IBM

IBM @server zSeries 800

The powerful IBM @server zSeries 800

As part of the IBM @server product line, z800 servers are built on the same guiding principles that make the IBM @server brand techno-logically advanced. These break-through servers provide new tools, innovative technology and application flexibility to help businesses lower costs, improve efficiency and expedite e-business transformation. Built on the same high security and powerhouse processing capabilities of the suc-cessful IBM @server zSeries 900 (z900), z800 servers are specifically optimized to integrate business applications, and to meet the critical transactions and evolving demands of e-business.

The attractive price/performance of z800 servers extends the advantages of advanced zSeries technology to customers whose capacity requirements are less than those served by the z900.

Highlights

- **Optimized for integration, and designed to handle the transaction processing demands of the e-business world with attractive price/performance**

- **Incorporates advanced self-management capabilities from IBM**

- **Provides outstanding flexibility for deploying Linux® solutions with a dedicated Linux server**

Built on proven technology

It's a conundrum that many IT managers know all too well. How does a company build and maintain an IT infrastructure while facing evolving technology with limited budgets and multiple types of workloads? How does a company reconcile the need for high availability with security and a variety of servers, storage and software that must work together seamlessly? To help customers meet these challenges, IBM introduces the IBM @server™ zSeries™ 800 (z800) servers.

Advanced design

z800 and z900 servers are designed from the ground up using key technologies from the IBM Autonomic Computing initiative, the IBM blue-print for self-managing systems. By using technology to manage technol-ogy, autonomic computing can help create an intelligent, self-managing IT infrastructure to minimize complexity.

This enables increased utilization of technology without the spiraling pressure on critical skills and software, as well as service and support costs.

The best example of this is the revolutionary z/Architecture™—the most extensive design effort in four decades of large-scale computing.

As the foundation of zSeries servers, the z/Architecture provides optimal flexibility in selecting, building and rapidly deploying applications across a customer's e-business infrastructure, while taking advantage of zSeries availability. It is designed to keep your business up and running.

Work priority is managed by the Intelligent Resource Director that works with the z/OS™ Workload Manager and is designed to automatically allocate physical resources to the task that needs it most.

Under the covers

All z800 servers have a five Processor Unit (PU) MultiChip Module. The first PU is, in most cases, designated as a general purpose engine with Processor Units two through four defined as general purpose, Integrated Facility for Linux or Coupling Facility engines for use in a Parallel Sysplex® cluster.

The fifth PU is used as a System Assist Processor (SAP) to drive large amounts of data through the I/O subsystem. A spare PU is available as a backup to any processing units that might fail.[1] HiperSockets™ exploits central memory communication functions and transmits data at memory speed between Logical Partitions (LPARs) or virtualized guests on z800 systems. HiperSockets is key in building internal LANs between LPARs and driving multiple workloads across tens to hundreds of virtual servers within a single, physical machine for an effective "network in a box."

In addition to supporting traditional workloads, z800 servers can host tens to hundreds of Linux images running major commercial applications using z/VM™ Version 4.1 and subsequent releases. z/VM enhanced technology and new functions are designed to provide outstanding virtualization capabilities.

Wide range of choices

The z800 family of mainframes are comprised of ten general purpose models (0A1, 0B1, 0C1, 0E1, 0X2, 001, 0A2, 002, 003, 004), one Coupling Facility model (0CF) for creating Parallel Sysplex clusters, and one Dedicated Linux model (0LF). Thus, customers benefit from having access to a wide range of choices for initial entry and substantial growth opportunity from any point along the z800 system continuum.

All z800 models have a base 8 GB central memory, which optionally can be increased to 16 GB, 24 GB or 32 GB.

Optimized to satisfy the most mission-critical requirements for enterprise e-business transaction processing and data management, z800 servers can be configured in numerous ways for increased flexibility and rapid deployment of e-business solutions.

Flexible and open

The IBM @server brand is about uncompromising flexibility in selecting, building and deploying the applications that a business needs. 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 key middleware—including DB2 Universal Database™, WebSphere® Application Server and MQSeries®—means a company won't be locked into a single platform as its business grows. As a result customers always have the flexibility to deploy applications in a cost-effective way. z800 servers offer technology leadership to meet current business needs and the availability, security and flexibility to grow as other requirements develop.

For example, some z800 servers have the flexibility to concurrently run multiple types of workload, including massive growth capabilities within the z800 product line. The z800 model 0E1, as standard equipment, has one general purpose engine for running traditional workloads and one Integrated Facility for Linux (IFL) engine to run Linux workloads.

The latest zSeries enhancement is the Fibre Channel support of Small Computer System Interface (SCSI) devices Fibre Channel Protocol (FCP). Initially in limited availability, FCP enables Linux environments to attach select industry-standard SCSI storage devices to the zSeries with multi-switch full fabric support.

Dedicated Linux model

IBM has extended its commitment to the open application environment by introducing the zSeries Offering for Linux. Included in this offering are the z800 Model 0LF, memory, channels, OSA-Express features, one-year warranty, two years of service and z/VM with three years of service. One to four engines can be enabled as Integrated Facility for Linux engines. This provides customers with outstanding flexibility for the rapid deployment of Linux solutions.

Upgradeability

IBM protects IT investments as businesses grow through the extensive upgrades offered by z800 servers. General purpose models are upgradeable throughout the z800 family. The Coupling Facility Model 0CF can be upgraded from one to four PUs, and to a general purpose model. The z800 Model 004 is upgradable to a z900 Model 104, thereby opening up massive growth capabilities within the z800 product line.

Security

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 has earned Federal Information Processing Standard (FIPS) 140-1 Level 4—the highest certification for commercial security awarded by the U.S. government.

Three types of cryptographic processors are available to handle increasingly complex and changing security issues. By enabling applications to invoke industry-standard cryptographic capabilities such as Data Encryption Standard (DES), Triple DES and Rivest-Shamir-Adleman encryption (RSA), z800 servers provide scalable e-transaction security and the flexibility to quickly include additional standards.

In particular all z800 models provide for a total of 16 optional PCI Cryptographic Coprocessors (PCICC) and/or 12 PCI Cryptographic Accelerators (PCICA). When all four Processor Units (PUs) are used along with the maximum number of PCICC and/or PCICA Coprocessors, the z800 supports a maximum of 711 SSL/second.

Each of the three types of Cryptographic features are individually serviceable. Cryptographic PCI features are concurrently hot-pluggable for upgrades and repair actions.

Linux for zSeries, running on standard z800 engines and on Integrated Facility for Linux engines, is capable of exploiting the hardware cryptographic feature provided by the PCI card for SSL acceleration. This enables customers implementing e-business applications on Linux for zSeries to utilize enhanced security and hardware performance.

Connectivity
A robust I/O subsystem provides ultra high-speed communications within a z800 server, between servers, to devices and out to users. As a result, greater integration between traditional and Web applications is available for maximum e-business effectiveness.

Connectivity to I/O devices with z800 servers is available through ESCON® and the FICON™ Express features.

Up to 240 ESCON channels are available on z800 servers. The 16-port ESCON card is used with 15 ports available and one reserved as a spare. ESCON channels are offered in four-port increments distributing channels across features for high availability.

Up to 32 FICON Express channels are available on the z800. Each FICON Express™ card has two ports. FICON Express, with its high-speed PCI bus, has bandwidth potential of 100 MB/sec. and provides high performance for large data transfers and remote vaulting applications.

Linux users can take advantage of new FCP function on z800 servers which supports connectivity to industry-standard SCSI devices. This support is enabled on the FICON Express card running in FCP mode.

Native FICON and FCP devices are designed to provide outstanding performance, great configuration flexibility, and low total cost through channel consolidations. The family of OSA-Express features (Gigabit Ethernet, Fast Ethernet, ATM, and Token-Ring) available on z800 servers are all capable of achieving line speed. Explosive Internet growth has contributed to a shortage of Internet Protocol (IP) addresses. IPV6, new on z800, expands the IP addressing scheme from 32-bits to 128-bits, enabling global addressability.

The z800 servers support one I/O cage with 16 card slots. A minimum of four ESCON channels or two FICON Express channels are required on all models except the z800 Model 0CF Coupling Facility.

Parallel Sysplex
Each z800 server is designed to run independently or be combined as part of a Parallel Sysplex cluster with other zSeries servers and selected IBM S/390® processors to increase scalability and maximize availability. Several options exist with the powerful z800 server to provide fast and balanced connectivity.

The new z800 Coupling Facility server Model 2066-0CF is designed to provide state-of-the-art coupling technology for continuous availability of Parallel Sysplex functions. Included with the z800 Coupling Facility is 64-bit architected coupling software.

InterSystem Coupling 3 (ISC-3) supports link rates of up to 2 Gigabits per second (Gbps) in Peer Mode (zSeries to zSeries), and up to 1Gbps in Compatibility Mode between zSeries and S/390 systems with HiPerLinks.

IBM @server zSeries 800 enterprise server at a glance

Hardware Models

General Purpose Models	0A1, 0B1, 0C1, 0E1, 0X2, 001, 0A2, 002, 003, 004
Coupling Facility Model	0CF (1–4 Internal Coupling Facilities)
Dedicated Linux Model	0LF (1–4 Integrated Facilities for Linux)

Channels

Minimum	0/0/0/0 (ESCON/FICON Express/ OSA-Express/HiperSockets)
Maximum	240/32/24/4 (ESCON/FICON Express/OSA-Express/HiperSockets)
Increments	4/2/2/1 (ESCON/FICON Express/OSA-Express/HiperSockets)

Cryptographic Coprocessor

PCI Crypto Coprocessor	up to 16 optional (up to 8 cards)
PCI Crypto Accelerator	up to 12 optional (up to 6 cards)
CMOS Coprocessor	optional with increments of 0 to 2

Processor Memory — **All Models**

Minimum	8 GB
Maximum	32 GB
Increments	8 GB

Upgradeability

Upgradeable within zSeries 800 and from a zSeries 800 Model 004 to
a zSeries 900 Model 104

Physical Configuration — **All Models**

Single Frame

Weight (unpacked)	545 Kg (1201 lbs.)
Footprint	0.83 Sq. meters (8.9 Sq. feet)
Service Clearance	5.99 Sq. meters (64.5 Sq. feet) all sides require clearance of 762 mm (30 inches)
Input Power	200 - 240 V single phase
Heat Output	10.0 kBTU/hr
Air Flow	11.1 cubic m/mm (400 cubic ft/min)
Height	1810 mm (71.3 inches)

Software

- z/OS basic and LPAR mode:
  z/OS V1.1 and subsequent releases
- z/OS.e™ V1.3 and subsequent releases in LPAR mode only
- z/VM basic and LPAR mode:
  z/VM V3.1, z/VM V4.1 and subsequent releases
- Linux for zSeries basic and LPAR mode:
  Redhat, SuSE, Turbolinux
- OS/390® basic and LPAR mode:
  OS/390 V2.9 and subsequent releases
- VM basic and LPAR mode:
  VM/ESA® V2.4
- VSE basic and LPAR mode:
  VSE/ESA™ V2.5 and subsequent releases
- TPF V4.1 (ESA mode only)
- Linux for S/390 basic and LPAR mode:
  Redhat, SuSE, Turbolinux

Integrated Cluster Bus-3 (ICB-3) links facilitate high-speed coupling between two zSeries servers over distances less than seven meters. Five possible ICB-3 links are available on the general purpose z800 models and six are available on the Coupling Facility model. ICB-3 links do not take up any of the 16 slots available in the cage.

Internal Coupling-3 (IC-3) links emulate the Coupling Links between images within a single server. A Parallel Sysplex environment can be established on a single z800 server through IC-3 capabilities. Up to 32 IC links are available on z800 servers.

Tools for e-business

z800 enterprise-class servers are backed by a comprehensive suite of offerings and resources that provide value at every stage of IT implementation. These tools can help an organization 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 deal with 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.

Key to nondisruptive growth on z800 servers is Capacity Upgrade on Demand. This feature provides the ability to add server capacity and virtual servers nondisruptively. Furthermore, installation of FICON Express, ESCON, OSA-Express Gigabit and Fast Ethernet, Token-Ring, ATM, PCICC and PCICA cards can also be done nondisruptively.

Customer-Initiated Upgrade (CIU) on the z800 is the new capability to initiate a processor upgrade via the Web using IBM Resource Link. Customers will be able to download and install the upgrade themselves at the exact point in time their business needs require the upgrade.

This unique and important function for zSeries gives the customer greater control and ability in adding capacity to the system to meet resource requirements for unpredict-able e-business workloads and for applications that are difficult to size.

IBM also offers innovative financing solutions designed to make the acquisition of the new zSeries 800 servers manageable and affordable. With TOTAL Solution Financing, customers may be able to overcome current budget constraints and acquire z800 systems they need today. TOTAL Solution Financing can help customers turn up-front costs into low monthly payments while preserving credit lines for other investments. To meet changing business requirements, customers can easily add capacity or upgrade at any time during the lease.

Quality of service

zSeries servers are designed to deliver the high level of application availability required in today's global networked environment. As such, they 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.

In addition, self-healing features such as Capacity BackUp, concurrent I/O and networking card maintenance,

IBM @server zSeries 800 enterprise server features and benefits

Features	Benefits	
z/Architecture	• 64-bit Architecture • Intelligent Resource Director • Capacity Upgrade on Demand • Integrated Facility for Linux	• Capacity BackUp • QDIO • HiperSockets • Customer-Intiated Upgrade
Cluster Systems	• Parallel Sysplex clustering technology • Internal Coupling Channel • Geographically Dispersed Parallel Sysplex™ • Shared ICFs and CPs • Transparent ICF Sparing • z/VM Virtual Parallel Sysplex • System-Managed CF Structure Duplexing	• InterSystem Coupling Links • Integrated Cluster Bus-3 • Internal Coupling Facility (ICF) • Dynamic ICF Expansion • Dynamic CF Dispatching
Availability	• Transparent CP Sparing • Dynamic Memory Sparing • CICS subsystem storage protect • Remote operations support • Concurrent power and thermal maintenance • N+1 cooling • Concurrent channel, OSA-E, and Link upgrade and maintenance • Concurrent Licensed Internal Code (LIC) maintenance for CP, SAP, SE, LPAR, channels, HMC	• Enhanced Application Preservation • CICS® subspace group facility • Dynamic Channel Path Management • Alternate service element • N+1 power supply technology • Dynamic I/O Reconfiguration • Concurrent HMC and Support Element maintenance • Dynamic System Assist Processor Reassignment and Sparing
Management	• Cancel I/O requests • ESCON Sparing • z/OS managed infrastructure • Intelligent Resource Director	
PR/SM™	• Up to 15 LPARs each with 64-bit central memory addressability management • Enhanced Dynamic Reconfiguration management	
Performance	• IEEE binary floating point support for advanced Domino™ and Java performance • Up to 32 GB central memory • Hipersorting • Hiperbatch™ • Compare-and-move extended • Hardware-assisted data compression • Performed Locked Operations for enhanced IP performance • DB2® sort assist	
Storage Connectivity	• ESCON half duplex data transfer • ESCON CTC native and basic mode • FICON CTC • Full fabric FCP support • FCP support for Linux SCI devices by Linux	• Multiple Image Facility (MIF) • FICON full duplex data transfer (MIF) • FICON Bridge
Networking	• OSA-Express (Gigabit Ethernet, Fast Ethernet, 155 ATM, Token-Ring) • HiperSockets	
Security	• Open Architecture Distributed Transaction Enablement • AES Encrytion support • Tamper-proof Cryptographic support (FIPS 140-1 Level 4 certified) • Cyrpto SSL for Linux	

Error Checking and Correcting memory, and automatic calls to IBM when the system detects an error, make the z800 product line the secure and reliable servers for business. For even higher levels of availability, the superior choice is zSeries with IBM Parallel Sysplex clustering technology.

Next generation of e-business

As the world's largest server company, IBM offers a full line of data transaction, Web application and appliance servers that embrace industry standards. Powered by breakthroughs such as microprocessors with copper wiring and Silicon-on-Insulator technology, the IBM @server product line has captured industry-leading benchmarks. It's the only server product line that covers a wide range of technologies and platforms while bringing common capabilities to the market. For example, Linux runs across the entire IBM @server product line, and each server participates in key self-managing initiatives from IBM to bring automation and cost reduction to IT implementations.

For more Information

For more information about the IBM @server zSeries 800, contact your IBM Marketing Representative, IBM Business Partner or visit the following IBM Web site:

ibm.com/eserver/zseries

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