Rack

#0595 PCI-X Expansion Unit in Rack is the racked version of the #5095 PCI-X Expansion Tower which provides I/O capability for System i5 servers. The #0595 has functional capabilities identical to the #5095. The #0595 has seven PCI-X IOP/IOA slots and supports up to 12 disk units. The #0595 requires 5 EIA Units in a rack. A #0595 cannot be converted to a #5095.

A schematic of the #0595 PCI-X Expansion Unit in Rack can be found in *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155.

## #5294 1.8m I/O Tower

The #5294 1.8m I/O Tower has space for up to 90 disk units, 28 PCI-X IOA/IOP slots, and up to four removable media units. A #5294 is equivalent to two #5094 PCI-X Expansion Towers with side covers and casters removed, and with two 30-disk expansion included (no feature required) and placed in a 1.8 M tower.

The 90 disk unit positions are controlled by up to 18 OS/400 or Linux controlled disk controllers.

The #5294 also supports up to four removable media devices (internal tape or CD-ROM/DVD). These removable media devices are supported by the two PCI RAID Disk Unit Controllers

A schematic of the #5294 1.8m I/O Tower can be found in *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155.

## #5116 Dual Line Cords - #5294 Tower

The #5116 provides dual line cord capability for a single enclosure in a #5294 tower.



## #5790 PCI-X Expansion Unit

The #5790 PCI Expansion Drawer is a rack mounted, four EIA, half-wide unit that has six full-length 64bit PCI-X slots requiring four units of vertical space in the rack. The #5790 PCI-X Expansion Unit requires i5/OS V5R3.

A schematic of the #5790 PCI-X Expansion Unit can be found in *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155.

## #7307 Dual I/O Unit Enclosure

The #7307 enclosure provides the mounting hardware, with adjustable rails, required to install a #5790 I/O drawer in a #0551, #0553, #0554, or #0555 rack. The enclosure can accommodate two #5790 drawers, side by side, but it may also be used with only one #5790 drawer installed.

The #7307 and #7311 are functionally equivalent except the #7307 can be used in the #0554 and #0555 racks and has rails adjustable to 29.25 inches depth.

## #7311 Dual I/O Unit Enclosure

The #7311 enclosure provides the mounting hardware required to install a #5790 I/O drawer in a #0551 or #0553 rack. The enclosure can accommodate two #5790 drawers, side by side, but it may also be used with only one #5790 drawer installed.

## Racks

Options are available to rack mount selected System i5 models and towers. Rack mounting allows multiple components to be mounted in a rack, conserving floor space and providing a secure environment for the devices.

### #0551 iSeries Rack

The #0551 iSeries Rack is an empty 1.8-meter rack that provides a total of 36 EIA units of space.

### #0553 iSeries 2.0m Rack

The #0553 iSeries 2.0m Rack is a 19-inch wide two meter high rack which contains 42 EIA units of space.

## **#0554 iSeries 11U Rack**

The #0554 iSeries 11U Rack provides a 19-inch .6 meter (24-inch) high rack with eleven EIA units of total space for installing rack mounted system units and/or expansion units. The #0554 includes a lockable front door.

## **#0555 iSeries 25U Rack**

The #0555 iSeries 25U Rack provides a 19-inch, 1.3 meter (49-inch) high rack with 25 EIA units of total space for installing rack-mounted system units and/or expansion units. The #0555 includes lockable front and rear doors.

## **#0599 Rack Filler Kit**

The #0599 Rack Filler Kit provides four spare filler panels 3x 1U and 1x 3U height. Use the filler panels if equipment is removed from racks. The #0599 helps ensure and maintain proper air flow, and improves the appearance of the rack.

## **#6586 Modem Tray for 19-Inch Rack**

The #6586 Modem Tray for 19-Inch Rack feature provides hardware for installing one or two modems in a 19-inch rack. The modem tray occupies 1U of rack space when it is mounted in the front of the rack. It provides a secure location in the rack for external modems such as the ones attached to the Hardware Management Console.

## **#7198 Adjustable Depth Rack Rails**

The #7198 Adjustable Depth Rack Rails provides rails that are adjustable to a depth of 29.5 inches for mounting a model 520 system unit in an OEM rack. The fixed depth rail provided in the prerequisite #7884, 520 Rack Mount specify, are replaced by the adjustable rails. The adjustable rails are installed by the client. The combination of #7884 and #7198 is equivalent to the #7883 specify feature.

## **#7841 Ruggedize Rack Kit**

The #7841 Rugged Rack Kit provides additional hardware that reinforces the rack and anchors it to the floor. The #7841 kit is designed to provide enhanced rigidity and stability for racks primarily installed in locations where earthquakes are a concern. This feature includes a large steel brace or truss that bolts into the rear of the rack.

## #7937 595 Bolt-Down (Low Raised Floor)

The #7937 provides rack ruggedizing and bolt-down hardware for securing a 24-inch rack to a concrete floor beneath a 9.25" to a 11.75" (235mm to 298mm) raised floor. Installation of this feature helps to secure and protect the rack and its contents from damage when exposed to vibrations and shocks, such as those in a seismic event.

## #7738 595 Bolt-Down (High-Raised Floor)

The #7938 provides rack ruggedizing and bolt-down hardware for securing a 24-inch rack to a concrete floor beneath a 11.75" to 16.0" (298mm to 405mm) raised floor. Installation of this feature helps to secure and protect the rack and its contents from damage when exposed to vibrations and shocks, such as those in a seismic event.

## #7939 595 Bolt-Down (Non-raised floor)

The #7939 provides rack ruggedizing and bolt-down hardware for securing a 24-inch rack to a concrete floor. Installation of this feature helps to secure and protect the rack and its contents from damage when exposed to vibrations and shocks, such as those in a seismic event.

## EIA units in a rack

The marketing configurator does not manage rack space in the #0551/#0553/#0554/#0555 racks. Use the following table to determine the number of EIA units required in the #0551 for each System i5 system unit or expansion tower.

System unit or expansion tower	EIA units
3581- xx3, xx7	5
3581- L28	2
3582	4
3583	14
3590	12
3592	10
Model 270 System Unit	16 EIA units (includes one for #0127, 2 for #0133 and #0137)

System unit or expansion tower	EIA units
Model 520 System Unit	4
Model 550 System Unit	4
Model 570 Processor 0/4and 2/4-way	4
Model 570 Processor 4/8 and 5/8-way	8
Model 570 Processor 9/12-way	12
Model 570 Processor 2/16, 8/16 and 13/16-way	16
Model 595 Processor	18 EIA in a 24-inch Enterprise Rack
Model 800 System Unit	16 EIA units (includes 2 EIA for #0133 and #0137)
Model 810 System Unit	16 EIA units (includes 2 EIA for #0133 and #0137)
Model 825 System Unit	16 EIA units (includes 2 EIA for #0134 and #0138)
Model 870 System Unit	17 EIA in a 24-inch Enterprise Rack
Model 890 System Unit	17 EIA in a 24-inch Enterprise Rack
#0551 iSeries Rack	36
#0578 PCI Expansion Unit in Rack	8
#0588 PCI-X Expansion Unit in Rack	8
#5094 PCI-X Expansion Tower	14
#0595 PCI-X Expansion Unit in Rack	5
#5560 MIRROR 35GB Drawer Package	5
#5561 MIRROR 70GB Drawer Package	5
#5790 PCI-X Expansion drawer	4 (two can be mounted side by side)
#6586 Modem Tray for 19-Inch Rack	1
7210-025 External DVD RAM Drive	2 EIA (includes the #8723 rack shelf)
7210-030 External DVD RAM Drive	2 EIA (includes the #8723 rack shelf)
7212-102 Tape/Optical Rack Enclosure	1
7307 Dual I/O Unit Enclosure	4
7310-CR2/CR3 Hardware Management Console	1

System unit or expansion tower	EIA units
7311 Dual I/O Unit Enclosure	4

For more information about the EIA units used in a rack or tower, refer to the following Web site:

<http://www-1.ibm.com/servers/eserver/support/series/planning/index.html>

## Mirror disk controller packages

The following packages for bus level, IOP level, or disk level mirroring are offered.

### #5555 Mirror 70GB Disk/Controller Package

The #5555 Mirror 70GB Disk/Controller Package provides a disk unit controller (a #2780 PCI-X Ultra RAID Disk Controller equivalent) and twelve 15k rpm 70 GB disk units (a #4327 70.56 GB 15k RPM Disk Unit equivalent) for servers doing mirroring. Either a #0042 Mirrored System IOP Level or #0043 Mirrored System Bus Level is a prerequisite.

### #5556 Mirroring 140 GB Disk/Controller Package

The #5556 Mirroring 140 GB Disk/Controller Package provides a disk unit controller (a #2780 PCI-X Ultra RAID Disk Controller equivalent) and twelve 15k RPM 141.12 GB disk units (a #4328 141.12 GB 15k RPM Disk Unit equivalent) for servers doing bus level mirroring. Either a #0042 Mirrored System IOP Level or #0043 Mirrored System Bus Level is a prerequisite.

### #5560 Mirror 35GB Drawer Package

The #5560 Mirror 35GB Drawer Package feature includes one #0595 PCI-X Expansion Unit in Rack, one Base PCI IOP (#9844 Base PCI IOP), twelve disk units, #4326 35.16 GB 15k RPM Disk Units and two high-function, large write cache disk controllers (#2757 PCI-X Ultra RAID Disk Controller or newer) for servers doing mirroring. The #0040 Mirrored System Disk Level is a prerequisite.

### #5561 Mirror 70GB Drawer Package

The #5561 Mirror 70GB Drawer Package feature includes one #0595 PCI-X Expansion Unit in Rack, one Base PCI IOP (#9844 Base PCI IOP), twelve disk units (#4327 70.56 GB 15k RPM Disk Units) and two high-function, large write

cache disk controllers (a #2757 PCI-X Ultra RAID Disk Controller or newer) for servers doing mirroring. The #0040 Mirrored System Disk Level is a prerequisite.

## #5562 Mirror 35 GB Tower Package

The #5562 Mirror 35 GB Tower Package feature includes one #5095 PCI-X Expansion Tower, one Base PCI IOP (#9844 Base PCI IOP), twelve 15k RPM Disk Units, (#4326 35.16 GB 15k RPM Disk Units) and two high-function, large write cache disk controllers (#2757 PCI-X Ultra RAID Disk Controller or newer) for servers doing mirroring. The #0040 Mirrored System Disk Level is a prerequisite.

## #5563 Mirror 70GB Tower Package

The #5563 Mirror 70GB Tower Package feature includes one #5095 PCI-X Expansion Tower, one Base PCI IOP (#9844 Base PCI IOP), twelve disk units (#4327 70.56 GB 15k RPM Disk Units) and two high-function, large write cache disk controllers (#2757 PCI-X Ultra RAID Disk Controller or newer) for servers doing mirroring. The #0040 Mirrored System Disk Level is a prerequisite.

## HSL fabric

HSL loops provide redundancy to all attached towers. In addition, the implementation of HSL and OS/400 provide data flow balancing across the loop by assigning communication paths during an initial program load (IPL) to optimize loop throughput based upon loop and tower configurations.

HSL loops can be either copper or optical. Optical provides longer distance, but offers a lower data rate.

Considerations for loop configurations include:

- ▶ Rack mounted Model 520 system units can only attach to HSL-2/RIO-G cables 2.5m or longer and can only attach to SPCN cables 3m or longer. Shorter cable lengths do not allow the system unit to be pulled out from the rack far enough for concurrent maintenance.
- ▶ The speed allowed by the two nodes of a link with @server i5 servers attached are:
  - 1 GB/s for RIO-G to RIO-G
  - 500 MB/s for RIO to RIO-G

The HSL bus structure provides:

- ▶ Performance improvements and future system growth
  - Up to 1 GB/s technology with HSL or HSL-2 (copper HSL or HSL-2 cables)
  - Up to 2 GB/s technology with HSL-2/RIO-G (copper HSL-2 cables) on Models 520, 550, 570, and 595 up to the 10m cable length: Use of the 15m cables on these loops results in reduced speeds.

You can find the base rules for tower placement in the *IBM @server iSeries and AS/400e System Builder*, SG24-2155.

Refer to the following publications for an explanation of HSL configuration rules and placement considerations:

- ▶ *IBM @server iSeries Migration: A Guide to Upgrades and Migrations to POWER Technology*, SG24-7200

This redbook also contains configuration rules for @server i5 Models and towers.

- ▶ *IBM @server iSeries Migration: System Migration and Upgrades at V5R1 and V5R2*, SG24-6055

This redbook also contains configuration rules for System i5 models and towers.

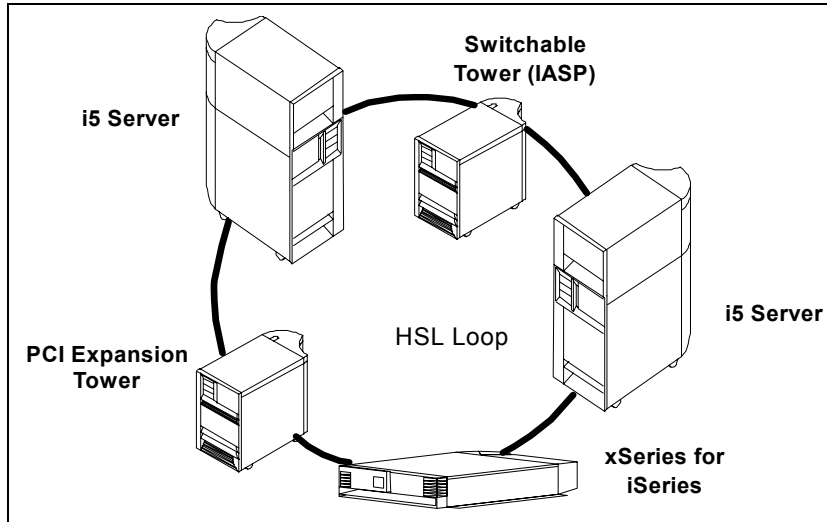
- ▶ *High-speed Link Loop Architecture for the IBM @server iSeries Server: OS/400 Version 5 Release 2*, REDP-3652

Also refer to the following web sites.

[http://publib.boulder.ibm.com/infocenter/eserver/v1r2s/en\\_US/index.htm](http://publib.boulder.ibm.com/infocenter/eserver/v1r2s/en_US/index.htm)

[http://www-1.ibm.com/servers/eserver/series/ha/pdf/HSL\\_rules\\_V5R3.pdf](http://www-1.ibm.com/servers/eserver/series/ha/pdf/HSL_rules_V5R3.pdf)

The following figure shows the HSL connectivity of loops.



## HSL OptiConnect

In system complexes that contain only V5R1 HSL hardware, the HSL OptiConnect loop implementation consists of loops that may contain up to four PCI/PCI-X I/O towers and units or external xSeries servers between two System i5 servers. The same is also true for OS/400 V5R2 scenarios. However, V5R2 allows for three System i5 servers to be connected on an HSL OptiConnect loop. When there are three System i5 servers on a loop, there cannot be any I/O towers or external xSeries servers on that loop.

In an HSL OptiConnect loop, external xSeries servers count against the per loop tower limits. Depending on the number of towers and I/O operations performed in these towers, overall system performance may be impacted.

## HSL loops

System i5 models have HSL-2/RIO-G ports to serve loops at a maximum speed of 2 GB per second. Only a limited number of towers can be enabled for this higher speed.

**Note:** HSL-2 also supports HSL towers (such as #5074 or #5079) in the loop. However, mixing these towers with HSL-2 in the same loop slows down faster devices.



The following table identifies the HSL loop maximums.

<b>System maximums</b>	<b>520</b>	<b>550</b>	<b>570</b>	<b>595</b>	<b>800</b>	<b>810</b>	<b>825</b>	<b>870</b>	<b>890</b>
HSL loops	1	2	8	31	1	1	3	8	14
HSL loops supporting fiber optic cables	0	1	4	24	0	0	2	6	12
I/O units	6	12	48	96	1	4	18	47	47
Integrated xSeries Adapter cards in xSeries towers	8	16	57	57	3	7	18	60	60
I/O units and Integrated xSeries Adapter cards	9	18	60	60	4	8	27	60	60
HSL OptiConnect loops	1	2	8	24	1	1	2	7	13
HSL migration tower	0	0	0	0	0	0	0	0	0
<b>HSL loop maximums</b>									
I/O units	6	6	6	6	1	4	6	6	6
Integrated xSeries Adapter cards in xSeries towers	8	8	8	8	3	7	8 <sup>1</sup>	8	8
I/O units and Integrated xSeries Adapter cards	9	9	9	9	4	8	9	9	9
<b>HSL OptiConnect loop: Two systems</b>									
I/O units and Integrated xSeries Adapter cards	4	4	4	4	4	4	4	4	4
<b>HSL OptiConnect loop: Three systems</b>									
I/O units and Integrated xSeries Adapter cards	0	0	0	0	N/A	N/A	0	0	0
<p><b>Notes:</b> I/O unit maximums do not include the base I/O tower attached to Models 840, 870, and 890. An I/O unit contains two HSL ports (0 and 1). The #5079 and #5294 I/O towers have two I/O units.</p> <p><sup>1</sup> Model 825: Maximum of five Integrated xSeries Adapters on loops A and C. Maximum on loop B is eight.</p> <p><sup>2</sup> Models 830 and 840: Maximum of eight Integrated xSeries Adapters. Limit on first loop is one, 0 if with migration tower.</p>									

You should see comparable performance due to the high bandwidth of HSL, whether using copper or optical HSL, even though optical runs at a slower speed. However, some performance degradation is possible with optical HSL for intensive I/O bandwidth requirements (for example, large system data mining). Use less than the allowed maximum number of I/O towers on an optical HSL loop to optimize performance.

## eServer i5 Models 520, 550, 570, and 595 tower and drawer support

This section identifies the towers and drawers supported on @server i5 Models 520, 550, 570, and 595. The following table assumes the maximum number of processor features to support the maximum number of loops. The maximum number of towers may be less on other processor features supporting a lower maximum number of loops.

A base I/O tower, where applicable to a model is included in these maximum values.

Tower/drawer	520	550	570				595		
<b>Number of loops</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>4</b>	<b>6</b>	<b>8</b>	<b>7</b>	<b>15</b>	<b>31</b>
Towers	6	12	12	24	36	48	36**	72**	96**
IXA (1519-100/200)	8	16	16	32	48	57	48	57	57
7040-61D*	0	0	0	0	0	0	4	4	4
Combined totals	9	18	18	36	54	60	36**	72**	96*
<p>* AIX and Linux partition only. Available for the purpose of consolidating existing @server p5 servers. The @server i5 and iSeries Marketing Configurator does not support the configuration of these towers.</p> <p>** Includes the primary I/O tower</p>									

## IBM i5/OS on eServer p5

@server p5 enables clients to run relatively large AIX 5L workloads along side a small amount of i5/OS workload. Many @server p5 I/O components are different from @server i5 I/O components. For example, i5/OS uses an IOP, and disk drives on @server i5 models are formatted differently and have additional function than disk drives on @server p5 servers. The i5/OS V5R3 operating system, for @server i5, runs on @server p5 servers to support @server i5 I/O. Each @server p5 partition acts as a separate i5/OS server.

i5/OS support on @server p5 servers is facilitated through the use of a 9411-100 @server p5 I/O subsystem for i5/OS. The 9411-100 allows clients who use the @server p5 model to consolidate i5/OS workloads onto their server. The 9411-100 is ordered for each @server p5 server running i5/OS to facilitate hardware feature orders for the i5/OS partitions.

The i5/OS operating system that runs on @server p5 servers is the same as i5/OS that runs on @server i5 servers. Since the @server i5 and @server p5 are built with the same POWER5 processors and server technology, i5/OS applications that run on @server i5 can run on @server p5 unchanged.

For a list of ISV applications that are available on i5/OS see:

<http://www-1.ibm.com/servers/eserver/series/solutions/v5r3ready/>

### 9411-100 eServer p5 I/O Subsystem for i5/OS

The 9411-100 @server p5 I/O Subsystem for i5/OS provides a machine type and model with prices, warranty, and service identical to that provided for the same I/O features on a @server i5 model. The 9411-100 i5/OS I/O is basically an administrative holder of @server i5 I/O that is attached to @server p5.

**Note:** From an IBM marketing configurator view, i5/OS support on the @server p5 is like having a machine type for a subsystem. Each tower, drawer, adapter, and DASD is a feature of the subsystem machine type.

The 9411-100 is the structure under which the 5250 OTLP capability is ordered. Like the System i5, each Enterprise Enablement feature provides one processor authorization of 5250 Online Transaction Processing (OLTP) capacity.

There is a maximum of one 9411-100 for each @server p5 server. A unique 9411-100 serial number is associated with a specific @server p5 server and stays with that server. It cannot be transferred to a different @server p5 serial number. All the I/O features associated with the 9411-100, with the exception of

the Enterprise Enablement feature, may be transferred to another 9411-100 associated with a different @server p5 server.

The 9411-100 uses the same hardware feature codes as used for the 9406 @server i5 machine type. If a @server p5 client has all the System i5 I/O they need, the 9411-100 starts as an empty model. The IBM administrative system transfers the existing @server i5 I/O features into this 9411-100. New @server i5 I/O features are ordered against the 9411.

The 9411-100 provides the I/O for any i5/OS partitions running on a 1.65 GHz @server p5 570, 590, or 595 server. Specifically, the 9411-100 is supported on the following @server p5 models:

- ▶ The 1.65 GHz 9117 570 supports one processor worth of i5/OS workload.
- ▶ The 1.65 GHz 9119 590 and 595 supports up to two processors worth of i5/OS workload.

The I/O maximums for a 9411 are consistent with an @server i5 Model 570:

- ▶ 270 disk drives
- ▶ 19 TB disk storage
- ▶ 18 Integrated xSeries Servers
- ▶ Eight Integrated xSeries Adapters
- ▶ 84 PCI slots
  - 192 communication lines
  - 36 LAN ports
  - 48 twinax controllers
- ▶ 12 internal DVD/CD/tape drives

The minimum configuration for a 9411-100 is:

- ▶ One IOP in an System i5 I/O tower or drawer
- ▶ One disk controller for a load source drive

For more information, see iSeries planning in the Information Center at:

<http://www.ibm.com/eserver/iseries/infocenter>

When you reach this site, select **Language** → **V5R3** → **Planning**.

## 1519-100, 1519-200 Integrated xSeries Adapter for iSeries (direct attach)

The IBM Integrated xSeries Adapter for iSeries provides a direct high-speed attachment (HSL) of an xSeries server to an System i5 server and installs in select xSeries servers. The Integrated xSeries Adapter extends System i5

integration with Windows 2000, Windows Server 2003, Linux RedHat Enterprise 3 (AS or ES) and SUSE LINUX Enterprise Server 8 to xSeries high performance n-way Intel architecture servers. With the Integrated xSeries Adapter, more Windows users and more complex Windows and Linux applications can be integrated with iSeries servers.

There are two models of the Integrated xSeries Adapter, 1519-100 and 1519-200. These two Integrated xSeries Adapter models provide the same function, but they are designed to work with different xSeries models. The 1519-100 plugs into selected 3U, 4U, 5U n-way xSeries servers. The 1519-200 plugs into rack-optimized (2U) xSeries x236 and x346 servers. Make sure you use the Integrated xSeries Adapter model that is designed to work with your choice of xSeries server.

The direct attach server consists of an xSeries server tower that contains a 1519 Model 100 or 200 Integrated xSeries Adapter for iSeries. The System i5 servers and features require OS/400 V5R2 or i5/OS V5R3. The iSeries Integration for Windows Server licensed program 5722-WSV provides the necessary software and device drivers that enable Windows Server to run on the Integrated xSeries Adapter server. 5722-WSV is included with all i5/OS shipments. Refer to page 547 for iSeries Windows integration and Microsoft Cluster Support.

The external xSeries server attaches to System i5 models via a copper HSL. Optical HSL is not supported.

The number of Integrated xSeries Servers and Integrated xSeries Adapters that can be attached varies by model, HSL loops, and number of I/O towers. Refer to the xSeries servers maximums table on page 129 for the maximum external xSeries servers by model.

Refer to the HSL system maximums table on page 129 for the maximum external xSeries servers per HSL loop on each System i5 model.


See “#4711/#4812/#4813/#9812/#9813 PCI Integrated xSeries Server” on page 275 for information regarding Integrated xSeries Server.

You can find additional information about PTF requirements for the Integrated xSeries Adapter on the Web at:

[http://www-912.ibm.com/e\\_dir/eServerPrereq.nsf](http://www-912.ibm.com/e_dir/eServerPrereq.nsf)

For xSeries server requirements, supported models, and Windows integration, go to:

<http://www-1.ibm.com/servers/eserver/series/integratedxseries/windows/>



For Linux enablement on the Integrated xSeries Adapter, see:

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



## System i5 I/O adapters and controllers

There are three categories of PCI adapters (IOA) for the System i5.

- ▶ Traditional adapters are IOP-based and must be driven by an I/O processor.
- ▶ Single-mode adapters do not require an IOP. As of 31 January 2006, only the #5707/#5706 PCI-X 1Gbps Ethernet-TX IOA and the #4806 PCI-X Crypto Coprocessor are in this single-mode category.
- ▶ Dual-mode adapters can function with or without an IOP. The operational mode of these enhanced controllers/adapters is determined by their location relative to an IOP.

IBM plans to continue expanding on the new IOA capabilities of POWER5 and later systems. Moving the IOP function mostly into the I/O adapter/controller and to a much lesser degree, the main processor, provides several benefits. It frees up a PCI slot, saves the cost of an IOP and increases configuration flexibility, especially for multiple i5/OS partition environments.

This chapter discusses input/output adapters (IOA) that are available from IBM for System i5 Peripheral Component Interconnect (PCI) system units and associated PCI towers. Refer to Chapter 20, “System i5 PCI and PCI-X I/O processors” on page 271, for input/output processor (IOP) information.

Communication restrictions for Peripheral Component Interconnect (PCI) systems are defined in the “LAN/WAN adapters” section of the model chapters in the *IBM @server iSeries and AS/400e System Builder*, SG24-2155. You can find rules for individual communication cards (adapters or IOPs) and sizing rules in the specific adapter or IOP feature description within each model chapter of the System Builder. For general communications performance considerations, refer to the online document *iSeries Performance Capabilities Reference*, SC41-0607.

## PCI card placement rules

There are two sets of rules that govern the placement of PCI cards in the System i5 servers:

- ▶ **Hard rules:** Impose restrictions on the type of card, size, and valid slot placement. Hard rules are taken into account by the IBM marketing configurator.
- ▶ **Soft rules:** Impose restrictions based on possible performance bottlenecks associated with certain configuration and use. Soft rules depend on the use of the cards and required performance and, therefore, are not supported by the marketing configurator and must be taken into account separately.

For a complete explanation of both *hard* and *soft* rules, as well the types of cards and slots supported on each system, refer to *PCI Card Placement Rules for the IBM @server iSeries Server Version 5 Release 2*, REDP-3638, before you propose any configuration. Rules and placement information are also explained in the IBM @server Hardware Information Center in the *How to install an Adapter* topic at:

[http://publib.boulder.ibm.com/infocenter/eserver/v1r2s/en\\_US/index.htm?info/iphak/howtodecide.htm](http://publib.boulder.ibm.com/infocenter/eserver/v1r2s/en_US/index.htm?info/iphak/howtodecide.htm)

PCI adapters are Customer Install Features. Refer to *IBM @server iSeries and AS/400e System Builder*, SG24-2155, for a list of CIF features for current System i5 models.

## AIX and Linux Direct Attach features overview

The following IOA features are supported without IOPs when an AIX or Linux partition is defined. To determine which features are customer installable, refer to *IBM @server iSeries and AS/400e System Builder*, SG24-2155. The features supported are determined by the operating system selected.

For current details about AIX and Linux features supported in System i5 servers, see:

[http://www.ibm.com/servers/eserver/iseries/aix/pdf/facts\\_features.pdf](http://www.ibm.com/servers/eserver/iseries/aix/pdf/facts_features.pdf)



Feature code	AIX <sup>5</sup>	RedHat <sup>6</sup>	SLES 9 <sup>7</sup>	System i5 equivalent
#0601 Direct Attach #2743 PCI 1 Gbps Ethernet IOA		X	X	#2743
#0602 Direct Attach #2760 PCI 1 Gbps Ethernet UTP IOA		X	X	#2760
#0603 Direct Attach #2744 PCI 100 Mbps Token-Ring IOA		X	X	#2744
#0607 Direct Attach #4838 PCI 100/10 Mbps Ethernet IOA		X	X	#4838
#0608 Direct Attach #4745 PCI WAN IOA		X	X	#4745
#0609 Direct Attach #2772 PCI Dual WAN/Modem IOA		X	X	#2772
#0610 Direct Attach #2773 PCI Dual WAN/ModemIOA		X	X	#2773
#0611 Direct Attach #2765 PCI Fibre Channel Tape Controller	X	X	X	#2765
#0612 Direct Attach #2766 PCI Fibre Channel Disk Controller		X	X	#2766
#0613 Direct Attach #2742 PCI 2-Line WAN IOA		X	X	#2742
#0614 Direct Attach #2793 PCI 2-Line WAN w/Modem		X	X	#2793
#0615 Direct Attach #2794 PCI 2-Line WAN w/Modem		X	X	#2794
#0616 Direct Attach #2805 PCI Quad Modem IOA		X	X	#2805
#0617 Direct Attach #2806 PCI Quad Modem (CIM)		X	X	#2806
#0618 Direct Attach #2757 PCI-X Ultra RAID Disk Controller		X	X	#2757
#0619 Direct Attach #2782 PCI-X RAID Disk Unit Controller		X	X	#2782
#0620 Direct Attach #5700 PCI 1 Gbps Ethernet IOA	X	X	X	#5700/ #6800
#0621 Direct Attach #5701 PCI 1 Gbps Ethernet UTP IOA	X	X	X	#5701/ #6801
#0623 Direct Attach #2849 PCI 100/10 Mbps Ethernet IOA		X	X	#2849
#0624 Direct Attach #5702 PCI-X Ultra Tape Controller		X	X	#5702
#0625 Direct Attach #5704 PCI-X Fibre Channel Tape Controller	X	X	X	#5704
#0626 Direct Attach #2787 PCI-X Fibre Channel Disk Controller		X	X	#2787
#0627 Direct Attach #2780 PCI-X Ultra4 RAID Disk Controller	X	X	X	#2780
#0628 Direct Attach #5703 PCI-X RAID Disk Unit Controller	X	X	X	#5703

Feature code	AIX <sup>5</sup>	RedHat <sup>6</sup>	SLES 9 <sup>7</sup>	System i5 equivalent
#0632 - PCI USB 2.0 Adapter	X	X	X	None
#0633 - Graphics Adapter	X	X	X	None
#0634 128-port ASYNC Adapter	X			None
#0635 - SDLC/X.25 - 2-port Adapter	X			None
#0637 - 100/10 Mbps 4-port Ethernet Adapter	X(3,4)	X	X	None
#0638 - SSA (40 MB/s) Adapter	X(3,4)			None
#0639 - 128MB SSA Adapter Memory	X(3,4)			None
#0640 - Fast Write Cache Option	X(3,4)			None
#0642 PCI Ultra-3 RAID Adapter	X(1,2,3)			None
#0643 Direct Attach #5706 PCI-X Gbps Ethernet-TX IOA		X	X	#5706
#0644 Direct Attach #5707 PCI-X 1 Gbps Ethernet-SX IOA		X	X	#5707
#0645 Direct Attach #5712 PCI-X Tape/DASD Controller	X	X	X	#5712
#0646 Direct Attach #5716 2 Gb Fibre Channel PCI-X Adapter	X	X	X	#5716
#0647 PCI-X Disk/Tape Controller No IOP	X	X	X	#5736
#0648 PCI-X Disk Controller-90MB No IOP	X	X	X	#5737
#2848 PCI 2D Entry Graphics Adapter	X	X	X	None
#2732 - PCI Serial HIPPI Adapter	X(3,4)			None
#2737 - PCI USB 1.1 Adapter	X(3,4)	X(3,4)	X(3,4)	None
#2943 - 8-Port ASYNC Adapter	X			None
#2946 PCI 622 Mbps ATM Fibre Adapter	X (3,4)			None
#2947 - PCI Multiprotocol Adapter	X			None
#4953 - 155 Mbps ATM UTP Adapter	X(3,4)			None
#4957 - 155 Mbps ATM Fiber Adapter	X(3,4)			None
#4959 - PCI 16/4 Mbps Token-Ring IOA	X			None
#4960 - Cryptographic Accelerator-	X(3,4)			None
#4962 - PCI 100/10 Mbps Ethernet IOA	X	X	X	None
#4963 - PCI Crypto Coprocessor	X(3,4)			None
#5706 PCI-X 1Gbps Ethernet-TX IOA	X	X	X	#5706

Feature code	AIX <sup>5</sup>	RedHat <sup>6</sup>	SLES 9 <sup>7</sup>	System i5 equivalent
#5707 1 Gbps Ethernet Adapter (Fiber)	X	X	X	#5707
#5709 RAID Enabler Card	X(1,2)	X(1,2)	X(1,2)	#5709
#5718 10 Gbps Ethernet Adapter (short)	X			None
#5719 10 Gbps Ethernet Adapter (long)	X	X	X	None
#5723 2-Port EIA-232 Async Adapter	X	X	X	None
#5726 RAID Enabler Card	X(3)	X(3)	X(3)	#5726
#5727 Integrated Cache 40MB	X	X	X	#5727
#6203 PCI Ultra3 SCSI Adapter	X(3,4)	X(3,4)	X(3,4)	None
#6204 Differential SCSI Adapter	X	X	X	None
#6312 Quad Digital Trunk Adapter	X(1,2)			None
#8136 Remote Async Node, Rack	X			None
#8137 RS232 Remote Async Node	X			None
<sup>1</sup> Model 520 <sup>2</sup> Model 550 <sup>3</sup> Model 570 <sup>4</sup> Model 595 <sup>5</sup> AIX 5L for POWER V5.2 for IBM @server or later <sup>6</sup> Red Hat Enterprise Linux AS for POWER Version 3 with Update 3 or later <sup>7</sup> SUSE LINUX Enterprise Server 9 for POWER or later				

Not all features are supported on all models. Some features may be withdrawn but are in the table for reference. Not all AIX-specific adapters are described in this book.

**Note:** The IBM marketing configurator does not add IOPs to #06xx direct attach features because they are not needed. The #06xx features can be moved to OS/400 or i5/OS partitions if there is sufficient IOP to support them. The equivalent System i5 features can be moved to a Linux or AIX partition (if supported) without the IOP.

## System unit hardware (PCI)

System i5 PCI IOAs available from IBM are described in this section. IOAs that are supported but are now *withdrawn from marketing* are described in the *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155. Withdrawn

features are identified in “Products and features no longer marketed by IBM” on page 370.

## **#0299 MES Conversion Analysis for #5580/#5581 MES**

The #0299 MES Conversion Analysis for #5580/#5581 provides additional ordering and scheduling steps for customers adding an auxiliary write cache IOA to existing large cache disk controllers. For example, when they are converting a #2757 PCI-X Ultra RAID Disk Controller or #2780 PCI-X Ultra RAID Disk Controller to a #5580 #2780 Controller with Auxiliary Write Cache or #5581 #2757 Controller with Auxiliary Write Cache.

For more details on the auxiliary write cache IOA, see:

<http://www.itso.ibm.com/redpieces/abstracts/redp4003.html?Open>

## **#2742 Two-Line WAN IOA**

The #2742 Two-Line WAN IOA supports up to two multiple protocol communications ports

## **#2744 PCI 100 Mbps Token Ring IOA**

The #2744 PCI 100 Mbps Token Ring IOA provides a single attachment to a 100 Mbps, 16 Mbps, or 4 Mbps IBM Token Ring network. The feature consists of an IOA card, internal code, which supplies IEEE 802.5 Media Access Control (MAC), and IEEE 802.2 Logical Link Control (LCC) functions. The 100/16/4 Token Ring IOA is capable of operating in half or full duplex mode.

## **#2757 PCI-X Ultra RAID Disk Controller**

The #2757 PCI-X Ultra RAID Disk Controller is an Ultra SCSI disk unit controller with a 757 MB compressed maximum cache that provides RAID-5 protection for internal disk units. It also supports up to two internal tape devices, CD-ROM, and DVD units. The #2757 has four Ultra SCSI buses.

The #2757 is not supported in the system unit of Models 520, 550, 570, or 595.

A minimum of three disk units of the same capacity is needed for a valid RAID-5 configuration. A maximum of six arrays is allowed per controller, with a maximum of 18 disk units allowed per array.

## **#2772 and #2773 PCI Dual WAN/Modem IOA**

The #2772 PCI Dual WAN/Modem IOA and #2773 PCI Dual WAN/Modem IOA are basically the same interface. The #2772 is the non-Complex Impedance Matching (CIM) version of this card. Both are 2-line WAN adapters, with two ports (RJ11) supporting V.90 56K Async PPP and FAX applications at data rates up to 14.4K via internal modems. Connection to the V.90 ports is via a telephone cable. Neither of these features support remote power on. #1012 Modem Cable-Africa

## **#2780 PCI-X Ultra RAID Disk Controller**

The #2780 PCI-X Ultra RAID Disk Controller is an Ultra4 (u320) SCSI disk unit controller with a maximum compressed write cache of 757 MB and a maximum compressed read cache of 1GB that provides RAID-5 protection for internal disk units. It also supports up to two internal tape devices, CD-ROM, and DVD units. The #2780 has four Ultra4 SCSI buses.

The #2780 is not supported in the system unit of the Model 520, 550, 570, or 595. Up to 20 disk units per #2780 are supported in a #5094 PCI-X Expansion Tower attached to a Model 520, 550, 570, or 595.

A minimum of three disk units of the same capacity is needed for a valid RAID-5 configuration. A maximum of six arrays is allowed per controller, with a maximum of 18 disk units allowed per array.

## **#2787 PCI-X Fibre Channel Disk Controller**

The #2787 PCI-X Fibre Channel Disk Controller provides Fibre Channel attachment capability for external disk devices. The #2787 supports point-to-point and arbitrated loop topologies and has an LC-type cable connector. Each #2787 is shipped with a wrap connector (part number 05N6767). The #2787 supports 64-bit, 133MHz PCI-X bus speeds.

The #2787 PCI-X Fibre Channel Disk Controller is the recommended replacement card for the #2766 PCI Fibre Channel Disk Controller.

## **#2793/#2794/#9793/#9794 PCI Dual WAN/Modem IOA**

The #2793/#2794/#9793/#9794 PCI Dual WAN/Modem IOA cards all provide the same interface. The #2793/#9793 are offered in all countries (regions) except Australia and New Zealand, where the #9793/#9794 is offered instead. The #9793/#9794 are base models.

The #2793/#9793 is a two-line WAN with Modem adapter and is the non-CIM version. The #2794/#9794 is the CIM version.

Port 0 is the modem port and supports V.92 56K Async PPP, V.92 data modem, V.44 data compression, V.34 FAX modem and FAX functions such as ECM and 2D/1D conversion. Port 0 does not provide Sync modem capabilities (SDLC and Sync PPP). Port 1 is the RVX port and supports multiple communications protocols.

## **#2805 and #2806 PCI Quad Modem IOA**

The #2805 PCI Quad Modem IOA and #2806 PCI Quad Modem (CIM) are basically the same interface. The #2805 is the non-CIM version of the card. Both are 4-line WAN modem adapters, with four RJ-11 ports that support V.92 56K Async SLIP/PPP and V.34 Fax applications at data rates up to 33.6K via internal modems. Connection to the V.92 ports is via a telephone cable.

The V.92 functions offer increased throughput for upload operations, improved V.44 data compression, and shortened modem synchronization periods. The call waiting and modem-on-hold functions associated with V.92 are not supported. Remote Power-On via ring-indicator, SDLC, and synchronous PPP are not supported.

The #2805 and #2806 cards need country (region)-specific telephone cables (a minimum of one and a maximum of four per card). Feature #2806, the CIM version, is intended for Australia and New Zealand only. The #2805/#2806 require country (region) certification/homologation.

## **#2849 10/100 Mbps Ethernet Adapter**

The #2849 10/100 Mbps Ethernet Adapter card allows an System i5 server to attach to standardized 100 Mbps high speed Ethernet LANs and allows attachment to existing 10 Mbps Ethernet LANs. The adapter comes standard with an RJ45 connector for attachment to UTP-5 media.

## **#4745 PCI 2-line WAN IOA**

The #4745 PCI 2-line WAN IOA supports up to two multiple protocol communications ports..

## **#4746 PCI Twinaxial IOA**

The #4746 PCI Twinaxial IOA is an 8-port twinaxial workstation IOA with a 20-foot attachment cable for attaching up to 56 5250-type displays and printers.

Each port supports seven attached devices and allows up to 56 attached addresses of which only 40 can be active. When the attached display supports address sharing, a maximum of 120 shared sessions is supported.

## #4801 PCI Cryptographic Coprocessor

The #4801 PCI Cryptographic Coprocessor is a hardware cryptography solution based on the IBM 4758-023 card. The #4801 is a half-length PCI card that offers rich cryptography function, secure storage of cryptographic keys, and triple DES capability. The Cryptographic Access Provider licensed program (no-charge 5722-AC3) must be installed to set the key length prior to using the adapter.

**Note:** On new systems from the plant, the #4801 is shipped with the system. Due to temperature requirements (card temperature must not drop below 5 degrees Fahrenheit (-15 degrees Celsius)), it is not installed.

## #4805 PCI Cryptographic Accelerator

The #4805 PCI Cryptographic Accelerator feature provides improved performance for high transaction rate secure Web applications, which use the Secure Sockets Layer (SSL) or Transport Layer Security (TLS) protocols. Establishing SSL/TLS secure Web connections requires very compute intensive cryptographic processing.

You can use the Cryptographic Accelerator to offload cryptographic processing. SSL/TLS secure Web connections typically protect information (for example, credit card number) as it is transferred over the Internet, for example between a Web browser and a server.

**FIPS:** Applications that require a FIPS 140 certified, tamper-resistant module for storing cryptographic keys or require financial PIN processing should continue to use the IBM 4758-023 Cryptographic Coprocessor PCI card (#4801 or #4802).

FIPS 140-1 is a U.S. Government National Institute of Standards & Technology (NIST) administered standard and certification program for cryptographic modules.

## #4806 PCI-X Crypto Coprocessor

The #4806 Crypto Coprocessor provides both cryptographic coprocessor and secure-key cryptographic accelerator functions in a single PCI-X card. The coprocessor functions are targeted to banking and finance applications. Financial

PIN processing and Europay, Master Card, Visa (EMV) credit card functions are provided. EMV is a standard for integrated-chip based credit cards. The secure-key accelerator functions are targeted to improving the performance of i5/OS Secure Sockets Layer (SSL) transactions. The #4806 provides the security and performance required to support eBusiness and emerging digital signature applications.

The #4806 provides secure storage of cryptographic keys in a tamper-resistant hardware security module (HSM), which is designed to meet FIPS 140 security requirements. FIPS 140 is a U.S. Government National Institute of Standards and Technology (NIST) administered standard and certification program for cryptographic modules.

The firmware for the #4806 is available on a separately ordered/distributed CD as the Cryptographic Device Manager (5733-CY1). The #4806 also requires Cryptographic Access Provider (5722-AC3) to enable data encryption.

The #4806 has country-specific rules.

## **#4811/#4812/#4813/#9812/#9813 PCI-X Integrated xSeries Server**

The #4811, #4812, #4813, #9812, or #9813 PCI-X Integrated xSeries Server contains an Intel Pentium 2.0 GHz processor with 2 MB integrated L2 cache. Features #4811, #4812, #4813 are functionally identical but have some physical differences depending on the model in which they are used.

The #4811 is supported in the 520 system tower. The #4812 is supported in the 550, 595, 800, 810, 825, 870 and 890 system towers and in the #0588, #0595, #5088, #5095, #5074, #5079, #5094 and #5294 expansion towers. The #4813 is supported in the 570 system tower and in the #5790 expansion unit.

The #9812 and #9813 are functionally identical to the #4812 and #4813 but are included in the base with orders for Enterprise Editions on system models 550, 595 and 570

The #4811, #4812, #4813, #9812, or #9813 PCI-X Integrated xSeries Server has two memory slots and supports up to 2 GB of memory.

The #4811, #4812, #4813, #9812, or #9813 PCI-X Integrated xSeries Server occupies two PCI slots and requires an IOP #9744, #9844 or #2844 to drive it. The IBM @server Marketing Configurator adds #9744 Base PCI IOP to the order. The #9744 can be removed from the order to conserve PCI slots. The IOP may be shared, but only one #4811, #4812, #4813, #9812, or #9813 is permitted per IOP.



The #4811, #4812, #4813, #9812, or #9813 PCI-X Integrated xSeries Server includes two embedded 1000/100/10 Mbps UTP Ethernet LAN ports for attachment to IEEE standard 802.3Z high-speed (1 Gbps) Ethernet LANs. The Ethernet LAN ports may also be used to connect to existing 10 and 100 Mbps Ethernet LANs by using switches with 10/100/1000 Mbps ports. The adapter supports UTP CAT 5 or higher media interface and TCP/IP.

i5/OS V5R3 is required to support the Integrated xSeries Server.

The #4811, #4812, #4813, #9812, or #9813 PCI-X Integrated xSeries Server runs Windows or Linux. The supported versions of Windows are:

- ▶ Windows Server 2003 Standard, Enterprise and Web Editions
- ▶ Windows 2000 Server and Windows 2000 Advanced Server Windows 2000

The supported versions of Linux are:

- ▶ Red Hat Enterprise Linux ES 3
- ▶ Red Hat Enterprise Linux AS 3

## **#5580 #2780 Controller with Auxiliary Write Cache**

The #5580 #2780 Controller with Auxiliary Write Cache IOA provides a disk controller with auxiliary write cache to improve cache data redundancy. The #5580 includes a #2780 PCI-X Ultra RAID Disk Controller and a secondary IOA with 757MB of auxiliary maximum compressed write cache.

The #2780 and the secondary IOA each require one PCI-X slot and must be installed together in the same system unit or I/O unit/drawer/tower. The auxiliary cache card connects to one of the SCSI ports on the #2780 and reduces the maximum number of disks supported to fifteen.

For more details regarding Auxiliary Write Cache, see *Planning for IBM eServer i5 Data Protection with Auxiliary Write Cache Solutions*, REDP-4003 at:

<http://www.redbooks.ibm.com/abstracts/redp4003.html?open>

## **#5581 #2757 Controller with Auxiliary Write Cache**

The #5581 #2757 Controller with Auxiliary Write Cache provides a disk controller with auxiliary write cache to improve cache data redundancy. The #5581 includes a #2757 PCI-X Ultra RAID Disk Controller and a secondary IOA with 757 MB of auxiliary maximum compressed write cache.

The #2757 and the secondary IOA each require one PCI-X slot and must be installed together in the same system unit or I/O unit/drawer/tower. The auxiliary

cache card connects to one of the SCSI ports on the #2757 and reduces the maximum number of disks supported to fifteen.

For more details regarding Auxiliary Write Cache, see *Planning for IBM eServer i5 Data Protection with Auxiliary Write Cache Solutions*, REDP-4003 at:

## #5700 PCI 1 Gbps Ethernet IOA

The #5700 PCI 1 Gbps Ethernet IOA allows attachment to IEEE standard 802.3Z high-speed (1 Gbps) Ethernet LANs. It can also be used to connect to existing 100 Mbps Ethernet LANs via switches capable of handling multiple speeds with 10 Mbps, 100 Mbps, or 1000 Mbps ports. It cannot be directly attached (crossover cables are not supported) to 10 Mbps or 100 Mbps networks.

The #5700 supports a multimode fiber interface with a 62.5 micron or 50.0 micron cable requirement. The adapter has a duplex LC fiber optic connector for attachment to client supplied cabling.

The #5700 adapter supports TCP/IP only. TCP/IP Checksum Offload and TCP Segmentation Offload are not supported. SNA and IPX protocols are not supported.

The #5700, #0620, and #6800 are physically the same adapter card but have different feature numbers that denote to IBM configurator tools whether or not an IOP is required.

## #5701 PCI 1 Gbps Ethernet UTP IOA

The #5701 PCI 1 Gbps Ethernet UTP IOA allows attachment to IEEE standard 802.3Z high-speed (1 Gbps) Ethernet LANs. The #5701 PCI 1 Gbps Ethernet UTP IOA can negotiate to a lower speed and can directly attach to 10 Mbps or 100 Mbps networks with appropriate switches and hubs. Direct attachment via crossover cables is not supported. The #5701 adapter supports a UTP CAT 5 media interface.

The #5701 adapter supports TCP/IP only. TCP/IP Checksum Offload and TCP Segmentation Offload are not supported. SNA and IPX protocols are not supported.

The #5701, #0621, and #6801 are physically the same adapter card but have different feature numbers that denote to IBM configurator tools whether or not an IOP is required.

## #5702/#5712 PCI-X Tape/DASD Controller

The #5702/#5712 PCI-X Tape/DASD Controller is an Ultra SCSI LVD controller for attachment of two external tape devices or external CD-ROM devices that have a Low Voltage Differential (LVD) SCSI interface. The #5702 has two ports with VHDCI connectors. The #5702 is rated at up to 160MBps and is a good match for 358x LTO tape drives.

**Note:** The #5702 has both internal and external SCSI ports. Devices cannot be attached both internally and externally on the same bus.

## #5703 PCI-X RAID Disk Unit Controller

The #5703 PCI-X RAID Disk Unit Controller is an Ultra3 SCSI controller with a cache size of 40 MB that provides RAID-5 protection for internal disks and internal tape units, CD-ROM, DVD-RAM, and DVD-ROM units. The #5703 has two Ultra3 SCSI buses and runs at a U320 (320 MB/s) data rate.

The #5703 controller supports a maximum of 12 disk units. DASD compression is not supported. The #5703 can control up to two removable media devices

## #5704 PCI-X Fibre Channel Tape Controller

The #5704 PCI-X Fibre Channel Tape Controller provides Fibre Channel attachment capability for external tape devices. The #5704 supports point-to-point and arbitrated loop topologies and has an LC-type cable connector. The #5704 is rated at up to 200 MBps. The highest performing tape drives are attached via fibre channel.

## #5705/#5715 PCI-X Tape/DASD Controller

The #5705/#5715 PCI-X Tape/DASD Controller provides SCSI Ultra PCI attachment capability for external tape devices, up to two removable media devices (internal tape, CD-ROM or DVD), and internal disk devices. The #5705 has two SCSI buses, with each bus providing an internal and an external device port (four ports total: two internal and two external). Each bus can only support one connection, either an internal DASD connection or internal tape on the internal port, or an external tape or removable media connection on the external port.

The internal SCSI DASD port supports up to six disk units. RAID is not supported.

Order a #5702/#5712 if two external SCSI ports are required.

## #5706 PCI-X 1Gbps Ethernet-TX IOA

The #5706 PCI-X 1Gbps Ethernet-TX IOA is a 2-port 1000/100/10 Mbps Base-TX Ethernet PCI-X Adapter. The #5706 is a full duplex, dual ported, Gigabit Ethernet adapter designed with highly integrated components. This adapter can be configured to run each port at 1000, 100, or 10 Mbps data rates. This adapter interfaces to the system via a PCI or PCI-X bus and connects to a network using a 4-pair CAT-5 Unshielded Twisted Pair (UTP) cable for distances of up to 100m. The adapter conforms to the IEEE 802.3ab 1000Base-T standard. The #5706 also supports jumbo frames when running at the 1000 Mbps speed.

The #5706 does not provide i5/OS native SNA support.

The #5706 IOA does not require a PCI IOP. The IOP functions are already integrated into the IOA.

## #5707 1 Gbps Ethernet Adapter (Fiber)

The #5707 1 Gbps Ethernet Adapter (Fiber) is a 2-Port Gigabit Ethernet-SX PCI-X Adapter that provides two 1 Gbps (1000 Base-SX) full-duplex Ethernet LAN connections with throughput on a standard shortwave multimode optical cable that conforms to the IEEE 802.3z standard. The adapter supports distances of 260m for 62.5 micron Multi Mode Fiber (MMF) and 550m for 50.0 micron MMF.

The #5707 IOA does not require a PCI IOP. The IOP functions are already integrated into the IOA.

## #5709 RAID Enabler Card

The #5709 RAID Enabler Card has 16 MB write cache. It supports up to eight disk unit positions in the Model 520 and 550 system unit and up to six disk unit positions in the Model 570 system unit. The #5709 is not supported on the Model 595. The #5709 provides RAID capability to the embedded SCSI controller. It plugs into its own specific internal slot and does not require or use a PCI card slot. Hardware disk compression is not supported.

**Note:** The i5/OS operating system does not have the capability to interface directly to the embedded SCSI controller. The #5709 communicates solely with the embedded controller. An IOP must be present for the #5709 to communicate with the i5/OS operating system.

## **#5719 10 Gbps Ethernet Adapter (long)**

The #5719 10 Gbps Ethernet Adapter (long) supports ten Gigabit Ethernet PCI-X based server connections over a maximum of 10 kilometers of 1310nm single-mode fiber optic cable. The #5719 conforms to the IEEE 802.3ae standard. The adapter requires 9um single-mode fiber optic cables and uses a SC connector type for connecting into network infrastructure components like 10 Gigabit Ethernet switch/router with SC connectors.

## **#5726 RAID Enabler Card**

The #5726 RAID Enabler Card provides a SCSI RAID controller which is installed into its own specific internal slot of a system unit. It does not require a PCI slot. The #5726 replaces the base integrated disk controller, adding RAID-5 capability and 40MB disk controller write cache.

## **#5727 Integrated Cache 40MB**

The #5727 provides a card which augments the base integrated disk controller of the model 520 or the model 550 with 40MB of write cache and also enables RAID-5 capability for the internal disk drives of the system unit. This feature is functionally equivalent to #5709, but can run in IOP-less mode. The #5727 is installed into its own specific internal slot of a system unit and does not require a PCI slot.

The #9510 is the base feature for this card when it is included in 9405 Express configurations with RAID.

## **#5728 Integrated Cache 40MB**

The #5728 provides a card which augments the base integrated disk controller in the model 570 with 40MB of write cache and also enables RAID-5 capability for the internal disk drives in the processor enclosure. This feature is functionally equivalent to #5709 and #5726, but can run in an IOP-less mode. The #5728 is installed into its own specific internal slot of a 570 processor enclosure and does not require a PCI slot. The #5728 or its #5709/#5726 predecessor is required if i5/OS is to access the 4th, 5th and 6th disk slots in the processor enclosure.

## **#5736 PCI-X Disk/Tape Controller with IOP**

The #5736 provides a PCI-X Disk/Tape SCSI Controller with zero write cache and without RAID support. Disk mirroring support is supported through i5/OS. A maximum of six disk drives are supported on the #5736. Removable media devices (tape, optical libraries, CD-ROM, DVD-ROM, or DVD-RAM) are also

supported. The #5736 has two U320 buses each with a bus data rate of up to 320MBs. Each SCSI bus can be either internal (using an internal port) or external (using an external port), but not both. There are four physical ports on the #5736, two internal and two external. Internal devices connect to the internal ports (1 or 2). External devices connect to the external ports (1 or 2) and use an LVD (Low Voltage Differential) interface and VHDCI connectors. A #1850 VHDCI to P Converter Cable is available to connect to external devices with type P connectors.

The #0647, #5736, #5766 and #5775 are physically the same adapter card but have different feature numbers to indicate to IBM configurator tools that an IOP is or is not being used in the configuration.

#5736 should be the choice over #5702/#5712 or #5705/#5715 controllers for systems running V5R3, or later.

### **#5737 PCI-X Disk Controller 90MB with IOP**

Provides a PCI-X SCSI disk controller that has a 90MB write cache and can provide RAID-5 or RAID-6 protection of disk units. The #5737 has two U320 SCSI buses each with a bus data rate of up to 320MBs. A maximum of 12 internal disk drives and up to two internal removable media devices (tape, CD-ROM, DVD-ROM, or DVD-RAM) are supported on the #5737.

A minimum of three disk drives are required for RAID-5, providing protection against a single drive failure in an array. A minimum of four disk drives are required for RAID-6, providing protection against up to two drives failing in an array.

#0648, #5737, and #5776 are physically the same adapter card but have different feature numbers to indicate to IBM configurator tools that an IOP is or is not being used in the configuration.

Note the #2780/#5580 and #2757/#5581 disk controllers with an effective 757MB write cache provide greater disk performance and can have an auxiliary write cache IOA to protect the write cache contents

### **#5740 1Gbps BaseT Ethernet(4-Port)**

The #5740 provides a 4-port 10/100/1000Mbps BaseT Ethernet adapter which supports four 1-Gigabit ports on a single adapter, delivering increased bandwidth for slot-constrained servers and providing high connectivity and reliability using two integrated, dual-port Gigabit Ethernet controllers

## #5760 PCI-X Fibre Channel Disk Controller

Provides a 4Gbps Single Port Fibre Channel PCI-X 2.0 Adapter which attaches external DASD devices. #5760 is a 64-bit address/data, short form factor PCI-X adapter with an LC type external fiber connector that provides single initiator capability over an optical fiber link or loop. With the use of appropriate optical fiber cabling, this adapter provides the capability for a network of high-speed local and remote located storage.

The #5760 will auto-negotiate for the highest data rate between adapter and an attaching device at 1Gbps, 2Gbps or 4Gbps of which the device or switch is capable. Distances of up to 500 meters running at 1Gbps data rate and up to 300 meters running at 2Gbps data rate and 4Gbps data rate up to 150 meters are supported between the adapter and an attaching device or switch. When used with IBM supported Fibre Channel storage switches supporting long-wave optics, distances of up to 10 kilometers are capable running at either 1Gbps or 2Gbps or 4Gbps data rates.

The #5760 can be used to attach devices either directly, or by means of Fibre Channel Switches. The #5760 requires a PCI IOP.

## #5761 PCI-X Fibre Channel Tape Controller

Provides a 4Gbps Single Port Fibre Channel PCI-X 2.0 Adapter which attaches external tape devices. #5761 is a 64-bit address/data, short form factor PCI-X adapter with an LC type external fiber connector that provides single initiator capability over an optical fiber link or loop. With the use of appropriate optical fiber cabling, this adapter provides the capability for a network of high-speed local and remote located storage.

The #5761 will auto-negotiate for the highest data rate between adapter and an attaching device at 1Gbps, 2Gbps or 4Gbps of which the device or switch is capable. Distances of up to 500 meters running at 1Gbps data rate and up to 300 meters running at 2Gbps data rate and 4Gbps data rate up to 150 meters are supported between the adapter and an attaching device or switch. When used with IBM supported Fibre Channel storage switches supporting long-wave optics, distances of up to 10 kilometers are capable running at either 1Gbps or 2Gbps or 4Gbps data rates.

The #5761 can be used to attach devices either directly, or by means of Fibre Channel Switches.

## #5775 PCI-X Disk/Tape Controller No IOP

The #5775 provides a PCI-X Disk/Tape SCSI Controller with zero write cache and without RAID support. Disk mirroring is supported through i5/OS. A maximum of six disk drives are supported on the #5775. Removable media devices (tape, optical libraries, DVD-ROM, or DVD-RAM) are also supported on the #5775.

The #5775 has two U320 buses each with a bus data rate of up to 320MBs. Each SCSI bus can be either internal (using an internal port) or external (using an external port), but not both. There are four physical ports on the #5775, two internal and two external.

Internal devices connect to the internal ports (1 or 2). External devices connect to the external ports (1 or 2) and use an LVD (Low Voltage Differential) interface and VHDCI connectors. A #1850 VHDCI to P Converter Cable is available to connect to external devices with type P connectors.

#0647, #5736, #5766 and #5775 are physically the same adapter card but have different feature numbers to indicate to IBM configurator tools that an IOP is or is not being used in the configuration.

The #5775 should be the choice over #0624/#0645 or #5705/#5715 controllers. It requires V5R4 or later except for the Model 520+ with 1.9GHz processors where V5R3 with V5R3M5 LIC, or later, is required.

## #5776 PCI-X Disk Controller 90MB No IOP

The #5776 provides a PCI-X SCSI disk controller that has a 90MB write cache and can provide RAID-5 or RAID-6 protection of disk units.

The #5776 has two U320 SCSI buses each with a bus data rate of up to 320MBs. A maximum of 12 internal disk drives and up to two internal removable media devices (tape, DVD-ROM, or DVD-RAM) are supported on the #5776.

A minimum of three disk drives are required for RAID-5, providing protection against a single drive failure in an array. A minimum of four disk drives are required for RAID-6, providing protection against up to two drives failing in an array.

The #0648, #5737, and #5776 are physically the same adapter card but have different feature numbers to indicate to IBM configurator tools that an IOP is or is not being used in the configuration.



Note the #2780/#5580 and #2757/#5581 disk controllers with an effective 757MB write cache provide greater disk performance and can have an auxiliary write cache IOA to protect the write cache contents.

## **#6800 PCI 1Gbps Ethernet IOA**

The #6800 provides a PCI-X IOA which does not require an IOP and allows a System i5 to attach to IEEE standard 802.3Z high speed (1Gbps) Ethernet LANs. The #6800 adapter supports a multimode fiber interface with a 62.5 micron or 50.0 micron cable requirement. The adapter has a duplex LC fiber-optic connector for attachment to customer-supplied cabling.

The #6800 only supports TCP/IP and requires an intervening switch/hub/router when connecting to 100Mbps or 10Mbps networks.

The #6800, #0620, and #5700 are physically the same adapter card but have different feature numbers that denote to IBM configurator tools whether or not an IOP is required.

## **#6801 PCI 1Gbps Ethernet UTP IOA**

The #6801 provides a PCI-X IOA which does not require an IOP and allows a System i5 to attach to IEEE standard 802.3ab high speed (1Gbps) Ethernet LANs. The adapter supports a UTP CAT 5 media interface.

The #6801 only supports TCP/IP and requires an intervening switch/hub/router when connecting to 100Mbps or 10Mbps networks.

The #6801, #0621, and #5701 are physically the same adapter card but have different feature numbers that denote to IBM configurator tools whether or not an IOP is required.

## **#6803 PCI WAN for ECS**

The #6803 is a WAN w/modem adapter which provides connectivity for IBM Electronic Customer Support (ECS) only. This feature is the non-CIM (Complex Impedance Matching) version offered in all countries except Australia and New Zealand. The #6803 is functionally equivalent to #0614/#2793/#9793, but #6803 indicates to IBM configurator tools that the IOA is being used by i5/OS in an IOP-less mode. When in IOP-less mode the adapter function is restricted to communicating to IBM ECS on port 0 (modem port). Port 1 is the RVX port and is not supported in an IOP-less mode.

Port 0 supports V.92 56K PPP, V.92 data modem and V.44 data compression. Port 0 does not provide Synchronous modem capabilities (SDLC and Synchronous PPP).

### **#6804 PCI WAN for ECS (CIM)**

The #6804 is a WAN w/modem adapter which provides connectivity for IBM Electronic Customer Support (ECS) only. This feature is the CIM (Complex Impedance Matching) version offered in Australia and New Zealand. The #6804 is functionally equivalent to #0615/#2794/#9794, but #6804 indicates to IBM configurator tools that the IOA is being used by i5/OS in an IOP-less mode. When in IOP-less mode the adapter function is restricted to communicating to IBM ECS on port 0 (modem port). Port 1 is the RVX port and is not supported in IOP-less mode.

Port 0 supports V.92 56K PPP, V.92 data modem and V.44 data compression. Port 0 does not provide Synchronous modem capabilities (SDLC and Synchronous PPP).

### **#9493/#9494 Base PCI WAN for ECS (CIM)**

The #9493 is a WAN w/modem adapter which provides connectivity for IBM Electronic Customer Support (ECS) only. This feature is the non-CIM (Complex Impedance Matching) version offered in all countries except Australia and New Zealand. #9493 is functionally equivalent to #0614/#2793/#9793, but #9493 indicates to IBM configurator tools that the IOA is being used by i5/OS in an IOP-less mode. When in IOP-less mode the adapter function is restricted to communicating to IBM ECS on port 0 (modem port). Port 1 is the RVX port and is not supported in an IOP-less mode.

Port 0 supports V.92 56K PPP, V.92 data modem and V.44 data compression. Port 0 does not provide Synchronous modem capabilities (SDLC and Synchronous PPP).

The #9494 is the CIM (Complex Impedance Matching) version offered in Australia and New Zealand. #9494 is functionally equivalent to #0615/#2794/#9794, but #9494 indicates to IBM configurator tools that the IOA is being used by i5/OS in an IOP-less mode.



## Upgrades to IBM System i5 and i5/OS V5R4

Use the IBM Prerequisite tool to find compatibility information for hardware and software features for IBM System i5 520, 550, 570, and 595 processors. Find this tool at:

[http://www-912.ibm.com/e\\_dir/eServerPrereq.nsf](http://www-912.ibm.com/e_dir/eServerPrereq.nsf)

The term *upgrade* in this chapter refers to a change or enhancement to an existing server, which can result in a more powerful server, but has the same machine type and serial number. An extensive set of upgrades to System i5 servers is supported both to a different model and within an existing model.

The following table shows an overview of the supported upgrades between and within System i5 models.

From model	To model													
	520	520+	550	550+	570	570+	595	595+	800	810	825	870	890	
Model 520	✓	✓												
Model 520 +		✓												
Model 550			✓	✓										
Model 550 +				✓										
Model 570					✓	✓	✓							
Model 570 +						✓	✓							
Model 595							✓	✓						
Model 595+								✓						
Model 800									✓					
Model 810	✓	✓	✓	✓	✓	✓				✓				
Model 825			✓	✓	✓	✓	✓				✓	✓		
Model 870					✓	✓	✓	✓				✓	✓	
Model 890					✓	✓	✓	✓					✓	

## Upgrade considerations

Supported model upgrades for System i5 models are identified in the *Upgrade* topic of the Find and Compare Tool (FACT) at:

<http://www-919.ibm.com/servers/eserver/fact/>

Refer to “Planning information” on page 41 and “Withdrawn products and end-of-support” on page 42 to understand upgrade considerations. Refer to *IBM @server iSeries Migration: A Guide to Upgrades and Migrations to POWER Technology*, SG24-7200, for guidance about upgrading to eServer i5 server models.

For software upgrade considerations, see “Supported software upgrade paths” on page 158, and “” on page 159. For considerations when upgrading to i5/OS V5R3, see:

<http://www-1.ibm.com/servers/eserver/series/support/planning/v5r3software.html>

For considerations when upgrading to OS/400 V5R2, see:

<http://www-1.ibm.com/servers/eserver/series/support/planning/v5r2software.html>

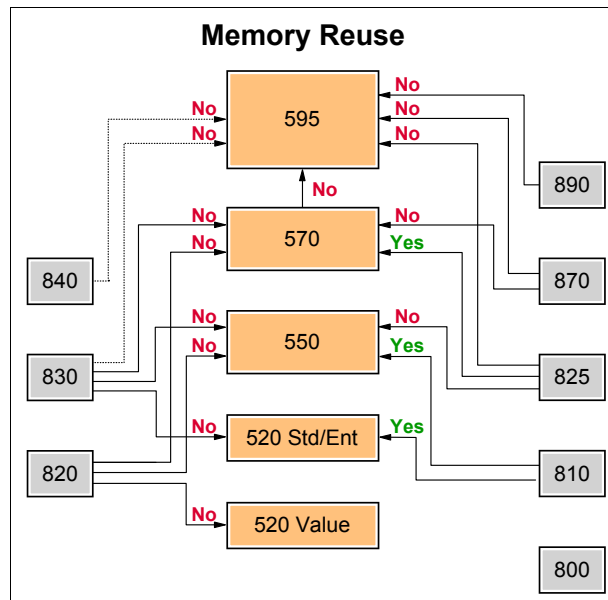
## 5250 OLTP considerations

iSeries 5250 online transaction processing (OLTP) is a powerful, efficient, and reliable transaction processor that is used by many clients. A maximum 5250 CPW is offered if upgrading to the Model s520, 550, 570, 595 with an Enterprise Edition. The server's entire resources are available for 5250 OLTP applications if desired. The High Availability and Capacity BackUp Editions also provide maximum 5250 CPW.

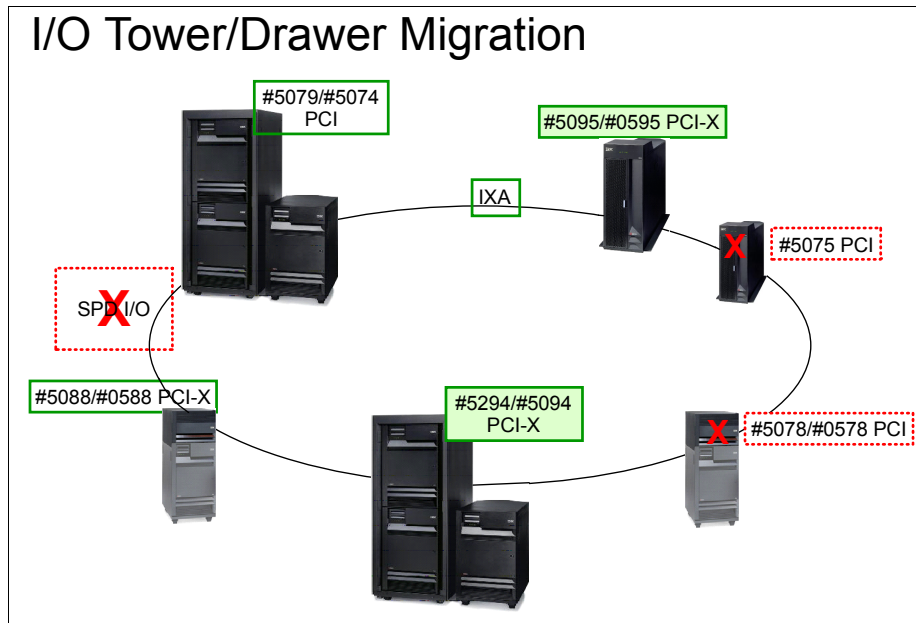
A Model 520, 550, 570, 595, with a Standard Edition has zero 5250 commercial processing workload (CPW). The maximum 5250 CPW is available with an upgrade from a Standard to Enterprise Edition. Many additional software, hardware, services, and education components are included in the Enterprise Edition. However, the additional components are not included during a Standard Edition upgrade to an Enterprise Edition.

You can find further information about 5250 CPW in Chapter 3, "Workload, capacity, and performance" on page 27.

- ▶ Main storage features of one model typically cannot be used in a different model. However, some Model 810 and 825 main storage features can be used in the Model 520, 550, or 570 if quad rules for these systems are fulfilled.
- ▶ Some features supported on earlier models cannot be ordered on the @server i5 Models 520, 550, 570, 595, and iSeries Models 800, 810, 825, 870, or 890.



- ▶ When upgrading existing I/O towers (see the following figure):-



Supported model upgrades for System i5 models are identified in the *Upgrade* topic of the Find and Compare Tool (FACT) at:

<http://www-919.ibm.com/servers/eserver/fact/>

Refer to *IBM @server iSeries Migration: System Migration and Upgrades at V5R1 and V5R2*, SG24-6055, and *IBM @server iSeries Migration: A Guide to Upgrades and Migrations to POWER Technology*, SG24-7200, for a full explanation of migration considerations.

## Supported software upgrade paths

The following table identifies software upgrade paths supported for i5/OS and OS/400.

From OS/400:	To:	OS/400 V5R1	OS/400 V5R2	i5/OS V5R3
V3R2				
V4R1				

<b>From OS/400:</b>	<b>To:</b>	<b>OS/400 V5R1</b>	<b>OS/400 V5R2</b>	<b>i5/OS V5R3</b>
V4R2				
V4R3				
V4R4	X			
V4R5	X		X	
V5R1			X	X
V5R2				X









## Internal storage

Storage on the System i5 is more than just disk drives. It is also about data protection, ease of use, low cost and low maintenance. The IBM System i5 offers many options for integrated disks and tape drives.

Integrated disks offer automated and optimized performance, which can extend SAN-like storage virtualization to multiple operating environments enabled on the System i5. Internal tape choices are provided as low-cost, convenient options for data backup and exchange with other i5 systems.

This chapter highlights the disk, tape, CD-ROM, DVD-ROM and DVD-RAM storage devices internal to the system unit or tower complex. It identifies specifications such as speed and capacities, with brief descriptions of the features and data protection methods, as well as alternate initial program load (IPL) options.

## Data protection and hardware compression

This section introduces the functions that can be used to protect the data stored on System i5 disk drives.

## Device parity protection

Device parity protection is a hardware function that protects data from being lost because of a disk unit failure or damage to a disk. Calculating and saving a parity value for each bit of data protects data. Conceptually, the parity value is computed from the data at the same location on each of the other disk units in the device parity set. When a disk failure occurs, the data on the failing unit can be reconstructed by using the saved parity value and the values of the bits in the same locations on the other disk.

Device parity protection is a high-availability function. It allows the IBM System i5 to continue to operate when a disk failure has occurred. RAID-5 and RAID-6 are the two levels of device parity protection available. They require disk controllers that support these functions.

### RAID-5

RAID-5 protects against the failure of a single disk unit. Logically, the capacity of one disk unit is dedicated to storing parity data in a parity set. In practice, the parity data is spread among multiple disk units depending upon the number of disk units in the parity set and the level of the disk controller. Internal disk units of different technology (that is, different feature numbers), but of the same capacity, can be RAID-5 protected.

Number of units in the array	Number of units parity is spread across
3	2
4 - 7	4
8 - 15	8
16 - 18	16

### RAID-6

RAID-6 protects against the failure of two disk units. Logically, the capacity of two disk units is dedicated to storing parity data. In practice, the parity data is spread among multiple disk units. The minimum number of disk units in a parity set is four and the maximum is eighteen. When a RAID-6 parity set is started, all the disk units contain parity data.

## Mirroring

Mirrored protection is a function that increases the availability of IBM System i5 servers in the event of a failure of a disk-related hardware component. Mirroring protection is a function of the i5/OS operating system.

Different levels of mirrored protection are possible, depending on the hardware that is duplicated. Mirroring involves duplicating disk-related hardware (bus, IOP, disk device). When a disk-related mirrored component fails, the system remains available.

## Cross-site mirroring

Geographic mirroring provides the ability to replicate changes made to the production copy of an independent auxiliary storage pool (IASP) to a mirror copy of that IASP. As data is written to the production copy of an IASP, the operating system mirrors that data to a second copy of the IASP through another System i5. This process keeps multiple identical copies of the data.

Cross-site mirroring (XSM), combined with the geographic mirroring function, enables you to mirror data on disks at sites that can be separated by a significant geographic distance. This technology can be used to extend the functionality of a device cluster resource group (CRG) beyond the limits of physical component connection.

## Integrated hardware disk compression

Data is dynamically compressed or uncompressed by the disk controller as data is written to and read from disk. Disk compression does not affect CPU utilization since compression is performed by the disk controller.

The compression ratio results of disk DASD varies. The compression ratio achieved and the impact on DASD performance depends on the data and how it is accessed. Compression is limited to user auxiliary storage pools (ASPs).

## Internal disk storage

This section summarizes information for the Peripheral Component Interconnect (PCI) disk features supported by the System i5. The following table identifies the system and expansion units that each disk drive is supported in, and specifications of each internal drive type such as RAID and mirror support, the number of bytes, and the minimum operating system level required.

PCI internal disks	System and expansion units supported					RAID/Mirror <sup>1</sup>	Minimum operating system level (OS/400) <sup>2</sup>
	Bytes	520 550 570 595	800 810 825 870 890	#5074 #5075 #5079	#5094 #5095 #5294		
#4317 8.58 GB 10k RPM Disk Unit <sup>3</sup>	2	S	S	S	S	G/7	V4R5
#4318 17.54 GB 10k RPM Disk Unit <sup>4</sup>	2	S	S	S	S	H/8	V4R5
#4319 35.16 GB 10k RPM Disk Unit	2	S	S	S	S	J/9	V5R1
#4326 35.16 GB 15k RPM Disk Unit	2	N	N	-	N	J/9	V5R2
#4327 70.56 GB 15k RPM Disk Unit	2	N	N	-	N	K/10	V5R2
#4328 141.12 GB 15k RPM Disk Unit	2	N	-	-	N		V5R3
#6817 8.58 GB 10k RPM Disk Unit	2	R	R	R	R	D/7	V4R5
#6818 17.54 GB 10k RPM Disk Unit	2	R	R	R	R	E/8	V4R5
#8817 8.58 GB Optional Base Two-byte Disk Unit 10k RPM	2	R	R	R	R	D/7	V4R5
#8818 17.54 GB Optional Base Two-byte Disk Unit 10k RPM	2	R	R	R	R	E/8	V4R5
#8917 8.58 GB Optional Base 10k RPM Disk Unit	2	R	R	R	R	D/7	V4R5
#8918 17.54 GB Optional Base 10k RPM Disk Unit	2	R	R	R	R	E/8	V4R5

PCI internal disks	System and expansion units supported				RAID/Mirror <sup>1</sup>	Minimum operating system level (OS/400) <sup>2</sup>
Feature description	Bytes	520 550 570 595	800 810 825 870 890	#5074 #5075 #5079		
<b>Notes:</b>						
1. Like lettered disks can be part of the same RAID array, and like numbered disks can mirror each other.						
2. Minimum operating system support level on System i5.						
3. This feature is supported for conversion only on Model 595. This feature is withdrawn effective December 2002.						
4. This feature is supported for conversion only on Model 595. This feature is withdrawn effective September 2004.						
N Available as a new disk.						
M Available via Miscellaneous Equipment Specification (MES) only.						
R Feature conversion to #4317 or #4318 during an MES upgrade is required to allow mounting of disk units in #5074, #5075, #5079, #5094, #5095 and #5294 towers or System i5 system units. RPK 847102 may be used in place of feature conversion to obtain mounting hardware and instructions.						
S Supported but not orderable.						

The following table shows the specifications of the current IBM internal disk technologies supported on the System i5.

Disk type	Disk diameter	Capacity	SCSI type	Average seek time	Average latency	RPM	Data-rate (burst)	Areal density Mb/inch	Read ahead cache
#4317	3.5 inches	8.58 GB	Ultra 2	R 5.3 ms W 6.3 ms	2.99 ms	10 K	80 MB/s	1353 to 2024	4 MB
#4318	3.5 inches	17.54 GB	Ultra 2	R 4.9 ms W 5.9 ms	2.99 ms	10 K	80 MB/s	3197 to 3535	2 MB
#4319	3.5 inches	35.16 GB	Ultra 2	R 4.9 ms W 5.9 ms	3.00 ms	10 K	80 MB/s	7040	3.58 MB
#4326 <sup>1</sup>	3.5 inches	35.16 GB	Ultra3	R: 3.6 ms W: 4 ms	2 ms	15 K	160 MB/s	34000	8 MB
#4327 <sup>1</sup>	3.5 inches	70.56 GB	Ultra3	R: 3.6 ms W: 4 ms	2 ms	15 K	160 MB/s	34000	8 MB
#4328	3.5 inches	141.1 GB	Ultra4	R:3.7 ms W: 4.1 ms	2 ms	15K	320 MB/s	61.700	16 MB

<sup>1</sup> These disk drives can run at U320 speeds under certain circumstances, such as the disk, IOA, or backplane used. Therefore, a mixture of devices running U160 and U320 can be in your system.

## Internal tape, CD-ROM, DVD-RAM, and DVD-ROM

Internal tape for the System i5 is available in several different formats such as quarter inch cartridge (QIC), VXA-2, VXA-320 and LTO-2, as follows:

- ▶ The QIC tape drives have the smallest capacity and the slowest performance of any of the currently available internal tape drives. Choose QIC for tape media compatibility with other

- ▶ The VXA-2 tape drives offer better performance and higher capacity than the QIC tape drives. The new VXA-320 tape drive is an entry drive offering excellent speed and capacity. It is up to twice the speed and capacity of the predecessor VXA-2 product, and up to three times the speed and five times the capacity of the 30GB QIC tape drive.
- ▶ The highest performing internal tape drive offered is the LTO-2 drive. It's native data rate is approximately twice that of the VXA-320, and it has higher capacity. LTO-2 media is supported on external LTO tape drives and libraries, which is a benefit if future growth is a consideration.

The following table shows which internal storage devices are supported in the IBM System i5 and associated towers.

Internal storage media	System units supported								
Feature	520	550	570	595	800	810	825 870 890	#5074 #5079	#5094 #5294
<b>CD</b>									
#4425 CD-ROM							S	S	S
#4525 CD-ROM					S	S			
#4625 CD-ROM						S	S	S	S
<b>DVD</b>									
#2640 DVD-ROM	X	X	X						
#4430 DVD-RAM							X	X	S
#4530 DVD-RAM					X	X			
#4531 DVD-ROM					X	X			
#4533 DVD-RAM					X	X			
#4630 DVD-RAM							X	X	X
#4631 DVD-ROM				X			X	X	X
#4633 DVD-RAM				X			X	X	X
#5751 DVD-RAM	X	X	X						
<b>¼-inch Cartridge Tape Devices</b>									
#4482 4GB ¼-inch Cartridge Tape Device							S	S	S
#4483 16 GB ¼-inch Cartridge Tape Device							S	S	S
#4486 25 GB ¼-inch Cartridge Tape Device							S	S	S
#4487 50 GB ¼-inch Cartridge Tape Device							X	X	X
#4582 4 GB ¼-inch Cartridge Tape Device					S	S			
#4583 16 GB ¼-inch Cartridge Tape Device						S			
#4584 30 GB ¼-inch Cartridge Tape Device					X	X			
#4682 4 GB ¼ inch Cartridge Tape Device							S	S	X
#4684 30 GB ¼ inch Cartridge Tape Device				X			X	X	X
#4686 25 GB ¼-inch Cartridge Tape Device						S		S	S

Internal storage media	System units supported								
Feature	520	550	570	595	800	810	825 870 890	#5074 #5079	#5094 #5294
#4687 50 GB ¼-inch Cartridge Tape Device				X	X	X		X	X
#5753/#9653 30 GB ¼ inch Cartridge Tape Unit	X	X							
#5754/#8754 Optional Base 50 GB ¼-inch Cartridge Tape Device	X	X							
#8287 50 GB ¼ inch Cartridge Tape Unit					X				
#9284 30 GB ¼ inch Cartridge Tape Unit					X				
#9285 80 GB ¼ inch Cartridge Tape Unit					X				
<b>VXA-2 Tape Devices</b>									
#1889/#9689 80 GB VXA-2 Tape Device	X	X							
#4585 80 GB VXA-2 Tape Device					X	X			
#4685 80 GB VXA-2 Tape Device				X			X	X	X
<b>VXA-320 Tape Devices</b>									
#6279 160GB VXA-320 Tape Drive	X	X							
<b>LTO Tape Devices</b>									
#5755 200 GB LTO-2 Tape Unit	X	X							
<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>▶ All tape features #44xx and #45xx are CIF. Orders for these devices are installed by the client. The IBM Service Representative can install the CIF as a billable service.</li> <li><b>X</b> Available as a new device.</li> <li><b>S</b> Supported but not orderable. May only be supported as part of a conversion.</li> </ul>									

The following table identifies the read/write capability, operating system requirements, capacity, media part numbers, performance and compression specifications of LTO and VXA internal tape devices available for the System i5.

IBM tape device					VXA-2	VXA 320	LTO-2 Tape Unit
Drive storage capability					80 GB	160 GB	400GB
Compaction algorithm					ALDC	ALDC	SLDC
Minimum OS/400 level					V5R1	V5R3	V5R3
Format	Native Media Capacity	Native data transfer rate	Media	Media part number	#1889 <sup>6</sup> #4585 #4685 #9285 #9689 <sup>6</sup>	#6279	#5755
VXA1 <sup>1,6</sup>	59 GB	6 MB/s	V17-59GB	19P4877	R/W	--	--
	20 GB	6 MB/s	V6-20GB	19P4878	R/W	--	--
	20 GB	6 MB/s	V6-test	19P4879	R/W	--	--
VXA2 <sup>1,3</sup>	80 GB	6 MB/s	V23-80GB	19P4876	R/W	R/W	--
	59 GB	6 MB/s	V17-59GB	19P4877	R/W	--	--
	20 GB	6 MB/s	V6-20GB	19P4878	R/W	--	--
	20 GB	6 MB/s	V6-test	19P4879	R/W	--	--
	80 GB	6 MB/s	X23-80GB	24R2137	R/W	R/W	--
	40 GB	6 MB/s	X10-40GB	24R2136	R/W	R/W	--
	20 GB	6 MB/s	X6-20GB	24R2134	R/W	R/W	--
	20 GB	6 MB/s	X6-test	24R2135	R/W	R/W	--
VXA3 <sup>1,2,4,5</sup>	80 GB	12 MB/s	V23-80GB	19P4876	--	R/W	--
	80 GB	12 MB/s	X23-80GB	24R2137	--	R/W	--
	40 GB	12 MB/s	X10-40GB	24R2136	--	R/W	--
	20 GB	12 MB/s	X6-20GB	24R2134	--	R/W	--
	20 GB	12 MB/s	X6-test	24R2135	--	R/W	--
LTO 1	200 GB	24 MB/s	LTO Ultrium 1	09L9120	--	--	R/W
LTO 2	400 GB	24 MB/s	LTO Ultrium 2	08L9870	--	--	R/W
<b>Notes:</b>							
1. Indicates that the capacity can double typically when the compression option is selected.							
2. The VXA3 format doubles the native capacity of the media.							
3. The VXA-2 drive can use VXA1 and VXA2 formats.							
4. The VXA-320 drive can use VXA2 and VXA3 formats.							
5. The VXA-320 drive will auto-eject all V-type media except V23.							
6. The VXA1 format is not supported on V23 and X-Type media.							



The following table identifies the read/write capability, operating system requirements, capacity, performance and compression specifications of QIC internal tape devices available for the System i5.

IBM tape device					QIC-2GB	QIC-2GB DC	4/8GB SLR5 QIC-4GB DC	MLR1 QIC 5010 DC	MLR1 QIC 5010 DC	MLR3	SLR 60	SLR 100
Drive storage capability					2.5 GB <sup>4</sup>	2.5 GB <sup>4</sup>	4 GB	13 GB <sup>4</sup>	16 GB	25 GB	30 GB	50 GB
Compaction algorithm						LZ1	LZ1	LZ1	LZ1	LZ1	LZ1	LZ1
Minimum OS/400 level					V4R1	V4R1	V4R1	V3R7	V4R1	V4R1	V4R5	V5R1
Format	Capacity	Native data transfer rate	Media	Media part number	#6380 #6480	#6381 #6481	#4482 #4582 #6382 #6482 7207-122	#6385 <sup>7</sup> #6485 <sup>7</sup>	#4483 #4583 #6383 #6483	#4486 #4586 #6386 #6486	#4584 #4684 #5753 <sup>6</sup> #6384 #6484 #9284 #9653 <sup>6</sup> 7207-330	#4487 #4587 #5754 <sup>6</sup> #8287 #8754 <sup>6</sup> #4687 7329-308
MLR3 <sup>1</sup>	25 GB <sup>B</sup>	2 MB/s	MLR3-25GB	59H4128	--	--	--	--	--	R/W	R/W	R/W
QIC5010 <sup>1</sup>	16 GB	1.5 MB/s	MLR1-16GB	59H4175	--	--	--	R/W	R/W	R/W	R/W	R
	13 GB	1.5 MB/s	DC5010	16G8574	--	--	--	R/W	R/W	R/W	R/W	R
	2 GB	1.5 MB/s	MLR1-2GB	35L0589	--	--	--	R/W	R/W	R/W	R/W	R
QIC4DC <sup>2</sup>	8 GB	760 KB/s	SLR5-4GB	59H3660	--	--	R/W	--	R	R	R	R
QIC4GB	4 GB	380 KB/s	SLR5-4GB	59H3660	--	--	R/W	--	R	R	R	R
QIC2DC <sup>2</sup>	5 GB	600 KB/s	DC9250	16G8436	--	R/W	R/W	--	R	R	R	
QIC2GB	2.5 GB	300 KB/s	DC9250	16G8436	R/W	R/W	R/W	R/W	R	R	R	
QIC1000	1.2 GB	300 KB/s	DC9120	21F8730	R/W	R/W	R/W	R/W	--	--		
QIC525	525 MB	200 KB/s	DC6525	21F8597	R/W	R/W	R/W	R/W <sup>5</sup>	--	--		
QIC525	320 MB	200 KB/s	DC6320	21F8583	R/W	R/W	R/W	R/W	--	--		
QIC120	120 MB	120 KB/s	DC6150	21F8578	R/W	R/W	R/W	R/W <sup>5</sup>	--	--		
QIC24 <sup>3</sup>	60 MB		DC6150		R	R	--	--	--	--		
SLR100	50 GB	5 MB/s	SLR100-50	35L0968	--	--	--	--	--	--	--	R/W
	5 GB	5 MB/s	SLR100-5G	35L0961	--	--	--	--	--	--	R/W	R/W
SLR60	30 GB	4 MB/s	SLR60-30G	19P4209	--	--	--	--	--	--	R/W	R/W
	37.5 GB	4 MB/s	SLR60-37.5 GB	24R0146	--	--	--	--	--	--	R/W	R/W
<b>Notes:</b>												
1. Indicates that the capacity can double typically when the compression option is selected.												
2. QIC-2DC and QIC-4DC are compression formats. Cartridge capacity is data dependent. Capacities shown are typical.												
3. QIC24 format is written by S/36.												
4. Available as a migration feature only during an upgrade.												
5. Use of DC6150 and DC6525 media may shorten the life of the tape device and require more frequent maintenance.												
6. Requires i5/OS V5R3												
7. The internal 13 GB tape drives with feature code #6385 or #6485 also supports the 16 MB IBM MLR1 tape media.												
8. Minimum operating system to support the 25GB capacity cartridge drive: V4R1.												

# Internal CD-ROM, DVD-RAM, and DVD-ROM drives

The following table identifies the CD-ROM, DVD-ROM, and DVD-RAM devices supported in System i5 models. Also listed is the supported format, maximum capacity, minimum operating system level, write supported media and the required IOA. All DVD drives support ISO 9660 and UDF formats.

Feature	Description	Minimum operating system	Supported formats	Write Supported Media	Maximum capacity (compressed) <sup>1</sup>	
#2640 <sup>2</sup>	DVD-ROM	i5/OS V5R3	CD ROM	N/A	650 MB	
			DVD-ROM Single-sided		4.7 GB	
			DVD-ROM Double-sided		9.4 GB	
#4525 #4625	CD-ROM	OS/400 V4R4	CD-ROM Read only	N/A	650 MB	
#4530 #4630	DVD-RAM	OS/400 V5R1	CD-ROM Read only	N/A	650 MB	
			DVD-RAM Single-sided		4.7 GB - Bare <sup>5</sup> 2.6 GB & 4.7 GB Cartridge	2.6 GB <sup>4</sup> 4.7 GB
			DVD-RAM Double-sided			9.4 GB
#4533 <sup>2, 3, 6</sup>	DVD-RAM	OS/400 V5R2	CD-ROM Read only	N/A	650 MB	
			DVD-RAM Single-sided		4.7 GB Bare	4.7 GB
			DVD-RAM Double-sided			9.4 GB
#4633 <sup>2, 3, 6</sup>	DVD-RAM	OS/400 V5R2	CD-ROM Read only	N/A	650 MB	
			DVD-RAM Single-sided		4.7 GB Bare	4.7 GB
			DVD-RAM Double-sided			9.4 GB
#5751 <sup>2, 6</sup>	DVD-RAM	i5/OS V5R3	CD-ROM Read only	N/A	650 MB	
			DVD-RAM Single-sided		4.7 GB Bare	4.7 GB
			DVD-RAM Double-sided			9.4 GB

Feature	Description	Minimum operating system	Supported formats	Write Supported Media	Maximum capacity (compressed) <sup>1</sup>
#4531 <sup>2</sup> #4631 <sup>2</sup>	DVD-ROM	OS/400 V5R2	CD-ROM (Read only)	N/A	650 MB
			DVD-RAM Single-sided (Read only)	N/A	4.7 GB
			DVD-RAM Double-sided (Read only)	N/A	9.4 GB
<b>Notes:</b> <ol style="list-style-type: none"> <li>Compressed values assume a 2:1 compression. Actual results may vary depending on the type and volume of data.</li> <li>Use of a cleaning kit could damage the drive.</li> <li>See Information APAR II13797 for software requirements of #4533 and #4633 when run with OS/400 V5R2.</li> <li>Only the #4530 and #4630 drives support writing of 2.6GB media</li> <li>Base i5/OS V5R3 supports writing bare 4.7GB and 9.4GB media. OS/400 V5R2 requires PTF MF32271 to support the writing of 4.7GB and 9.4GB bare media.</li> <li>Supports dual-sided bare media but not recommended due to handling issues. The media must be flipped manually.</li> </ol>					

## System i5 code distribution

System i5 code (LIC, firmware, operating system and licensed programs) is distributed on CD-ROM media. One CD-ROM, DVD-RAM, or DVD-ROM drive must be ordered as a separate feature of the system unit of all IBM System i5 servers. The CD-ROM and DVD-ROM can also be used for alternate IPL, but not as a save/restore device for the system. The DVD-RAM can be an alternate IPL and save/restore device. It is not recommended as a save/restore device for performance reasons.

## Virtual Storage

Virtual Storage consists of objects that, when used together, imitate tape, CD, DVD and write-once read-many (WORM) media on the disk units of a System i5. The imitated media appear to the server to be actual media.

When virtual storage is used, a virtual device description is created to support the virtual storage, in a similar way that an actual device description is needed to support a physical tape device.

Virtual storage is of benefit for the following reasons:

- ▶ Eliminates media errors
- ▶ Eliminates user intervention
- ▶ Increases system availability
- ▶ Simplifies software and data distribution by using electronic distribution
- ▶ allows CD, DVD and tape creation using the DUPTAP or DUPOPT commands
- ▶ increases security by using Object signing for digital signatures
- ▶ simplifies creating copies by using catalog shadowing to create them

## Virtual Tape

Virtual tape devices use virtual tape volumes that are created on a servers disk units. This allows i5/OS SAV commands to be used to back up data to virtual tapes stored on disk rather

than on actual tapes which is a lot slower. Virtual tape devices can perform the same tasks as a physical tape except:

- ▶ Install of base i5/OS (RSTLICPGM is supported)
- ▶ SAVSTG
- ▶ Dump to Media from SST & DST

The considerations for using virtual tape storage include the:

- ▶ Correct authority to create virtual images
- ▶ Disk space requirements (smallest volume size is 48 MB. The largest is 1,000,000 MB)
- ▶ Quantity of virtual image volumes required
- ▶ Maximum block size supported by the physical tape device that the virtual tape volume will be saved to
- ▶ User profiles used to create the virtual tape volume must have their maximum storage allowed attribute set to \*MAX.

For further information, select the “Storage Solution” tab in the V5R4 information Centre at:

<http://publib.boulder.ibm.com/infocenter/series/v5r4/index.jsp>



## External storage and SAN

This chapter describes the latest external storage media devices that are marketed today for IBM System i5. Specification charts are provided for the supported attachment methods and external devices. It also covers storage area network (SAN) components that are marketed and supported by the System i5.

Further descriptions of the storage features highlighted in this chapter can be found in *IBM @server i5, iSeries, and AS/400e System Builder*, SG24-2155.

You can find more information about System i5 storage on the Web at:

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

You can find more information about System i5 and SAN on the Web at:

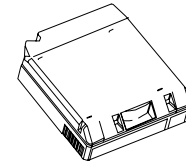
<http://www.ibm.com/servers/storage/san/>

## External storage tape

This section describes select external storage tape devices supported by the current System i5 product line.

### IBM TotalStorage 358x Ultrium Solutions with LTO Technology

The 358x Ultrium tape family of devices supports the latest industry standard Linear Tape-Open (LTO) technology. LTO technology enhances data compression capacity, performance, and reliability. A powerful open tape architecture, Ultrium sets the stage for the new generation of tape storage products expected to surpass current tape capacity and performance benchmarks while maintaining the highest data integrity. The following table compares Ultrium feeds and speeds:



Ultrium Model	Ultrium 1	Ultrium 2	Ultrium 3
Cartridge capacity GB/s (native/compressed)	100/200	200/400	400/800
Data transfer rate GB/s (native/compressed)	15/30	35/70	80/160
<b>Note:</b> Compressed data rates are estimates and are data, application, and processor dependent. User results may vary.			

The models of the 358x supported on the System i5 are shown in the following table:

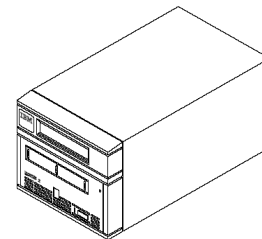
358x Model	Device description	Number of drives	Maximum number of cartridges	Interface
3580 L23, H23	Ultrium 2 Tape Drive	1	1	LVD, HVD
3580 L33	Ultrium 3 Tape Drive	1	1	LVD
3581 L28, F28	Ultrium 2U Tape Autoloader	1	8	LVD, HVD, FC
3581 L38, F38	Ultrium 2U Tape Autoloader	1	8	LVD, FC
3582 L23	Ultrium Tape Library	1 - 2	24	LVD, HVD, FC

358x Model	Device description	Number of drives	Maximum number of cartridges	Interface
3583 L18 - 18 Carts L36 - 16 Carts L72 - 72 Carts	Ultrium Scalable Tape Library	1 - 6	72	LVD, HVD FC
3584 L22 - Base Frame D22 - Expansion Frame (up to 16 frames)	Ultrascaleable Tape Library For 3592-J1A drives	1- 192	6260	FC
3584 L32 / L52 - Base Frame D32 / D522 - Expansion Frame	Ultrascaleable Tape Library For Ultrium 1 or Ultrium 2 LTO drives	1- 192	6881	LVD, HVD FC

The IBM TotalStorage 358x tape devices that are supported on the System i5 include:

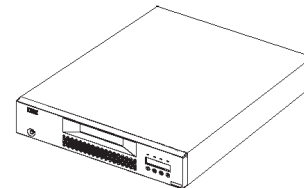
► **IBM TotalStorage Ultrium External Tape Drive 3580**

The IBM LTO 3580 tape drive is an external stand-alone or rack-mountable unit. It is the entry point for the family of IBM Ultrium tape products. The Ultrium 3 tape drive provides up to 400GB of uncompressed data storage. The IBM Ultrium 3 tape drive can read and write LTO Ultrium 2 data cartridges and can read LTO Ultrium 1 cartridges. The IBM Ultrium External Tape Drive 3580 is an excellent alternative to S-DLT, DLT, ¼-inch, 4 mm, or 8 mm tapes drives.



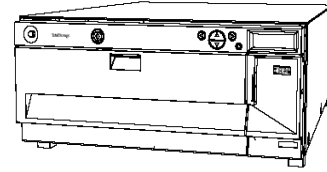
► **IBM TotalStorage Ultrium Tape Autoloader 3581**

The IBM LTO 3581 Autoloader is an external stand-alone or rack-mountable unit and contains a single LTO Ultrium 2 or Ultrium 3 tape drive. The Ultrium Tape Autoloader 3581 capacity is seven to eight tape cartridges depending on the model and provides a media capacity of up to 3.2TB of uncompressed data storage.



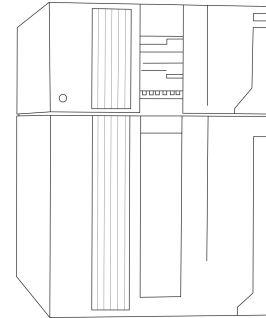
► **IBM TotalStorage Ultrium Tape Library 3582**

The IBM LTO 3582 Tape Library is an external stand-alone unit that may be optionally rack-mounted. It supports up to two IBM TotalStorage Ultrium 3 or Ultrium 2 Tape Drives and comes standard with a one-cartridge I/O station and twenty-three data cartridge slots giving a native library capacity of up to 9.6TB of uncompressed data storage.



► **IBM 3576 System Storage TS3310 Tape Library**

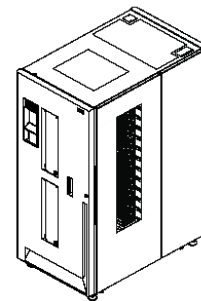
The TS3310 Tape Library is a modular, scalable tape library designed to address the tape storage needs of rapidly growing companies who find themselves space and resource constrained with tape backup and other tape applications. The TS3310 is designed to scale vertically with expansion for LTO tape cartridges, drives and a redundant power supplies. For organizations unsure of their short or long term tape capacity needs, the TS3310's Capacity on Demand (COD) built-in capability allows the system to scale as needs grow. The TS3310 Tape Library models supports LTO Ultrium 3 Tape Drives with either LVD Ultra160 SCSI or 2Gb switched fabric Fibre Channel attachment.



► **IBM TotalStorage UltraScalable Tape Library 3584**

The IBM LTO 3584 Tape library provides a highly scalable mid-range, open systems, and network server tape storage solution. It combines reliable, automated tape handling, and storage with reliable, high-performance IBM LTO Ultrium tape drives and IBM TotalStorage 3592 tape drives.

The 3584 supports up to 16 frames housing a maximum of 6,881 LTO Ultrium tape cartridges and 192 LTO Ultrium tape drives. The UltraScalable Tape Library is designed with a variety of advanced features. The IBM Multi-path Architecture and Advance Library Management System (ALMS) are designed to simultaneously attach heterogeneous servers and applications to LTO logical library partitions, including mixed Ultrium drives and media.



For additional information about the LTO products, see the following Web site:

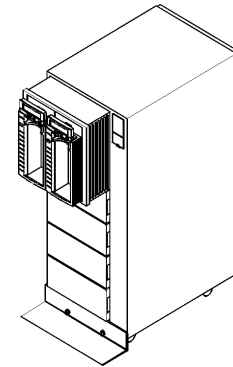
<http://www-1.ibm.com/servers/storage/tape/lto/index.html>



## IBM TotalStorage Enterprise Tape System 3590

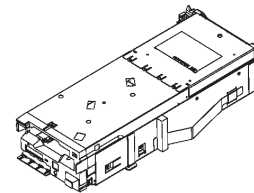
The IBM TotalStorage Enterprise Tape System 3590 is designed to provide high levels of performance and data reliability for both stand-alone and automated systems.

The 3590 Models B11, E11, and H11 incorporate a standard 10-slot ACF for high-capacity stand-alone unattended operation. The 3590 Models B1A, E1A, and H1A come without the ACF. They are designed to go into the IBM 3494 Enterprise Automated Tape Library.



## IBM TotalStorage 3592 Tape Drive Model J1A

The IBM TotalStorage 3592 Tape Drive Model J1A surpasses the capabilities of its predecessors by providing up to five times the capacity and two and a half times the data transfer rates of the Enterprise Tape System 3590 E or H Model. The drive has dual fibre channel ports and is supported in the IBM TotalStorage Enterprise Tape Library 3494. The 3592 Model J1A is also available for installation in a stand-alone rack.

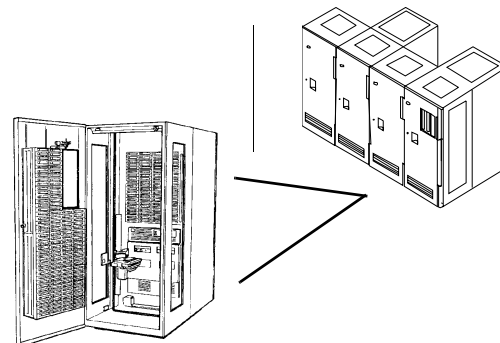


For more information about the Enterprise Tape System 3592, go to:

<http://www-1.ibm.com/servers/storage/tape/3592/index.html>

## IBM TotalStorage 3494 Enterprise Tape Library

The IBM TotalStorage 3494 Enterprise Tape Library is a stand-alone automated tape storage subsystem for 3590 and 3592 ½-inch cartridges available for attachment to the IBM System i5. It provides an automated tape solution for automating tape operations such as save and restore, migration of data between disk and tape, and other mass data applications.



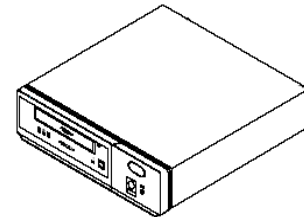
Flexible configuration choices start at a single frame configuration with up to two tape drives and up to 240 tape cartridges. Optional drives and cartridge storage can be added as needed to create an automated tape library multiple frame or tape drives, and up to 6,240 tape cartridges.-

For additional information about the 3494 Enterprise Tape Library, see:

<http://www-1.ibm.com/servers/storage/tape/3494/index.html>

## IBM 7206 Model VX2 80 GB External VXA-2 Tape Device

The IBM 7206 Model VX2 External Tape Drive is a VXA-2 Packet Drive that features capacity of 80 and 160 GB (native and compressed) and six and 12 MB/s transfer rates (native and compressed). The VXA Packet Technology provides a digital solution to the long-standing mechanical problem of head-to-tape alignment. This is a common problem that causes conventional tape storage products to trade off costly mechanical complexity with data restore integrity.



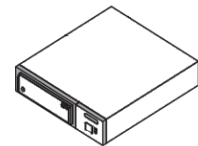
The IBM 7206 Model VX2 is an excellent solution for midrange tape requirements with an entry level price.

For additional information about the 7206-VX2 and other 7206 products, see:

[http://www.storage.ibm.com/tape/drives/7206/models/model\\_vx2.html](http://www.storage.ibm.com/tape/drives/7206/models/model_vx2.html)

## IBM 7207 Model 122 4 GB External SLR5 QIC Tape Drive

The IBM 7207 Model 122 4 GB External SLR5 QIC Tape Drive is a stand-alone streaming linear tape drive in a raven black enclosure incorporating the most recent Single Channel Linear Recording (SLR5) QIC technology.



For additional information about the 7207-122 and other 7207 products, see:

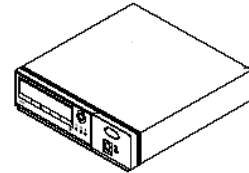
<http://www-1.ibm.com/servers/storage/tape/7207/index.html>

## IBM 7207 Model 330 30 GB External SLR60 Tape Drive

The IBM 7207 Model 330 30 GB External SLR60 Tape Drive is a stand-alone streaming tape drive in a single, externally attached enclosure. It incorporates 4-Channel Scalable Linear Recording (SLR) technology.

For additional information about the 7207-330 and other 7207 products, go to:

<http://www-1.ibm.com/servers/storage/tape/7207/index.html>



## IBM 7212 Model 102 TotalStorage Storage Device Enclosure

The 7212 Model 102 is designed to mount in one EIA unit of standard 19-inch rack using an optional rack-mount hardware feature kit. The 7212 Model 102 can also be configured for desktop installation.

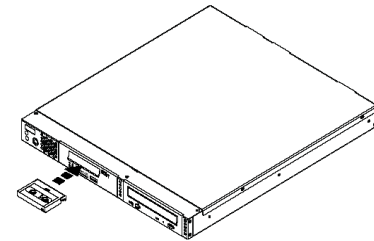
The 7212 Model 102 is an excellent choice for applications where availability of server bays for storage devices is limited or not available and it is important to consolidate storage devices in a single, convenient location to minimize space and cabling impacts.

The two bays of the 7212 Model 102 can accommodate any two of the following features codes on the 7212 to support System i5 servers:

- ▶ #1103 DVD-RAM 2 Drive
- ▶ #1104 VXA-2 Tape Drive
- ▶ #1106 DVD ROM Drive
- ▶ #1107 SLR60 Tape Drive
- ▶ #1108 SLR100 Tape Drive

For additional information about the 7212-102, see the following Web site:

<http://www-1.ibm.com/servers/storage/tape/7212/index.html>



## VXA, QIC, 8mm tape and DVD-RAM specifications summary

The following table helps to distinguish the technical characteristics of the IBM 7206, 7207, 7208, 7212 tape, and 7210 DVD devices.

Machine model	7206-VX2	7207-122 7207-330	7208-345	7210-025	7210-030	7212-102
Description	VXA-2	QIC ¼ inch	8mm Mammoth-2	DVD-RAM	DVD-RAM	Storage Device Enclosure

Machine model	7206-VX2	7207-122 7207-330	7208-345	7210-025	7210-030	7212-102
Native / Compressed <sup>1</sup>	80 GB / 160 GB	<b>122:</b> 4 GB/8 GB <b>330:</b> 30 GB/60 GB	60 GB / 150 GB	2.6 GB / 4.7 GB	2.6 GB / 4.7 GB	DDS-4: 20/40 GB DAT72: 36/72GB VXA-2: 80/160 B
Maximum Data Rate/sec <sup>2</sup>	6 MB/s 12 MB/s	<b>122:</b> 380 KB/s 760 KB/s <b>330:</b> 4 MB/s 8 MB/s	12 MB/s 20 MB/s	CD: 3.6 MB/s DVD-RAM: 1.35 MB/s <sup>3</sup> 2.7 MB/s <sup>4</sup>	CD: 3.6 MB/s DVD-RAM: 2.7 MB/s <sup>3</sup> 2.7 MB/s <sup>4</sup>	DDS/DAT72: 3/6 MB/s VXA: 6/12 MB/s
Interface	Ultra2 SCSI LVD	<b>122:</b> Wide SCSI <b>330:</b> Ultra2 SCSI LVD	LVD/SE Ultra wide SCSI-2	SCSI-2	SCSI-2 SE Fast/Wide Fast/Narrow	SCSI-2 F/W SE, LVS/SE
Supported Controllers	#2768 #5702 <sup>5</sup> #5705 <sup>5</sup>	#2768 #5702 <sup>5</sup> #5705 <sup>5</sup>	#2768 #5702 <sup>5</sup> #5705 <sup>5</sup>	#2768 #5702 <sup>5</sup> #5705 <sup>5</sup>	#2768 #5702 <sup>5</sup> #5705 <sup>5</sup> #5712 <sup>6</sup>	#2768 #5702 <sup>5</sup> #5705 <sup>5</sup> #5712 <sup>6</sup>
Minimum operating system level	OS/400 V5R1	<b>122:</b> OS/400 V4R2 with PTFs <b>330:</b> OS/400 V5R1 with PTFs	OS/400 V4R5	OS/400 V5R1	<b>7xx and 8xx:</b> OS/400 V5R2 System i5 i5/OS V5R3	OS/400 V5R2
<p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. The degree of compression that is achieved is highly sensitive to the characteristics of the data being compressed.</li> <li>2. Compressed data rates are estimates and are data, application, and processor dependent. User results may vary.</li> <li>3. Write rate of DVD</li> <li>4. Read rate of DVD</li> <li>5. Minimum operating system to support the #5702 and #5705: OS/400 V5R2</li> <li>6. Minimum operating system to support the #5712: i5/OS V5R3</li> </ol>						

## External tape storage automated library specifications

The following table helps to distinguish the technical characteristics of the external storage automated tape library devices supported by the System i5 servers marketed today.

**Note:** The last models of the 3490E, 3570, and 3575 range were *withdrawn from marketing* in 2002. They are included in the table for comparison purposes.

<b>Machine model</b>	<b>Desktop</b> 3490E-F10  <b>Rack</b> 3490E-F11  <b>Library</b> 3490-F1A <sup>9</sup>	3494-L12 3494-L22 3494-L10 3494-D12 3494-D22 3494-D10 3494-HA1	<b>Desktop</b> 3570-C01 3570-C02  <b>Rack</b> 3570-C11 3570-C12	3575-L06 3575-L12 3575-L18 3575-L24 3575-L32	<b>Desktop/Rack</b> 3581-L28, F28 3582-L23  <b>Library, Floor/Rack</b> 3583-L18 3583-L36 3583-L72  <b>Library</b> 3584-L52, L22, L32 <sup>9</sup> 3584-D52, D22, D32	3590-B1A 3590-B11 3590-E1A 3590-E11 3590-H1A 3590-H11 3592-J1A
Description	½-inch tape	Library for 3490-x1A 3590-x1A 3592-J1A	C-XL format 0.31 inch	C-XL format 0.31 inch	LTO Ultrium 1 or 2 3592-J1A (3584 L22 and D22)	½-inch tape
Recording technology	Longitudinal Serpentine	Longitudinal Serpentine or Linear Serpentine (J)	Longitudinal Serpentine	Longitudinal Serpentine	Longitudinal Serpentine	Longitudinal Serpentine <b>J:</b> Linear Serpentine
Native/ compressed <sup>1</sup>	800 MB /2.4 GB	Depends on installed drives; See columns <b>3590-X1A</b> and <b>3592-J1A</b> .	7 GB/21 GB	7 GB/21 GB	<b>Ultrium 1</b> 100/200 GB <b>Ultrium 2</b> 200/400 GB <b>3592-J1A</b> 300GB/900GB	<b>B:</b> 10/30 GB or 20/60 GB <sup>7</sup> <b>E:</b> 20/60 GB or 40/120 GB <sup>7</sup> <b>H:</b> 30/90 GB <sup>7</sup> <b>J1A</b> 300GB/900GB
Maximum number of cartridges/ library	10	6240	20	<b>L06:</b> 60 <b>L12:</b> 120 <b>L18:</b> 180 <b>L24:</b> 240 <b>L32:</b> 324	<b>L28/F28:</b> 8 <b>L23:</b> 24 <b>L18:</b> 18 <b>L36:</b> 32 <b>L72:</b> 72  <b>L52, D52:</b> 64-6887 <sup>12</sup> <b>L22, D22:</b> 58 - 6260 <sup>12</sup> <b>L32, D32:</b> 281-6881 <sup>12</sup>	B1A: 1 B11: 10 E1A: 1 E11: 10 H1A: 1 H11: 10 J1A:1
Maximum total capacity	24 GB	1.12 PB (3590H)  5.62PB 3592J  (3:1 comp)	420 GB	<b>L06:</b> 1.2 TB <b>L12:</b> 2.5 TB <b>L18:</b> 3.78 TB <b>L24:</b> 5.04 TB <b>L32:</b> 6.8 TB	<b>L28:</b> 3.2 TB <b>L23:</b> 9.6 TB <b>L18:</b> 7.2TB <b>L36:</b> 14.4 TB <b>L72:</b> 28.8 TB  L32 + D32: 56.2 to 2752 TB  <b>L52, D52:</b> 25.6 TB to 2.76PB (2:1 comp)  <b>L22, D22:</b> 52TB to 5.63PB (3:1 comp) <b>L32, D32:</b> 112TB to 2.75PB (2:1 comp)	B1A: 60 GB B11: 0.6 TB E1A: 120 GB E11: 1.2 TB H1A: 180 GB H11: 1.8 TB J1A: 900GB (3:1 comp)

Machine model	Desktop 3490E-F10  Rack 3490E-F11  Library 3490-F1A <sup>9</sup>	3494-L12 3494-L22 3494-L10 3494-D12 3494-D22 3494-D10 3494-HA1	Desktop 3570-C01 3570-C02  Rack 3570-C11 3570-C12	3575-L06 3575-L12 3575-L18 3575-L24 3575-L32	Desktop/Rack 3581-L28, F28 3582-L23  Library, Floor/Rack 3583-L18 3583-L36 3583-L72  Library 3584-L52, L22, L32 <sup>9</sup> 3584-D52, D22, D32	3590-B1A 3590-B11 3590-E1A 3590-E11 3590-H1A 3590-H11 3592-J1A
Maximum data rate/sec (native) <sup>2</sup>	3 MB/s	Depends on installed drives; see columns <b>3590-X1A</b> and <b>3592-J1A</b> .	7MB/s	7MB/s	35 MB/s	B11: 9 MB/s E11: 14 MB/s H11 14 MB/s J1A:40 MB/s
Time to load and thread a cartridge	81 sec	See columns <b>3590-X1A</b> and <b>3592-J1A</b> .	19 sec	20 sec	15 sec, LTO Ultrium 2	40 sec (3590 J media) 60 sec (3590 K media) 19 sec (3592 J1A)
Interface	SCSI-2 Fast/wide differential	RS232 Async or LAN for Library Manager/robotics	SCSI-2 Fast/wide differential	SCSI-2 Fast/wide differential	Ultra160 SCSI LVD Fibre Channel SCSI-2 HVD (with #3104 Converter Kit)	3590 SCSI-2 Fibre Channel  3592 Fibre Channel only
Compression/compaction method <sup>6</sup>	HDC IDRC	Depends on installed drives; see columns <b>3590-X1A</b> and <b>3592-J1A</b> .	LZ1	LZ1	LTO-DC (LZ1)	I3590 - ALDC (LZ1) 3592 - SLDC (LZ1)
Controllers supported	#2749 <sup>3</sup>	Depends on installed drives; see columns <b>3590-X1A</b> and <b>3592-J1A</b>	#2749 <sup>3</sup>	#2749 <sup>3</sup>	#2749 <sup>3</sup> #2765 <sup>4, 5</sup> #5702 <sup>8</sup> #5704 <sup>8</sup> #5705 <sup>8</sup> #5712 <sup>10</sup>	3590 #2749 <sup>3</sup> #2765 <sup>4, 6</sup> #5704 <sup>11</sup> 3592 #2765, #5704 <sup>11</sup>
Minimum operating system level	OS/400 V4R1	OS/400 V2R3	OS/400 V3R1	OS/400 V4R1	OS/400 V5R1	<b>B1x:</b> OS/400 V3R1 <b>E1x:</b> OS/400 V4R1 <b>H1x:</b> OS/400 V4R5 <b>J1A:</b> OS/400 V5R1

<b>Machine model</b>	<b>Desktop</b> 3490E-F10  <b>Rack</b> 3490E-F11  <b>Library</b> 3490-F1A <sup>9</sup>	3494-L12 3494-L22 3494-L10 3494-D12 3494-D22 3494-D10 3494-HA1	<b>Desktop</b> 3570-C01 3570-C02  <b>Rack</b> 3570-C11 3570-C12	3575-L06 3575-L12 3575-L18 3575-L24 3575-L32	<b>Desktop/Rack</b> 3581-L28, F28 3582-L23  <b>Library, Floor/Rack</b> 3583-L18 3583-L36 3583-L72  <b>Library</b> 3584-L52, L22, L32 <sup>9</sup> 3584-D52, D22, D32	3590-B1A 3590-B11 3590-E1A 3590-E11 3590-H1A 3590-H11 3592-J1A
Alternate IPL device specify	#5504	Depends on tape devices installed; see columns <b>3590-X1A</b> and <b>3592-J1A</b>	#5515	#5515	#5537	#5519 for 3590
<b>Notes:</b>						
<ol style="list-style-type: none"> <li>The actual degree of compression achieved is highly sensitive to the characteristics of the data compressed.</li> <li>This entry illustrates the best possible performance. Other components of the system may limit the actual performance achieved. The best source of information about performance is the <i>iSeries Performance Capabilities Reference</i>, SC41-0607.</li> <li>The #2749 PCI Ultra Magnetic Media Controller attachment requires a minimum of OS/400 V4R5.</li> <li>The #2765 PCI Fibre Channel Tape Controller attachment requires a minimum of OS/400 V5R1.</li> <li>The #2765 PCI Fibre Channel Tape Controller supports attachment to the 3582, 3583, and 3584 only.</li> <li>The #2765 PCI Fibre Channel Tape Controller supports attachment to the 3590-Exx and 3590-Hxx only.</li> <li>The 3590 capacities depend on cartridge type. The Extended High Performance Cartridge has twice the capacity of the original High Performance Cartridge. The compressed capacities assume 3:1 compression.</li> <li>Minimum operating system to support the #5702 PCI-X Ultra Tape Controller, #5704 PCI-X Fibre Channel Tape Controller and #5705 PCI-X Tape/DASD Controller attachment is OS/400 V5R2.</li> <li>The maximum number of drives depends on the adapter used to attach to the System i5 server: <ul style="list-style-type: none"> <li>#2765, #5702: 16 drives, media changers, or both per adapter with a maximum of 96 devices in the library partition.</li> <li>OS/400 is limited to 32 drives pooled per library, regardless of how the drives are attached (one versus multiple).</li> </ul> </li> <li>Minimum operating system to support #5712 PCI-X Tape/DASD Controller attachment: i5/OS V5R3.</li> <li>Minimum operating system to support #2765 attachment: OS/400 V5R1. Minimum operating system to support #5704 attachment: OS/400 V5R2</li> <li>Multiple frame combinations are possible.</li> </ol>						

Refer to *IBM TotalStorage Tape Selection and Differentiation Guide*, SG24-6946 to assist you in finding the best tape product solution for the designated backup environment. The 2004 edition of this Redbook covers the 3494, 3580, 3581, 3582, 3583, 3584, 3590, 3592, and other tape products.

## Magnetic media controller transfer rates

The following table identifies the theoretical transfer rates of System i5 media controllers. Refer to appropriate benchmarks for an accurate representation of

performance capabilities. Refer to the following two guides for benchmark information:

- ▶ *iSeries Performance Capabilities Reference*, SC41-0607
- ▶ *iSeries in Storage Area Networks*, SG24-6220

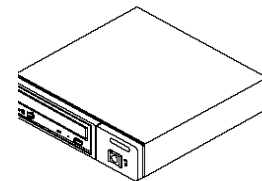
IOP or IOA	Transfer rate
#2749 PCI Ultra Magnetic Media Controller OS/400 V4R5	Up to 38 MB/s Aggregate sustained data rates up to 108 GB/hour
#2765 PCI Fibre Channel Tape Controller OS/400 V5R1	Up to 100 MB/s
#2766 PCI Fibre Channel Disk Controller OS/400 V5R1	Up to 100 MB/s
#2787 PCI-X Fibre Channel Disk Controller OS/400 V5R2	Up to 200 MB/s
#5702 PCI-X Ultra Tape Controller OS/400 V5R2	80 MB/s Up to 160 MB/s with MF30636 applied
#5704 PCI-X Fibre Channel Tape Controller i5/OS V5R3	Up to 200 MB/s
#5705 PCI-X Tape/DASD Controller OS/400 V5R2	80 MB/s Up to 160 MB/s with MF30636 applied
#5712 PCI-X Tape/DASD Controller i5/OS V5R3	Up to 160 MB/s

## External DVD-RAM storage

DVD-RAM is an optical technology that advances the capabilities that CD-ROM brings to System i5. This section describes select external storage DVD-RAM devices supported by the current System i5 product line.

### IBM 7210 Model 025 External DVD-RAM Drive

The IBM 7210 External DVD-RAM drive provides data interchange capability in support of LPAR configurations for System i5. The 7210 Model 25 is flexible, supporting synchronous and asynchronous data transfer and accommodates both 12 cm and 8 cm disks. The Model 025 reads multi-session disks, CD-recordable disks, and CD-RW disks. DVD disk capacities of 2.6 GB, 4.7 GB, 5.2 GB, and 9.4 GB are supported. The IBM 7210





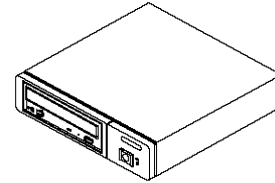
External DVD-RAM Drive enhances the function and capabilities of the System i5.

For additional information about the 7210-025, see the following Web site:

<http://www-1.ibm.com/servers/storage/tape/7210/index.html>

## IBM 7210 Model 030 External DVD-RAM Drive

The high-performance IBM 7210 External DVD-RAM drive provides data interchange capability in support of LPAR configurations for System i5. The 7210 Model 30 is flexible, supporting synchronous and asynchronous data transfer and accommodates both 12 cm and 8 cm bare media only. The Model 030 reads multi-session disks, CD-recordable disks, and CD-RW disks. The Model 030 writes to 4.7Gb and 9.4Gb DVD-RAM media. Media capacities of 2.6 GB, 4.7 GB, 5.2 GB, and 9.4 GB are supported.



For additional information about the 7210-030, see the following Web site:

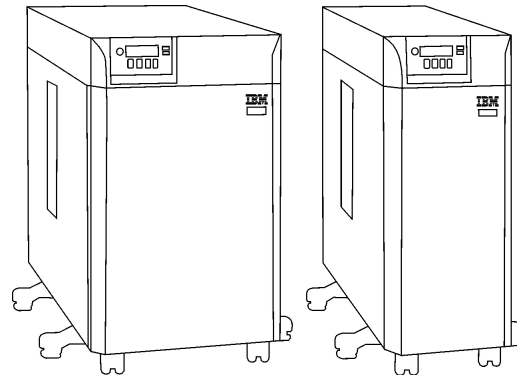
<http://www-1.ibm.com/servers/storage/tape/7210/index.html>

## External optical storage

This section describes select external storage optical devices supported by the current System i5.

### IBM 3996 Optical Library

The IBM 3996 Optical Library is designed for excellent reliability and performance. This family of optical libraries features 5.25 inch, 30GB Ultra Density Optical (UDO) technology, and the UDO media provides up to five times the maximum capacity of media used in the previous 3995 optical library offered by IBM. The IBM 3996 Optical Library supports permanent Write Once / Read Many (WORM), and rewritable recording technologies in a single library. The IBM 3996 is available with a low



voltage differential (LVD) SCSI interface connectivity and has an optional barcode scanner to facilitate library inventory.

The 3996 Optical Library is available in three models.

► **Model 3996-032**

The IBM 3996 Model 032 has the physical capacity to hold optical discs capable of holding up to 960 GB. Each of the 32 media slots can handle an optical disc providing up to 30 GB of optical storage.

► **Model 3996-080**

The IBM 3996 Model 080 has the physical capacity to hold optical discs capable of holding up to 2.4 TB. Each of the 80 media slots can handle an optical disc providing up to 30 GB of optical storage. When additional drives are added, its capacity becomes 2.16 TB. Adding two optional drives uses eight media slots, reducing the storage capacity of the 3996.

► **Model 3996-174**

The IBM 3996 Model 174 has the physical capacity to hold optical discs capable of holding up to 5.2 TB. Each of the 174 media slots can handle an optical disc providing up to 30 GB of optical storage. With two 30 GB optical disc drives and an option of increasing to four drives, its capacity becomes 4.98 TB. Adding the two optional drives uses eight media slots, reducing the storage capacity of the 3996.

The IBM 3996 features an optional barcode scanner for out-of-library media management, faster media inventorying inside the library, and added security.

## External disk storage devices

This section describes select external storage disk storage devices that are supported by the current System i5.

### IBM TotalStorage DS6000

The IBM TotalStorage DS6000 series is designed to deliver enterprise-class storage capabilities in a space-efficient, modular design at a low price. This functionality, as well as the high performance and advanced functions found in enterprise disk storage devices, is available in 19-inch rack mountable packages with the base storage server enclosure 5.25-inch (3U) high, and modular expansion enclosures of the same size to add capacity as your needs grow.



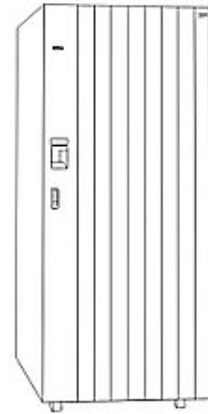
The IBM TotalStorage DS6800 consists of redundant, hot-swappable power supplies and cooling fan assemblies, redundant RAID controllers, supporting RAID 5, RAID 10 and optional IBM TotalStorage Resiliency Family functions, IBM TotalStorage FlashCopy®, Metro Mirror, Global Mirror, and Metro/Global Copy.

For additional information about DS6000, see the following Web site:

<http://www-1.ibm.com/servers/storage/disk/ds6000/index.html>

## IBM TotalStorage DS8000

The IBM TotalStorage DS8000 series is designed to provide unmatched functionality, flexibility, and performance for enterprise disk storage systems. It incorporates a high bandwidth internal fabric designed to support fault tolerance, highly expandable and flexible processor memory, and Fibre Channel attached disks. It has a dual processor complex implementation base on IBM POWER5 technology that supports concurrent microcode loads, transparent I/O failover and fallback support, and redundant, hot-swappable components for 24 x 7 business environments. The DS8000 series offers support for IBM TotalStorage Resiliency Family technologies, which includes FlashCopy, Global Mirror, and Metro Mirror. The DS8000 supports RAID-5 and RAID-10 disk protection. It is designed to support a broad range of operating environments including zSeries, System i5 and pSeries servers, as well as servers from Sun, HP, and other Intel-based providers. For the System i5, attachment via 2 Gbps Fibre Channel controllers is supported.



For additional information about DS8000, see the following Web site:

<http://www-1.ibm.com/servers/storage/disk/ds8000/index.html>

## IBM TotalStorage Enterprise Storage Server Model 750

The IBM TotalStorage ESS Model 750 is designed to help meet the needs of clients who do not require the full range of capacity and performance scalability offered by the IBM TotalStorage ESS Model 800, but need enterprise level functionality intended to support reliable, continuous access to data at an affordable price.

The ESS Model 750 provides an entry point into the IBM TotalStorage ESS product family comprised of ESS Model 750 and ESS Model 800. The ESS Model 750 offers many of the features of ESS Model 800, but is based on a two-way processor with 8 GB cache and 2 GB of Non Volatile Storage (NVS).

This is in contrast to the 4-way or 6-way processors available with the ESS Model 800.

For additional information about ESS, see the following Web site:

<http://www-1.ibm.com/servers/storage/disk/ess/>

## IBM TotalStorage Enterprise Storage Server Model 800

The IBM TotalStorage Enterprise Storage Server Model 800, the third generation of IBM intelligent storage, sets yet another milestone in ESS functionality, flexibility, performance, and overall value available to meet today's storage requirements. The Model 800 is designed to provide performance, scalability, and flexibility. Meanwhile, it supports 24 x 7 operations to help provide the access and protection demanded by today's business environment and delivers the flexibility and centralized management needed to lower long-term costs.

The Model 800 integrates a new generation of hardware, including faster symmetrical multiprocessors (SMP) with an optional Turbo feature, 64 GB cache, double internal bandwidth, and 2 Gb Fibre Channel/FICON Host Adapters. This hardware, in addition to RAID-10 support and 15,000 rpm drives, enables the Model 800 to deliver excellent levels of performance throughput.

For additional information about ESS, see the following Web site:

<http://www-1.ibm.com/servers/storage/disk/ess/>

## Storage area network components

SAN can be defined as a combination of technologies (including hardware, software, and networking components) that provide any-to-any interconnection of server and storage elements.

SANs connect SAN storage (usually tape and disk) together with servers into a network called a *fabric*. Today's industry standard for interconnecting

components of a SAN is Fibre Channel. The System i5 supports connection of disk and tape using Fibre Channel.

## IBM SAN switches and directors for System i5

SAN switches are supported on the System i5 servers for connecting multiple host servers with storage servers and devices, creating a SAN. There are a variety of SAN switches supported by the System i5, including:

- ▶ IBM TotalStorage SAN Switches 2005-H08/-H16, 3534-F08 and 2109-F16/-F32 with 4-32 ports and 2 Gbps fabric switching.
- ▶ IBM TotalStorage SAN Switches SAN12M-1 2026-E12 and SAN24M-1 f2026-224 2 Gbps fabric switches with FlexPort scalability from 4 to 24 ports.
- ▶ Cisco MDS 9216 Multilayer Fabric Switch 2062-D01 and 9120/9140 2061-020/-040, with 16 to 48 ports and 2 Gbps performance.
- ▶ IBM TotalStorage SAN Switch SAN32M-1 2027-232 and Director SAN140M 2027-140 with 8 and 140 ports and 2 Gbps performance.
- ▶ CNT UltraNet Multi-service Director (UMD) 2042-N16, CNT FC/9000 Fibre Channel Director 2042-256/128/001/
- ▶ Cisco MDS Multilayer Director 9509 2062-D07 and 9506 2062-D04 which support 1 and 2 Gbps Fibre Channel and up to 128 and 224 fibre channel ports.
- ▶ IBM TotalStorage SAN Director 2109-M14/M12 and Cabinet 2109-C36 with up to 128 ports 2 Gbps performance.

For additional information about System i5 with SAN, refer to *IBM @server iSeries in Storage Area Networks: Implementing Fibre Channel Disk and Tape with iSeries*, SG24-6220, and the following Web site:

<http://www-1.ibm.com/servers/storage/san/>





## I/O devices and other components

This chapter describes the printers that are offered and supported today for System i5 servers.

## System i5 printers

System i5 printers are designed, built, tested, and supported as an integrated component of the system. Printer options are scalable from desktop to production, impact to laser, with 375 characters per second up to 2200 impressions per minute.

This section describes the current line of printers for the System i5. The descriptions are divided into these sections depending on typical usage:

- ▶ Monochrome laser
- ▶ Color laser
- ▶ Cutsheet departmental
- ▶ Industrial printers
- ▶ Production
- ▶ Industrial

The following table summarizes the characteristics of each of these printers, including the duty cycle ratings.

Category	Printer	Machine number	Printer form	Speed (IPM)	Maximum monthly usage (pages)*	IPDS™
Monochrome	Infoprint® 1512		Cutsheet laser			
	Infoprint 1532					
	Infoprint 1552					
	Infoprint 1572					
	Infoprint 1585					
Color	Infoprint Color 1454	4924	Cutsheet laser	25 IPM	85K	Y
	Infoprint Color 1464	4924		24 IPM	85K	Y
	Infoprint Color 1534					
	Infoprint Color 1567					
Departmental	Infoprint 2090ES	2790	Cutsheet laser	90 IPM	800K	Y
	Infoprint 2105ES	2706		105 IPM	1M	Y
Production	Infoprint 3000	3300	Continuous form laser	344 IPM	4.4M - 8.8M	Y
	Infoprint 4000	4000		1002 IPM	11.6M	Y
	Infoprint 4100	4100		2200 IPM	23.2M	Y



Category	Printer	Machine number	Printer form	Speed (IPM)	Maximum monthly usage (pages)*	IPDS™
Industrial	IBM 4247	4247	Continuous form line matrix	600 CPS	---	Y
				600 CPS	---	N
				1100 CPS	---	Y
	IBM 6500					
	IBM 6700					
<b>IPM</b> Impressions per minute <b>IPS</b> Inches per second <b>CPS</b> Characters per second <b>LPM</b> Lines per minute <b>K</b> 1,000 <b>M</b> 1,000,000 * IBM does not recommend printing at the maximum monthly usage rate on a continuous basis.						

You can find information about System i5 print applications on the System i5 printing Web site at:

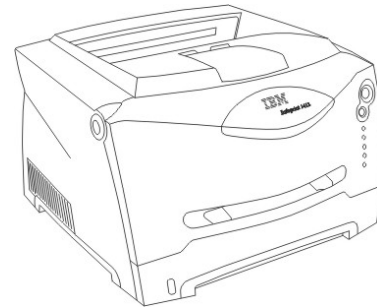
<http://www.printers.ibm.com/R5PSC.NSF/Web/as400overview>

## System i5 workgroup printers

IBM Infoprint workgroup printers are a family of high-performance laser printers designed for System i5 and network printing environments. System i5 workgroup printers provide high fidelity (600 dots-per-inch (dpi) or 1200 dpi) and multiple concurrent connections. They support multiple print data streams (Advanced Function Printing™ (AFP™)/Intelligent Printer Data Stream™ (IPDS), PostScript, Printer Control Language (PCL), Portable Document Format (PDF), a wide range of paper handling options, high-performance color, and a complete line of multifunction printer (MFP) options.

## **IBM Infoprint 1512 Workgroup Laser Printer**

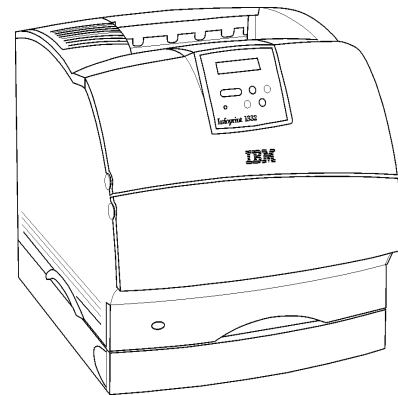
With a small footprint and a low acquisition price, the IBM Infoprint 1412 delivers the function needed to support small businesses and small workgroups. With a fast print speed, 32 MB of memory, a first page out time as fast



as eight seconds, and a 200 MHz processor, the Infoprint 1412 allows you to keep up with the pace of On Demand Business.

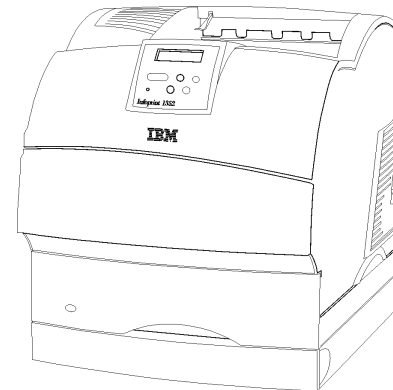
### **IBM Infoprint 1532 Workgroup Laser Printer)**

The IBM Infoprint 1332 is a mid-speed laser printer designed for both System i5 and workgroup applications.



### **IBM Infoprint 1552 Workgroup Laser Printer)**

The IBM Infoprint 1352 is a high-speed workgroup laser printer at a low



cost-per-page and with a wide array of options.

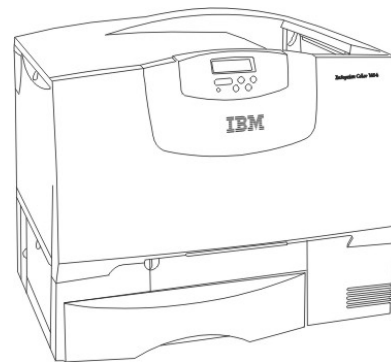
### **IBM Infoprint 1372 Workgroup Laser Printer)**

The IBM Infoprint 1372 provides high-performance monochrome workgroup laser printing with the memory and speed to handle complex documents at a high throughput rate.



### **IBM Infoprint Color 1454 and 1464 Laser Printer**

The IBM Infoprint Color 1454 and 1464 are high-value workgroup color printers that provide high-speed printing for both color and black-and-white jobs. The outstanding performance, reliability and fast page delivery of the 1454 and 1464 laser printers can help workgroups become more efficient.



## **Multifunction printing options**

MFP options enable you to protect and expand your printer investment by adding scan, fax, and copy functions to IBM Infoprint 1000 series workgroup printers. The following table summarizes current Infoprint MFP options.

MFP option	Mono scan (IPM)	Color scan (IPM)	Duplex	Printers supported
M22	15	14	N	Infoprint 1332, 1352, 1372

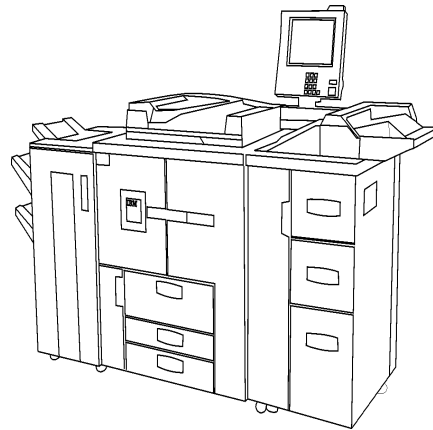
<b>MFP option</b>	<b>Mono scan (IPM)</b>	<b>Color scan (IPM)</b>	<b>Duplex</b>	<b>Printers supported</b>
M26	23	14	Y	Infoprint 1332, 1352, 1372
M30	23	14	Y	Infoprint 1332, 1352, 1372, 1464
M32	34	19	Y	Infoprint 1357
M35	40	N/A	N	Infoprint 1145

## System i5 departmental and production printers

In the same manner that the System i5 server scales up in performance, IBM system printers provide a wide range of choices at midrange and production printing speeds (generally 60 impressions per minute and up). These include both cutsheet and continuous form printers, currently achieving up to 2200 impressions per minute (with the IBM Infoprint 4100). All of the departmental and production printers feature the Advanced Function Common Control Unit (AFCCU™), a high-performance controller using the same processor technology as the System i5 servers.

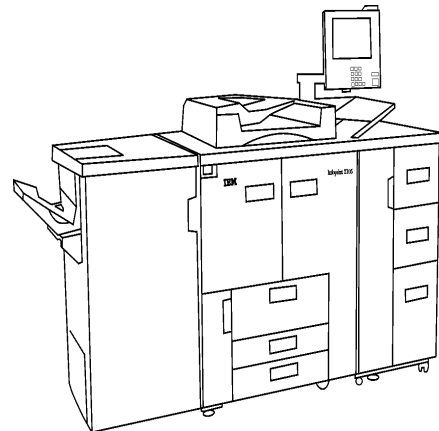
### IBM Infoprint 2090ES

The IBM Infoprint 2090ES is the 90 impression per minute member of the ES midrange production printing family. This cutsheet digital multifunction system effectively combines high-speed System i5 production printing with full reproduction capabilities.



### IBM Infoprint 2105ES

The IBM Infoprint 2105ES is the 105 impression per minute member of the ES midrange production printing family. This cutsheet digital multi-function system



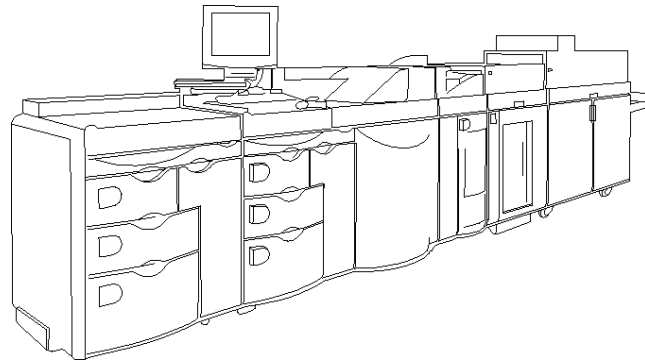
effectively combines high-speed System i5 production printing with full reproduction capabilities.

## IBM Infoprint 2000(keep?)

Infoprint 2000 printers bring cutsheet printer capabilities to address the output needs of an On Demand Business. This high-speed cutsheet printer combines advanced hardware and software technologies to provide exceptional

performance, flexibility,

and control. Internet Printing Protocol (IPP) and is ready for On Demand Business. IPP provides mobile users the means to address a printer from anywhere, allows companies to provide their clients with direct access to their printer, and provides notifications to communicate printer status.

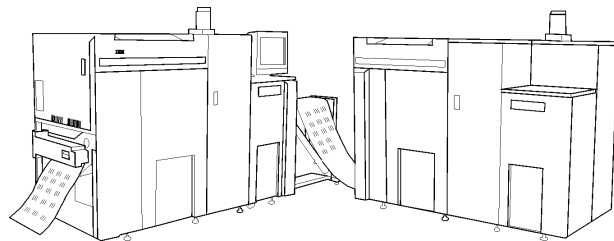


Powered by an advanced imaging technology, Infoprint 2000 is designed to monitor and self-adjust print quality as needed. Establishing new AFP/IPDS benchmark print quality, Infoprint 2000 produces fine lines and offset-like halftones. To ensure user-friendly paper support and reliability, the system has a straight paper path, as well as three standard and three optional vacuum fed paper drawers for preventing paper mis-feeds. In addition, IBM Infoprint 2000

## IBM Infoprint 3000 Advanced Function Printing System

IBM Infoprint 3000 is a high-speed, high-resolution, continuous-form production printing system designed and integrated for high-volume System i5 printing. geFull application enablement includes

system printer file function, DDS, Infoprint Designer for iSeries, AFP Utilities, Advanced Print Utility (APU), Page Printer Formatting Aid (PPFA/400), AFP Toolbox, and many other IBM and third-party document composition products.

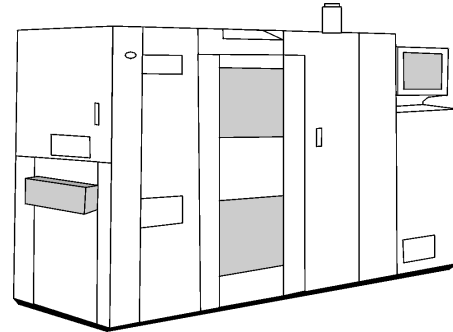


With high-volume applications such as reports, statements, documents, and direct mail, continuous-forms printing ensures high reliability. They also ensure the attachment of a wide variety of pre- and post-processing devices (paper roll input, cutters, inserters, and so on) for a smooth end-to-end process. This is an intelligent process that starts with blank paper and can end up a complete package ready for mailing.

## IBM Infoprint 4000 Advanced Function Printing Systems

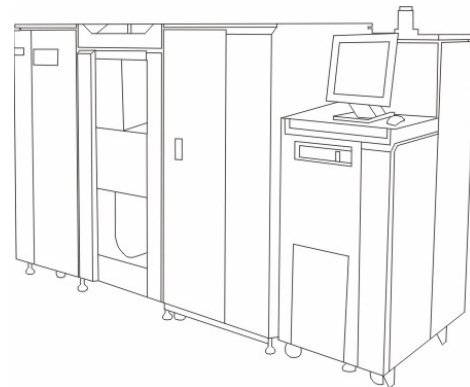
Infoprint 4000 is a high-speed, continuous-form production printer family for System i5 servers.

Infoprint architecture provides higher resolutions and support for PostScript data streams to meet far more wide-ranging organizational document requirements, including the replacement of applications that traditionally went to offset printing. Driven by IBM AFCCU, which provides high-speed processing of complex documents, full IPDS function, and comprehensive connectivity



## IBM Infoprint 4100 Advanced Function Printing Systems

The Infoprint 4100 offers continuous forms printing with 19-inch wide print line for digital publishing and statements printing. Infoprint architecture provides higher resolutions and support for PostScript data streams. This helps to meet far more wide-ranging organizational document requirements, including replacement of applications that traditionally went to offset printing. Reduced total cost of printing



## System i5 industrial printers

Central to today's supply chain environments, System i5 industrial printers are designed for harsh environments and multi-part form applications. The printer technology is either dot matrix or line matrix. IPDS is supported throughout, both

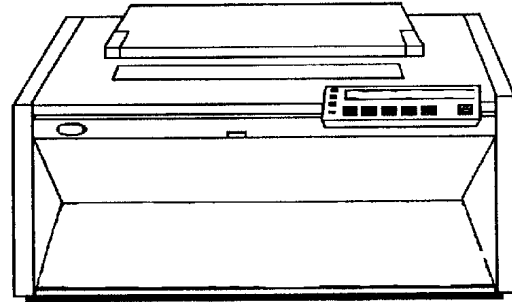


for complete print management and graphics function (for example, barcodes). This category includes the IBM 4232, IBM 4247, and IBM 6400 printer families.

### **IBM 4247 MultiForm Matrix Printer)**

The 4247 printers are desktop model impact printers. They include two continuous paper paths and a standard manual cutsheet input.

The 4247 can be used as a directly attached workstation printer, as a system printer, remote or distributed, or for departmental printing. Supported applications include word processing and spreadsheets, business graphics such as pie charts, barcode printing, line drawings from CAD/CAM applications, and special forms for checks, labels, and mailers.



▶



**Software**

**Software**



## i5/OS: Architecture

**Note:** This chapter provides an overview of i5/OS at V5R4. In this Handbook, the term i5/OS is used to include V5R4 and previous releases, unless otherwise noted.

IBM i5/OS for V5R2 and earlier versions is called OS/400.

After you buy an System i5 server, you do not have to continue shopping for system software components before the server is ready to run your business. All of the software factors for a relational database, comprehensive security, communications with a broad range of diverse systems, including Internet capabilities, and many more components are already in the operating system. Each is fully integrated into i5/OS. All components and prerequisites for running business applications in the 21st century are fully tested and work. i5/OS operates as a single entity.

The System i5 operating system is architected as a single entity. This means that such facilities as relational database, communication and networking capabilities, online help, Web enablement technologies, easy enterprise management, and much more are fully integrated into the operating system and the machine. The user communicates with all components of i5/OS using a single command language Control Language (CL) or administers and manages the system using a graphical user interface (GUI).

i5/OS provides the industry's foremost application flexibility with support for System i5, Linux, Windows 2000, Java, and UNIX applications. It combines high availability with superior workload management and logical partitioning. The next generation of applications can be quickly deployed and managed in a single, partitioned server alongside current business applications.

With i5/OS, a business can simply and rapidly deploy applications for On Demand Business with seamless integration of existing applications and data. With extensions to its robust security and networking options, i5/OS enables business-to-business (B2B) connectivity through the supply chain and to clients.

This chapter describes the capabilities and enhancements integrated into the System i5 operating system which enable System i5 as servers in a network-centric design. Features of the operating system product itself are described in "i5/OS (5722-SS1): Operating system licensed products" on page 235.

## V5R4 i5/OS highlights

- ▶ Improved application portability with new Java™ Virtual Machine
- ▶ Improved security and compliance with integrity protection, network intrusion detection, and auditing enhancements
- ▶ Improved integration with Web applications
- ▶ Simplified application development with free-format SQL in RPG applications
- ▶ Improved workload management with enhancements to i5/OS subsystems
- ▶ Support for SNA applications over IP networks with Enterprise Extenders
- ▶ Simplified Web administration and performance management
- ▶ Simplified database performance management and index maintenance
- ▶ Enhanced capabilities and simplified management of business continuity solutions
- ▶ Improved management and retention of printed information
- ▶ Enhanced cluster resource services for high availability
- ▶ Networking enhancements including establishment of VPNs through network address translation (NAT) firewalls and additional IPv6 support

## i5/OS base functions

**Note:** i5/OS V5R3 is the required operating system release level for all @server i5 or System i5 systems. i5/OS V5R3, OS/400 V5R2 and earlier releases are supported on earlier System i5 servers. See “i5/OS overview” on page 237 for further information and “Today’s System i5 summary” on page 47 or “Summary of earlier AS/400, AS/400e, and iSeries models” on page 449 to identify the minimum operating system level of a specific system.

i5/OS is a 64-bit operating system. With its base function, i5/OS provides ease of implementation, management, and operation in one totally integrated object-oriented operating system. The integrated features are:

- ▶ Advanced GUI support to provide for:
  - Easy setup and management of the system, including TCP/IP functions
  - Database functions
  - User and printer job administration
  - System management
  - Software distribution
  - Performance monitoring
  - Centralized management of multiple systems
  - Plug-in support for Domino, Backup Recovery and Media Services (BRMS), and others
- ▶ Network computing
- ▶ IFS with industry standards
- ▶ Multiple operating environments and logical partitions (LPARs)
  - Different versions and releases of i5/OS and OS/400
  - Linux
  - AIX 5L
  - OS/400 Portable Application Solutions Environment (PASE)
  - Resource sharing
- ▶ Clustering and shared resources
- ▶ High system availability
- ▶ Client/server connectivity
- ▶ DB2 Universal Database (UDB) for iSeries
- ▶ Transaction processing
- ▶ Batch processing
- ▶ Extensive run-time applications
- ▶ Openness standards
- ▶ PM @server iSeries
- ▶ Electronic Customer Support (ECS)

- ▶ Comprehensive security for system resources
- ▶ Interfaces to system functions
- ▶ Connectivity to remote devices, systems, and networks
- ▶ Office services
- ▶ National language versions and multilingual support

Each function of i5/OS follows a consistent design philosophy. This consistency is one of the cornerstones of System i5 ease of use. Ease-of-use translates into higher productivity for its users and easier systems management.

## Linux on System i5

Linux enables a stream of applications for On Demand Business to complement the strengths of the System i5 as an integrated core business solution. Linux inherits important strengths and reliability features of the System i5 architecture.

i5/OS is enhanced to support Linux running in a secondary LPAR. The primary partition must run OS/400 V5R1 or later. Up to 31 Linux partitions are supported, depending on the System i5 model. The @server i5 and System i5 Models 520, 550, 570 and 595 running i5/OS support from 2 to 254 partitions based on the model.

Processor features for iSeries Models 270, 800, 810, 820, and 840 using SSTAR technology, iSeries Models 825, 870, and 890 using POWER4 technology, and @server i5 Models 520, 550, 570, and 595 POWER5 technology-based processors, allow Linux to run in a shared processor pool, where one processor can be shared between four IBM i5/OS, OS/400, and Linux partitions. On n-way processor features for iSeries Models 820, 830, and 840 with ISTAR technology, Linux requires a minimum of one processor per Linux partition.

The System i5 extends support for Linux on the Integrated xSeries Server, feature #4811/#4812/#4813/#9812/#9813.

For details about supported operating systems and xSeries models, refer to the Web site:

<http://www.ibm.com/servers/eserver/series/integratedxseries>

Linux on the System i5 can be implemented as either hosted or non-hosted. In a hosted environment, Linux uses virtual resources (such as disk, tape, CD-ROM, and LAN), which are owned by an i5/OS partition and shared with the i5/OS partition. Linux is started from the hosting i5/OS partition by varying on a network server description (NWSD).

An i5/OS partition can host multiple LPARs subject to appropriate capacity planning.



In a non-hosted environment, the Linux partition does not depend on a hosting i5/OS partition for any input/output (I/O) resources. The LPAR has its own disk units or the partition uses networking support to perform a network start.

You can start a non-hosted LPAR can be started even if the primary partition is not fully active. You can start it from the Work with Partitions Status display. The non-hosted LPAR has its own resources defined to it.

**Note:** Linux is not part of i5/OS or OS/400. Therefore, it must have its own partition of the system processor resources segregated from i5/OS and OS/400.

### Virtual I/O in a Linux partition

Virtual I/O resources are devices owned by the hosting i5/OS partition that provides I/O function to the LPAR. The System i5 Linux kernel and i5/OS supports several different kinds of virtual I/O resources:

- ▶ Virtual console
- ▶ Virtual disk unit
- ▶ Virtual CD
- ▶ Virtual tape
- ▶ Virtual Ethernet

### Directly attached I/O in a Linux partition

With directly attached I/O, Linux manages the hardware resources directly. All I/O resources are under the control of the Linux operating system and i5/OS or OS/400 does not see the devices and cannot directly use them. Input/output processors (IOPs) are not used with direct I/O..

The Linux console is a PC connected to the System i5 primary or hosting partition via a TCP/IP LAN. Operations Console with LAN Connectivity (a function of iSeries Access) is required to establish a secure connection to i5/OS. A Telnet environment is then used to connect into the Linux environment through the Virtual Ethernet. The console is used for installation and problem determination operations. There is no console adapter in the Linux partition.

The System i5 processors, based on IBM POWER5+ technology, are capable of running POWER Linux distributions. Linux for iSeries product upgrades, support,

and maintenance are available directly from Linux distributors. Red Hat and Novell (SUSE) offer POWER Linux distributions for the System i5.

### **Linux integration with i5/OS**

The following products help to integrate Linux and the System i5:

- ▶ iSeries Open Database Connection (ODBC) driver for Linux

For further information and to download the product, go to:

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

- ▶ iSeries Access for Linux

For more information and to download the product, see:

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

- ▶ Grid Toolbox V3 for Linux on iSeries (5733-GD1)

For further information, see:

<http://www.alphaworks.ibm.com/tech/gridtoolbox>

- ▶ WebSphere Application Server Express for Linux (5733-WL1)

WebSphere Application Server Express for Linux is a tightly integrated development tool and application server that provides an easily affordable entry point to On Demand Business for companies creating dynamic Web sites. It is available on the 570, 810, 825, 870, and 890 Enterprise Editions (otherwise orderable via Passport Advantage).

### **Suggested reading**

For additional information about Linux, see the following Web site:

<http://www.ibm.com/eserver/series/linux>

### **XML enablers**

XML is a key technology for B2B solutions that links together trading partners and pervasive computing applications, which connect mobile devices such as cell phones to core business solutions.

The XML application enablers provided in i5/OS include:

- ▶ XML parsers for use with Java and C++ applications

XML parsers are a common building block that XML-based solutions use to work with data in XML format.

- ▶ XML parsing interfaces for procedural languages such as RPG, COBOL, and C
- ▶ An XSL processor used to apply XSL stylesheets to transform an XML document into another markup language format

System i5 system support for XML is delivered through IBM XML Toolkit for iSeries (5733-XT1).

For more information, search on “XML Toolkit” at:

<http://publib.boulder.ibm.com/infocenter/series/v5r4>

## IBM Java for System i5

Java is the environment of choice for programming in today's network computing environment. It allows true portability of applications between platforms without modification or recompiling. System i5 servers are uniquely positioned to leverage Java as it evolves from its current Web focus to a full commercial application environment. The strengths of the System i5 server are combined with Java's object-oriented, network computing technology to provide solutions in this millennium.

Java is a key application development environment for the System i5 server. The Java virtual machine (JVM™), which resides below the Machine Interface, enables fast interpretation and execution of Java code on the System i5 servers. A *class transformer* enables the direct execution of Java on the system without the overhead of interpretation.

A new Java Virtual Machine (JVM) technology is included in i5/OS V5R4. This new JVM technology is common on all IBM platforms and has improved its capability to be modular, flexible, and reliable. For i5/OS operating system, this 32-bit JVM provides a much smaller memory footprint that especially benefits small to medium business (SMB) applications on smaller servers. This new JVM supports JDK 1.5 and does not require any code change for the vast majority of pure Java applications. The existing JVM remains in i5/OS as a highly scalable JVM for JDK 1.3, 1.4, and 1.5.

Java is a complete computing environment, reaching new standards for program portability and programmer productivity. Java provides an object-oriented programming environment that is dramatically simpler than C++. iSeries Java implementation provides improved scalability compared to other Java platforms and synergy with the System i5 object-based architecture.

Because of its portability, Java is the programming language for On Demand Businesses. And the System i5 system support for Java is the best of breed.

## Components

Java support on the System i5 is delivered in the following components:

- ▶ IBM Developer Kit for Java (5722-JV1)
- ▶ IBM Toolbox for Java (5722-JC1)

Incremental enhancements have been made to the most popular components of the Java Toolbox, and several new components have been added.

New components include:

- ▶ SaveFile component enables Java applications to work with "save files" located on the server. The Subsystem component similarly enables applications to query and manipulate subsystems.
- ▶ SignonHandler feature enables applications to plug in their own customized signon GUIs for use when the Toolbox needs to prompt for missing or changed signon information.

### Enhanced JDBC functions:

Numerous enhancements to JDBC exploit recently introduced DB2 enhancements, including:

- ▶ 2 MB statement size
- ▶ 128-byte column name support
- ▶ Database host server trace support
- ▶ eWLM Correlator support

The JarMaker utility, which produces stripped-down versions of the Toolbox JAR file, is enhanced for improved effectiveness and usability.

Both are included with every i5/OS V5R4. See "IBM Toolbox for Java (5722-JC1)" on page 291 and "IBM Developer Kit for Java (5722-JV1)" on page 292 for product information.

## i5/OS integrated functions

The following sections list the functions that are integrated into the i5/OS operating system.

### NetServer: File and print serving

For additional information, refer to:

<http://www.ibm.com/servers/eserver/series/netserver>

## Network printing support

## Host print transform

## Printer load balancing

## Business continuity

With a new virtualization capability for backup/restore operations, you can create virtual tape devices that enable reliable, high-speed backups directly to disk using your normal save/restore functions. This function can reduce the scheduled save windows, enabling increased scheduled production hours of operation. Virtual tape files can then be moved from disk to physical tape cartridges while end-user applications are in production. Other save/restore enhancements include:

- ▶ Ability to directly back up and recover spool files
- ▶ Use of parallel save and restore for files in the integrated file system
- ▶ Avoiding downtime associated with a periodic SAVSYS

Dual parity support within a disk array (RAID6) ensures a new level of data protection for continued operation even if two units fail in a RAID protected set of disks with appropriate hardware. System i5 SAN support is simplified, enabling additional options for IBM TotalStorage® copy services. Other enhancements to availability include improved IPL recovery and journal performance and recovery.

Enhancements to cluster services include additional ease of use in managing critical resources in a highly available environment. With the new cluster administrative domain you can easily maintain the operational environment for business applications across a system cluster to ensure consistent application results. You can designate that certain configuration objects, environmental attributes, and system values be maintained so that they have the same values across the administrative domain. If a change is made to one of these values on any node in the administrative domain, that change is propagated to all other administrative domain nodes.

A new type of cluster resource group supports additional application and management models such as stateless Web serving. The Peer CRG supports an environment where multiple nodes are involved in the recovery domain for a resource without the use of a primary or backup. All nodes in the recovery domain are equal in role and can provide access for the associated resources.

Data resilience technologies are enhanced. To help ensure that all critical objects are covered by the logical replication process, you can designate that new objects added to a library be automatically journaled. If you use cross-site mirroring, changes made on the source are tracked when geographic mirroring is suspended. This ability helps eliminate situations where complete

resynchronization between source and target needs to be done. Several new commands enable additional mechanisms to monitor and manage IASPs. For example, you can observe the IASP vary on progress details.

## Communication and networking

This section discusses the communications and networking features.

### Connectivity to remote devices, systems, and networks

i5/OS offers many integrated capabilities and functions that enable communications with a variety of IBM and non-IBM systems, either in batch or interactive modes. Worldwide standard TCP/IP or the traditional SNA hierarchy, as well as SNA peer networks and Systems Application Architecture® (SAA®) standards, are supported and offer the greatest flexibility possible in network design.

With V5R4, i5/OS offers the second stage of a multistage delivery of IPv6 function. This release has an IPv6-capable TCP/IP stack that removes many of the restrictions that existed in the V5R2 and V5R3 IPv6 application development platform. Restrictions on the number of adapters that can support IPv6 are removed, and all Ethernet adapters including 10/100 MB, Gigabit, 10 Gigabit, and Virtual Ethernet can be used for IPv6 traffic. In addition, adapters can be shared between IPv4, IPv6, and PPPoE. Previously, separate Ethernet adapters were required to run IPv4, IPv6, and PPPoE concurrently. Along with the ability to share IPv4 and IPv6 over the same adapters, the i5/OS TCP/IP stack also includes the dual stack transition mechanism, which enables a server application to be developed on i5/OS that can seamlessly support both IPv4 and IPv6 clients simultaneously.

The need for other solutions is driven by forces such as networking equipment providers' discontinuance of adapters capable of carrying SNA traffic natively.

- ▶ Enterprise Extender, using a widely supported industry standard, allows most SNA-based applications to communicate over an IP network. Enterprise Extender is a strategic replacement for AnyNet® on i5/OS for those who have adopted TCP/IP as their networking infrastructure but need to protect their investment in SNA-based applications. Enterprise Extender offers more capabilities than AnyNet with complete APPN® function, the ability to transport alerts, and the ability to support Dependent LU sessions to host systems, when used in conjunction with the Dependent LU Requester support on i5/OS.
- ▶ Virtual Private Network (VPN) support on i5/OS is enhanced to establish VPNs that traverse one or more network address translation (NAT) firewalls. Previously, i5/OS VPN provided this ability when the i5/OS is the client/initiator of the VPN connection. Now, VPN support enables VPN NAT

traversal when i5/OS takes the role of the server/responder of the VPN connection. With this enhancement, i5/OS VPN support provides a complete solution for allowing VPNs through NAT firewalls.

- ▶ Improvements to checksum processing include support for TCP/IP checksum offload when running over Gigabit and 10 Gigabit Ethernet adapters that support this feature. Enhancements are also made in the TCP/IP stack for optimizing TCP/IP checksum processing.
- ▶ Ability to define virtual IP addresses and assign the adapters allowed to perform Proxy ARP functions on behalf of virtual IP addresses. You can assign an alias name to a local IP interface. This function, along with CL command capabilities, enables you to change IP address assignments without having to change associated CL commands (for example, those defining network configurations or for starting and ending local IP interfaces).

### **Network management facilities**

Several communications and systems management functions are available to manage System i5 servers. Some are integrated into i5/OS, and some are separately-priced features. These functions help manage and control local systems and distributed systems that operate within a network controlled by a host system or by another System i5 server.

Network management functions available for the System i5 server include:

- ▶ Systems management in TCP/IP networks
- ▶ Alerts support to NetView®, System/36, System/38, System i5
- ▶ Distributed System Node Executive (DSNX)

## **Security**

The many levels of security available with i5/OS eases the job of system security management. The five levels of security range from minimal to an enhanced level that enables the System i5 servers to operate at the C2 level of trust as defined by the United States Government. Security foundation offered with i5/OS includes system integrity with digital signature and object signing, a Digital Certificate Manager (DCM), and password protection.

System i5 security has been enhanced with the addition of an intrusion detection system and a new line of defense to protect data. The new i5/OS intrusion detection system notifies you of attempts to hack into, disrupt, or deny service. The function consists of a shared policy file parser with the Quality of Service (QoS or \*QOS) TCP server that organizes and acts upon the conditions and actions from the parsed IDS policy file. Types of intrusions that are caught, discarded, and audited include:

- ▶ **Attacks:** Malformed packets, IP fragments, SYN floods, restricted IP protocols, restricted IP options, perpetual echoes, and ICMP redirect attempts
- ▶ **Scans:** Scan events that are either classified as single isolated events or as part of a global scan
- ▶ **Traffic regulation:** Events that are statistically analyzed to determine that either a TCP or UDP interface might be the subject of a denial of service attack

Intrusion Monitor (entry type: IM) records are cut in the system audit journal (QSYS/QAUDJRN) for all of the listed intrusions based on an existing IDS policy file and threshold values.

New line of defense added to protect data: All supported systems have enhanced hardware storage protection (HSP) capabilities. This stronger HSP "force field" is applied to most machine interface (MI) objects, even those that were created on previous releases.

- ▶ Hardware checks every attempted access against the protection attributes assigned to that particular storage.
- ▶ Only directly addressable spaces retain previous protection attributes that are appropriate to the direct nature of their intended uses. The encapsulated part of spaces are newly protected.
- ▶ All other objects, including database record and file system containers, are given stronger protection and are accessible only to Licensed Internal Code (LIC).

Nothing changes for valid programs because LIC already accesses MI objects on their behalf. In contrast, now even altered programs are denied back-door access.

See *Tips and Tools for Securing Your iSeries*, SC41-5300, for information about System i5 security implementation.

## Network security

i5/OS includes many ways to secure network connections and transactions between other servers and clients. The strategic methods include:

- ▶ Secure Sockets Layer
- ▶ Digital Certificate Management

A digital certificate is an electronic credential to establish proof of identity in an electronic transaction. Digital certificates are increasingly used to provide enhanced network security measures. They are essential to configure and use the SSL to secure connections between users and server applications



across an untrusted network, such as the Internet, by protecting such key data as user names and passwords. Many System i5 services and applications (including FTP, Telnet, and HTTP Server for iSeries) provide SSL support to ensure data privacy.

i5/OS provides extensive digital certificate support to use digital certificates as credentials with SSL or for client authentication in both SSL and virtual private network (VPN) transactions. Digital certificates can also sign objects, making it possible to detect changes or possible tampering to object contents.

The Digital Certificate Manager allows the creation and management of certificates on the System i5 and those obtained from another Certificate Authority (CA).

- ▶ Enterprise Identity Mapping (EIM)

EIM for iSeries is the i5/OS implementation of an IBM infrastructure intended to solve the problem of managing multiple user registries across an enterprise. The need for multiple user registries evolves into a large administrative problem that affects users, administrators, and application developers. EIM enables inexpensive solutions for easier management of multiple user registries and user identities in your enterprise.

EIM allows the creation of a system of identity mappings called associations, between the various user identities in various user registries for a person in your enterprise. It also provides a common set of APIs. They can be used to develop applications that use these identity mappings to look up the relationships between user identities across platforms.

In conjunction with network authentication service, the i5/OS implementation of Kerberos, EIM provides an SSO environment that is managed and configured through iSeries Navigator.

- ▶ Network Authentication Service

Network Authentication Service allows the System i5 server and several System i5 services, such as iSeries Access for Windows, to use a Kerberos ticket as an optional replacement for a user name and password for authentication. The Kerberos protocol, developed by Massachusetts Institute of Technology (MIT), allows a principal (a user or service) to prove its identity to another service within an unsecure network. Authentication of principals is completed through a centralized server called a Kerberos server or key distribution center (KDC).

- ▶ Virtual private networking

VPN allows a company to extend its private intranet securely over the existing framework of a public network, such as the Internet. It controls network traffic while providing important security features such as authentication and data privacy.

i5/OS VPN is an optionally-installable component of iSeries Navigator. It allows the creation of a secure end-to-end path between any combination of host and gateway. i5/OS VPN uses authentication methods, encryption algorithms, and other precautions to ensure that data sent between the two endpoints of its connection remains secure.

► IP filtering and Network Address Translation (NAT)

IP filtering and NAT act as a firewall to protect internal network from intruders. With IP filtering, IP traffic is controlled by filtering packets according to rules that are user-defined. NAT allows the hiding of unregistered private IP addresses behind a set of registered IP addresses. This serves to protect internal networks from outside networks. NAT also alleviates the IP address depletion problem, since many private addresses can be represented by a small set of registered addresses.

## DB2 Universal Database for iSeries

DB2 UDB for iSeries offers state-of-the-art database functions and open systems, standards-based technology, while providing the maturity, stability, and ease of use that is the trademark of the System i5 server. It is not a separate product. DB2 UDB for iSeries is fully integrated into i5/OS software.



The fact that the database is integrated allows the operating system to control some of its management functions and makes it easier to maintain than competitive database from other vendors reducing the need for a dedicated database administrator. Its security functions are integrated into the operating system. These functions allow a better security model than other databases where additional tools may need to be purchased to provide these functions.

Many System i5 clients have the need for applications that access both DB2 UDB for System i5 data and data on other databases platforms such as Oracle or Sybase. The SQL Client Integration application programming interface (API) allows providers of gateways and client/server solutions to integrate their products with DB2 UDB for iSeries.

DB2 UDB for iSeries can be used for both transaction processing and *complex* decision support applications. Advanced parallel processing and advanced query optimization techniques support queries of large decision support databases for applications such as business-to-business, business-intelligence, customer relationship management (CRM), and other applications for On Demand Business.

In an on demand world, standards and globalization are important for integration and openness. Application portability through standards and the flexibility to access the database via numerous client interfaces from Linux partitions and Windows systems allows the application provider and the client the most flexibility possible.

DB2 UDB for iSeries embodies that flexibility through the support of its traditional database interface along with enhancing the Structured Query Language (SQL)-based database required by today's enterprise application systems. Enhancements to the RPQ SQL pre-compiler help clients and independent software vendors (ISVs) to more easily make use of both interfaces.

## Features

- ▶ Object-relational technology
- ▶ DATALINK data type
- ▶ DB2 UDB Extenders for iSeries
- ▶ Advanced query optimization technologies
- ▶ DB2 UDB family compatibility
- ▶ Database SQL portability
- ▶ National language support (NLS)
- ▶ User-defined types
- ▶ User-defined functions (UDF)
- ▶ Declarative referential integrity
- ▶ Column-level security  
complete.
- ▶ Two-phase commit transaction management
- ▶ Data replication
- ▶ Open Database Connectivity (ODBC) driver for DB2 UDB for iSeries enhanced with ODBC 3.5 support and support for Microsoft Transaction Server (MTS)
- ▶ System-wide database catalog
- ▶ Multiple-level concurrency control
- ▶ Server consolidation
- ▶ SQL enhancements
- ▶ SQL Repeatable Read
- ▶ Journaling and SQL DDL operation journaling (V5R1)

## Open standards-based interoperability

Support for client/server environments is greatly enhanced in DB2 UDB for iSeries by incorporating popular database standards and transmission protocols, such as support for:

- ▶ ANSI X3.135.1999, ISO 9075-1999, and FIPS 127-2 SQL
- ▶ The Open Group's Distributed Relational Database Architecture™ (DRDA®) Distributed Unit of Work - Application Directed
- ▶ Microsoft's ODBC
- ▶ Apple's Data Access Language (DAL)
- ▶ XML
- ▶ JDBC™
- ▶ Object Link Embedded (OLE) DB and ADO
- ▶ U.S. Government C2 security
- ▶ UCS-2 (Unicode or ISO 10646)
- ▶ Euro character support
- ▶ Stored procedures
- ▶ Triggers
- ▶ Join operators
- ▶ Enhanced SQL query support

X/Open's Call Level Interface (CLI) supported transmission protocols for the System i5 include:

- ▶ TCP/IP
- ▶ Advanced Program-to-Program Communication (APPC)
- ▶ Advanced Peer-to-Peer Networking® (APPN)
- ▶ X/Open Call Level Interface to SQL

The integrated database is a full-function database with features competitive to other widely used databases, reducing the need for a dedicated Database Administrator. The fact that the database is integrated allows the operating system to control some of its management functions and makes it easier to maintain than a competitive database. With security built-into i5/OS, DB2 UDB allows a better security model than other database where additional tools are purchased to provide the security functions.

The SQL Client Integration API allows providers of gateways and client/server solutions to integrate their products with DB2 UDB for iSeries. Many System i5 clients need applications that both access DB2 UDB for iSeries data, and access data on other databases platforms such as Oracle or Sybase.

## **Distributed database support**

i5/OS supports distributed relational databases using SQL. Distributed database support allows read and write access from an System i5 server to another System i5 server or to any other database supporting the Open Group DRDA architecture, including DB2 UDB for OS/390® and z/OS®, DB2 UDB for Windows, and DB2 UDB for AIX.

## **High performance database server (centralized and distributed server)**

The high performance System i5 server and improvements in communication performance combine to strengthen the position of the System i5 server as a high performance database server. In addition, DB2 UDB for iSeries offers enhanced performance for both centralized and distributed client/server database access, making the System i5 the database server of choice for many computing needs.

The following DB2 UDB for iSeries functions are available to enhance application performance:

- ▶ Advanced SQL optimizer
- ▶ SQL encoded vector indexes (EVIs)
- ▶ Explain function
- ▶ Block INSERT and FETCH
- ▶ Automatic record blocking
- ▶ Parallel data access
- ▶ Query Governor
- ▶ Query tuning
- ▶ Scalability

DB2 UDB for iSeries supports very large database environments. A single table can be up to one TB and 4.2 billion rows. Distributed tables can be up to 32 TB.

DB2 Symmetric Multiprocessing (SMP) for iSeries and DB2 Multisystem support enable both horizontal and vertical growth.

## **Database ease of use and management**

The System i5 reputation for usability and maintainability is unsurpassed in the industry. This is due in part to the tight integration of i5/OS and DB2 UDB for iSeries. Users do not have to learn separate operating system and database functions, nor are they burdened with maintaining the complex interfaces between multiple layers of software. In addition to seamless integration, a rich set of utilities continue to be provided for easy management of DB2 UDB for iSeries databases.

### ***New with i5/OS V5R4 DB2 Universal Database for iSeries***

DB2 On Demand Performance Center, included with iSeries Navigator, allows you to easily analyze and improve the indexing strategy on your system.

The "always on" diagnostic information in the SQL plan cache enables you to do query performance analysis and comparisons from one point in time to another without the overhead of a database monitor. With the DB2 Health Center, also part of iSeries Navigator, you can track your environment against system limits, including archiving of that information to do trend analysis.

- ▶ Satisfies all of the core components of the 2003 SQL StandardDB2
- ▶ Expands support of data warehouse workloads in V5R4
- ▶ Delivers additional SQL Syntax to support OLAP functions, improved Materialized Query Table support, and recursive common table expressions.
- ▶ Has advancements in the DB2 code generation engine and enhancements in the operating system and in the XML Extenders code
- ▶ Has System Managed Access Path Protection (SMAPP) support for Encoded Vector Index (EVI) and resiliency improvements to the database cross reference file.

Journaling is also easier in V5R4 with automatic journaling of sequence objects and automatic journal restart after database copies and restore processing.

## **Integrated file system**

The IFS is a part of i5/OS that lets you support stream input, output, and storage management similar to personal computer and UNIX operating systems. The IFS treats the library and folders support as separate file systems. Other types of file management support that have differing capabilities are also treated as separate file systems.

Supported file systems within the IFS are:

- ▶ Network File System (NFS)
- ▶ QDLS
- ▶ QFileSvr.400
- ▶ QNetWare
- ▶ QNTCQOpenSys
- ▶ QOPT
- ▶ QSYS.LIB
- ▶ root (/)
- ▶ UDFS

You can interact with any of the file systems through a common interface that includes commands, menus, displays, and APIs. The interface is optimized for

the I/O of stream data, in contrast to the record I/O provided through the data management interfaces.

The IFS is a hierarchical directory structure that provides support for storing information in stream files that can contain long continuous strings of data. It is a common interface that allows users and applications to access not only the stream files, but also database files, documents, and other objects that are stored in the System i5 server.

## Ease of installation, use, and maintenance with i5/OS

i5/OS is renowned for its ease-of-use and management. Some of these utilities contributing to this notoriety include:

- ▶ iSeries Navigator database (Database Navigator)
- ▶ Online backup and restore
- ▶ Object-level recovery
- ▶ Roll forward and backward recovery
- ▶ Audit trail
- ▶ Performance tuning and trace

## Operations Console

iSeries Models 800, 810, 825, 870, and 890 support a directly-attached or LAN-attached full-function 5250 PC console that includes a graphical control panel application.

Functions provided by Operations Console and Remote Operator and Control Panel, are managed via the Hardware Management Console (HMC) for the @server i5 and System i5 Models 520, 550, 570 and 595. To understand equivalent functions to operations console for the Models 520, 550, 570 and 595, refer to “Hardware Management Console” on page 315.

For further information about Operations Console, refer to “System i5 system console solutions” on page 312.

### Remote capabilities

The direct-attach Operations Console can serve as a gateway for a remote, dial-in Operations Console. See “System i5 system console solutions” on page 312 for details about Operations Console and cabling requirements.

## Software requisites

Operations Console is a component of iSeries Access for Windows (known as *Client Access Express for iSeries* in releases prior to OS/400 V5R2). The PC must be running the Windows NT 4.0, 2000, or XP Professional operating system to be supported. The LAN-attached Operations Console is supported on servers with i5/OS V5R4, V5R3 and OS/400 V5R2 or V5R1.

## EZ-Setup

EZ-Setup is part of the iSeries Access code, and is delivered on the Setup and Operations CD-ROM which is shipped with all orders. An Operations Console connection is required to set up TCP/IP if you are using a PC console. EZ-Setup then uses a TCP/IP connection to communicate with the server.

EZ-Setup consists of two parts:

- ▶ An interview process
- ▶ The task list

Clients can complete the interview either on the Internet or on the PC where they have installed iSeries Access. The output of this interview includes a setup definition file that is used to customize the EZ-Setup task list. EZ-Setup also requires a connection to the iSeries Information Center, either on the Internet or locally installed.

## iSeries Navigator

i5/OS provides iSeries Navigator, the premier System i5 user interface for managing and administering your System i5 servers from your Windows desktop. The iSeries Navigator interface is packaged as a component of iSeries Access for Windows. No license is required.

iSeries Navigator provides wizards that help simplify System i5 management for a wide variety of functions including security, TCP/IP services, applications, and more. You can customize the powerful iSeries Navigator displays to optimize your productivity.

iSeries Navigator includes Management Central, a technology for doing systems management tasks across one or more servers simultaneously.

Using an Internet capable cellular phone, personal digital assistant (PDA) with a wireless modem, or a Web browser, the administrator can monitor and manage their System i5 server status and performance metrics on the System i5 servers.

This includes task scheduling, real-time performance monitoring, managing fixes, distributing objects, and running commands from a central system.



Systems management tasks can be requested on multiple servers with just one request.

Refer to the iSeries Navigator for Wireless Web site for more information about Management Central-Pervasive:

<http://www-1.ibm.com/servers/eserver/series/navigator/pervasive.html>

## Availability and recovery

Many functions are available to help maintain the availability of an System i5 server. They include:

- ▶ System Managed Access Path Protection (SMAPP)
- ▶ Uninterruptable power supply
- ▶ Redundant Array of Independent Disks (RAID)

The System i5 provides disk protection and availability. RAID-0, RAID-1 (disk, controller, and bus level protection), RAID-5, and RAID-6 are supported. Concurrent maintenance of disks is also supported.

- ▶ Journaling
- ▶ Commitment control
- ▶ Batch journal caching
- ▶ Save-while-active (SWA)
- ▶ Save/restore to multiple tapes concurrently
- ▶ Print/Output Management

Native save/restore spool file gives you a better, faster method of saving and restoring spool files to and from backup media. It saves and restores all attribute information and spool file identity information. Auto deletion of spool files includes a tool that enables you to more easily clean up unnecessary spool files, reducing the number of spool files on an output queue. You can use standard 2D barcodes in documents when printing them on ASCII printers. You can also place constant text data anywhere on a page in a document.

- ▶ ASPs
- ▶ IASP

**Note:** All I/O, not just the disk in the I/O tower, are switched. Any LAN, wide area network (WAN), workstation controllers, and so on in the I/O tower are switched at the same time.

- ▶ Large capacity disk load balancing
- ▶ Teraspace storage
- ▶ Expert Cache

- ▶ Integrated hardware disk compression

Integrated Hardware Disk Compression is supported by select DASD controllers.

Compression is limited to user ASPs only.

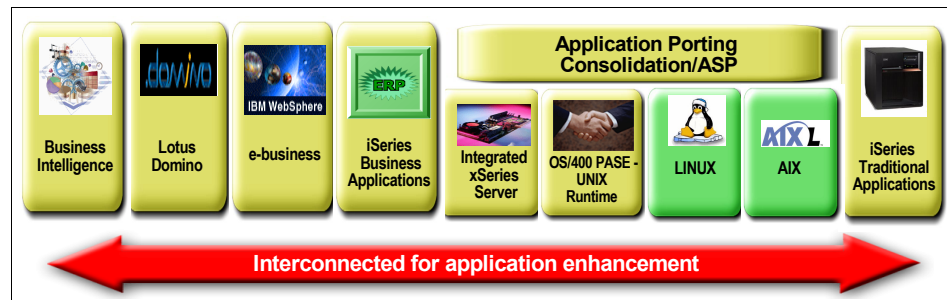
- ▶ Hierarchical Storage Management (HSM)
- ▶ Concurrent maintenance

Concurrent maintenance of some components are feature or configuration dependent.

Select models of 270, 250, 520, 550, 570, 595, 800, 810, 820, 825, 830, 840, 870, and 890 hardware also support concurrent maintenance.

## Logical partitions

Logical partitioning enhances the role of the System i5 as a consolidated server. With LPAR, companies have both the power and flexibility to address multiple system requirements in a single machine to achieve server consolidation, business unit consolidation, a mix of production and test environments, and integrated clusters.



LPARs are ideal for companies that want to run varied workloads in a single System i5 system. They allow the CPW performance of an System i5 system to be flexibly allocated between partitions. Licenses can be managed across partitions.

Each partition's system name is distinct and the system values can be set independently. Each partition can have a different primary and secondary national language and can be operated using different time zones. This flexibility is ideal for multinational companies to centralize operations in a single location, yet retain the national characteristics of each system.

LPAR allows for the simultaneous running of multiple independent servers, each with its own system processor or (with V5R1 onward) with parts of shared processors. Memory can be shared within a single System i5 server.

The System i5 LPAR capabilities have been improved with each release since OS/400 V4R4. Enhancements with i5/OS V5R4 include:

- ▶ Hardware Management Console

A Hardware Management Console (HMC) can be required for POWER5 and POWER5+ processors implementing LPAR. HMC features a specific NetVista workstation running Linux with preloaded HMC software to perform multi-partition LPAR management function (and CoD) as well as console functions. A single HMC supports up to 160 partitions and up to 32 servers. It is supported in IBM @server i5 and System i5 Models 520, 550, 570 and 595 only.

Refer to “Product Previews” on page 40 to understand the future direction of HMC.

- ▶ Virtual Partition Manager

For more information about VPM, refer to the Redpaper *Virtual Partition Manager A Guide to Planning and Implementation*, REDP-4013.

**Note:** HMC and VPM can only be used on the @server i5 systems. They are not supported on earlier models.

- ▶ Dynamic creation and deletion of partitions

- ▶ Partition shared processor resource specified as *uncapped* (@server i5 and System i5 Models 520, 550, 570 and 595 only)

Idle processing resources may be used by that partition up to the number of virtual processor specified.

- ▶ Unallocated, powered off dedicated or newly added processor resources (via CoD) can make part of a shared pool that is used by uncapped partitions (@server i5 Models 520 and 570 only)

- ▶ Software Licensed Management (SLM) APIs

- ▶ A dynamic movement of processor, memory, and 5250 CPW performance between partitions spreads the system workload to where resources are needed, and potentially reduces the total amount of resource required on a system.

- ▶ The capability to support partial (fractional) processors was introduced with V5R1. The number of partitions allowed per physical processor depends on the processor type.

- ▶ Multiple operating system support
  - i5/OS and OS/400
  - Linux
  - AIX 5L
  - Windows (via Integrated xSeries Server or Integrated xSeries Adapter)
- ▶ Multiple i5/OS and OS/400 versions within a partitioned environment on appropriate systems
- ▶ Virtual OptiConnect emulates external OptiConnect hardware by providing a virtual bus between LPARs. To use Virtual OptiConnect, you only need to purchase OptiConnect for OS/400. Additional hardware is not required.
- ▶ iSeries Navigator support creates and manages partitions including a scheduled movement of resources on non @server i5 systems.

## LPAR partition support

### LPAR specify features

The following feature codes relate to ordering LPAR on an System i5 Server:

- ▶ **#0006 LPAR Restrict Build Process**

The #0006 LPAR Restrict Build Process feature is added to an initial order where LPAR #0140 is requested. The #0006 feature instructs manufacturing to only load SLIC on the minimum number of disk drives.
- ▶ **#0140 Logical Partition Specify**

The #0140 Logical Partition Specify feature is used to specify that this system will be logically partitioned.
- ▶ **#0142 Linux Partition Specify**

The #0142 Linux Partition Specify feature is used to specify that this system will be logically partitioned with a Linux partition.
- ▶ **#0145 AIX Partition Specify**

The #0145 AIX Partition Specify feature is used to specify that this system will be logically partitioned with an AIX partition.
- ▶ **#0454 LPAR Partition Initialization**

The #0454 LPAR Partition Initialization enables a partition configuration and assignment of resources as specified by the customer.
- ▶ **#0455 LPAR OS Preload**

The #0455 LPAR OS Preload feature determines that the Operating System specified by the customer (i5/OS or AIX 5L) for a partition is configured via the #0454 LPAR Partition Initialization feature.

▶ **#0496 Force i5/OS Preload**

The #0496 feature preloads i5/OS on a new server whether partitioning is specified or not. i5/OS is preloaded on all the disk drives in the ordered configuration. It forces the preload of a single i5/OS partition when Linux or AIX 5L partitions with virtual storage is configured.

**Note:** Do not specify an #0496 feature if the Linux or AIX 5L partition has dedicated disk controllers and drives are in the ordered configuration.

▶ **#8453 Base Customer Placement:**

The #8453 Base Customer Placement feature places hardware components as directed by the hardware placement information from the LPAR Verification Tool (LVT). The customer is responsible for submitting LVT information.

### **Suggested reading**

For additional information about logical partitioning, see:

<http://www.ibm.com/servers/eserver/series/lpar>  
<http://www-1.ibm.com/servers/eserver/series/service/itc>  
<http://www.redbooks.ibm.com/redpapers/pdfs/redp4013.pdf>

## **System i5 clustering**

A cluster is a group of independent servers that appears on a network as a single machine. It is a collection of complete systems that work together to provide a single unified computing resource.

Today, System i5 clusters enable you to set up an environment to provide availability beyond 99.94% for critical applications and critical data. System i5 server high availability business partners and Solution Developers complete the solution with easy-to-use cluster management, robust data resiliency, and resilient applications that take advantage of the new technology.

IASPs offer significant functions that allow even more flexibility and improved availability. Data residing in IASPs can be switched between servers using HSL OptiConnect loop. IASPs allow you to take data offline and bring data online independent of the system ASP and other user ASPs. IASPs also support:

- ▶ Journaling of IFS objects, data areas and data queues, and options to reduce the amount of data journaled
- ▶ System services support of HA Switchable Resources, which allows use of resilient device cluster resource groups that contain IASPs
- ▶ HSL OptiConnect support as a cluster communications fabric

- ▶ Options to adjust the tuning and configuration parameters of your cluster to match better your communications environment
- ▶ IBM Cluster Management Utility, which allows you to create and manage a simple four-node, switched disk cluster

See *IBM @server iSeries Independent ASPs: A Guide to Moving Applications to IASPs, SG24-6802*, and *Independent ASP Performance Study on the IBM @server iSeries Server, REDP-3771*, for more information about IASPs.

Cluster Resource Services consists of an open set of APIs that provide cluster facilities. System i5 application providers and clients use the APIs to enhance their application availability and to create, configure, and administer the cluster. Systems are defined into the cluster as *cluster nodes*. Communication interface addresses are defined to form the cluster node-to-node interconnection links. Resilient resources (objects replicated to one or more nodes) are associated with a Cluster Resource Group (CRG) so they can be managed as a single unit.

Cluster Resource Services includes integrated facilities such as heartbeat monitoring, reliable message delivery, switch-over administration, and distributed activities. The services are built on a robust cluster topology and messaging functions that keep track of each node in the cluster and ensure that all nodes have consistent information about the state of cluster resources.

*Heartbeat monitoring* ensures that each node is active. When the heartbeat for a node fails, the condition is reported so that the cluster can automatically failover to the resilient resources on the backup node. System services for high availability solutions are enhanced with real-time recording of IFS stream file changes into journals. Data resiliency applications can use this function to provide enhanced support for this class of objects.

System i5 clusters support up to 128 nodes. Any OptiConnect, WAN, and LAN connectivity options can be used to build a cluster, as follows:

- ▶ HSL copper and fiber bus connections are fully supported system features. When used with OptiConnect software, they are attractive connectivity methods for high-end and mid-range models existing in the same location. IASPs and switched disk work in this environment as of V5R1.
- ▶ ATM provides a high-performance connection to remote systems in the cluster.
- ▶ Ethernet and token-ring LANs are ideal for connecting low-end System i5 models into the cluster.

All systems are managed from a single workstation that contains the high-availability business partner cluster management application. The required minimum release of OS/400 to support each node in the cluster is V4R4.

High Availability Switchable Resources installs as Option 41 of i5/OS. A chargeable option of i5/OS, HA Switchable Resources provides the capability to achieve a highly available environment using switchable resources (IASPs). The resources are physically switched between systems so that only one copy of the resource is required.

Additional capabilities in System i5 clustering include:

- ▶ IASPs containing i5/OS DB2 library-based objects and output queues
- ▶ Groups of IASPs that can be linked together
- ▶ Thread relative naming for controlling job attributes
- ▶ Multiple library namespaces that allow multiple databases and duplicate library names across different namespaces
- ▶ Clustered Hash Table Server for sharing and replicating of non-persistent data between cluster nodes
- ▶ Clustered Hash Table APIs for connection control, storage, and retrieval table of entries, and generate keys and information about stored entries
- ▶ Cluster GUI enhancements
- ▶ On rejoin, cluster node ability to self start
- ▶ Fully supported cluster commands
- ▶ User control of automatic failover
- ▶ Fully supported cluster commands

### **Suggested reading**

For additional information about clustering, refer to the following Web sites:

<http://www-1.ibm.com/servers/eserver/series/ha>

<http://www-1.ibm.com/servers/eserver/series/service/itc>

## **iSeries Windows integration and Microsoft cluster support**

The System i5 servers offer integration with Windows to support both simple and complex Windows applications integration. This support is provided through the use of the Integrated xSeries Server and the Integrated xSeries Adapter offerings. Support for Virtual Ethernet LAN, Microsoft Cluster Services, Automatic Cartridge Loader as well as additional tools help reduce the cost of managing a Windows server environment. Some of these functions are highlighted below.

## **Suggested reading**

Refer to the following web site for additional information about Windows integration as well as a list of currently supported xSeries servers.

<http://www-1.ibm.com/servers/eserver/series/windowsintegration>

## **Virtual Ethernet LAN**

The Virtual Ethernet supports Integrated xSeries Servers and xSeries servers attached with Integrated xSeries Adapters.

## **Microsoft Cluster Services**

With the clustering support provided in Windows 2000 Advanced Server, two Integrated xSeries Servers or two xSeries servers attached with Integrated xSeries Adapters can form a cluster and use the 16 new shared storage spaces available with OS/400 V5R2.

## **Auto Cartridge Loader**

Clients who have systems with large amounts of data often have Auto Cartridge Loader (ACL) tape devices (3570, 3580, and 3590) with the ability to automatically load another tape cartridge. Support is now added in the Windows integration support to handle commands for ACLs. Multiple tape cartridges can be accessed during backup/restore operations initiated from the Windows server.

## **Attachment of n-way xSeries servers**

The System i5 server supports the attachment of n-way xSeries servers via the high-speed link.

## **iSeries Navigator support for Windows disk and user management**

# **GUI management and administration**

This section discusses the i5/OS GUI management and administration functions.

## **Work Management**

The Work Management function of i5/OS eases the job of systems management by giving the operator control of the activities of a job and of its performance characteristics. Work Management supports concurrent execution of batch jobs, 5250 CPW jobs, and non-conversational transactions on the system. Each job is



protected from other jobs on the system. However, job-to-job communication is allowed.

## iSave/restore

Save is the capability of making a backup copy of objects or members on tape or online save file. Restore is the capability to copy saved objects back to the original or a different system.

Support for virtual tape devices has been added to base i5/OS V5R4.

- ▶ Parallel save supported
- ▶ Data is written to disk
- ▶ Virtual tape volumes stored as type 2 IFS stream files.
- ▶ Full BRMS support

For more information, see the High Availability and Clusters Web site at:

<http://www-1.ibm.com/servers/eserver/series/ha>

## Graphical (GUI) management of a system

### Performance collection and evaluation

Collection

### CL application development language

i5/OS V5R4 continues to deliver enhancements to the CL application development language.

- ▶ Support for subroutines within a CL procedure
- ▶ New pointer (\*PTR) data type for CL variables
- ▶ Ability to declare based (\*BASED) variables whose storage depends on the address of the basing pointer
- ▶ Ability to declare defined (\*DEFINED) variables whose storage depends on the CL variable being defined over.
- ▶ i5/OS system management functions include Simple Network Management Protocol (SNMP) APIs and access to additional management information. The SNMP APIs for managing applications have the ability to manipulate management data via local or remote SNMP agents. Information can be retrieved from systems on SNA or TCP/IP networks. This makes it easier to discover and manage potential problems anywhere within the network.

## Application programming interfaces


Hundreds of i5/OS APIs can provide access to functions and data not available through any other interface or levels of performance not available through other interfaces. These CLIs are intended for use by Solution Developers and IBM Business Partners whose applications require these functions and data. You can find a complete list in *System API Reference*, SC41-5801.

## Extensive run-time application function

OS/400 is a functionally-rich platform for applications. Because it is enabled to run a wide range of applications, clients can easily grow their application base as their business needs grow. The extensive run-time function integrated into the i5/OS licensed programs enables application programs created with these languages, utilities, and support:

- ▶ ILE RPG for iSeries
- ▶ RPG/400®
- ▶ IBM System/36-Compatible RPG II
- ▶ IBM System/38-Compatible RPG III
- ▶ ILE COBOL for iSeries
- ▶ COBOL/400®
- ▶ IBM System/36-Compatible COBOL
- ▶ IBM System/38-Compatible COBOL
- ▶ ILE C for iSeries
- ▶ SAA AD/Cycle® C/400®
- ▶ System C/400
- ▶ VisualAge® C++ for iSeries
- ▶ AS/400 BASIC
- ▶ AS/400 Pascal
- ▶ AS/400 PL/I
- ▶ RM/COBOL-85 for the AS/400


The corresponding licensed programs are not required for systems that execute the code.



## **i5/OS (5722-SS1): Operating system licensed products**

The computing industry is moving rapidly toward a network-centric world made up of global networks. The newest release of IBM i5/OS builds on this to make the System i5 servers key players in this vibrant and vital area.

This chapter describes the features and enhancements of the System i5 operating system product. The functionality and integrated capabilities of the operating system are described in “i5/OS: Architecture” on page 205. Associated licensed programs and enhancements are described in the following chapters of this Handbook.

IBM i5/OS (5722-SS1)		
Version and release	i5/OS V5R4	
Software type	Usage - Processor based Software Subscription - Yes IPLA - Yes Keyed - Yes	
Installation prerequisites	None	
Related products	All	
Client code	Delivered as 5722-XE1, which is stored in an integrated file system (IFS) directory and is downloaded to the PC	
Replaces product	5722-JC1 (functions included in OS/400) 5769-SS1, 5716-SS1, 5763-SS1, 5763-VP1	
Further information	<a href="http://www.iseries.ibm.com/infocenter">http://www.iseries.ibm.com/infocenter</a>	

## New with i5/OS V5R4

i5/OS is necessary for the IBM System POWER5+ technology-based hardware. Consider it as an upgrade from previous versions of OS/400 to take advantage of new and enhanced functions such as:

- ▶ Improved application portability with new Java™ Virtual Machine
- ▶ Improved security and compliance with integrity protection, network intrusion detection, and auditing enhancements
- ▶ Improved integration with Web applications
- ▶ Simplified application development with free-format SQL in RPG applications
- ▶ Improved workload management with enhancements to i5/OS subsystems
- ▶ Support for SNA applications over IP networks with Enterprise Extenders
- ▶ Simplified Web administration and performance management
- ▶ Simplified database performance management and index maintenance
- ▶ Enhanced capabilities and simplified management of business continuity solutions
- ▶ Improved management and retention of printed information
- ▶ Enhanced cluster resource services for high availability
- ▶ Networking enhancements including establishment of VPNs through network address translation (NAT) firewalls and additional IPv6 support

**Note:** V5R4 Licensed Internal Code requires more storage space on the load source than in previous releases. A load-source disk unit of 17GB or larger is required on each server or logical partition to upgrade to the V5R4 i5/OS or V5R3 i5/OS with V5R3M5 Licensed Internal Code (LIC).

## i5/OS overview

i5/OS contains the base operating system, additional optional feature components, and separate licensed programs bundled with the operating system at no extra charge. The client can purchase advanced features and functions that are not included in the base group of products shipped with the operating system.

V5R4 of i5/OS provides system support for the following RISC models:

- ▶ 270
- ▶ 800, 810, 820, 825, 830, 840, 870, 890
- ▶ SB2, SB3
- ▶ 520, 550, 570, and 595
- ▶ 9117-570 or 9119-590 servers configured with 1.65 GHz POWER5™ processor or 9119-595 server configured with 1.65 GHz or 1.9 GHz POWER5 processors

**Important:** Some functions of the operating system are available *only* on newer hardware.

V5R4 of OS/400 is the final release supported on the following RISC models:

- ▶ 270
- ▶ 820, 830, 840
- ▶ SB2, SB3

**Note:** V5R4 of OS/400 does not run on models of the AS/400 system based on internal microprogram instruction (IMPI) processors (CISC models) and some earlier RISC models

Refer to “Planning information” on page 41 for information about OS/400 and processor compatibility.

Version 5 of OS/400 is offered for no additional charge. See “New with i5/OS V5R3” on page 261.

The following sections briefly describe the components of i5/OS. Programs offered within i5/OS are described in “Programs within i5/OS” on page 239. Refer

to “i5/OS V5R4 options” on page 246 for a list of all OS/400 options available at i5/OS V5R4.

Version 5 of OS/400 is delivered on CD-ROM to speed loading of software and to reduce the risk of media errors. All manuals are delivered in softcopy on CD-ROM.

## National language and multilingual support (5722-NLV)

The System i5 server with i5/OS is a worldwide product that addresses many country (region)-unique requirements. For different countries (regions) and languages, specific support is provided, either with translated machine-readable information (MRI), such as screens and messages, or with keyboards and displays on the local or remote workstation twinaxial controller.

Multilingual support allows multiple users on the same system to operate in different languages. This means that system messages, displays, and help information, as well as user applications, can be presented to the end user in their national language.

### Primary and secondary national languages

The national language in which licensed programs are ordered is considered the primary national language.

Second languages in a single partition are known as *secondary languages*. Users can switch among the languages as necessary. Multiple national language versions can be installed on a single System i5 server. Regardless of the national language version, all system commands are in U.S.A. English. Therefore, a single set of system commands works in all national language environments.

National Languages for i5/OS (5722-NLV)	
Included in base	Yes
Status	Shipped with OS/400 as no charge feature
Further information	<a href="http://www.iseries.ibm.com/infocenter">http://www.iseries.ibm.com/infocenter</a>

### Universal Coded Character Set support

Many clients do business in a worldwide environment. It is too costly and time consuming to redesign and rewrite an application to support users in another national language or culture. These applications require the ability to store and process character data from more than one national language.

The Universal Coded Character Set (UCS) is an emerging global character encoding, developed jointly by the industry (UNICODE 1.1) and the International Organization for Standardization (ISO). ISO/IEC 10646-1 defines a code page (UCS-2) encompassing the characters used by all currently significant languages, a rich set of scientific and publishing symbols, and a variety of script languages. This common code page spans the character sets of many languages. It can ease application development and management issues historically found in multiple code page system environments and networks. This capability is provided in i5/OS with the UCS2 Level 1 support for database to permit characters of any national language to “coexist” in database files.

### **Locale support of cultural values**

Cultural values change from one national language to another. Examples of cultural values are:

- ▶ Date and time format
- ▶ Currency symbol
- ▶ Sort (collating) sequence

### **Euro currency support**

Euro currency sign support is offered to those countries (regions) that are currently supported in the System i5 national language structure, that are inside and outside the European Monetary Units (EMU), and whose national standards authorities have approved the appropriate standards. This support has been available in OS/400 since V4R5.

## **Options and licensed programs offered with i5/OS**

The following sections describe the options that can be ordered or ship with the i5/OS operating system.

### **Programs within i5/OS**

The licensed programs in the following table appear within the iSeries Software Resources and Licensed Program menus as a separate product. Each is part of the base i5/OS (product 5722-SS1). Each program ships with i5/OS automatically with no additional charge and does not need to be ordered separately.

The following programs are included with all i5/OS shipments:

- ▶ 5722-DG1 HTTP Server\*

- Option 1 triggered Cache Manager
- ▶ 5722-IA1 Software Integration Assistant
- ▶ 5722-JC1 Toolbox for Java\*
- ▶ 5722-JV1 Developer Kit for Java\*
  - Option 5 Java Developer Kit 1.3\*
  - Option 6 Java Developer Kit 1.4
  - Option 7 Java Developer Kit 5.0
  - Option 8 J2SE 5.0 32 bit
- ▶ 1TME-LCF Tivoli Management Agent\*
- ▶ 5722-TC1 TCP/IP Utilities\*
- ▶ 5722-XE1 iSeries Access for Windows\*
- ▶ 5722-XP1 iSeries Access for Wireless
- ▶ 5722-LSV i5/OS Integration for Linux on xSeries
- ▶ 5722-BZ1 Business Solutions V1.0

**Note:** The previously listed software is included in the software order. Those product and product options identified with an asterisk (\*) are preloaded on all new system orders.

Product name	Product number	For further information, see:
DB2 UDB for iSeries	N/A	Chapter 19, "IBM licensed programs: Database accessories" on page 265
HTTP Server for iSeries	5722-DG1	"IBM TCP/IP Connectivity Utilities for iSeries (5722-TC1)" on page 244
IBM Software Integration Assistant for iSeries	5722-IA1	"IBM Software Integration Assistant for iSeries (5733-IA1)" on page 322
TCP/IP Connectivity Utilities for iSeries	5722-TC1	"IBM TCP/IP Connectivity Utilities for iSeries (5722-TC1)" on page 244
i5/OS Integration for Linux on xSeries	5722-LSV	
iSeries Access for Windows iSeries Navigator*	5722-XE1	Chapter 24, "IBM eServer iSeries Access products" on page 305
Tivoli Management Agent	1TMELCF	"IBM Tivoli Storage Manager Extended Edition (5698-A11)" on page 718
* Formerly known as Client Access Express and Operations Navigator		



## HTTP Server for iSeries (5722-DG1)

HTTP servers are the core foundation of technology at the heart of all applications for On Demand Business. They handle the communication with the client (typically browsers or Extensible Markup Language (XML)-rendering devices such as personal digital assistant (PDAs)) and provide the entry point into server resources. These resources can range from simple Hypertext Markup Language (HTML) and GIF files, to On Demand Business and e-commerce applications, all the way to complete business-to-business, collaborative enterprises.

For System i5 servers, network computing is supported with HTTP Server for iSeries. An System i5 servers can access a vast network of computers as though they were a single entity. Everyone and everything can access and distribute information, applications, and services provided by the network.

Based on the popular Apache 2.0 open-source software, the HTTP Server (powered by Apache) is the IBM strategic HTTP server. Multiple HTTP servers can be active simultaneously on a single System i5.

The HTTP Server for iSeries product also contains several Internet-enablement tools to aid in Web/Internet application development:

- ▶ Apache Software Foundation (ASF) Jakarta Tomcat
- ▶ Net.Data®
- ▶ Search and Web Crawler

These tools are described further in this section.

HTTP Server for iSeries (5722-DG1)	
Included in base	Yes
Status	Shipped with OS/400 as no charge feature
Further information	<a href="http://www.ibm.com/eserver/series/software/http">http://www.ibm.com/eserver/series/software/http</a> <a href="http://www.webdav.org/">http://www.webdav.org/</a> <a href="http://www.apache.org/">http://www.apache.org/</a>

Refer to the following Web site for information about preventive service planning (PSP) for the iSeries HTTP Server:

<http://www.ibm.com/eserver/series/software/http>

Apache, a freeware HTTP server, is open-source software that implements the industry standard HTTP/1.1 protocol. The focus is on being highly configurable

and easily extendable. It is built and distributed under the Apache Software License by the ASF. You can find it on the Web at:

<http://www.apache.org>

### **Apache Web Server**

The enhancements to Apache Web Server include the following:

- ▶ New and existing directives allow CGI jobs to run in more than one language from a single Apache server.
- ▶ CGI job handling is enhanced by avoiding unnecessary conversions until the CGI CCSIDs and conversion mode are determined specific to the configuration.
- ▶ Log files are tagged with CCSID 1208 (UTF-8).
- ▶ Porting open source modules to i5 is easier.

### **Apache Software Foundation Jakarta Tomcat (5722-DG1)**

The HTTP Server includes the popular ASF Tomcat Servlet Engine. With ASF Tomcat, you can serve both servlets and JavaServer Pages (JSPs) using an “In Process” or “Out of Process” servlet engine. Tomcat, which is based on open source software, is compatible with the IBM HTTP Server (powered by Apache).

IBM plans for i5/OS V5R4 to be the final release to ship Apache Tomcat (jsp/servlet) support in IBM HTTP Server, which is shipped with i5/OS.

### **Net.Data**

The IBM HTTP Server product includes Net.Data. IBM Net.Data is an application that allows Web developers to easily build dynamic Internet applications using “Web Macros”. Net.Data Web Macros combine the simplicity of HTML with the power of dynamic SQL. Net.Data provides connectivity to a variety of relational data sources as well as flat files.

For more information, see the following Web site:

<http://www.iseries.ibm.com/netdata>

## **Toolbox for Java (5722-JC1)**

Incremental enhancements have been made to the most popular components of the Java Toolbox, and several new components have been added.

New components include:

- ▶ SaveFile component enables Java applications to work with "save files" located on the server. The Subsystem component similarly enables applications to query and manipulate subsystems.
- ▶ SignonHandler feature enables applications to plug in their own customized signon GUIs for use when the Toolbox needs to prompt for missing or changed signon information.
- ▶ Enhanced JDBC functions: Numerous enhancements to JDBC exploit recently introduced DB2 enhancements, including:
  - 2 MB statement size
  - 128-byte column name support
  - Database host server trace support
  - eWLM Correlator support

The JarMaker utility, which produces stripped-down versions of the Toolbox JAR file, is enhanced for improved effectiveness and usability.

<b>IBM Toolbox for Java (5722-JC1)</b>	
Included in base	Yes
Status	Shipped with OS/400 as no charge feature of 5722-SS1
Further information	Search using "IBM Toolbox for Java" <a href="http://publib.boulder.ibm.com/infocenter/iseriess/v5r4">http://publib.boulder.ibm.com/infocenter/iseriess/v5r4</a> <a href="http://www.ibm.com/servers/eserver/iseriess/toolbox/">http://www.ibm.com/servers/eserver/iseriess/toolbox/</a>

## Developer Kit for Java (5722-JV1)

A new Java Virtual Machine (JVM) technology is included in i5/OS V5R4.

- ▶ New JVM technology is common on all IBM platforms
- ▶ Has improved its capability to be modular, flexible, and reliable.
- ▶ 32-bit JVM provides a much smaller memory footprint that especially benefits small to medium business (SMB) applications on smaller servers.
- ▶ New JVM supports JDK 1.5 and does not require any code change for the vast majority of pure Java applications. The existing JVM remains in i5/OS as a highly scalable JVM for JDK 1.3, 1.4, and 1.5.

<b>IBM Developer Kit for Java (5722-JV1)</b>	
Included in base	Yes
Status	Shipped with OS/400 as no charge feature
Further information	<a href="http://publib.boulder.ibm.com/infocenter/iseriess/v5r4">http://publib.boulder.ibm.com/infocenter/iseriess/v5r4</a> Search using "IBM Developer Kit for Java"

## IBM TCP/IP Connectivity Utilities for iSeries (5722-TC1)

System i5 servers come with a complete and robust suite of TCP/IP protocols, servers, and services. It is easy to implement full-featured intranets by simply cabling System i5 servers and workstations together and starting the desired services. In most cases, no additional software or hardware is required.

TCP/IP networking on System i5 is administered and managed directly from iSeries Navigator running on a PC client. You can define Dynamic Host Configuration Protocol (DHCP), Domain Name System (DNS), and Dynamic Domain Name System (DDNS) servers from a single graphical interface.

The TCP/IP protocol stack on the System i5 is tuned for robust, secure, and scalable TCP/IP services and servers. This results in significant improvements in capacity for TCP/IP users.

The base protocols are implemented within OS/400 and OS/400 microcode for excellent performance, security, and stability. A wide range of physical interfaces is supported.

IBM TCP/IP Connectivity Utilities	
Product number	5722-TC1
Ordering	Included free of charge with OS/400
Minimum operating system level	V5R1
Software type	Software Subscription
Replaces product	5769-TC1
Further information	<a href="http://www-1.ibm.com/servers/eserver/iseries/tcpip">http://www-1.ibm.com/servers/eserver/iseries/tcpip</a> <i>IBM @server iSeries IP Networks: Dynamic!</i> , SG24-6718

For a full description of TCP functions and features, refer to the Networking - TCP/IP section of the iSeries Information Center, and *IBM @server iSeries IP Networks: Dynamic!*, SG24-6718.

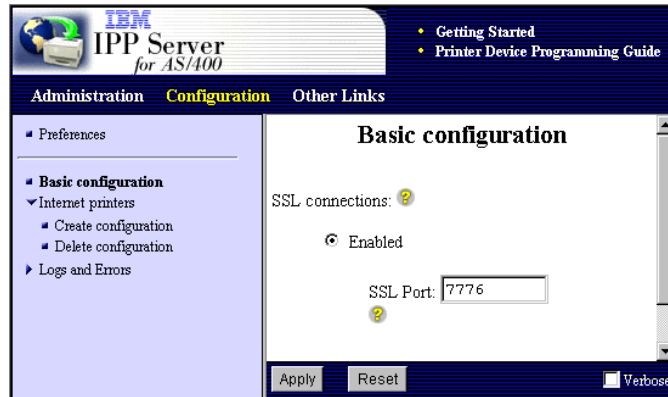
## Internet Printing Server for iSeries

The Internet Printing Protocol (IPP) defines an industry-standard method of delivering print jobs using Internet technologies providing for Web-enabled print around the world. The IPP was developed by the Printer Working Group, a consortium of all major companies involved in network printing. IPP is fast becoming the single standard interface for printing on the Internet, with broad vendor implementation and client acceptance.

The IPP Server for iSeries, included in OS/400, provides an IPP Version 1.0 compatible print server for the System i5. The IPP Server for iSeries allows anyone working remotely, to submit and manage print jobs on a distant System i5. IPP is built on top of HTTP, which

in turn, runs over TCP/IP. Clients can now use the same print solution on local area networks, intranets, and the Internet. The same process used to send a print document to the department printer down the hall can be used to send the document to the corporate printer across the country (region).

The IPP Server for iSeries provides security features for user authentication and encryption of print jobs using SSL 3.



## iSeries Webserver Search Engine

The iSeries Webserver Search Engine allows you to perform full text searches on HTML and text files from any Web browser. The Webserver Search Engine also includes a Web crawler.

For more information, see:

<http://www-1.ibm.com/servers/eserver/iseries/software/http/services/searchinfo.htm>

<http://www-1.ibm.com/servers/eserver/iseries/software/http/services/webcrawler.htm>

## i5/OS V5R4 options

The programs in the following list appear within the iSeries Software Resources and Licensed Program menus as a separate product. Each is part of the base i5/OS (product 5722-SS1). Some programs ship with i5/OS automatically with no additional charge. Others are ordered separately or are a chargeable option.

- ▶ Option 0 i5/OS -- Per Processor Pricing Key
- ▶ Option 1 i5/OS -- Extended Base Support
- ▶ Option 2 i5/OS -- Online Information
- ▶ Option 3 i5/OS -- Extended Base Directory Support
- ▶ Option 5 i5/OS -- System/36(TM) Environment
- ▶ Option 6 i5/OS -- System/38(TM) Environment
- ▶ Option 7 i5/OS -- Example Tools Library
- ▶ Option 8 i5/OS -- AFP(TM) Compatibility Fonts
- ▶ Option 9 i5/OS -- \*PRV CL Compiler Support
- ▶ Option 12 i5/OS -- Host Servers
- ▶ Option 13 i5/OS -- System Openness Includes
- ▶ Option 14 i5/OS -- GDDM(R)
- ▶ Option 18 i5/OS -- Media and Storage Extensions(3)
- ▶ Option 21 i5/OS -- Extended NLS Support
- ▶ Option 22 i5/OS -- ObjectConnect
- ▶ Option 23 i5/OS -- OptiConnect(3)
- ▶ Option 25 i5/OS -- NetWare Enhanced Integration(3)
- ▶ Option 26 i5/OS -- DB2 Symmetric Multiprocessing(3)
- ▶ Option 27 i5/OS -- DB2 Multisystem(3)
- ▶ Option 29 i5/OS -- Integrated Server Support
- ▶ Option 30 i5/OS -- Qshell
- ▶ Option 31 i5/OS -- Domain Name System
- ▶ Option 33 i5/OS -- Portable Application Solutions Environment
- ▶ Option 34 i5/OS -- Digital Certificate Manager
- ▶ Option 35 i5/OS -- CCA Crypto Service Provider
- ▶ Option 36 i5/OS -- PSF/400 1-45 IPM Printer Support(3)
- ▶ Option 37 i5/OS -- PSF/400 1-100 IPM Printer Support(3)
- ▶ Option 38 i5/OS -- PSF/400 Any Speed Printer Support(3)
- ▶ Option 39 i5/OS -- International Components for Unicode
- ▶ Option 41 i5/OS -- HA Switchable Resources(3)
- ▶ Option 42 i5/OS -- HA Journal Performance(3)
- ▶ Option 43 i5/OS -- Additional Fonts

<sup>3</sup> This software is only included if it is ordered.

## System/36 environment (5722-SS1 Option 5)

Most System/36 applications can run on the System i5 server using the System/36 environment. When running in the System/36 environment, OS/400 supports a set of commands designed to migrate data between the System/36 and the System i5 server or the System i5 server and the System/36. These commands save and restore library source, procedure members, and data files between the two systems.

System/36 environment (5722-SS1 Option 5)	
Included in base	Yes
Status	No charge

## System/38 environment (5722-SS1 Option 6)

The System/38 environment provides:

- ▶ Migration from System/38 systems
- ▶ Intermixing System/38 and System i5 functions
- ▶ Maintenance of System/38 applications on the System i5 server

System/38 environment (5722-SS1 Option 6)	
Included in base	Yes
Status	No charge

The System/38 environment allows the execution of most programs written for a System/38 system. The same job can execute any combination of System i5 or System/38 programs. The programmer menu on the System i5 supports source types to enable the identification of System/38 syntax. The programmer can maintain either System i5 or System/38 programs during the same job.

## Host servers (5722-SS1 Option 12)

Host servers handle requests from client PCs or devices such as running an application, querying a database, printing a document, or even performing a backup or recovery procedure.

Host Servers (5722-SS1 Option 12)	
Included in base	Yes
Status	No charge

Host Servers (5722-SS1 Option 12)	
Included in base	Yes
Further information	<a href="http://www.iseries.ibm.com/infocenter">http://www.iseries.ibm.com/infocenter</a>

## System Openness Includes (5722-SS1 Option 13)

System Openness Includes provides developers with header files for the many callable APIs and exits found in OS/400. The header files are provided in a high-level language source for application development in languages such as C, C++, OPM RPG, ILE RPG, OPM COBOL, and ILE COBOL. They provide for easier access to many of the functions found in OS/400.

The Pthread APIs are based on open APIs described in the ANSI/IEEE Standard 1003.1, 1996 edition (also known as ISO/IEC 9945-1: 1996) and the Single UNIX Specification, Version 2, 1997 standards.

System Openness Includes (5722-SS1 Option 13)	
Included in base	Yes
Status	No charge

## Media and Storage Extensions (5722-SS1 Option 18)

For software developers who want to customize their own storage management applications, Media and Storage Extensions provides an API to enable application monitoring and control of media usage, including volumes to be selected and volume expiration dates. The API also enables fast search for IBM 3480, 3490, 3490E, and 3575 tape devices.

Media and Storage Extensions (5722-SS1 Option 18)	
Included in base	No
Status	Charged feature
Related products	Backup Recovery and Media Services (BRMS) (5722-BR1) Tivoli Storage Manager (5697-TSM)
Further information	<a href="http://www.iseries.ibm.com/infocenter">http://www.iseries.ibm.com/infocenter</a>

An API is provided to handle the interruption that occurs when an application tries to open a database file that has been migrated to offline media. The API



enables an on demand recall of a database file from offline media to direct access storage device (DASD) and resumption of the application. Application changes are not required.

These APIs provide support to use or build applications to manage tape usage and the recall of data from offline media to DASD. This feature is a prerequisite feature to BRMS. It is also required when developing HSM dynamic retrieval functions.

## Object Connect for iSeries (5722-SS1 Option 22)

Object Connect for iSeries provides support to simply and efficiently move individual objects, entire libraries, or entire IFS directories from one System i5 server to another over a standard communications connection. Systems can be connected via standard APPC (using APPN), TCP/IP communications lines (using AnyNet), local area network (LAN), or an high-speed link (HSL) OptiConnect loop (fiber or copper). The economy of not requiring intermediate save file procedures and copies to distribution queues saves DASD and improves performance in a manner that is nondisruptive to system operations.

Object Connect for iSeries (5722-SS1 Option 22)	
Included in base	Yes
Status	No Charge

## OptiConnect for iSeries (5722-SS1 Option 23)

OptiConnect for iSeries provides high-speed transparent access to data through SPD fiber optic bus connections or HSL fiber optic and copper bus connections. It also includes performance enhancements to iSeries Distributed Data Management (DDM).

OptiConnect for iSeries (5722-SS1 Option 23)	
Included in base	No
Status	Charged feature
Further information	<a href="http://www-1.ibm.com/servers/eserver/iseriess/ha/opticonnect">http://www-1.ibm.com/servers/eserver/iseriess/ha/opticonnect</a>

The mechanism used by OptiConnect for iSeries to access database files on connected systems is modeled after DDM. Just as DDM uses a DDM file and APPC communications to redirect file access operations, OptiConnect for iSeries

uses DDM files and a specialized transport service to redirect file access operations to a target system.

Using OptiConnect for iSeries among systems sharing the same bus (connected with SPD fiber or HSL fiber/copper cables only) can achieve transport efficiencies not possible with more general purpose, wide-area communications protocols.

With HSL OptiConnect for iSeries, clients can offload the database application CPU cycles of up to 28 System i5 servers given three CECs per loop. However when three CECs are on a loop, no I/O towers can exist on that loop.

The major advantages of OptiConnect for iSeries are realized by clients who are rapidly approaching system capacity limits, and who intend to implement distributed database application servers within a data center or short-distance campus environment. OptiConnect for iSeries is also an integral part of high availability configurations.

When used with the Object Connect for iSeries facility, OptiConnect for iSeries provides a high-efficiency migration aid for the iSeries Advanced Series.

## OS/400 - NetWare Enhanced Integration (5722-SS1 Option 25)

OS/400 - NetWare Enhanced Integration provides NetWare client and integration services for System i5 users, operators, and applications. This is achieved using a Network Loadable Module (NLM) that runs on NetWare 6.0.

**Note:** Novell no longer supports NetWare 4.2 and NetWare 5.0, and therefore, nor does IBM. A license is required for each NetWare server.

NetWare Enhanced Integration has a nonwarranted license with no committed support for V5R4.

TCP/IP support in OS/400 is used to connect the System i5 using a token-ring adapter, an Ethernet adapter, IPCS, X.25, or frame relay adapters. OS/400 Enhanced Integration for Novell NetWare provides user profile and password integration from the System i5 to NetWare. System i5 user or group profiles can be propagated to multiple NetWare Directory Services (NDS) trees. When System i5 users change their passwords, the change is propagated to NetWare.

<b>OS/400 - NetWare Enhanced Integration (5722-SS1 Option 25)</b>	
Included in base	Yes
Status	No charge
Further information	<a href="http://www-1.ibm.com/servers/eserver/series/netware/as4nwhm.htm">http://www-1.ibm.com/servers/eserver/series/netware/as4nwhm.htm</a>

OS/400 - NetWare Enhanced Integration provides System i5-to-NetWare printing support. An System i5 user's printed output is sent from an System i5 output queue to a printer queue managed by the NetWare server. OS/400 host print transform services are used to translate the output to print on common PC printers.

IFS support is provided, allowing System i5 users, including iSeries Access users, and applications access to files and directories in multiple NDS trees throughout the network. Full integration with NetWare security ensures that each System i5 user of these services is fully authenticated in NetWare Directory Services. Another use of the file system is to access files on NetWare servers to be served by OS/400 Internet connection support:

- ▶ Internet Connection Server for AS/400 (V4R1 and V4R2 only)
- ▶ HTTP Server for iSeries (V4R3 or later release)

Server configuration and management tasks can operate from System i5 interfaces. This is not intended to provide full management and operations of a NetWare server. However, System i5 operators can manage user connections and disk resources. Facilities are provided for creating, extending, and mounting or dismounting volumes on NetWare servers.

## **OS/400 - DB2 Symmetric Multiprocessing (5722-SS1 Option 26)**

OS/400 - DB2 Symmetric Multiprocessing (SMP) expands on the parallel capabilities of DB2 UDB for iSeries. This separately priced feature of OS/400 improves the performance of the database for the System i5 server. This improved performance is critical, especially in a data warehouse or decision-support environment. The performance gains provided by this feature allow for better and more effective business decisions to be made in a timely manner.

OS/400 - DB2 Symmetric Multiprocessing further enables DB2 UDB for iSeries with SMP on any n-way System i5 server. SMP capabilities have existed since the introduction of the System i5 n-way systems. This form of SMP allows multiple database operations to take place simultaneously on multiple

processors. Each database operation runs on a single processor, therefore, optimizing DB2 UDB for iSeries for online transaction processing.

<b>OS/400 - DB2 Symmetric Multiprocessing (5722-SS1 Option 26)</b>	
Included in base	No
Status	Charged feature
Related products	DB2 Multisystem for iSeries
Further information	<a href="http://www-1.ibm.com/servers/eserver/iseries/db2/db2sym.htm">http://www-1.ibm.com/servers/eserver/iseries/db2/db2sym.htm</a>

With the DB2 Symmetric Multiprocessing, a single database operation can run on multiple processors at the same time or in parallel. These database operations are typically queries. However, parallel processing is also supported for import and export between DB2 UDB for iSeries and other databases.

This parallel index build, splitting an individual query into many smaller subtasks, can then be run independently on separate processors before the subtask results are combined again. This allows for significant performance increases. These performance increases become more pronounced with the addition of more processors. For example, if a query is running in 20 seconds on an System i5 with a dedicated processor, adding a second dedicated processor along with the DB2 Symmetric Multiprocessing feature may allow this query to run in approximately 10 seconds. Adding two additional processors may allow this query to run in approximately 5 seconds.

## **OS/400 - DB2 Multisystem (5722-SS1 Option 27)**

The System i5 server and OS/400 - DB2 Multisystem provide a scalable solution for data warehousing that spans from the smallest datamart to the largest enterprise data warehouse. DB2 Multisystem allows multiple System i5 servers to be connected to allow the processing power and storage capacity of all the servers to be used. From a database perspective, these interconnected System i5 servers appear as a single large system. It is intended for use when System i5 servers are used for large data warehouse installations.

<b>OS/400 - DB2 Multisystem (5722-SS1 Option 27)</b>	
Included in base	No
Status	Charged feature
Related products	DB2 Symmetric Multiprocessing

## Integrated Server Support (5722-SS1 Option 29)

The i5/OS Integrated Server Support option 29 for i5/OS replaces the IBM iSeries Integration for Windows Server product. This new option delivers virtual storage, communications, and operations management integration between i5/OS and integrated xSeries® solutions and Linux™ and AIX 5L™ partitions for the System i5 family.

The Integrated Server Support option includes enhancements provided with i5/OS V5R4 to deliver:

- ▶ Virtual Ethernet support for Linux on xSeries systems attached by an Integrated xSeries Adapter
- ▶ Support for extending the size of a network server storage space
- ▶ Support for Windows Server 2003 Volume Shadow Copy Service, which can be used by Windows backup applications
- ▶ iSeries Navigator enhancements to deliver a consistent management interface for integrated xSeries systems, and Linux and AIX 5L partitions

## OS/400 - Domain Name System (5722-SS1 Option 31)

OS/400 includes a full-function Domain Name System server. It can be configured for primary, secondary, and caching roles. DNS configuration data from other platforms can easily be migrated to the System i5 DNS server. In addition, a migration utility that moves existing System i5 host table information into the DNS configuration databases is provided.

OS/400 - Domain Name System (5722-SS1 Option 31)	
Included in base	Yes
Status	No charge feature
Related products	Requires 5722-SS1 Option 33 (OS/400 PASE) to run with full functionality

### Dynamic DNS

OS/400 DNS services are based on the widely used industry-standard DNS reference implementation. A dynamic update capability is offered that transforms the DNS into a DDNS.

## OS/400 Portable Application Solutions Environment (5722-SS1 Option 33)

OS/400 PASE is an integrated runtime that provides simplified porting of selected solution provider UNIX applications. OS/400 PASE complements and expands the System i5 solution portfolio by focusing on rapidly porting UNIX applications to the System i5 platform.



OS/400 PASE is a library of APIs and system services that enable AIX programs to run in OS/400. It provides a subset of AIX functionality to support running 32-bit and 64-bit UNIX applications directly on System i5 hardware. OS/400 PASE includes full support for X-Windows.

OS/400 PASE applications are created on an AIX workstation and execute on System i5 hardware.

OS/400 PASE (5722-SS1 Option 33)	
Included in base	Header and export file extensions are packaged with OS/400 Option 33
Status	No charge feature
Further information	<a href="http://www-1.ibm.com/servers/enable/site/porting/iseres/pase">http://www-1.ibm.com/servers/enable/site/porting/iseres/pase</a>

OS/400 PASE exploits the System i5 processor's ability to switch between OS/400 and AIX runtime modes within an OS/400 job. This allows applications deployed using OS/400 PASE to run directly on System i5 hardware and take full advantage

## Digital Certificate Manager (5722-SS1 Option 35)

Digital certificate management changes for V5R4 include:

- ▶ Self-signed certificates with private keys can be assigned to application identifiers.
- ▶ Reverse order PKCS12 files can be imported. This may be extended to "orderless" PKCS12 files.
- ▶ Target release for exporting certificates and creating certificates for another system are eliminated.
- ▶ Optional, overriding labels on server/client certificates are enabled when importing a PKCS12 file.

## IBM Print Services Facility (5722-SS1 Options 36, 37, 38)

IBM Print Services Facility™ for OS/400 (PSF/400) provides support for high-function Advanced Function Presentation (AFP) electronic printing and print management of Intelligent Printer Data Stream (IPDS) printers. With AFP, application output can be transformed into fully graphical documents with electronic forms, image, graphics, barcoding, lines, boxes, and text in a wide variety of fonts. This flexibility enables the production of electronic documents that are more effective, and enables the re-engineering of business processes.

Documents and reports can be produced using a variety of enabling tools, including Infoprint Designer for iSeries (5733-ID1). Other enabling tools include OS/400 printer file keywords (for front and back overlays, N-up, and duplex), DDS printer files, System i5 page and form definitions, Advanced Print Utility (APU), and AFP Toolbox. Output created by network and client applications can be transformed to AFP, and, therefore, managed by PSF/400 to IPDS printers. OS/400 Version 5 includes capabilities (via Infoprint Server for iSeries) to handle PCL, PostScript, and PDF output with PSF/400 print management.

PSF/400 is the OS/400 subsystem driving the interactive management of IPDS printers. IPDS is a bidirectional print architecture that ensures that the printing process can be managed every step of the way.

The following table lists the OS/400 option number associated with each tier.

Option number	Feature description
36	1 to 45 IPM
37	1 to 100 IPM
38	Any speed printer support

An unlimited number of printers within each tier is supported.

IBM Print Services Facility (5722-SS1 Options 36, 37, 38)	
Included in base	No
Related products	Advanced Function Printing Utilities (5722-AF1) Infoprint Designer for iSeries (5733-ID1) iSeries Facsimile Support (5722-FAX) Infoprint Server for iSeries (5722-IP1) IBM AFP Font Collection (5648-B45) IBM Infoprint Fonts for Multiplatforms (5648-E77)
Further information	<a href="http://www.printers.ibm.com/internet/wwsites.nsf/vwebpublished/psfhome_i_ww">http://www.printers.ibm.com/internet/wwsites.nsf/vwebpublished/psfhome_i_ww</a>

## OS/400 High Availability Switchable Resources (5722-SS1 Option 41)

OS/400 High Availability (HA) Switchable Resources provides the capability to achieve a highly available environment using switchable resources. The resources are physically switched between systems so that only one copy of the resource is required.

High Availability Switchable Resources (5722-SS1 Option 41)	
Included in base	No
Status	Charged feature Keyed - Yes
Further information	<a href="http://www-1.ibm.com/servers/eserver/series/ha/clustertech.htm">http://www-1.ibm.com/servers/eserver/series/ha/clustertech.htm</a>

Option 41 includes support for:

- ▶ **Switchable IASPs:** Allow you to move the data to a backup system to keep the data constantly available. The data is contained in a collection of switchable disk units such as an I/O tower.
- ▶ **IBM Simple Cluster Management GUI:** Allows you to create and manage a simple four-node, switched disk cluster. The utility includes wizards and help text that simplify the tasks involved in and managing the cluster.

## OS/400 High Availability Journal Performance (5722-SS1 Option 42)

For the most demanding high-availability clustering environments supported by our high availability Business Partners, Journal Standby Mode and Asynchronous Journaling capabilities enable faster failover and reduce



performance bottlenecks. Both the Journal Caching feature and the Journal Standby feature are provided by installing OS/400 option 42.

OS/400 High Availability Journal Performance (5722-SS1 Option 42)	
Included in base	No
Status	Charged feature Keyed - Yes

### Journal Caching feature

The Journal Caching feature allows batch applications to substantially reduce the number of synchronous disk write operations performed, thereby reducing overall elapsed batch execution time.

Journal Caching provides significant performance improvement for batch applications that perform large numbers of add, update, or delete operations against journaled objects. Applications using commitment control see less improvement (commitment control already performs some Journal Caching). Journal Caching is especially useful for situations where journaling is being used to enable replication to a second system.

You can find more detailed information in the iSeries Information Center at:

<http://www.iseries.ibm.com/infocenter>





## Software terms

Software on System i5 servers is priced in one of three ways:

- ▶ Per server based by the grouping of systems into tiers
- ▶ By the number of processors on which the software is running
- ▶ By the number of users

Software is grouped into seven tiers: P05, P10, P20, P30, P40, P50, and P60. Each server is placed into a tier based on its processor and, for older models, its 5250 commercial processing workload (CPW) feature. Software pricing is then based on this tier for that server. Each server in the hardware section has a software tier indicated.

Some software products are chargeable by the number of processors on which the software is running, rounded up to the nearest processor. If the number of processors is increased, by IBM @server Capacity Upgrade on Demand (CUoD) for example, an additional charge becomes payable.

User-based pricing depends on the number of actual active users using that software on a system. Keyed software where user pricing is required needs a software key for the “base” license and for the allowed number of users. In some cases, after purchasing a certain amount of licenses in a particular software tier, the user is then entitled to unlimited use of that software on that system. Where user pricing is applicable, the terms of use are stated in the respective chapters.

This chapter discusses software migration, upgrade paths, previous release support, software maintenance, terms and conditions, and software upgrades.

For more Information review Announcement Letter 205-163.

<http://www-1.ibm.com/servers/eserver/series/announce/>

## Software Maintenance for System i5

Software Maintenance for iSeries (SWMA) is an offering that provides entitlement to new versions and releases of Operating System/400 (OS/400) and selected iSeries Licensed Program Products (LPP) and provides access to IBM world class System i5 software support services for assistance with routine, short duration installation and usage (how-to) questions, and code-related problems. The eligible Software Maintenance products are listed on the Web at:

<http://www-1.ibm.com/servers/eserver/series/sftso1/subscript3.html>

## Software license and upgrades

With the one- or three-year Software Maintenance option included for a price with every new System i5 purchase, clients are entitled to order future versions and releases for eligible software products during the period they are covered by Software Maintenance. At renewal time, the client is required to purchase Software Maintenance for System i5 to maintain their entitlement to future versions and releases of eligible products they are licensed for.

Failure to renew makes a client ineligible to receive new versions, releases, or updates. The client becomes liable for an After License fee in addition to the applicable Software Maintenance for System i5 offering charge when reinstatement of Software Maintenance eventually takes place. The client *must* ensure that reinstatements are on a timely basis to avoid this After License Fee.

On 12 July 2005, IBM announced new PID' s for IBM Software Maintenance by processor for i5/OS and selected products on all @server i5 models. There is a transition period through 30 September 2005. There are no changes to POWER4 and earlier models.

The i5/OS software maintenance program numbers are:

- ▶ 5733-SPP IBM Software Maintenance i5/OS for 1-year
- ▶ 5733-SP3 IBM Software Maintenance i5/OS for 3-years

The additional processor i5/OS license program numbers are:

- ▶ 5733-SSA IBM Software Maintenance i5/OS additional processor license combined with 1-year per processor maintenance.
- ▶ 5733-SPE IBM Software Maintenance for i5/OS, 3-year extended registration (billing and registration for the second and third year additional processor license).

To determine if a product is covered Software Maintenance (SWMA) or Passport Advantage refer to the following URL:

<http://www-03.ibm.com/services/s1/swm/>

The Passport Advantage Online website enables the client to submit and manage their contact information, view purchase history, and more. See:

<http://www.ibm.com/software/passportadvantage>

This is an IBM program that covers software license acquisition and maintenance options under a single common set of agreements, processes, and tools. Using Passport Advantage Online, IBM Clients can submit contact updates, view purchase history, and more.

You can find full details about Passport Advantage on the Passport Advantage Home page at:

[http://www.lotus.com/services/passport.nsf/WebDocs/Passport\\_Advantage\\_Home](http://www.lotus.com/services/passport.nsf/WebDocs/Passport_Advantage_Home)

A tutorial on Passport Advantage is available at:

<http://www.lotus.com/services/passport.nsf/startpa.htm>

## **New with i5/OS V5R3**

i5/OS is included with System i5 systems and licensed under the International Program License Agreement (IPLA). OS/400 Version 5 is software keyed to the designated serial number of the machine where it is initially installed. Version 5 of OS/400 is licensed to operate on only that serial number machine. It may not be moved or transferred from one machine to another except in an emergency backup situation.

The number of processors that need an OS/400 license entitlement are the aggregation of all processors, including partial shares of a processor, across all partitions of a single system where OS/400 is used, rounded up to the next highest whole number. Clients must license based on what the System i5 is configured to use, the dedicated and capped partitions, and the virtual processor quantity for uncapped partitions. If large Virtual Processor quantities are

configured for uncapped partitions, IBM does not require OS/400 licensing for processors larger than the number of processors in a system.

Each System i5 Edition feature includes the quantity of OS/400 processor licenses for the startup processors of the hardware model.

For software-only OS/400 Version 5 orders, the OS/400 License Authorization Code is ordered from IBM. Contact your IBM Representative or IBM Business Partner for ordering information.

Many of the program products and optional features also require a software key to function. These are all included in the Keyed Stamped Media distribution.

## Keyed Stamped Media Distribution

Many OS/400 product features are available on Keyed Stamped Media shipped with OS/400. This provides on demand delivery of these products and features and allows a 70-day evaluation period for any of the provided products or features. To use the software distributed on the Keyed Stamped Media after the 70-day evaluation period, the software license must be ordered and a software key is created. Contact your IBM Representative or IBM Business Partner for ordering information.

New software license keys are required when the version, release, or modification level of the software changes, or the software is transferred to a different system. Some software is keyed based on the software tier. A new software key must be obtained when the software tier changes.

**Note:** When ordering software license keys for the iSeries 720, 730, 740, and newer models, the Processor Feature code that is used is displayed in the QPRCFEAT system value or in the Hardware Service Manager report. Refer to “Today’s System i5 summary” on page 47 and “Summary of earlier AS/400, AS/400e, and iSeries models” on page 449 to find the QPRCFEAT value associated with a specific processor.

If a keyed product or feature is to be upgraded, the current Proof of Entitlement or the invoice must be provided to your IBM Representative or IBM Business Partner as proof of license.

## Keyed Stamped Media Distribution for i5/OS V5R3

The following products are included with the standard set for every software or upgrade order.

- ▶ **5722-SS1** IBM i5/OS
  - Option 18 Media and Storage Extensions
  - Option 36 Print Services Facility 1-45 IPM Printer Support
  - Option 37 Print Services Facility 1-100 IPM Printer Support
  - Option 38 Print Services Facility Any speed Printer Support
  - Option 41 High Availability Switchable Resources
  - Option 42 High Availability Journal Performance
- ▶ **5722-AF1** AFP Utilities for iSeries
- ▶ **5722-AP1** Advanced DBCS Printer Support for iSeries
  - Option 1 Advanced DBCS Printer Support - IPDS
- ▶ **5722-BR1** Backup Recovery and Media Services for iSeries
  - Option 1 - Network
  - Option 2 - Advance
- ▶ **5722-CM1** Communication Utilities for iSeries
- ▶ **5722-DE1** DB2 Universal Databases Extenders for iSeries V7.2
- ▶ **5722-DP4** DB2 DataPropagator for iSeries V8.1
- ▶ **5722-IP1** Infoprint Server for iSeries
- ▶ **5722-JS1** Advanced Job Scheduler for iSeries
- ▶ **5722-PT1** Performance Tools for iSeries
  - Option 1 - Manager
  - Option 2 - Agent
- ▶ **5722-QU1** Query for iSeries
- ▶ **5722-ST1** DB2 Query Manager and SQL Development Kit for iSeries
- ▶ **5722-WDS** WebSphere Development Studio
- ▶ **5722-XH2** iSeries Access for Web
- ▶ **5722-XW1** iSeries Access Family
  - Option 1 - iSeries Access Enablement Support







## IBM licensed programs: Database accessories

DB2 Universal Database (UDB) for iSeries is the relational database manager that is fully integrated on your System i5 server. Because it is integrated, DB2 UDB for iSeries is easy to use and manage. DB2 UDB for iSeries embodies flexibility through the support of its traditional database interface along with enhancing the Structured Query Language (SQL)-based database required by today's Enterprise Application Systems.

Multiple databases are now supported on an System i5 server through the use of independent disk pools. You can manage all of the databases on the server using iSeries Navigator. DB2 UDB provides databases access from client interfaces such as Linux partitions and Windows systems.

This chapter identifies the accessories available from IBM to complement the IBM i5/OS integrated database.

Product name	Product number	Refer to page
IBM System/38 Utilities for AS/400	5722-DB1	269
IBM DB2 Universal Database Extenders for iSeries V7.2	5722-DE1	270
IBM DB2 DataPropagator for iSeries, V8.1	5722-DP4	267
IBM DB2 Warehouse Manager V8	5724-E66	269
DB2 QMF Distributed Edition V8.1 for Multiplatforms	5724-E86	268
DB2 Spatial Extender Version 8	5765-F40	270
IBM Query for iSeries	5722-QU1	267
IBM DB2 Query Manager and SQL Development Kit for iSeries	5722-ST1	268

The following database accessory products are part of the iSeries Access Family (5722-XW1):

- ▶ iSeries Access for Windows (5722-XE1) delivers an iSeries Open Database Connectivity (ODBC) driver and OLE DB provider for accessing DB2 for iSeries. It also provides an end-user graphical user interface (GUI) and ActiveX® Automation Objects, for uploading PC data to DB2 for iSeries or downloading DB2 for iSeries data to the PC.
- ▶ iSeries Access for Web (5722-XH2) delivers an end-user GUI for uploading or downloading DB2 UDB for iSeries data. It also provides the capability to download database information to a PC browser or spreadsheet, and to convert it to Portable Document Format (PDF) or Extensible Markup Language (XML) format.


Refer to Chapter 24, “IBM eServer iSeries Access products” on page 305, for an overview of these products.

### IBM DB2 DataPropagator for iSeries V8.1 (5722-DP4)

IBM DB2 DataPropagator for iSeries V8.1 provides read-only, update anywhere, and on demand replication between relational sources and targets. It consists of the Administration, Capture, and Apply autonomous components and programs.

DataPropagator for iSeries provides capabilities to view and analyze multiple aspects of business information. Replication provides the ability to share the same data among multiple locations, or multiple business functions. Data replication can consistently deliver the right data, to the right people, at the right time, allowing them to improve decision making, increase online throughput, improve data availability, and reduce application costs.

Data replication has proven value in application areas with a need to share access to data in a distributed computer environment. In addition to one-for-one copying of data from source to target, replication allowed clients to combine data from multiple sources into a single target location for easy access and analysis.


Ordering	OS/400 software group-based	
Minimum operating system level	OS/400 V5R2	
Software type	PassPort Advantage	
Replaces products	IBM DB2 DataPropagator Version 7.1 for AS/400 (5769-DP3) IBM DB2 DataPropagator Relational for AS/400 V5.1 (5769-DP2) IBM DB2 DataPropagator Relational Capture and Apply OS/400 (5769-DP1)	
Further information	<a href="http://www.ibm.com/software/data/dpropr/">http://www.ibm.com/software/data/dpropr/</a> <a href="http://publib.boulder.ibm.com/html/as400/infocenter.html">http://publib.boulder.ibm.com/html/as400/infocenter.html</a> <a href="http://www.redbooks.ibm.com">http://www.redbooks.ibm.com</a> <a href="http://www.ibm.com/software/data/dpropr/cmd/as400cmd.html">http://www.ibm.com/software/data/dpropr/cmd/as400cmd.html</a>	


### IBM Query for iSeries (5722-QU1)

Query for iSeries is recommended for non-programming users of 5250-family workstations or remotely attached 3270-family Web links who must extract, display, and format reports containing data from the iSeries database, and merge resulting data into documents.



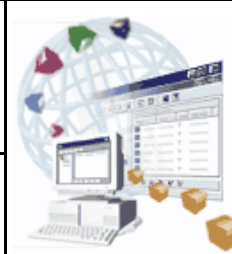
Further information	<a href="http://www.ibm.com/eserver/iseries/software/query/">http://www.ibm.com/eserver/iseries/software/query/</a>
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<b>IBM DB2 Query Manager and SQL Development Kit for iSeries (5722-ST1)</b>		
<p>The DB2 Query Manager and SQL Development Kit for iSeries provides an interactive query and report writing interface. It also provides precompilers and tools to assist in writing SQL application programs in high-level programming languages. Most SQL functions can be performed interactively or in application programs.</p> <p>The DB2 Query Manager and SQL Development Kit for iSeries provides an SQL Development Kit for relational database access using programming languages such as C, RPG, COBOL, PL/I, and REXX. The interactive query interfaces, <i>Query Manager</i> and <i>Interactive SQL</i>, are provided for users to generate queries and reports, and for programmers to test complex SQL statements.</p>		
Ordering	<ul style="list-style-type: none"> <li>▶ Shipped as a chargeable LPO</li> <li>▶ OS/400 software group-based</li> <li>▶ A software key is required.</li> <li>▶ Included on the Distribution Keyed Media CD</li> </ul>	
Minimum operating system level	i5/OS V5R4	
Related product	IBM Query for AS/400 (5722-QU1)	
Replaces product	IBM DB2 Query Manager and SQL Development Kit for AS/400 (5769-ST1)	
Further information	<a href="http://www-1.ibm.com/servers/eserver/iseries/db2/db2sql.htm">http://www-1.ibm.com/servers/eserver/iseries/db2/db2sql.htm</a> <a href="http://www.ibm.com/eserver/iseries/infocenter">http://www.ibm.com/eserver/iseries/infocenter</a> <a href="http://www.ibm.com/servers/eserver/iseries/db2/">http://www.ibm.com/servers/eserver/iseries/db2/</a>	


<b>IBM DB2 QMF Distributed Edition for Multiplatforms V8.1 (5724-E86)</b>		
Minimum client and OS/400 level	Microsoft Windows (on the Integrated xSeries Server) or client based Server capable of running OS/400 V5R1	
Software type	Passport Advantage	
Replaces	QMF for Windows for iSeries 5697-G24	


<b>IBM DB2 QMF Distributed Edition for Multiplatforms V8.1 (5724-E86)</b>	
Further information	<a href="http://www-3.ibm.com/software/data/qmf/">http://www-3.ibm.com/software/data/qmf/</a> <a href="ftp://ftp.software.ibm.com/software/data/qmf/pdfs/r202046.pdf">ftp://ftp.software.ibm.com/software/data/qmf/pdfs/r202046.pdf</a> <a href="http://www.ibm.com/servers/eserver/series/db2/db2udbprod.htm">http://www.ibm.com/servers/eserver/series/db2/db2udbprod.htm</a> <a href="http://www.ibm.com/software/data/qmf/library.html">http://www.ibm.com/software/data/qmf/library.html</a>

<b>IBM DB2 UDB Data Warehouse Enterprise Edition and Standard Edition V8.1 (5724-E66)</b>	
<p>IBM is a leader in Business Intelligence (BI). The technology built into the DB2 UDB Data Warehouse Editions enables real-time information integration, insight, and decision making. The editions combine the strength of DB2 UDB with the essential IBM BI infrastructure.</p>	
Ordering	<b>5724-E66</b> Part number BB0HENA for DB2 UDB Data Warehouse Enterprise Edition V8.1 Media Pack Part number BB0HFNA for DB2 UDB Data Warehouse Standard Edition V8.1
Software type	Passport Advantage
Prerequisites	<a href="http://www-3.ibm.com/software/data/db2/datawarehouse/">http://www-3.ibm.com/software/data/db2/datawarehouse/</a>
Replaces product	DB2 Warehouse Manager V8 (5765-F42)
Further information	<a href="http://www-3.ibm.com/software/data/db2/datawarehouse/">http://www-3.ibm.com/software/data/db2/datawarehouse/</a> <a href="http://www.ibm.com/eserver/series/software/s38utilities/">http://www.ibm.com/eserver/series/software/s38utilities/</a>



<b>IBM System/38 Utilities for AS/400 (5722-DB1)</b>	
<p>System/38 Utilities is used to run applications that were written using System/38 Data File Utility or System/38 Query and that were migrated from the System/38. The alternative is to rewrite all these existing System/38 applications. The Text Management/38 component of System/38 Utilities for AS/400 is for use by migrators whose word processing and data processing personnel use the Text Management/38 component of System/38 Personal Services.</p>	

<b>DB2 Spatial Extender Version 8 (5765-F40)</b>	
<p>DB2 Spatial Extender allows you to store, manage, and analyze spatial data (information about the location of geographic features) in DB2 UDB along with traditional data for text and numbers. With this capability, you can generate, analyze, and exploit spatial information about geographic features, such as the locations of office buildings or the size of a flood zone.</p> <p>DB2 Spatial Extender extends the function of DB2 UDB with a set of advanced spatial data types that represent geometries such as points, lines, and polygons and many functions and features that interoperate with those new data types. These capabilities allow you to integrate spatial information with your business data, adding another element of intelligence to your database.</p>	
Further information	<a href="http://www.ibm.com/eserver/series/db2/extender/">http://www.ibm.com/eserver/series/db2/extender/</a>

<b>IBM DB2 Universal Database Extenders for iSeries V8 (5722-DE1)</b>	
<p>Web-enabled On Demand Business is driving most companies to redefine their IT strategy. Moving away from proprietary data formats toward an open, interchangeable format, such as XML, to transact business on the Web is a key part of the strategy.</p> <p>In this electronic age, the bulk of a company's managed data (90%), including e-mail, technical and business documents, contracts, problem reports, and customer complaints, is still in textual form. Companies continue to look for efficient ways to leverage such massive textual data to provide valuable information. IBM DB2 Universal Database Extenders for iSeries V8 can help.</p>	
Minimum operating system level	i5/OS V5R4
Software type	SWMA
Further information	<a href="http://www.ibm.com/software/data/db2/extenders/">http://www.ibm.com/software/data/db2/extenders/</a> <a href="http://www-1.ibm.com/servers/eserver/series/db2/">http://www-1.ibm.com/servers/eserver/series/db2/</a>
	



## System i5 PCI and PCI-X I/O processors

IBM System i5 models are designed for business computing. One of the fundamental characteristics of that environment is that it is input/output (I/O)-intensive, rather than compute-intensive. This chapter discusses Peripheral Component Interconnect (PCI) system unit I/O processors (IOP) available from IBM for System i5 servers and associated towers.

Refer to Chapter 11, “System i5 I/O adapters and controllers” on page 135, for I/O adapter (IOA) information. Refer to the Customer Information Feature chapter of the *IBM System i5, @server i5, and iSeries System Builder*, SG24-2155, to identify the CIF status for each supported feature. See the IBM Redpaper *PCI Card Placement Rules for the IBM @server iSeries Server Version 5 Release 3*, REDP-4011 for complete configuration and card placement rules.

This chapter describes PCI IOPs that are supported by current System i5.

## #2844/#9744/#9844 PCI IOP

The #2844 PCI IOP is an I/O processor which drives PCI IOA adapters in the Model 520, 550, 570, 595, 800, 810, 825, 870, and 890 system units, and on HSL attached PCI or PCI-X I/O expansion towers/units.

A #2844 can drive a maximum of four IOAs, subject to configuration restrictions

The #9844 Base PCI IOP was included with Models 520, 550, 570, 595, 825, 870, and 890, and PCI-X I/O towers #0595, #5094, #5095, #5294, #8094, and #9094. However, as of 31 January 2006, the #9844 is not always included in system units and expansion towers. The inclusion rules are as follows:

- ▶ For expansions ordered after 31 January 2006, an IOP (#9844, #9943) is not included at no-charge. The order process tools (LVT, Manufacturing configurator and marketing configurator) cease to default any IOP for expansion units, but do require priced IOPs (for example, the #2844) as required to support the IOAs that are ordered. The exception to this is the “base” I/O tower (#9194 or #8294) on the Model 595. The marketing configurator defaults to a #9844 on a Model 595 with a 1.65GHz processor, and allows de-selection of the #9844 if i5/OS V5R4 is ordered.
- ▶ The existing definition of features #5560, #5561, #5562 and #5563 mirror tower packages include an enclosure equivalent to a #0595 or #5095. The #0595 and #5095 have included an IOP to be ordered at no-charge, and that IOP is assumed to be part of the #0595 and #5095 in the four mirror tower packages. As of 31 January 2006, #0595 and #5095 ordered as features, on their own, no longer allow a no-charge IOP to be ordered for them. However, because each of the four mirror tower package features also include two disk IOAs (that cannot run IOP-less), the intent is to continue to allow a no-charge IOP (a #9844) to be ordered with each of the four mirroring package features.
- ▶ Model 520, 550 and 570 Systems ordered with processors announced prior to 31 January 2006 (1.5GHz and 1.65GHz processors) include one no-charge IOP (a #9844) to be placed in the first IOP slot in the system unit. This is limited to one #9844 per system including a Model 570 with multiple system unit enclosures.
- ▶ A Model 595 system ordered with processor features (1.65GHz) announced prior to 31 January 2006 include one no-charge IOP (#9844), regardless of whether i5/OS V5R3 or V5R4 is ordered. When V5R3 is ordered, this #9844 must be placed in the #9194/#8294. When V5R4 is ordered, the marketing configurator allows the #9844 to be de-selected. If the #9844 is ordered, it can be placed wherever required within the system.
- ▶ 9406 Systems ordered with 31 January 2006 announced processors (1.9GHz and 2.2GHz) do not allow any no-charge IOPs (except in conjunction with



mirror tower package features), regardless of whether i5/OS V5R3 or V5R4 is ordered.

- ▶ Models 550, 570 and 595 ordered with 31 January 2006 announce processors (1.9GHz and 2.2GHz) and i5/OS V5R3 require an IOP. The required IOP (a #2844) must be purchased.
- ▶ 9405 Model 520 systems ordered with 31 January 2006 announce processors (1.9GHz) allow a single no-charge IOP (a #9844 to drive the included twinaxial IOA) to be ordered and placed in the first IOP slot in the system unit.
- ▶ 9406 Systems ordered with V5R4 support IOP-less in all expansion towers, including the primary I/O tower on Model 595 (1.65GHz and 1.9GHz processors). Note that a Model 595 ordered with a 1.65GHz processor and i5/OS V5R4 continue to default a no-charge IOP, even though IOP-less is supported in the primary I/O tower. The marketing configurator defaults to a #9844 on the interface for all Model 595s when a 1.65GHz processor is selected. The #9844 can be deselected if i5/OS V5R4 is also selected.
- ▶ Dual-mode adapters may be used with or without an IOP (IOP-less). They are not supported IOP-less in the system units of Models 520, 550 and 570 with 1.5GHz or 1.65GHz processors, regardless of whether i5/OS V5R4 is ordered or not.
- ▶ IOPs on existing systems (both priced and no-charge features) migrate when doing model upgrades. No-charge IOP features are supported but are not orderable, except as explicitly noted otherwise.

## #2847 PCI IOP for SAN Load Source

PCI IOP for SAN Load Source provides the specialized function required to attach an i5/OS load source via a fibre channel adapter and boot from that load source. The #2847 PCI IOP for SAN Load Source does not support multipath for the i5/OS load source disk unit. It does support multipath for all other logical units (LUNs) attached to this IOP. A minimum of two IOPs are required for enabling redundancy.

The #2847 I/O processor is dedicated to driving a maximum of one IOA from the following list:

- ▶ #2766 PCI Fibre Channel Disk Controller
- ▶ #2787 PCI-X Fibre Channel Disk Controller
- ▶ #5760 PCI-X Fibre Channel Disk Controller

Refer to *iSeries and IBM TotalStorage: A Guide to Implementing external disk on eServer i5*, SG24-7120 for more information.

## #4806 PCI-X Crypto Coprocessor

The #4806 PCI-X Crypto Coprocessor provides both cryptographic coprocessor and secure-key cryptographic accelerator functions in a single PCI-X card. The coprocessor functions are targeted to banking and finance applications. Financial Pin processing and Europay, Mastercard, Visa (EMV) credit card functions are provided. EMV is a standard for integrated-chip based credit cards.

The secure-key accelerator functions are targeted to improving the performance of i5/OS Secure Sockets Layer (SSL) transactions. The #4806 provides the security and performance required to support eBusiness and emerging digital signature applications.

The #4806 provides secure storage of cryptographic keys in a tamper-resistant hardware security module (HSM), which is designed to meet FIPS 140 security requirements. FIPS 140 is a U.S. Government National Institute of Standards and Technology (NIST) administered standard and certification program for cryptographic modules.

The firmware for the #4806 is available is Licensed Program Product 5733-CY1 Cryptographic Device Manager. The firmware CD is ordered and distributed separately from the #4806. The #4806 also requires Licensed Program Product 5722-AC3 Cryptographic Access Provider to enable data encryption.

This feature has country-specific usage.

## #4710/#4810/#9710 PCI Integrated xSeries Server

The #4710, #4810, or #9710 PCI Integrated xSeries Server has a 2 GHz processor and four memory slots. Each server memory slot can contain one of the following features, providing a total main storage capacity from 1024 MB to 4096 MB:

- ▶ 512 MB server memory (#0426/#9726)
- ▶ 1 GB server memory (#0427)

A minimum of two server memory cards are required and must be installed in identical capacity pairs. On model upgrades or MES orders, you may order a #4710/#4810 without memory features if usable supported memory features already exist on the installed system.

The #4710, #4810, or #9710 includes one embedded 100/10 Mbps Ethernet LAN controller. It can support the following LAN IOAs in combination:

- ▶ #2744 PCI 100 Mbps Token Ring IOA
- ▶ #5700 PCI 1 Gbps Ethernet IOA
- ▶ #5701 PCI 1 Gbps Ethernet UTP IOA

You can order the #4710/#4810 without any LAN IOA features.

Up to three IOA LAN features can be supported by the #4710/#4810, depending on the system unit or tower position into which the #4710/#4810 is placed.

Native AS/400 functions are *not* supported.

The #4710, #4810, or #9710 does not support an external host LAN.

## **#4711/#4812/#4813/#9812/#9813 PCI Integrated xSeries Server**

The #4711, #4812, #4813, #9812 and #9813 PCI Integrated xSeries Servers contain a 2 GHz processor with 2MB integrated L2 cache. There are two integrated 1000/100/10Mbps Ethernet ports. Two USB 1.1 ports are included and an additional PC keyboard and mouse port.

There are two memory slots that must always contain a pair of identical memory features. Total memory can be either 1GB or 2GB.

The #4811, #4812, #4813 are functionally identical with some physical differences depending on the model in which they are used. The #9812 and #9813 are functionally identical to the #4812 and #4813, but are included in the base with orders for Enterprise editions on Models 550, 570 and 595.

The PCI Integrated xSeries Server requires an #2844, #9744, or #9844 Base PCI IOP to drive it. The IOP can be shared, but only one PCI Integrated xSeries Server is permitted per IOP.

The Integrated xSeries Server does not support any other LAN features and does not support native i5/OS functions.

For Linux server products supported, see:

<http://www.ibm.com/eserver/iserries/integratedxseries/linux>





## Lotus products for System i5

Lotus Domino for iSeries is the leading groupware solution available for the System i5 server. It provides unparalleled capability for System i5 clients to use their business data in collaborative solutions for On Demand Business, both within their organizations and with their partners over the Internet. Lotus Domino for iSeries provides a critical foundation as companies begin to move from “information overload” into organizational learning and knowledge management. No competitive product offers the ease of use, low cost of ownership, tight integration, and positioning for the future that Lotus Domino for iSeries delivers. Lotus Domino for iSeries is offered with familiar iSeries and AS/400e terms and conditions for purchase, services, and support.

IBM Lotus Domino is the brand name for the server component in a family of integrated messaging, collaboration, and Web application software from IBM. Domino is a software, a framework, and an infrastructure that connects your business to anyone, anywhere, anytime.

Domino is designed for growing organizations that need to improve customer responsiveness and streamline business processes. Electronic business-to-business communication, which was once a luxury, is now a necessity. Electronic mail has become an important application. Web-enabling your business (On Demand Business) is a requirement to remain competitive in the marketplace.

IBM and Lotus work in partnership to offer solutions for today's business environment by combining the strengths of Lotus Domino collaborative software

and System i5 hardware. The combination of Lotus Domino and the System i5 server delivers a highly scalable and reliable infrastructure for e-collaboration. Lotus Domino for iSeries enables existing System i5 clients to build and deploy messaging, mail, and collaborative applications on the same system as their enterprise applications and data.

For clients who are looking to reduce their service delivery cost by eliminating server farms and consolidating to a single platform, System i5 delivers the scalability and reliability to support thousands of users and applications.

This chapter highlights the following IBM products that are offered by Lotus Software.

Product name	Product number	Refer to page
Lotus Domino 6 Message Server	Licensing option	280
Lotus Domino 6 Enterprise Server	Licensing option	280
Lotus Domino 6 Utility Server	Licensing option	280
IBM Lotus Domino Collaboration Express offering	Licensing option	278
IBM Lotus Domino Utility Server Express offering	Licensing option	278
IBM Lotus Domino 6.5 for iSeries	5733-L65	281
Lotus Domino client	Varies	282
IBM Lotus Enterprise Integrator® for iSeries	5733-LEI	284
IBM Lotus Instant Messaging and Web Conferencing for iSeries	5733-LST	285
IBM Lotus Team Workplace for iSeries	5733-LQP	285
IBM Lotus Domino Document Manager	5769-LDD	286
IBM Integrated Domino Fax for iSeries	5733-FXD	286

Refer to *Lotus Domino for the IBM @server iSeries Server Buying and Selling Guide*, REDP-3845, to further understand Domino solutions for the iSeries server.

## Domino on iSeries

A Domino on iSeries solution provides a compelling case for using the iSeries as the Domino server of choice. Of particular interest to Domino users are:

- ▶ Reliability

The stability of the iSeries hardware and software coupled with the iSeries architecture, which logically insulates applications from one another, promotes uninterrupted performance.

- ▶ Availability

Centralized backup and recovery for applications and data and the ability to run multiple partitioned Domino servers (DPARs) on one physical iSeries server leads to increased system availability.

- ▶ Scalability

The iSeries server product line allows for nondisruptive growth from a uni-processor to a 32-way system on the same operating system, using the same skill sets.

- ▶ Server efficiency

iSeries servers feature system management capabilities that allow processor resources to be highly used. Servers that lack these capabilities lead to server farms of poorly used systems.

- ▶ Server consolidation

Multiple physical Domino servers can be consolidated into one iSeries server, and additional users can be catered for without additional servers. This saves cost and eases the management environment. Local area network (LAN) traffic declines as Domino servers communicate over the virtual Ethernet within the iSeries hardware.

- ▶ Integration

Domino for iSeries is designed to integrate with many of the built-in Operating System/400 (OS/400) services including security, backup and recovery, systems management, iSeries Navigator, Java virtual machine (JVM), and IBM DB2 Universal Database (UDB) for iSeries. Furthermore, the iSeries is the only server that allows deployment of Linux, Java, UNIX, Windows, AIX 5L and Domino-based applications on a single server.

## Domino server options

Lotus Domino for iSeries is a powerful, popular, versatile, and integrated groupware product from Lotus Software. It provides functions that include e-mail, workflow-based computing, and the integration and management of both structured and unstructured data. Domino is a *server* product that runs on a variety of platforms, providing easy-to-manage interpretability in a heterogeneous network.

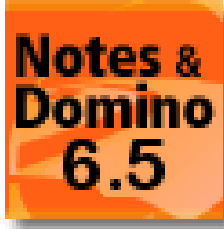
Versions of IBM Lotus Domino prior to Version 6 are not supported at i5/OS V5R3. Lotus Domino 6 for iSeries includes five separately orderable components, as represented in the following table.

Domino Server Options	Description
IBM Lotus Domino Messaging Server	IBM Lotus Domino Messaging Server combines full support for the latest Internet mail standards with Domino's state of the art messaging and calendaring capabilities, all in one manageable and reliable package.
IBM Lotus Domino Enterprise Server	IBM Lotus Domino Enterprise Server includes all functions of the messaging server, plus support for custom intranet and Internet applications, and partitioning and clustering technology for high availability.
IBM Lotus Domino Utility Server	IBM Lotus Domino Utility Server is an application server license option that includes unlimited access to non-mail applications. Entitlement to messaging capability is <i>not</i> available with this option.
IBM Lotus Domino Utility Server Express offering	The IBM Lotus Domino Utility Server Express offering is powered by the Domino Enterprise Server. It provides unlimited access to collaborative applications, but does not allow the use of individual mail files. Clients can choose to access their Domino applications through a Web browser or via a separately purchased Lotus Notes® client. IBM Lotus Domino Utility Server Express makes applications available to users who are internal to that organization and to external users. Access is allowed for individually authenticated and anonymous users.
IBM Lotus Domino Collaboration Express offering	The IBM Lotus Domino Collaboration Express offering is powered by the Domino Enterprise Server and allows clients to use both the messaging and collaborative capabilities of Domino. Clients can choose to access Domino via Lotus Notes or Lotus Domino Web Access (iNotes™) clients for both e-mail and collaborative applications.



**IBM Lotus Domino 6.5 for iSeries (5733-L65)**

With the delivery of Domino 6.5 Lotus continues to play a major role in the On Demand Business revolution. To meet the challenges of business globalization, frequent mergers and acquisitions, and the increasing demand for Web-based business tools, Lotus has combined both evolution and innovation in its latest upgrade of Domino server technology. The features in Domino 6.5 build on the features in previous releases to address rapidly changing industry trends and meet their challenges directly.

Ordering product number	5724-E70	
Minimum operating system level	OS/400 V5R1	
Software type	Software Maintenance	
Installation prerequisites	<a href="http://www.lotus.com/products/product4.nsf/wdocs/65dominosysrequirements">http://www.lotus.com/products/product4.nsf/wdocs/65dominosysrequirements</a> <a href="http://www-10.lotus.com/1dd/notesua.nsf/RN?OpenView">http://www-10.lotus.com/1dd/notesua.nsf/RN?OpenView</a>	
Related products	IBM Integrated Domino Fax for iSeries (5733-FXD) Lotus Enterprise Integrator (LEI) (5733-LE1)	
Replaces product	Lotus Domino Server for iSeries R5	
Ordering	Domino 6 is orderable through standard Lotus channels only.	
Further information	<a href="http://www.ibm.com/software/howtobuy">http://www.ibm.com/software/howtobuy</a> <a href="http://www.ibm.com/servers/eserver/iseries/domino/">http://www.ibm.com/servers/eserver/iseries/domino/</a> <a href="http://www.lotus.com/products/r5web.nsf/webpi/Domino+for+iSeries/">http://www.lotus.com/products/r5web.nsf/webpi/Domino+for+iSeries/</a> <a href="http://www.lotus.com/1dd/domino6">http://www.lotus.com/1dd/domino6</a>	

## Domino Notes client choices

The choice of clients supported by Domino for iSeries are represented in the following table.

Lotus Notes clients	Description
IBM Lotus Domino Access for Microsoft Outlook®	IBM Lotus Domino Access for Microsoft Outlook allows Microsoft Outlook users to access e-mail and calendar features based on Lotus Domino.
IBM Lotus Domino Web Access (iNotes)	IBM Lotus Domino Web Access extends Domino messaging and collaboration, personal information management (PIM), and offline services to Web browsers clients.
IBM Lotus Notes for Messaging	IBM Lotus Notes for Messaging is a license-only Lotus Notes client option with capability limited to messaging, calendar, and discussions. The degree of function available to the user is controlled by the administrator via a parameter in the Domino Directory.
IBM Lotus Notes for Collaboration	IBM Lotus Notes for Collaboration is a full-function integrated client for messaging, calendar, and discussions, plus the capability to use custom Domino applications.
Domino Administrator	Domino Administrator is the Win32® graphical interface for administration and management of the Domino environment, including registration of users and servers. It is provided with the Domino server and with the Domino Designer® client. It is not available separately.
Domino Designer	Domino Designer is the interactive, Win32 graphical development environment for creation of powerful intranet and Internet applications. The Domino Designer client option also includes Lotus Notes for Collaboration and Domino Administrator.

### New with Lotus Domino Client 6.5

The clients provided for Domino build upon previous clients. They include such enhancements as:

- ▶ Single access point for Lotus Notes users  
Improve productivity by providing unified access to the tools, tasks, and people with whom users work. There is also an introduction to portals.

- ▶ Lotus Instant Messaging integration

Single signon gives users the ability to view and manage online status and be aware of a colleagues presence through online status indicators while users remain within the context of a e-mail or task.
- ▶ Enablement of applications to start IBM Lotus Instant Messaging via application integration
- ▶ Follow up

You have the ability the mark e-mails with a follow up flag (high, normal, or low) to indicate further action is necessary. Alarms can be set for a specific date and time, including e-mail notifications. The inbox can be sorted via the follow-up priority flags.
- ▶ Inbox management features


Anti-spam features block e-mails from specified senders reducing junk mail. A QuickRules option on the Tools menu automates the creation of rules by populating sender, domain, and subject from selected messages.
- ▶ Further productivity features

You have the ability to drag and drop e-mails from the inbox view to the calender. You can view only unread mail in the inbox view by toggling the message on and off. A facility is included to allow Lotus Notes to be set as the default mail client, so that when users click a mailto: link on a Web page, a new message window is automatically open in Notes.
- ▶ Linux client support via a Mozilla browser in Lotus Domino Web Access (iNotes)
- ▶ Lotus Domino Web Access 6.5 integration of Lotus Instant Messaging functionality and an increased feature parity with Lotus Notes
- ▶ Changes to Lotus Domino Access for Microsoft Outlook

The new architecture uses open Internet standards (IMAP/Simple Mail Transfer Protocol (SMTP)/iCAL), with improved scalability, lower resource use, and a more solid solution. It also supports Outlook 2000 and 2002 clients.

Refer to the following Web site for information about Domino client choices:

<http://www.lotus.com/engine/jumpages.nsf/wdocs/products>

<b>IBM Lotus Enterprise Integrator 6.5 for iSeries (5733-LEI)</b>		
<p>The Lotus Enterprise Integrator (LEI) is a server-based product that provides data movement between DB2 UDB for iSeries and Domino with no programming required. LEI allows the exchange of data with the integrated file system (IFS) of the iSeries and Enterprise Resource Planning (ERP) applications. Domino forms-based interfaces are used to map fields in a Domino database to columns in a DB2 table. Lotus Enterprise Integrator takes care of the movement and conversion of data between the data sources.</p>		
Ordering product number	5724-E89	
Minimum operating system level	OS/400 V5R1	
Software type	Software Maintenance	
Related product	Lotus Domino Enterprise Server for iSeries (5733-LD6)	
Replaces product	IBM Lotus Enterprise Integrator for Domino R5 (5769-LNP)	
Ordering	LEI is orderable through standard Lotus Channels only.	
Further information	<a href="http://www.lotus.com/products/product4.nsf/wdocs/enterpriseintegrator/">http://www.lotus.com/products/product4.nsf/wdocs/enterpriseintegrator/</a> <a href="http://www-1.ibm.com/servers/eserver/iseriess/domino/related/lei.htm">http://www-1.ibm.com/servers/eserver/iseriess/domino/related/lei.htm</a>	

The following table shows the Domino and LEI release compatibility.

<b>LEI for iSeries versions and updates</b>	<b>Compatible Domino releases</b>
LEI 6.5.1 for iSeries	Domino 6.5.1
LEI 6.5.0 for iSeries	Domino 6.5.0 and Domino 6.0.3
LEI 6 for iSeries	LEI 6.0.1 for Domino 6.0.1, LEI 6.0.2 for Domino 6.0.2

**IBM Lotus Instant Messaging and Web Conferencing (5733-LST)**

Lotus Instant Messaging and Web Conferencing is real-time collaboration software, with online awareness, instant messaging, application sharing and virtual meetings. Lotus Instant Messaging and Web Conferencing helps your organization be more responsive and more efficient by allowing your employees, customers, partners, and suppliers to easily interact with one another in real-time.

Real-time collaboration is a natural extension to e-mail. You not only chat with colleagues, but you use the Web to improve customer service, reduce travel costs, and create communities among your employees, customers, partners, and suppliers.

The product is also included within WebSphere Portal - Express Plus. WebSphere Portal - Express Plus is included with the Enterprise Edition of the Models 520, 550, 570, and 595 as well as the Solutions Edition of 550.

Minimum operating system level	OS/400 V5R1
Software type	Software Maintenance Passport Advantage
Installation prerequisites	<a href="http://www.ibm.com/eserver/series/sametime/sysreq.html">http://www.ibm.com/eserver/series/sametime/sysreq.html</a>
Related products	IBM Lotus Domino 6 for iSeries (5733-LD6) IBM Lotus Domino 6.5 for iSeries (5733-L65) IBM Lotus Team Workplace (QuickPlace) (5733-LQP)
Replaces product	None
Ordering	Through standard Lotus channels or free with the Enterprise Edition of Models 825, 870, and 890
Further information	<a href="http://www.ibm.com/eserver/series/sametime">http://www.ibm.com/eserver/series/sametime</a> <a href="http://www.lotus.com/sametime">http://www.lotus.com/sametime</a> <a href="http://www.lotus.com/1dd">http://www.lotus.com/1dd</a>

**IBM Lotus Team Workplace for iSeries (5733-LQP)**

IBM Lotus Team Workplace (QuickPlace) is the Web-based solution for creating team work spaces for collaboration. The product is also included within WebSphere Portal - Express Plus. WebSphere Portal - Express Plus is included with the Enterprise Edition of the Models 520, 550, 570, and 595 as well as the Solutions Edition of the 550. For more information about WebSphere Portal Express Plus, refer to "IBM WebSphere Portal - Express, IBM WebSphere Portal - Express Plus for Multiplatform, Version 5 (5724-E77)" on page 651.

Minimum operating system level	OS/400 V5R1
Software type	Software Maintenance Passport Advantage

<b>IBM Lotus Team Workplace for iSeries (5733-LQP)</b>	
Installation prerequisites	<a href="http://www.ibm.com/eserver/series/quickplace/sysreq.htm">http://www.ibm.com/eserver/series/quickplace/sysreq.htm</a>
Related products	IBM Lotus Domino 6.5 for iSeries (5733-L65) IBM Lotus Instant Messaging and Web Conferencing (5733-LST)
Further information	<a href="http://www.ibm.com/eserver/series/quickplace">http://www.ibm.com/eserver/series/quickplace</a> <a href="http://www.lotus.com/quickplace">http://www.lotus.com/quickplace</a> <a href="http://www.lotus.com/ldd">http://www.lotus.com/ldd</a>

<b>IBM Lotus Domino Document Manager (5769-LDD)</b>	
IBM Lotus Domino Document Manager (Domino.Doc®) brings scalable, flexible document Management capabilities to Domino. It extends the concept of a shared document library via an open, Web accessible, distributed, and collaborative environment.	
Minimum operating system level	OS/400 V4R5
Availability	July 2004
Software type	Software Maintenance Passport Advantage
Installation prerequisites	<a href="http://www-1.ibm.com/servers/eserver/series/domino/related/domdoc.htm">http://www-1.ibm.com/servers/eserver/series/domino/related/domdoc.htm</a>
Related products	IBM Lotus Workflow™ IBM Instant Messaging and Web Conferencing
Replaces product	None
Ordering	Through standard Lotus channels
Further information	<a href="http://www.lotus.com/products/domdoc.nsf/content/domdohomepage">http://www.lotus.com/products/domdoc.nsf/content/domdohomepage</a>

<b>IBM Integrated Domino Fax for iSeries (5733-FXD)</b>	
IBM Integrated Domino Fax for iSeries enables Lotus Notes users to send and receive faxes directly from their Notes client, using their current telephone system and Domino infrastructure. Domino Fax for iSeries supports more than just simple text. Notes memos containing rich text and graphics can also be faxed. Files attached to Notes memos can also be formatted and faxed. In addition with the Print-to-Fax driver (available for download at no charge), Notes users can send faxes directly from within a Microsoft Windows application, such as word processing or spreadsheet software.	

IBM Integrated Domino Fax for iSeries (5733-FXD)	
Minimum operating system level	OS/400 V5R1
Software type	Software Subscription
Installation prerequisites	<a href="http://www-1.ibm.com/servers/eserver/series/domino/related/fxd/">http://www-1.ibm.com/servers/eserver/series/domino/related/fxd/</a>
Related product	Lotus Domino 6 for iSeries
Replaces product	Lotus Fax for Domino V4R1
Ordering	IBM Licensed Program Product. Not available through Passport Advantage.
Further information	<a href="http://www-1.ibm.com/servers/eserver/series/domino/related/fxd/">http://www-1.ibm.com/servers/eserver/series/domino/related/fxd/</a>









# IBM Application Development Licensed Program Products

Business leaders who are looking to solve business problems with automation start by choosing an application to fit their business goals and needs. System i5 clients worldwide have tens of thousands of proven business applications from which to select. Application development is an undeniable strength of the System i5 server. This strength is based on the support for traditional and On Demand Business development provided in the i5/OS operating system.

This chapter describes today's application development Licensed Program Offerings (LPOs). It focuses on the key tools for application development for the System/i5 client. To understand this and how to develop new business value then the iSeries Developers RoadMap can be found at:

<http://www-03.ibm.com/servers/eserver/series/roadmap/index.html>


To learn about the IBM On Demand Business strategy for the System/i5, refer to *WebSphere for IBM @server iSeries Server Buying and Selling Guide*, REDP-3646. See Chapter 26, "Web collaboration and WebSphere" on page 325, to understand the strength of the WebSphere family of products.

**Tip:** As an operating system (AIX within OS/400) and an application development suite (AIX/UNIX application development for OS/400), OS/400 Portable Application Solutions Environment (PASE) gives application providers a path to the System/i5 product line. Refer to “OS/400 PASE” on page 261 for a description of OS/400 PASE.

Product name	Product number	Refer to page
IBM CICS Transaction Server for iSeries	5722-DFH	290
IBM WebSphere Application Server Version 5.1 for iSeries Developer Edition	5724-D18	330
IBM Java for iSeries IBM Toolbox for Java IBM Developer Kit for Java	5722-JC1 5722-JV1	291 292
IBM WebSphere Development Studio for iSeries Server components: Application Development ToolSet ILE RPG ILE COBOL ILE C ILE C++ Workstation components: IBM WebSphere Development Studio Client for iSeries, V6.0  IBM WebSphere Development Studio Client Advanced Edition for iSeries V6.0	5722-WDS          5722-WDS (Standard client is free with entitlement)  (Advanced client is offered via the Passport Advantage channel)	294  295 294 295 295 295 296 297  298
IBM XML Toolkit for iSeries	5733-XT1	291


#### IBM CICS Transaction Server for iSeries (5722-DFH)


The Customer Information Control System (CICS) platform is widely used as a basis for implementing business solutions. The CICS architecture defines a common programming interface and inter-system communications between various systems. Because of this architecture, CICS Transaction Server for iSeries enables many of these applications to be made available on the iSeries server without excessive costs of code conversion. CICS applications and data can coexist with iSeries applications and data.


<b>IBM CICS Transaction Server for iSeries (5722-DFH)</b>		
Minimum operating system level	OS/400 V5R2	
Replaces Product	CICS Transaction Server for iSeries (5722-DFH) (V5R1) CICS for AS/400 (5769-DFH)	
Further information	<a href="http://www-306.ibm.com/software/htp/cics/">http://www-306.ibm.com/software/htp/cics/</a> <a href="http://publib.boulder.ibm.com/infocenter/series/v5r3/topic/rzahg/rzahgcics.htm">http://publib.boulder.ibm.com/infocenter/series/v5r3/topic/rzahg/rzahgcics.htm</a>	

<b>XML Toolkit for iSeries (5733-XT1)</b>	
XML is widely touted as a solution to the problem of information exchange between applications and within B2B environments. It is simple, extensible, and non-proprietary. XML parser APIs assist in the creation, navigation, or modification of XML document content.	
Minimum operating system level	OS/400 V5R1
Replaces product	XML parsers service programs QXML4C310 and QXMLPR310
Further information	<a href="http://www.ibm.com/servers/eserver/series/software/xml">http://www.ibm.com/servers/eserver/series/software/xml</a>

<b>IBM Toolbox for Java (5722-JC1)</b>
IBM Toolbox for Java is a set of Java classes that allow you to write Java applications, applets, and servlets to access data on your System/i5 server. IBM Toolbox for Java also provides a set of graphical user interface (GUI) classes. These classes use the access classes to retrieve data and then present the data to the user.

IBM Toolbox for Java (5722-JC1)		
Ordering product number	Included with 5722-SS1	
Minimum operating system level	OS/400 V5R1	
Further information	<a href="http://www-03.ibm.com/servers/eserver/series/toolbox/">http://www-03.ibm.com/servers/eserver/series/toolbox/</a>	

IBM Developer Kit for Java (5722-JV1)	
<p>IBM Developer Kit for Java facilitates the creation of Java applets and full-scale applications. It includes a collection of development tools, help files, and documentation for Java programmers. As Sun Microsystems, Inc. rolls out new Java technologies and provides updates, the Developer Kit is also updated. System i5 support of Java is planned to be made available over several releases, and applications written using the Developer Kit are portable.</p> <p>The System/i5 supports multiple Java 2 Software Developer Kit (SDK) (J2SDK) Standard Editions. It also supports the use of multiple JDKs simultaneously, but only through multiple JVMs. A single JVM runs one specified JDK. Find the JDK to be used and select the coordinating option to be installed. More than one JDK can be installed at one time. The java.version system property determines which JDK to run. After a JVM is up and running, changing the java.version system property has no effect.</p> <p>There is a new 32-bit version of the JVM intended to help ISV portability. It should also help memory usage and could improve Java application performance.</p>	
Further information	

<b>IBM WebSphere Development Studio for iSeries (5722-WDS)</b>		
<p>WebSphere Development Studio for iSeries is an integrated, comprehensive suite of application development tools for both On Demand Business and traditional iSeries development. It is the pervasive iSeries development tool set containing both server and workstation components that are optimized for iSeries development. With this product new iSeries server applications and new applications for On Demand Business can be created. It is also easy to convert existing business applications to Web-enabled solutions.</p>		
Ordering	5722-WDS	 <p><b>IBM WebSphere Software</b></p>
Minimum operating system level	OS/400 V5R4	
Replaces products	<p>5769-CB1 ILE COBOL for AS/400            5769-CL2 VA RPG and CODE/400            5769-CL3 WebSphere Development Tools for AS/400            5769-CX2 ILE C for AS/400            5769-CX5 VisualAge for C++ for AS/400            5799-GDW ILE C++ for AS/400 PRPQ            5769-PW1 Application Development ToolSet for AS/400 (ADTS)            5769-RG1 ILE RPG for AS/400</p> <p><b>Note:</b> Clients with Software Subscription can upgrade, at no additional charge, to 5722-WDS from any of the products listed, except 5799-GDW.</p>	
Further information	<p><a href="http://www-306.ibm.com/software/awdtools/wds400/">http://www-306.ibm.com/software/awdtools/wds400/</a>  <a href="http://www-306.ibm.com/software/awdtools/library/">http://www-306.ibm.com/software/awdtools/library/</a></p>	

The following diagram shows the server (host) and workstation (client) components of WebSphere Development Studio 6.0.1. The workstation components are those included with the “base” client.



A description of the host and workstation components of WebSphere Development Studio are highlighted in the following sections.

## Server components of 5722-WDS

The host (server-based programming tools) components of WebSphere Development Studio include:

- ▶ IBM Integrated Language Environment RPG for iSeries
- ▶ IBM Integrated Language Environment Cobol for iSeries
- ▶ IBM Integrated Language Environment C and C++ for iSeries
- ▶ Application Development ToolSet

### IBM Integrated Language Environment RPG for iSeries

RPG is the most popular language for writing iSeries business logic due to its ease of use and tight integration with the server.

ILE RPG for iSeries is designed for writing various types of application programs. This language is easy to learn, yet offers many advanced functions for experienced programmers. It delivers RPG IV, the next evolution of the programming language. The RPG IV compiler offers improved programmer productivity and application growth and quality. Previous versions of the RPG are shipped as options.

For a list of the current and previous enhancements to the RPG compiler, see:

[http://www-306.ibm.com/software/awdtools/wds400/about/ile\\_rpg.html](http://www-306.ibm.com/software/awdtools/wds400/about/ile_rpg.html)

## **IBM ILE COBOL for iSeries**

Cobol is popular language for writing iSeries business logic because of its ease of use and integration with the system. ILE COBOL for iSeries is a programming language that is used in the processing of business problems. COBOL can be used to manipulate DB2 Universal Database (UDB) for iSeries database files in a relatively simple way. COBOL uses English-like syntax to assist the programmer in generating self-documenting, structured programming constructs. Previous versions of Cobol are shipped as options

For a list of current and previous enhancements to the COBOL compiler, see:

[http://www-306.ibm.com/software/awdtools/wds400/about/ile\\_cobol.html](http://www-306.ibm.com/software/awdtools/wds400/about/ile_cobol.html)

## **ILE C**

The ILE C compiler is a high-performance, high-function compiler for C development on the System i5 platform. It provides a combination of function-rich C programming and the power of Integrated Language Environment (ILE). ILE gives fast calls and a uniform run-time model which are definite benefits for call-intensive C programming

## **ILE C++**

The C++ compiler provides additional features not found in the C language. These features include additional keywords, parameterized types (templates), support of object-oriented programming via classes, and stricter type checking.

With the ILE C++ Compiler, you can develop object-oriented, mission-critical applications for the System i5 server. You can take advantage of the object-oriented technology, such as data encapsulation and code reuse, to quickly design and adapt applications for changing business needs

For a list of the current and previous enhancements to the C and C++ compilers, see:

[http://www-306.ibm.com/software/awdtools/wds400/about/ile\\_ccpp.html](http://www-306.ibm.com/software/awdtools/wds400/about/ile_ccpp.html)

## **Application Development ToolSet**

Application Development ToolSet (ADTS) is the traditional tool suite for System i5 application development programmers. These tools are included in the package so that existing System i5 programmers can more easily make the shift to the new development tools and environment.

ADTS contains these utilities:

- ▶ Programming Development Manager (PDM)
- ▶ Source Entry Utility (SEU)

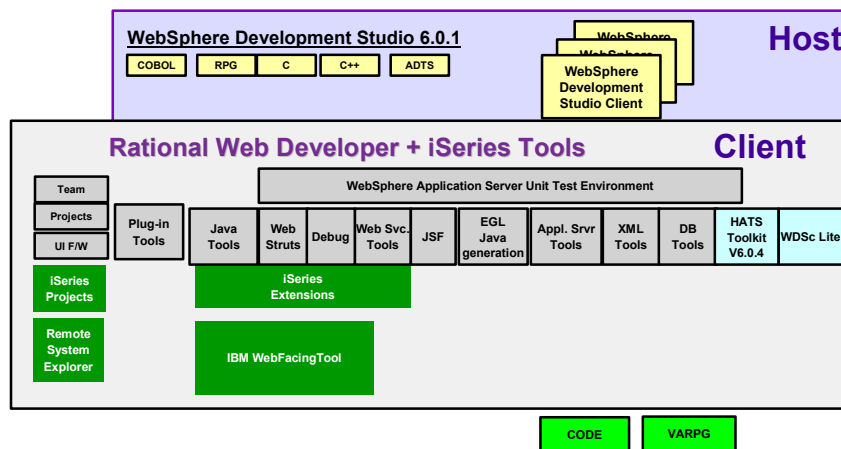
- ▶ Screen Design Aid (SDA)
- ▶ Report Layout Utility (RLU)
- ▶ Data File Utility/Application Development (DFU/AD)
- ▶ File Compare and Merge Utility (FCMU)
- ▶ Interactive Source Debugger (ISDB)

## Workstation components of 5722-WDS

The WebSphere Development Studio client for iSeries is a free entitlement with WebSphere Development Studio for iSeries. New orders of 5722-WDS are entitled to the V6.0 workstation tools. Existing V5R3 5722-WDS customers who have a current iSeries SW Maintenance contract may upgrade to V6 by ordering 5722-WDS #2656. The workstation product is also available via Passport Advantage as 5724-A81. The workstation tools contained are:

- ▶ WebSphere Development Studio Client refresh pack V6.0.1
- ▶ Rational Web Developer refresh pack V6.0.1
- ▶ Remote System Explorer
- ▶ i5/OS plugins for Java, Web and Web Services
- ▶ IBM Webfacing Tool
- ▶ Host Access Transformation Toolkit V6.0.4
- ▶ 5/OS debugger
- ▶ separate installation of CODE and VARPG

The following diagram shows the workstation (client) and server (host) components of WebSphere Development Studio.





**Note:** You must have i5/OS V5R4 for the server portion of WebSphere Development Studio. The V6.0.1 client can work with OS/400 V5R2, i5/OS V5R3 or V5R4. The C++ compiler requires a machine capable of running OS/400 PASE and Option 33 of OS/400 (5722-SS1).

## **IBM WebSphere Development Studio Client for iSeries, V6.0.1**

WebSphere Development Studio Client for iSeries leverages the capabilities of Rational Web Developer to optimize and simplify Web application development.

Remote Systems Explorer provides System i5 system access similar to PDM for the editing, compiling and debugging of System i5 applications. The improved development capabilities of this environment provide the upgrade path for those more familiar with SEU and PDM.

iSeries Java Tools are included offering improved Program Call Markup Language (PCML) support and a new feature in the Program Call Wizard allowing authentication and library list settings to be defined in a separate configuration file for greater flexibility.

The iSeries integrated debugger delivers support for end- to-end debugging of Web applications plus enhanced integration with RSE.

The tools also include the IBM Web Facing Tool, which is a source-code based application transformation development tool. New web settings simplify customizing of Web-enabled interfaces to 5250 applications to make them look and feel like native Web applications. Web-enabled applications run in batch mode with no OLTP requirement.

The tool has been updated to include extensions to allow Web-enabled applications created with the WebFacing tool to interoperate with a 5250 application in a browser using IBM Host Access Transformation Server (HATS).

The HATS Toolkit (V6.0.4) quickly and easily generates a default dynamic runtime transformation of the 5250 data stream with no requirement for 5250 OLTP capacity at V5R4. The resulting Web interface can also be customized with the HATS Toolkit. The Web interface can be deployed to production with the purchase of HATS separately.

For a detailed comparison of the IBM WebFacing Tool and the HATS Toolkit, see:

<http://www-306.ibm.com/software/awdtools/wdt400/about/compareWebFacingHats.html>

## WebSphere Development Studio Client Advanced Edition for iSeries V6.0.1

WebSphere Development Studio Client Advanced Edition for iSeries contains all the features of the base client, with the following extensions:

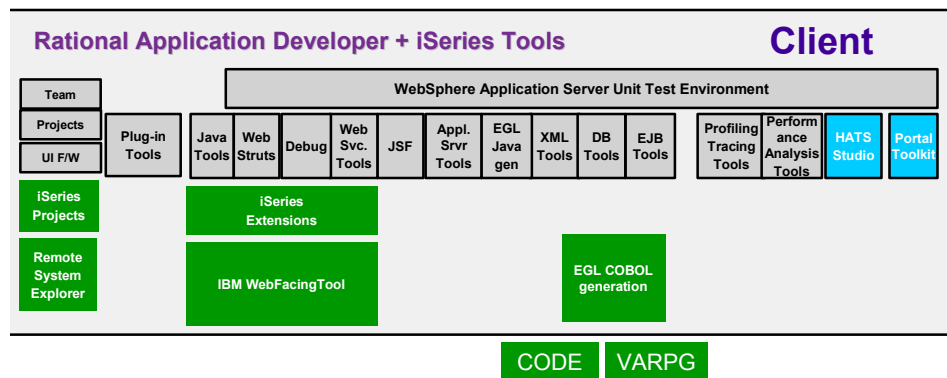
- ▶ Extension of the Web Facing Tool to include Single signon enabling users to access more than one application and multiple platforms using one ID and password.
- ▶ Portal support allowing the generation of Struts-based portlet applications or add a WebFacing portlet to an existing non-Struts based portlet project.
- ▶ System Screen support to allow developers to include System i5 system screens in their Web enablement.

Additional capabilities include the J2EE development environment and Enterprise Java Bean support. For a full comparison, see:

[http://www-306.ibm.com/software/awdtools/wdt400/about/WDSC\\_featureList.html](http://www-306.ibm.com/software/awdtools/wdt400/about/WDSC_featureList.html)

The following diagram shows the workstation (client) components of WebSphere Development Studio Client Advanced Edition for iSeries V6.0.1

### WebSphere Development Studio Client Advanced Edition V6.0.1



### **Web technology choices**

The following table may be used for selecting an appropriate tool within IBM Development Studio Client Advanced Edition to provide business solutions. Find

the objective in the first column of the table that most closely matches your goal and review the technology choice that can help you achieve the goal.

Your goal	Technology	Features
Quickly Web-enable existing interactive System i5 applications	IBM WebFacing Tool	Converts a display file (DSPF) DDS to JSPs built on struts
Build Web applications with System i5 business logic	iSeries Web Tools	Wizards and Web components for building JSP files that provide a user interface for System i5 business logic; build on Struts
Build Web applications with System i5 data	JavaServer Faces (JSF)	Rich tagging choices for user interface; strategic choice for data-driven applications that have little business logic; emerging technology (a potential follow-on to Struts)
Build Web applications with System i5 data, moving more user interface logic to the client	JSFs with client-side scripting	Provides better response times by reducing trips to the server; validation and formatting is done on the client; uses JSF extensions
Build Web applications with Java business logic	Struts and Struts tools	Rich tagging choices for model-controller; leverages JSPs for the user interface
Encapsulate your applications from future technology changes and enable them for multiple platforms	Enterprise Generation Language (EGL)	Fourth generation language (4GL); abstracts your applications at a higher level and generated the appropriate Java (standard edition) or iSeries COBOL code (Advanced Edition only); leverages JSF; learning time relatively short for COBOL or RPG programmers

## Easy/400

Easy/400 is an Open Source Site that provides free tools that enable RPG and COBOL programmers to develop full rational e-business solutions by exploiting their current skills. These tools are delivered with their source. Easy/400 can be found at:

<http://www-922.ibm.com/en?>





## IBM Networking and communications licensed program products

Access to network resources is a fundamental requirement for today's business environment. This chapter identifies the optional Licensed Program Products (LPP) that serve to connect users to the IBM System i5 or to link the System i5 to a network. It also lists licensed programs that support secure network access.

Product name	Product number	Refer to page
IBM WebSphere MQ for iSeries, V5.3	5724-B41	303
IBM Communications Utilities for iSeries	5722-CM1	302
IBM Cryptographic Support for AS/400	5722-CR1	302
IBM MQSeries Integrator for iSeries and DB2 Version 1.1	5697-F49	303
IBM Facsimile Support for iSeries	5798-FAX	302
IBM WebSphere Host Integration Solution for iSeries V5	5724-J97 / J98	303

**IBM Cryptographic Support for AS/400 (5722-CR1)**

Cryptographic Support for AS/400 is a legacy product designed to be functionally equivalent to the cryptographic facilities of the IBM 4700 Finance Controller. Cryptographic Support for AS/400 supports the following functions:

- ▶ Data encryption/decryption using the Data Encryption Standard (DES) and 56-bit keys
- ▶ Message Authentication Code generation and verification using DES
- ▶ Key management
- ▶ 3624 Personal Identification Number (PIN) generation and verification

Minimum operating system level	OS/400 V5R1
Related product	None
Replaces product	None

**IBM Communications Utilities for iSeries (5722-CM1)**

The Communications Utilities for iSeries comprise the MVS/VM bridge and Remote Job Entry (RJE) functions. These capabilities provide the interchange of mail and files and the submitting or receiving of jobs between connected systems.

Minimum operating system level	OS/400 V5R1
Installation prerequisites	None
Related product	None
Replaces product	None

**IBM Facsimile Support for iSeries (5798-FAX)**

Facsimile Support for iSeries provides the base product enablers to fax System i5 or PC output (such as text, images, or graphics) and to receive incoming faxes. Integration of the product with the OS/400 Mail Server Framework allows users of various electronic mail services to exchange mail. The integration allows electronic mail to be sent to a fax machine as easily as it is sent to another computer.

Minimum operating system level	OS/400 V5R1
Installation prerequisites	None
Related product	None
Further information	<a href="http://www.ibm.com/iseries/fax400">http://www.ibm.com/iseries/fax400</a>

**IBM WebSphere MQ for iSeries V5.3 (5724-B41)**

IBM WebSphere MQ for iSeries provides an open, scalable, industrial-strength messaging backbone which supports high volume throughput, time-independent communication, with assured one-time delivery. To this, WebSphere MQ V5.3 adds enhanced security via SSL support, enhanced performance especially for Java Message Service (JMS) applications and other new features that enhance system scalability and reliability.

Minimum operating system level	OS/400 V5R1
Software type	Passport Advantage One-year subscription (5733-M27) Three-year subscription (5733-M28)
Replaces product	MQSeries for iSeries V5.2 5733-A38
Further information	<a href="http://www.ibm.com/software/ts/mqseries/messaging/">http://www.ibm.com/software/ts/mqseries/messaging/</a>

**IBM WebSphere Host Integration Solution for iSeries V5 (5724-J97/J98)**

IBM WebSphere Host Integration Solution (HIS) for IBM System i5 can enable virtually every user to access your mission-critical business systems, independent of the platform, network, connectivity, or host system. It includes the following:

- ▶ IBM Communications Server for Linux V6.2
- ▶ IBM Communications Server for AIX V6.1
- ▶ IBM Communications Server for Windows V6.1.2
- ▶ IBM Personal Communications V5.8 for Windows
- ▶ WebSphere Studio Site Developer (WSSD), V5.1
- ▶ WebSphere Development Studio Client for iSeries (WDSi), V5.1
- ▶ WebSphere Applications Server - Express (Application Server - Express) V5.1
- ▶ IBM WebSphere Host On-Demand V9.0
- ▶ IBM WebSphere Host Access Transformation Services (HATS) V5.0

Further information	<a href="http://www.ibm.com/software/webservers/hostintegration/">http://www.ibm.com/software/webservers/hostintegration/</a>
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## IBM eServer iSeries Access products

IBM @server iSeries Access Family (5722-XW1) provides the middleware software to connect other systems and platforms to System i5 servers. This chapter describes the iSeries Access products.

Product name	Product number	Refer to page
IBM @server iSeries ODBC Driver for Linux	5733-L01	310
IBM @server iSeries Access for Windows	5722-XE1	307
IBM @server iSeries Access for Web	5722-XH2	308
IBM @server iSeries Access for Linux	5722-XL1	309
IBM @server iSeries Access for Wireless	5722-XP1	309
IBM @server iSeries Access Family	5722-XW1	305

### IBM @server iSeries Access Family (5722-XW1)

iSeries Access Family is a single product to solve all the desktop-to-iSeries connectivity needs. It provides data connectivity from other systems and platforms to iSeries servers.

Increasingly, application providers are taking advantage of heterogeneous platforms to deliver solutions. iSeries Access Family provides the middleware so that applications can easily be built to run on the desktop, browsers, and wireless devices, yet work with iSeries resources simply and efficiently. This combination provides iSeries clients with more application options and helps to lower the cost of management for these solutions.

Deploying PCs to your users should enhance their productivity without increasing your PC network administration costs. iSeries Access is your ideal connectivity solution because it contains a unique set of products that integrate the use of a variety of PCs and workstation desktops, browsers, and wireless devices with the iSeries server. It has the functions that end users need, yet it is built to be centrally administered.

Minimum operating system level	i5/OS V5R3
Replaces products	Client Access Family (5722-XW1) Client Access Family (5769-XW1)
Further Information	<a href="http://www-03.ibm.com/servers/eserver/iseries/access/">http://www-03.ibm.com/servers/eserver/iseries/access/</a> <a href="http://publib.boulder.ibm.com/infocenter/iseries/v5r3/topic/rzahg/rzahgicia.htm">http://publib.boulder.ibm.com/infocenter/iseries/v5r3/topic/rzahg/rzahgicia.htm</a>

### IBM @server iSeries Access for Windows (5722-XE1)


IBM @server iSeries Access for Windows, previously known as iSeries Client Access Express for iSeries, is a component of the IBM @server iSeries Access Family (5722-XW1). It offers a powerful set of capabilities to connect PCs to iSeries servers. It also enables end users and application programmers to leverage business information, applications, and resources across an enterprise by extending the System i5 resources to the PC desktop.

iSeries Access for Windows provides:

- ▶ TCP/IP connectivity with Secure Sockets Layer (SSL) for client functions to improve TCP/IP network security
- ▶ iSeries NetServer for PC file serving and network print support
- ▶ Operations Console for both local and remote system console access
- ▶ All functions of iSeries Navigator for working with System i5 resources and administering and operating System i5 servers, plus graphical interfaces to work with the System i5
- ▶ With V5R4128-bit SSL encryption is an installable component. This function was previously supplied as the product Client Encryption (5722-CE3).

Integrated graphical user interface (GUI) features deliver increased productivity for end users who access resources on System i5 servers.

iSeries Access for Windows is compatible with Windows 98, Windows Me, Windows 2000, Windows XP, and Windows NT 4.0 operating systems.

Minimum operating system level	i5/OS V5R3	
Client code	This is an iSeries Access client that runs on Windows operating systems. The code is shipped in the LPP and stored in IFS directory and is downloaded from the IFS directory to the PC and is shipped on a PC CD.	
Replaces products	Client Access Express (5722-XE1) Client Access Express (5769-XE1)	
Further information	<a href="http://www-03.ibm.com/servers/eserver/iseries/access/">http://www-03.ibm.com/servers/eserver/iseries/access/</a>	

### IBM @server iSeries Access for Web (5722-XH2)

IBM @server iSeries Access for Web is a Java application that runs in a Web application server (for example, WebSphere Application Server or Apache Software Foundation ASF Tomcat) on OS/400 V5R2 or later System i5 servers. End users access its functions by starting their browser and connecting to an System i5 server.

iSeries Access for Web can be used with the Mozilla browser as well as Internet Explorer and Netscape. This enables users on desktop operating systems such as Windows, UNIX, Linux, and Macintosh to access System i5 resources.

It provides a variety of functions, such as 5250 emulation, and access to System i5 printers, printer output, database, jobs, job queues, message queue, and so on. It also provides the ability to run OS/400 CL batch commands without using a 5250 emulation session.

iSeries Access for Web also contains iSeries Access for Linux which provides an ODBC driver to access the DB2 UDB for iSeries and a 5250 emulator.

New function in V5R4 includes supported Web Application Servers increased to include WebSphere Application Server 6.0. Support for WebSphere Security model to enable single sign-on. Enhancements to 5250 session support including Bypass signon, HTML keyword support and hotspot support. Further enhancements include database function and the implementation of style sheets.

Host Access Transformation Server Limited Edition (HAS LE) is no longer being bundled with 5722-XH2.

Minimum operating system level	i5/OS V5R3
Ordering	Ships with OS/400
Replaces Product	5722-XH1
Further information	<a href="http://www-1.ibm.com/eserver/iseries/access/web/">http://www-1.ibm.com/eserver/iseries/access/web/</a> <a href="http://www-1.ibm.com/servers/eserver/iseries/access/linux/">http://www-1.ibm.com/servers/eserver/iseries/access/linux/</a> <a href="http://www.ibm.com/eserver/iseries/access/web/5250.html">http://www.ibm.com/eserver/iseries/access/web/5250.html</a>



### IBM @server iSeries Access for Linux (5722-XL1)

IBM @server iSeries Access for Linux runs natively on Linux operating systems offering Linux-based access to System i5 servers. iSeries access for Linux contains a 5250 emulator and an ODBC driver.

It is not available as an individually orderable product. However, it is available with the iSeries Access for Web (5722-XH2) client or via download from the Web:

<http://www14.software.ibm.com/webapp/download/search.jsp?go=y&rs=ilinux>

The 5250 Display Emulation component requires an iSeries Access Family (5722-XW1) license before it can be used.

The new function in V1.10 provides Kerberos Support to provide authentication tools over a network, together with single signon support and a bypass signon function. iSeries Access for Linux information has also been added to the Information Center at V5R4.


Minimum operating system level	OS/400 V5R1
Further information	<a href="http://www.ibm.com/eserver/iseries/access/linux/">http://www.ibm.com/eserver/iseries/access/linux/</a>

### IBM eServer iSeries Access for Wireless (5722-XP1)

IBM @server iSeries Access for Wireless provides access to System i5 administrative functions and development tools intended for wireless devices such as personal digital assistants (PDAs) and Internet-enabled phones. Using the functions of the iSeries Access for Wireless licensed program, you can use your wireless device to access and administer your servers.

iSeries Access for Wireless consists of two separate services that can be used individually, or together, to provide the access you need:

- ▶ iSeries Navigator for Wireless
- ▶ IBM Toolbox for Java 2 Micro Edition

Minimum operating system level	i5/OS V5R3	
Client code	This product is client code that runs on wireless devices. The code is shipped in the LPP and stored in IFS directory and is downloaded to the client device	
Further information	<a href="http://www-1.ibm.com/servers/eserver/iseries/access/wireless/">http://www-1.ibm.com/servers/eserver/iseries/access/wireless/</a>	

<b>iSeries ODBC Driver for Linux (5733-L01)</b>	
The iSeries ODBC Driver for Linux is an ODBC driver that allows you to access the iSeries database from a Linux client. Linux applications written to the ODBC API can use this driver to connect to an System i5 server to access the database.	
Minimum operating system level	OS/400 V5R1
Related products	iSeries Access for Windows (5722-XE1) and iSeries Access for Web (5722-XH2)
Client code	This product is client code.
Further information	<a href="http://www-1.ibm.com/servers/eserver/iseries/linux/odbc">http://www-1.ibm.com/servers/eserver/iseries/linux/odbc</a>

## IBM System management services and licensed programs

The management of a System i5 is handled by built-in functions and licensed programs for specific needs, each complemented by service offerings. This chapter discusses the products and services that are listed in the following table.

Product or service name	Product number	Refer to page
iSeries Operations Console: Direct Attach, LAN, and Remote	---	312
IBM @server Technical Support Advantage	---	311
IBM Director with Virtualization Engine Console for i5/OS V5.1	5733-DR1	
BM Virtualization Engine Enterprise Workload Manager for i5/OS, V2.1	5733-EWA	
IBM Backup Recovery and Media Services for iSeries	5722-BR1	319
PATROL for iSeries – Predict	5620-FIF	323
IBM Software Integration Assistant for iSeries	5722-IA1	322
IBM Advanced Job Scheduler for iSeries	5722-JS1	321

Product or service name	Product number	Refer to page
IBM Managed System Services for iSeries	5722-MG1	321
IBM Performance Tools for iSeries	5722-PT1	322
IBM System Manager for iSeries	5722-SM1	322
IBM Tivoli	Various	385

## System management services

This section discusses the features and services that are integrated in i5/OS.

### System i5 system console solutions

The following console solutions are available to help manage @server i5 systems:

- ▶ Twinax attach console
- ▶ Operations Console direct-connect
- ▶ Operations Console LAN-connect
- ▶ Hardware Management Console (HMC)
- ▶ Advanced System Management Interface (ASMI)

The console solution selected depends on the number of PCI slots available, as well as the function supported by each console type. This section discusses these console options.

For further information on factors involved when deciding which type of console to use on @server i5 servers, see the *V5R3 i5/OS Console Positioning Paper* on the Web at:

<http://www-1.ibm.com/servers/eserver/series/literature/index.html>



**Important:** All existing console types are supported in IBM i5/OS V5R4 partitions and on System i5.

HMC is required for managing partitions and Capacity on Demand. Although the HMC can be used as a console device, all previously available console types are still valid.

The #0367 is to be used for direct attached Operations Console and is delivered when Operations Console on the local area network (LAN) is selected. The #0367 can also be ordered for each partition running i5/OS when the client chooses a console type making use of this cable.

The remote operator panel function of Operations Console is not supported on @server i5 systems. The HMC or the ASMI interface can provide similar function. Refer to “Hardware Management Console” on page 315 and “Advanced System Management Interface” on page 316 for more details.

The following table lists the functions that are available for each console option.

Function supported	Twinax	Operations Console	HMC: @server i5 models only
Local 5250 access	Yes	Yes	Yes
Remote 5250 access	No	Yes	Yes via passthru
Many partitions and systems managed with one console PC	No	Yes LAN-only	Yes
Manage logical partitions (LPARs) and IBM @server Capacity Upgrade on Demand (CUoD)	No	Yes pre-@server i5 models only	Yes
Graphical disk management	No	Yes via iSeries Navigator	No
Remote Control panel	No	Yes Remote power capability not available on i5 Models	Yes
Requires IOP and dedicated IOA	Yes	Yes	No
Supported via LAN	No	Yes	Yes
Software required on console	No	Yes	No
All languages supported by OS/400 and i5/OS	Yes	Yes	No Language support is limited
EZ Setup	No	Yes	No

Function supported	Twinax	Operations Console	HMC: @server i5 models only
Remote service	No	Yes	Yes with Service Focal Point

## iSeries Operations Console features

Operations Console support allows a personal computer (PC) to be a local or remote console of System i5 servers. This allows a system administrator to monitor the system from another location. A twinaxial connection for console functions is not required.

The remote console application is a full-function 5250 PC console session that makes it possible to perform the majority of system operations tasks, for example backup and recovery, when the System i5 and the operations staff are in physically separate locations.

Operations Console enables connections across a LAN and enables directly cabled connections. Multiple Operations Console LAN connections can be active per system or partition at a time. Only one interface at a time can connect the console, even though they each has data on the screen. A separate dedicated interface for each partition is required.

A single PC can have multiple connections to multiple System i5 servers and can be the console for multiple System i5 servers. Only one PC can have control of the System i5 server at a given time. It also allows multiple local consoles on a network connection, with only one directly cabled configuration.

There is a high level of security for the connections of Operations Console on the LAN. Enhanced authentication and data encryption provide network security for console procedures. Operations Console with LAN connectivity uses a version of Secure Sockets Layer (SSL) that supports device and user authentication, without using certificates.

IBM POWER5 hardware does not support a directly attached remote control panel. For remote power on capability on this platform, consider remote HMC (Remote Client) or ASMI.

iSeries Navigator can be enabled on the Operations Console PC. An advantage of this is that you can centralize system management functions through a single asynchronous connection to the System i5 server using the iSeries console, Remote Control Panel capabilities, and iSeries Navigator on one PC.

Operations Console is a follow-on to the AS/400 Client Access Communications console. It is packaged with the iSeries Access for Windows product (5722-XE1), which is part of the iSeries Access Family (5722-XW1). Operations Console is an

optionally installed component of 5722-XE1, but no 5722-XW1 license is required to use this component.

You can find setup information in the iSeries Information Center at:

<http://www.ibm.com/eserver/iseries/infocenter>

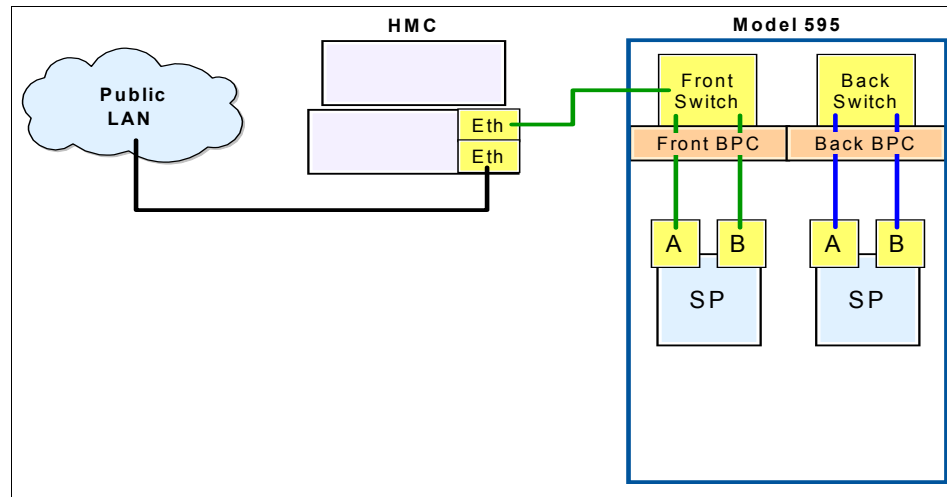
Under Connecting to iSeries, select the **Operations Console** topic.

## Hardware Management Console

The IBM Hardware Management Console is a PC-based console that runs a Linux-based server management application. It is required for any of the new POWER5 technology-based System i5 that implement partitions, Capacity on Demand, or support concurrent maintenance. An HMC is only supported for POWER5 technology-based servers and runs on a pre-installed Linux-based workstation via an Ethernet LAN connection. An Ethernet cable attaches to the HMC port.

**Note:** Virtual Partition Manager can be used to define up to four partitions for Linux support without an HMC. Refer to “Virtual Partition Manager” on page 227.

The following figure illustrates the basic attachment of an HMC to a System i5 Model 595.



The HMC can be used to manage from one to thirty-two partitioned systems. It is not required for non-logically partitioned systems. It can connect to one or more

managed systems. A Model 520, 550, or 570 and 595 can be managed by only one HMC. A virtual console terminal can be configured to run on the HMC for each partition, reducing the need for extra hardware in each partition.

Management functions offered through the use of HMC include the ability to:

- ▶ Create and maintain a LPAR environment
- ▶ Display a virtual console session for each i5/OS partition
- ▶ Detect, report, and store changes in hardware conditions
- ▶ Power managed systems on and off
- ▶ Act as a service focal point for IBM Service Representatives to determine an appropriate service strategy and enable Service Agent to call home to IBM
- ▶ Activate additional resources on demand

The HMC operates as a single, dedicated console for System i5 servers, providing 5250 console support to run diagnostics and monitor operations. Updates to the HMC are made via microcode (firmware). In some ways, the HMC replaces the primary partition of a system.

**Note:** The HMC can be used only for the control and service functions of the POWER5 technology-based servers it servers. It is not available for use as a general purpose computing resource.

Refer to the iSeries Information Center for setup information for the Hardware Management Console:

<http://www.ibm.com/eserver/iseries/infocenter>  
[http://publib.boulder.ibm.com/infocenter/eserver/v1r2s/en\\_US/info/ipha1/hardwaremanagementconsolehmc.htm](http://publib.boulder.ibm.com/infocenter/eserver/v1r2s/en_US/info/ipha1/hardwaremanagementconsolehmc.htm)

Refer to *Logical Partitions on IBM PowerPC: A Guide to Working with LPAR on POWER5 for IBM @server i5 Servers*, SG24-8000, for a setup guide and information about working with the HMC.

## Advanced System Management Interface

ASMI is a browser-based interface that runs on the Service Processor (SP). It allows you to perform general and privileged service tasks, such as reading service processor error logs and vital product data, setting up the service processor, controlling the system power, and performing hardware maintenance.

ASMI is used to allow concurrent hardware maintenance if you have an *@server* i5 system that does not include an HMC. ASMI may not be used often if an HMC or an ASCII console is also installed. ASMI does not allow you to build partitions

on the system. Use either the HMC or Virtual Partition Manager (VPM) to build partitions. VPM is used to build partitions to host Linux.

Refer to the IBM Systems Hardware Information Center for setup information for the Advanced System Management Interface:

<http://publib.boulder.ibm.com/infocenter/eserver/v1r3s/index.jsp>

<http://publib.boulder.ibm.com/infocenter/eserver/v1r3s/index.jsp?topic=/iphby/genconcepts.htm>

## IBM eServer Technical Support Advantage for iSeries

An important aspect of technology is technical support that helps make that technology work for us as people. The IBM @server Technical Support Advantage is a comprehensive set of resources available to IBM Clients, each focused on one objective: the simplification and streamlining support of each IBM @server solution. It offers easier access to total System i5 solutions in this increasingly Web-based world.

The Technical Support Advantage initiative offers total server support that you need for today's On Demand Business world. You receive great support that is personalized, flexible, and in the form you need it. What counts is keeping your business running and helping you drive your business to the next level.

Technical Support Advantage is the total solutions focus of IBM for System i5 servers. It involves voice and Web-based technical support and support that is integrated into the product. Emphasis is on a collaborative approach to technical support that helps to ensure a personal touch.

You can find more information about technical support and resources at:

<http://www.ibm.com/eserver/series/support>

## Management Central-Pervasive

Management Central-Pervasive allows network administrators to monitor the performance and status of their System i5 servers while away from their workstation or office. Using a cellular phone or personal digital assistant (PDA) with a wireless modem, the administrator can check on System i5 server status and monitor performance metrics on the System i5 servers. Management Central-Pervasive also runs from a Web browser running on PCs or Network Stations.

For more information about Management Central-Pervasive, see "IBM eServer iSeries Access for Wireless (5722-XP1)" on page 309.

## **iSeries Information Center**

The i5/OS V5R3 iSeries Information Center is available with tips, techniques, scenarios, and technical information to help you take advantage of all of the features of your System i5 server. From hardware specifications to wireless management and Enterprise Identity Mapping (EIM) information, the iSeries Information Center is a prime technical resource for your iSeries information needs.

The iSeries Information Center is available on the Internet at:

<http://www.ibm.com/eserver/series/infocenter>

The hardware information for i5 systems is contained on the internet in the IBM Systems Hardware Information Center located at:

<http://publib.boulder.ibm.com/infocenter/eserver/v1r3s/index.jsp>

## **Program temporary fixes**

Program temporary fixes (PTFs) can be shipped to a central site, either on media or electronically, and then packaged and distributed to remote license sites, either on media or electronically. Clients can download PTFs over the Internet. Configuration and setup information is documented on the Web at:

<http://www-912.ibm.com/supporthome.nsf/document/10000045>

PTFs (including Licensed Internal Code (LIC) changes) are loaded and applied using a command.

## **System detected software problems**

Symptom strings are automatically created by the i5/OS licensed programs at the time an error occurs. They make the management of problems in the system easier and recovery quicker by improving the rate at which clients can find appropriate fixes for problems. Problem resolution time is decreased when failure data is collected at the time of occurrence and reduces the need to recreate failures.

## **Electronic Service Agent**

The Electronic Service Agent™ is a “nocharge” software tool that resides on the System i5 to monitor events and transmit system inventory information to IBM. Electronic Service Agent has two functions: automatic hardware problem reporting and system inventory collection. With these functions, Electronic Service Agent can monitor, track and capture system inventory and hardware error logs.

In V5R4, Electronic Service Agent is included in i5/OS.

Using the power of your System i5 and i5/OS software applications, Electronic Service Agent monitors the system's functional hardware and selected peripherals, and then electronically reports potential problems. In addition to error detection and reporting, Service Agent also aids remote support centers and onsite service personnel in problem source identification by providing a comprehensive error history of the system.

Electronic Service Agent also collects and sends system hardware inventory and i5/OS software, PTFs and software error logs to IBM. This information helps the IBM Support Center in their analysis of a system problem or client question. The inventory information and service requests are transmitted to IBM either by Internet or AT&T Global Network. Client information is protected behind IBM firewalls. Only those with a valid IBM business reason are authorized to access the Electronic Service Agent data. The Service Agent inventory information is available for clients to view at: <http://www.ibm.com/support/electronic>

## System management products


This section discusses the products available to manage System i5 systems.

### IBM Backup Recovery and Media Services for iSeries (5722-BR1)

IBM Backup Recovery and Media Services is the IBM strategic solution for planning and managing the backup of the System i5 server. It provides all of the functions that most System i5 users need to implement a fully automated, single system, backup, recovery, and media management strategy.

BRMS facilitates centralized management of media by maintaining a consistent view of removable tape media, its contents, location, and availability across multiple System i5 servers or OS/400 partitions referred to as *networked systems*. This common media scratch pool contains shared tape volumes, which are eligible for use by any participating networked system. When a networked system uses one of the shared volumes, that usage is broadcast to all networked systems so that each system has a current view of the active media and the available expired media.

BRMS provides the System i5 server with support for policy-oriented setup and execution of archive, backup, recovery, and other removable media-related operations. BRMS uses a consistent set of intuitive concepts and operations, which can be used to develop and implement a backup strategy tailored to your business requirements. The user interface is menu-driven, with a significant number of functions enabled through the optional BRMS iSeries Navigator client, a plug-in to iSeries Navigator.

<b>IBM Backup Recovery and Media Services for iSeries (5722-BR1)</b>		
Minimum operating system level	i5/OS V5R3	
Replaces products	5769-BR1, 5716-BR1	
Options	Option 1 - Network feature Option 2 - Advanced feature	
Software type	Software subscription	
Installation prerequisites	5722-SS1 Option 18 Media and Storage Extensions	
Client code	Delivered with the server.	
Further information	<a href="http://www-1.ibm.com/servers/eserver/iseries/service/brms/">http://www-1.ibm.com/servers/eserver/iseries/service/brms/</a> <a href="http://www-1.ibm.com/servers/eserver/iseries/service/brms/adsmperf.htm">http://www-1.ibm.com/servers/eserver/iseries/service/brms/adsmperf.htm</a>	

<b>IBM Director with Virtualization Engine Console for i5/OS V5.1 (5733-DR1)</b>	
<p>IBM Director V5.10 maximizes system availability. Director is designed to reduce the cost and complexity of management by providing comprehensive yet easy-to-use administration of the entire environment from a single point of control. It features an open, integrated toolset with new functions and improved ease of use that helps you get started faster and be more productive.</p> <p>The Virtualization Engine Console provides a comprehensive set of management tasks that leverage the Virtualization Engine management collection as well as your existing management structure and tools. Virtualization Engine console discovers your environment and works with your existing management resources to harness their power into a consistent user experience. Administrators can discover and explore relationships between IT resources in their virtualization environment, and manage these resources through a common set of tasks. For deeper analysis and troubleshooting, the console works with your existing tools and technology to launch tools and applications, taking users to the tools they need.</p>	
Further information	<a href="http://publib.boulder.ibm.com/infocenter/eserver/v1r2/index.jsp">http://publib.boulder.ibm.com/infocenter/eserver/v1r2/index.jsp</a>



## IBM Virtualization Engine Enterprise Workload Manager for i5/OS, V2.1 (5733-EWA)

IBM Virtualization Engine Enterprise Workload Manager for i5/OS, V2.1 (5733-EWA)	
<p>EWLM is a dynamic policy-based workload-management system that optimizes resources in multi-tier heterogeneous application environments. Application performance can be measured against pre-defined goals by end-to-end collection and reporting. Both IBM and non-IBM platforms and operating systems are supported.</p> <p>EWLM V2.1 builds upon the base functions delivered in the initial release of the Virtualization Engine and continues the evolution toward autonomic management of customer service level objectives in heterogeneous, multi-tiered server environments. EWLM support focuses on expanding the set of operating system platforms supported as an EWLM Domain Manager and as an EWLM Managed Server to provide end-to-end coverage of heterogeneous applications. This release also introduces dynamic, goal-oriented EWLM server resource optimization algorithms, focused on management of logically partitioned IBM eServer i5 and p5 hardware.</p>	
Further information	<a href="http://publib.boulder.ibm.com/infocenter/eserver/v1r2/index.jsp">http://publib.boulder.ibm.com/infocenter/eserver/v1r2/index.jsp</a>

IBM Advanced Job Scheduler for iSeries (5722-JS1)	
<p>Easily manage your job automation across multiple systems running the IBM Advanced Job Scheduler for iSeries. For example, with the Advanced Job Scheduler on multiple systems, you can condition jobs on one system to only start when a job on another system is successful or ends in error. Supported network environments for the Advanced Job Scheduler include TCP/IP.</p>	
Further information	<a href="http://www.ibm.com/eserver/series/jscheduler/product.html">http://www.ibm.com/eserver/series/jscheduler/product.html</a>

IBM Managed System Services for iSeries (5722-MG1)	
<p>IBM Managed System Services for iSeries (MSS) licensed program is part of an integrated offering Operation Control Center/400, which includes System Manager for iSeries. MSS enables an System i5 server to be managed from a central site running either S/390 NetView Distribution Manager for MVS (Release 5 or later) for MVS-based networks or System Manager for iSeries-based networks.</p> <p>The central site defines, schedules, and tracks software distribution (change management) requests sent to an System i5 server with Managed System Services for iSeries installed. These change management requests include sending, receiving, and deleting System i5 system files, programs, and other objects (libraries, save files, message files, documents, folders, PTFs, and so on).</p>	
Minimum operating system level	OS/400 V5R1
Installation prerequisites	None

<b>IBM Managed System Services for iSeries (5722-MG1)</b>	
Related product	System Manager for iSeries (5722-SM1)
Replaces product	5769-MG1

<b>IBM System Manager for iSeries (5722-SM1)</b>	
<p>System i5 objects can be sent directly to or received from System i5 libraries or through the local System i5 distribution repository with IBM System Manager for iSeries. Non-System i5 objects can be received into, stored, and distributed from the System i5 distribution directory. The capability for the central site System i5 to define, schedule, run these change requests one time or repetitively, and track their status significantly enhances unattended operation of the remote systems supported by System Manager.</p>	
Minimum operating system level	OS/400 V5R1
Software type	Part of the integrated offering Operations Control Center/400, which includes Managed System Services for iSeries
Installation prerequisites	None
Related product	Managed System Services for iSeries (5722-MG1)
Replaces product	5769-SM1

<b>IBM Software Integration Assistant for iSeries (5733-IA1)</b>	
<p>Some IBM software products are created and packaged so that a single version of the software can be installed on any one of several operating system platforms, including i5/OS. The IBM Software Integration Assistant for iSeries provides mechanisms that enable standard System i5 fix (PTF) delivery and application procedures for these multiplatform products. These products are not packaged as System i5 licensed programs because the same product can be installed on platforms other than System i5.</p>	
Minimum i5/OS level	i5/OS V5R2
Software type	Shipped with i5/OS at no charge
Replaces product	New in i5/OS V5R2

<b>IBM Performance Tools for iSeries (5722-PT1)</b>	
<p>Performance Tools for iSeries is a program product that provides a set of reporting, analysis, and modeling functions to assist an System i5 administrator to manage the performance of the system. It provides printed and online reports. These can be in graphic or tabular form.</p> <p>The Performance Advisor function assists the user in analyzing system performance and provides recommendations. Performance Tools for iSeries, through its modeling facility, can be used to help predict probable system performance before changes are made.</p>	

<b>IBM Performance Tools for iSeries (5722-PT1)</b>	
Minimum operating system level	OS/400 V5R1
Installation prerequisites	None
Related product	PATROL for iSeries – Predict (5620-FIF)
Client code	Client Access Express plug-in distributed with 5722-PT1
Replaces products	5769-PT1, 5716-PT1, 5763-PT1, 5769-GP1, 5769-VP1, 5798-RYP
Further information	<a href="http://www-1.ibm.com/servers/eserver/series/perfmgmt/pt400.htm">http://www-1.ibm.com/servers/eserver/series/perfmgmt/pt400.htm</a>

<b>PATROL for iSeries – Predict (5620-FIF)</b>	
<p>PATROL for iSeries – Predict is a performance analysis and capacity planning product for System i5. Using existing performance data from Collection Services or STRPFMON, PATROL for iSeries – Predict provides comprehensive response-time analysis and predictive modeling capabilities. The “what-if” analysis capabilities reveal the impact of changes, such as load, configuration, and users across the System i5 environment. With this approach, users can prevent performance, service and response-time problems before they occur, and ensure ongoing success by provisioning the right hardware upgrades, at the right time.</p>	
Minimum operating system level	OS/400 V4R4
Related products	5722-PT1
Replaces product	BEST/1-400 function of 5722-PT1
Further information	<a href="http://www.bmc.com/products/proddocview/0,2832,19052_19429_23137_7064,00.html">http://www.bmc.com/products/proddocview/0,2832,19052_19429_23137_7064,00.html</a>

## Valupak for iSeries (5722-VP1)

Valupak for iSeries is a package of chargeable products which provides a discount rather than buy all the products separately. Valupak consists of:

- ▶ 5722-PT1 Performance Tool for iSeries
- ▶ 5722-PT1 - Option 1 Manager Feature
- ▶ 5722-QU1 Query for iSeries
- ▶ 5722-ST1 DB2 Query Manager and SQL Development Kit for iSeries
- ▶ 5722-XW1 iSeries Access Family (user based)

The number of iSeries Access licenses varies with the software tier of the Valupak ordered as shown in the following table.

Software tier	Client Access users
P05	10
P10	20
P20	50
P30	70
P40	125
P50	150
P60	175

When upgrading to a new version or release, the upgrade is achieved by using individual product upgrades, and not by upgrading to a new ValuPak. Similarly if an System i5 upgrade involves a processor upgrade, which requires moving to a new software tier, the software charges are calculated on an individual product basis, not as a Valupak upgrade.

## Tivoli Software

Tivoli Software is a portfolio of products delivering a better way to manage the business of I.T. by intergrating people, processes, technology and information. The portfolio includes a range of software covering Application Management, Availability, Business Service Management, Orchestration and Provisioning Management, Security and also Storage and Optimisation.

Tivoli software is intended to support complex and heterogeneous environments though supporting a broad set of market leading platform and database products.

To understand the full range of Tivoli products visit:

<http://www-306.ibm.com/software/tivoli/>

To obtain a consolidated view of what System i5 support is available for all Tivoli products, a spreadsheet is available at:

[http://www-306.ibm.com/software/sysmgmt/products/support/Tivoli\\_Supported\\_Platforms.html](http://www-306.ibm.com/software/sysmgmt/products/support/Tivoli_Supported_Platforms.html)



## Web collaboration and WebSphere

IBM i5/OS contains everything that is needed to quickly create a Web presence. As the integrated platform, it provides the infrastructure and components necessary to “Start Simple” with On Demand Business adoption. For example, WebSphere Application Server - Express is now included with every i5 Edition.

In addition to these base features, a set of On Demand Business products is available to help you “Grow Fast”, allowing a complete On Demand Business Web site to be built that is secure and easy to develop, maintain and scale. These products (listed in the following table) belong to the WebSphere family of products offered by IBM for the System i5 server.

Each of these products addresses specific client requirements to build applications for On Demand Business quickly and easily. They often include graphical user interface (GUI)-based PC development and management tools.

The base of these WebSphere products is the WebSphere Application Server technology. An application server “serves” applications written in Java, which in turn can leverage your existing System i5 programs and data.

<b>Product name</b>	<b>Product number</b>	<b>Refer to page</b>
IBM Business Solutions	5722-BZ1	329
IBM WebSphere Application Server Version 5.1, Developer Edition	5724-D18	330
IBM WebSphere Application Server - Express Version 5.1 for iSeries	5722-E51	328
IBM WebSphere Host Access Transformation Services (HATS)	5724-L03	333
IBM WebSphere Portal Express and Express Plus	5724-E77	332
IBM WebSphere Commerce for iSeries, Version 5.6 Express Edition IBM WebSphere Commerce for iSeries, Version 5.6 Business Edition, IBM WebSphere Commerce for iSeries, Version 5.6 Professional Edition	5724-I36 5724-I38 5724-I40	332
IBM Web Enablement for iSeries	5722-WE2	328
IBM WebSphere Application Server Version 5.1 for iSeries	5733-W51	329
IBM WebSphere Application Server Version 5.1, Network Deployment for iSeries	5733-W51	329
IBM WebSphere Application Server V6.0 for iSeries IBM WebSphere Application Server Network Deployment V6.0 for OS/400 IBM WebSphere Application Server for Developer V6.0 for OS/400	5733-W60	379
IBM WebSphere Application Server - Express V6.0 for OS/400	5724-I63	379
IBM WebFacing Deployment Tool - with HATS Technology	5724-N52	382

## WebSphere Application Server offerings

System i5 clients have the following WebSphere Application Server offerings from which they can choose:

- ▶ **IBM WebSphere Application Server - Express for iSeries:** This is a Java application server based on a servlet-based engine that turns your existing Web server (IBM HTTP Server for iSeries) into a Java Web application server. It supports the full Java 2 Enterprise Edition (J2EE) 1.4 programming model and extensions including Servlets, JSPs, EJBs, and Web services
- ▶ **IBM WebSphere Application Server V6.0.1 for OS/400:** Provides similar support to the Express version but allows multiple application server processes per Websphere application instance.
- ▶ **IBM Websphere Application Server V6.0.1 for OS/400:** extends WebSphere Application Server Version 6.0.1 with network deployment management facilities allowing multiple WebSphere Application server nodes to be managed from a single console. It also provides clustering, edge services, and high availability services for distributed configurations as well as load balancing capabilities.

To understand the IBM On Demand Business strategy for the System i5 server, and the positioning of strategic WebSphere products, refer to *WebSphere for IBM @server iSeries Server Buying and Selling Guide*, REDP-3646.

**Note:** Use the IBM @server Workload Estimator to help size all system configurations:

<http://www-912.ibm.com/wle/EstimatorServlet>

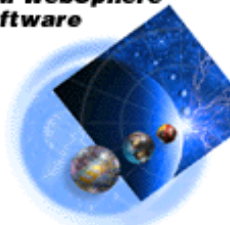
## Product positioning: WebSphere Application Server and Jakarta Tomcat

The strategic Web application server from IBM is WebSphere Application Server. The latest version of WebSphere Application Server is Version 6.0.1. All WebSphere Application Server offerings support Servlets, JSPs, EJBs, and more.

Some System i5 clients want a basic, no-cost Web application server that supports servlets and JavaServer Pages. Relying on the IBM HTTP Server (powered by Apache) as its Web server, the Apache Software Foundation's Jakarta Tomcat provides a basic Web application server for System i5 clients. Jakarta Tomcat is available with OS/400 and at no additional cost to clients.

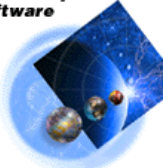
Clients who require a robust and scalable Web application server can select WebSphere Application Server. Jakarta Tomcat provides fewer functions and capabilities compared to the IBM WebSphere Application Server. IBM plans for i5/OS V5R4 to be the final release to ship Apache Tomcat support in the IBM HTTP Server which is shipped with i5/OS.

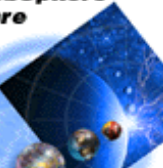
For more information, see *iSeries e-business Handbook: A Technology and Product Reference*, SG24-5694.

<b>IBM WebSphere Application Server - Express Version 5.1 for iSeries (5722-E51)</b>		
<p>IBM WebSphere Application Server - Express for iSeries is delivered to System i5 customers via IBM Web Enablement for iSeries (5722-WE2) or can be purchased through Passport Advantage. It is intended for fast, productive development, deployment, and management of dynamic Web sites. As such it has a subset of the application server shipped with the WebSphere Application Server 5.1 for iSeries product, shipping without EJB support, some clients applications and the ability to have multiple application server processes per WebSphere application server instance.</p>		
Ordering	5724-D06	<p><b>IBM WebSphere Software</b></p> 
Minimum operating system level	OS/400 V5R1	
Replaces product	WebSphere Application Server Standard Edition V3.5 or WebSphere Application Server - Express V5.0	
Further information	<a href="http://www-03.ibm.com/servers/eserver/series/software/websphere/wsappserver/express/indexexp51.html">http://www-03.ibm.com/servers/eserver/series/software/websphere/wsappserver/express/indexexp51.html</a>	


<b>IBM Web Enablement for iSeries (5722-WE2)</b>
<p>IBM Web Enablement for iSeries is a license only product that delivers WebSphere Application Server - Express Version 6.0 and Version 5.1 (5722-IWE and 5722-E51). Web Enablement is included on every i5/OS order. It can be removed from the order if desired. This makes an application server available with i5/OS at no additional cost to the client.</p>




<b>IBM Web Enablement for iSeries (5722-WE2)</b>		
Minimum operating system level	i5/OS V5R3	<b>IBM WebSphere Software</b> 
Replaces product	5722-WE1	
Further information	<a href="http://www-03.ibm.com/servers/eserver/series/software/websphere/wsappserver/news/package.html">http://www-03.ibm.com/servers/eserver/series/software/websphere/wsappserver/news/package.html</a>	


<b>IBM Business Solutions Version 1.0 (5722-BZ1)</b>		
<p>IBM Business Solutions Version 1.0 (5722-BZ1) provides a set of enterprise Web applications available for iSeries servers. Each application is an integrated solution to a common business need that works in conjunction with your existing applications, server components, and enterprise data. The applications demonstrate the value of integrated solutions for On Demand Business, increase worker productivity, provide services that virtually any business may find useful, and are easy to understand and use.</p>		
Ordering	5722-BZ1	<b>IBM WebSphere Software</b> 
Minimum operating system level	OS/400 V5R1	
Further information	<a href="http://www-03.ibm.com/servers/eserver/series/software/bizapps/">http://www-03.ibm.com/servers/eserver/series/software/bizapps/</a>	

<b>IBM WebSphere Application Server Version 5.1 for iSeries and IBM WebSphere Application Server Version 5.1, Network Deployment for iSeries (5733-W51)</b>		
<p>IBM WebSphere Application Server Version 5.1 for iSeries is supplied via Passport Advantage. It is Java 2 Enterprise Edition (J2EE) compatible with full support for SDK 1.4 (both client and server). It has core web services support as well as Enterprise Java Bean (EJB) V2 support and Java Message Services V1.0.2. The Network Deployment version additionally provides advanced Web services, enhanced work management and performance management tools for workload management across multiple servers via load balancing and clustering capabilities.</p>		

<b>IBM WebSphere Application Server Version 5.1 for iSeries and IBM WebSphere Application Server Version 5.1, Network Deployment for iSeries (5733-W51)</b>		
Ordering product number	5630-A36, BA0BWML Base Application Server 5630-A36, BA0BVML Network Deployment	
Minimum operating system level	OS/400 V5R1	
Replaces products	WebSphere Application Server Version 4.0, Advanced Single Server Edition (5733-WA4) WebSphere Application Server Version 4.0, Advanced Edition (5733-WS4)	
Further information	<a href="http://www-03.ibm.com/servers/eserver/iseries/software/websphere/wsappserver/indexb51.html">http://www-03.ibm.com/servers/eserver/iseries/software/websphere/wsappserver/indexb51.html</a> <a href="http://www-03.ibm.com/servers/eserver/iseries/software/websphere/wsappserver/indexnd51.html">http://www-03.ibm.com/servers/eserver/iseries/software/websphere/wsappserver/indexnd51.html</a>	

<b>IBM WebSphere Application Server Version 5.1 for iSeries, Developer Edition (5724-D18)</b>		
The IBM WebSphere Application Server V5.1 for iSeries Developer Edition is a Passport Advantage program. It is the same product as WebSphere Application Server V5.1 for iSeries (Base edition) with different licensing.		
Ordering	BA0BUML	
Minimum operating system level	OS/400 V5R1	
Replaces product	WebSphere Application Server V5.0 for iSeries Developer	
Further information	<a href="http://www-03.ibm.com/servers/eserver/iseries/software/websphere/wsappserver/indexdev51.html">http://www-03.ibm.com/servers/eserver/iseries/software/websphere/wsappserver/indexdev51.html</a>	

<b>IBM WebSphere Application Server - Express Version 6.0 for iSeries (5733-W60)</b>		
IBM WebSphere Application Server - Express for iSeries is delivered to System i5 customers via IBM Web Enablement for iSeries (5722-WE2) or can be purchased through Passport Advantage. It is intended for fast, productive development, deployment, and management of dynamic Web sites. It provides the almost the same function as the WebSphere Application Server 6.0 for iSeries product without the ability to have multiple application server processes per WebSphere application server instance.		

<b>IBM WebSphere Application Server - Express Version 6.0 for iSeries (5733-W60)</b>		
Ordering	5724-I63	
Minimum operating system level	OS/400 V5R2	
Replaces product	WebSphere Application Server - Express V5.0, 5.1 Express WebSphere Application Server 4.0 Advanced Edition	
Further information	<a href="http://www-03.ibm.com/servers/eserver/series/software/websphere/wsappserver/express/indexexp60.html">http://www-03.ibm.com/servers/eserver/series/software/websphere/wsappserver/express/indexexp60.html</a>	

<b>IBM WebSphere Application Server Version 6.0 for OS/400, Network Deployment Edition for iSeries V6.0, and WebSphere Application Server for Developers V6.0 (5733-W60)</b>		
<p>The IBM WebSphere Application Server V6.0 is shipped as a licensed program option (LPO) via Passport Advantage and is installed as product 5733-W60 on the System i5.</p> <p>All three products contain the same full function WebSphere Application Server.</p> <p>The Network Deployment edition contains advanced Web services and functions for managing multiple application servers including clustering, networking, load balancing and distributed administration capabilities.</p> <p>The application server for Developers is the same product as the WebSphere Application Server V6 but with different licensing.</p>		
Ordering	5724-J08 Base Application Server 5724-H88 Network Deployment 5724-H89 Developers	
Minimum operating system level	OS/400 V5R2	
Replaces product	WebSphere Application Server Version 5.1	
Further information	<a href="http://www-03.ibm.com/servers/eserver/series/software/websphere/wsappserver/indexb60.html">http://www-03.ibm.com/servers/eserver/series/software/websphere/wsappserver/indexb60.html</a> <a href="http://www-03.ibm.com/servers/eserver/series/software/websphere/wsappserver/indexnd60.html">http://www-03.ibm.com/servers/eserver/series/software/websphere/wsappserver/indexnd60.html</a> <a href="http://www-03.ibm.com/servers/eserver/series/software/websphere/wsappserver/indexdev60.html">http://www-03.ibm.com/servers/eserver/series/software/websphere/wsappserver/indexdev60.html</a>	

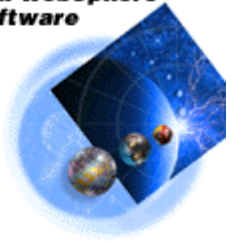
**IBM WebSphere Commerce for iSeries, Version 5.6 Business Edition (5724-I38), Professional Edition (5724-I40), and Express Edition (5724-I36)**

IBM WebSphere Commerce for iSeries, Version 5.6 are Passport Advantage products providing complete e-commerce solutions for business-to-consumer (B2C) or business-to-business (B2B) Web sites.

WebSphere Commerce Express is an easily installed, yet complete solution to help growing mid-market companies do business on the Web. It is ready to go out-of-the-box to affordably build and maintain an e-commerce site for B2B or B2C.

WebSphere Commerce Professional Edition increases site functionality for B2B and B2C retailers. By enhancing client buying experiences and improving operational efficiencies, Professional Edition can increase customer satisfaction and loyalty.

WebSphere Commerce Business Edition provides a powerful solution for running large high-volume B2B and advanced B2C e-commerce Web sites for global On Demand Businesses. It is a flexible infrastructure based on a unified platform for running complex and high volume sites.

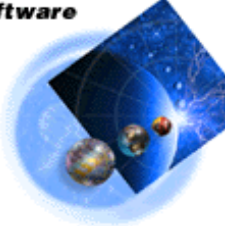
Ordering	5724-I38, 5724-I40, 5724-I36	 <p><b>IBM WebSphere Software</b></p>
Minimum operating system level	OS/400 V5R2	
Replaces products	IBM WebSphere Commerce for iSeries Version 5.5 (5724-A18) WebSphere Commerce Suite Version 5.1 (5798-WC5) WebSphere Commerce V5.4 (5733-WC5)	
Further information	<a href="http://www-306.ibm.com/software/sw-by-category/subcategory/SWH10.html">http://www-306.ibm.com/software/sw-by-category/subcategory/SWH10.html</a>	

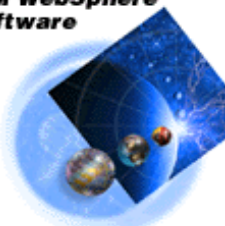
**IBM WebSphere Portal - Express, and IBM WebSphere Portal - Express Plus for Multiplatform, Version 5 (5724-E77)**

Portals serve as unified access points to Web applications. A portal delivers integrated content and applications, plus a unified, collaborative workplace.

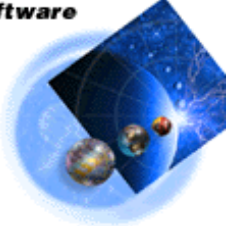
IBM WebSphere Portal - Express for Multiplatform (5724-E77) is a Passport Advantage program allowing easy deployment of portal solutions.

WebSphere Portal Express Plus adds collaboration features to help teams work together more.

<b>IBM WebSphere Portal - Express, and IBM WebSphere Portal - Express Plus for Multiplatform, Version 5 (5724-E77)</b>		
Ordering	Express BA0BYML, Express Plus BA0COML	
Minimum operating system level	OS/400 V5R2	
Replaces product	N/A A WebSphere Portal Enable V4.1 upgrade to WebSphere Portal Express V5 is not supported	
Further information	<a href="http://www-03.ibm.com/servers/eserv/iSeries/software/websphere/portal/">http://www-03.ibm.com/servers/eserv/iSeries/software/websphere/portal/</a>	

<b>IBM WebSphere Host Access Transformation Services (HATS) V6 (5724-L03)</b>		
<p>IBM WebSphere Host Access Transformation Services (HATS) is ordered via Passport Advantage. It provides all the tools necessary to make 5250 applications available as HTML through the most popular web browser, while converting host screens to a Web look and feel in real time. This significantly improves the navigation and productivity of host applications.</p>		
Ordering	D52WTLL, D52WULL	
Minimum operating system level	OS/400 V5R3	
Replaces product	IBM Websphere Host Access Transformation Services V5	
Further information	<a href="http://www-306.ibm.com/software/web/servers/hats/index.html">http://www-306.ibm.com/software/web/servers/hats/index.html</a>	

<b>IBM WebFacing Deployment Tool for WebSphere Development Studio V6.0.1 with HATS Technology (5724-N52)</b>		
<p>IBM WebFacing Deployment Tool - with HATS technology (WDHT) is a runtime enabler allowing the WebFacing Tool and HATS technologies to work together in an integrated fashion. To leverage the new WebFacing extensions, WDHT is needed for deployment to production.</p>		

IBM WebFacing Deployment Tool for WebSphere Development Studio V6.0.1 with HATS Technology (5724-N52)		
Ordering	5724-N52	<b>IBM WebSphere Software</b> 
Minimum operating system level	OS/400 V5R2	
Replaces product	None	
Further information	<a href="http://www-306.ibm.com/software/awdtools/wds400/news/announcement-hats013106.html">http://www-306.ibm.com/software/awdtools/wds400/news/announcement-hats013106.html</a>	



## **IBM licensed programs: Printing and document handling products**

Office and printing products provide the vehicle for communications both inside and outside a company. To help you understand the System i5 print solutions that are available for a particular set of business requirements, refer to this Web site:

[http://www.printers.ibm.com/internet/wwsites.nsf/vwwebpublished/main\\_ww](http://www.printers.ibm.com/internet/wwsites.nsf/vwwebpublished/main_ww)

The office and printing products that are listed in the following table are discussed in this chapter.

Product name	Product number	Refer to page
IBM Advanced Function Printing Utilities for iSeries	5722-AF1	337
IBM Advanced DBCS Printer Support for iSeries	5722-AP1	337
IBM AFP Font Collection for Workstations and OS/400	5648-B45	338
IBM Dictionary and Linguistics Tools for AS/400	5769-DL1	339
IBM Business Graphics Utility for AS/400	5722-DS1	340
IBM Infoprint Fonts for Multiplatforms	5648-E77	341
IBM Facsimile Support for iSeries	5798-FAX	341
IBM Advanced Function Printing Fonts for AS/400	5769-FNT	342
IBM Advanced Function Printing DBCS Fonts for AS/400 V4R3	5769-FN1	343
IBM Infoprint Designer for iSeries	5733-ID1	344
Infoprint Server for iSeries	5722-IP1	345
IBM Content Manager OnDemand for iSeries	5722-RD1	346
IBM Content Manager for iSeries	5722-VI1	346
IBM Print Services Facility for iSeries (PSF/400)	5722-SS1 options 36, 37, and 38	347




### IBM Advanced Function Printing Utilities for iSeries (5722-AF1)

Advanced Function Printing (AFP) Utilities consists of three integrated utilities that support AFP print applications. Included are Overlay Utility for electronic forms, Resource Management Utility for managing document resources, and Print Format Utility, a “Query/AFP” tool to help you build advanced electronic output directly from System i5 database files. For most System i5 document design functions, look at Infoprint Designer (5733-ID1).

The user can interactively design, create, and verify AFP resources such as overlays. In addition to the AFP resource creation and management, it provides the capability to print users’ data contained in a database file in various formats, with various fonts and barcodes on the Intelligent printer Data Stream (IPDS) printer without developing any application programs. For example, it allows users to print barcode labels from data stored in the database file.

Users with various levels of experience can easily take full advantage of IPDS printer capability that is either not accessible to them now or accessible only with great difficulty.

Components include the Overlay Utility, Print Format Utility, and the Resource Management Utility.

Minimum operating system level	OS/400 V5R1	
Software type	Software Subscription 5733-SW1 or 5733-SW3	
Installation prerequisites	5722-SS1 Option 36, 37, or 38 PSF is required	
Related products	Infoprint Server, Infoprint Designer, Page Printer Formatting Aid, AFP Toolbox, and iSeries Access	
Replaces product	IBM Advanced Function Printing for AS/400 (5769-AF1)	
Further information	<a href="http://www.printers.ibm.com/internet/wwsites.nsf/vwwebpublished/supportoverview_ww">http://www.printers.ibm.com/internet/wwsites.nsf/vwwebpublished/supportoverview_ww</a> <a href="http://www.redbooks.ibm.com">http://www.redbooks.ibm.com</a> <a href="http://www.printers.ibm.com/R5PSC.NSF/Web/software+overview">http://www.printers.ibm.com/R5PSC.NSF/Web/software+overview</a>	


### IBM Advanced DBCS Printer Support for iSeries (5722-AP1)

Advanced DBCS Printer Support for iSeries is a set of the following utilities:

- ▶ Advanced Print Writer (APW)
- ▶ Advanced Page Printer Writer (APPW)
- ▶ Kanji Print Function (KPF)
- ▶ Printer Function Control (PFC)
- ▶ System/36 Resource Migration

The difference in these utilities is the supported printers and the print functions.


IBM Advanced DBCS Printer Support for iSeries (5722-AP1)	
Minimum operating system level	OS/400 V5R1
Software type	Software Subscription
Related products	Infoprint Server, Infoprint Designer, Advanced Print Utility, Page Printer Formatting Aid, AFP Toolbox, and iSeries Access
Replaces product	5769-AP1
Further information	<a href="http://www.printers.ibm.com/R5PSC.NSF/Web/software+overview">http://www.printers.ibm.com/R5PSC.NSF/Web/software+overview</a> <a href="http://www.redbooks.ibm.com">http://www.redbooks.ibm.com</a> <a href="http://www.ibm.com/eserver/series/infocenter">http://www.ibm.com/eserver/series/infocenter</a>



## IBM AFP Font Collection for Workstations and OS/400 V2.1.1 (5648-B45)

IBM AFP Font Collection for Workstations and OS/400 V2.1.1 (5648-B45)
<p>The IBM AFP Font Collection for Workstations and OS/400 provides fonts that can be used by most Advanced Function Presentation products. Skillful use of fonts in typography can dramatically improve the readability and effectiveness of your documents. The IBM AFP Font Collection CD is bundled and shipped with all orders of PSF/400.</p> <p>The AFP Font Collection is designed to support printing on AFP/IPDS printers that accept host downloaded fonts using Print Services Facility or Infoprint Manager. The AFP Font Collection CD is shipped automatically with PSF/400.</p> <p>AFP Font Collection provides one-stop shopping for System i5 printer fonts - the fonts you need to realize the full potential of business communications. The fonts are provided in a full range of resolutions (240 dpi, 300 dpi, and outlines) and in over 48 languages. Font sizes change easily to support the latest IPDS printers, and to enable full graphical document viewing, as well as offer a performance savings over raster fonts.</p>

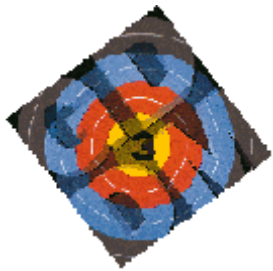
IBM AFP Font Collection for Workstations and OS/400 V2.1.1 (5648-B45)	
Minimum operating system level	V2
Installation prerequisites	5722-SS1 Option 36, 37, or 38
Related products	Infoprint Server, Infoprint Designer, PSF/400 Advanced Print Utility, Page Printer Formatting Aid, AFP Toolbox, and iSeries Access
Replaces product	5648-B45 V2.1.0
Further information	<a href="http://www.printers.ibm.com/internet/wbsites.nsf/vwebpublished/supportoverview_w">http://www.printers.ibm.com/internet/wbsites.nsf/vwebpublished/supportoverview_w</a> <a href="http://www.redbooks.ibm.com">http://www.redbooks.ibm.com</a> <a href="http://www.printers.ibm.com/R5PSC.NSF/Web/as400overview">http://www.printers.ibm.com/R5PSC.NSF/Web/as400overview</a>



## IBM Dictionary and Linguistics Tools for AS/400 (5769-DL1)

IBM Dictionary and Linguistics Tools for AS/400 (5769-DL1)	
<p>Dictionary and Linguistics Tools provides 36 dictionaries and a set of dictionary access methods (application programming interfaces (APIs)) to allow clients to write applications to access the dictionaries directly. Advanced linguistic information is built into each dictionary, such as hyphenation, synonyms, spelling aid, morphological identification, and tokenization.</p> <p>Dictionary and Linguistics Tools allow you to write your own APIs and support more languages than the Language Dictionary product.</p>	
Minimum operating system level	OS/400 V5R1
Software type	Software Maintenance <ul style="list-style-type: none"> <li>▶ One Year 5733-M89</li> <li>▶ Three Year 5733-M90</li> </ul>
Ordering	5716-DCT is shipped with the System/38 Utilities product (5722-DB1)
Installation prerequisites	None
Replaces product	Language Dictionaries (5716-DCT)


## IBM Business Graphics Utility for AS/400 (5722-DS1)

IBM Business Graphics Utility for AS/400 (5722-DS1)		
<p>The Business Graphics Utility (BGU) for AS/400 licensed program provides a very flexible and powerful business graphics function through a menu-driven interface. Users can create, modify, store, display, print, and plot business graphics using data from a keyboard or database file. Exercise and tutorial materials are supplied in the <i>BGU User's Guide</i> to provide the necessary familiarization.</p> <p>Extensive options provided by BGU offer users considerable flexibility in creating computer-generated charts. Font style, font size, font color, line styles, legend type, legend position, annotation, and grid line construction are a few of the many options. A chart management facility provides convenient storage, retrieval, deletion, modifications, renaming, and copying of charts.</p>		
Minimum operating system level	OS/400 V5R1	
Software type	Software Subscription 5733-SW1 or 5733-SW3	
Ordering	Shipped as a chargeable software group-based OS/400 LPO.	
Installation prerequisites	None	
Replaces product	IBM Business Graphics Utilities for AS/400 (5769-DS1)	

# IBM Infoprint Fonts for Multiplatforms V1.1 (5648-E77)

<b>IBM Infoprint Fonts for Multiplatforms V1.1 (5648-E77)</b>	
<p>IBM Infoprint Fonts for Multiplatforms provides fonts that can be used by most Advanced Function Presentation products. It includes all the outline fonts in the IBM AFP Font Collection V2.1, with these enhancements:</p> <ul style="list-style-type: none"><li>▶ Euro support for Eastern European and Asia Pacific languages</li><li>▶ SAP support for Asia Pacific languages</li><li>▶ GB18030 support for People's Republic of China</li><li>▶ JIS X0213 support for Japan</li><li>▶ An improved graphical user interface (GUI) with context-sensitive help for the Type Transformer</li><li>▶ An improved GUI for RMARK font data</li></ul> <p>In addition, the GUIs that were in the AFP Font collection are improved.</p> <p>Some additional considerations for Infoprint Fonts are:</p> <ul style="list-style-type: none"><li>▶ Infoprint Fonts does not include the raster fonts included with the AFP Font Collection (5648-B45).</li><li>▶ If you currently have the AFP Font Collection and do not need the preceding functions, you do not need to migrate to Infoprint Fonts for Multiplatforms.</li></ul> <p>The AFP Font Collection is shipped automatically with PSF/400.</p>	
Minimum operating system level	OS/400 V5R1
Installation prerequisites	5722-SS1 Option 36, 37, or 38; PSF/400 is required
Related products	Infoprint Server, Infoprint Designer, Page Printer Formatting Aid, AFP Toolbox, iSeries Access
Replaces product	None
Further information	<a href="http://www.printers.ibm.com">http://www.printers.ibm.com</a> <a href="http://www.printers.ibm.com/R5PSC.NSF/web/as400overview">http://www.printers.ibm.com/R5PSC.NSF/web/as400overview</a>

<b>IBM Facsimile Support for iSeries (5798-FAX)</b>
<p>Facsimile Support for iSeries enables your users and your applications to send and receive faxes. Combined with native integrated modem hardware solutions, it provides a convenient, cost efficient fax solution for your business. It provides users with direct fax capabilities, which help increase operational efficiency and productivity through rapid information dispersal.</p> <p>Cost savings may also be achieved through reduced human intervention time, paper cost, telephone charges, postage charges, and document delivery time. Also, there is an audit trail of both inbound and outbound activity to track the flow of your business data.</p>

<b>IBM Facsimile Support for iSeries (5798-FAX)</b>		
Minimum operating system level	OS/400 V5R1	
Software type	Software Subscription 5733-SW1 or 5733-SW3	
Ordering	Shipped as a chargeable software group-based OS/400 LPO	
Installation prerequisites	For hardware and software requirements, see: <a href="http://www-1.ibm.com/servers/eserver/series/fax400/">http://www-1.ibm.com/servers/eserver/series/fax400/</a>	
Related products	IBM Integrated Domino Fax (5733-FXD)	
Replaces product	IBM Facsimile Support for AS/400 (5769-TBY)	
Further information	<a href="http://www-1.ibm.com/servers/eserver/series/fax400/">http://www-1.ibm.com/servers/eserver/series/fax400/</a> <a href="http://www.ibm.com/eserver/series/infocenter">http://www.ibm.com/eserver/series/infocenter</a> <a href="http://www.redbooks.ibm.com">http://www.redbooks.ibm.com</a>	

# IBM Advanced Function Printing Fonts for AS/400 (5769-FNT)

IBM Advanced Function Printing Fonts for AS/400 (5769-FNT)	
This is a set of 240 dpi fonts that primarily is provided for compatibility with existing print applications. Unless you have applications that require these specific fonts, the standard font product for OS/400 is AFP Font Collection (5648-B45).	
Minimum operating system level	OS/400 V5R1
Software type	Software Subscription
Related products	Infoprint Server, Infoprint Designer, Advanced Print Utility, Page Printer Formatting Aid, AFP Toolbox, and iSeries Access
Replaces product	None
Further information	<a href="http://www.printers.ibm.com/internet/wwsites.nsf/vwebpublished/main_ww">http://www.printers.ibm.com/internet/wwsites.nsf/vwebpublished/main_ww</a>



# IBM Advanced Function Printing DBCS Fonts for AS/400 (5769-FN1)

<b>IBM Advanced Function Printing DBCS Fonts for AS/400 (5769-FN1)</b>	
<p>IBM Advanced Function Printing DBCS Fonts for AS/400 is a rich selection of DBCS font families for use on 240 dots-per-inch, non-impact printers supported by AFP software integrated in the OS/400. This program includes:</p> <ul style="list-style-type: none"> <li>▶ Japanese fonts</li> <li>▶ Korean fonts</li> <li>▶ Traditional Chinese fonts</li> <li>▶ Simplified Chinese fonts</li> <li>▶ Thai fonts</li> </ul> <p>AFP is designed to allow printing on page printers. These fonts allow clients more flexibility in printing. Some common uses for these families are for printing books, brochures, business plans, handbooks, magazines, manuals, operating schedules, price lists, presentation materials, headlines, subtitles, and reports.</p> <p>Some of the features of IBM Advanced Function Printing are:</p> <ul style="list-style-type: none"> <li>▶ Provides a double-byte font library for use with 240 dots-per-inch, non-impact printers attached to an System i5 server</li> <li>▶ Enhances system management flexibility with AFP resources transfer</li> <li>▶ Allows for growth and flexibility in the use of AFP printers</li> <li>▶ Enhances user productivity by printing the same object on AFP printers attached to an S/370™ or System i5 server</li> </ul>	
Minimum operating system level	OS/400 V5R1
Software type	Software Subscription
Related products	Infoprint Server, Infoprint Designer, Advanced Print Utility, Page Printer Formatting Aid, AFP Toolbox, and iSeries Access
Replaces product	5716-FN1
Further information	<a href="http://www.printers.ibm.com/internet/wwwsites.nsf/vwebpublished/main_ww">http://www.printers.ibm.com/internet/wwwsites.nsf/vwebpublished/main_ww</a>

<b>IBM Infoprint Designer for iSeries (5733-ID1)</b>
<p>Infoprint Designer for iSeries provides a fully-graphical document composition interface to the iSeries printing and e-output system. It supports the requirements of today's complex documents and reports to produce fully electronic documents combining data, text, electronic forms, graphics, image, barcoding, and typographic fonts. Infoprint Designer for iSeries can be used for the design of new output applications or the re-engineering of existing applications.</p>



<b>IBM Infoprint Designer for iSeries (5733-ID1)</b>	
Minimum operating system level	OS/400 V4R5
Software type	Software Subscription 5733-SW1 or 5733-SW3
Ordering	Shipped as a chargeable software group-based OS/400 LPO
Installation prerequisites	5722-SS1 and option 37, 38, or 39 are optional iSeries Access for Windows
Related products	Infoprint Server, iSeries Access, and PSF/400
Replaces product	IBM Advanced Function Printing Utilities for iSeries (5722-AF1)
Further information	<a href="http://www.printers.ibm.com/internet/wwsites.nsf/vwebpublished/main_ww">http://www.printers.ibm.com/internet/wwsites.nsf/vwebpublished/main_ww</a>

<b>Infoprint Server for iSeries (5722-IP1)</b>	
<p>The focus of Infoprint Server is to extend the considerable capabilities of the iSeries beyond printing to the management and dissemination of output. As business applications are re-engineered into applications for On Demand Business, the output of those applications may need to change and flow electronically to the consumer of that output. Infoprint Server provides for <i>multi-channel</i> delivery of communications that include print, e-mail, Web, and other options.</p> <p>For enterprise printing requirements, Infoprint Server delivers improved efficiency, improved reliability, and lower overall printing costs. It applies iSeries printing management and System i5-attached printers to the task of handling all of the essential printing generated across the network.</p>	
Minimum operating system level	OS/400 V5R1
Software type	Software Subscription 5733-SW1 or 5733-SW3
Ordering	Shipped as a chargeable software group-based OS/400 LPO
Prerequisites	OS/400 PASE, Option 33, is required for PostScript, PCL, or Portable Document Format (PDF) to AFPDS transforms
Related products	PSF/400, Infoprint Designer, and Content Manager OnDemand
Replaces product	None



<b>Infoprint Server for iSeries (5722-IP1)</b>	
Further information	<a href="http://www.printers.ibm.com/internet/wwsites.nsf/vwebpublished/main_ww">http://www.printers.ibm.com/internet/wwsites.nsf/vwebpublished/main_ww</a>

<b>IBM Content Manager OnDemand for iSeries (5722-RD1)</b>	
<p>IBM Content Manager OnDemand for iSeries provides a powerful Enterprise Report Management solution to electronically capture and archive large volumes of computer-generated information. This includes customer statements, invoices, reports, scanned images, and e-mails.</p> <p>Content Manager OnDemand (OnDemand/400) supports electronic statement presentment solutions through robust, advanced client applications for both desktop and standard Web browsers, with advanced search and report mining capabilities. With OnDemand/400, enterprises can automatically organize printed output, and provide rapid, direct access to specific information, making more effective use of the massive amounts of information captured over time.</p>	
Minimum operating system level	OS/400 V5R1
Installation prerequisites	None
Related products	IBM Content Manager for iSeries, Content Manager CommonStore for Lotus Domino, Enterprise Information Portal
Client code	Downloaded from <a href="ftp://service.software.ibm.com/software/ondemand/fixes/v71/">ftp://service.software.ibm.com/software/ondemand/fixes/v71/</a>
Replaces product	5769-RD1
Further information	<a href="http://www.ibm.com/software/data/ondemand/400">http://www.ibm.com/software/data/ondemand/400</a>

<b>IBM Content Manager for iSeries (5722-VI1)</b>	
<p>IBM Content Manager for iSeries provides document imaging and workflow technology designed to replace cumbersome paper document processing with image processing to achieve greater productivity and process reliability. With <i>Advanced Workflow</i>, Content Manager provides a fast, efficient way to customize and automate business processes by automatically routing documents and folders through a business.</p> <p>Content Manager is highly scalable, from entry level to enterprise level needs. It extends the information infrastructure to manage unstructured content, integrate content with core business applications, and automate business processes.</p>	

<b>IBM Content Manager for iSeries (5722-VI1)</b>	
Minimum operating system level	OS/400 V5R1
Software type	Software Maintenance One Year 5733-M81 Three Year 5733-M82
Installation prerequisites	<a href="http://www.ibm.com/software/data/ondemand/400/">http://www.ibm.com/software/data/ondemand/400/</a>
Related products	Content Manager OnDemand, Content Manager CommonStore for Lotus Domino, Content Manager CommonStore for SAP, Enterprise Information Portal
Replaces product	IBM Content Manager for AS/400 (5769-VI1)
Further information	<a href="http://www-3.ibm.com/software/data/cm/cmgr/400">http://www-3.ibm.com/software/data/cm/cmgr/400</a>



<b>IBM Print Services Facility for iSeries (PSF/400) (5722-SS1 options 36, 37, and 38)</b>	
<p>Print Services Facility for OS/400 (PSF/400), a feature of OS/400, provides support for high-function Advanced Function Presentation (AFP) electronic printing and print management of IPDS printers. With AFP, application output can be transformed into fully graphical documents with electronic forms, image, graphics, barcoding, lines, boxes, and text in a wide variety of fonts. This flexibility enables the production of electronic documents that are more effective and enables the re-engineering of business processes.</p>	
Minimum operating system level	OS/400 V5R1
Software type	Software Subscription
Ordering	Feature of OS/400
Installation prerequisites	None
Related products	Infoprint Server for iSeries, AFP Font Collection Type Transformer for Windows, Infoprint Designer for iSeries, and Facsimile Support for iSeries
Replaces product	PSF/400 (5769-SS1)
Further information	<a href="http://www.printers.ibm.com/internet/wwsites.nsf/vwebpublished/main_ww">http://www.printers.ibm.com/internet/wwsites.nsf/vwebpublished/main_ww</a>



## Reference

# Reference



## AS/400, AS/400e, and iSeries model summary

This chapter identifies resources and capacities for all AS/400e and iSeries processors that are no longer marketed by IBM.

You can find summary charts of iSeries processors currently marketed by IBM in Chapter 5, “Today’s System i5 summary” on page 47.

## CISC systems

You can find resource and capacity information for the AS/400 CISC systems sold beginning in 1988 in *AS/400 CISC System Builder*, REDP-0042.

## RISC servers

You can find resource and capacity information for the AS/400e RISC servers sold beginning in 1996 in *AS/400e RISC System Builder*, REDP-0342. Refer to the *IBM @server iSeries and AS/400e System Builder*, SG24-2155, for resource and capacity information for AS/400e RISC systems that are not found in *AS/400e RISC System Builder*, REDP-0342.

## iSeries and AS/400e servers

This section presents resource and capacity information for the most recent systems *withdrawn from marketing*. As such, they detailed information is no longer represented in this IBM Redbook.

The following AS/400e and iSeries servers are found in this section:

- ▶ 9406 AS/400e Model 270
- ▶ 9406 AS/400e Model 720
- ▶ 9406 AS/400e Model 730
- ▶ 9406 AS/400e Model 740
- ▶ 9406 iSeries Model 800
- ▶ 9406 iSeries Model 810
- ▶ 9406 iSeries Model 820
- ▶ 9406 iSeries Model 825
- ▶ 9406 iSeries Model 830
- ▶ 9406 iSeries Model 840
- ▶ 9406 iSeries Model 870
- ▶ 9406 iSeries Model 890

Processor performance represents the relative performance (maximum capacity) of a processor feature running CPW in a client/server environment. Processor capacity is achievable when the commercial workload is not constrained by main storage and direct access storage device (DASD). Performance of the 5250 CPW represents the relative performance available to perform host-centric workloads. The amount of in 5250 CPW capacity consumed reduces the available processor capacity by the same amount.



Mail and Calendar Users (MCU) is a relative performance measurement derived by performing mail and calendar functions using Domino and Notes clients. The MCU workload represents concurrent users on a Notes client who are reading, updating, or deleting documents in an e-mail database. It also represents users who are performing lookups in the Domino Directory, and scheduling calendar appointments and invitations. Reported values reflect 70% processor utilization to allow for growth and peak loads in excess of client workload estimates.

5250 CPW (Interactive) is an approximate value that reflects the amount of Processor CPW that can be used for workloads performing 5250-based tasks. Remember that:

- ▶ The iSeries Enterprise Edition provides maximum 5250 CPW support (up to 100% of the capacity of the active processor CPW). The iSeries Standard Edition provides zero CPW for 5250 work.
- ▶ Any task that uses a 5250 data stream is considered 5250 online transaction processing (OLTP) work and requires some amount of 5250 CPW to process no matter how the task was started.
- ▶ A task submitted through a 5250 session (5250 device or 5250 emulation) that does display or printer input/output (I/O) requires 5250 CPW.
- ▶ A task submitted through a 5250 session (5250 device or 5250 emulation) as a “batch” job is not considered 5250 OLTP work and does not require any 5250 CPW unless the task does display or printer I/O.

Limited 5250 CPW is available with the Standard Edition for a system administrator to use 5250 display device I/O to manage various aspects of the server. Multiple administrative jobs exceed this capability

## 9406 Model 270

Model	270			
	#2248	#2250	#2252	#2253
Relative system performance				
Processor CPW	150	370	950	2000
5250 CPW				
Base #1516	-	0	0	0
#1517	25	-	-	-
#1518	-	30	-	-
#1519	-	-	50	-
#1520	-	-	-	70
Number/type/speed of processors	1/Pulsar/400 MHz	1/Pulsar/400 MHz	1/Pulsar/450 MHz	2/Pulsar/450 MHz
L2 Cache (MB)/processor	0	0	2	4
Main storage (MB min/max)	256 - 4096	256-4096	256-8192	256-8192
Main storage DIMMs (min/max)	2/8	2/8	2/16	2/16
Minimum operating system level	V4R5	V4R5	V4R5	V4R5
Software group	P05	P10/P10	P05	P20/P20

Model 270	Dedicated Server for Domino		
	#2422	#2423	#2424
Relative system performance (CPW)			
Processor CPW	50	100	200
5250 CPW	0	0	0
Simple Mail Users	2400	3860	7580
Mail and Calendaring Users	1600	2570	5050
Number/type/speed of processors	1/Pulsar/400 MHz	1/Pulsar/450 MHz	2/Pulsar/450 MHz
L2 Cache (MB)	0	2	4
Main storage (MB min/max)	256-4096	256-8192	256-8192
Main storage DIMMs (min/max)	2/8	2/16	2/16
Minimum operating system level	V4R5	V4R5	V4R5
Software group	P05	P05	P10

<b>Model</b>	<b>270</b>		
<b>Processor feature</b>	<b>#2431</b>	<b>#2432</b>	<b>#2434</b>
Relative system performance			
Processor CPW	465	1070	2350
5250 CPW			
#1516 (Base)	-	0	0
#1517	-	-	-
#1518	30	-	-
#1519	-	50	-
#1520	-	-	70
Number/type/speed of processors	1/SSTAR/ 540 MHz	1/SSTAR/ 540 MHz	2/SSTAR/ 600 MHz
L2 Cache (MB)/processor	0	2	4
Main storage (MB min/max)	256 - 8192	256 - 8192	256 - 16384
Main storage DIMMs (min/max)	1/8	1/8	2/16
Minimum operating system level	V5R1	V5R1	V5R1
Software group	P10	P10	P20

<b>Model</b>	<b>270 Dedicated Server for Domino</b>	
<b>Processor feature</b>	<b>#2452</b>	<b>#2454</b>
Relative system performance		
Processor CPW	100	240
5250 CPW	0	0
Mail and Calendar Users	3070	6660
Number/type/speed of processors	1/SSTAR/540 MHz	2/SSTAR/600 MHz
L2 Cache (MB)	2	4
Main storage (MB min/max)	256 - 8192	256 - 16384
Main storage DIMMs (min/max)	1/8	2/16
Minimum operating system level	V5R1	V5R1
Software group	P05	P10

Model	270		
Processor feature	#2431	#2432	#2434
Relative system performance			
Processor CPW	465	1070	2350
5250 CPW			
#1516 (Base)	-	0	0
#1517	-	-	-
#1518	30	-	-
#1519	-	50	-
#1520	-	-	70
Number/type/speed of processors	1/SSTAR/ 540 MHz	1/SSTAR/ 540 MHz	2/SSTAR/ 600 MHz
L2 Cache (MB)/processor	0	2	4
Main storage (MB min/max)	256 - 8192	256 - 8192	256 - 16384
Main storage DIMMs (min/max)	1/8	1/8	2/16
Minimum operating system level	V5R1	V5R1	V5R1
Software group	P10	P10	P20

## 9405 and 9406 Model 520

## 9406 Model 570

Model	570	
Processor feature	#8961	#8961 (x2)
Server feature	#0919	#0920
Relative system performance		
Processor CPW	3300/6000	6350/12000
Mail and Calendar Users	7300/13300	14100/26600
5250 CPW		
Standard	0	0
Enterprise	Maximum	Maximum
Number/type/speed of processor	0/2/POWER5/1.65 GHz	2/4/POWER5/1.65 GHz
L2 Cache (MB per processor)	1.88	1.88
L3 Cache (MB per processor)	36	36
Main storage (GB minimum/maximum)	2/65	2/128
Main storage DIMMs (minimum/maximum)	4/8	8/16
LPAR	10/20	20/40
Minimum i5/OS level	V5R3	V5R3

Model	570	
Processor feature	#8961	#8961 (x2)
Server feature	#0919	#0920
Software group	P30	P30

## 9406 Model 720

Model	720			
Processor feature	#2061	#2062	#2063	#2064
Relative system performance Version 4 Release 3 and later Processor CPW	240	420	810	1600
Interactive CPW/system feature code				
#1500 (Base)	35/206A	35/206D	35/207B	35/207F
#1501	70/206B	70/206E	-	-
#1502	120/206C	120/206F	120/207C	120/208A
#1503	-	240/207A	240/207D	240/208B
#1504	-	-	560/207E	560/208C
#1505	-	-	-	1050/208D
Number/type/speed of processors	1/Northstar/ 250 MHz	1/Northstar/ 250 MHz	2/Northstar/ 250 MHz	4/Northstar/ 250 MHz
Main storage (MB)	256-2048	256-4096	256-8192	256-8192
Software group	P10-P20	P10-P20	P20-P30	P20-P30

## 9406 Model 730

Model	730			
Processor feature	#2065	#2066	#2067	#2068
Relative system performance Version 4 Release 3 and later Processor CPW	560	1050	2000	2890
Interactive CPW/system feature code				
#1506 (Base)	70/2A6A	70/2A6E	70/2B6D	70/2C6C
#1507	120/2A6B	120/2A6F	-	-
#1508	240/2A6C	240/2B6A	240/2B6E	240/2C6D
#1509	560/2A6D	560/2B6B	560/2B6F	560/2C6E
#1510	-	1050/2B6C	1050/2C6A	1050/2C6F
#1511	-	-	2000/2C6B	2000/2D6A
Number/type/speed of processors	1/Northstar/ 262 MHz	2/Northstar/ 262 MHz	4/Northstar/ 262 MHz	8/Northstar/ 262 MHz
Main storage (MB)	512-24576	512-24576	512-24576	1024-24576

Software group	P20-P30	P20-P30	P30-P40	P30-P40
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## 9406 Model 740

Model	740	
Processor feature	#2069	#2070
Relative system performance Version 4 Release 3 and later Processor CPW	3660	4550
Interactive CPW/system feature code		
#1514 (Base)	120/2D6B	120/2E6A
#1510	1050/2D6C	1050/2E6B
#1511	2000/2D6D	2000/2E6C
#1512	3660/2D6E	3660/2E6D
#1513	-	4550/2E6E
Number/type/speed of processors	8/Northstar/ 262MHz	12/Northstar/ 262MHz
Main storage (MB)	1024-40960	1020-40960
Software group	P40-P50	P40-P50

## 9406 Model 800

Model	800		
Processor feature	#2463		#2464
Server feature	#0863	#0864	#0865
Relative system performance			
Processor CPW	300	300	950
5250 CPW			
#7400	25	25	-
#7408	-	-	50
Number/type/speed of processor	1/SSStar/540 MHz	1/SSStar/540 MHz	1/SSStar/750 MHz
L2 Cache (MB) per processor	0	0	2
Main storage (MB minimum to maximum)	256 to 8192	256 to 8192	256 to 8192
Main storage DIMMs (minimum/maximum)	1/8	1/8	1/8
Minimum operating system level	V5R2	V5R2	V5R2
Software group	P05	P05	P10

## 9406 Model 810

Model	810			
Processor feature	#2465	#2466	#2467	#2469

Server feature	#0868	#0866	#0867	#0869
Relative system performance				
Processor CPW	750	1020	1470	2700
5250 CPW				
Standard	0	0	0	0
Enterprise	750	1020	1470	2700
High Availability	750	1020	1470	2700
Number/type/speed of processor	1/SStar/540 MHz	1/SStar/540 MHz	1/SStar/750 MHz	2/SStar/750 MHz
L2 Cache (MB) per processor	2	2	4	4
Main storage (MB minimum to maximum)	512 to 16384	512 to 16384	512 to 16384	512 to 16384
Main storage DIMMs (minimum/maximum)	1/8	1/8	1/8	2/16
Minimum operating system level	V5R2	V5R2	V5R2	V5R2
Software group	P10	P10	P10	P20

Model	810 iSeries for Domino		
Processor feature	#2466	#2467	#2469
Server feature <sup>9c</sup>	#0769	#0770	#0771
Relative system performance			
Processor CPW	1020	1470	2700
Mail and Calendar Users (MCU)	3100	4200	7900
5250 CPW			
Domino	0	0	0
Number/type/speed of processor	1/SStar/540 MHz	1/SStar/750 MHz	2/SStar/750 MHz
L2 Cache (MB) per processor	2	4	4
Main storage (GB minimum to maximum)	1.5 to 16	3.5 to 16	5.5 to 16
Main storage DIMMs (maximum)	8	8	16
Minimum operating system level	V5R2	V5R2	V5R2
Software group	P10	P10	P20



## 9406 Model 820

Model	820			
Processor feature	#2395	#2396	#2397	#2398
Relative system performance		950	2000	3200
Processor CPW	370			
5250 CPW				
#1521	35	35	35	35
#1522	70	70	70	70
#1523	120	120	120	120
#1524	240	240	240	240
#1525	-	560	560	560
#1526	-	-	1050	1050
#1527	-	-	-	2000
Number/type/speed of processors	1/Pulsar/400 MHz	1/Pulsar/450 MHz	2/ISTAR/500 MHz	4/ISTAR/500 MHz
L2 Cache (MB)	0	2	4	4
Main storage (MB min/max)	256 - 4096	256-8192	256-16384	256-16384
Main storage DIMMs (min/max)	2/8	2/16	2/32	2/32
Minimum operating system level	V4R5	V4R5	V4R5	V4R5
Software group	P10-P20	P20-P30	P20-P30	P30-P40

Model	Dedicated Server for Domino		
Processor feature	#2425	#2426	#2427
Relative system performance	100	200	300
Processor CPW			
5250 CPW	0	0	0
Simple Mail Users	4250	8000	14400
Mail and Calendaring Users	2570	5610	9890
Number/type/speed of processors	1/Pulsar/450 MHz	2/ISTAR/500 MHz	4/ISTAR/500 MHz
L2 Cache (MB)	2	4	4
Main storage (MB min/max)	256-8192	256-16384	256-16384
Main storage DIMMs (min/max)	2/16	2/32	2/32
Minimum operating system level	V4R5	V4R5	V4R5
Software group	P05	P10	P10

<b>Model</b>	<b>820</b>			
<b>Processor feature</b>	<b>#2435</b>	<b>#2436</b>	<b>#2437</b>	<b>#2438</b>
Relative system performance				
Processor CPW	600	1100	2350	3700
5250 CPW				
None	-	-	-	-
#1521	35	35	35	35
#1522	70	70	70	70
#1523	120	120	120	120
#1524	240	240	240	240
#1525	-	560	560	560
#1526	-	-	1050	1050
#1527	-	-	-	2000
Number/type/speed of processors	1/SSTAR/ 600 MHz	1/SSTAR/ 600 MHz	2/SSTAR/ 600 MHz	4/SSTAR/ 600 MHz
L2 Cache (MB)	2	2	4	4
Main storage (MB min/max)	256 - 8192	256 - 16384	256 - 32768	256 - 32768
Main storage DIMMs	2/8	2/16	2/32	2/32
Minimum operating system level	V5R1	V5R1	V5R1	V5R1
Software group	P10 or P20	P20 or P30	P20 or P30	P30 or P40

<b>Model</b>	<b>820 Dedicated Server for Domino</b>		
<b>Processor feature</b>	<b>#2456</b>	<b>#2457</b>	<b>#2458</b>
Relative system performance			
Processor CPW	120	240	380
5250 CPW	0	0	0
Mail and Calendar Users	3110	6600	11810
Number/type/speed of processors	1/SSTAR/600 MHz	2/SSTAR/600 MHz	4/SSTAR/600 MHz
L2 Cache (MB)	2	4	4
Main storage (MB min/max)	256 - 16384	256 - 32768	256 - 32768
Main storage DIMMs (min/max)	2/16	2/32	2/32
Minimum operating system level	V5R1	V5R1	V5R1
Software group	P05	P10	P10

Model	820		
Processor feature	#0150	#0151	#0152
Relative system performance			
Processor CPW	1100	2350	3700
5250 CPW			
None	0	0	0
#1521	-	-	-
#1522	-	-	-
#1523	-	-	-
#1524	-	-	-
#1525	-	-	-
#1526	-	-	-
#1527	-	-	-
Number/type/speed of processors	1/SSTAR/600 MHz	2/SSTAR/600 MHz	4/SSTAR/600 MHz
L2 Cache (MB)	2	4	4
Main storage (MB min/max)	256 - 16384	256 - 32768	256 - 32768
Main storage DIMMs	2/16	2/32	2/32
Minimum operating system level	V5R1	V5R1	V5R1
Software group	P20	P20	P30

## 9406 Model 825

Model	825			
Processor feature	#2473			#2495
Server feature	#0873	-	-	#0890
Server feature for Domino	-	#0772	#0773	-
Relative system performance				
Processor CPW	3600/6600	-	-	1250/6600
Mail and Calendar Users (MCU)	-	11600	17400	-
5250 CPW				
Standard and Domino	-	0	0	-
Enterprise	Maximum	-	-	-
High Availability	Maximum	-	-	-
Capacity Backup	-	-	-	Maximum
Number/type/speed of processor	3/6/POWER4/ 1.1 GHz	4/POWER4/ 1.1 GHz	6/POWER4/ 1.1 GHz	1/6/POWER4/ 1.1 GHz
L3 Cache (MB per processor)	16	16	16	16
L2 Cache (MB per processor)	0.72	0.72	0.72	0.72
Main storage (GB minimum to maximum)	2 to 48	6 to 48	12 to 48	2 to 48
Main storage DIMMs (minimum/maximum)	8/24	8/24	8/24	8/24

Minimum operating system level	V5R2	V5R2	V5R2	V5R2
Software group	P30	P30	P30	P30

## 9406 Model 830

Model	830	
	#2402	#2403
Relative system performance Processor CPW	4200	7350
5250 CPW		
#1531 (Base)	70	70
#1532	120	120
#1533	240	240
#1534	560	560
#1535	1050	1050
#1536	2000	2000
#1537	-	4550
Number/type/speed of processors	4/ISTAR/540 MHz	8/ISTAR/540 MHz
L2 Cache (MB)	4	4
Main storage (GB min/max)	1-64	1-64
Main storage DIMMs (min/max)	8/64	8/64
Minimum operating system level	V4R5	V4R5
Software group	P30-P40	P40-P50

Model	830		
	#0153	#2349	#2400
Relative system performance Processor CPW	7350	4200/7350	1850
5250 CPW	0		
#1531 (Base)		70	70
#1532		120	120
#1533		240	240
#1534		560	560
#1535		1050	1050
#1536		2000	-
#1537		4550	-
Number/type/speed of processors	8/ISTAR/540 MHz	4/8/ISTAR/540 MHz	2/ISTAR/400 MHz
L2 Cache (MB)	4	4	2
Main storage (GB min-max)	1 - 64	1 - 64	1 - 64
Main storage DIMMs (min/max)	8/64	8/64	8/64

Minimum operating system level	V5R1	V5R1	V4R5
Software group	P30	P30 or P40	P20 or P30

## 9406 Model 840

Model	840				
	#0158	#0159	#2352	#2353	#2354
Relative system performance					
Processor CPW	12000	20200	9000-12000	12000-16500	16500-20200
5250 CPW	0	0			
#1540 (Base)			120	120	120
#1541			240	240	240
#1542			560	560	560
#1543			1050	1050	1050
#1544			2000	2000	2000
#1545			4550	4550	4550
#1546			10000	10000	10000
#1547			-	16500	16500
#1548			-	-	20200
Number/type/ speed of processors	12/SSTAR/ 600 MHz	24/SSTAR/ 600 MHz	8 - 12/ SSTAR/ 600 MHz	12 - 18/ SSTAR/ 600 MHz	18 - 24/ SSTAR/ 600 MHz
L2 Cache (MB)	16x4	16x4	16x4	16x4	16x4
Main storage (GB min/max)	4/128	4/128	4/128	4/128	4/128
Main storage cards (min/max)	4/16	4/16	4/16	4/16	4/16
Minimum operating system level	V5R1	V5R1	V5R1	V5R1	V5R1
Software group	P40	P40	P40 or P50	P40 or P50	P40 or P50

Model	840					
	#2416	#2417	#2418	#2419	#2420	#2461
Relative system performance						
Processor CPW	10000	13200	10000	16500	16500	20200
5250 CPW						
#1540 (Base)	120	120	120	120	120	120
#1541	240	240	240	240	240	240
#1542	560	560	560	560	560	560
#1543	1050	1050	1050	1050	1050	1050
#1544	2000	2000	2000	2000	2000	2000
#1545	4550	4550	4550	4550	4550	4550
#1546	10000	10000	10000	10000	10000	10000
#1547	-	-	-	16500	16500	16500
#1548						20200

Model	840					
Number/ type/ speed of processors	8 to 12/ ISTAR/ 500 MHz	12 to 18/ ISTAR/ 500 MHz	12/ISTAR/ 500 MHz	18 to 24/ ISTAR/ 500 MHz	24/ISTAR/ 500 MHz	24/SSTAR/ 600 MHz
L2 Cache (MB)	8	8	8	8	8	16x4
Main storage (GB min/max)	4/128	4/128	4/128	4/128	4/128	4/128
Main storage cards (min/max)	4/16	4/16	4/16	4/16	4/16	4/16
Minimum operating system level	V4R5	V4R5	V4R5	V4R5	V4R5	V5R1
Software group	P40-P50	P40-P50	P40-P50	P40-P50	P40-P50	P40-P50

## 9406 Model 870

Model	870		
Processor feature	#2486	#2489	#2496
Server feature	#0886	#0889	#0891
Relative system performance			
Processor CPW	11500/20000	7700/11500	3200/20000
5250 CPW			--
Standard	0	0	0
Enterprise	Maximum	Maximum	Maximum
High Availability	Maximum	Maximum	Maximum
Capacity BackUp	--	--	Maximum
Number/type/speed of processor	8/16/POWER4/ 1.3 GHz	5/8/POWER4/ 1.3 GHz	2/16/POWER4/ 1.3 GHz
L2 and L3 Cache (MB/processor)	16.72	16.72	16.72
Main storage (GB minimum to maximum)	8 to 128	8 to 64	8 to 128
Main storage cards (minimum/maximum)	2/4	2/2	2/4
Minimum operating system level	V5R2	V5R2	V5R2
Software group	P40	P40	P40

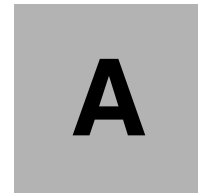
## 9406 Model 890

Model	890		
Processor feature	#2497	#2498	#2499
Server feature	#0897	#0898	#0892
Relative system performance			
Processor CPW	20000/29300	29300/37400	5600/37400
5250 CPW			
Standard	0	0	0
Enterprise	Maximum	Maximum	-
High Availability	Maximum	Maximum	-
Capacity Backup	-	-	Maximum
Number/type/speed of processor	16/24/POWER4/ 1.3 GHz	24/32/POWER4/ 1.3 GHz	4/32/POWER4/ 1.3 GHz
L2 and L3 Cache (MB/processor)	16.72	16.72	16.72
Main storage (GB minimum to maximum)	8 to 192	16 to 256	16 to 256
Main storage cards (minimum/maximum)	2/6	4/8	4/8
Minimum operating system level	V5R2	V5R2	V5R2

Model	890		
Processor feature	#2497	#2498	#2499
Server feature	#0897	#0898	#0892
Software group <sup>6e</sup>	P50	P50	P50

Model	890			
Processor feature	#0197	#0198	#2487	#2488
Relative system performance <sup>1</sup>				
Processor CPW	29300	37400	20200 - 29300	29300 - 37400
5250 CPW <sup>5</sup>	0	0		
#1576 (Base)			120	120
#1577			240	240
#1578			560	560
#1579			1050	1050
#1581			2000	2000
#1583			4550	4550
#1585			10000	10000
#1587			16500	16500
#1588			20200	20200
#1591			---	37400
Number/type/speed of processor	24/POWER4/ 1.3 GHz	32/POWER4/ 1.3 GHz	16 - 24/POWER4/ 1.3 GHz	24 - 32/POWER4/ 1.3 GHz
L2 Cache (MB)	1.5 MB/chip set	1.5 MB/chip set	1.5 MB/chip set	1.5 MB/chip set
L2 and L3 Cache (MB/processor)	16.72	16.72	16.72	16.72
Main storage (GB min-max)	16 - 192	24 - 256	16 - 192	24 - 256
Main storage cards (min/max)	2/6	4/8	2/6	4/8
Minimum operating system level <sup>7</sup>	OS/400 V5R2	OS/400 V5R2	OS/400 V5R2	OS/400 V5R2
Software group <sup>6</sup>	P50	P50	P50-P60	P50-P60





## Referenced lists

This appendix accommodates lists and details that are considered pertinent to you, as referred to within the context of this publication. The details are presented in this appendix to improve the readability of the base information.

## Options included in OS/400 and i5/OS

To view all the options of OS/400 and other programs then the manual “Install, Upgrade or Delete i5/OS and Related Software” (SC41-5120-08) should be referred to. It can be found in the Information Center at:

<http://publib.boulder.ibm.com/series/>

## Products and features no longer marketed by IBM

As products and features are withdrawn from marketing, they are removed from the published edition of the handbook. The tables in this section identify such products.

The currently available features are listed in this book, which may assist with providing a replacement. Refer to the iSeries Upgrade Planning Web site for further information:

<http://www-03.ibm.com/servers/eserver/support/series/planning/upgrade/>

You can find alternate solutions for features no longer supported at V5R3 and V5R4 (and earlier releases) on the Web at:

<http://www-03.ibm.com/servers/eserver/support/series/planning/upgrade/v5r3/index.html>

<http://www-03.ibm.com/servers/eserver/support/series/planning/upgrade/v5r4/index.html>

## Hardware no longer marketed by IBM

### Hardware withdrawn from marketing

The hardware products and features shown in the following table are now withdrawn from marketing, along with the recommended replacement.

Product or feature	Withdrawal date	Recommended replacement
2105 Model B09 Versatile Storage Server™ (VSS)	24 November 1999	2105-800
2105 Models Exx IBM TotalStorage Enterprise Storage Server (ESS)	29 September 2000	2105-800
2105 Model F10 ESS	22 November 2000	2105-800
2105 Model F20 ESS	31 December 2003	2105-800

Product or feature	Withdrawal date	Recommended replacement
2109 Mod S08 S16 SAN Fibre Channel Switch	30 January 2003	3534 Model F08, 2109 Model F16
2422 ½-inch Reel Tape Drive		3580, 3590
2440 Magnetic Tape Subsystem (½-inch Reel Tape Drive)	20 January 1992	3580, 3590
2480 Wireless LAN Access Point (2480-RS0)	13 January 1999	N/A
2480 Wireless LAN Access Point (2480-E00, -EB0, -TR0, -TB0)	24 May 1999	N/A
2482 AS/400 Wireless Portable Transaction Computer (PTC)	24 May 1999	N/A
2483 Integrated Laser PTC for AS/400 Wireless Network	24 May 1999	N/A
2484 Industrial PTC for AS/400 Wireless Network	24 May 1999	N/A
2486 IBM PTC	24 May 1999	N/A
3430 Magnetic Tape Subsystem (½-in. Reel Tape Drive)	19 December 1989	3580, 3590
3490E Models F00 F01, F11, F1A, FC0 Magnetic Tape	28 June 2002	3580, 3590
3494 - L10, D10 IBM TotalStorage Enterprise Tape Library	27 December 2002	3494 L12, D12
3499 All Model Media	26 December 2003	N/A
3534 Model 1RU SAN Fibre Channel Managed Hub	14 February 2003	3534-F08
3570 Models Bxx Magstar® MP (Multi-Purpose) Tape Library	31 December 1999	3580, 3581, 3582
3570 Models Cxx Magstar MP (Multi-Purpose) Tape Library	27 December 2002	3580, 3581, 3582
3575 Models Lxx Magstar MP (Multi-Purpose) Tape Library Dataserver	28 June 2002	3583, 3584
3583-Lxx Ultrium Scalable Tape Library Models L18, L36, L72	announced to be withdrawn 27 January 2006	3576-L5B
3584-D42 UltraScalable Tape Library	25 April 2003	N/A
3995 Models A43, 043 143, 042, 142 Optical library	06 December 1996	3995 C40, C42, C44, C48
3995 Models C20, C22, C24, C26, C28 Optical Library, LAN attached	31 January 2002	N/A
5308 ASCII to 5250 Connection	21 December 1999	N/A
5494 Remote Control Unit	21 December 1999	N/A
5500 Express IP Control Unit	21 December 1999	N/A

Product or feature	Withdrawal date	Recommended replacement
6299 Midrange Hub	01 September 1999	N/A
7210-020 External CD ROM	29 June 2001	7210-025
7208-342 External 8mm Tape Drive	27 June 2003	7208-345
7208-345 60 GB External 8mm Tape Drive	31 March 2005	
7315-CR2 Hardware Management Console	29 April 2005	
7852-40Z AS/400 Data/Fax Modem V.34	12 March 2002	#0032 Modem
7852-400 External V.34 Data/Fax Modem	01 November 2003	#0032 Modem
8361 -100 Network Station® series 100 Ethernet	14 October 1999	Neoware Eon Thin Client
8361 - 200 Network Station series 100 Token-Ring	14 October 1999	Neoware Eon Thin Client
8361 - 210 Network Station series 300 Token-Ring	31 December 1999	Neoware Eon Thin Client
8361 - 341 Network Station series 300 Twinax	31 December 1999	Neoware Eon Thin Client
9309 1.6m Rack Enclosure	01 October 2002	#0551 iSeries Tower
9347 Tape drive	31 October 2000	3580
9348 Magnetic tape device	26 February 1999	3580
Model 150 - System and features	31 October 2000	Model 520
Model 236 - Model upgrades from Model 236 to Model 436	25 February 2000	N/A
Model 436 Processor upgrades within the Model 436	25 February 2000	N/A
Model 170 - All models	31 May 2002	Model 520
Model 170 - All processor upgrades	28 December 2001	Model 520
Model 250- All models	16 June 2004	Model 520
Model 270 - All models, new model sales	21 November 2003	Model 520
Model 4xx - Model upgrades from 4xx to 7xx	30 June 2000	N/A
Model 5xx - Model upgrades from 5xx to 7xx	30 June 2000	N/A
Model 6xx - Model 600, 620, 640, and 650	31 May 1999	Model 520
Model 6xx - Model upgrades from 6xx to 6xx and processor feature conversions within 6xx models	31 May 2000	N/A

Product or feature	Withdrawal date	Recommended replacement
Model 6xx/Sxx - Model upgrades from 6xx/Sxx to 7xx/8xx	28 September 2001	N/A
Model 7xx - All models, new model sales Model 720 Model 730 Model 740	28 December 2001	Model 520 Model 520, 550 Model 550, 570
Model 7xx to 7xx model upgrades	28 December 2001	N/A
Model 7xx - Processor and interactive feature upgrades within 7xx models	02 July 2002	N/A
Model 7xx to 820, 830, 840 model upgrades	08 October 2003	
Models 800, 810, 825, 870, and 890	01 October 2005	
Model 820 - #2396, #2397, #2398, #2425, #2426, and #2427 Model 820 processors	21 November 2003	Model 520, 550
Model 830 - #2402 and #2403 Model 830 processors	21 November 2003	Model 550, 570
Model 840 - #2416, #2417, #2418, #2419, #2420, and #2461 Model 840 processors	21 November 2003	Model 570
Model 890 - #0197, #0198, #2487, and #2488 Model 890 processors	07 May 2003	Model 570, 595
Model SB1 System	29 December 2000	Model 550, 570
Model SB2 System	03 December 2002	Model 550, 570
Model SB3 System	03 December 2002	Model 570
Model Sxx - Model S10, S20, S30, S40	31 May 1999	Model 520, 550
Model Sxx - Model upgrades from Sxx to Sxx and processor feature conversions within Sxx	31 May 2000	N/A
Model Sxx - Model upgrades from Sxx to 7xx/8xx	28 September 2001	N/A
#0001 - MES Bulk Order	02 July 2002	N/A
#0018 - 2440-xxx Local Source Rack Mount	30 June 2000	N/A
#0029 - 9347-xx Local Source Rack Mount	31 October 2000	N/A
#0034 - Red Covers	31 October 2000	N/A
#0046 - OptiConnect system	28 December 2001	N/A
#0059 - Transition Data Link	31 May 2000	N/A
#0086 - Optimize 3590 Performance	31 May 1999	N/A
#0088 - OptiConnect Cluster Specify	28 December 2001	N/A

Product or feature	Withdrawal date	Recommended replacement
#0123 - #5074 Lower Unit in Rack	03 December 2002	N/A
#0134 Field Install in Rack (HD)	03 November 2003	
#0150 - 820 Base Processor	21 November 2003	Model 520, 550
#0151 - 820 Base Processor	01 October 2004	Model 520, 550
#0152 - 820 Base Processor	01 October 2004	Model 520, 550
#0153 - 830 8-way Processor	21 November 2003	Model 550, 570
#0158 - 840 12-way Processor	21 November 2003	Model 570
#0159 - 840 24-way Processor	21 November 2003	Model 570
#0185 - Performance Enhancement Model 150	31 October 2000	N/A
#0197 - Model 890 24-way processor	07 May 2003	Model 595
#0198 - Model 890 24-way processor	07 May 2003	Model 595
#0121 - 270 Lower Unit in a Rack	21 November 2003	N/A
#0122 - 270 Upper Unit in a Rack	21 November 2003	N/A
#0202 - Staged Upgrade Offering	31 May 1999	N/A
#0203 - Side-by-Side Install	02 July 2002	N/A
#0204 - Staged Side-by-Side Upgrade	31 May 1999	N/A
#0205 RISC-to-RISC Data Migration	1 April 2005	
#0220 - Token ring on IPCS	1 December 2005	#0223
#0221 - Ethernet on IPCS	1 December 2005	#0224, #0225
#0295 - Performance Enhancement/28WS	31 October 2000	N/A
#0297 - Model 250 Package	16 June 2004	Model 520
#0298 - Model 250 Package	16 June 2004	Model 520
#0328 - Operations Console Cable	21 November 2003	#0367
#0349 V.24/EIA232 50-ft./15m PCI cable	02 December 2002	
#0362 - 20-ft. Communications Console Cable	31 January 2001	#0367
#0366 - Optical Bus Cable 20m	28 December 2001	N/A
#0380, #0381 Remote Control Panel Cable, #0382 Remote Control Panel Cable	02 July 2002	Virtual Control Panel, see Info APAR II13117

Product or feature	Withdrawal date	Recommended replacement
#0398 - Operations Console Package	02 July 2002	#9771
#0399 - 4 Port Twinaxial Expansion	30 June 2000	N/A
#0399 - Model 150 4 port Twinaxial Expansion	31 May 2000	N/A
#0578 PCI Expansion Unit in Rack	01 October 2004	N/A
#0588 PCI-X Expansion Unit in Rack	announced to be withdrawn 1 June 2006	
#0591 - Entry Twinaxial Package V4R4 (type 9401)	31 October 2000	Model 520
#0592 - Growth Twinaxial Package V4R4 (type 9401)	31 October 2000	Model 520
#0593 - Entry Server Package V4R4 (type 9401)	31 October 2000	Model 520
#0594 - Growth Server Package V4R4 (type 9401)	31 October 2000	Model 520
#0601 Direct Attach #2743 PCI 1 Gbps Ethernet IOA	01 October 2004	#0620
#0602 Direct Attach #2760 PCI 1 Gbps Ethernet UTP IOA	01 October 2004	#0621
#0604 Direct Attach #2763 PCI RAID Disk Unit Controller Conversions to feature remain available.	21 November 2003	#0618
#0605 Direct Attach #4748 PCI RAID Disk Unit Controller Conversions to feature remain available.	02 July 2002	#0606
#0606 Direct Attach #4778 PCI RAID Disk Unit Controller Conversions to feature remain available.	119 November 2004	#0618
#0618 Direct Attach #2757 PCI-X Ultra RAID Disk Controller	01 June 2006	#0627
#0628 Direct Attach #5703 PCI-X RAID Disk Unit Controller	01 June 2006	#0648
#0645 Direct Attach #5712 PCI-X Tape/DASD Controller	01 June 2006	#0647
#1312 - 1-Byte 1.03 GB Disk Unit Kit	31 October 2000	N/A
#1313 - 1-Byte 1.96 GB Disk Unit Kit	31 October 2000	N/A
#1322 - 2-Byte 1.03 GB Disk Unit Kit	31 October 2000	N/A
#1323 - 2-Byte 1.96 GB Disk Unit Kit	31 October 2000	N/A
#1325 - 2-Byte 1.03 GB Disk Unit Kit	31 October 2000	N/A
#1326 - 2-Byte 1.96 GB Disk Unit Kit	31 October 2000	N/A
#1327 - 2-Byte 4.19 GB Disk Unit Kit	31 October 2000	N/A
#1333 - 2-Byte 8.58 GB Disk Unit Kit	31 October 2000	N/A
#1334 - 2-Byte 17.54 GB Disk Unit Kit	31 October 2000	N/A

<b>Product or feature</b>	<b>Withdrawal date</b>	<b>Recommended replacement</b>
#1336 - 2-Byte 1.96 GB Disk Unit Kit	31 October 2000	N/A
#1337 - 2-Byte 4.19 GB Disk Unit Kit	31 October 2000	N/A
#1349 - 1.2 GB ¼-inch Tape Kit	31 October 2000	#4582
#1350 - 2.5 GB ¼-inch Tape Kit	31 October 2000	#4582
#1355 - 13.0 GB ¼-inch Tape Kit	31 October 2000	#4583
#1360 7.0 GB 8mm Cartridge Tape Kit	31 October 2000	7208-345 8mm
#1471 30m Optical HSL Cable	21 November 2003	#1472
#1490 to #1496 - Interactive Capacity Specify	02 July 2002	Enterprise Edition iSeries
#1500 to #1514 - Interactive Capacity Cards	02 July 2002	Enterprise Edition iSeries
#1517 to #1527, #1531 to #1547 - Interactive Capacity Cards	01 October 2004	Enterprise Edition iSeries
#1576 - Interactive Capacity Card	21 November 2004	Enterprise Edition iSeries
#1577 to #1578 - Interactive Capacity Card	01 October 2004	Enterprise Edition iSeries
#1579, #1581, #1583, #1585, #1587, #1591 - Interactive Capacity Card	21 November 2003	Enterprise Edition iSeries
#2061 - Model 720 Processor	28 December 2001	Model 520
#2062 - Model 720 Processor	02 July 2002	Model 520
#2063 - Model 720 2-way Processor	02 July 2002	Model 520
#2064 - Model 720 4-way Processor	02 July 2002	Model 520
#2065 - Model 730 Processor	28 December 2001	Model 520, 550
#2066 - Model 730 2-way Processor	02 July 2002	Model 520, 550
#2067 - Model 730 4-way Processor	02 July 2002	Model 520, 550
#2068 - Model 730 8-way Processor	02 July 2002	Model 520, 550
#2069 - Model 740 Processor	28 December 2001	Model 570
#2070 - Model 740 12-way Processor	02 July 2002	Model 570
#2159 - Model 170 Processor	February 2000	Model 520
#2248 - Model 270 Processor	21 November 2003	Model 520



<b>Product or feature</b>	<b>Withdrawal date</b>	<b>Recommended replacement</b>
#2250 - Model 270 Processor	03 December 2002	Model 520
#2252 - Model 270 Processor	03 December 2002	Model 520
#2253 - Model 270 2-way Processor	03 December 2002	Model 520
#2289 - Model 170 Processor	31 May 2002	Model 520
#2295 - Model 250 Processor	02 July 2002	Model 520
#2296 - Model 250 Processor	02 July 2002	Model 520
#2310 - Model SB1 8-way Processor	25 July 2000	Model 550, 570
#2311 - Model SB1 12-way Processor	25 July 2000	Model 550, 570
#2312 - Model SB1 8-way Processor	25 July 2000	Model 550, 570
#2313 - Model SB1 12-way Processor	25 July 2000	Model 550, 570
#2315 - Model SB2 8-way Processor	03 December 2002	Model 550, 570
#2316 - Model SB3 12-way Processor	03 December 2002	Model 570
#2318 - Model SB3 24-way Processor	03 December 2002	Model 570
#2349 - Model 830 4/8-way Processor	01 October 2004	Model 550, 570
#2351 Model 830 1/8-way (POD)	21 November 2003	Model 550, 570
#2352 Model 840 8/12-way (POD)	21 November 2003	Model 570
#2353 Model 840 12/18-way	01 October 2004	Model 570
#2354 Model 840 18/24-way	01 October 2004	Model 570
#2395 Model 820 Processor	21 November 2003	Model 520, 550
#2396 Model 820 Processor	03 December 2002	Model 520, 550
#2397 Model 820 2-way Processor	03 December 2002	Model 520, 550
#2398 Model 820 4-way Processor	03 December 2002	Model 520, 550
#2400 Model 830 2-way Processor	21 November 2003	Model 550, 570
#2402 Model 830 4-way Processor	03 December 2002	Model 550 570
#2403 Model 830 8-way Processor	03 December 2002	Model 550, 570
#2407 Model 170 Dedicated Domino Processor	31 May 2002	Model 520
#2416 Model 840 8/12-way	03 December 2002	Model 570
#2417 Model 840 12/18-way	03 December 2002	Model 570

<b>Product or feature</b>	<b>Withdrawal date</b>	<b>Recommended replacement</b>
#2418 Model 840 12-way Processor	03 December 2002	Model 570
#2419 Model 840 18/24-way	03 December 2002	Model 570
#2420 Model 840 24-way Processor	03 December 2002	Model 570
#2422 Dedicated Domino Processor	03 December 2002	Model 520
#2423 Dedicated Domino Processor	03 December 2002	Model 520
#2424 Dedicated Domino 2-way Processor	03 December 2002	Model 520
#2425 Dedicated Domino Processor	03 December 2002	Model
#2426 Dedicated Domino 2-way Processor	03 December 2002	Model
#2427 Dedicated Domino 4-way Processor	03 December 2002	Model
#2431 9406 Model 270 Processor	01 October 2004	Model 520
#2432 9406 Model 270 Processor	01 October 2004	Model 520
#2434 9406 Model 270 Processor	01 October 2004	Model 520
#2435 9406 820 Processor	01 October 2004	Model 520, 550
#2436 9406 820 Processor	01 October 2004	Model 520, 550
#2437 9406 820 2-way Processor	01 October 2004	Model 520, 550
#2438 9406 820 4-way Processor	01 October 2004	Model 520, 550
#2452 9406 Model 270 Processor	01 October 2004	Model 520
#2454 9406 Model 270 Processor	01 October 2004	Model 520
#2461 9406 Model 840 24-way Processor	03 December 2002	Model 570
#2487 Model 890 16/24-way Processor	07 May 2003	Model 570, 595
#2488 Model 890 24/32-way Processor	07 May 2003	Model 595
#2605 ISDN Basic Rate Interface Adapter	31 December 1999	#2742
#2609 EIA 232/V.24 Two-Line Adapter	31 March 1999	#2742
#2610 EIA 232/V.24 Two-Line Adapter	31 March 1999	#2742, #2772, #2773, #2805, #2806
#2612 EIA 232/V.24 One-Line Adapter	31 March 1999	#2742, #2793, #2794
#2613 V.35 One-Line Adapter	31 March 1999	#2742, #2793, #2794

Product or feature	Withdrawal date	Recommended replacement
#2614 X.21 One-Line Interface Adapter	31 March 1999	#2742, #2793, #2794
#2617 Ethernet/IEEE 802.3 Adapter/HP	31 March 1999	#2744, #2849, #4838, #5700, #5701, #5706, #5707
#2618 Fiber Distributed Data Interface Adapter	31 August 1998	N/A
#2619 LAN/WAN/Workstation IOA	31 March 1999	#2744
#2620 Full Cryptographic Processor	31 December 1999	#4801
#2621 Storage Device Controller	30 June 2000	#5702, #2749
#2623 Six-Line Communications Controller	31 December 1999	#2742
#2624 Storage Device Controller	28 December 2001	N/A
#2626 16/4 Mbps Token Ring Adapter/A	01 July 1997	#2744
#2628 Limited Cryptographic Processor	31 December 1999	#4801
#2629 LAN/WAN/Workstation IOP	31 May 2002	#2844
#2644 Magnetic Tape Attachment Card/HP	31 March 1999	#2749
#2654 EIA 232/V.24 Two-Line IOA	31 August 1998	#2742
#2655 EIA 232/V.24 20	31 August 1998	#2742
#2656 X.21 Two line 20	31 August 1998	#2742
#2657 EIA 232/V.24 50E	31 August 1998	#2742
#2658 EIA 232/V.24 50	31 August 1998	#2742
#2659 X.21 Two line 50	31 August 1998	#2742
#2664 Integrated Fax Adapter	31 December 1999	#2742 with #0032
#2665 Copper distributed data interface	31 August 1998	#2849, #2744, #5701
#2666 High-Speed Communications Adapter		#2742
#2668 Wireless LAN Adapter	31 August 1998	N/A
#2669 Shared bus interface card	28 December 2001	N/A
#2673 Optical Bus Adapter	30 June 2000	N/A
#2674 Optical Bus Adapter	30 June 2000	N/A

<b>Product or feature</b>	<b>Withdrawal date</b>	<b>Recommended replacement</b>
#2680 Optical bus receiver - 266 Mbps	28 December 2001	N/A
#2683 266 Mbps OptiConnect receiver	28 December 2001	N/A
#2685 1063 Mbps OptiConnect receiver	28 December 2001	#2792
#2686 Optical Link Processor	28 December 2001	#2842, #2843
#2688 Optical Link Processor	01 October 2004	#2842, #2843
#2695 Optical Bus Adapter	01 October 2004	N/A
#2699 Two-Line WAN IOA	28 December 2001	N/A
#2718 PCI Magnetic Media Controller	02 July 2002	#5702
#2720 Base PCI WAN/Twinaxial IOA	02 July 2002	#4746 and #2742
#2721 PCI Two-Line WAN IOA	31 October 2000	#2742
#2722 Twinaxial Workstation IOA	31 July 2001	#4746
#2723 PCI Ethernet IOA	28 December 2001	#2849, #4838, #5701, #5706
#2724 PCI 16/4 Mbps Token Ring IOA	31 July 2001	#2744
#2726 PCI RAID Disk Unit Controller	30 June 2000	#2757
#2729 PCI Magnetic Media Controller	02 July 2002	#2749
#2730 Programmable Regulator	01 October 2004	N/A
#2738 HSL ports - 8 copper	07 May 2003	N/A
#2740 PCI RAID Disk Unit Controller	31 May 2002	#2757
#2741 PCI RAID Disk Unit Controller	31 May 2002	#2757
#2743 1 Gbps PCI Ethernet IOA	16 June 2004	#5700, #5701, #5707
#2744 PCI 100 Mbps Token Ring IOA	announced to be withdrawn 1 June 2006	
#2745 PCI Two-Line WAN IOA	01 October 2004	#2742
#2746 PCI Twinaxial Workstation IOA	01 October 2004	#4746
#2748 PCI RAID Disk Unit Controller	08 July 2003	#2757
#2749 PCI Ultra Magnetic Media Controller	01 October 2004 --> 3 March 2005	N/A

Product or feature	Withdrawal date	Recommended replacement
#2757 PCI-X Ultra RAID Disk Controller	01 June 2006	#2780
#2760 PCI 1 Gbps Ethernet UTP Adapter	01 October 2004	#5701, #5706
#2761 Integrated Analog Modem	02 July 2002	#2772, #2773
#2763 PCI RAID Disk Unit Controller	21 November 2003	#5703
#2766 PCI Fibre Channel Disk Controller	01 October 2004	#2787
#2768 PCI Magnetic Media Controller	01 October 2004	#5702
#2772 PCI Dual WAN/Modem IOA	01 June 2006	
#2778 PCI RAID Disk Unit Controller	01 October 2004	#2757
#2782 PCI-X RAID Disk Unit Controller	01 January 2004	#5703
#2787 PCI-X Fibre Channel Disk Controller	01 June 2006	#5760
#2790 PCI Integrated Netfinity Server	31 May 2002	#4810
#2791 PCI Integrated xSeries Server	03 December 2002	#4810
#2792 PCI Integrated xSeries Server	1 January 2004	
#2795 - 128 MB server memory	19 November 2004	
#2796 - 256 MB Server IOP Memory	19 November 2004	
#2799 PCI Integrated xSeries Server	21 November 2003	#4810
#2809 PCI LAN/WAN/Workstation IOP	31 May 2002	#2844
#2810 LAN/WAN IOP	31 May 2002	#2844
#2811 PCI 25 Mbps UTP ATM IOA	31 May 1999	N/A
#2812 PCI 45 Mbps Coax T3/DS3 ATM IOA	31 May 1999	N/A
#2815 PCI 155 Mbps UTP OC3 ATM IOA	31 May 2002	#2849, #4838, #5700, #5701, #5706, #5707
#2816 PCI 155 Mbps MMF ATM IOA	28 December 2001	#2849, #4838, #5700, #5701, #5706, #5707
#2817 PCI 155 Mbps MMF ATM IOA	03 December 2002	#2849, #4838, #5700, #5701, #5706, #5707
#2818 PCI 155 Mbps SMF OC3 ATM IOA	31 May 2002	#2849, #4838, #5700, #5701, #5706, #5707

<b>Product or feature</b>	<b>Withdrawal date</b>	<b>Recommended replacement</b>
#2819 PCI 34 Mbps Coax E3 ATM IOA	31 May 1999	N/A
#2824 PCI Feature Controller	28 December 2001	N/A
#2838 PCI 100/10 Mbps Ethernet IOA	21 November 2003	#2849, #4838, #5701, #5706
#2842 PCI IOP	21 November 2003	#2844
#2843 PCI IOP	01 October 2004	#2844
#2849 10/100 Mbps Ethernet Adapter	announced to be withdrawn 1 June 2006	#5700 PCI 1 Gbps Ethernet IOA
#2850 Integrated PC Server	31 March 1999	#4710, #4810
#2851 Integrated PC Server	31 March 1999	#4710, #4810
#2852 Integrated PC Server	30 June 2000	#4710, #4810
#2854 PCI Integrated PC Server	31 May 1999	#4710, #4810
#2857 Integrated PC Server	31 May 1999	#4710, #4810
#2858 FSIOA 128 MB memory, keyboard and mouse	30 June 2000	N/A
#2860 Integrated PC Server Memory	31 March 1999	N/A
#2861 32 MB IOP memory	28 December 2001	
#2862 128 MB IOP memory	28 December 2001	N/A
#2865 PCI Integrated Netfinity Server	02 July 2002	N/A
#2866 PCI Integrated Netfinity Server	02 July 2002	N/A
#2867 - 256 MB IOP memory	02 July 2002	N/A
#2868 Integrated Netfinity Server	31 October 2000	N/A
#2890 PCI Integrated Netfinity Server	31 May 2002	N/A
#2891 PCI Integrated xSeries Server	03 December 2002	N/A
#2892 PCI Integrated xSeries Server	01 January 2004	N/A
#2895 - 128 MB server memory	19 November 2004	
#2896 - 256 MB server memory	19 November 2004	
#2899 PCI Integrated xSeries Server	21 November 2003	N/A
#3000, #3002, #3004, #3006, #3007, #3009 Memory features (various)	01 October 2004	#3614

<b>Product or feature</b>	<b>Withdrawal date</b>	<b>Recommended replacement</b>
#3001, #3003, #3005 Memory features	31 May 2002	#3612
#3032 to #3034 Memory features	01 October 2004	#3613
#3025 512 MB main storage	03 December 2002	N/A
#3065 512 MB main storage	03 December 2002	N/A
#3103 32 MB main storage	31 March 1999	N/A
#3104 64 MB main storage	31 March 1999	N/A
#3110 64 MB main storage	30 March 2001	N/A
#3117, #3120, #3121 8 MB main storage	31 March 1999	N/A
#3118 16 MB main storage	31 March 1999	N/A
#3122 32 MB main storage	31 March 1999	N/A
#3133 64 MB main storage	31 March 1999	N/A
#3134 128 MB main storage	31 March 1999	N/A
#3135 256 MB main storage	31 March 1999	N/A
#3136 256 MB main storage	31 March 1999	N/A
#3138 64 MB main storage	31 March 1999	N/A
#3144 8 MB main storage	31 March 1999	N/A
#3145 16 MB main storage	31 March 1999	N/A
#3146 32 MB main storage	31 March 1999	N/A
#3147 32 MB main storage	31 March 1999	N/A
#3149 128 MB main storage	31 March 1999	N/A
#3172 32 MB main storage (two SIMMS)	31 March 1999	N/A
#3179 256 MB main storage	03 December 2002	N/A
#3180 512 MB main storage	03 December 2002	N/A
#3182 32 MB main storage	31 May 2002	N/A
#3189 128 MB main storage	03 December 2002	N/A
#3190 256 MB main storage	03 December 2002	N/A
#3191 512 MB main storage	03 December 2002	N/A
#3192 1024 MB main storage	03 December 2002	N/A

Product or feature	Withdrawal date	Recommended replacement
#3193 2048 MB main storage	03 December 2002	N/A
#3195 4096 MB main storage	03 December 2002	N/A
#3197 1024 MB main storage	03 December 2002	N/A
#3198 2048 MB main storage	03 December 2002	N/A
#4308 4.19 GB disk unit	29 December 2000	#4326
#4314 8.58 GB Disk Unit	23 October 2000	#4326
#4317 8.58 GB 10k RPM Disk Unit Feature conversions remain available	03 December 2002	#4326
#4318 17.54 GB 10k RPM Disk Unit	01 June 2004	#4326
#4324 17.54 GB Disk Unit	23 October 2000	#4326
#4425 CD-ROM	21 November 2003	#4625
#4430 DVD-RAM	01 January 2004	#4630
#4482 4GB ¼-inch Cartridge Tape Device	01 January 2004	#4682
#4483 16 GB ¼-inch Cartridge Tape Device	03 December 2002	#4684
#4486 25 GB ¼-inch Cartridge Tape Device	03 December 2002	#4684
#4487 50 GB ¼-inch Cartridge Tape Device	01 January 2004	#4687
#4525 CD-ROM	21 November 2003	#4625
#4582 4 GB ¼-inch Cartridge Tape Device	01 October 2005	#4584
#4583 16 GB ¼-inch Cartridge Tape Device	03 December 2002	#4584
#4584 30 GB ¼-inch Cartridge Tape Device	01 June 2006	
#4586 25 GB ¼-inch Cartridge Tape Device	03 December 2002	#4584
#4625 CD-ROM	15 July 2005	
#4682 4 GB ¼-inch Cartridge Tape Device	1 October 2005	#4684
#4710 PCI Integrated xSeries Server	01 June 2006	#4812
#4723 PCI 10 Mbps Ethernet Adapter	28 December 2001	#2849, #4838, #5701, #5706
#4748 PCI RAID Disk Unit Controller Feature conversions remain available	21 November 2003	#2757
#4761 PCI Integrated Analog Modem	02 July 2002	#2772, #2773, #2805 or #2806



Product or feature	Withdrawal date	Recommended replacement
#4800 PCI Cryptographic Processor	29 December 2000	#4801
#4801 PCI Cryptographic Coprocessor	announced to be withdrawn 1 June 2006	#4806
#4802 PCI Cryptographic Processor	21 November 2003	#4801
#4810 PCI Integrated xSeries Server	announced to be withdrawn 1 June 2006	#4812
#4815 PCI ATM 155 Mbps UTP OC3	28 December 2001	#2849, #4838, #5700, #5701, #5706, #5707
#4816 PCI ATM 155 Mbps MMF	28 December 2001	#2849, #4838, #5700, #5701, #5706, #5707
#4818 PCI ATM 155 Mbps SMF OC3	28 December 2001	#2849, #4838, #5700, #5701, #5706, #5707
#5033 Migration Tower I	07 May 2003	N/A
#5034 Migration Tower I	21 November 2003	N/A
#5035 Migration Tower I	21 November 2003	N/A
#5043 Convert primary rack to secondary rack	31 March 1999	N/A
#5044 System Unit Expansion Rack	31 March 1999	#5094, #5294
#5051 Storage Expansion Unit for System Unit	30 June 2000	#5108, #7127
#5052 Storage Expansion Unit	31 May 2002	#5108, #7127
#5055 Storage Expansion Unit	31 May 2002	#5108, #7127
#5057 Storage Expansion Unit Feature conversions remain available	02 July 2002	#5108, #7127
#5058 Storage Expansion Unit	31 May 2002	#5108, #7127
#5062 OptiConnect in tower	28 December 2001	N/A
#5063 OptiConnect in system unit tower	28 December 2001	N/A
#5064 System Unit Expansion	28 December 2001	N/A
#5065 Storage/PCI Expansion Tower	21 November 2003	#5094
#5066 1.8 M I/O Tower	21 November 2003	#5294
#5070 266 Mbps System Unit Expansion Tower	30 June 2000	#5088, #0588

Product or feature	Withdrawal date	Recommended replacement
#5071 266 Mbps System Unit Expansion Tower	02 July 2002	#5088, #0588
#5073 1063 Mbps System Unit Expansion Tower	28 December 2001	#5088, #0588
#5074 PCI Expansion Tower	01 October 2005	#5094
#5075 PCI Expansion Tower	21 November 2003	#5095 / #0595
#5079 1.8 M I/O Tower	01 October 2005	#5294 1.8m I/O Tower
#5080 266 Mbps Storage Expansion Tower	30 June 2000	#5088, #0588
#5081 266 Mbps Storage Expansion Tower	02 July 2002	#5094 with #5108
#5082 Storage Expansion Tower	30 June 2000	#5094 with #5108
#5083 Storage Expansion Tower	28 December 2001	#5094 with #5108
#5088 PCI-X Expansion Unit	announced to be withdrawn 1 June 2006	
#5097 1.8m I/O Tower	01 October 2005	
#5117 30 Disk Expansion with Dual Line Cord	07 May 2003	
#5135 Feature Power Supply	30 June 2000	N/A
#5143 Power Supply	02 July 2002	N/A
#5150 Battery Backup	20 November 2001	N/A
	02 July 2002	N/A
#5151 Power Supply	02 July 2002	N/A
#5153 Redundant Power Supplies	02 July 2002	N/A
#5155 Redundant Power and Cooling	01 October 2004	N/A
#5157 Feature Power Supply	01 October 2004	N/A
#5518 Alt IPL Spec 13 GB Tape	31 October 2000	N/A
#5543 Sys Console on comm	29 December 2000	N/A
#5546 System Console on 100 Mbps Token Ring	01 June 2006	
#5554 Mirror 35GB Disk/Controller Package	25 October 2005	#5555
#5601 OptiConnect in Rack	28 December 2001	N/A

Product or feature	Withdrawal date	Recommended replacement
#5702 PCI-X Ultra Tape Controller	1 June 2006	#5712
#5703 PCI-X RAID Disk Unit Controller	1 June 2006	#5737
#5704 PCI-X Fibre Channel Tape Controller	1 June 2006	#5761
#5705 PCI-X Tape/DASD Controller	1 June 2006	#5715
#5709 RAID Enabler Card	1 June 2006	#5727
#5712 PCI-X Tape/DASD Controller	1 June 2006	#5736
#5715 PCI-X Tape/DASD Controller	1 June 2006	#5736
#5726 RAID Enabler Card	1 June 2006	#5728
#6134 60 GB 8mm Tape Device	24 June 2004	N/A
#6050 Enhanced Twinaxial Workstation Controller	31 May 2002	#4746
#6140 Twinaxial Workstation Controller	27 March 1998	#4746
#6141 ASCII Workstation Controller	31 March 1999	N/A
#6142 ASCII 12-Port Workstation Attachment	31 March 1999	N/A
#6148 Eight-Port Twinaxial Expansion	30 June 2000	#4746
#6149 16/4 Mbps Token Ring IOA	31 May 2002	#2744
#6151 X.21 One-line adapter	31 August 1998	#2742
#6152 EIA 232/V.24 adapter	31 October 1996	#2742
#6153 V.35 One-line adapter	31 August 1998	#2742
#6173 V.35 One-line adapter 50 foot	31 August 1998	#2742
#6180 Twinaxial workstation IOA	31 July 2001	#4746
#6181 Ethernet IOA	31 July 2001	#2849, #4838, #5701, #5706
#6325 CD-ROM Feature conversions remain available	02 July 2002	#4525, #4625
#6380 2.5 GB ¼-inch Cartridge Tape Unit	30 June 2000	#4582, #4682
#6381 2.5 GB ¼-inch Cartridge Tape	29 December 2000	#4582, #4682
#6382 4 GB ¼-inch Cartridge Tape Unit	03 December 2002	#4582, #4682
#6383 16 GB ¼-inch Cartridge Tape Unit	03 December 2002	#4583, #4683
#6384 30 GB ¼-inch Cartridge Tape Unit	21 November 2003	#4584, #4684

Product or feature	Withdrawal date	Recommended replacement
#6385 13 GB ¼-inch Cartridge Tape Unit	31 May 2000	#4583, #4683
#6386 25 GB ¼-inch Cartridge Tape Unit	03 December 2002	#4584, #4684
#6425 CD-ROM	02 July 2002	#4525, #4625
#6480 2.5 GB ¼-inch Cartridge Tape Unit	02 July 2002	#4582, #4682
#6481 2.5 GB ¼-inch Cartridge Tape Unit	29 December 2000	#4582, #4682
#6482 4 GB ¼-inch Cartridge Tape Unit	03 December 2002	#4582, #4682
#6483 16 GB ¼-inch Cartridge Tape Unit	03 December 2002	#4583, #4683
#6484 30 GB ¼-inch Cartridge Tape Unit	21 November 2004	#4584, #4684
#6485 13 GB ¼-inch Cartridge Tape Unit	31 May 2000	#4583, #4683
#6486 25 GB ¼-inch Cartridge Tape Unit	03 December 2002	#4584, #4684
#6501 Tape/Disk Device Controller	31 July 2001	#2787 for Disk #2749 for Tape
#6502 High Performance Controller	02 November 1997	#2757
#6512 High Performance Controller	30 June 2000	#2757
#6513 Internal Tape Device Controller	01 October 1999	#2749 or #5702
#6522 Disk unit controller for RAID	30 June 2000	#2757
#6523 Storage Device Controller	30 June 2000	#2757
#6530 Disk Unit Controller No Cache	31 March 1999	#2757
#6532 RAID Disk Unit Controller	30 June 2000	#2757
#6533 RAID Disk Unit Controller	31 May 2002	#4317
#6534 Magnetic Media Controller	31 May 2002	#2749
#6584 4 Disk Slot Exp - PCI-X Controller	19 November 2004	
#6607 4.19 GB Additional Two-byte Disk Unit	29 December 2000	#4326
#6616 Integrated PC Server	31 March 1999	#4710, #4810
#6617 Integrated PC Server	31 May 1999	#4710, #4810
#6618 Integrated Netfinity Server	28 December 2001	#4710, #4810
#6713 8.58 GB Disk Unit New features Feature conversions	23 October 2000 02 July 2002	#4326

Product or feature	Withdrawal date	Recommended replacement
#6714 17.54 GB Disk Unit	23 October 2000	#4326
#6717 8.58 GB 10k RPM Disk Unit Feature conversions remain available	03 December 2002	#4326
#6718 17.54 GB 10k RPM Disk Unit	03 December 2002	#4326
#6807 4.19 GB Additoinal Two byte Disk Unit	29 December 2000	#4326
#6813 8.58 GB Additional Two-byte Disk Unit	23 October 2000	#4326
#6817 8.58 GB 10k RPM Disk Unit	03 December 2002	#4326
#6818 17.54 GB 10k RPM Disk Unit	01 June 2004	#4326
#6824 17.54 GB Disk Unit	23 October 2000	#4326
#6907 4.19 GB Additional Two-byte Disk unit	29 December 2000	#4326
#7000 Panel Keylock	30 June 2000	N/A
#7101 System Expansion Unit	31 May 2002	N/A
#7102 System Expansion Unit	02 July 2002	N/A
#7108 Expansion Gate	30 June 2000	N/A
#7117 Integrated Expansion Unit	30 June 2000	N/A
#7123 DASD Expansion Unit	01 October 2004	N/A
#7127 DASD Expansion Unit	01 October 2004	N/A
#7128 DASD Expansion Unit	01 October 2004	N/A
#7130 Expansion Unit Tape Cage	02 July 2002	N/A
#7174 Ethernet IEEE 802.3 Adapter	31 August 1998	#2849, #4838, #5701, #5706
#7175 16/4 Mbps Token-ring Adapter	31 August 1998	#2744
#7311 Dual I/O Unit Enclosure	1 June 2006	
#7411, #7413, #7417 Express Editions	15 April 2005	#7390, #7391, #7393
#7417, #7420 Express Editions	15 April 2005	#7392, #7394
#7883 Model 520 OEM Rack Mount	1 June 2006	
#8079 Optional Base 1.8 M I/O Rack	21 November 2003	#5294
#8093 Optional 1.8 M I/O Rack	07 May 2003	#8094

Product or feature	Withdrawal date	Recommended replacement
#8094 Optional 1.8 M I/O Rack	1 October 2005	
#8180 Opt. Base 512 MB main storage	28 December 2001	N/A
#8191 Opt. Base 512 MB main storage	28 December 2001	N/A
#8192 Opt. Base 1024 MB main storage	28 December 2001	N/A
#8193 Opt. Base 2048 MB main storage	28 December 2001	N/A
#8617 Opt. Base 8.58 Gb 10k RPM Disk Unit	28 December 2001	#4326
#8618 Opt. Base 17.54 Gb 10k RPM Disk Unit	28 December 2001	#4326
#8713 Opt Base 8.58 GB Disk Unit New orders Feature conversions	31 January 2001 02 July 2002	#4326
#8714 Opt Base 17.54 GB Disk Unit (7200 RPM) New orders Feature conversions	31 January 2001 02 July 2002	#4326
#8754 Optional Base 50 GB ¼-inch Cartridge Tape Device	15 October 2004	
#8809 EIA 232/V.24 Two line adapter		#2745
#8813 Opt Base 8.58 GB Disk Unit	23 October 2000	#4326
#8813 Opt Base 8.58 GB Disk Unit (7200 RPM)	31 January 2001	#4326
#8817 8.58 GB Optional Base Two-byte Disk Unit 10k RPM	28 December 2001	#4326
#8818 17.54 GB Optional Base Two-byte Disk Unit 10k RPM	28 December 2001	#4326
#8824 Opt Base 17.54 GB Disk Unit	23 October 2000	#4326
#8824 Opt Base 17.54 GB Disk Unit (7200 RPM)	31 January 2001	#4326
#8863 EIA 232/V.24 Two line adapter	31 May 2001	#2745
#8866 EIA 232/V.24 Two line adapter (50-foot)	31 May 2001	#2745
#8917 8.58 GB Optional Base 10k RPM Disk Unit	02 July 2002	#4326
#8918 17.54 GB Optional Base 10k RPM Disk Unit	02 July 2002	#4326
#8924 17.54 GB Optional Base Two-byte Disk Unit	23 October 2000	#4326
#8924 17.54 GB Optional Base Two-byte Disk Unit (7200 RPM)	31 January 2001	#4326
#9052 Standard Storage Expansion Unit (16 disk)	02 July 2002	N/A
#9080 Watertight Line Cord	02 July 2002	N/A

Product or feature	Withdrawal date	Recommended replacement
#9082 120/240V 14-ft. Line Cord	02 July 2002	N/A
#9083 Locking Line Cord Plug	02 July 2002	N/A
#9094 Base PCI I/O Enclosure	01 October 2005	
#9116 High Performance CD Enable	02 July 2002	N/A
#9119 Migrated DASD	02 July 2002	N/A
#9174 Ethernet/IEEE 802.3 Adapter		#2849, #4838, #5701, #5706
#9175 16/4 Mbps Token-ring Adapter		#2744
#9179 Base 256 MB main storage	02 July 2002	N/A
#9180 Line Cord Specify	02 July 2002	N/A
#9182 14-ft. Line Cord Specify	02 July 2002	N/A
#9183 Locking Line Cord Plug	02 July 2002	N/A
#9190 Base 256 MB main storage	31 May 2002	N/A
#9240 Base 400 W Power Supply	30 June 2000	N/A
#9243 400 W Power Supply	30 June 2000	N/A
#9244 Expansion Unit 320 W Power Supply	30 June 2000	N/A
#9245 Base Battery Backup	30 June 2000	N/A
#9249 Base 16/4 Mbps Token Ring IOA	31 May 2002	#2744
#9251 Base I/O Tower	02 July 2002	N/A
#9280 Base Twinaxial Workstation Controller	28 December 2001	#2746 or #9746
#9313 8.58 GB Base Two-byte Disk Unit	23 October 2000	#4326
#9313 8.58 GB Base Two-byte Disk Unit	31 January 2001	#4326
#9329 PCI Card Expansion Unit	31 May 2002	N/A
#9330 PCI Integrated Expansion Unit Feature conversions remain available	02 July 2002	N/A
#9331 Expansion Unit for SPD Cards- 001 and 002 Diskette drive	25 October 1995	N/A
#9331 Expansion Unit for SPD Cards- 011 and 011 Diskette drive	15 September 1998	N/A
#9331 Expansion Unit for SPD Cards	28 December 2001	N/A
#9347 Local Source Rack Mount	31 October 2000	N/A

Product or feature	Withdrawal date	Recommended replacement
#9364 System Unit Expansion	28 December 2001	N/A
#9381 Base Ethernet IEEE 802.3 IOA	28 December 2001	#2849, #4838, #5701, #5706
#9509 Base Ultra320 RAID Controller	01 June 2006	
#9691 Base Bus Adapter	1 December 2005	
#9699 Base Two-Line WAN IOA	28 December 2001	#2742
#9707 4.19 GB Base Two-byte Disk Unit (Ultra SCSI)	29 December 2000	#4326
#9720 Base PCI WAN/Twinaxial IOA	02 July 2002	#4746 and #2742
#9721 Base PCI Two-Line WAN IOA	31 October 2000	#2742
#9723 PCI Ethernet IOA	02 July 2002	#2849, #4838, #5701, #5706
#9724 PCI Token Ring IOA	02 July 2002	#2744
#9728 Base Disk Unit Controller	02 July 2002	#2757
#9738 PCI 100/10 Mbps Ethernet IOA	02 July 2002	#2849, #4838, #5701, #5706
#9740 Base RAID Disk Unit Controller	02 July 2002	#2757
#9745 Base PCI Two-Line WAN IOA	02 July 2002	#2742
#9746 Base PCI Twinaxial IOA	1 October 2005	
#9748 Base PCI RAID Disk Unit Controller	08 July 2003	#2757
#9751 Base MFIO with RAID (Models 640, 650, S30, S40, SB1)	31 May 1999	N/A
#9754 MFIO with RAID	28 December 2001	N/A
#9771 Base PCI Two-Line WAN with integrated modem	1 October 2005	
#9778 Base PCI RAID Disk Unit Controller	21 November 2003	#2757
#9789 Base HSL Ports - 4 Optical	07 May 2003	#9710
#9792 Base PCI Integrated xSeries Server	01 January 2004	N/A
#9793 Two-Line WAN IOA with Modem	01 October 2005	
#9794 Two-Line IOA with Modem	01 October 2005	
#9902 - Do not integrate	02 July 2002	N/A



<b>Product or feature</b>	<b>Withdrawal date</b>	<b>Recommended replacement</b>
#9907 - Base 4.19 GB Disk Unit	29 December 2000	#4326



# Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion about the topics covered in this redbook.

## IBM Redbooks

For information about ordering these publications, see “How to get IBM Redbooks” on page 401.

- ▶ *IBM @server i5 and iSeries System Handbook*, GA19-5486

The latest update to this Handbook is always available in soft copy on the World Wide Web. You can also view, search, or download in PDF or HTML formats of this book from the Redbooks Web site. Simply enter iSeries Handbook or GA19-5486 in the search parameter on the Web site.

You can find the final, edited edition of the Handbook directly at:

<http://www.redbooks.ibm.com/pubs/pdfs/redbooks/ga195486.pdf>

Prior to availability of the final edited edition, you can find the draft edition at:

<http://www.redbooks.ibm.com/redpieces/pdfs/ga195486.pdf>

- ▶ *IBM @server iSeries and AS/400e System Builder*, SG24-2155
- ▶ *IBM Web-to-Host Integration Solutions*, SG24-5237
- ▶ *Developing an e-business Application for the IBM WebSphere Application Server*, SG24-5423
- ▶ *WebSphere Application Servers: Standard and Advanced Editions*, SG24-5460
- ▶ *Web Enabling AS/400 Applications with IBM WebSphere Studio*, SG24-5634
- ▶ *iSeries e-business Handbook: A Technology and Product Reference*, SG24-5694
- ▶ *IBM @server iSeries Migration: System Migration and Upgrades at V5R1 and V5R2*, SG24-6055
- ▶ *WebSphere Scalability: WLM and Clustering Using WebSphere Application Server Advanced Edition*, SG24-6153
- ▶ *WebSphere Personalization Solutions Guide*, SG24-6214
- ▶ *IBM @server iSeries in Storage Area Networks: Implementing Fibre Channel Disk and Tape with iSeries*, SG24-6220 (Redbook Draft)

- ▶ *IBM @server iSeries IP Networks: Dynamic!*, SG24-6718
- ▶ *IBM @server iSeries Independent ASPs: A Guide to Moving Applications to IASPs*, SG24-6802
- ▶ *IBM TotalStorage Tape Selection and Differentiation Guide*, SG24-6946
- ▶ *Integrating Backup Recovery and Media Services and IBM Tivoli Storage Manager on the IBM @server iSeries Server*, SG24-7031
- ▶ *iSeries and IBM TotalStorage: A Guide to Implementing external disk on eServer i5*, SG24-7120
- ▶ *Logical Partitions on the IBM PowerPC: A Guide to Working with LPAR on POWER5 for IBM @server i5 Servers*, SG24-8000
- ▶ *OS/400 Maximum Capacities V5R2*, REDP-0204
- ▶ *WebSphere for IBM @server iSeries Server Buying and Selling Guide*, REDP-3646
- ▶ *Lotus Domino for the IBM @server iSeries Server Buying and Selling Guide*, REDP-3845
- ▶ *Planning for IBM eServer i5 Data Protection with Auxiliary Write Cache Solutions*, REDP-4003
- ▶ *Virtual Partition Manager A Guide to Planning and Implementation*, REDP-4013
- ▶ *iSeries Model 825 High-speed Link Loop*, TIPS-0297
- ▶ *Twinaxial Attached Device Throughput for Twinaxial Devices*, TIPS-0358

## Other resources

These publications are also relevant as further information sources:

- ▶ Soltis, Frank G. *Fortress Rochester: The Inside Story of the IBM @server iSeries*. 29th Street Press, July 2001. ISBN 1583040838.
- ▶ *IBM TotalStorage Enterprise Tape System 3590 Introduction and Planning Guide*, GA32-0329
- ▶ *AS/400 Road Map for Changing to PowerPC Technology*, SA41-5150
- ▶ *iSeries Performance Capabilities Reference*, SC41-0607  
<http://publib.boulder.ibm.com/infocenter/iseries/v5r3/ic2924/books/sc410607.pdf>
- ▶ *System/36 Migration Planning*, SC41-4152
- ▶ *System/38 Migration Planning*, SC41-4153
- ▶ *Tips and Tools for Securing Your iSeries*, SC41-5300

- ▶ *Backup Recovery and Media Services for iSeries*, SC41-5345
- ▶ *IBM AS/400 Integration for Windows Server – Setup*, SC41-5439
- ▶ *Client Access Express for Windows – Setup*, SC41-5507
- ▶ *Operations Console Setup*, SC41-5508
- ▶ *System API Reference*, SC41-5801
- ▶ *Physical Planning Quick Reference*

You can find this document in the iSeries Information Center at:

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For OS/400 V5R2, select **your language** and **V5R2**. Then select **Plan for hardware and software** → **Planning reference**.

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## Referenced Web sites

These Web sites are also relevant as further information sources:

- ▶ Redbooks home page  
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<http://w3.itso.ibm.com>
- ▶ iSeries Information Center  
<http://www.ibm.com/eserver/iseriess/infocenter>  
<http://publib.boulder.ibm.com/pubs/html/as400/v5r2/ic2924/index.htm>
- ▶ iSeries and AS/400 publications: “What’s new” by release  
<http://publib.boulder.ibm.com/pubs/html/as400/online/chgfrm.htm>
- ▶ IBM @server iSeries Resource Library  
<http://www.ibm.com/eserver/iseriess/library>
- ▶ IBM @server iSeries Support: Software Knowledge Base  
<http://www.as400service.ibm.com/supporthome.nsf/Document/10000051>
- ▶ iSeries Technical articles and white papers  
<http://www.ibm.com/servers/enable/resources/index.html>
- ▶ i5/OS V5R3 Console Positioning white paper  
<http://www-1.ibm.com/servers/eserver/iseriess/literature/index.html>
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- ▶ IBM Product Publications  
<http://www.elink.ibm.link.ibm.com/public/applications/publications/cgibin/pbi.cgi>
- ▶ IBM Publications Center (intranet site)  
<http://w3.ehone.ibm.com/public/applications/publications/cgibin/pbi.cgi>
- ▶ iSeries Nation  
<http://www-1.ibm.com/servers/eserver/series/nation/>
- ▶ Partnerworld for Developers - IBM @server iSeries  
<http://www.iseries.ibm.com/developer/index.html>
- ▶ IBM @server iSeries server site  
<http://www-1.ibm.com/servers/eserver/series/>
- ▶ iSeries software  
<http://www.ibm.com/eserver/series/software>
- ▶ ibm.com/software site  
<http://www.software.ibm.com>
- ▶ iSeries Planning  
<http://www.ibm.com/servers/eserver/support/series/planning>
- ▶ iSeries Upgrade Planning for OS/400 V5R2  
<http://www-1.ibm.com/servers/eserver/series/support/planning/v5r2software.html>
- ▶ iSeries Upgrade Planning for i5/OS V5R3  
<http://www-1.ibm.com/servers/eserver/series/support/planning/v5r3software.html>
- ▶ Product Previews, Statements of Direction, Planning for withdrawn products  
<http://www.ibm.com/servers/eserver/series/support/planning/v5r3direct.html>
- ▶ IBM @server Solution Connection  
[http://www-1.ibm.com/servers/solutions/finder/CSFServlet.wss?mvcid=main&packageid=1000&ca=oiesc\\_uk&me=W](http://www-1.ibm.com/servers/solutions/finder/CSFServlet.wss?mvcid=main&packageid=1000&ca=oiesc_uk&me=W)
- ▶ Performance Center  
<http://www.iseries.ibm.com/developer/performance/index.html>
- ▶ Performance ratings for @server p5 and pSeries servers  
<http://www-1.ibm.com/servers/eserver/pseries/hardware/rperf.html>
- ▶ IBM @server Workload Estimator  
<http://www-912.ibm.com/wle/EstimatorServlet>

- ▶ Sizing IBM @server i5 servers for AIX 5L applications  
<http://www-1.ibm.com/servers/eserver/iserries/aix/index.html>
- ▶ iSeries technical support overview  
<http://www.as400service.ibm.com/supporthome.nsf/document/20965550>
- ▶ Storage networking home page  
<http://www.storage.ibm.com/ibmsan/index.html>
- ▶ IBM @server iSeries Support  
<http://www.ibm.com/iserries400/support>
- ▶ iSeries hardware editions  
<http://www-1.ibm.com/servers/eserver/iserries/hardware/editions>
- ▶ BRMS application client performance  
<http://www-1.ibm.com/servers/eserver/iserries/service/brms/adsmperf.htm>
- ▶ CICS  
<http://www.ibm.com/software/ts/cics/>
- ▶ IBM Connect for iSeries  
<http://www.ibm.com/eserver/iserries/btob/connect>
- ▶ iSeries Navigator for Wireless: Offers information and helpful links about Management Central-Pervasive  
<http://www-1.ibm.com/servers/eserver/iserries/navigator/pervasive.html>
- ▶ 5250 Emulation Products  
<http://www.networking.ibm.com/525>
- ▶ IBM @server Capacity Upgrade on Demand (CUoD)  
<http://www.ibm.com/eserver/iserries/ondemand>
- ▶ Windows integration (with iSeries)  
<http://www.iseries.ibm.com/windowsintegration>
- ▶ Electronic Support Access  
<http://www.iseries.ibm.com/tstudio/planning/esa/esa.htm>
- ▶ Ultrium Linear Tape-Open benefits  
[http://www.storage.ibm.com/hardsoft/tape/lto/prod\\_data/ultrium.html](http://www.storage.ibm.com/hardsoft/tape/lto/prod_data/ultrium.html)
- ▶ IBM NetVista  
<http://www.pc.ibm.com/ww/netvista/index.html>
- ▶ Application Factory - OS/400 PASE  
<http://www.iseries.ibm.com/developer/factory/pase>

- ▶ Linux for IBM @server iSeries  
<http://www.ibm.com/eserver/series/linux>
- ▶ Eclipse platform  
<http://www.eclipse.org/>
- ▶ The Apache Software Foundation  
<http://www.apache.org>
- ▶ Logical partitioning  
<http://www.ibm.com/servers/eserver/series/lpar>
- ▶ VisualAge Generator  
<http://www-4.ibm.com/software/ad/visgen>
- ▶ IBM Toolbox for Java  
<http://www.ibm.com/servers/eserver/series/toolbox>
- ▶ IBM Electronic Services for iSeries and AS/400e  
<http://www.ibm.com/services/electronic>
- ▶ DB2 Content Manager  
<http://www.ibm.com/software/data/cm/cmgr>
- ▶ Backup Recovery and Media Services  
<http://www.ibm.com/servers/eserver/series/service/brms.htm>
- ▶ Facsimile Support for iSeries  
<http://www.ibm.com/servers/eserver/series/fax400>
- ▶ Lotus SmartSuite  
<http://www.lotus.com/smartsuite>
- ▶ Lotus Domino  
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- ▶ Lotus Domino Support  
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- ▶ Lotus Messaging  
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- ▶ The ATM Forum  
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