The industry's leading integrated operating environment

IBM i—Efficient, resilient business processing

Highlights

- *Integrated middleware for efficient business processing*
- *Virtualized to manage multiple applications and processes*
- *Optimized for exceptional business resilience*
- *Trusted security with auditing and compliance tools*
- *Designed for open application design choices*
- *Simplified operations and storage management*
- *Scalable to enable non-disruptive business growth*

Companies rely on an efficient IT infrastructure to support business-critical applications. They need to know that their systems and business processes are deployed to meet the highest service levels defined by their business units plus can be adapted to handle every new business opportunity. IBM i (formerly known as i5/OS®) running on an IBM Power™ Systems server offers a highly scalable and virus resistant architecture with a proven reputation for exceptional business resiliency. Running applications based on i has helped companies over many years to focus on innovation and delivering new value to their business, not just on managing their data center operations.

i integrates a trusted combination of relational database, security, Web services, networking and storage management capabilities. It provides a broad and highly stable database and middleware foundation for efficiently deploying business processing applications, with support for over 5,000 solutions from over 2,500 ISVs. i solutions are offered through an extensive, highly skilled worldwide network of IBM Business Partners that is backed by IBM's trusted services and support infrastructure.

IBM develops, fully tests and pre-loads the core middleware components of i together up front, whereas on other platforms, operating system, database and middleware integration is done in the data center. The pre-integration and testing of i is a key factor in enabling companies to deploy applications faster and maintain them with fewer staff. Virtualization and workload management are also built into i to enable you to run multiple applications and components together on the same system, driving up system utilization and delivering a better return on IT investments.

Integrated middleware for efficient business processing

The integrated database and middleware design of i provides unique business value and differentiates it from component operating environments like UNIX® and Windows®. This unique value is derived from IBM pre-integrating and pre-testing the majority of the underlying middleware components required to run business applications. For example, IBM installs and integrates the SQL standards-based DB2® database for i with advanced database management utilities, plus additional middleware components such as multiple file system options, directory capability, an HTTP Web-server powered by Apache, a Web application server and a Web-services environment. IBM also makes available WebSphere® Application Server Express with i for Web-based J2EE™ application serving. Normally, companies purchase i with the DB2 capability built-in, but IBM also offers an i application server license for those companies deploying workloads that do not use the DB2 database.

IBM DB2 for i provides a scalable and easy-to-secure environment for the business data behind transaction processing and business intelligence applications. DB2 can be used to provide data to applications regardless of whether they are running on i, Windows, UNIX or Linux® operating systems with access via standards-based interfaces such as SQL, .NET, DRDA/CLI, ODBC and JDBC.

DB2 for i offers a wide range of features to help improve performance and reliability of your business applications. For example, DB2 offers object-relational technology that allows you to manage large, non-relational objects within your database, such as images, audio or XML documents. It also provides extensive tools to manage queries based on the SQL industry standard. DB2 advanced parallel processing and query optimization techniques also support the exploitation of very large databases for analytical purposes.

The DB2 database for i is managed through the same easy-to-use, web-based interfaces as other components of the operating system. Online database maintenance is designed to be performed while users are accessing and changing the database, which helps avoid scheduled outages by keeping applications available to users. Sophisticated database audit utilities also capture the information you need to conform to reporting and data compliance requirements.

In addition to handling data stored in the DB2 relational database, i also has an integrated file system that supports storage management of files in a similar way to Windows and UNIX operating systems. The integrated file system provides a

hierarchical directory structure and management interface to 11 different file systems (including UNIX, Windows and NFS), each with its own set of logical structures and rules for interacting with information in storage. Compared to systems that focus only on their own native file system technology, the integrated file system gives companies much broader flexibility to integrate with a range of open applications from wide variety of operating environments.

Virtualized to manage multiple applications and processes

One of the key factors to the i operating environment's efficiency is the ability to run multiple business processes and applications reliably and securely together. In a study of large enterprises using multiple operating systems, IBM found utilization rates on i-based servers were over 10 times that compared to Intel® processor-based servers and over twice as high as UNIX and other mid-range based systems. The high rate of utilization of Power Systems with i is achieved through the use of a variety of proven virtualization technologies, such as subsystems (multiple workloads managed in a single operating system image) and logical partitions (multiple workloads managed in independent operating system images).

Subsystems are independent operating environments within an i instance, through which the system coordinates and automatically manages work flow and resource use for jobs, processes and applications. The system can contain many subsystems, each of which can be assigned defined system resources such as memory pools and processor priority. i subsystems are routinely used to separate multiple Web, batch and transaction processing application components. Subsystems may be tuned manually for specific workloads, but most companies let i automatically handle routine subsystem prioritization and workload balancing.

IBM PowerVM™ provides virtualization technology that enables multiple images of i, AIX® (industrial-strength UNIX operating system from IBM) or Linux operating systems to be run on the same Power processor-based system with resources automatically balanced between partitions. Unlike most industry virtualization implementations on Intel processor-based systems, the Micro-Partitioning™ capability of PowerVM is directly based on the proven IBM mainframe hypervisor architecture. The PowerVM hypervisor ensures true separation of operating systems functionality from the performance-optimized firmware layer that handles management of system hardware resources. The PowerVM hypervisor ensures each operating system partition—either i, AIX or Linux—is completely independent and secure. Up to ten micro-partitions can be defined per processor, with dynamic or automatic balancing of processor resources between the micro-partitions. PowerVM also supports memory and I/O resource virtualization to improve asset utilization and decrease system costs. Companies deploying i have routinely deployed their business applications using logical partitioning to optimize their IT operations over the past decade.

Optimized for exceptional business resilience

For many companies, business process resilience and the ability to meet and exceed demanding service levels of multiple business units are top priorities. Over many years and in many businesses, i has established the reputation as one of the top operating environments in the industry for resilient application deployment. Companies routinely trust the i operating environment to deploy their most critical business applications.

To handle the most challenging resiliency requirements, i features a clustering architecture with multiple deployment options to provide continuous availability for application processing. For example, it includes options for remote database journaling and cross site mirroring capability to cluster between systems at both transaction and disk levels. For disk level clustering, IBM offers PowerHA for i. These resiliency features have been extended and enhanced by a broad range of business resiliency solutions available from specialist resiliency ISVs that have exploited the i cluster architecture and implemented additional cluster management tools.

Trusted security with auditing and compliance tools

For companies running Windows and UNIX operating system-based servers, security and virus management are major challenges in terms of time and money. According to secunia.com , i has a long-term track record of significantly fewer security advisories than Microsoft® Windows Server® and UNIX operating environments.

The simple-to-deploy, object-based security model of the i operating environment provides comprehensive capabilities for deploying and managing a highly secure system environment. Its object-based architectural design provides virus resistance by protecting the operating system code from modification (via hardware storage protection) and by preventing the running of executable instructions stored in a file, a common source of viruses. i also helps safeguard data against hackers with built-in intrusion detection and prevention and has an audit journal to track security changes and breaches to help with compliance and auditing. Of course, i supports options for encrypting data on disk as well as backups and common network networking standards, including SSL and VPN.

i also supports multiple additional tools from IBM and ISV tools providers that help create, deploy and comply with business security policies.

Designed for open application design choices

i offers an integrated language environment that supports a broad range of open application options, with best-of-breed IBM Rational® development tools as well as a wide range of options from IBM tools partners. ISV solutions written for i are routinely deployed with a combination of development languages optimized for transaction processing such as C, RPG, COBOL and C++, as well as environments optimized for Web-based and open source applications such as Java™, EGL, PHP and the MySQL database.

The integrated language environment for i enables companies to exploit existing application assets, while taking advantage of new business opportunities with a range of open technologies. A variety of technologies can be used to implement a Service Oriented Architecture (SOA), integrating traditional transaction processing language environments with today's open source technologies. Traditional language applications can also be made available as a Web service or easily connected to Web services running on other systems. Java and PHP offer powerful and open Web application environments on i with thousands of applications and components. With its easy-to-use development approach, PHP is a natural fit for companies that have invested in i, offering rapid deployment and simple integration with existing business applications.

i also includes a runtime for AIX applications—the Portable Application Solutions Environment—enabling UNIX applications more simply to be ported to the system. The PASE run-time environment enables running selected UNIX applications without the complexity of managing a full UNIX system. It is shipped with industry-standard and de facto-standard shells and utilities that provide powerful scripting tools.

i is also shipped with a powerful Command Language (CL) that is commonly used for automating complex operations, such as for deploying batch processing and job scheduling.

Simplified operations and storage management

i is renowned for its ease-of-use and powerful systems management features. Typically, companies require fewer administrators to manage the i operating environment compared to their UNIX and Windows operating system-based systems. Systems Director Navigator for i is a browser-based graphical interface that enables the system to be managed with minimal skills and resources. Additionally, IBM Systems Director is available to help with management of heterogeneous systems.

Storage management software is also a key element of i providing fundamental operating advantages compared to UNIX and Windows operating system-based systems. Unlike on UNIX and Windows, applications running in i do not directly access disk drives. Instead, i automatically manages and balances the storage of data across multiple disk drives. The automated storage balancing both optimizes performance and helps companies avoid reorganizing disk units and defragmenting disks to reclaim unused space. Of course, i also enables protection of disk storage through various resiliency options, including RAID-6, mirroring, as well as IBM System Storage™ solutions.

The value of i advanced storage management capabilities can also be extended to other operating environments by hosting storage for i, AIX and Linux logical partitions or Windows, Linux and VMware-based blades running on IBM BladeCenter® blade servers.

Scalable to enable non-disruptive business growth

i offers a variety of expansion options to help a company maximize return on its IT investments. With support for IBM Power Systems servers with one to sixty-four processor cores as well as blades, i can support the computing requirements of small and mid-sized businesses to large enterprises. With support for IBM BladeCenter solutions, i can be consolidated with x86 environments into a single platform infrastructure, helping to reduce complexity and costs. Most important to non-disruptive growth is the Technology Independent Machine Interface (TIMI) that provides a protective layer between applications and hardware devices, such as processors and disks. Proven over many years and technology generations, the TIMI has protected applications from changing hardware devices and processor technologies, enabling applications to be upgraded without recompilation. i also directly supports software upgrades from the previous two releases, with the system automatically changing system data structures and other object characteristics to new operating levels.

Capacity on Demand is an additional aid to non-disruptive business growth, enabling additional built-in processors to be activated without disrupting business operations. When using Capacity on Demand with i, neither the operating environment, nor the database or applications need to be restarted to take advantage of the additional performance.

Feature	Benefits
Integrated middleware for efficient business processing	• Standards-based DB2 database • HTTP Server Powered by Apache • Integrated Web application server • Java and J2EE Web-services environment • IBM WebSphere Application Server Express • Integration with SQL, .NET, DRDA/CLI, ODBC, JDBC • Support for TCP/IPv6 • Multiple file systems (Windows, UNIX, NFS) • Support for MySQL database
Virtualized to manage multiple applications and processes	• Subsystem workload manager • PowerVM technology providing Micro-Partitioning and shared processor pools • Automatic partition performance balancing
Optimized for exceptional business resilience	• Highly resilient with built-in cluster architecture • Transaction based journaling & cross site mirroring • IBM PowerHA for i • Complementary ISV cluster management solutions
Trusted security with auditing and compliance tools	• Simple to deploy, object based security model • Virus resistance object architecture • Intrusion detection, prevention, and audit journal • Encryption of data on disk and backups • Secure networking with SSL and VPN
Designed for open application design choices	• IBM Rational development tools • C, RPG, COBOL, C++, Java, EGL, PHP, CL • Services Oriented Architecture • UNIX application runtime
Simplified operations and storage management	• Web-based systems management • IBM Systems Director • Integrated storage management • Support for integrated and IBM System Storage • Hosts managed storage for i, AIX, Linux, Windows, VMware
Scalable to handle non-disruptive business growth	• Support for POWER™ processor-based systems and blades • Technology independent machine interface • Automatic software upgrades from previous releases • Capacity on Demand (processor & memory)

For more information

To learn more about i and the supported IBM server platforms, please contact your IBM marketing representative or IBM Business Partner or visit the following Web sites:

ibm.com/systems/power/

ibm.com/systems/power/software/i/

This equipment is subject to FCC rules. It will comply with the appropriate FCC rules before final delivery to the buyer.

Information concerning non-IBM products was obtained from the suppliers of these products or other public sources. Questions on the capabilities of the non-IBM products should be addressed with the suppliers.

All performance information was determined in a controlled environment. Actual results may vary. Performance information is provided “AS IS” and no warranties or guarantees are expressed or implied by IBM. Buyers should consult other sources of information, including system benchmarks, to evaluate the performance of a system they are considering buying.

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

IBM Systems and Technology Group
Integrated Marketing Communications
Route 100
Somers, NY 10589

Produced in the United States
October 2008

This document was developed for products and/or services offered in the United States. IBM may not offer the products, features or services discussed in this document in other countries.

The information may be subject to change without notice. Consult your local IBM business contact for information on the products, features and services available in your area.

All statements regarding IBM future directions and intent are subject to change or withdrawal without notice and represent goals and objectives only.

IBM hardware products are manufactured from new parts or new and used parts. In some cases, the hardware product may not be new and may have been previously installed. Regardless, IBM warranty terms apply.

Photographs show engineering and design models. Changes may be incorporated in production models.

POB03001-USEN-01