IBM @server zSeries 900

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Highlights

- ***Balanced system design enables optimal use of system resources in dynamic e-business environments***
- ***Expanded range of models provides even greater scalability and performance***
- ***Linux for zSeries® supports the new 64-bit z/Architecture™ and extends choice in application flexibility***
- ***Self-managing... simplicity in an otherwise complex world***

IBM extends server leadership

Complexity is a way of life for businesses today. An average business must contend with five different architectures in its e-business infrastructure. The challenge customers face is how to manage all of these resources effectively while transforming their infrastructures. Compounding the problem is the projected shortfall of IT skills and the significant growth of the Internet.

This may sound like a daunting task, but IBM is designing its IBM @server™ product line to be self-managing so customers can concentrate on their business needs. At the core of many infrastructures is the IBM @server zSeries 900 (z900) powered by z/OS®. Specifically designed to handle the massive growth in transactional and data demands of the e-business world, z900 and z/OS intelligently manage a multitude of diverse workloads within a single server, out to the network and to data, all according to each customer's business priorities.

z900 servers now offer 42 air-cooled models, ranging from 1- to 16-way, including 16 2xx models offering up to approximately 20 percent improvement over the original 1xx models. These servers can be configured in numerous ways to offer outstanding flexibility for speedy deployment of e-business solutions. Each z900 can operate independently or as part of a Parallel Sysplex® cluster of servers. In addition to supporting z/OS, the z900 can host tens to hundreds of Linux images running major commercial applications and open source applications using z/VM®.

IBM @server zSeries 900 enterprise server at a glance

Hardware models						
General Purpose Models	101-109, 110-116, 210-216					
Capacity Models	1C1-1C9, 2C1-2C9					
Coupling Facility	Model 100 Coupling Facility: 1-9 Internal Coupling Facilities					
Coupling Links	**Links**	**IC**	**ICB-3**	**ICB**	**ISC-3**	**Max # Links**
	z900 - 100	32	16	16	32, 42, w/RPQ	64
	z900 server	32	16	8,12/16 w/RPQ	32	32
Channels						
Minimum	0[1]/0/0/0/0/0 (Parallel/ESCON®/FICON™/FICON Express/OSA-Express/HiperSockets)					
Maximum	88[1]/256/96/96/24/4 (Parallel/ESCON/FICON/FICON Express/OSA-Express/HiperSockets)					
Increments	4[1]/4/2/2/2/1 (Parallel/ESCON/FICON/FICON Express/OSA-Express/HiperSockets)					
Cryptographic	CMOS Cryptographic Coprocessor — 2 standard PCI Crypto Coprocessor — up to 16 optional (up to 8 cards) PCI Crypto Accelerator — up to 12 optional (up to 6 cards)					
Processor memory	**Model 101-109**		**1C1-1C9/2C1-2C9**		**110-116/210-216**	
Minimum	5 GB		10 GB		10 GB	
Maximum	32 GB		64 GB		64 GB	
Upgradeability	Upgradeable from G5/G6, R06, IBM @server zSeries 800 (z800) models Upgradeable within zSeries 900. Upgradeable to z990 (except z900-100)					
Physical configuration	**Models 101-116 and 1C1-1C9, 1 frame, minimum[2]**			**2C1-2C9 and 210-216 2 frame, maximum[3]**		
Weight (unpacked)	917 kg (2021 lbs)			1866 kg (4113 lbs)		
Footprint	1.32 Sq meters			2.81 Sq meters (14.2 Sq feet)		(30.3 Sq feet)
Service clearance	3.04 Sq meters			6.18 Sq meters (32.7 Sq feet)		(66.5 Sq feet)
Input power	5.3 kVA			12.4 kVA		
Heat output	18.1 KBTU/hr			42.1 KBTU/hr		
Air Flow	CFM 800, m^3/m in 22.2			CFM 2223, m^3/m in 61.7		
Height	200.4 cm (79.8 inches)			200.4 cm (79.8 inches)		
General	Conforms to EIA guidelines for frames Employs standard 24-inch cage enclosures					
Software	z/OS basic and LPAR mode:			z/OS 1.1 and subsequent releases		
	z/VM basic and LPAR mode:			z/VM 3.1 and subsequent releases		
	Linux for zSeries basic and LPAR mode:			Red Hat, SuSE, Turbolinux		
	OS/390® basic and LPAR mode:			OS/390 2.8 and subsequent releases		
	VM basic and LPAR mode:			VM/ESA® 2.4 and subsequent releases		
	VSE basic and LPAR mode:			VSE/ESA™ 2.4 and subsequent releases		
	TPF LPAR mode:			TPF V4R1 (ESA mode only)		
	Linux for S/390 basic and LPAR mode:			Red Hat, SuSE, Turbolinux		

[1] Available only with a compatibility I/O Cage. [2] Without Internal Battery Feature (IBF) [3] With IBF

The IBM @server product line is backed by a comprehensive suite of offerings and resources that provide value at every stage of IT implementation. These tools can help customers test possible solutions, obtain financing, plan and implement applications and middleware, manage capacity and availability, improve performance and obtain technical support across the entire infrastructure. The result is an easier way to handle the complexities and rapid growth of e-business. In addition, IBM Global Services experts can help with business and IT consulting, business transformation and total systems management services as well as customized e-business solutions.

Powerful

z900 servers are based on the z/Architecture, which enables applications to have large memory and can help eliminate bottlenecks associated with the lack of addressable memory. It supports a new standard of performance and integration by expanding on the balanced system approach of the IBM S/390® architecture.

As the connected world becomes increasingly demanding, servers will need to provide faster data access and continuous data availability, as well as improved flexibility and efficiency of data — all with lower cost of ownership. zSeries I/O connectivity and networking features can help customers attain these goals. Additions to CPU, memory and I/O capacity enables z900 to respond quickly to workload spikes. A robust I/O subsystem complements the great number of processors and large main memory. Native FICON and Fibre Channel Protocol (FCP) devices provide improved performance, greater configuration flexibility, and lower total cost through channel consolidations. Furthermore, IBM's intent to provide FICON cascaded director support will mean improved fiber infrastructure utilization and additional cost savings.

High speed interconnects for TCP/IP communication, known as HiperSockets™, let TCP/IP traffic travel between partitions at memory speed, rather than network speed. A new, higher performing Gigabit Ethernet feature is one of the first in the industry capable of achieving line speed: one gigabit per second. IPv6 support enables more addresses to allow for larger configurations. The result is ultra high speed communications within the server, between servers, to devices and out to users, thereby allowing greater integration between traditional and Web applications for maximum e-business effectiveness.

Intelligent

Improving capacity, bandwidth, and performance is good — but managing these resources to meet your business goals is even better. Save time and money with zSeries self-optimizing and self-healing functionality.

zSeries servers automatically direct resources to priority work through Intelligent Resource Director (IRD). The zSeries IRD combines the strengths of three key technologies: Workload Manager, Logical Partitioning and Parallel Sysplex clustering.

This powerful combination of z900 servers and z/OS provides the ability to intelligently self manage numerous operating system images executing

IBM @server zSeries 900 enterprise server features and benefits

z/Architecture	• Intelligent Resource Director • Capacity BackUp • Customer Initiated Upgrades	• Capacity Upgrade on Demand • QDIO	• Integrated Facility for Linux • HiperSockets
Cluster systems	• Parallel Sysplex clustering technology • Internal Coupling Facility (ICF) • Internal Coupling Channel • Intersystem Coupling-3 Links • Integrated Cluster Bus	• Sysplex Distributor • Geographically Dispersed Parallel Sysplex™ • Transparent ICF Sparing • System-Managed CF Structure Duplexing	• Shared ICFs and CPs • Dynamic CF Dispatching • Dynamic ICF Expansion • z/VM Virtual Parallel Sysplex
Availability	• Transparent CP Sparing • Dynamic Memory Sparing • Partial memory restart • Remote operations support • N+1 power supply technology • Concurrent channel, OSA-2, OSA-E and Coupling Link maintenance • Dynamic I/O Reconfiguration	• System Assist Processor (SAP) Reassignment & Sparing • CICS® subsystem storage protect • Dual Support elements • N+1 cooling • Concurrent Hardware Management Console (HMC) and Support Element	• Enhanced Application Preservation • CICS subspace group facility • Dynamic Channel Path Management • Concurrent power and thermal maintenance • Concurrent Licensed Internal Code (LIC) maintenance for CP, SAP, SE, PR/SM™, LPAR, channels, HMC
Management	• (SE) maintenance • Internal Battery Feature	• Power/Thermal • ESCON sparing	• Cancel I/O requests
PR/SM	• Up to 15 LPARs each with 64-bit central memory addressability	• Enhanced Dynamic Reconfiguration Management	
Performance	• IEEE binary floating point support for advanced Domino™ and Java® performance • DB2® sort assist	• Up to 64 GB central memory • Hiperbatch™ • Hardware-assisted data compression	• Hipersorting • Compare-and-move extended • Performed Locked Operations for enhanced IP performance
I/O Connectivity	• ESCON half duplex data transfer • FICON full duplex data transfer (MIF) • Full fabric FCP support	• Multiple Image Facility (MIF) • FICON CTC • FCP support for SCSI devices by Linux	• ESCON CTC native and basic mode • FICON Bridge
Networking	• OSA-Express (Gigabit Ethernet, Fast Ethernet, I55 ATM, Token-Ring)	• OSA-2 (FDDI)	• HiperSockets
Security	• Open Architecture Distributed Transaction Enablement • Tamper-proof Cryptographic support FIPS Level 4 certified • LPAR isolation certified E4 by US Government		• AES Encryption support • Crypto SSL support for Linux

on a single server, as a single compute resource, with dynamic workload management and physical resource balancing across logical partitions. In short, the system can dynamically allocate processors, channel paths and channel-and-controller work across multiple virtual servers to ensure that the unpredictable needs of e-business workloads can be managed according to business priorities.

The zSeries and z/OS extend the power of Workload Manager from the edge of a network to the heart of data. Business priorities are used for realtime prioritization of network and I/O requests when combined with Cisco technology and through the IBM Enterprise Storage Server™. The Sysplex Distributor function of z/OS provides intelligent load balancing of TCP/IP traffic across a Parallel Sysplex cluster. Dynamic Virtual Internet Protocol Addressing (VIPA) support extends the workload distribution and availability features of Parallel Sysplex technology to the TCP/IP network.

Always on

zSeries servers can deliver the highest level of application availability required in today's global networked environment. Even in a single footprint, zSeries servers are designed to avoid or recover from failures to minimize business disruptions.

High availability is realized through very high-component reliability and design features that assist in providing fault avoidance and tolerance, as well as permitting concurrent maintenance and repair.

For even higher levels of availability, the superior choice is zSeries 900 with IBM Parallel Sysplex clustering technology. New faster Coupling Links provide balanced performance for the powerful z900 in a sysplex. ISC-3 links provide up to two gigabits/second transfer rates; ICB links provide up to one GigaByte/second. In addition, complete backward compatibility exists with S/390 ISC and ICB links.

Another aspect of availability is nondisruptive growth, enabled in the zSeries by Capacity Upgrade on Demand. z900 servers have the capability to add server capacity and virtual servers nondisruptively, as well as to install FICON Express, (FICON and FCP channels), ESCON, OSA-Express Gigabit and Fast Ethernet, Token-Ring and ATM, and PCI Cryptographic Coprocessor (PCICC), PCI Cryptographic Accelerator (PCICA) cards, and to activate memory without bringing down the system.

The latest enhancement to nondisruptive growth is Customer Initiated Upgrade. This enables zSeries customers to initiate processor and memory upgrades through the Web, and then download and install the upgrade them selves at the exact point in time that their business needs define.

Safe and Secure

IBM leads the industry in bringing security to e-business with the integrated security features of z/Architecture. The high-availability CMOS Cryptographic Coprocessors feature have earned Federal Information Processing Standard (FIPS) 140-1 Level 4, the highest certification for commercial security ever awarded by the U.S. Government. Further, these coprocessors are designed as single-chip modules that are individually serviceable, eliminating the need for downtime in the event of a crypto chip repair action.

z900 servers can also support a combined total of 16 optional PCICC and/or PCICA cards, leading the industry in supporting in excess of 4,300 SSL transactions/second on a z900 model 216. The combination of the three cryptographic options enables applications to invoke industry-standard cryptographic capabilities – such as DES, Triple DES and RSA – for scalable e-transaction security and the flexibility to quickly adopt new standards.

Linux for zSeries running on standard z900 engines and on Integrated Facility for Linux engines is capable of exploiting the hardware cryptographic feature provided by the PCICA card for SSL acceleration. This enables customers implementing e-business applications on Linux for zSeries to utilize enhanced security of the hardware.

An open, flexible server

z900 servers offer the flexibility to manage numerous operating systems on a single server, including z/OS, OS/390, z/VM, VM/ESA, VSE/ESA, TPF, Linux for zSeries and Linux for S/390.

z/VM delivers support for hardware technologies such as FICON and FICON Express channels, OSA-Express— high-speed communication adapters, low latency HiperSockets, and advanced storage solutions. z/VM also takes advantage of 64-bit real and virtual memory.

Linux for zSeries supports the 64-bit architecture and HiperSockets on z900 servers. In addition, Linux for S/390 will run 31-bit applications.

Multiple Linux systems can be easily managed on the zSeries 900 with z/VM. Linux images are able to share resources and HiperSockets for internal high speed communications.

The Integrated Facility for Linux (IFL) is a feature that dedicates a processor for Linux images. Additional processing capability can be purchased exclusively for Linux workloads without impacting the z900 model designation and without increasing charges for zSeries software on the rest of the server. Additionally, z/VM V4 supports IBM Integrated Facility for Linux, as does the PCICA Cryptographic for very high speed SSL transactions.

The latest enhancement to zSeries will be Linux support for the Fibre Channel Protocol for Small Computer System Interface (SCSI) channel— or FCP channel. An FCP Channel enables Linux environments to permit attachment to select industry-standard FC and SCSI (via bridge) storage devices to the zSeries with multi-switch full fabric support.

World-class servers

The IBM @server product line is about uncompromising flexibility in selecting, building and deploying applications that businesses need.

Toward that end, IBM offers the industry's broadest range of platforms and operating systems. IBM is committed to industry-standard, cross-platform technologies – such as Java, XML, HTML, SOAP and UDDI – that are at the heart of a flexible e-business infrastructure. Support for these standards in our key middleware— including DB2 Universal Database™, WebSphere® Application Server and MQSeries® —means companies will not be locked in to a single platform as businesses grow. As a result, our customers always have the flexibility to deploy applications in a cost-effective way.

Paying for what you use

The zSeries and z/OS can be a powerful combination in helping to reduce computing costs. Workload Pricing allows software bills to be based on the utilization of one or more LPARs, not the total capacity installed in the server. It also provides common pricing for many cross-platform products.

Smoothing the path

The systems management function and features of the zSeries platform provide more robust control and automation as well as better serviceability and availability. For example, Intelligent Resource Director extends the classic strengths of I/O priority queuing by prioritizing requests across zSeries 900 channels via Channel Subsystem Priority Queuing. In addition, it allows I/O channels to move automatically to those workloads, which require additional connectivity via Dynamic Channel Path Management and it dynamically balances CPU resource across LPARs according to business goals.

z/OS can act as a server gateway in Tivoli® enterprise-based management of the whole IT environment. Tivoli Enterprise for OS/390 and its applications can be ordered as part of the z/OS ServerPac.

z/OS installation is simpler, faster and less demanding on systems programming skills and times. The ServerPac for z/OS offers the option of full system replacement and upgrading software in the same package. Other customized offerings (i.e. SystemPac) assist in further reducing the workload associated with installing z/OS, CICS, IMS™, and DB2.

In addition, z/OS provides an entirely new approach for installing and configuring products: a managed system infrastructure. This approach goes a step beyond Web-based wizards by furnishing a step-by-step installation guide and automated system updates. For example, Managed Systems Infrastructure for Setup can establish a Parallel Sysplex cluster quickly and easily by transparently creating the policies, parmlib specifications and initialization parameters necessary to configure a basic Parallel Sysplex environment.

"The New Frontier"

The first generation of e-business was about cool technology. The second generation was about new business models. Every business today must begin to ask some strategic questions with the current e-business environment in mind: how do I evolve my infrastructure; what are the right architectures and interfaces to build on; what products and services do I need?

To help organizations deal effectively with complexity, IBM has undertaken an autonomic computing initiative to bring self-managing and self-healing properties to computing infrastructure. The goal is to use technology to manage technology, creating an intelligent, self-managing IT infrastructure that minimizes complexity and gives customers the ability to manage environments that are hundreds of times more complex and more broadly distributed than exist today. This enables increased utilization of technology without the spiraling pressure on critical skills, software and service/support costs.

The autonomic computing initiative represents a major shift in the way the industry approaches reliability, availability and serviceability (RAS). It promises to harness the strengths of IBM to deliver open, standards-based servers and operating systems that are self-configuring, self-protecting, self-healing and self-optimizing. Autonomic computing technology helps ensure that critical operations continue without interruption and with minimal need for operator intervention.

For companies that need to provide next generation e-business solutions on an enterprise level, the platform of choice is the IBM @server zSeries 900.

For more information:

For more information about the IBM @server zSeries 900, contact your IBM marketing representative or IBM Business Partner or visit the following IBM Web site:
ibm.com/eserver/zseries

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