A mainframe specifically designed to meet the needs of small to medium enterprises

IBM System z9 Business Class

Highlights

- ***IBM® System z9™ technology, for entry level to midsize capacity needs, with a wide choice of capacity settings and highly granular growth options, an increase of 2.6 times more capacity settings than IBM eServer™ zSeries® 890 (z890)***
- ***A broad set of specialty engines to facilitate integration of all types of workloads and fully leverage the power of the mainframe***
- ***Protects client's investments in mainframe technologies with upgradeability from z890 and z800 servers***
- ***Key System z9 advanced security, resiliency, virtualization and connectivity technologies delivered in a midrange package***

Time to rethink the role of the mainframe

As we look at the technology installed in businesses of all sizes across the world, one thing we see is that nearly every infrastructure is different from any other infrastructure. These differences have built up over time and often stem from the buying decisions made both centrally and by multiple departments, with drivers varying from application availability to technology to cost, to name a few. The results of this approach to IT purchasing are highly complex and often costly infrastructures, comprised of multiple platforms, with limited integration, making it very difficult to manage and implement progressive change.

So what does this boil down to? In many cases, it means that rather than IT being an enabler of new business opportunities, it instead restrains the business by limiting its flexibility. These limitations are becoming ever more

restrictive as sophisticated users both within and outside of the business have ever greater expectations for the service provided by your business through your IT infrastructure. Well, it is time to regain control, time to create a unified infrastructure, time to re-think the role of the new mainframe!

The modern mainframe is worlds apart from the mainframe of a decade ago! It has retained the strengths on which its reputation was formed and taken them to new heights, with security, availability and reliability built in across the system components. It is flexible and open, with comprehensive support for Service-Oriented Architectures, all of which make it an ideal platform for deploying new workloads, or for interoperating with new workloads on alternative technologies. Now, IBM is evolving the mainframe further, extending the scope of key management capabilities across heterogeneous platforms, so that the mainframe can provide a unifying influence across the IT that supports your critical business processes.

The introduction of the IBM System z9 Business Class (z9 BC) marks a key milestone in the mainframe's evolution, delivering significant capabilities to meet the demands of small and medium enterprises.

An extremely flexible approach to computing

The z9 BC advances the innovation of the System z9 platform and brings value to a wider audience, both midrange and small enterprise businesses. The z9 BC offers a low cost of entry, granular growth, flexible configurations, subcapacity pricing and On/Off Capacity on Demand to meet growing and changing demands for traditional and new workloads.

So what are subcapacity models?

This is the ability to offer only a portion of a single processor's full capacity. On the z9 BC, subcapacity options are offered on 1-way to 4-way servers. Having the ability to offer just a portion of the full capacity gives you greater flexibility.

The z9 BC is available in two models with 73 capacity settings. The Model R07, aimed at smaller enterprises, has a smaller I/O configuration and lower entry point where large amounts of resources are not the driving factor, but always a quick upgrade away when needed, either temporary or permanent. The Model S07 is aimed at medium sized businesses that need to have more available I/O or more capacity, as well as upgrades to the IBM System z9 Enterprise Class (z9 EC). Today, more than ever, z9 BC means there is a System z9 for everyone.

Built on a "classic"

Built specifically for the midrange and small enterprises, the z9 BC offers many of the robust features and functions of the z9 EC at a considerably lower capacity entry point. This "classic" mainframe offers the highest standards of scalability, availability and security.

The z9 BC comes in a single frame, with one multi-chip module (MCM) which hosts the engines, memory and high speed connectors for I/O. On the Model R07, there are seven customer-configurable engines and one System Assist Processor (SAP). This model must be ordered with at least one general purpose processor (CP), and two more can be characterized as general purpose processors or specialty engines. The remaining four engines are available for additional specialty engines.

The Model S07 also has seven customer-configurable engines and one System Assist Processor (SAP). Up to four engines can be characterized as general purpose processors or specialty engines, with room for 3 more

specialty engines. This model does not require a general purpose processor to allow for a fully configured Linux® offering.

The z9 BC uses the latest chip innovation built on CMOS 10K-SOI technology. It can support up to 64GB of memory which is double the amount in the z890 and 16 enhanced, high performance Self-Timed Interconnects (STI) for data communications between memory and I/O.

IBM System z™ virtualization technologies can help lower the total cost of computing by supporting multiple, diverse operating system images on a single hardware footprint and helping to provide a compatible environment for mission critical applications. IBM's mainframe virtualization technology represents over 35 years of innovation. It offers the features and functions to help consolidate from tens to hundreds of independent distributed servers onto one larger server. Virtualization helps to reduce management complexity and can facilitate a more efficient use of system resources. The z9 BC improves on our System z base with N_Port ID Virtualization (NPIV), which allows the sharing of FCP channels among operating system images in LPARs or virtual machines.

An important connectivity feature available on the z9 BC is the OSA-Express2 OSN (OSA for NCP) feature, which provides channel connectivity from System z9 operating systems to the communications controller for Linux (CCL). It can help protect investments in traditional SNA applications and data.

Integrating the old with the new

IBM mainframes have a long history of providing integrated technologies to optimize a variety of workloads. The first specialty engine, the I/O processor or System Assist Processor (SAP) is unique in the industry in terms of being an I/O assist processor embedded to help improve the operational efficiency of I/O processing.

The Internal Coupling Facility (ICF) was introduced with S/390® servers and helps to cut the cost of Coupling Facility functions by reducing the need for an external Coupling Facility. IBM System z Parallel Sysplex® technology allows for greater scalability and availability by coupling mainframes together. Using Parallel Sysplex clustering, System z servers are designed for up to 99.999% availability. Having a Parallel Sysplex environment also allows for centralized data sharing across mainframes.

The introduction of the Integrated Facility for Linux (IFL) in 2001 allowed IBM to support new workloads and open standards. Linux provides a stable and open, economical application enabling platform with a wealth of available applications. The System z platform provides users with the ability to "scale out," deploying large numbers of virtual Linux servers to provide high levels of service while at the same time helping reduce expense and complexity. For smaller mainframe customers, having an IFL running side by side with traditional workloads offers the accessibility of core business data to new Web based applications—done in a more secure fashion with faster and more current data availability.

The System z9 Application Assist Processor (zAAP) allows users to strategically deploy and integrate new Java™ technology based workloads on the mainframe, facilitating the integration of applications and core business data in a highly cost effective manner. A zAAP can help simplify and reduce server infrastructures, providing both operational and performance advantages over a physically separated multi-tier solution; increase system productivity by reducing the demands and capacity requirements on general purpose processors which may be

available for reallocation to other mainframe System z9 workloads; and lower the overall cost of computing for WebSphere® Application Server and other Java technology-based solutions through potential hardware, software and maintenance savings.

The newest specialty engine is the IBM System z9 Integrated Information Processor (IBM zIIP), which is focused on facilitating the integration of database workloads with applications. The first exploiter is DB2® for z/OS® V8 and the zIIP is the next proof point in delivering against the goal of the mainframe as the hub for data serving.

Enabling with FICON

The z9 BC now includes FICON® Express4 to help improve capacity and performance with the next generation of FICON/FCP. This new feature may reduce the cost of storage operations and infrastructure and shorten backup windows with faster channel link speeds. The FICON Express4 channel is designed to improve performance of FICON channel reads or writes for unidirectional transfers and total throughput for a mix of reads and writes when compared to FICON Express2.

While available with four channels per feature, FICON Express4 is designed to help provide improved performance and supports 1, 2 or 4 Gbps link data rate, auto negotiated. With enhanced availability features, the new FICON Express4 feature supports pluggable optics for individually servicing each of the four channels on a feature.

To help customers scale their FICON I/O connectivity investments for their business needs, whether for consolidation or performance, FICON Express4 is also available on z9 BC with two channels per feature. This provides an entry point that still provides the faster channel link speeds that help to improve performance and throughput, increased availability with pluggable optics, and maintains investment protection by recognizing and supporting 2 or 4 Gbps link data rate transfer speeds of currently installed I/O technology.

Mainframe protection means being available and secure

The mainframe has traditionally set the excellence bar for being “always on,” as well as for helping maintain the privacy of confidential information and the security of the system itself. These system characteristics are becoming increasingly important to on demand enterprises of all sizes.

A key focus of the System z9 family of servers is to provide high availability by helping to reduce both planned and unplanned outages. When properly configured, outage reductions can be achieved as a result of the z9 BC’s improved nondisruptive replace, repair, and upgrade functions for I/O, as well as the capability, in select circumstances, to download Licensed Internal Code (LIC) upgrades nondisruptively. LIC upgrades provide functional enhancements for your system.

There are new integrated clear key encryption security features on the System z9 platform, including support for Advanced Encryption Standard (AES), Secure Hash Algorithm-256 (SHA-256), and Pseudo Random Number Generator (PRNG). Performing these functions in hardware may help to contribute to improved throughput, and the z9 BC advanced virtualization technologies can create a solid foundation for flexible integration of business and information management.

The configurable Crypto Express2 feature is a System z9 platform exclusive. This new feature combines the functions of coprocessor (for secure key encrypted transactions) and accelerator

(for Secure Sockets Layer [SSL] acceleration) modes in a single feature with two PCI-X adapters. Using the Hardware Management Console (HMC), the PCI-X adapters can be customized as having either two coprocessors, two accelerators, or one of each.

Protecting sensitive data and the importance of security to protect both business data and customer information is a growing concern for companies of all sizes. Being unable to protect these assets may result in high out-of-pocket costs and, more importantly, may also result in lost customer and investor confidence. Announced in September 2005, the IBM Encryption Facility for z/OS 1.1 leverages mainframe encryption services to the creation of encrypted tapes. Customers can use z/OS centralized key management to provide a highly secure exchange of encryption keys when exchanging data with trusted business partners.

"Ready when needed" to keep you in control

Correctly sizing business needs is important. Too little capacity causes slow response and low customer satisfaction. Too much means paying more than necessary. In the highly unpredictable world of on demand business, businesses need to be able to get what they need, when and how they need it, and pay for only what is used. IBM capacity on demand for the IBM System z brand is designed to help achieve those goals.

It is a must to have the flexibility to rapidly increase or decrease computing capability or processor requirements when needed. This may be a permanent capacity increase for planned growth or a temporary capacity increase for seasonal or unpredictable peak periods. The z9 BC provides the capability to quickly and nondisruptively activate "extra" processor capacity that is built directly into the server. IBM Capacity Upgrade on Demand (CUoD) allows for a permanent increase in processing capacity, and IBM On/Off Capacity on Demand (On/Off CoD) allows for a temporary capacity increase that allows you to revert to the previous processing level whenever it's required.

Add on other features and programs like Capacity BackUp (CBU) and Customer Initiated Upgrade (CIU) and there is a great deal of flexibility in these on demand solutions.

The z9 BC offers a variety of growth options that can help you protect your investment. All z9 BC R07 models are upgradeable to all of the z9 BC S07 models, which in turn are upgradeable to the z9 EC. And like the z890, the upgrades within a model can be vertical, horizontal, or diagonal on the capacity setting matrix. To help you get the most of your prior investments, all models of the z890 and the z800 Model 004, are upgradeable to the z9 BC.

Flexibility and choice to meet a range of business challenges

Delivering the technologies required to address today's IT challenges takes much more than a server; it requires all of the system elements to be working together. For many years IBM has designed and developed its server technology in collaboration with the other system elements. The result of this collaborative approach to system design for the IBM System z9 platform means we can deliver technologies that are designed to exploit each other's strengths, enhancing the capabilities of the total system and delivering greater value to the on demand business enterprise.

The z9 BC is able to manage numerous operating systems on a single server, including z/OS, z/OS.e, z/VM®, z/VSE™, VSE/ESA™, z/TPF, TPF, and Linux for System z (31-bit and 64-bit distributions). The operating systems are designed to support existing application investments without anticipated change to help realize the benefits of the z9 BC.

z/OS delivers the highest qualities of service for enterprise transaction and data and extends these qualities to new applications using the latest software technologies. It provides a security-rich, scalable, high-performance base on which to build and deploy Internet and Java technology-enabled applications, providing a comprehensive and diverse application execution environment.

z/OS.e, unique to the System z entry and midrange mainframes, provides an exceptional price for the deployment of new applications. z/OS.e provides select z/OS functions and is comparable to z/OS in service and reliability. Best of all, no new skills or service procedures are required for z/OS customers who wish to exploit z/OS.e. z/OS.e makes your decision to integrate new workloads on your mainframe easier.

Linux on System z combines the advantages of the IBM mainframes with the flexibility and open standards of the Linux operating system. Linux can play a major role in the simplification of the IT infrastructure—not only because it helps simplify business integration through the use of open and industry standards but also because it supports deployment of new solutions more quickly and accelerates time to market.

z/VM provides a highly flexible test and production environment for enterprises deploying the latest on demand solutions. z/VM helps businesses meet their growing demands for multi-system server solutions with a broad range of support for operating system environments such as z/OS, z/OS.e, OS/390®, TPF, z/VSE, CMS, Linux for S/390, or Linux on System z.

z/TPF remains the “high volume transaction processing” (HVTP) platform of choice for many of IBM’s largest customers. These customers cover several industries, including airlines, lodging, finance, health, and travel.

z/VSE is designed to help provide robust, cost-effective solutions for customers with a wide range of capacity needs in most industries, worldwide. z/VSE is built on a heritage of ongoing refinement and innovation that spans four decades. It brings the value of innovative IBM eServer zSeries and IBM TotalStorage® technology to VSE clients.

New ways to tackle the future of development using SOA

Businesses of all sizes point out the challenges that exist in managing the changing requirements of enterprise software in areas of integration, time to respond, cost to manage, and the inability to reconfigure business processes when needed. There is a growing recognition and acceptance in the IT industry of the potential benefits of Service-Oriented Architecture (SOA) for building new applications. Over the years, IBM customers have employed and developed business applications running on z/OS, using a combination of CICS®, IMS™, and DB2 for z/OS. Consequently, the inherent strengths and service capabilities of a z/OS environment running on a z9 BC can make it an ideal platform from which to evolve and enhance, develop, deploy and manage applications as customers move to a SOA.

The use of IBM SOA products, such as the new IBM WebSphere Developer for zSeries V6.0, may assist in the quicker

and easier generation of Web and user interfaces for core business. IBM WebSphere Process Server for z/OS V6.0 is designed to help enable the integration of diverse "services" such as multiple core applications, new applications or other packaged applications within the same workspace. The IBM WebSphere, Rational® and Tivoli® products feature technology in development tools, middleware, and management tools designed to help improve operational efficiency.

For companies and businesses of any size or industry, choosing to deploy Service-Oriented Architecture on the z9 BC may help enhance application re-use, may help reduce the cost and risk of new development projects and bring flexibility and responsiveness to the way customers are able to tackle business challenges or opportunities.

Take back control with z9 BC

IBM's mainframe capabilities are legendary. Customers deploy systems that remain for years because they are expected to, and continue to, work well. However, mainframe systems have seen significant innovative improvements for running new applications in the last few years, and customers can see real gains in price/performance by taking advantage of this new technology.

IBM provides world-class mainframe technology to help today's enterprises respond to business conditions quickly and with flexibility. From automation to advanced virtualization technologies and open industry standards such as SOA, IBM mainframes teamed with IBM's storage products help deliver competitive advantages for a unified infrastructure.

This unified approach enhances the role of the mainframe, creating a data hub that positions you to meet future challenges head on.

IBM System z9 Business Class features and benefits

Availability / Reliability	• Transparent CP Sparing • Fault Tolerant Interconnect Design • Dynamic memory sparing • CICS subspace group facility • Enhanced Firmware Simulation • Remote operations support • N+1 power supply technology • Concurrent channel, OSA-E, OSA-E2 and Coupling Link maintenance • Dynamic I/O Reconfiguration • FICON Purge Path Extended • System Assist Processor (SAP) • Sparing for Storage Protect Preservation Keys • Partial memory restart • CICS subsystem storage protect	• Dual Support Elements • Air cooling • Concurrent Hardware Management Console (HMC) and Support Element • Redundant I/O Interconnect • Enhanced Driver Maintenance • Failure Containment for MBA • Reassignment and Sparing • Dynamic Channel Path Management • Concurrent power and thermal maintenance • Concurrent Licensed Internal Code (LIC) maintenance for CP, SAP, SE, PR/SM™, LPAR, HMC, OSA-Express2 • Enhanced Dynamic Reconfiguration Management
Security	• Open Architecture Distributed Transaction Enablement • Advanced encryption standard (AES) • Pseudo random number generator (PRNG) • Secure hash algorithm-256 (SHA-256) • CP Assist for Cryptographic Function • SSL Acceleration for Linux and z/OS	• Certified for LPAR isolation • Designed for EAL5 certification • Tamper-proof Cryptographic Support • Designed for FIPS 140-2 Level 4 • Configurable Crypto Express2 (secure coprocessor or SSL acceleration) • Remote key load for ATMs
Capacity on Demand	• Capacity Upgrade on demand • On/Off Capacity on Demand • Customer Initiated upgrades	• Capacity Backup • Administrative On/Off CoD Testing • API for On/Off CoD activation
Specialty Engines	• Internal Coupling Facility (ICF) • System z9 Integrated Information Processor (zIIP)	• Integrated Facility for Linux (IFL) • System z9 Application Assist Processor (zAAP)
I/O Connectivity	• FICON Express4 4 Gbps • FICON full duplex data transfer • N_Port ID Virtualization • Multiple Image Facility (MIF) sharing across LCSS's • FICON CTC	• Full fabric FCP support • FCP support for SCSI devices by Linux and z/VM • ESCON half duplex data transfer • ESCON CTC native and basic mode • Logical Channel SubSystems
Networking	• OSA-Express (Gigabit Ethernet, 1000BASE-T Ethernet, Fast Ethernet)[2] • HiperSockets™ • OSA-Express2 (Gigabit Ethernet, 10 Gigabit Ethernet, 1000BASE-T Ethernet)	• OSA-Express Integrated Console Controller (1000BASE-T Ethernet) • OSA-Express and OSA-Express2 Layer 2 Support • OSA for NCP (OSN)

IBM System z9 Business Class features and benefits

Cluster systems	• Parallel Sysplex clustering technology • Internal Coupling Facility (ICF) • Internal Coupling Channel • InterSystem Channel-3 (Peer mode only) • Sysplex Distributor • Geographically Dispersed Parallel Sysplex™ • Transparent ICF Sparing • Integrated Cluster Bus-3	• Integrated Cluster Bus-4 • CF Duplexing • Shared ICFs and CPs • Dynamic CF Dispatching • Dynamic ICF Expansion • z/VM Virtual Parallel Sysplex • System-Managed CF
Performance	• IEEE binary floating point support for advanced Lotus® Domino® and Java performance • Multiple Subchannel sets (MSS) • Modified Indirect Data Address Word (MIDAW) Facility • Up to 64GB memory • Hiperbatch™	• Long Displacement Facility • Hardware-assisted data compression • Hipersorting • Compare-and-move extended • DB2 sort assist • Performed Locked Operations for enhanced IP performance
Management	• (SE) maintenance • Internal Battery Feature • Power/thermal	• ESCON sparing • Cancel I/O Requests
z/Architecture	• Intelligent Resource Director • Up to 30 LPARS each (up to 15 LPARS each for model R07) with 64-bit central memory addressability	• Tri-modal addressability • Superscalar Processor

IBM System z9 Business Class at a glance

Hardware models	R07 and S07			
Processor unit types				
Model	R07	S07		
Minimum	1/0/0/0/0/1	0/0/0/0/0/1	(CP/IFL/ICF/zAAP, zIIP, SAP)[1]	
Maximum	3/6/6/3/3/4	4/7/7/3/3/4	(CP/IFL/ICF/zAAP, zIIP, SAP)	
Increments	1/1/1/1/1/1	1/1/1/1/1/1	(CP/IFL/ICF/zAAP, zIIP, SAP)	
Coupling links	ISC-3	IC	ICB-3, ICB-4	Max # external links
R07	48 Links	32 CHPIDs	16 Links[4]	48
S07	48 Links	32 CHPIDs	16 Links	48
Channels				
Minimum	0/0/0/0 (ESCON® / FICON Express[2] / OSA-Express[2] / HiperSockets)—an I/O or CF feature is required			
Minimum	0/0/0/0 (FICON Express2[2] / FICON Express4 2C / FICON Express4 / OSA-Express2)—an I/O or CF feature is required			
Maximum R07	240/32/32/16 (ESCON / FICON Express / OSA-Express[4] / HiperSockets)			
Maximum R07	64/32/64/32 (FICON Express2 / FICON Express4 2C / FICON Express4 / OSA-Express2[4])			
Maximum S07	420/40/40/16 (ESCON / FICON Express / OSA-Express / HiperSockets)			
Maximum S07	80/56/112/48 (FICON Express2 / FICON Express4 2C / FICON Express4 / OSA-Express2)			
Increments	4/2/2/1 (ESCON / FICON Express / OSA-Express / HiperSockets)			
Increments	4/2/4 (FICON Express2 / FICON Express4 2C / FICON Express4)			
Increments	2/1 (OSA-Express2 - GbE, 1000BASE-T / OSA-Express2 - 10 GbE)			
Cryptographic[3]				
R07	Crypto Express2- optional up to 4 features (8 PCI-X adapters)			
S07	Crypto Express2- optional up to 8 features (16 PCI-X adapters)			

IBM System z9 Business Class at a glance

Processor memory	**Model R07**	**S07**
Minimum	8GB	8GB
Maximum	64GB	64GB

Upgradeability	
R07	Upgradeable within the z9 BC R07 and to the z9 BC model S07
	Upgradeable from IBM eServer zSeries 890 and 800-004
S07	Upgradeable within the z9 BC S07 and to the z9 EC S08
	Upgradeable from IBM eServer zSeries 890 and 800-004

Physical configuration	**Minimum**	**Maximum**
Weight (unpacked)	699 kg (1542 lbs)	785 kg (1730 lbs) – with IBF feature
Footprint	1.24 Sq meters (13.31 Sq. ft)	1.24 Sq meters (13.31 Sq. ft)
With service clearance	3.03 Sq meters (32.61 Sq. ft)	3.03 Sq meters (32.61 Sq. ft)
Input power	5.4 kW	5.4 kW
Heat output	18.4 KBTU/hr	18.4 KBTU/hr
Air Flow	CFM 880 at 16 deg C, 1495 m3/hr at 16 deg C	CFM 880 at 16 deg C, 1495 m3/hr at 16 deg C
Height	194.1 cm (76.4 inches)	194.1 cm (76.4 inches)

General	Conforms to EIA guidelines for frames

	Operating System	**Minimum Version Release**
Software	z/OS and z/OS.e:	z/OS and z/OS.e 1.4 and subsequent releases
	z/VM:	z/VM 4.4, z/VM 5.1 and subsequent releases
	Linux on System z:	Red Hat RHEL 3 and subsequent releases, SUSE SLES 8 and subsequent releases, Linux as z/VM guest
	z/VSE:	z/VSE V3.1 , z/VSE 4.1 (when available)
	VSE/ESA™:	VSE/ESA 2.7 and subsequent releases
	TPF:	TPF 4.1
	z/TPF:	z/TPF 1.1

[1] One zAAP and/or zIIP per CP; one CP can satisfy the requirement of one or both specialty engines

[2] Available only when carried forward on an upgrade

[3] Initial order of Crypto Express2 is 4 adapters (2 features)

[4] R07 capacity setting A01 has maximum of eight ICB-4 links and a maximum of 24 OSA-Express and OSA-Express2 ports

For more information

For more information about the IBM System z9 Business Class, contact your IBM marketing representative or IBM Business Partner, or visit the following IBM Web site:

ibm.com/systems/z

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Produced in the United States of America
April 25, 2006

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ZSD01858-USEN-02