News with z/VSE, z/VM and Linux on System z

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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.

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Topics

- § IBM System z10 Business Class
- § Linux on System z
- § z/VM Version 5 Release 4
- § z/VSE Version 4 Release 2
- § Customer Examples
- § Summary

IBM System z Family

IBM System z9 EC (2094)

- Announced 7/2005 - Superscalar Server with up to 64 cores
- 5 models – Up to 54-way
- Granular Offerings for up to 8 CPs
- PU (Engine) Characterization
  - CP, SAP, IFL, ICF, zAAP, zIIP
- On Demand Capabilities
  - CUoD, CIU, CBU, On/Off CoD
- Memory – up to 512 GB
- Channels
  - Four LCSSs
  - Multiple Subchannel Sets
  - MIDAW facility
  - 63.75 subchannels
  - Up to 1024 ESCON channels
  - Up to 336 FICON channels
  - FICON Express2 and 4
  - OSA 10 GbE, GbE, 1000BASE-T
  - Coupling Links
- Configurable Crypto Express2
- Parallel Sysplex® clustering
- HiperSockets – up to 16
- Up to 60 logical partitions
- Enhanced Availability
- Operating Systems
  - z/OS, z/VM, z/VSE, TPF, z/TPF, Linux on System z

IBM System z9 BC (2096)

- Announced 4/2006 - Superscalar Server with 8 cores
- 2 models – Up to 4-way
- High levels of Granularity available
  - 73 Capacity Indicators
- PU (Engine) Characterization
  - CP, SAP, IFL, ICF, zAAP, zIIP
- On Demand Capabilities
  - CUoD, CIU, CBU, On/Off CoD
- Memory – up to 64 GB
- Channels
  - Two LCSSs
  - Multiple Subchannel Sets
  - MIDAW facility
  - 63.75 subchannels
  - Up to 420 ESCON channels
  - Up to 112 FICON channels
  - FICON Express2 and 4 Gbps
  - OSA 10 GbE, GbE, 1000BASE-T
  - Coupling Links
- Configurable Crypto Express2
- Parallel Sysplex clustering
- HiperSockets – up to 16
- Up to 30 logical partitions
- Enhanced Availability
- Operating Systems
  - z/OS, z/OS.e, z/VM, z/VSE, TPF, z/TPF, Linux on System z

IBM System z10 EC (2097)

- Announced 2/2008 - Server with up to 77 cores
- 5 models – Up to 64-way
- Granular Offerings for up to 12 CPs
- PU (Engine) Characterization
  - CP, SAP, IFL, ICF, zAAP, zIIP
- On Demand Capabilities
  - CoD, CIU, CBU, On/Off CoD, CPE
- Memory – up to 1.5 TB for Server and up to 1 TB per LPAR
- Channels
  - Four LCSSs
  - Multiple Subchannel Sets
  - MIDAW facility
  - 63.75 subchannels
  - Up to 1024 ESCON channels
  - Up to 336 FICON channels
  - FICON Express2 and 4
  - OSA 10 GbE, GbE, 1000Base-T
  - InfiniBand Coupling Links
- Configurable Crypto Express2
- Parallel Sysplex clustering
- HiperSockets – up to 16
- Up to 60 logical partitions
- Enhanced Availability
- Operating Systems
  - z/OS, z/VM, z/VSE, TPF, z/TPF, Linux on System z

IBM System z10 BC (2098)

- Announced 10/2008 – Server with 12 cores
- Single model – Up to 5-way
- High levels of Granularity available
  - 130 Capacity Indicators
- PU (Engine) Characterization
  - CP, SAP, IFL, ICF, zAAP, zIIP
- On Demand Capabilities
  - CoD, CIU, CBU, On/Off CoD, CPE
- Memory – up to 120 GB
- Channels
  - Two LCSSs
  - Multiple Subchannel Sets
  - MIDAW facility
  - 63.75 subchannels
  - Up to 480 ESCON channels
  - Up to 128 FICON channels
  - FICON Express2 and 4 Gbps
  - OSA 10 GbE, GbE, 1000BASE-T
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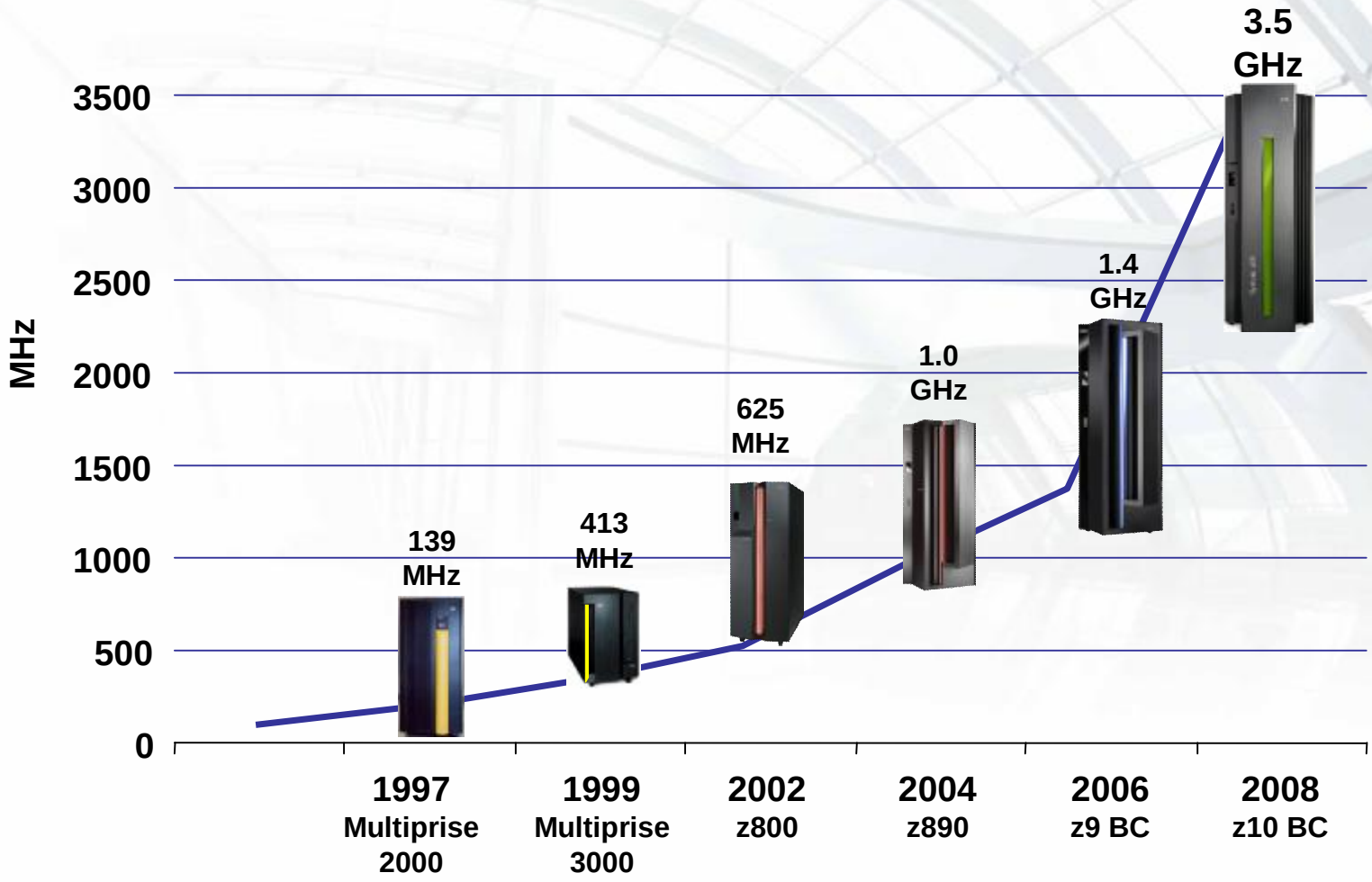
IBM z10 BC continues the CMOS Mainframe Heritage



- § Multiprise® 2000 – 1st full-custom CMOS S/390®
- § Multiprise 3000 – Internal disk, IFL introduced on midrange

- § IBM eServer™ zSeries® 800 (z800) – Full 64-bit z/Architecture®
- § IBM eServer zSeries 890 (z890) – Superscalar CISC pipeline
- § z9 BC – System level scaling

- § z10 BC – Architectural extensions
- § Higher frequency CPU

The modern Mainframe for small and medium Enterprises

The Mainframe made over – Smart, Cool, Affordable

IBM System z10™ Business Class (z10 BC™)

Machine Type: 2098

1 Model: E10

Single Frame

Non-raised floor option

Processor Cores:

- Enterprise Quad Core technology – 3.5 GHz
- Enhanced capacity 5-way model with up to 5 zAAPs/zIIPs
- Up to a 10-way IFL or Coupling Facility
- Core sparing technology
- 2 SAPs standard per system
- Configurable PUs allow you to design the system to meet your needs (e.g. CPs, IFLs, ICFs, zAAPs, zIIPs, SAPs)

Memory:

- Lower 4 GB entry point
- 8 GB HSA separately managed and not included in customer purchased memory
- Customer maximum 248 GB
  - 120 GB- Oct. 08
  - 248 GB – June 09

I/O:

- New I/O drawer (RAS)
- 6 GBps InfiniBand® host buses for I/O
- High Performance FICON® for System z
- FICON/FCP Serviceability Enhancements
- OSA-Express3 GbE, 10 GbE, 1000BASE-T
- InfiniBand Coupling Links
- Continued lower capacity / priced I/O cards

System z10 BC delivers continued Price / Performance and Affordability for new Workloads

Generation to generation price / performance improvements:	z10 BC
Reduction in software charging units, MSUs,[1] versus z9 BC ([1] Millions of Service Units)	10%
Reduction in software charging units, MSUs, versus z890 or z800 / z900	19% or 27%
Maintenance price per MIPS reduction for equivalent capacity[1]	5%
Maintenance price per MIPS reduction with capacity growth[1]	Up to 10%
Performance improvement for Linux (IFLs), Java (zAAPs) and Integrated Information Processors (zIIPs)	Up to 40%
Typical charge for MES upgrades for IFLs, zAAPs, and zIIPs	0
Technology-driven value	**z10 BC**
Number of capacity settings - 5 Full Uni + 125 Sub-Cap settings	130
50% price reduction on Specialty engines for System z10 BC [2, 4]	$47.5 K NEW
IBM Software charges for zAAP capacity and zIIP capacity	0
62% price reduction on System z10 Memory Prices for new workloads when purchased together with Specialty engines [2, 3, 4]	$2,250 USD NEW

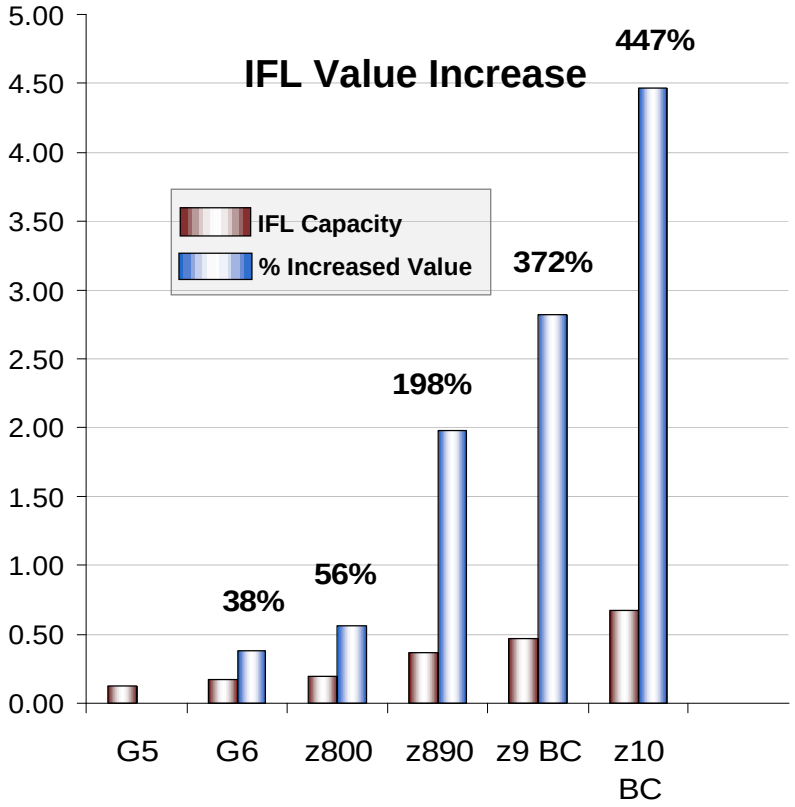
Plus

- **100 percent of IBM mainframes are delivered virtualization ready**
- **System z New Application License Charge (zNALC) pricing metrics for New Workloads on z/OS**
- **On/Off Capacity on Demand (On/Off CoD) enhancements to better manage volatile business requirements**

1 – Comparisons shown are z9 BC to z10 BC; 2 - Prices in USD, may vary by country; 3 – Limited to 16GB per engine; 4 – Does not include Internal Coupling Facilities (ICFs)

Harness the Unique Value of Specialty Engines

- **Specialty engine prices have remained constant yet deliver more capacity**
  - Up to 40% more capacity from z9 BC!!!
  - New lower prices on z10 BC, now $47.5k USD[1,3]
- **Specialty engine MES upgrades to z10 BC typically move with NO charge**
  (exception for all IFL server and short path upgrades)
- **New lower memory costs for specialty engine enabled workloads, now $2,250 per GB[1,2,3]**
- **PLUS: Special pricing promotions from Novell and Red Hat for Linux support on z10 BC IFLs**



1 - Prices in USD, may vary by country, 2 – Limited to 16GB per engine, 3 – Does not include Internal Coupling Facilities (ICFs)

Specialty Engines:

The investments that continues to deliver value generation to generation

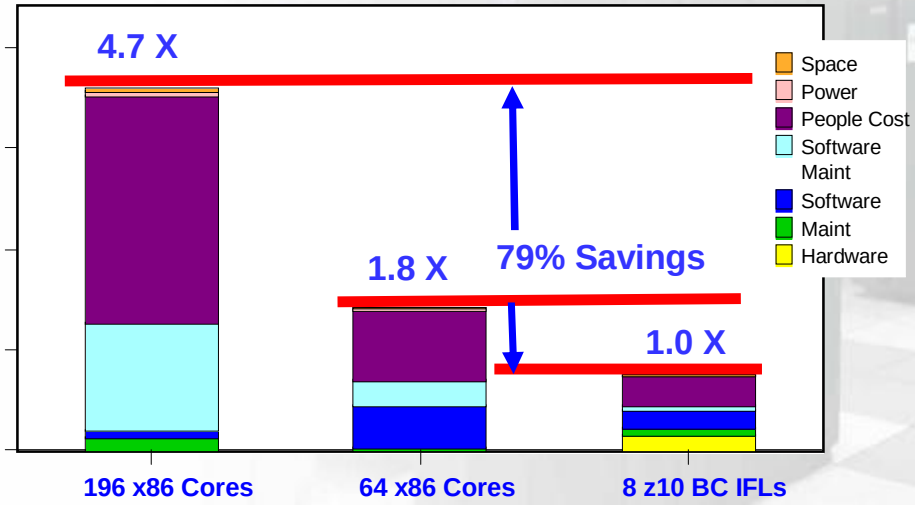
z10 BC delivers almost Twice the Virtualization Benefit compared to VMware

Your IT Cost may vary:

- Up to 44% saving in IT cost compared to VMware Dell consolidation
- Potential for dramatic reductions in software expense for processor based licenses
- Up to 57% people savings
- Increased processor utilization
- Industry leading security

Consolidating 196 Linux servers
z/VM Virtualization versus x86
Oracle DB Workload
3-Year Total IT Cost

$14.2 M Savings versus
x86 without Virtualization



x86 w/o Virtualization
Sun X2100 Single Core servers

x86 Virtualization
Dell Power Edge Quad Core servers

z/VM Linux on System z10 BC

Energize your IT savings with z10 BC

All performance information was determined in a controlled environment. Actual results may vary.

System z10 and IBM System Storage
Better Together

- **IBM Virtualization Engine™ TS7700**
  - NEW TS7720 provides high capacity disk cache for rapid recall
  - NEW TS7740 cache models more than double existing capacity
  - Grid configurations offer availability and disaster recovery
- **IBM System Storage™ DS8000: The best gets better**
  - NEW zHPF support brings performance and availability enhancements
  - Higher capacity Fibre channel drives & supported volume size up 400%
  - New z/OS Metro/Global Mirror Incremental Resync enables seamless high availability with GDPS® HyperSwap™
  - New IBM Basic HyperSwap volume failover as part of z/OS
  - Certified Secure Data Overwrite Services virtually erases all DS8000 data to protect sensitive information on retired systems
- **IBM System Storage™ SAN Volume Controller V4.3 for Linux, z/VM (V5.3 / V5.4) and z/VSE (V4.2)**
  - New space-efficient Virtual Disks and FlashCopy® support improves utilization and reduces storage growth
  - New Virtual Disk Mirroring helps improve availability for critical applications

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Open Source Code Drops for Linux on System z

4Q07 Code drop content (Nov 20, 2007)

Virtual Server

- Support for Processor Degradation
- Provide Linux process data into z/VM monitor stream
- Unit record device driver

Networking

- skb scatter-gather support for large incoming messages - QETH Exploitation
- IUCV access to VM services

Common I/O

- Dynamic CHPID reconfiguration via SCLP [z9-EC GA3]

Storage - FCP

- FCP performance data collection - adapter statistics [z9-EC GA3]

RAS

- Cleanup SCSI dumper code for upstream integration

Note:
System z9/z10 hardware exploitation marked in ‘red‘.

2Q08 Code drop content (May 07, 2008)

Kernel

- STSI change for capacity provisioning [z10]
- Standby CPU activation/deactivation
- User space tooling for auto-adaptive CPU and memory mgmt
- Kernel Infrastructure for Record/Replay - stage 1
- Software Support for CP Assist Instructions AES & SHA [z10]
- In-Kernel crypto exploitation of new CP Assist functions (AES 192 / 256 and SHA 384 / 512) [z10]
- In-kernel crypto generic algorithm fallback

Virtual Server

- Linux CPU Node Affinity [z10]
- Vertical CPU Management [z10]
- Dynamic CPU hotplug daemon for System z
- Large Page Support [z10]
- CMM2 upstream merge

Networking

- HiperSockets MAC layer routing support [z10]
- QETH Componentization
- OSA 2 Ports per CHPID support [z10]

Common I/O

- High Performance FICON Infrastructure in CIO [z10]

Storage - ESCON/FICON

- Multi Path IPL (IPL through IFCC) [z9-EC GA3]
- SIM/MIM Handling for ECKD DASD devices {MR0414064519, MR0223067137}
- Hyper PAV enablement

Storage FCP

- Linux System-Loader (sysload)
- zfcp performance statistics (blktrace contribution)
- zfcp performance statistics (System z specific I/O and adapter statistics) [z9-EC GA3]

Security

- Exploitation of Long Random Numbers

RAS

- Shutdown actions interface

System z10 Toleration in Linux Distributions

	Latest service level	Based on kernel	Gcc	Glibc	System z10 Toleration
SLES 8	SP4	2.4.21	3.2	2.2.5	no
SLES 9	SP4	2.6.5	3.3	2.3.3	Yes
SLES 10	SP1	2.6.16	4.1	2.4	Yes
RHEL 3	Update 8	2.4.21	3.2.3	2.3.2	No
RHEL 4	Update 6	2.6.9	3.4	2.3.4	Yes
RHEL 5	Update 1	2.6.18	4.1	2.5	Yes

Novell

redhat

Note: In addition, SLES 9 SP3 was tested for toleration of System z10 (because at GA time of z10, some specific middleware products had only been certified with SLES 9 SP3).

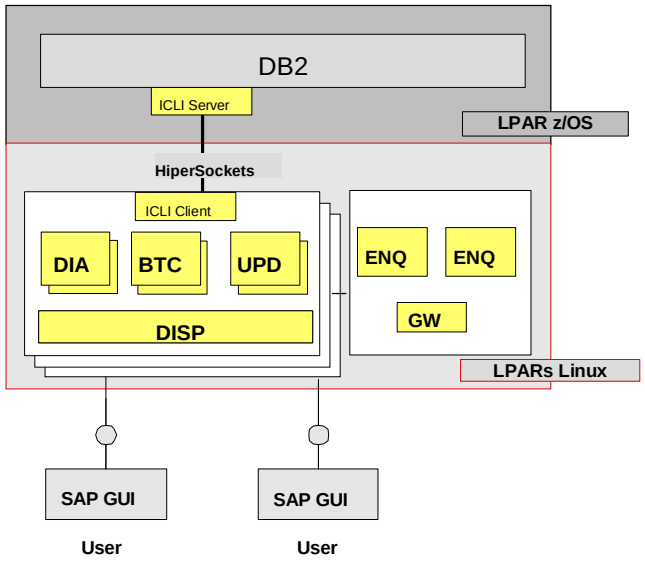
Linux on System z10 Exploitation (available since May 21, 2008)

	SLES 10 SP2	RHEL 5 Update 2
HW Toleration and Exploitation	z10 Large Page Support z10 STSI Change for Capacity Provisioning z10 CPU Node Affinity Processor Degradation External Time Reference (ETR)	z10 Large Page Support) z10 STSI Change for Capacity Provisioning
Virtualization	z/VM Monitor Stream Application Support (SLES 10 SP1) Guest Filesize in Monitor Appldata (SLES 10 SP1) z/VM hypfs DIAG 2FC (eWLM) (SLES 10 SP 1) Process Data into z/VM Monitor Stream Unit-record Device Driver Auto-adaptive CPU and Memory Management Kernel NSS	z/VM Monitor Stream Application Support Guest Filesize in Monitor Appldata z/VM hypfs DIAG 2FC (eWLM) Process Data into z/VM Monitor Stream Unit-record Device Driver
Network	z10 HiperSockets MAC Layer2 Routing z10 OSA Express3 with 4 Ports AF_IUCV Protocol Support QETH Skb scatter-gather support for large incoming messages	z10 HiperSockets MAC Layer2 Routing z10 OSA Express3 with 4 Ports AF_IUCV Protocol Support QETH Skb scatter-gather support for large incoming messages
Security	z10 CP Assist Instructions AES & SHA SW and In-Kernel z10 Crypto Card Dynamic add	z10 CP Assist Instructions AES & SHA SW and In-Kernel z10 Crypto Card Dynamic add
RAS	Dynamic CHPID reconfiguration via SCLP SCSI Dump Support (SLES 10) FCP Performance Data Collection – Adapter Statistics	Dynamic CHPID reconfiguration via SCLP SCSI Dump Support
Other Highlights	Network Configuration GUI (SLES 10)	Network Configuration GUI

Note: LDP's are independent companies. IBM cannot guarantee that newly developed features will get included in their Linux distributions.

SAP Certification for RHEL

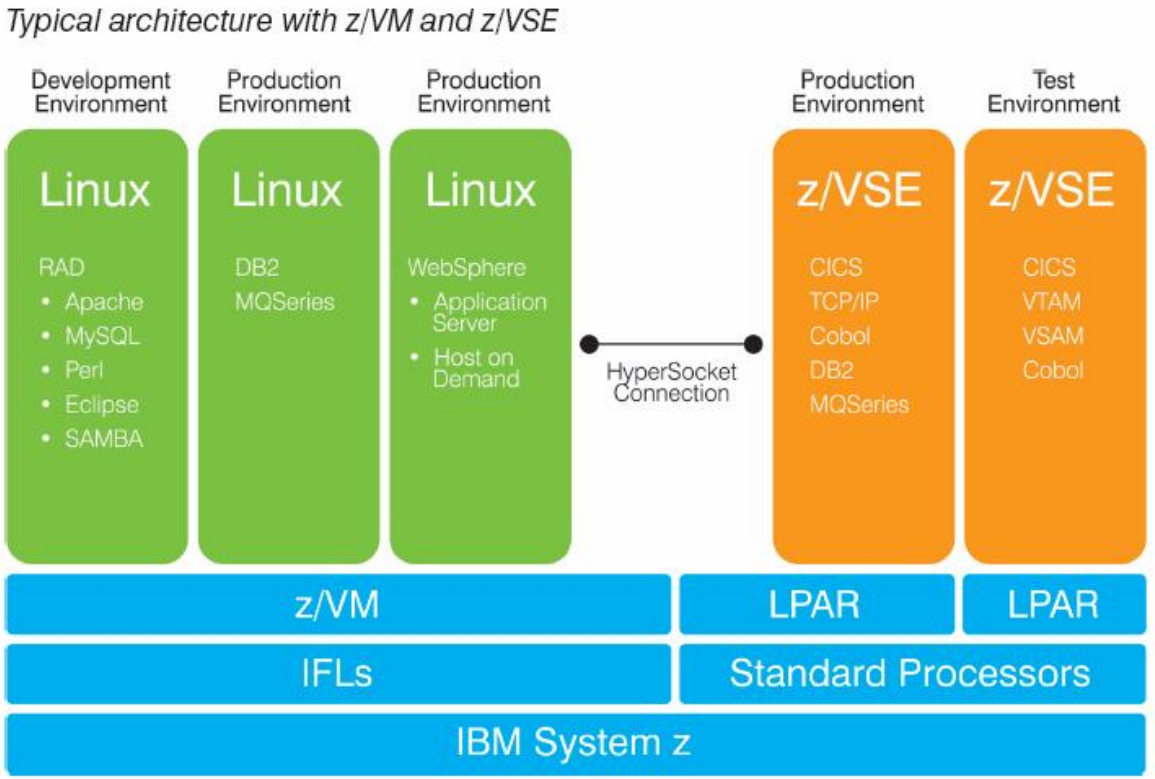
- **Announced by Red Hat on Feb 5, 2008: SAP certification for RHEL**
  - **SAP Business Suite**
  - **SAP NetWeaver**



- **SAP's certification for RHEL is part of the worldwide Linux-on-Mainframe program led by IBM and Red Hat, as announced in May 2007.**
- **RHEL provides additional functions such as Security-Enhanced Linux (SELinux) and ExecShield.**
- **In addition to the Common Criteria certifications already available to customers of System z, IBM is sponsoring the EAL 4+ certification of Red Hat Enterprise Linux 5 on System z.**

Novell: Linux Starter Kit for System z

- **Announced Jan-30-2008**
- **Available for SLES 10 SP1**
- **Pre-built installation server**
  - Simplifies installation of SLES 10 on System z on a z/VM system
- **Eliminates big hurdle to try out Linux on the mainframe**
  - Gaining network access to the installation media from the mainframe
- **Allows customers with little or no Linux experience and/or little or no z/VM experience to initiate evaluations of SLES 10 for System z**



Source: Novell Product Flyer, Feb 2008

http://www.novell.com/partners/ibm/mainframe/starterpack.html

IBM Project 'Big Green'

IBM consolidates its own data center for big savings:

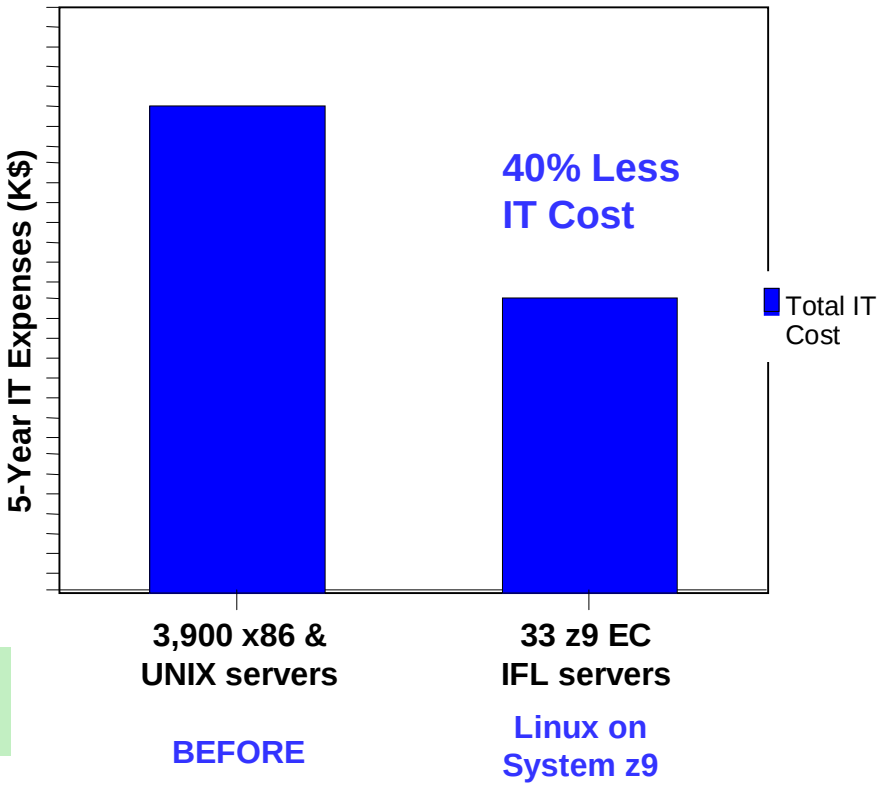
- **92% less hardware**
  - 23,000 processor cores going to 1,782 IFLs
  - +80% energy reduction
  - +85% space reduction
- **180% greater utilization**
  - 30% average utilization going to over 85%
- **Reduced people cost through virtualization**
  - Freeing up resources for growth opportunities
- **Potential for dramatic reductions in software expense for processor based licenses**
  - Elimination of 23,000 SW licenses and related on-going S&S costs
- **Significant reductions in power and cooling costs are possible**
  - Less Stress on Data Center Infrastructure
- **Significant reductions in IT Data Center square footage are likely**
  - Enables growth and better utilization of facilities

Workload consolidation using Linux on a mainframe may result in over 40% IT Cost savings.

Note: Effect and resulting savings might differ in your environment.

IBM Global Account (IGA) IT Costs
Varied Distributed Workloads
5-Year IT Cost Study Results

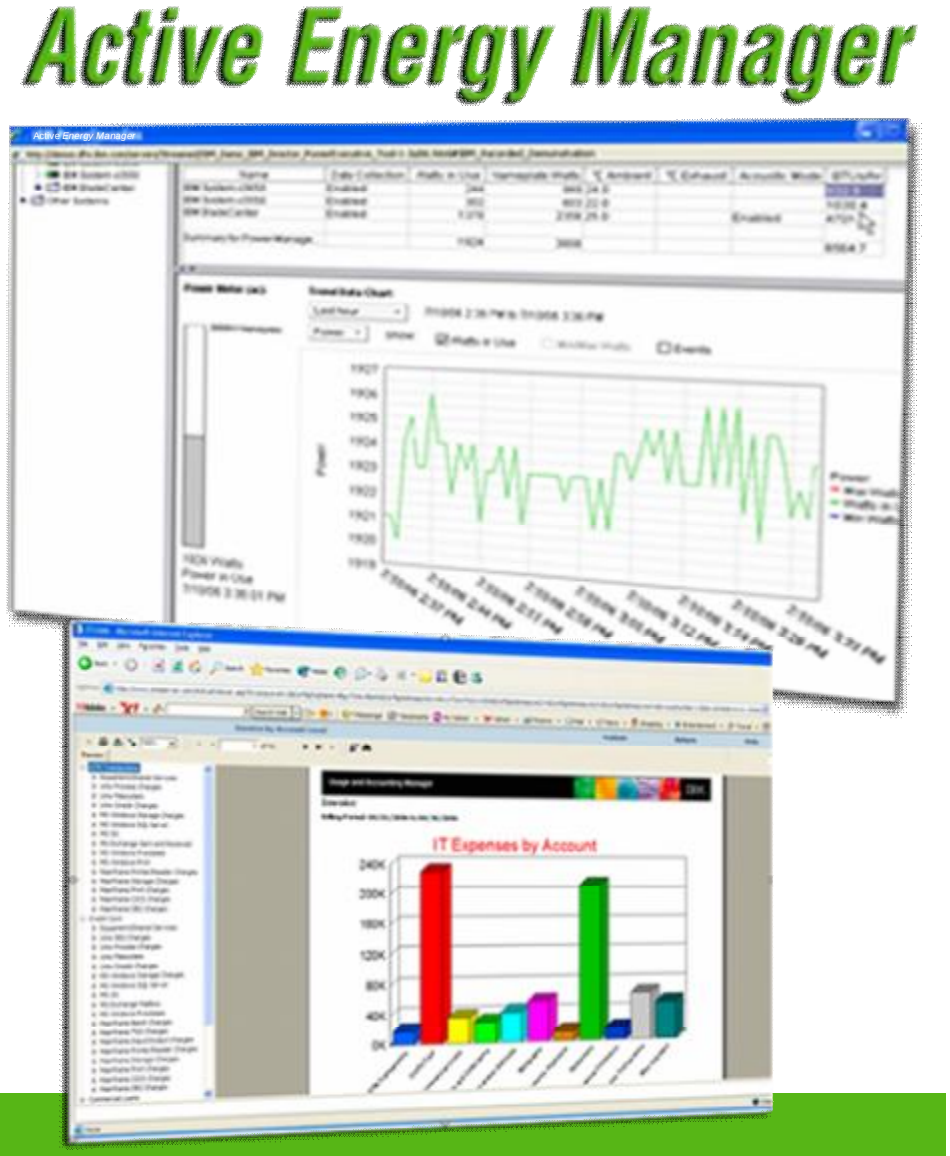
Potential 5-Year IT Cost Savings



IBM Systems Director Active Energy Manager (AEM)

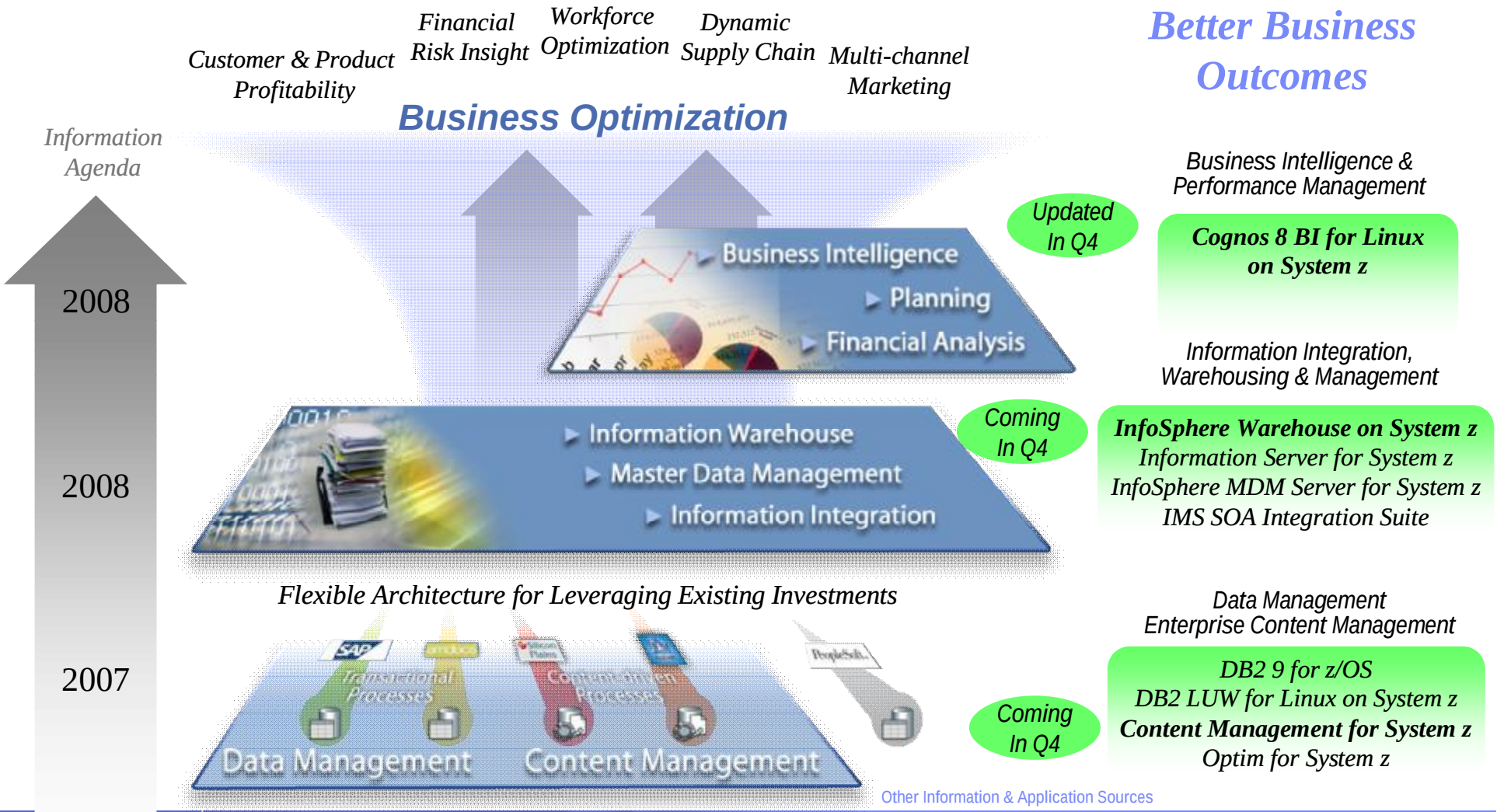
Announced Feb-26-2008, available since March-14-2008

- **AEM helps monitor, measure and control energy usage**
- **AEM is supported on Linux on System z**
  - to monitor energy use of IBM System z10, BladeCenter, System i, System p, System x
  - to manage energy use of IBM BladeCenter, Power6 processor based systems, System x
- **No agents are required on the endpoint servers**
  - no dependency on z/OS, z/VM, z/VSE
- **System z10 hardware capabilities are exploited**
  - Power trending
  - Thermal trending
- **AEM can be integrated with Tivoli to provide energy mgmt solution**
  - e.g. Tivoli Accounting Manager



Information On Demand

More Information On Demand Capabilities coming in Q4'08



Better Business Outcomes

Business Intelligence & Performance Management

Updated In Q4

Cognos 8 BI for Linux on System z

Information Integration, Warehousing & Management

Coming In Q4

InfoSphere Warehouse on System z
Information Server for System z
InfoSphere MDM Server for System z
IMS SOA Integration Suite

Data Management
Enterprise Content Management

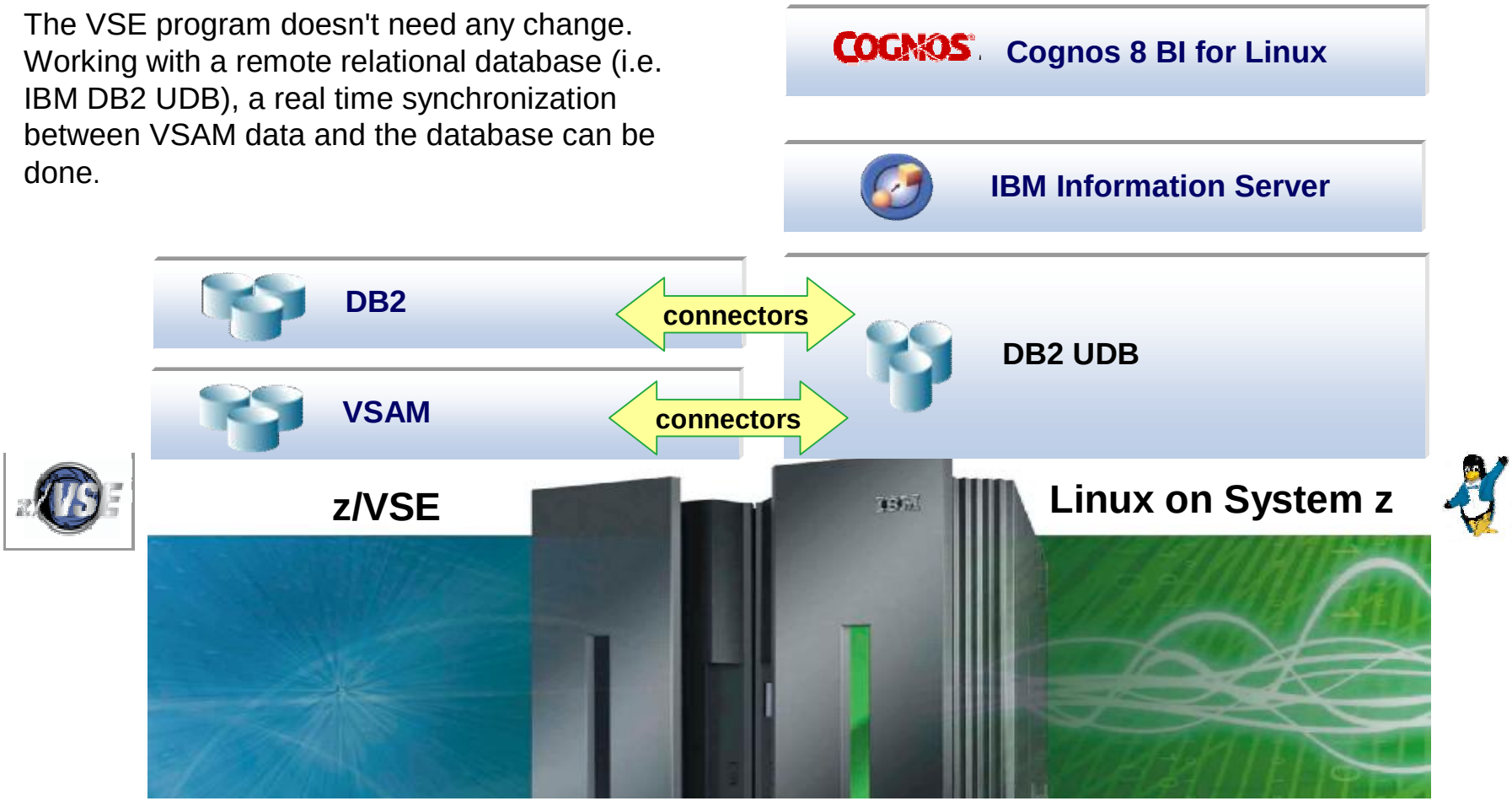
Coming In Q4

DB2 9 for z/OS
DB2 LUW for Linux on System z
Content Management for System z
Optim for System z

Cognos on IBM System z with z/VSE

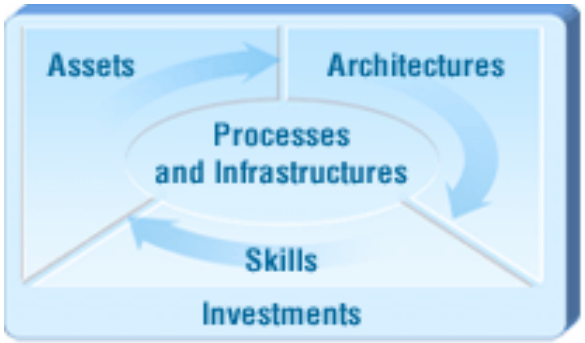
Connectors like *VSAM Redirector* enable a VSE application to store data on a remote system.

The VSE program doesn't need any change. Working with a remote relational database (i.e. IBM DB2 UDB), a real time synchronization between VSAM data and the database can be done.



New Rational Announcements "At a Glance"

Accelerating Software Innovation on System z



- ü ***Extend value of existing enterprise assets and skills***
- ü ***Drive innovation with technology advancements***
- ü ***Improve team collaboration and responsiveness***
- ü ***Enable business flexibility and change across the software lifecycle***

New and Enhanced!

Rational

New & Enhanced Capabilities

Rational Asset Analyzer v5.5
Gain business intelligence and technical analysis of application systems

Understand Assets

Rational Business Developer v7.5.1
Rational Developer for System z v7.5
Rational Host Access Transformation Services v7.5
Leverage "EGL" to accelerate Web 2.0 and SOA development on System z; increase productivity and skills flexibility for COBOL and PL/I developers

Drive Innovation

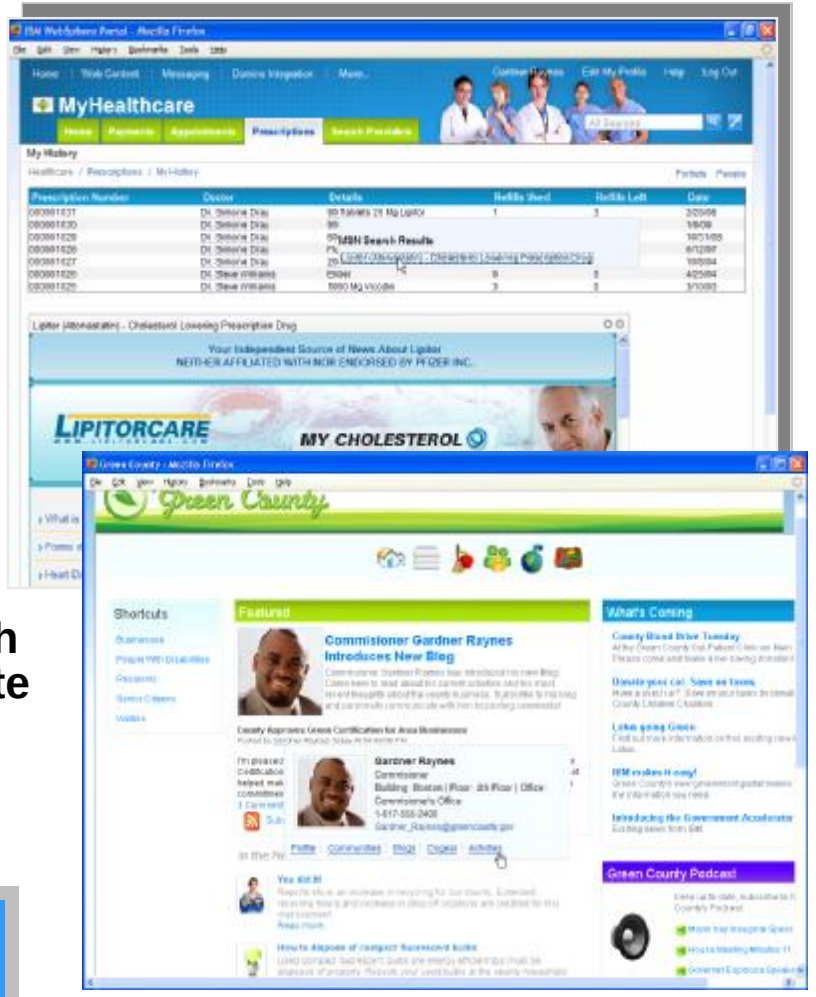
Rational Team Concert for System z v1.0.1
Rational ClearCase®, ClearQuest® & Build Forge® v7.1
Deploy common team infrastructure and tooling to improve collaboration and governance; Increasing productivity and reduced errors per build and release cycle

Enable Flexibility

The 'new' WebSphere Portal V6.1 for System z

Rich set of Web 2.0 Features – for both z/OS and Linux on System z

- **User Contribution** to portal sites through our Web Content Management
- **Simpler Situational Development** through Composite Application Templates and through Portlet Factory & Forms Designer
- **User Control** of their pages through drag & drop portlet pallete and Google Gadget catalog
- **Google Gadgets and iWidgets** – integrate thousands of additional applications
- **Application integration with AJAX and REST support** for core features - context menus, search menu, administration, drag and drop portlet palette
- **Live Text** – Give users one-click access to information that "pops" on the page



Rich, desktop-like application experiences improve performance and increase end user productivity and satisfaction

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z/VM V5.3 Evaluation Edition for IBM System z10

- **No-charge copy of z/VM V5.3 that allows System z10 users to familiarize themselves with z/VM virtualization technology**
  - Delivered as a ready-to-run program executable
- **Suitable to evaluate proof-of-concepts, effectiveness, robustness, and other capabilities of z/VM**
  - Can execute on IFLs or general-purpose CPUs
- **Includes ICKDSF, DirMaint and Performance Toolkit**
  - Does not include features or products such as: RSCS, RACF Security Server, EREP, HCD/HCM, OSA/SF
- **Not intended for production use**
  - Configuration support only facilitates a trial execution environment
  - IBM service support is not offered for z/VM Evaluation Edition
- **Question-and-answer support available via e-mail**
  - Send questions to zvmdemo@us.ibm.com

Learn more at: www.vm.ibm.com/eval

z/VM Version 5 Release 4 New Function Highlights

Announce August 5, 2008 – Available September 12, 2008

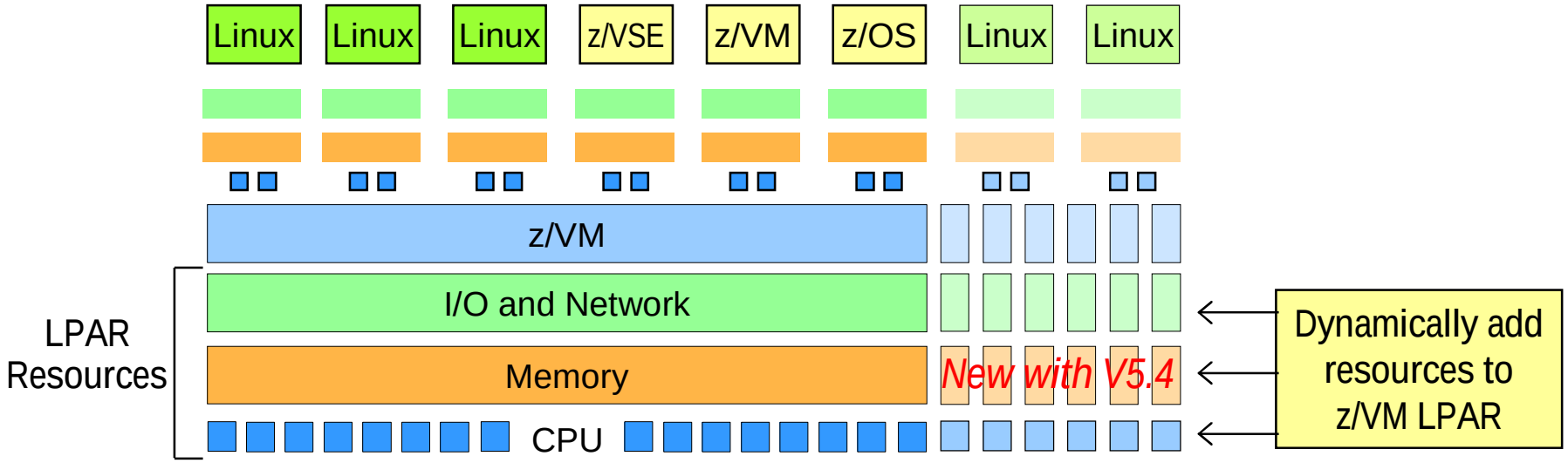
- **Processor support**
  - System z10 processor instruction exploitation
  - DAT table performance enhancements
  - **Dynamic LPAR memory upgrade**
- **Virtualization support**
  - Dynamic virtual machine memory upgrade
  - **z/VM-mode LPAR support**
  - Virtual CPU SHARE redistribution
  - DCSS addressability above 2 GB
  - Guest FCP dump
  - OSA-Express3 Four-Port Connectivity
  - Virtual Switch networking management
- **Networking**
  - z/VM TELNET IPv6 support
  - Path MTU discovery
  - TCP/IP OSD Layer 2 support
- **Security**
  - LDAP upgrade
  - RACF change logging and password/phrase enveloping
  - SSL server re-host
- **Systems management**
  - z/VM system management API enhancements
  - Linux-on-z/VM installation using the Hardware Management Console (HMC)
  - Service and installation improvements
  - Performance Toolkit and DirMaint support enhancements
  - LE, C/C++, and Binder upgrades
  - System SHUTDOWN verification
- **Withdrawn**
  - 3480 tapes no longer supported as product distribution media

Refer to announcement letter: 208-249 (US), AP08-0242 (AP), A08-1178 (CAN), ZP08-0349 (EMEA)

z/VM Dynamic Memory Upgrade

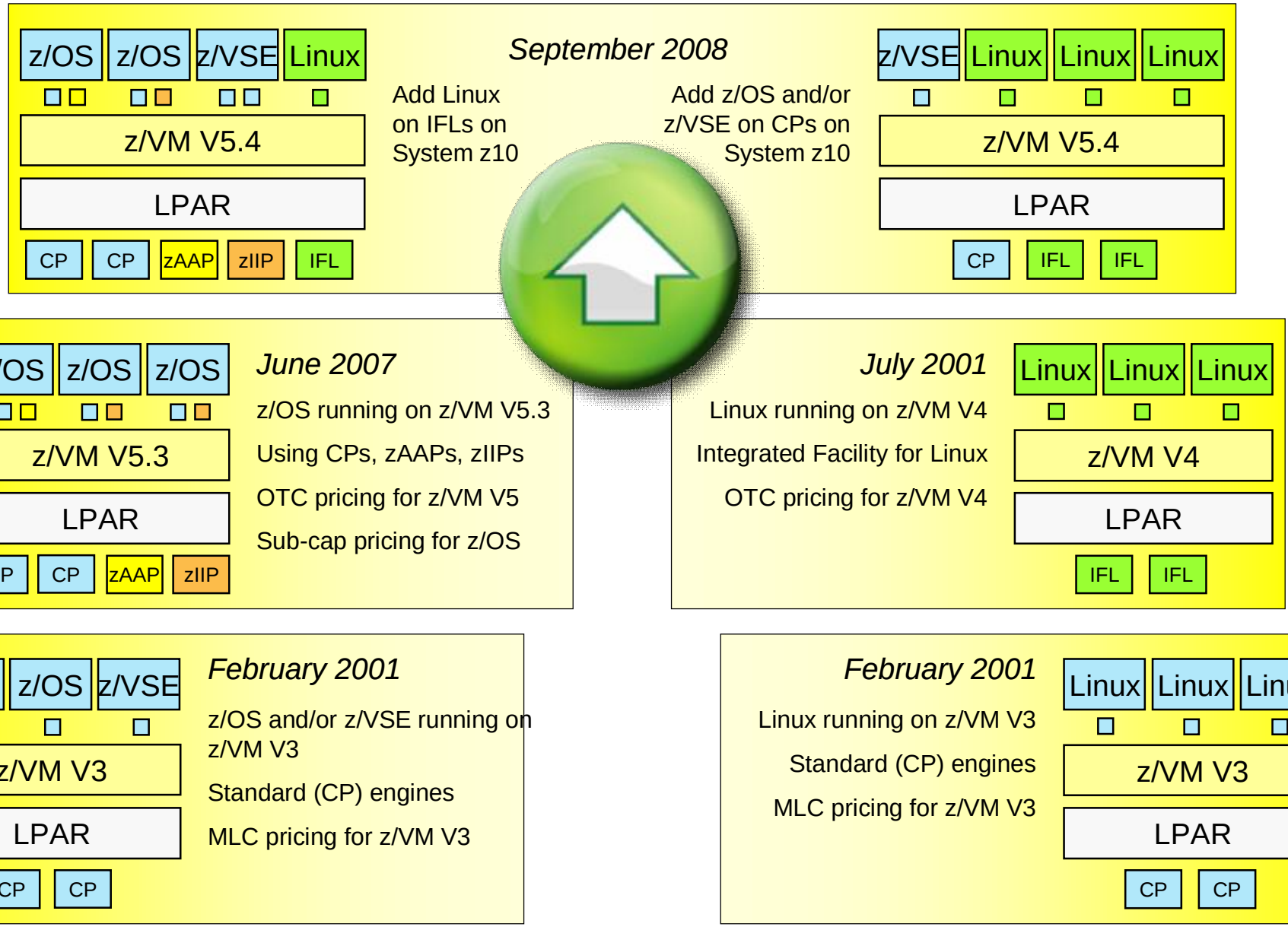
New z/VM V5.4 Function Enhances System Availability

- **Users can non-disruptively add memory to a z/VM *LPAR***
  - Additional memory can come from: *a)* unused available memory, *b)* concurrent memory upgrade, or *c)* an LPAR that can release memory
  - Memory *cannot* be non-disruptively removed from a z/VM LPAR
- **z/VM virtualizes this hardware support for *guest machines***
  - Currently, only z/OS and z/VM support this capability in a virtual machine environment
- **Complements ability to dynamically add CPU, I/O, and networking resources**



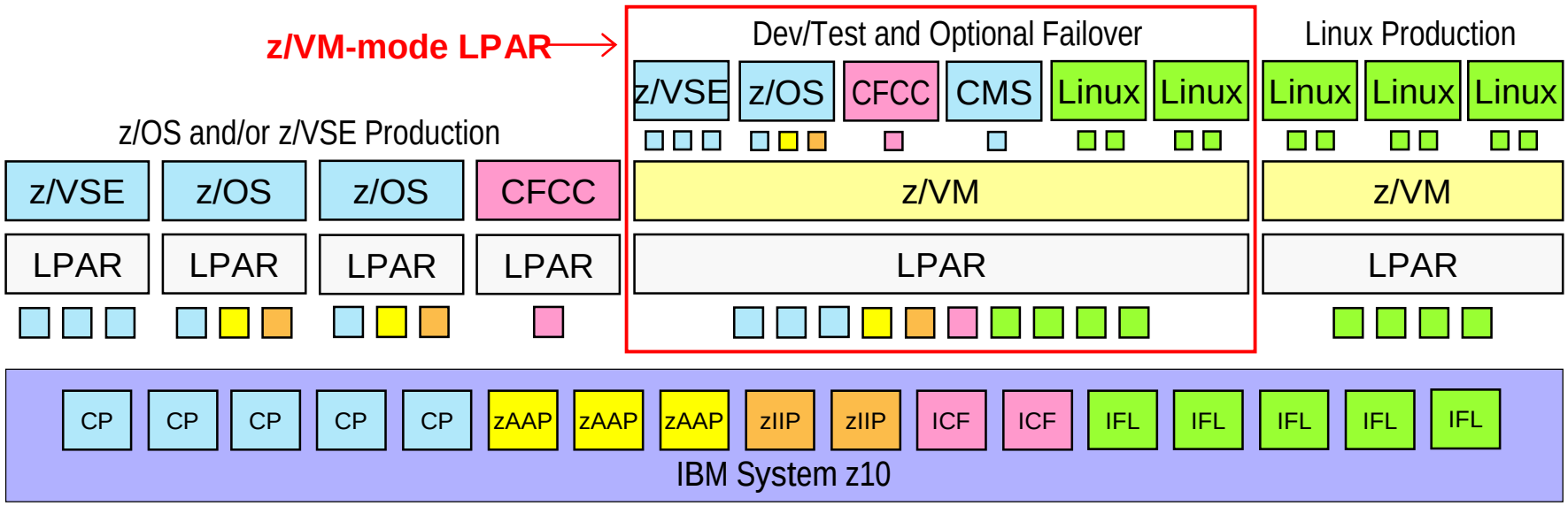
Smart economics: non-disruptively scale your z/VM environment by adding hardware assets that can be shared with every virtual server

z/VM and Specialty Engine Support



z/VM-Mode LPAR Support for IBM System z10

- **New LPAR type for IBM System z10: *z/VM-mode***
  - Allows z/VM V5.4 users to configure all CPU types in a z10 LPAR
- **Offers added flexibility for hosting mainframe workloads**
  - Add *IFLs* to an existing standard-engine z/VM LPAR to host Linux workloads
  - Add *CPs* to an existing IFL z/VM LPAR to host z/OS, z/VSE, or traditional CMS workloads
  - Add *zAAPs* and *zIIPs* to host eligible z/OS specialty-engine processing
  - Test integrated Linux and z/OS and z/VSE solutions in the same LPAR
- **No change to software licensing**
  - Software continues to be licensed according to CPU type



Topics

- § IBM System z10 Business Class
- § Linux on System z
- § z/VM Version 5 Release 4
- → § z/VSE Version 4 Release 2
- § Customer Examples
- § Summary

Important z/VSE-related Announcements

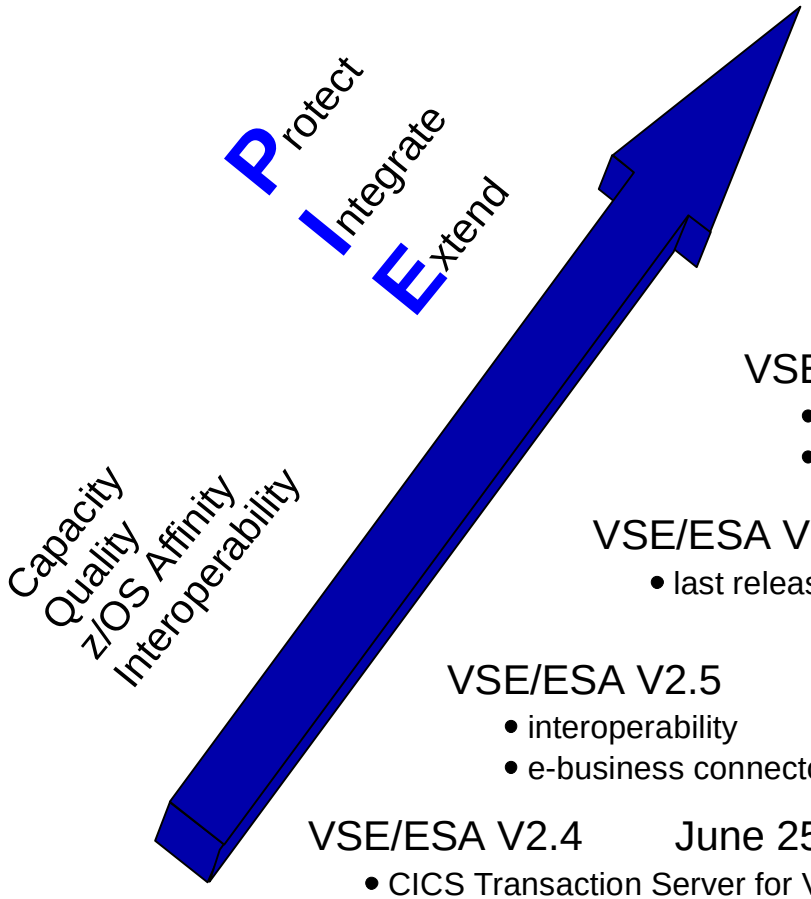
- § **Feb-28, 2007** - End-of-Service for VSE/ESA V2.7 effective
- § **March-16, 2007** - z/VSE V4.1 General Availability
- § **March-16, 2007** - SecureFTP PTF available
- § **May-18, 2007** - IBM TS1120 encrypting tape PTF available for z/VSE V4.1
- § **June-05, 2007** - End-of-Marketing for z/VSE V3.1 announced (effective 5/31/2008)
- § **June-18, 2007** - IBM TS1120 encrypting tape PTF available for z/VSE V3.1
- § **June-29, 2007** - z/VM V5.3 General Availability
- § **July-10, 2007** - IBM TS3400 Tape Library attachment to System z
- § **Aug-07, 2007** - End-of-Service for z/VSE V3.1 announced (effective 7/31/2009)
- § **Aug-09, 2007** - DL/1 enhancement (up to 10 datasets for HD databases) available
- § **Sep-09, 2007** - z/VSE V4.2 Preview announced
- § **Oct-09, 2007** - Encryption Facility for z/VSE V1.1 announced (available 11/30/2007)
- § **Oct-10, 2007** - SCRT V14.2 available for z/VSE V4.1
- § **Nov-14, 2007** - IBM DB2 Server for VSE & VM V7.5 announced (available 11/30/2007)
- § **Nov-30, 2007** - z/VSE V4.1.1 available
- § **Jan-18, 2008** - z/VSE V3.1.3 available
- § **Feb-26, 2008** - IBM System z10 Enterprise Class (z10 EC) announced
- § **May-31, 2008** - End-of-Marketing for z/VSE V3.1 effective
- § **June-13, 2008** - z/VSE V4.1.2 available
- § **June-24, 2008** - HLASM for z/OS, z/VM, and z/VSE V1.6 announced
- § **Aug-05, 2008** - z/VM V5.4 announced with planned availability 09/12/2008
- § **Aug-05, 2008** - z/VSE V4.2 announced with planned availability 10/17/2008
- § **Sep-12, 2008** - z/VM V5.4 General Availability
- § **Oct 21, 2008** - IBM System z10 Business Class (z10 BC) announced
- § **Oct 17, 2008** - z/VSE V4.2 General Availability

z/VSE Evolution

z/VSE V4.2 Oct 17, 2008
- **More tasks, PAV, LDAP Client, SVC**
- **SoD for CICS/VSE, EGL, WMQ**

NEW

z/VSE V4.1 March 16, 2007
- **z/Architecture only / 64-bit real addr**
- **MWLC full & sub-cap pricing**



z/VSE V3.1* March 4, 2005
- selected zSeries features, FCP/SCSI
- 31-bit mode only

VSE/ESA V2.7 March 14, 2003
- enhanced interoperability
- ALS2 servers only

VSE/ESA V2.6 Dec 14, 2001
- last release to support pre-G5 servers

VSE/ESA V2.5 Sept 29, 2000
- interoperability
- e-business connectors

VSE/ESA V2.4 June 25, 1999
- CICS Transaction Server for VSE/ESA
- e-business

•Note: z/VSE V3 can operate in 31-bit mode only. It does not implement z/Architecture and specifically does not implement 64-bit mode capabilities. z/VSE V3 is designed to support selected features of IBM System z hardware.

Press on z/VSE

CNNMoney.com

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http://money.cnn.com/news/newsfeeds/articles/marketwire/0317343.htm

IBM Continues the Evolution of Its z/VSE Mainframe Operating System

October 19, 2007: 08:01 AM EST

marketwire

IBM (NYSE: IBM) today announced that the z/VSE mainframe operating system is being updated to help address customer needs for scalability, security and integration. z/VSE V4.2 is designed to support growing mainframe applications and drive stronger investment protection.

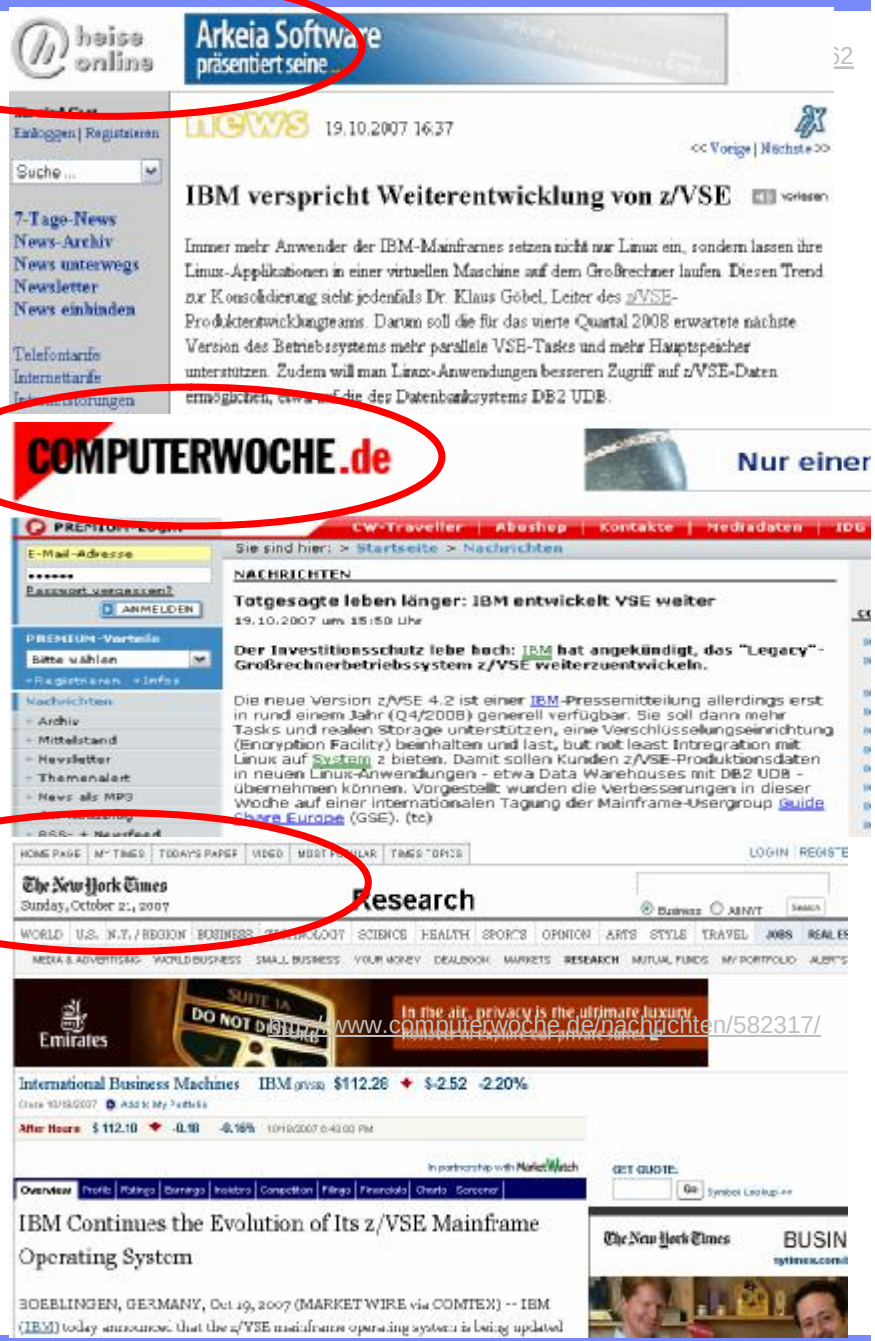
"Many customers are beginning to put new Linux applications on the same IBM System z9 mainframe that also runs their production z/VSE applications. This integrated approach is designed to offer the best of Linux, the robust data serving capabilities of z/VSE, and the potential for low total cost of ownership of the System z9 mainframe," said Dr. Klaus Goebel, Development Executive Project Manager and z/VSE PDT Leader. "IBM's powerful mainframe virtualization system, z/VM, is fundamental to these integrated environments. It helps customers get the most from their Linux and z/VSE applications, integrate their business, and support business growth."

Previewed at a special international meeting of the GUIDE SHARE EUROPE (GSE) mainframe user group earlier this week, z/VSE enhancements include a range of new features, especially important to modern applications, such as on-line commerce. Capabilities include:

-- More z/VSE tasks and more real storage designed to improve scalability

and many more, e.g.

- **yahoo.com**
- **pressebox.de**
- **verivox.de**
- **boerse-go.de**
- **Wall Street Journal**
- **news.moneycentral.msn.com**
- **marketwatch.com**
- **businessweek.com**
- **smartmoney.com, etc. etc.**

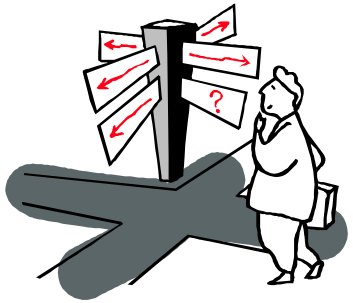


z/VSE V4.2 Contents

- **Servers**
  - IBM System z10 Enterprise Class (z10 EC) **and z10 Business Class (z10 BC)** NEW
  - IBM System z9 Enterprise Class (z9 EC) and z9 Business Class (z9 BC)
  - IBM eServer zSeries 990, 890, 900, and 800
- **Scalability**
  - **Up to 512 tasks (2x z/VSE V4.1)**
  - Up to 32 GB real processor storage (4x z/VSE V4.1)
  - Turbo dispatcher enhancements (CP balancing)
  - Parallel Access Volume (PAV) feature of IBM System Storage DS8000 and DS6000 series
  - IBM System Storage DS8000 SE Flashcopy
- **Security**
  - **Lightweight Directory Access Protocol (LDAP) sign-on support using a z/VSE LDAP client**
  - IBM System z10 extensions to CP Assist for Cryptographic Function (CPACF)
  - SOA Message Layer and Transport layer security
  - IBM System Storage TS1130 and TS1120 're-keying' function NEW
  - Basic Security Manager (BSM) improvements
  - Encryption Facility for z/VSE V1.1 as an optional priced feature (also available for z/VSE V4.1)

z/VSE V4.2 Contents (continued)

- **Enhanced storage options**
  - **IBM System Storage SAN Volume Controller (SVC) access to FCP-attached SCSI disks**
  - IBM System Storage TS3400 Tape Library and TS7700 Virtualization Engine Release 1.4
  - IBM System Storage TS1130 Tape Drive NEW
- **Pricing**
  - MWLC (full capacity or sub capacity options) eligible on z10 EC, z10 BC, z9 EC, and z9 BC
  - 'Traditional' price metrics for other servers
- **Migration**
  - Fast Service Upgrade (FSU) from z/VSE V4.1 and z/VSE V3.1
- **Virtualization**
  - Requires z/VM V5.2 or later if running under z/VM
- **Statement of Direction (SOD)****
  - z/VSE V4.2 will be the last version/release of VSE to ship CICS/VSE V2.3
  - New Enterprise Generation Language (EGL) extension to Rational Business Developer NEW
  - New version of WebSphere MQ for z/VSE NEW



** All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice.

z/VSE V4.2 Enhancement: More Tasks

§ Up to 512 concurrent VSE tasks

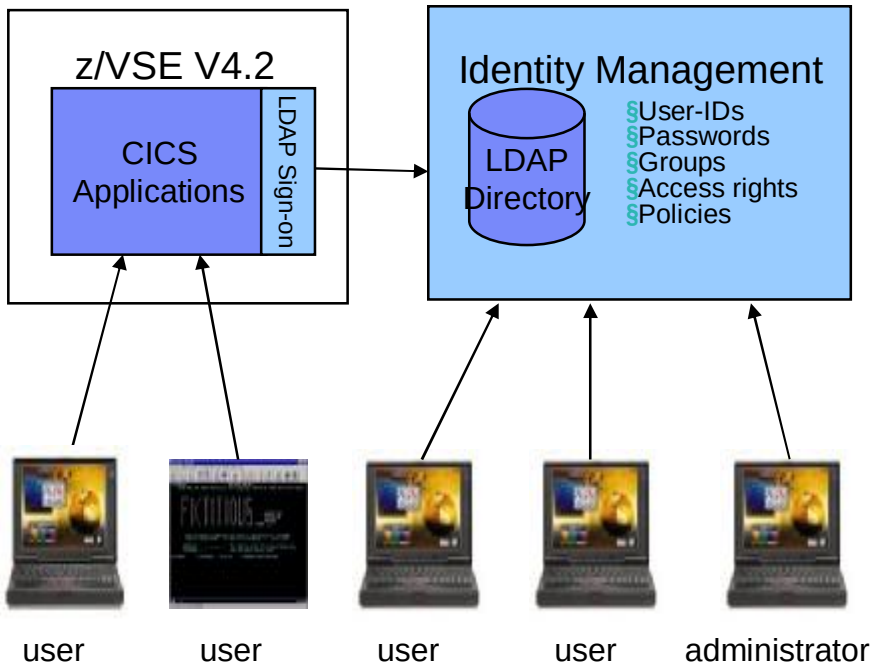
- 2x prior limit of 255
  - maximum 32 tasks per partition remains
- long standing requirement from both customers and ISVs
- optional
- default remains 255
  - activate additional tasks system-wide using SYSDEF command
  - SYSDEF can be overwritten with JCL

§ Potential benefits

- enables growing z/VSE workloads
  - more CICS and batch partitions can run in parallel
  - more workload in a single VSE image
- simplify environment
  - consolidate multiple VSE images
- may ease migration from CICS/VSE to CICS Transaction Server for VSE/ESA
- opens additional opportunities
  - new IBM middleware
  - new ISV product offerings

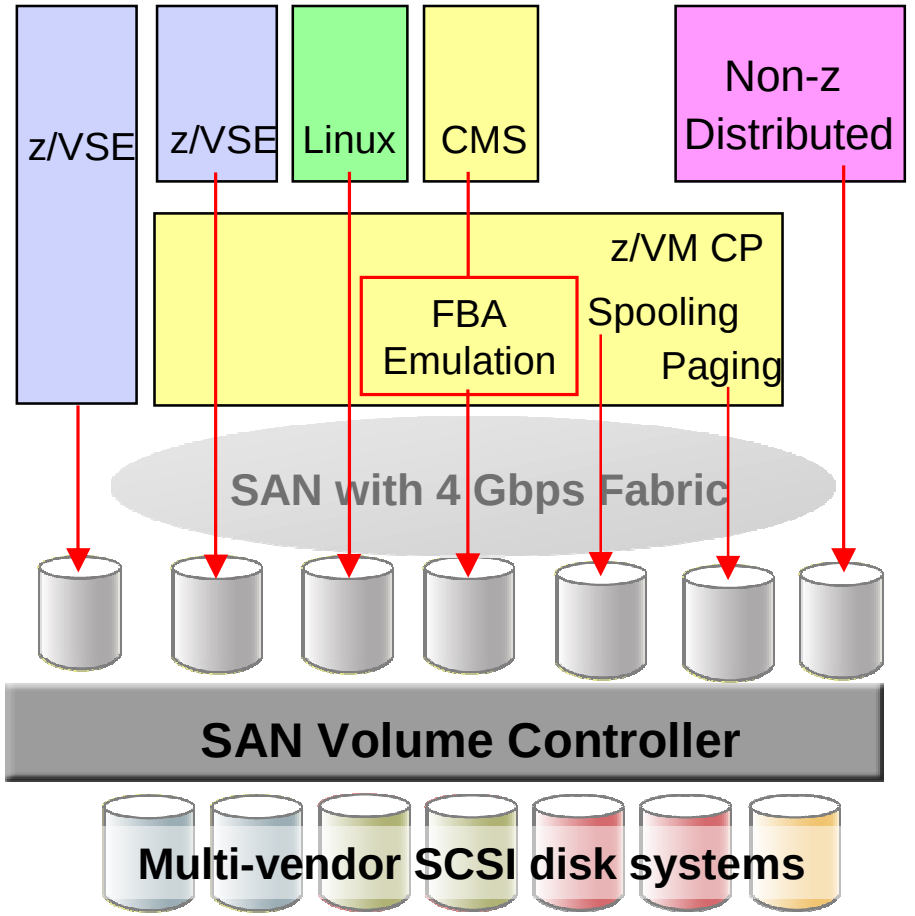
z/VSE V4.2 Enhancement: LDAP Client

- **Enables users to sign on z/VSE using a single, comprehensive, corporate-wide 'Identity Management' systems (i.e. IBM Tivoli Identity Manager, etc.)**
- **LDAP user-IDs and passwords can be up to 64 characters. Helps overcome VSE internal limits**
  - 4 character VSE/ICCF user-IDs
  - 4 and 8 character CICS user-IDs
  - up to 8 character Passwords
- **LDAP sign on sits on top of existing z/VSE security manager (i.e. BSM, ESM, etc.)**
- **z/VSE LDAP client can work with common LDAP servers**
  - IBM Tivoli Directory server
  - z/VM LDAP server (with optional RACF repository)
  - Microsoft Active Directory, OpenLDAP, Apache Directory server, Novell eDirectory, and many others.
- **Potential benefits include improved protection, consistent access rules, ease of use for end-users**



z/VSE V4.2 Enhancement: SAN Volume Controller (SVC)

- **SAN Volume Controller (SVC) creates a single pool of SCSI disk capacity**
- **Disk storage options include IBM DS8000, DS6000, ESS, DS4000, etc. plus qualified systems from various non-IBM vendors**
- **SVC *platform* includes both hardware and software components:**
  - SVC 'nodes' provide redundant components plus cache
  - Systems Storage Productivity Center (SSPC) software provides administrative and copy services
- **Also supported in z/VM V5.3 and later, as well as Linux on System z**
- **Potential benefits include a simpler, more flexible, less costly disk storage infrastructure**



Learn more at: **ibm.com**/storage/support/2145

Topics

- IBM System z10 Business Class
- Linux on System z
- z/VM Version 5 Release 4
- z/VSE Version 4 Release 2
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IBM System z: Transforming our Clients' Datacenters

TRANSZAP

Moved to System z from Lintel to deliver the availability and security their clients demand of their e-Procure-to-Pay SAAS, while supporting the strong growth the company is experiencing

Casas Bahia centralized operations on System z to support rapid growth and reduce IT costs

Nationwide
On Your Side

Consolidated Windows-based systems to Linux on z to achieve substantial cost efficiencies

Satyam
The Official IT Services Provider of the 2010 FIFA World Cup™

Satyam has positioned the mainframe as a platform to reach the SMB audience in growth markets with hosted web business services

MARIST
www.marist.edu

Entering provider space for cloud services for universities, schools systems and other public entities

HOPLON infotainment

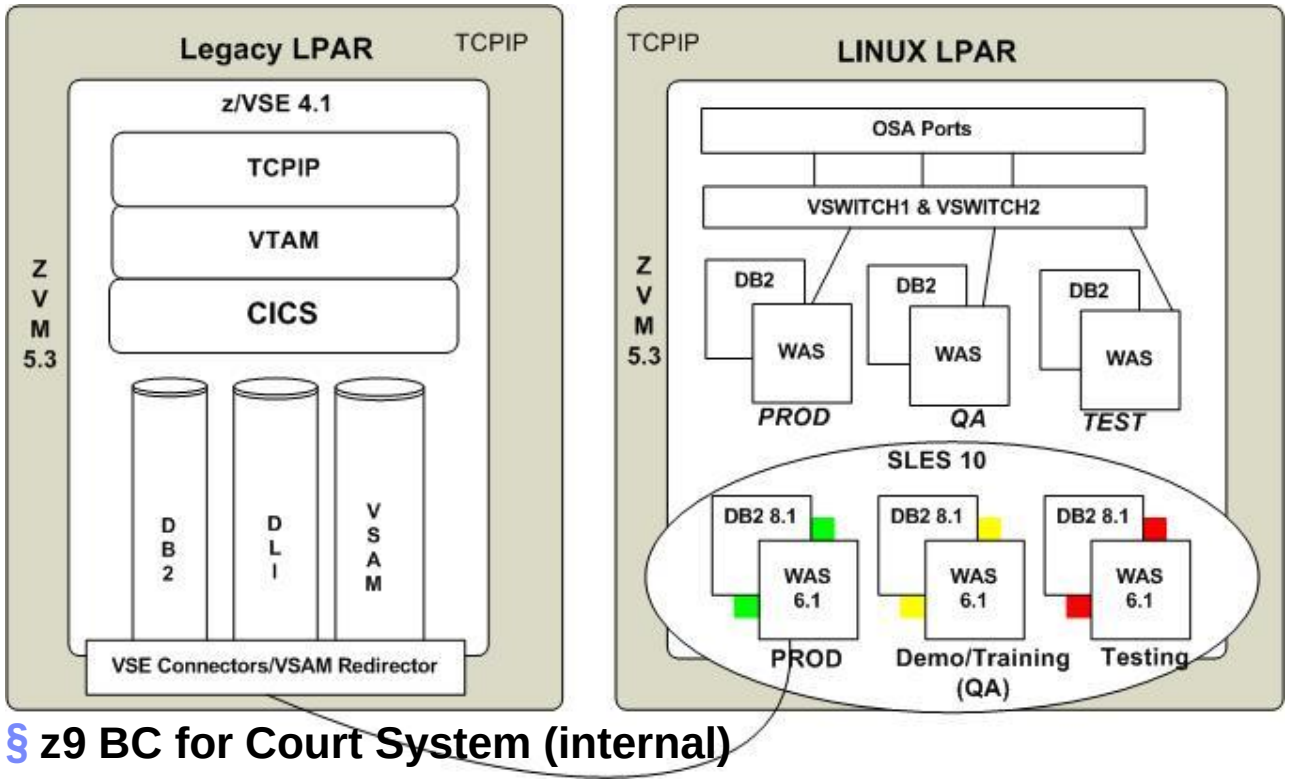
Their massive-multi-player game and virtual world application middleware runs on System z10. (www.taikodom.com)

Very large Bank in Japan

Category	# of z9	# of IFL	Memory (GB)	# of LPAR	# of DS8000	Disk (TB)
Production	4	160	1536	138	4	300
D/R	4	112	1280	180	2	60
Training	2	32	416	42	1	13
Development	1	17	128	15	1	4
Porting	1	18	128	60	1	6
Total	12	339	3488	435	9	383

Probably the largest Linux on System z installation in the world!

Supreme Court of Virginia



- 1 + 1 z9 BC
- 2 + 2 CPs
- 5 + 5 IFLs
- 48 + 32 GB memory
- 2 + 2 z/VM 5.3 LPARs
- 7 + 4 z/VSE 4.1 guests
- 41 + 14 SLES 10 guests

§ z9 BC for Court System (internal)

- **Serves 325 courts, 5.000+ users, 4 million cases (2007)**
- **Integrating z/VSE, DB2/UDB and WebSphere applications**
- **eMagistrate* system serves 125 locations, 2.800 trans per day**

**2007 ComputerWorld Honors Program Laureate*

§ z9 BC for Internet

- **eCommerce application integrating z/VSE and WebSphere appls**

BRZ Deutschland

Accelerates data processing run times with IBM System z9 and IBM System Storage DS6800 technology

Business challenge:

As an IT service provider to the fast-paced construction industry with more than 13,000 clients, the ability to respond quickly to its customers' needs is paramount. Having reached capacity on its IBM S/390® Multiprise® 2000 mainframe, BRZ Deutschland GmbH (BRZ) needed to migrate to a more flexible platform that could run Virtual Storage Extended (VSE) and Java-based applications on a Linux® operating system in parallel.

Solution:

BRZ decided to migrate to an IBM System z9® Business Class server running the IBM z/VSE™ V4 operating system. IBM and IBM Premier Business Partner Fritz & Macziol GmbH, who recommended the change, completed the migration in one weekend. Three VSE systems run in a logical partition with the System z9 server functioning as a data hub. An IBM System Storage™ DS6800 provides BRZ with the latest hard drive technology.

Benefits:

- Accelerates processing times for batch jobs
- Cuts run times by 20% compared to the previous system
- Reduces run times even further with addition of DS6800 technology

"A maximum in flexibility, stability and availability is simply what our clients expect and is a requirement for the permanent improvement of process flows. With the IBM System z9 BC we can meet these requirements."

— Oliver Neureuther, director of product management systems BRZ Deutschland GmbH

Solution components:

- IBM System z9 Business Class
- IBM System Storage DS6800
- IBM z/VSE

BRZ Deutschland Bauinformationstechnologie

ZSP03110-USEN-00

Wessels+Müller AG

Improves application response times and cuts operating costs with an IBM System z mainframe

Business challenge:

Wessels+Müller had migrated many of its key business systems to an IBM zSeries® 890 mainframe. And, while it was pleased with the platform, it found that the IBM hardware was unable to keep pace with the company's growing processing demands. With the system operating at 80 percent just to handle day-to-day operations, the business was concerned about peak processing periods when high volumes of data need to be analyzed.

Solution:

Working with IBM Business Partner Becom, Wessels+Müller migrated its business systems to an IBM System z9® Business Class mainframe. The IBM hardware, leveraging the IBM z/VSE™ operating platform, supports multiple Linux® virtual machines that host the client's online parts ordering and information management systems as well as an IBM DB2® data server containing part information.

Benefits:

- Improved application speeds and reduced response times—even during peak processing periods
- Increased staff productivity with a more responsive environment
- Reduced operating costs by simplifying the infrastructure

"This System z mainframe has reaffirmed our confidence in IBM's hardware. Not only does the server offer more power but more control over the environment as well."

— Wessels+Müller AG

Solution components:

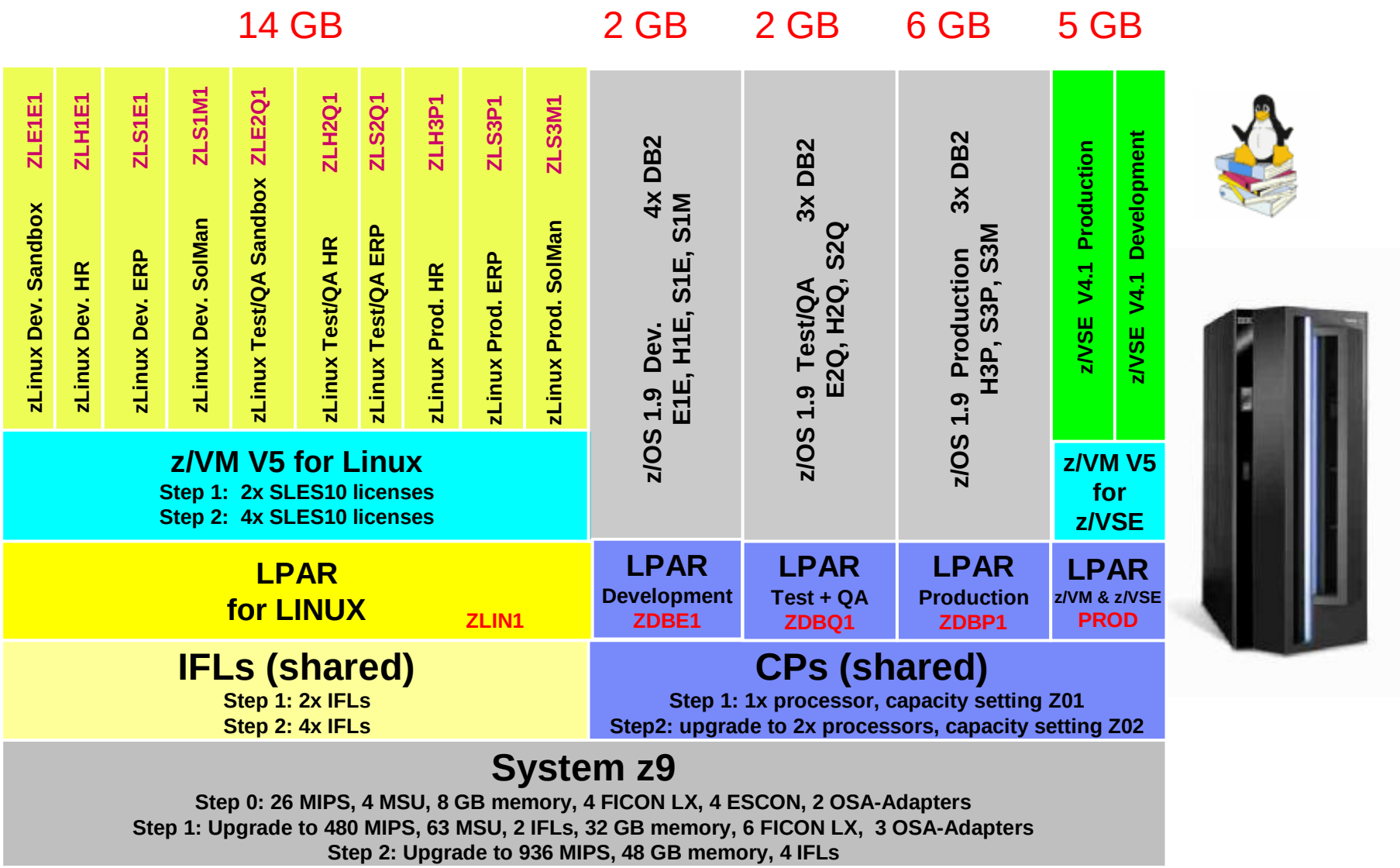
- IBM System z9 Business Class (BC) mainframe
- IBM DB2 data server

GK12-4361-00

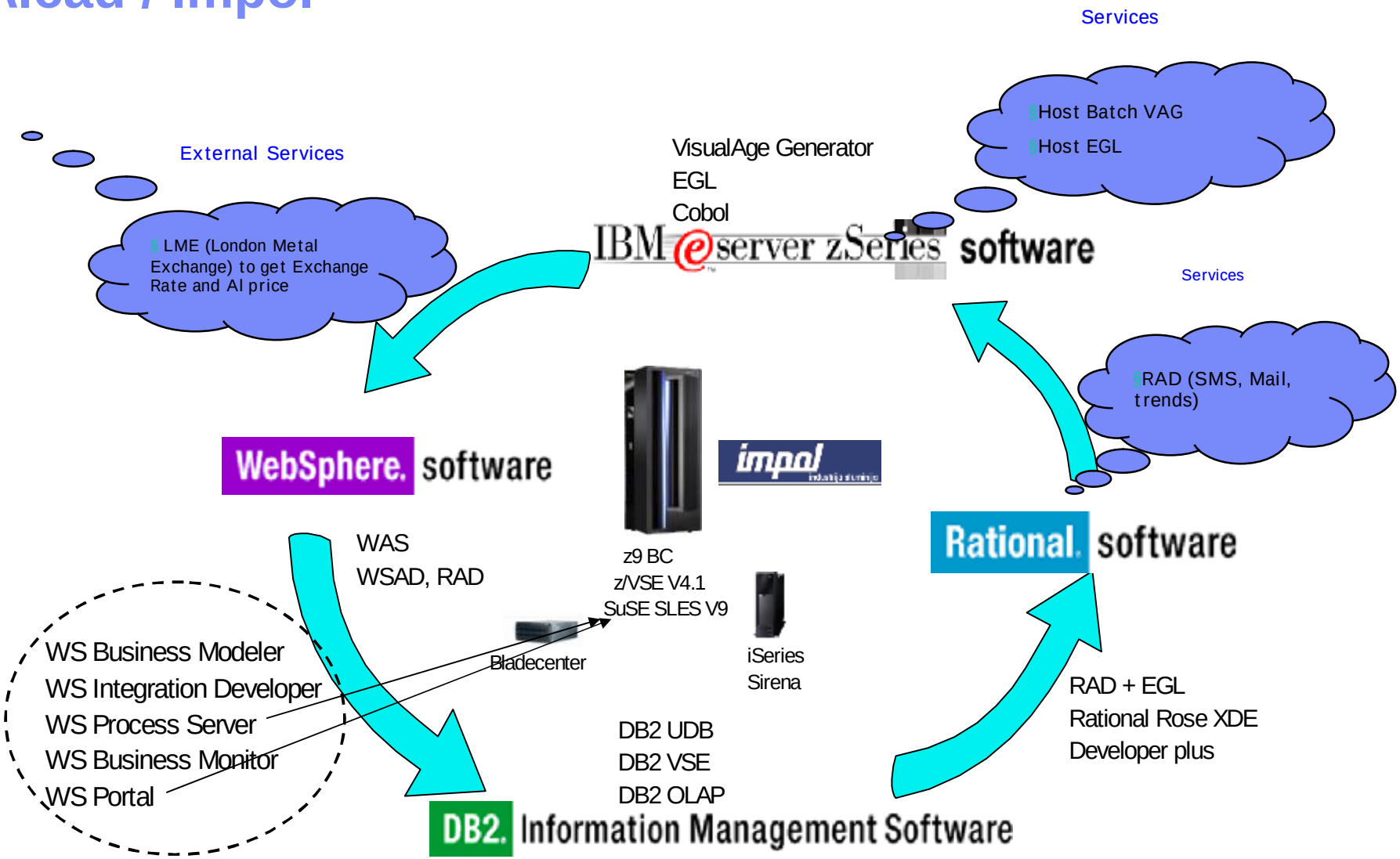
Scheidt & Bachmann

VSE/ESA 2.2 on 9121-411 w/ ESS à z/VSE 4.1 on z9 BC A01 w/ DS6800

Scheidt & Bachmann: Growing with SAP on System z



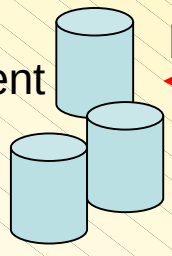
Alcad / Impol


Services
§Host Batch VAG
§Host EGL
External Services
§ LME (London Metal Exchange) to get Exchange Rate and Al price
VisualAge Generator
EGL
Cobol
IBM @server zSeries software
Services
§RAD (SMS, Mail, trends)
WebSphere. software
impol
Rational. software
WAS
WSAD, RAD
z9 BC
z/VSE V4.1
SuSE SLES V9
iSeries
Sirena
Bladecenter
WS Business Modeler
WS Integration Developer
WS Process Server
WS Business Monitor
WS Portal
DB2 UDB
DB2 VSE
DB2 OLAP
RAD + EGL
Rational Rose XDE
Developer plus
DB2. Information Management Software

Email from batch or CICS

AFP / PSF via IPaddress

300 files every day transfered to different operating systems (zLinux, Linux, Microsoft)



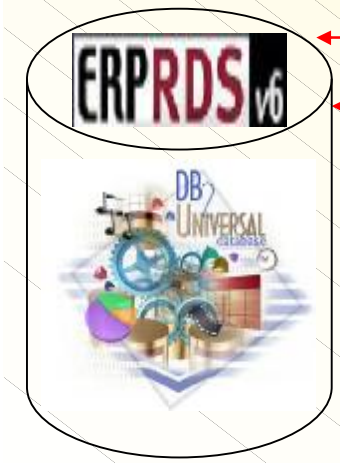
FTP

Production Environment

z/VSE w/ TCP/IP 1.5E

DB2 UDB zLinux applications

VSAM Redirector Server via HiperSockets to zLinux DB2 and via Vswitch OSA QDIO to SQL Server



Microsoft SQL server

TCP/IP 1.5E only for Telnet applications

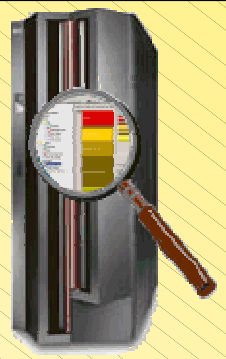
Virtual Tape

CICS TS web SOA via HiperSockets

redhat **version 5** zLinux Java application running on Tomcat

VSE Navigator

z/VSE Health Checker



Every day 240,000 CICS transactions from 400 Telnet connections

OlioCarli

the leading producer of premium olive oil sold directly to consumers

Topics

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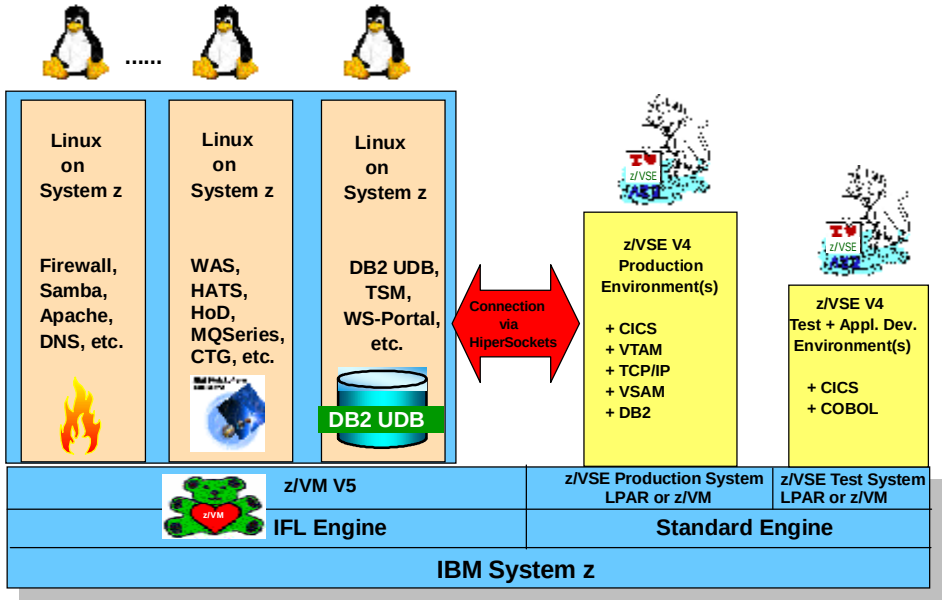
System z10 Can Do IT All - Smart, Cool, Affordable

- **Leadership capabilities for the New Enterprise Data Center**
- **Smart technology for all enterprises**
- **A modern, energy efficient platform to help you save big through consolidation**
- **New business growth opportunities with an expanded range of affordable solutions**

The Future runs on System z

Exploiting the Best of all Worlds

with IBM System z10, IBM System Storage, and IBM Middleware



§ z/VSE V4

- ▸Protect core IT investments thru PIE
- ▸Robust, secure enterprise server
- ▸Cost-effective solutions
- ▸Interoperability with network / servers
- ▸Highly improved price / performance

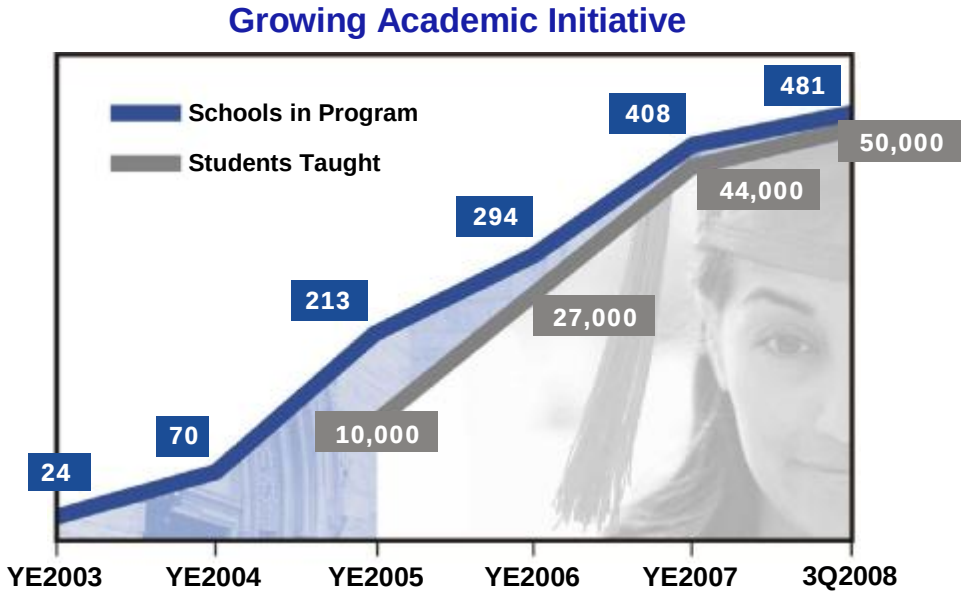
§ z/VM V5

- ▸Highly flexible, industrial strength
- ▸Advanced virtualization
- ▸Multiple z/VSE and Linux images
- ▸Designed to exploit System z9 and z10

§ Linux on System z

- ▸Large portfolio of new applications
- ▸Platform for IBM middleware
- ▸Infrastructure Simplification
- ▸Massive scalability and consolidation

Building Mainframe Skills for the Community



- **IBM Academic Initiative System z by the numbers:**
  - Web site: **www.ibm.com/university/systemz**
  - Participation – 481 schools registered, 50,000 students attended mainframe education
  - Courses – 29+ Courses (plus more under development) & Mastery Exam Certification
  - Resources – Access to Mainframes worldwide for teaching (6 Univ hubs)
  - Student MF Contests – 10 contests with 8,630 students, 1,167 schools…more planned
  - Assist Professors – Seminars, Faculty awards, education coupons
  - zCommunity – Roundtable events with Clients / Schools / ISVs / Business Partners
  - IBM zSkills (**zskills@us.ibm.com**) + over 300 IBM Mainframe ambassadors
  - Collateral / WW Analyst & Press events / Corporate PR Campaign

… including courses on z/VM, Linux on System z and z/VSE

Any Questions?