

IBM System z9
*The foundation for
a simpler IT infrastructure*



Trademarks

The following are trademarks of the International Business Machines Corporation in the United States and/or other countries.

AIX*	FlashCopy*	MQSeries*	Tivoli*
BookManager*	GDDM*	Multiprise*	TotalStorage*
CICS*	GDPS*	OMEGAMON*	Virtualization Engine
DB2*	geoManager*	OS/390*	VisualAge*
DB2 Connect	HiperSockets	Parallel Sysplex*	VM/ESA*
DB2 Universal Database	IBM*	PR/SM	VSE/ESA
DirMaint	IBM eServer	QMF	VTAM*
Domino	IBM logo*	RACF*	WebSphere*
DRDA*	ImagePlus*	Rational*	z/Architecture
Encina*	IMS	RMF	z/OS*
Enterprise Storage Server*	Intelligent Miner	System i	z/VM*
ESCON*	Language Environment*	System z	z/VSE
FICON*	Lotus*	System z9	zSeries*
		System Storage	zSeries Entry License Charge

* Registered trademarks of IBM Corporation

The following are trademarks or registered trademarks of other companies.

Intel is a trademark of Intel Corporation in the United States, other countries, or both.

Java and all Java-related trademarks and logos are trademarks of Sun Microsystems, Inc., in the United States and other countries

Linux is a trademark of Linus Torvalds in the United States and other countries..

UNIX is a registered trademark of The Open Group in the United States and other countries.

Microsoft is a registered trademark of Microsoft Corporation in the United States and other countries.

* All other products may be trademarks or registered trademarks of their respective companies.

Notes:

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

IBM hardware products are manufactured from new parts, or new and serviceable used parts. Regardless, our warranty terms apply.

All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions.

This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.

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

Information about non-IBM products is obtained from the manufacturers of those products or their published announcements. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

Prices subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.

A simpler infrastructure means:
Fewer servers operating at higher levels of utilization



Must be scalable

Must be highly reliable,
available, and resilient

Must be rich in security features

Must react to unpredictable
changes in business volume

Must be highly virtualized

System z qualities of service make it the ideal foundation for a simplified infrastructure

A simpler infrastructure means:
Fewer servers operating at higher levels of utilization



Must be scalable



System z servers – right sized for your business now and able to grow as your business does

Protecting your investment in IBM System z technology

- Designed to protect your investment by offering upgrades from zSeries servers to System z9 servers and upgradeability within the System z9 family
- Growth can be initiated when you need it – either temporarily or permanently
- On/Off Capacity on Demand upgrades can now be tested by your staff ☀
- New options for reconfiguring specialty engines if business demands it ☀
- Capacity BackUp (CBU) enhancements too ☀

Upgrade to z9 BC

Upgrade to z9 EC



z800*



z890



z9 BC



z900**



z990



z9 EC

* z800 Model 004 only

** All models except z900 Model 100

System z9 EC . . . built to help protect and grow with your business

- **Capacity to meet your business objectives**
 - ▶ Capacity on demand for minimal downtime
 - ▶ Large mainframe server in a single footprint with the S54
 - ▶ Leadership capabilities to help improve I/O access *

- **Helping lower risk of downtime**
 - ▶ Leader in Parallel Sysplex clustering and GDPS services
 - ▶ Superior access to applications via comprehensive protection from unplanned and planned outages

- **Security features to help address compliance**
 - ▶ Industry certifications and regulatory compliance
 - ▶ Leadership capabilities in cryptography and encryption



* Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput or performance improvements equivalent to the numbers stated here.

IBM System z9 EC overview

- **Machine Type**

- ▶ 2094

- **5 Models**

- ▶ S08, S18, S28, S38 and S54

- **Processor Units (PUs)**

- ▶ 12 PUs (16 for Model S54) per book
- ▶ 2 SAPs per book, standard
- ▶ 2 spares per server
- ▶ 8, 18, 28, 38 or 54 PUs available
 - CPs, IFLs, ICFs, zAAPs, zIIPs, optional SAPs

- **Memory**

- ▶ Minimum of 16 GB
- ▶ Up to 128 GB per book
 - 16 GB increments
- ▶ Up to 512 GB

- **I/O**

- ▶ Up to 16 STIs per book
 - 2.7 GB/s for each I/O and 2.0 GB/s for ICBs
- ▶ Total system I/O bandwidth capability of 172.8 GB*
- ▶ Up to 4 Logical Channel SubSystems (LCSSs)

* z9 EC exploits a subset of its designed I/O capacity



z9 EC Model Structure

A flexible model structure that can be optimized for your business

- **One machine type – 2094 – five models – S08, S18, S28, S38, and S54**
- **Model number indicates PUs available for characterization**
 - ▶ Single serial number
 - ▶ PU characterization is identified by number of features ordered
- **2 System Assist Processors (SAPs) per book**
- **2 spares standard per server**
- **z9 EC software models**
 - ▶ 700, 401 to 408, 501 to 508, 601 to 608 and 701 to 754
 - ▶ nxx, where n = the capacity setting of the engine, and xx = the number of PU characterized as CPs in the CEC
 - ▶ Once xx exceeds 08, then all CP engines are full capacity

Models	MCMs	Available PUs	Max Available Sub-capacity CP PUs	Standard SAPs	Standard Spares	CP/IFL/ICF/zAAP/zIIP *****	Max Memory	Max Channels
S08*	1	12	8	2	2	8	128 GB	960 **
S18*	2	24	8	4	2	18	256 GB	1024 ***
S28*	3	36	8	6	2	28	384 GB	1024 ***
S38*	4	48	8	8	2	38	512 GB	1024 ***
S54*	4	64	8	8	2	54	512 GB	1024 ***

Notes:

* Must have a minimum of 1 CP, IFL or ICF

** There is a max of 64 ESCON features/960 active channels and a max of 64 FICON features/256 channels on Model S08.

*** The one for one relationship of zAAP or zIIP to CP still exists, but one CP can satisfy requirement for either or both specialty engines

**** Maximum of 16 ICFs

z9 BC – The modern mainframe for the small to medium enterprise

- **Based on System z9 technology**
- **Designed for flexibility in 2 new models**
- **More engines for more workloads**
 - ▶ IBM System z™ Application Assist Processor (zAAP), Integrated Facility for Linux (IFL), Internal Coupling Facility (ICF), zIIP
- **On demand upgrade capability**
 - ▶ Exceptional upgradeability
 - ▶ On/Off Capacity on Demand (On/Off CoD) functions available
- **Enhanced networking and connectivity options**
- **Built with System z9's cryptographic and encryption functions**
 - ▶ ATM/POS Remote Key Load
- **EWLC and Tiered EWLC Software Pricing Structure**
- **Operating system support – similar to z9 EC**
 - ▶ SOD for z/VSE™ V4 - intends to deliver enhanced pricing options
 - ▶ z/OS.e continues to be supported

Low entry point and more choices



IBM System z9 BC model comparison

Model R07

Processor Units (PUs)

- ▶ 7 PUs + 1 SAP
- ▶ 1 - 3 CPs
- ▶ 0 – 3 zAAPs or zIIPs
- ▶ 0 – 6 IFLs or ICFs
- ▶ 20 Capacity Settings

Memory

- ▶ 8 – 64GB

I/O

- ▶ 240 ESCON®
- ▶ 64 FICON Express4
- ▶ 32 OSA-Express2 (2-port);
with 24 on A01
- ▶ 8 Crypto Express2
- ▶ 16 STIs



Model S07

Processor Units (PUs)

- ▶ 7 PUs + 1 SAP
- ▶ 0 - 4 CPs
- ▶ 0 – 3 zAAPs or zIIPs
- ▶ 0 – 7 IFLs or ICFs
- ▶ 53 Capacity Settings

Memory

- ▶ 8 – 64GB

I/O

- ▶ 420 ESCON
- ▶ 112 FICON Express4
- ▶ 48 OSA-Express2 (2-port)
- ▶ 16 Crypto Express2
- ▶ 16 STIs

Both models have Sub-capacity CBU CPs and Specialty Engine CBU capabilities for more robust disaster recovery possibilities

z9 BC – Delivering increased capacity and performance

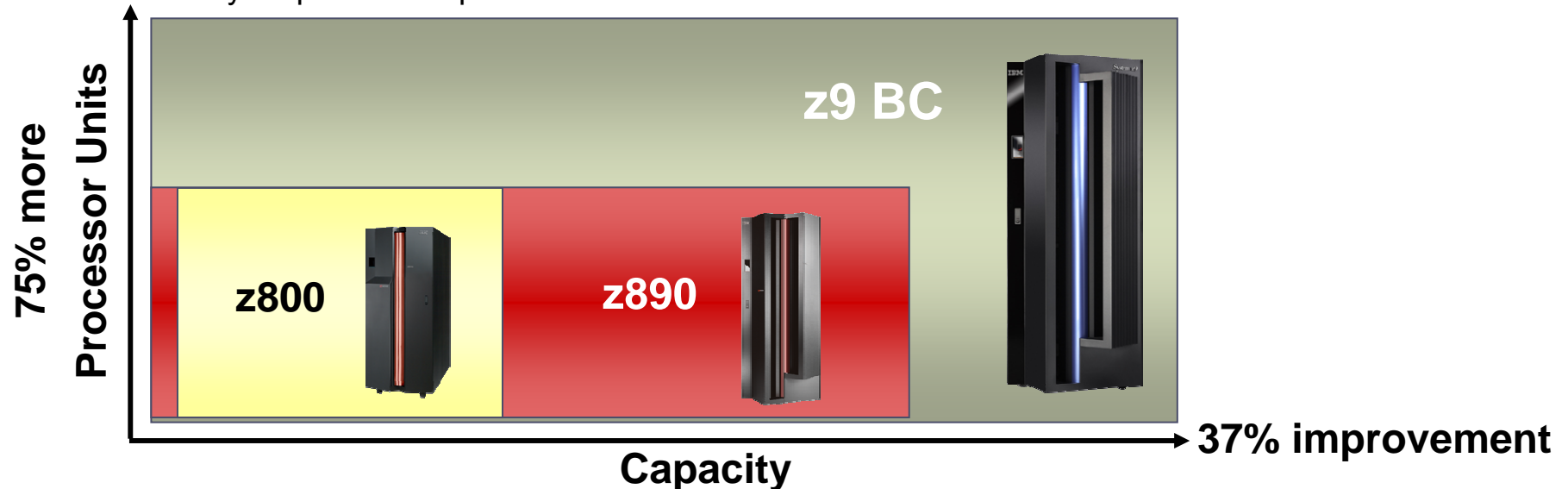
Flexibility for growth

■ Greater granularity and scalability

- ▶ Two models with one machine type (2096)
 - 1 to 4-way high performance server standard engines
 - Entry model with 1 to 3-way standard engines
 - Up to a 7-way with specialty engines
- ▶ 73 capacity settings for a 2.6 times increase in flexibility over IBM eServer™ zSeries® 890 (z890)
- ▶ Delivers over 37% more capacity with the same low entry point as the z890
- ▶ Up to 37% hardware performance improvement for Linux® (IFLs), Java™ (zAAPs) and coupling (ICFs)
- ▶ New zIIP for data serving workloads
- ▶ Double the memory – up to 64 GB per server

■ Improved I/O Performance

- ▶ 40% more FICON® channels – up to 112
- ▶ Up to 170% more bandwidth than z890
- ▶ Can improve FICON performance with Modified Indirect Data Address Word (MIDAW) facility
- ▶ Double the FICON concurrent I/O operations from 32 to 64 on FICON channel
- ▶ Multiple Subchannel Sets (MSS) for an increased number of logical volumes



A simpler infrastructure means:
Fewer servers operating at higher levels of utilization



Must be scalable

Must be highly reliable,
available, and resilient

Legendary mainframe reliability, availability and resilience helps avoid costly downtime and lost business

IBM System z *Legendary availability and dependability*

- **There when you need it**
 - ▶ **As little as 5 minutes downtime a year**
 - ▶ **Mean time between failure measured in decades**
- **A systems approach to availability / reliability**
 - ▶ **Hardware, software, storage, and network designed for maximum application availability**
- **Designed to minimized time lost due to planned or unplanned system outage**
 - ▶ **Unique mainframe clustering technology for maximum up-time**
 - ▶ **Resilient recovery in multiple locations**
 - ▶ **Replicate data real-time at remote locations and switch to replicated data without application outage**



z9 EC – Providing new levels of availability

- **Improving the application of hardware driver maintenance:***
 - ▶ Potentially reducing planned outages using enhanced driver maintenance
- **New enhanced back availability and redundant I/O interconnect – increasing z9 EC's availability by helping to avoid unplanned outages:***
 - ▶ Enhancing recovery of resources
 - ▶ Improving ability to nondisruptively add and repair memory resources
- **Extending capability for Capacity Backup Upgrade (CBU) to include specialty engines**
- **Improving memory availability with flexible memory offering**

* Customer pre-planning is required and may require purchasing additional hardware resources



z9 BC – Providing new levels of availability

- **Improving the application of hardware driver maintenance:**
 - ▶ Potentially reducing planned outages using enhanced driver maintenance
- **Redundant I/O interconnect helps to avoid unplanned outages***
 - ▶ Designed to help maintain critical connections to I/O devices
- **Extending capability for Capacity Backup Upgrade (CBU) to include specialty engines**
 - ▶ Improving disaster recovery capabilities by extending temporary activation of IFLs, ICFs, zIIPs, and/or zAAPs
- **Dynamic Oscillator switchover**
 - ▶ Transparent switch over in the event of failure of the primary oscillator card

* Customer pre-planning is required and may require purchasing additional hardware resources



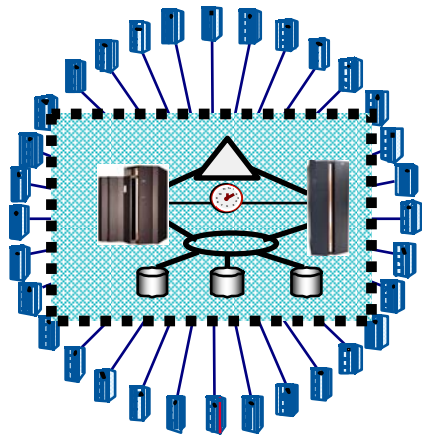
System z Continuous Availability

Single System



- Built In Redundancy
- Capacity Upgrade on Demand
- Capacity Backup
- Hot Pluggable I/O
- Concurrent LIC updates

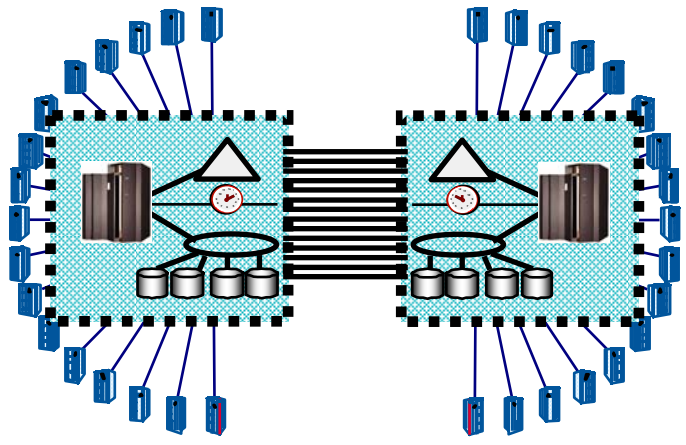
Parallel Sysplex



1 to 32 Systems

- Addresses Planned/Unplanned HW/SW Outages
- Flexible, Nondisruptive Growth
 - Capacity beyond largest CEC
 - Scales better than SMPs
- Dynamic Workload/Resource Management

GDPS



Site 1

Site 2

- **Addresses Site Failure/Maintenance**
- **Sync/Async Data Mirroring**
 - Eliminates Tape/Disk SPOF
 - No/Some Data Loss
- **Application Independent**

A simpler infrastructure means:
Fewer servers operating at higher levels of utilization



Must be scalable

Must be highly reliable,
available, and resilient

Must be rich in security features

Protect sensitive information without compromising responsiveness

Protect sensitive information on line and off line

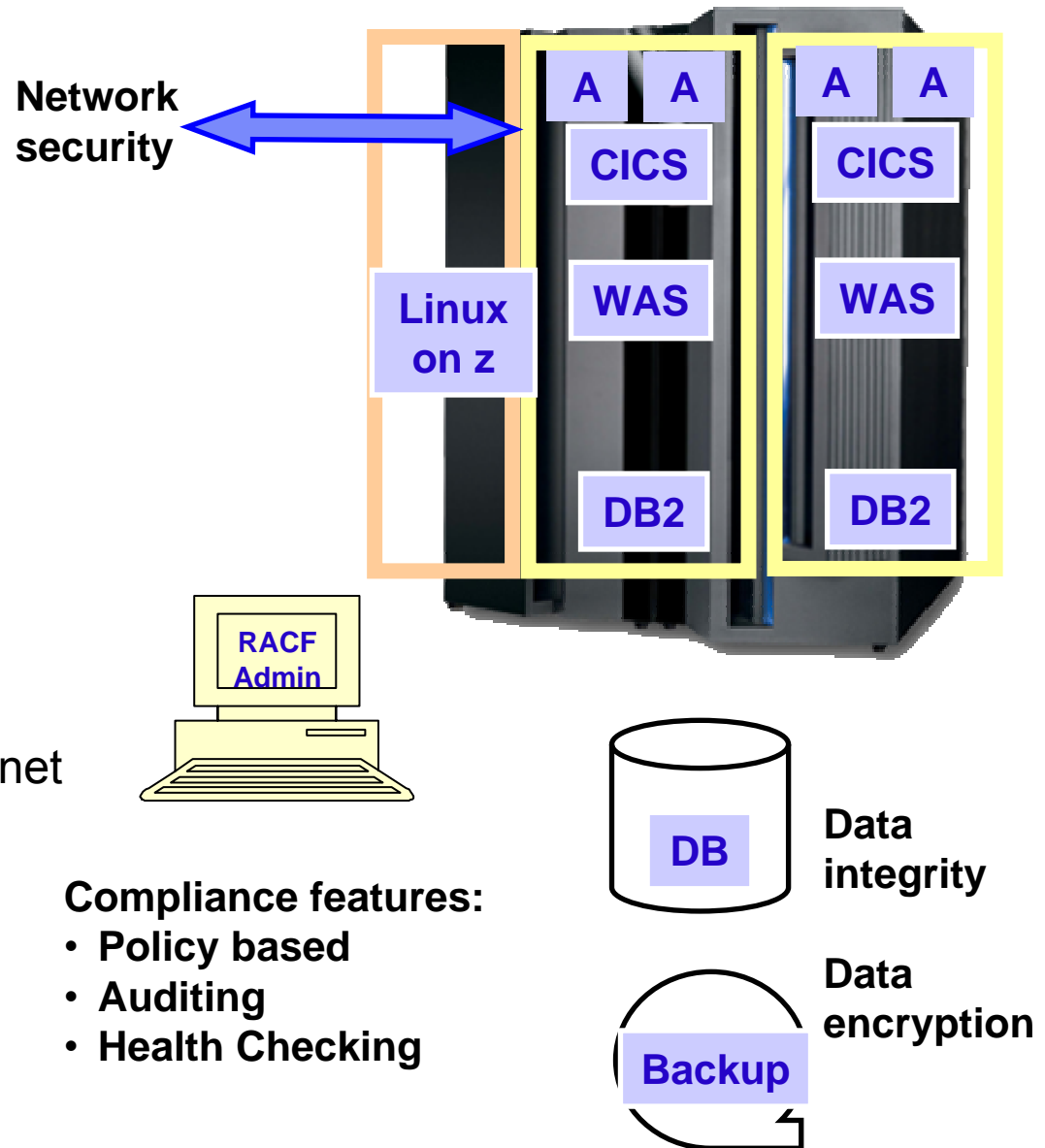
System z provides security without sacrificing responsiveness

- **Protect the data**
 - ▶ End-to-end protection that helps keep data uncorrupted and uncompromised
 - ▶ Multiple Level Security for different levels of “need to know”
- **Encrypt sensitive data**
- **Prevent unauthorized access**
 - ▶ IBM Resource Access Control Facility – 25 years strong
 - ▶ Support for a variety of encryption algorithms
 - ▶ EAL5 and other security certifications
- **Secure and speed the transaction**
 - ▶ Specialized Cryptographic co-processor hardware
- **Monitor, manage, and control**
 - ▶ Centralized access and control helps lower security costs, meet compliance guidelines, and simplify audit trail.
- **Compliance with privacy/security legislation**
 - ▶ Auditability
 - ▶ Control
 - ▶ Recoverability
- **ISV solutions available**
 - ▶ Vanguard
 - ▶ Stonesoft
 - ▶ Consul Risk Management
 - ▶ More – from a large selection of ISVs



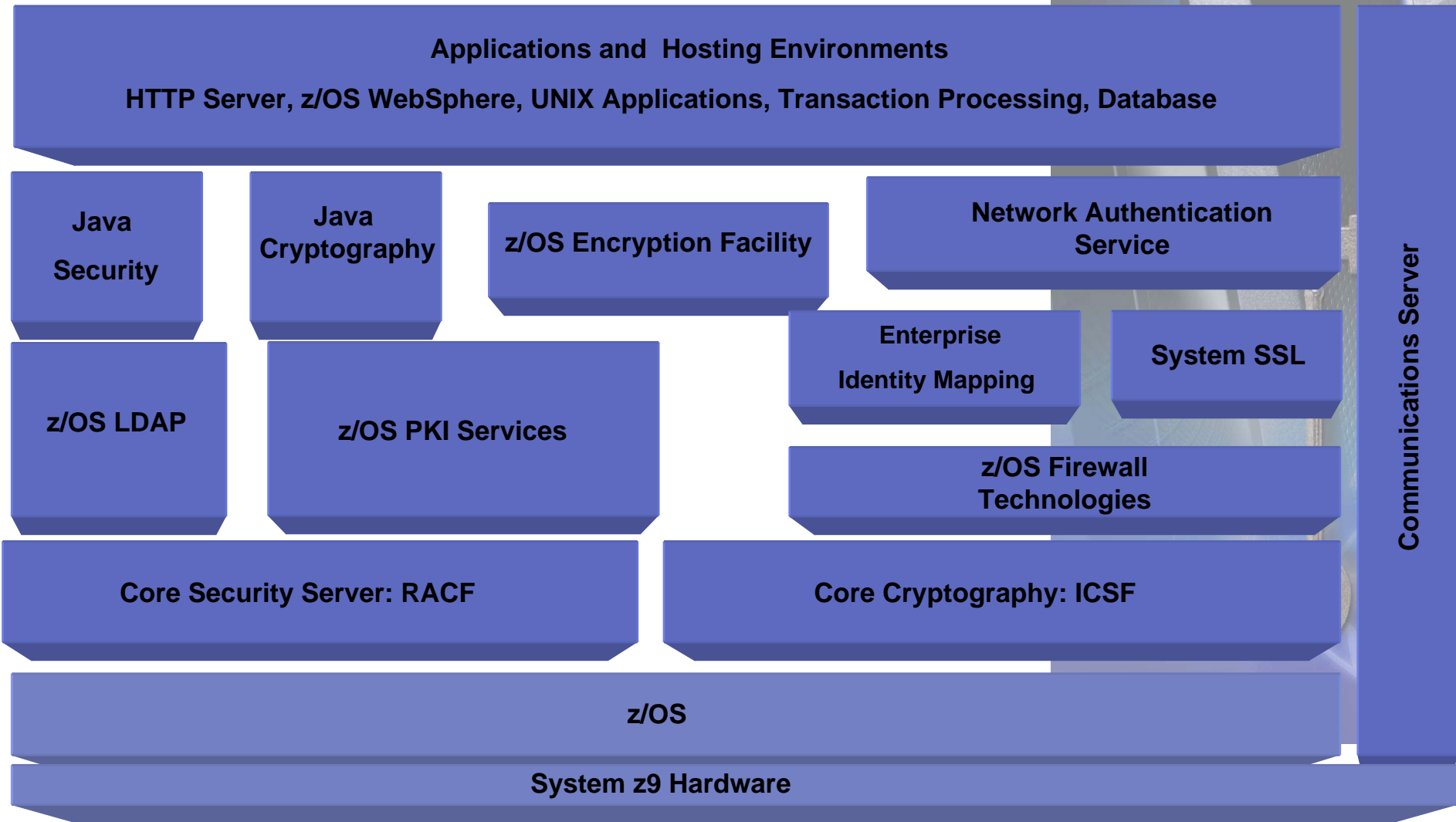
System z Security - Architecture value

- System integrity
 - FIPS certified partitions
- Application integrity
 - z/OS integrity statement
 - Inhibit malicious attacks against computing infrastructure
- Authorization and identification
 - Single point of control with RACF
- Network security
 - Intrusion detection services
 - Virtual networks (HiperSockets)
 - Encryption options across the internet
- Data confidentiality
 - Cryptography built in every engine
 - Secure key in specialized engines
 - Encryption key management
- Certifications



z/OS Security Components

Integrated components working in unison



Encryption of Data

- A Business Imperative
 - ▶ Requirements for tighter security driving need for encryption of data
 - ▶ Increasing regulatory requirements driving need for security of data for audit compliance
 - ▶ Recent events highlight impacts caused by loss/theft of removable data

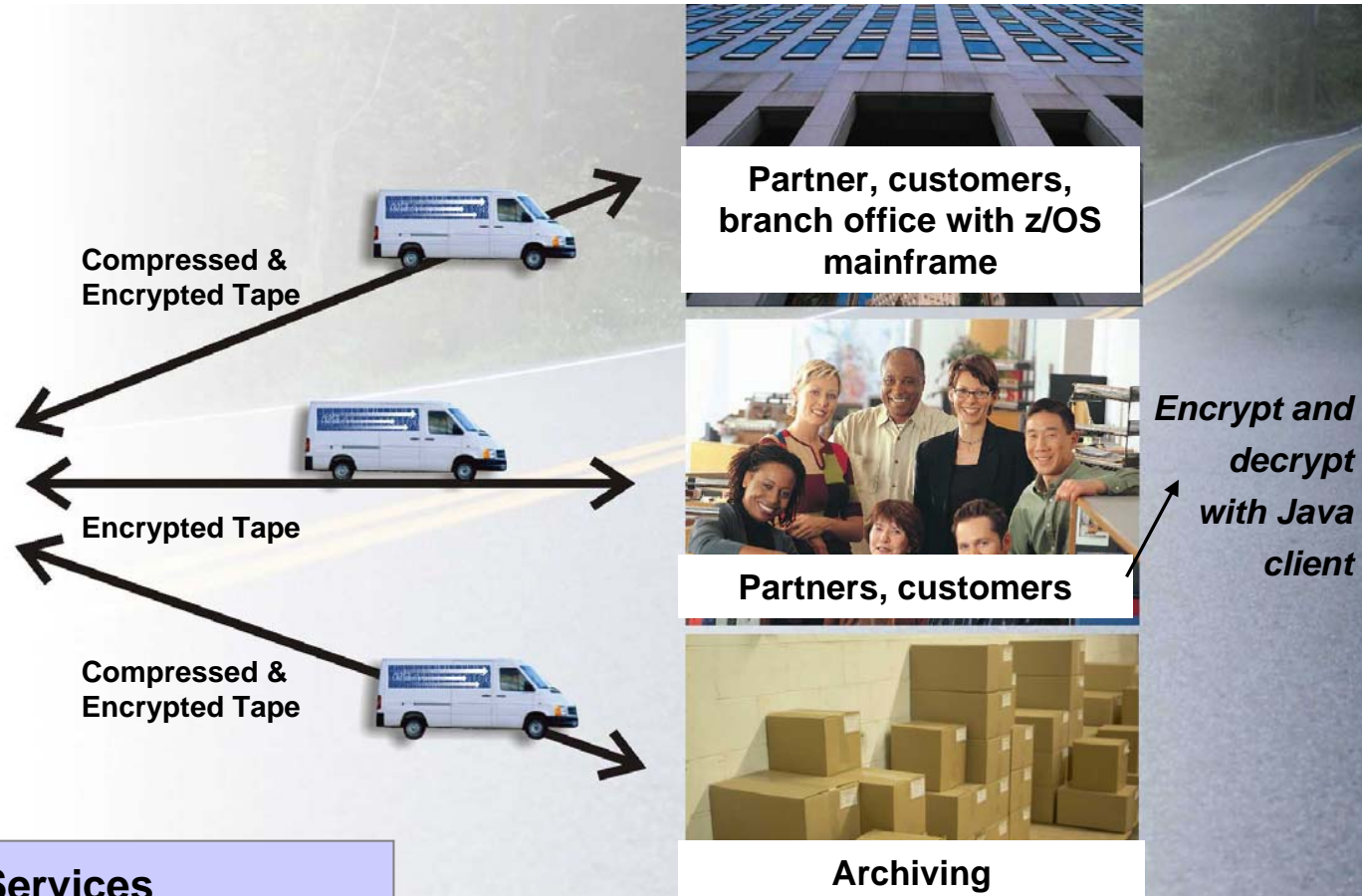
- Potential costs of a security breach:
 - \$ Cost of research and recovery
 - \$ Cost to notify customers
 - \$ Lost customers/business
 - \$ Problem solution or remediation
 - \$ Claims from trusted vendors and business partners

Damage to your image



Extending Mainframe Encryption to Tape

Introducing: Encryption Facility for z/OS, V1



Mainframe Encryption Services

Encryption and compression in hardware

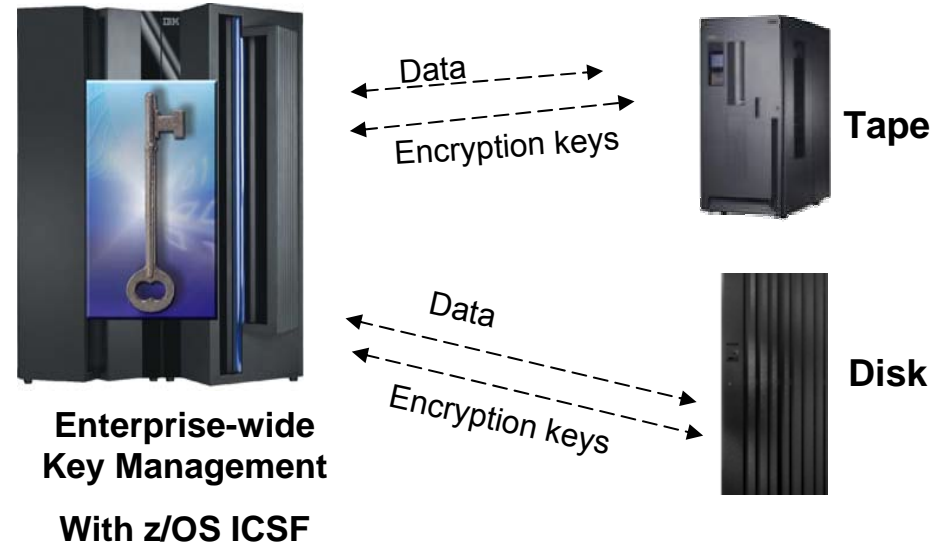
Centralized key management in z/OS

Encryption standards (AES, TDES, SHA-256)

Planned Future Directions For Encryption*

Extending Encryption to IBM TotalStorage

- **Statement of Direction:**
 - ▶ IBM intends to support offer capabilities within the IBM TotalStorage portfolio to support outboard encryption and to leverage the centralized key management functions planned for z/OS ICSF.



Exchanging encrypted tapes with partners or remote sites

- ▶ Encryption Facility Services support for OpenPGP standard
- **Statement of Direction:**
 - ▶ IBM intends to enhance the Encryption Facility for z/OS Encryption Services feature to use the OpenPGP standard, RFC 2440

Network encryption (IPSec) support for Advanced Encryption Standard (AES-128)

- **Previewed for z/OS 1.8***
 - ▶ TLS and SSL support for AES-128 already provided in z/OS
 - ▶ InfoPrint support for encrypted data transfer to printers

A simpler infrastructure means:

Fewer servers operating at higher levels of utilization



Must be scalable

Must be highly reliable,
available, and resilient

Must be rich in security features

Must react to unpredictable
changes in business volume

An effective infrastructure must have features and tools that provide cost effective management

Systems management features and functions

Big function doesn't mean big staff

- **Hardware / Software-based systems management that aligns system resources with business priorities**
 - ▶ System responds automatically to assigned policy
 - ▶ Management functions for centralized Linux environments
- **Use your mainframe as a hub to manage servers / subsystems in your IT infrastructure**
 - ▶ Enterprise management software solutions available from IBM and other vendors
- **Accurate and comprehensive charge-back information**
- **Mainframe skills**
 - ▶ IBM Scholars IBM eServer™ zSeries® program
 - ▶ Plentiful Linux and Java™ skills available
- **ISV solutions available**
 - ▶ Provisioning, management, and more



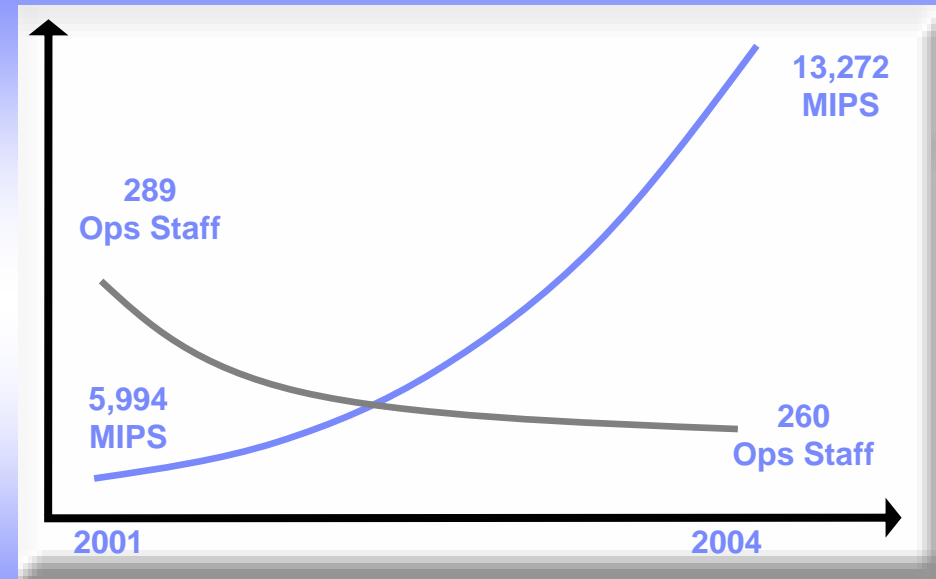
System z

Helping to reduce the cost of systems management

Data center staffing levels have not significantly changed despite large increase in volume.

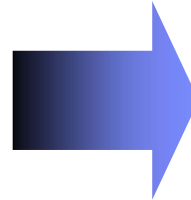
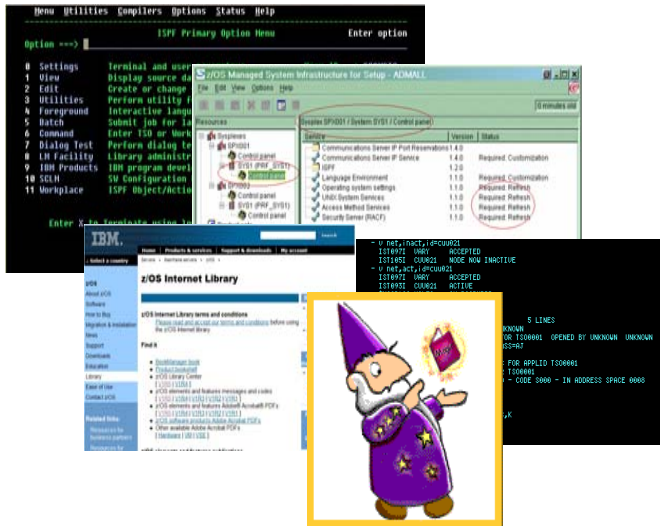
“Since we published our last high-level perspective of the ratio between MIPS and head count in 2001, the largest z/OS installations have more than doubled their ‘MIPS to head count’ ratio.”

L. Mieritz, M. Willis-Fleming – Gartner, 2004

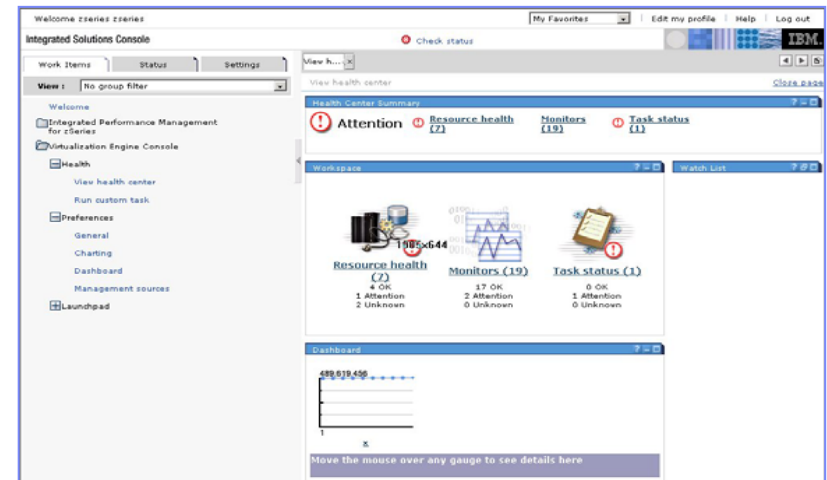


z/OS Management Simplification Strategy

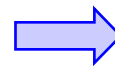
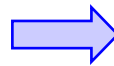
Today



Tomorrow



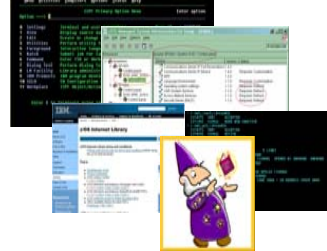
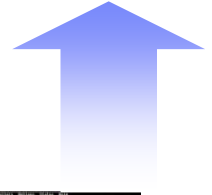
- Complex tasks requiring deep z/OS skills and extensive documentation
- Challenging to manage z/OS as part of a heterogeneous enterprise



- Eliminate, automate, simplify tasks without sacrificing z/OS strengths
- Embrace IBM's converged systems management strategy

Simplifying z/OS Management – Focus Areas

Management Console and Framework	Create a z/OS management framework based on open standards
Day-to-day admin and operations	Simplify the monitoring and control of z/OS environments (overall health, z/OS resources like systems & devices, workload, data...)
Problem management	Help reduce the time spent analyzing problems and working with IBM support
Installation & configuration	Accelerate software installation and maintenance Simplify sysplex, I/O, network, and security setup; implement “best practices”
Policy management	Allow customers to specify z/OS policies (security, storage, recovery...) in a common way using business terms Help realize the potential of z/OS autonomic features



Continued leadership from z/OS WLM

z/OS world class on demand capabilities

Automatic sense and respond features

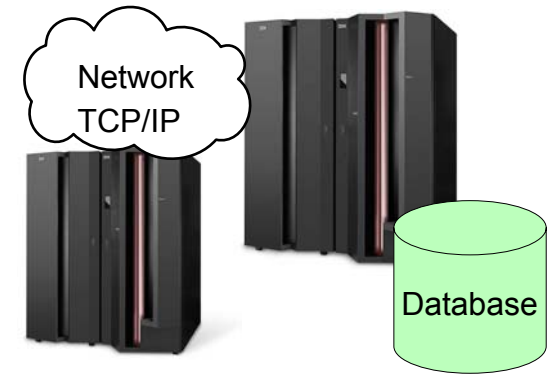
**Can allow work to be prioritized based on business needs –
Manage to Service Level Agreements**

Dynamic resource sharing across mixed application workloads

End-to-end prioritization capability, from the network to the data

Features:

Workload Manager (WLM)	1994
Parallel Sysplex®	1994
Sysplex data sharing	1994
TCP/IP Sysplex Distributor	2000
Intelligent Resource Director (IRD)	2001
Transactional VSAM (DFSMStvs)	2002
TCP/IP Sysplex Health Monitoring	2004
Cross platform monitoring - EWLM	2004



Prioritizing work
in a single z/OS image,
across LPARs
across a

Recent enhancements

- Batch workload balancing (1.4)
- Simplified WebSphere V5 support (1.5)
- WLM-DB2® stored procedures (1.6)
- TCP/IP Health Monitoring (1.6)
- Support for EWLM (1.6)
- Support for zIIP and zAAP (1.6)

Simplifying the management of virtual servers with z/VM

Work load management

Business priorities can be applied to individual servers. Machine resources can be directed to servers that need them, when they need them.

Day-to-day admin and operations

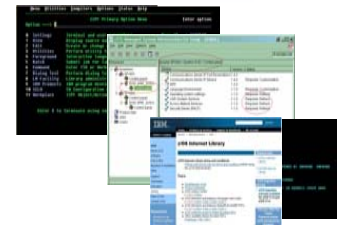
Simplify the monitoring and control of virtual servers by providing automatic restart, failover protection etc. with functions like programmable operator, Performance Toolkit for VM enhancements

Definition and provisioning

New virtual servers can be defined in minutes, not hours or days. Solutions available from Tivoli and native services available through z/VM systems administrator toolkit functions.

Accounting

Information about machine resource consumption is recorded for each virtual server, including processor, memory, I/O utilization, and network traffic



A simpler infrastructure means:
Fewer servers operating at higher levels of utilization

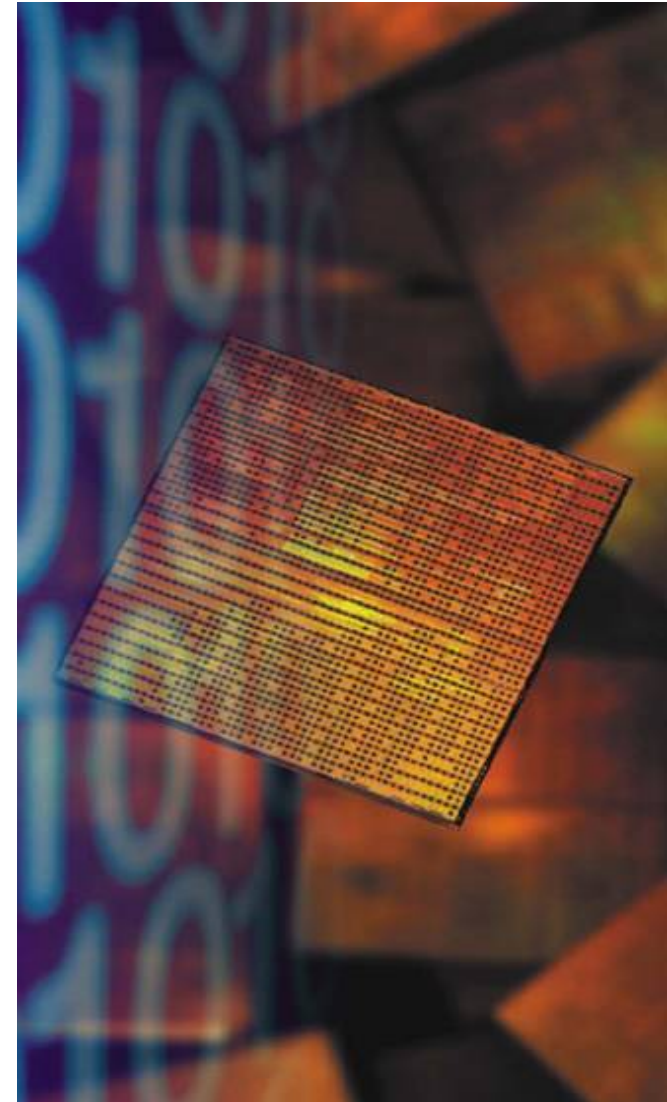


- Must be scalable
- Must be highly reliable, available, and resilient
- Must be rich in security features
- Must react to unpredictable changes in business volume
- Must be highly virtualized

System z provides virtualization capabilities that help to centralize function and add new workloads economically

System z – 35+ years of simplification through virtualization *the innovator and leader in virtualization function*

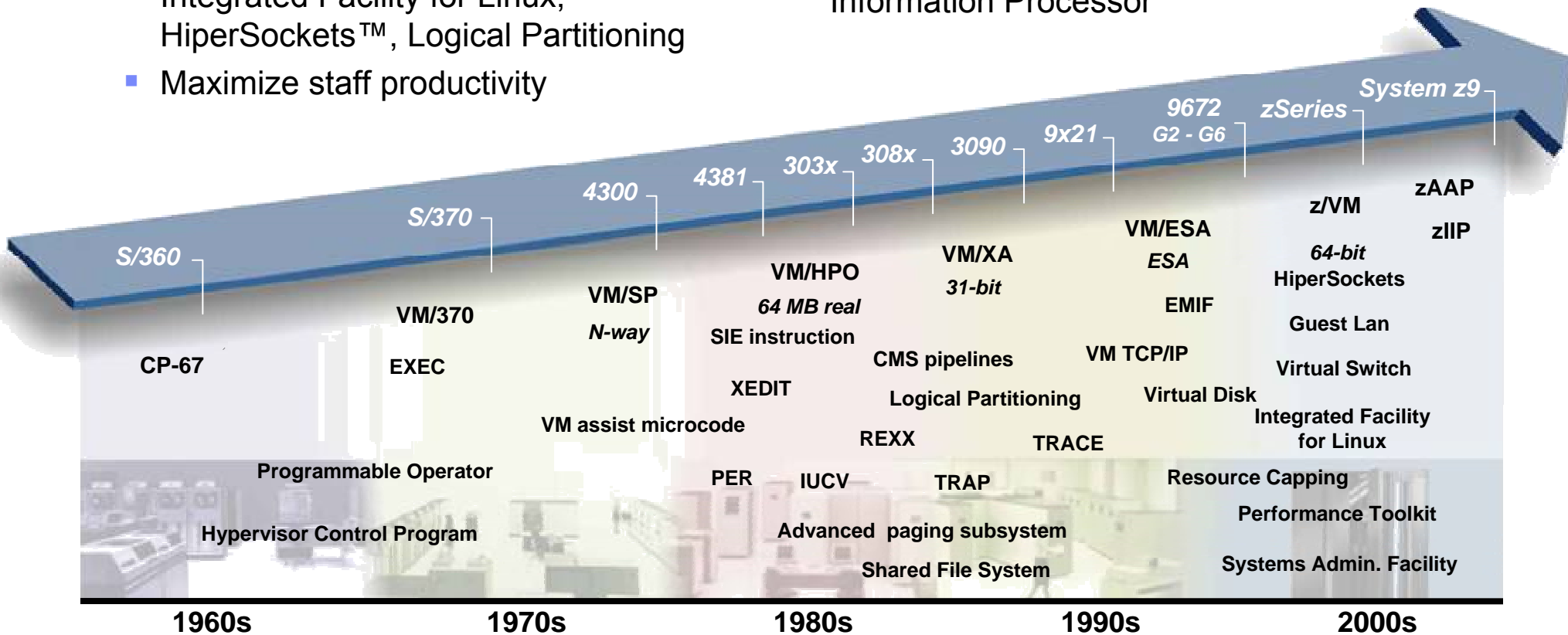
- **Share processor, memory, I/O, and network among multiple operating environments**
 - ▶ Isolate workloads with EAL5 level security
 - ▶ Share resources among workloads
 - ▶ Enable communication for workloads internally with an in-memory TCP/IP network
- **35+ year history of virtualization, innovation and refinement**
 - ▶ Hardware and software based for optimum performance and flexibility
 - ▶ Robust suite of function for creating, provisioning, deploying, and managing virtual servers
- **z/VM® Virtualization to simplify your IT infrastructure**
 - ▶ Support up to hundreds of concurrent applications with z/VM
 - Share applications, data, as well as hardware among large numbers of servers
 - ▶ **Management tools for operation, maintenance, and accounting**



IBM Mainframe virtualization technology evolution

Over 35 Years of Relentless Innovation


- Constantly refined to support modern business requirements
- Exploit hardware technology for economical growth
- Integrated Facility for Linux, HiperSockets™, Logical Partitioning
- Maximize staff productivity
- Systems Administration Facility, REXX, Performance Toolkit
- System z Application Assist Processor, System z9 Integrated Information Processor

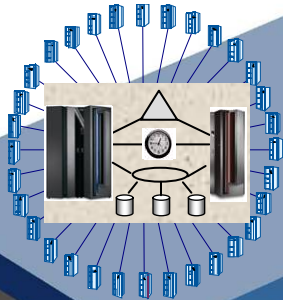


A complete and sophisticated suite of virtualization function

More choice for your business

Evolution of specialty engines

Building on a strong track record of technology innovation with specialty engines, IBM introduces the System z9 Integrated Information Processor 



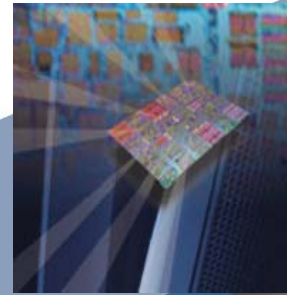
Internal Coupling Facility (ICF) 1997

Centralized data sharing across mainframes



Integrated Facility for Linux (IFL) 2001


Support for new workloads and open standards



IBM System z Application Assist Processor (zAAP) 2004

Designed to help improve resource optimization for z/OS Java technology-based workloads



IBM System z9 Integrated Information Processor (IBM zIIP) 

Designed to help improve resource optimization for eligible data workloads within the enterprise

Helping customers integrate data across the enterprise

The new IBM System z9 Integrated Information Processor (IBM zIIP)

Announcing
Availability

- **z/OS and z/OS.e manages and directs work between the general purpose processor and the zIIP**
 - ▶ No changes anticipated to DB2 Universal Database™ (UDB) for z/OS V8 applications
 - ▶ Number of zIIPs per System z9 not to exceed number of general purpose processors
 - ▶ Price for each zIIP on z9 BC is \$95,000 (US) * ☀
 - ▶ Price for each zIIP on z9 EC is \$125,000 (US) *
 - ▶ No IBM software charges on the zIIP – consistent with other specialty engines
- **DB2 UDB for z/OS V8 will be first IBM exploiter of the zIIP with:**
 - ▶ System z9 EC and z9 BC ☀
 - ▶ z/OS and z/OS.e 1.6 or later
 - ▶ DB2 UDB for z/OS V8
- **Portions of the following DB2 UDB for z/OS V8 workloads may benefit from zIIP**:**
 - ▶ ERP, CRM, Business Intelligence and other enterprise applications – via DRDA® over a TCP/IP connection
 - ▶ Data warehousing applications** – requests that utilize star schema parallel queries
 - ▶ DB2 UDB for z/OS V8 utilities** – select internal DB2® utility functions used to maintain index maintenance structures

* Prices may vary outside the US

** The zIIP is designed so that a program can work with z/OS to have all or a portion of its enclave Service Request Block (SRB) work directed to the zIIP. The above types of DB2 V8 work are those executing in enclave SRBs, of which portions can be sent to the zIIP.

NOTE: z/OS.e is supported only on z9 BC

System z multi-dimensional virtualization:

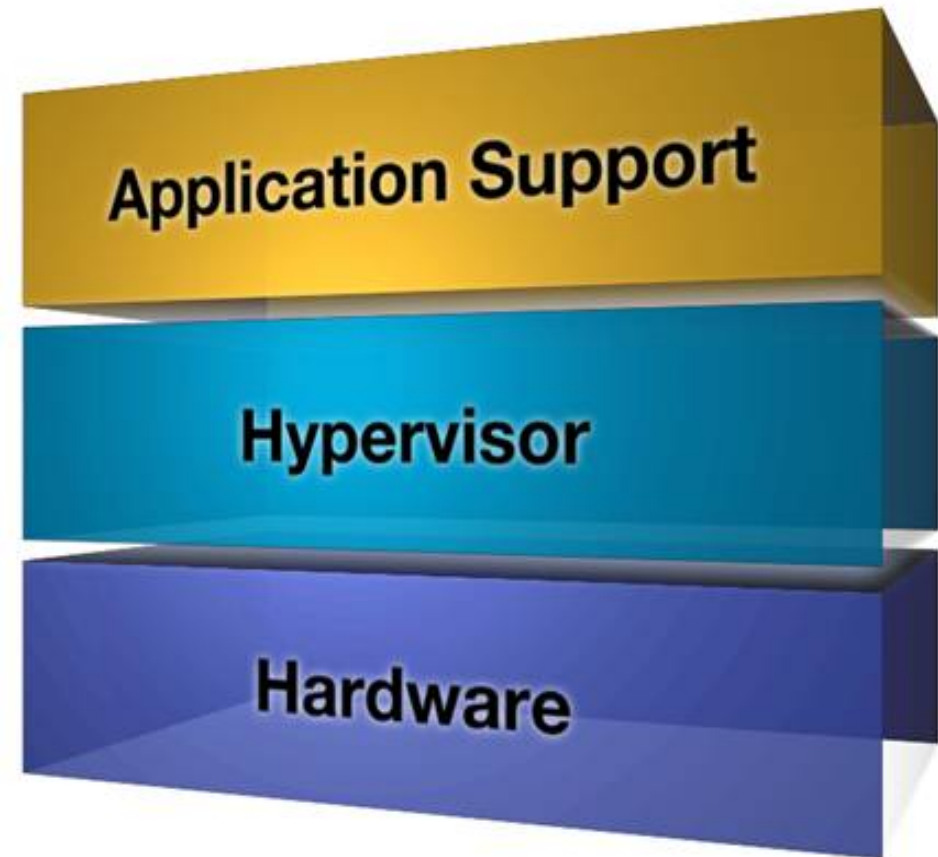
"Virtualization is built in, not added on"

On demand scale out solutions are composed of three distinct and complete dimensions of function:

- **Application Support Dimension / open, stable**
 - ▶ Enterprise applications
 - ▶ Application infrastructure
 - ▶ Open, stable operating system

- **Hypervisor Dimension / powerful, flexible**
 - ▶ Server maintenance tools
 - ▶ Server operation continuity
 - ▶ Resource control / accounting
 - ▶ Inter-server communication
 - ▶ Hypervisor sharing / virtualization
 - ▶ Hypervisor control program

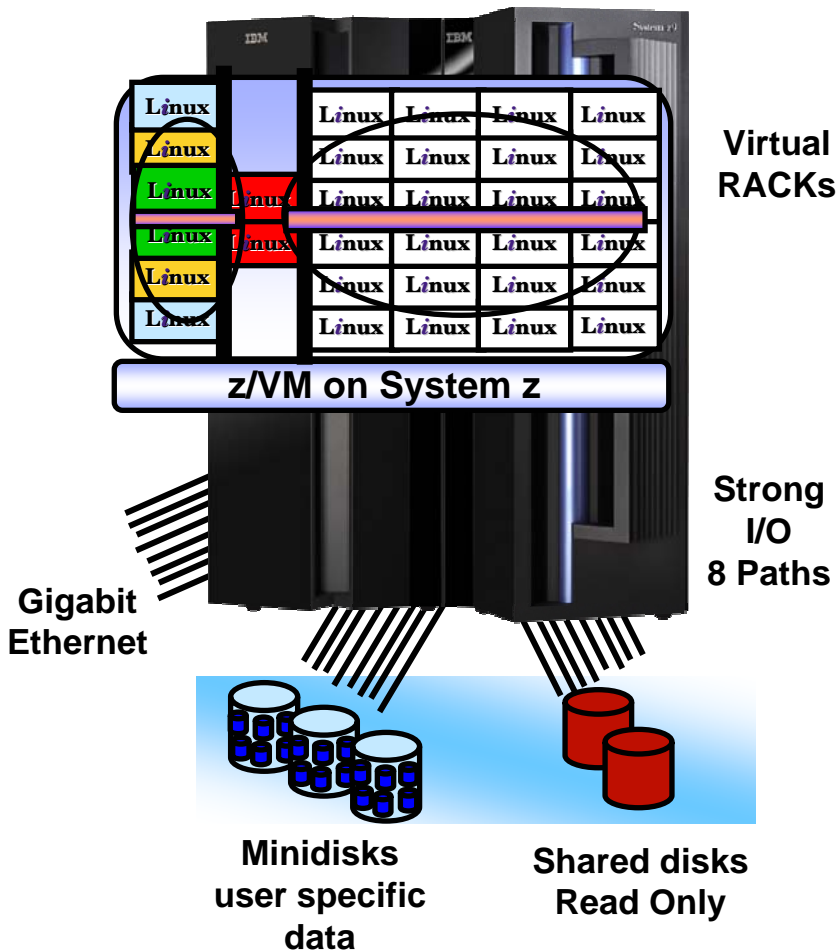
- **Hardware Dimension / robust, reliable foundation**
 - ▶ Interpartition communication
 - ▶ Hardware / peripheral sharing
 - ▶ Partitioning
 - ▶ Hardware



Utilizing the virtualization capabilities of z/VM

Flexible and cost effective - for consolidation, integration and on demand

**Sharing of
ALL resources
processor, memory & I/O**



- Virtual Machine – Software Hypervisor “integrated” with the HW Architecture
- 10’s, 100’s, up to 1000’s of “virtual servers”
- New Servers installed in “minutes” – CLONING
- Sharing of CPU, Memory & I/O resources
- Virtual Network – Virtual Switches/Routers
- Virtual I/O (mini-disks, temporary disks, virtual cache . . .)
- Virtual Appliances (SNA/NCP etc . . .)
- 64bit support – REAL & VIRTUAL
- Self-Optimizing Workload Mgmt – PRIORITIES, capping, monitoring, reporting, charge back . . .
- Excellent Automation & System Mgmt facilities
- Low “cpu-cost” via HW & ucode support
- Very FLEXIBLE “NO COST” solution for Test, Development & Proof-of-Concept
- Mature technology – z/VM first time introduced in 1967

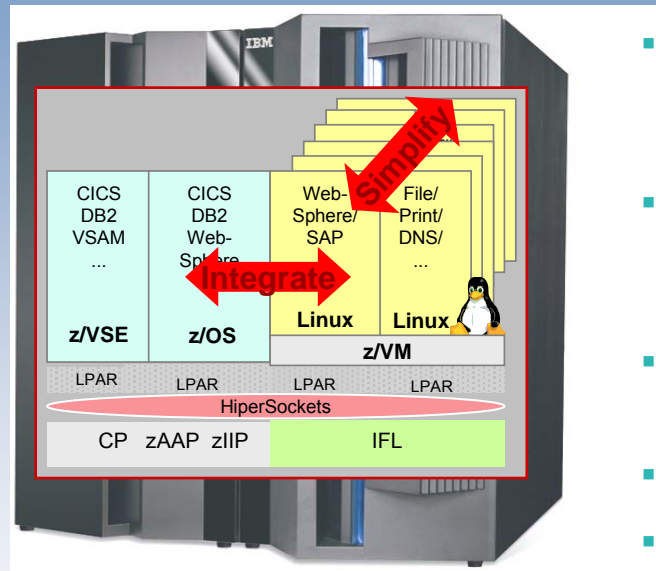
Utilize open and industry based standards with System z9

Help meet unified IT infrastructure objectives with System z virtualization technology and Linux

IBM can help you build an optimized, unified IT infrastructure for your applications

Infrastructure Simplification

- Virtual growth instead of physical expansion on Intel or RISC servers
- Consolidation of many physical servers, quickly and easily provisioned and deployed
- Optimal resource utilization through sharing of resources and applications
- Network simplification through highly virtualized internal network
- Easier systems management through Single-Point-of-Control for administration and operation



Business Integration

- New solutions deployed in less time, and with more efficient transaction processing
- Rapid access to enterprise data and applications through the internal network
- Superior performance, simplified management, security rich environment
- Offsite disaster recovery with GDPS
- Integration is supported by IBM middleware from DB2, Lotus®, Rational®, Tivoli® and WebSphere®.

Linux on System z can help to integrate and simplify distributed applications to minimize cost and maximize manageability.

There's a system z9 that can help to tame any infrastructure



... which one is right for you?