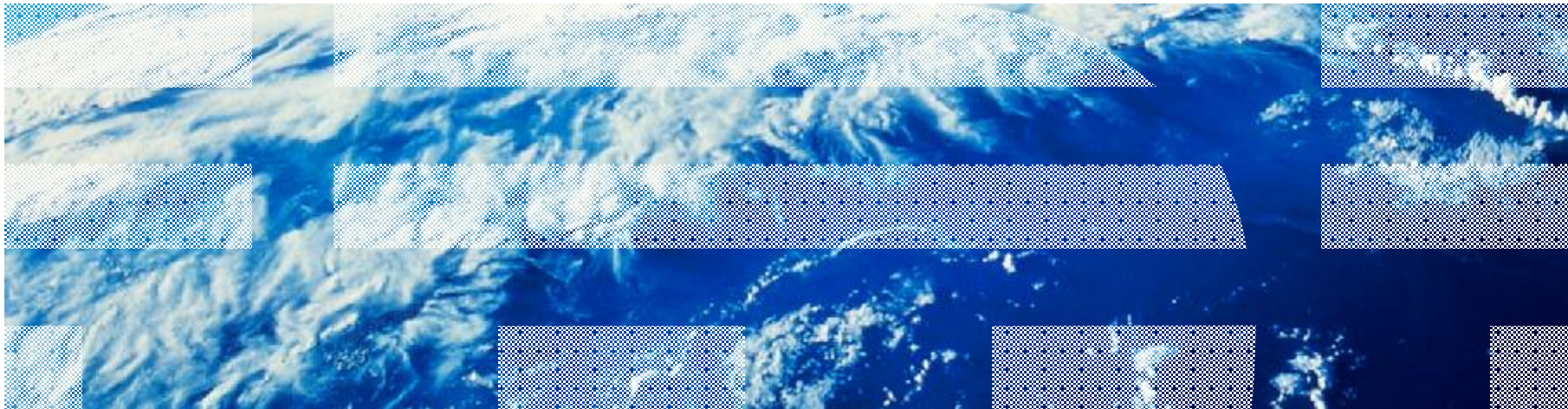


z/VSE Update



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DFSORT	HyperSwap	System z	z/VM*
DFSMS	IBM*	System z9	z/VSE
DS6000	IBM eServer	System z10	zSeries*
DS8000	IBM logo*	System z10 Business Class	z9
Enterprise Storage Server*	IMS	Tivoli	z10
ESCON*	MQSeries*	TotalStorage*	z10 BC
FICON*	OMEGAMON*	VSE/ESA	z10 EC

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Notes:

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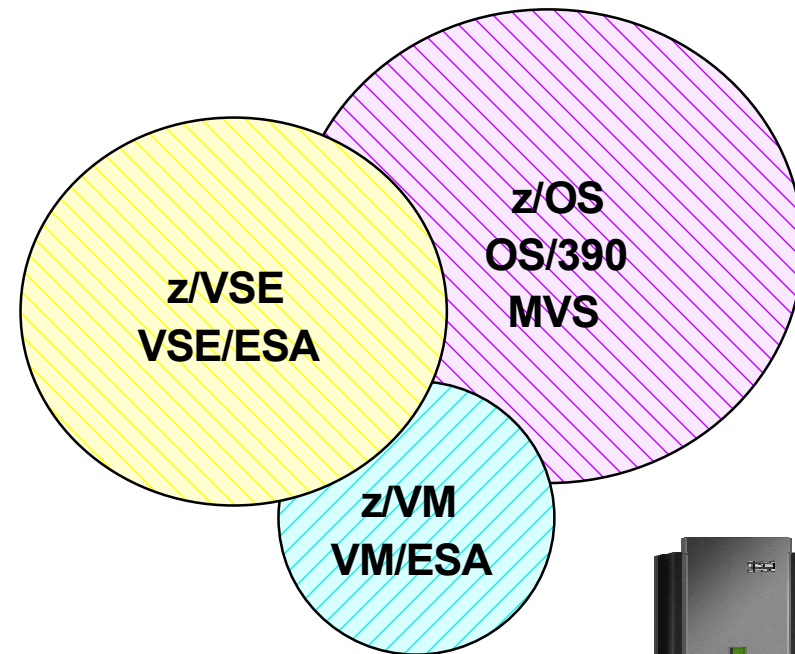
Agenda

- § z/VSE strategy
- § z/VSE evolution & z/VSE Version 4 enhancements
- § Midrange Workload License Charge
- § Linux on System z
- § Customer examples



Operating Systems on IBM System z

- § 33% of worldwide traditional mainframe operating system installs are z/VSE or VSE/ESA
- § VSE* population is
 - 40% in US,
 - 40% in Europe,
 - 20% in rest of world
- § Worldwide
 - 50% run VSE under VM,
 - in Europe 90+% are VSE under VM
- § IFLs play an important role in VSE's strategy
- § zIIP/zAAP have no meaning to VSE



(*) The term "VSE" stands for both, VSE/ESA and z/VSE.

z/VSE “PIE” Strategy

§**Protect** existing customer investments in VSE programs, data, equipment, and IT skills, plus business processes, end user training, etc.

f Core CICS TS VSE apps & data

§**Integrate** VSE with the rest of IT

f Interoperability based on standards

f IBM middleware

f VSE e-business connectors

§**Extend** with Linux on System z

f Build modern integrated solutions

f Consolidate existing distributed servers

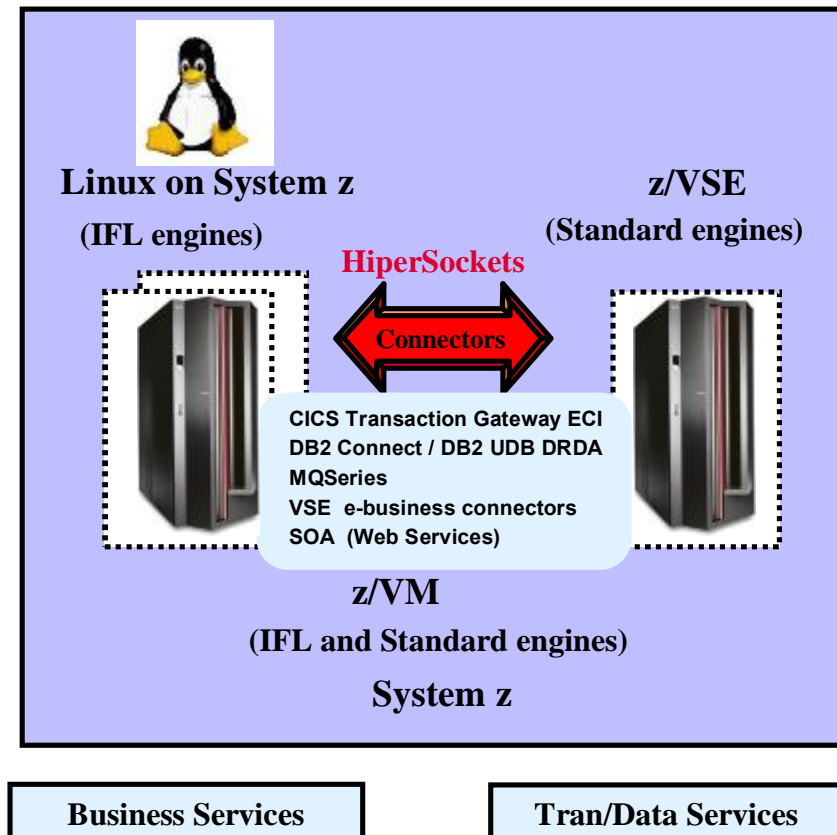
f Add new e-business workloads

Leverage z/VSE

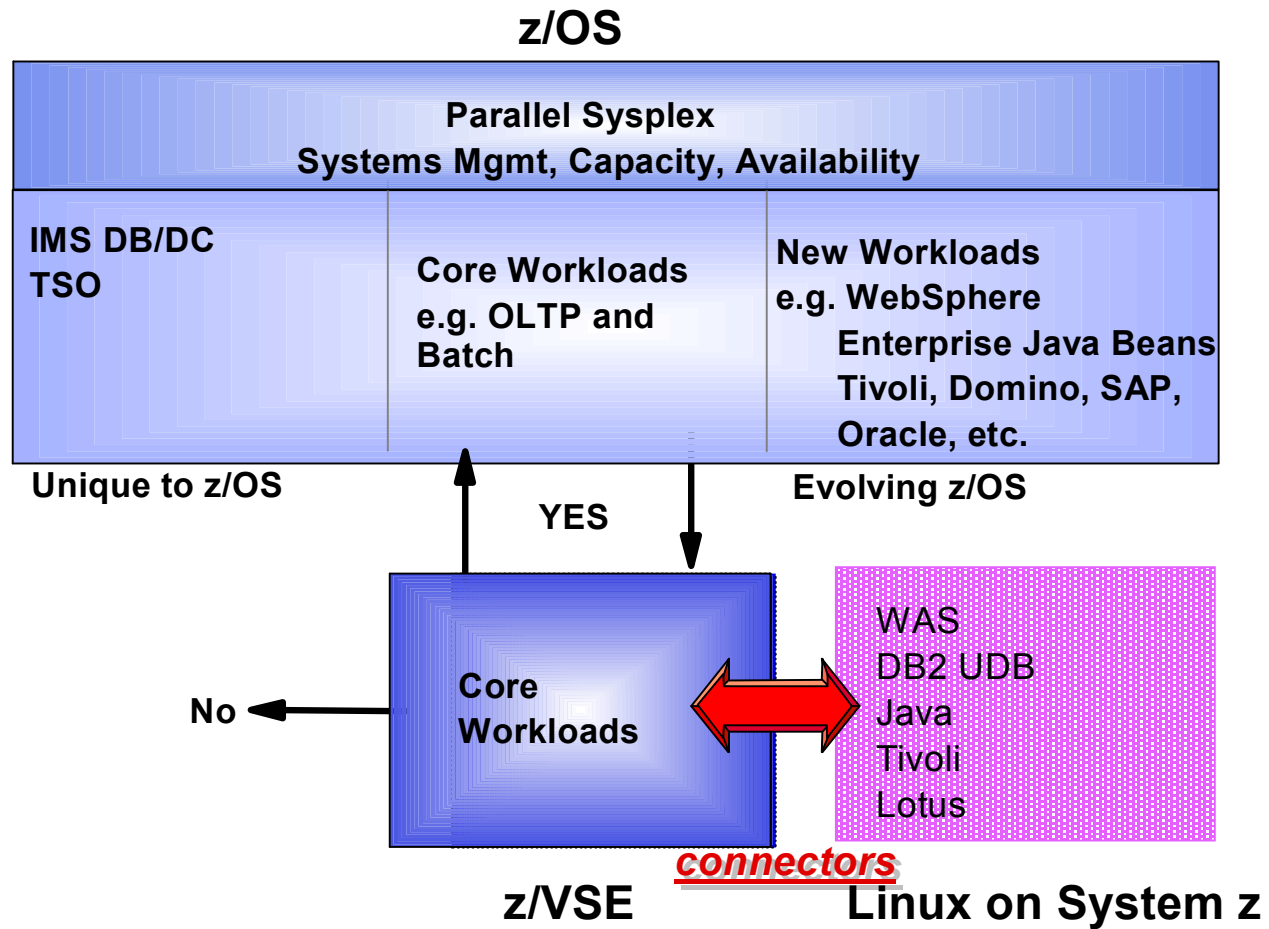
- without being limited by it



Think *inside the box* – with Linux on System z

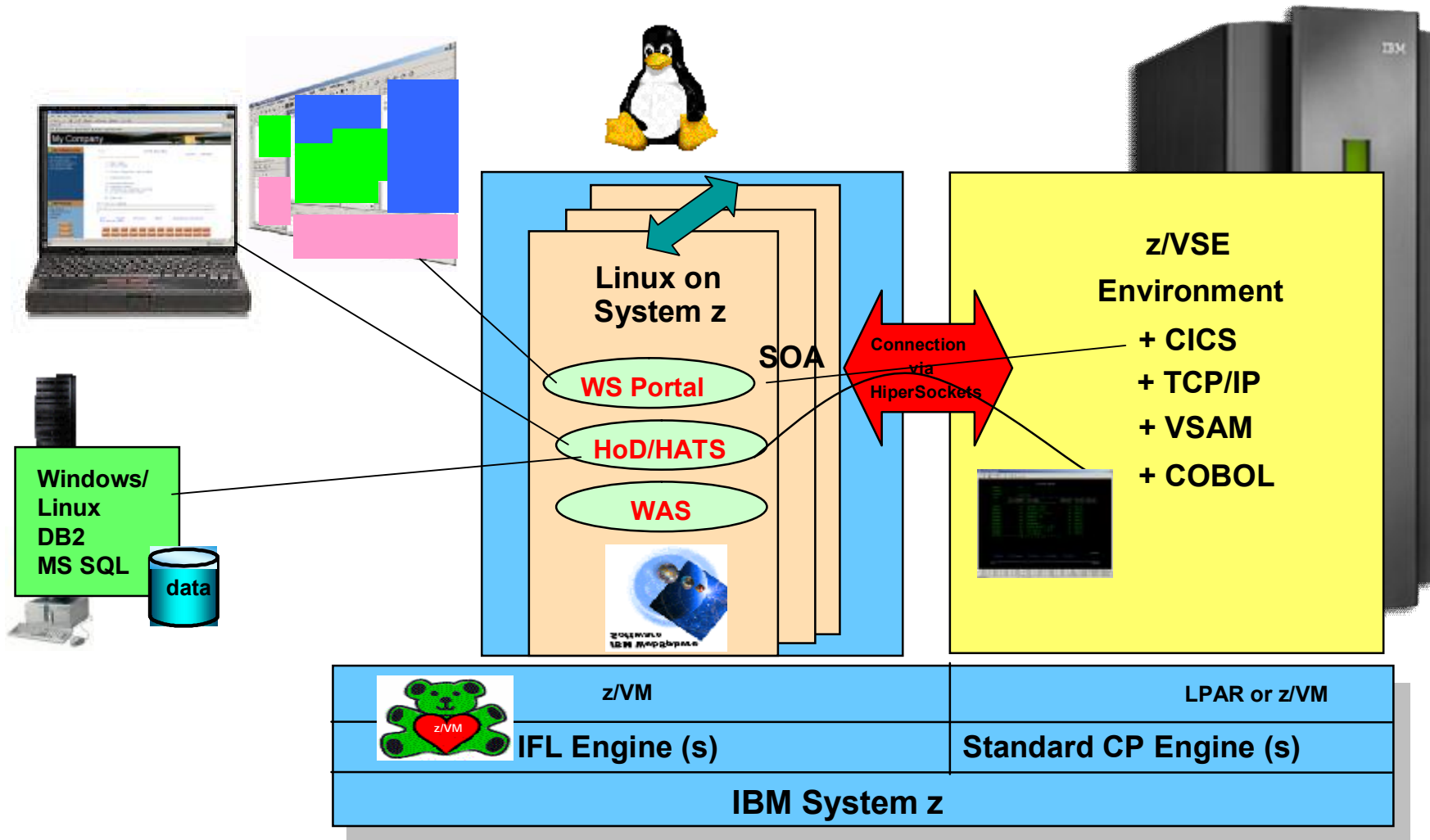


z/VSE and z/OS Affinity



Linux on System z as Central Access Hub

Web enable, improve interface, simplify, extend existing applications



Agenda

- § z/VSE strategy
- § z/VSE evolution & z/VSE Version 4 enhancements
- § Midrange Workload License Charge
- § Linux on System z
- § Customer examples



z/VSE Evolution



VSE/ESA V2.4 June 25, 1999

- CICS Transaction Server for VSE/ESA
- e-business

VSE/ESA V2.5 Sept 29, 2000

- interoperability
- e-business connectors

VSE/ESA V2.6 Dec 14, 2001

- last release to support pre-G5 servers

VSE/ESA V2.7 March 14, 2003

- enhanced interoperability
- ALS2 servers only

z/VSE V3.1* March 4, 2005

- selected zSeries features, FCP/SCSI
- 31-bit mode only

z/VSE V4.1 March 16, 2007

- z/Architecture only / 64-bit real addr
- MWLC full & sub-cap pricing

z/VSE V4.2 Oct 17, 2008

- More tasks, PAV, LDAP Client, SVC
- SoD** for CICS/VSE, EGL, WMQ

z/VSE V4.2.1 July 17, 2009

- Delivering on SoD
- Additional enhancements



* 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.

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

z/VSE Support Status

<i>z/VSE Version.Release</i>	<i>Marketed</i>	<i>Supported</i>	<i>End of Support</i>
z/VSE V4.2	Yes	Yes	tbd
z/VSE V4.1	No	Yes	04/30/2010
z/VSE V3.1	No	No	07/31/2009
VSE/ESA V2.7	No	No	02/28/2007

z/VSE and related Product Milestones in 2008/09



- § 01/18/2008 - z/VSE V3.1.3 available
- § **02/26/2008 - IBM System z10 Enterprise Class**
- § **05/31/2008 - End-of-Marketing for z/VSE V3.1 effective**
- § **06/13/2008 - z/VSE V4.1.2 available**
- § 06/24/2008 - HLASM for z/OS, z/VM, and z/VSE V1.6 announced
- § 08/05/2008 - z/VSE V4.2 announced
- § 08/05/2008 - z/VM V5.4 announced
- § 09/12/2008 – z/VM V5.4 available
- § **10/17/2008 - z/VSE V4.2 available**
- § **10/21/2008 – IBM System z10 Business Class**
- § 04/28/2009 - z/VSE V4.2.1 announced
- § **07/17/2009 – z/VSE V4.2.1 available**
- § 07/07/2009 – z/VM V6.1 Preview announcement
- § **07/31/2009 - End-of-Service for z/VSE V3.1 effective**



z/VSE V4.2 and z/VSE V4.2.1 Contents...



§ Servers

- IBM System z10 Enterprise Class (z10 EC) and z10 Business Class (z10 BC)
- 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 Space Efficient 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
- Basic Security Manager (BSM) improvements
- Encryption Facility for z/VSE V1.2 as an optional priced feature supporting OpenPGP format

... z/VSE V4.2 and z/VSE V4.2.1 Contents



§ Enhanced storage options

- IBM System Storage SAN Volume Controller (SVC) access to FCP-attached SCSI disks
- IBM System Storage TS3400 Tape Library
- IBM System Storage TS1130 Tape Drive
- DS8000 Full Disc Encryption
- IBM Virtualization Engine TS7700 Release 1.5
including support for IBM System Storage TS7720 Virtual Tape System

§ Interoperability

- IBM Rational COBOL Runtime for z/VSE V7.5
- IBM WebSphere MQ for z/VSE V3.0

§ Pricing

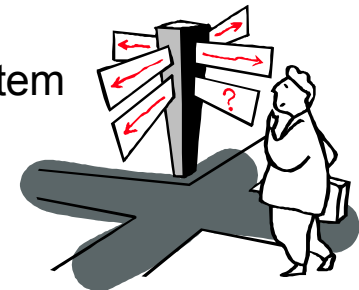
- MWLC (full capacity or sub capacity options) eligible on z10 EC, z10 BC, z9 EC, and z9 BC
- ‘Traditional’ price metrics for other servers

§ 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



z/VSE V4.2 Statement of Direction (SoD)*



§ Delivering on the SoD:

- New Enterprise Generation Language (EGL) extension to Rational Business Developer
- New version of WebSphere MQ for z/VSE



§ Reemphasizing the SoD:

- z/VSE V4.2 will be the last release to offer CICS/VSE V2.3
 - CICS/VSE V2.3 and DL/I V1.10 will not be included in any future version or release of z/VSE

§ For planning purposes:

- Expect any future version or release of z/VSE not sooner than second half of 2010

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

z/VSE V4.2 Additional Enhancements

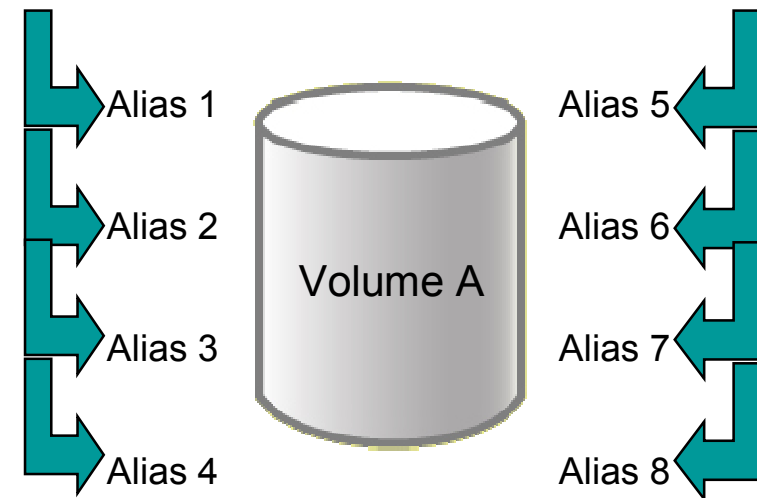
Available since July 17, 2009



- § Parallel Access Volume (PAV) feature of IBM System Storage series DS8000 and DS6000
 - *I/O performance improvements*
- § IBM DS8000 Full Disk Encryption
 - *Highest security for business-critical data*
- § IBM Virtualization Engine TS7700 Release 1.5 including support for the TS7720 virtual tape system
 - *Support includes disk-only virtual tape systems with up to 70 TB of disk cache*
- § Encryption Facility for z/VSE V1.2 supporting the OpenPGP format
 - *Flexible and highly secure data exchange with business partners and peers*
- § IBM Rational COBOL Runtime for z/VSE V7.5
 - *Execute modern Enterprise Generation Language (EGL) developed with Rational Business Developer*
- § IBM WebSphere MQ for z/VSE V3.0
 - *Improved interoperability on distributed and mainframe platforms*

z/VSE V4.2 Enhancement: Parallel Access Volume (PAV)

- § Allows a z/VSE V4.2 host to access a single ECKD disk volume with multiple concurrent requests
 - multiple addresses (alias) to a single logical device
 - enables more than one I/O operation to a single logical device
 - may reduce device queue delays
 - volume sharing – not file sharing
- § PAV is an optional, licensed feature of IBM DS8000 and DS6000
 - no changes needed for application programs
- § Examples of PAV candidates
 - VSAM catalogs, shared clusters, libraries
 - spool files, work files, log files
- § Potential benefits include possibility of improved performance/throughput
 - multiple jobs, multiple partitions, CICS
 - gains are *highly dependent on workload*



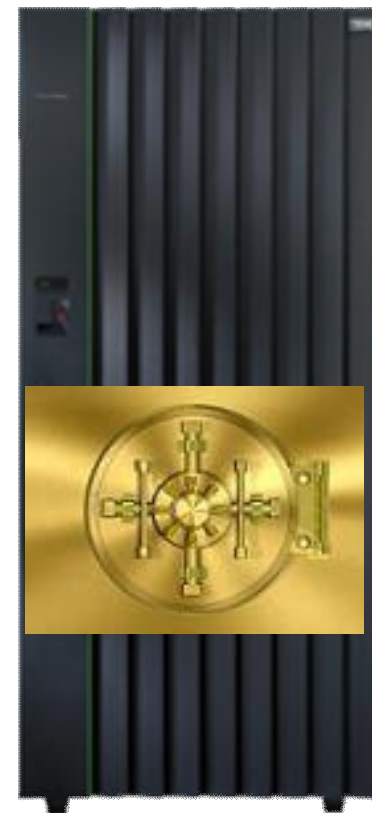
Full Disk Encryption on DS8000

§ Encrypted data on DS8000 series storage controller

- Capability to install encrypted 146 GB, 300 GB, and 450 GB 15,000 rpm Fibre Channel drives
- Full Disk Encryption drive sets are optional to DS8000 series
- Available only as plant order
- Transparent to applications
- Can be used by z/VSE V3.1 or later

§ Helps to mitigate the threat of -

- theft,
- mis-management, or
- loss of critical data



IBM System Storage TS7700 Virtualization Engine Release 1.5

- § TS7720 is a new member of IBM's family of virtualization products
 - Virtual tape system designed for use in a mainframe environment
 - Tape Volume Cache capacity up to 70 TB but without a physical tape library for back-end processing

- § TS1130 Model E06 and Model EU6 Tape Drive support



The TS7700 Virtualization Engine tape solution is well suited for -

- Disaster recovery
- Data consolidation
- Data protection
- Data sharing



Encryption Facility for z/VSE V1.2 (EF)

§ OpenPGP

- Complies with selected OpenPGP standard (RFC 4880) requirements
- Encryption of SAM files, VSE/VSAM files, VSE library members, tapes, or virtual tapes

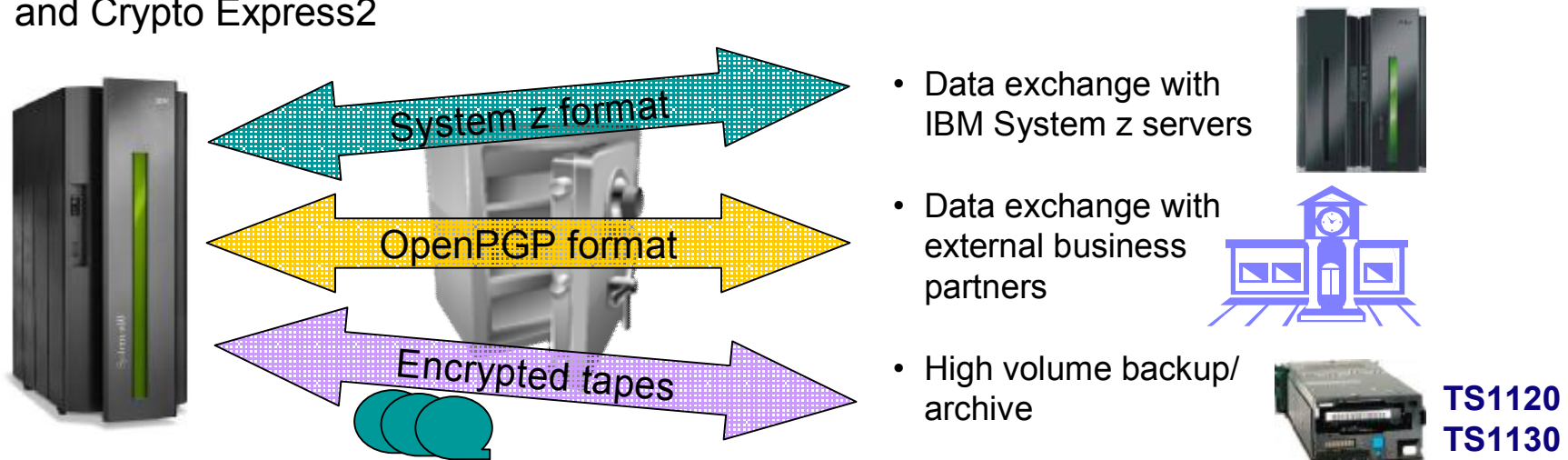
§ Choice of two formats:

- System z format (introduced with EF for z/VSE V1.1) - compatible with EF for z/OS
- OpenPGP - compatible with other products that are OpenPGP-compliant

§ EF is an optional priced feature for VSE Central Functions V8

- Requires z/VSE V4.1 or later
- MWLC-eligible

§ Exploits hardware encryption technology: CPACF (CP Assist for Cryptographic Function) and Crypto Express2

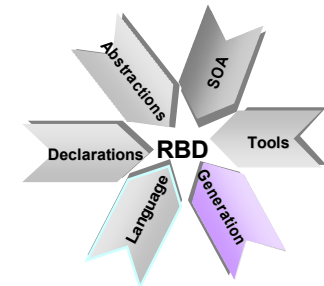


Modern Development Environment with RDB

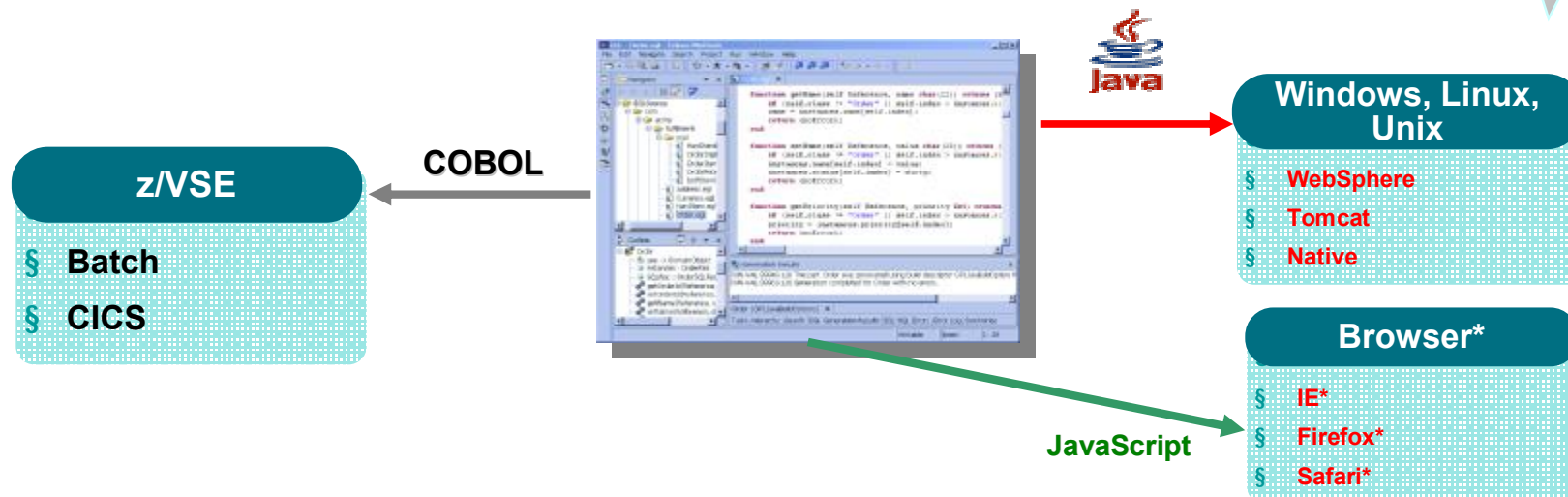


Continued 4GL support for z/VSE is available:

- § z/VSE host component: IBM Rational COBOL Runtime for z/VSE V7.5
 - Replaces the VisualAge Generator Server for VSE
- § PC tool for development: IBM Rational Business Developer (RBD) V7.5.1 and the associated components
 - IBM Rational Business Developer Extension for z/VSE V7.5.1
 - COBOL Code generation for z/VSE
 - Generation for System z (z/OS, Linux on System z)



EGL program/library/service



IBM WebSphere MQ for z/VSE V3.0



- § Enhanced manageability, currency, and performance
- § Improved interoperability on both distributed and mainframe platforms
 - API crossing exits – supports a chain of up to 8 API exits
 - Chained message exit – supports a chain of up to 8 send, receive, and message exits
 - WebSphere MQ Explorer interface enhanced to support remote administration
 - Channel batch interval – performance in batch processing
 - Miscellaneous performance enhancements: MQI operation, reduced logic paths and use of resources for improved message throughput
 - Server and requester channels – allows accumulation of messages until needed by queue manager

IBM WebSphere MQ for

- Reliable application connectivity
- SOA connectivity with a proven messaging backbone
- Universal, multipurpose data transport



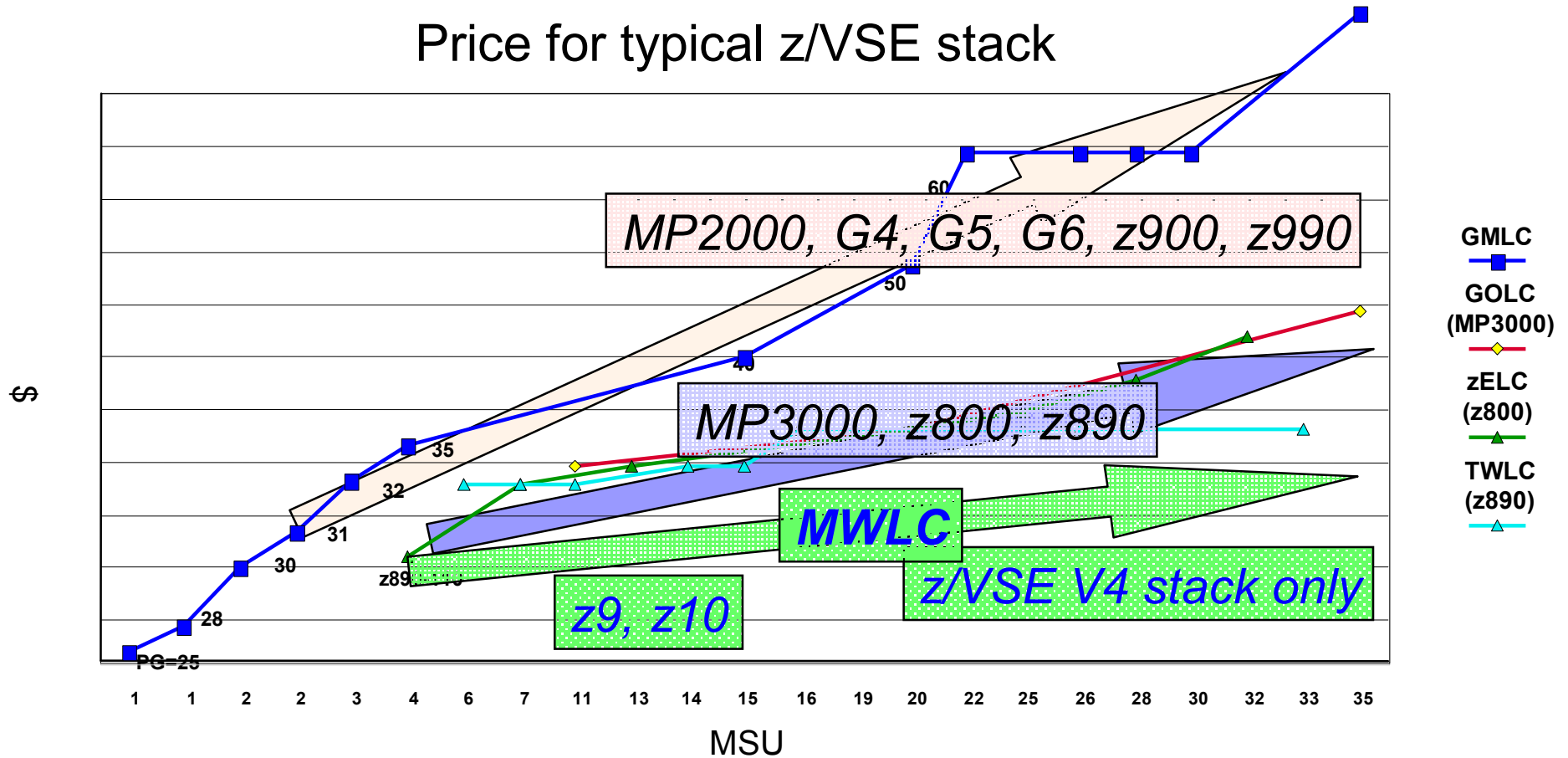
Agenda

- § z/VSE strategy
- § z/VSE evolution & z/VSE Version 4 enhancements
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MWLC – Midrange Workload License Charge

Price for typical z/VSE stack

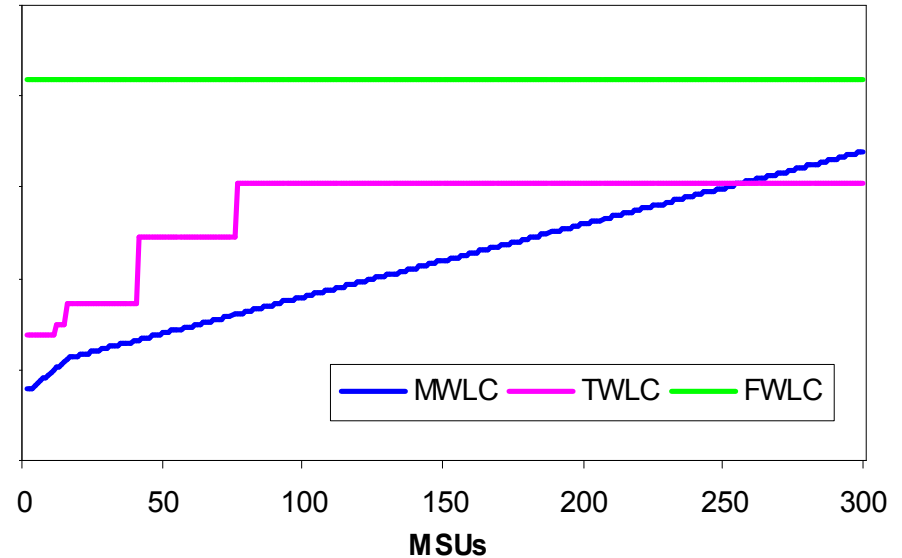


§ ***"I just got our April software bill from IBM for the first month on our z9 under z/VSE 4.1 and MWLC. We were paying \$22,965 per month on our z800 under z/VSE 3.1.2. The April bill is for the same software and it is \$12,318: a difference of \$10,647 per month."*** Mike Moore, IT Manager, Alabama Judicial Datacenter, Alabama

Improved TCO through new Pricing Metric and Sub-capacity Pricing

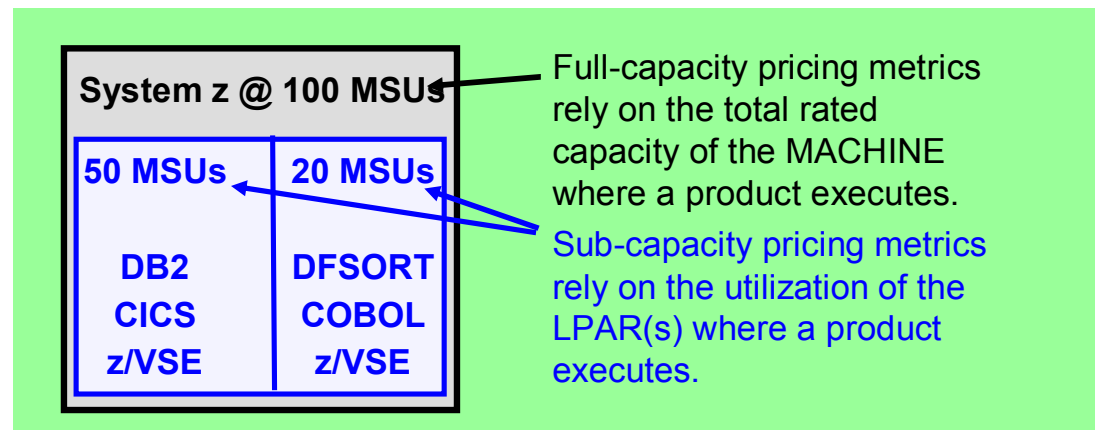
§ z/VSE price/performance through new pricing metric

- Midrange Workload License Charge (MWLC)
- MWLC requires current HW (z9* or z10*) and z/VSE V4



§ Additional price/performance through sub-capacity option

- Some hardware footprint **consolidations** more attractive now
- Presence of z/VSE V3 or VSE/ESA™ forces full-capacity pricing



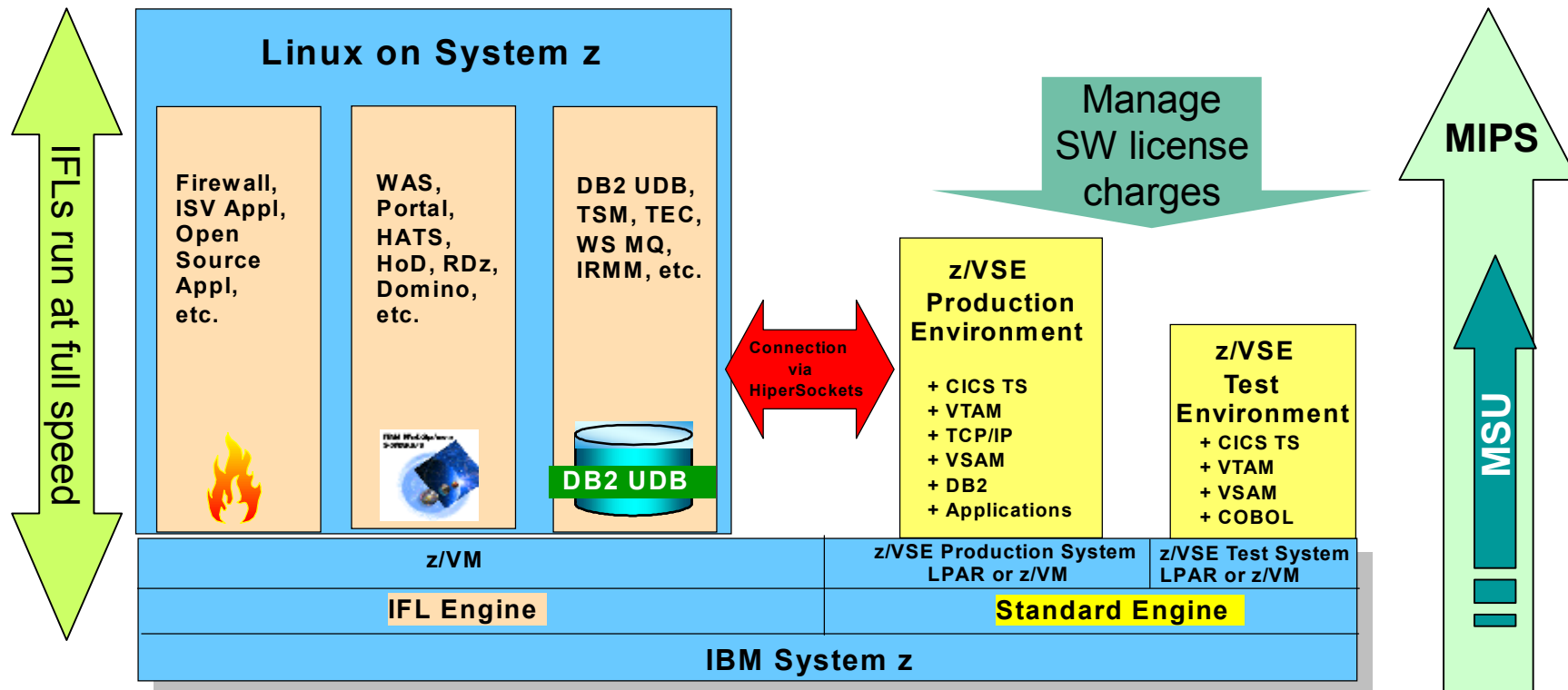
* z9 BC A01 and z10 BC A01 are priced zELC, not MWLC.

MWLC allows to “manage” MSU consumption and software cost

§ Midrange Workload License Charge for z/VSE

§ Sub-capacity pricing option (for z/VSE environment)

- Sub-capacity pricing metrics rely on the utilization (based on peak 4-hour rolling average each month) of the LPAR(s) or guest Virtual Machines where a product executes.
- Reporting requirements (Sub-capacity Reporting Tool)



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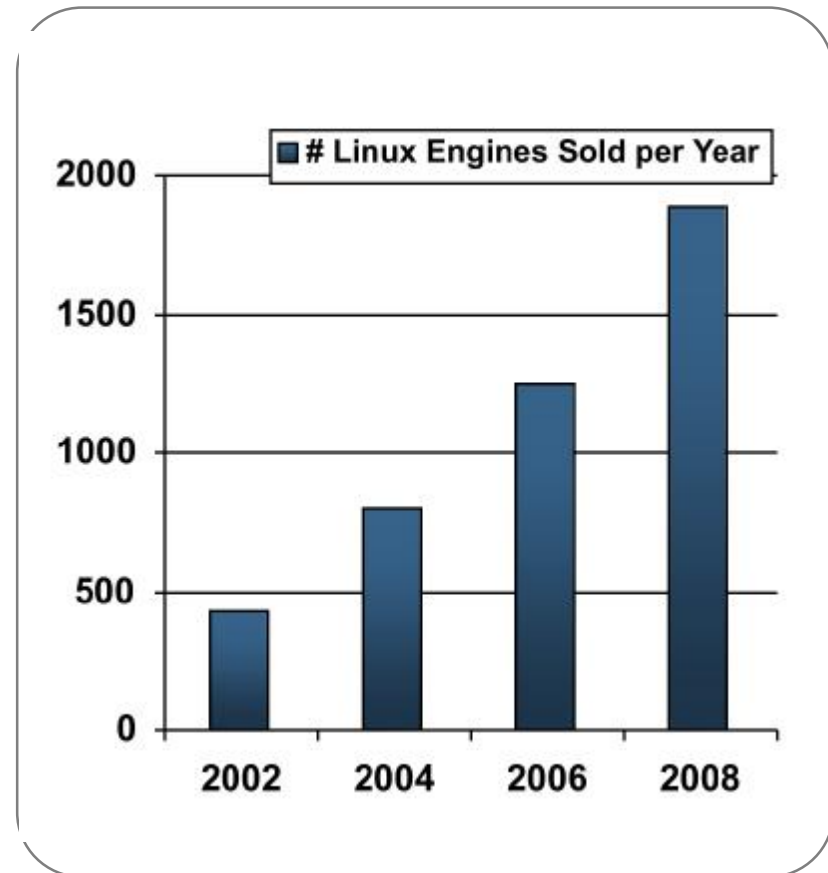


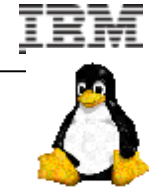
System z Linux: The fastest growing server platform.

2008 New Linux Capacity on System z = ~40-60,000 x/86 cores!

2008:

- § **77% increase in System z Linux MIPS**
- § **22 of 54 new System z clients installed Linux on System z**
- § **Approximately 1,300 System z customers are now using Linux on System z**
- § **Linux is ~15% of the customer System z install base (MIPS)**





Linux on System z Distributions – Kernel 2.6 based

	Latest service level	Based on kernel	GCC version	Available since	System z supported
SLES 9	SP4	2.6.5	3.3.3	12/2007	Yes
SLES 10	SP2	2.6.16	4.1.0	05/2008	Yes
SLES 11	-	2.6.27	4.3.3	03/2009	z9 and z10 only !
RHEL 4	Update 7	2.6.9	3.4.3	07/2008	Yes
RHEL 5	Update 3	2.6.18	4.1.0	01/2009	Yes





Open Source Code Drop for Linux on System z

4Q08 Code drop content (Nov 25, 2008)

- § Tool chain support for z9 + z10 instructions with GCC + binutils
- § Automatic CPU detection
- § Support for HiperSockets mult-iwrite SBALs on output queues
- § Tool chain support for decimal floating point (DFP) with GCC, binutils + GDB
- § Server time protocol (STP) support for clock synchronization
- § HiperSockets IPv6 support for Layer 3
- § Enable to attach and use standby memory that is configured for a logical partition or z/VM guest
- § Dynamic memory attach/detach
- Exploitation of z/VM 5.4 features:**
- § Expanded shared memory addressability:
Linux on System z can now use discontinuous Saved Segments (DCSS) above 2047 MB (2 GB) of virtual storage
- § Capability to dump Linux guests to SCSI disks
- Other enhancements:**
- § Processor-type safety-check, preventing a kernel to run a processor if it was compiled to exploit instructions of a newer machine
- § New IPL tools
- § zipl can dump on multiple ECKD DASD devices
- § Enhanced zfcpl trace facility
- § zfcpl performance data collection
- § zfcpl Host Bus Adapter application programming interface
- § glibc support for 31/64-bit compatible utmp (glibc-2.8-1 compat)



Note: This list shows the major items only. A complete list can be found at [developerWorks](#).

2Q09 Code drop content (May 08, 2009)

HW Exploitation:

- § Standby memory add via SCLP
- § Kernel vdso support

Tool chain:

- § z10 new instruction support
- § Provide hardware decimal floating point (DFP) accelerated libgcc

Virtualization:

- § Linux support for dynamic memory attach/detach
- § Extra kernel parameter via VMPARM
- § TTY terminal server over IUCV

Network:

- § HiperSockets enhanced SIGA
- § Secondary unicast addresses for qeth layer2 devices

Storage:

- § FCP performance data reports
- § FCP LUN discovery tool
- § DS8000 disk encryption
- § DS8000 support: large volume support
- § High Performance FICON

Security:

- § Enablement for next generation Crypto cards
- § Crypto Device Driver use of Thin Interrupts

RAS:

- § FCP SCSI error recovery hardening
- § Large image dump on DASD
- § Shutdown actions tool
- § Automatic IPL after dump

Linux on System z – XIV Support Statement

April 30, 2009

IBM is announcing qualification and general availability of support for Linux on System z (SLES 10) with the IBM XIV Storage System.

- § IBM eServer™ zSeries® 890, 990 (z890, z990), all IBM System z9® and all IBM System z10™ servers
- § IBM XIV Storage System (2810-A14)
- § Environment:
 - Native LPAR mode: Linux on System z SLES 10 SP2
 - Guest OS mode: Linux on System z SLES 10 SP2 z/VM® is supported as a Hypervisor only. VM System volumes must reside on non XIV storage. z/VM release 5.4 and 5.3 are supported.
- § SLES 10 2.6.16.60-0.34-default (or higher) is required




Linux on IBM System z – IBM XIV Storage System Support Statement

IBM now supports Linux® on IBM System z® (SLES 10 SP2) with the IBM XIV® Storage System!

Linux on System z combines the advantages of the IBM mainframes with the flexibility and open standards of the Linux operating systems. Linux can help simplify business integration through the use of open industry standards, and it can also support deployment of new solutions more quickly.

Now the benefits of Linux on System z can be combined with the phenomenal capabilities of XIV – Storage Reinvented to support today’s fast growing, dynamic environments. The IBM XIV Storage System is a revolutionary open disk system that represents the next generation of high-end disk storage, offering self-tuning and self-healing for consistently high performance and reliability as well as management simplicity and low total costs.

IBM is announcing qualification and general availability of support for Linux on System z (SLES 10) with the IBM XIV Storage System. This includes the integration into the IBM enterprise support mechanisms as well as all needed qualification items (hardware and software). Support qualification is as follows:

System z Host Type:	IBM eServer™ zSeries® 890, 990 (z890, z990), all IBM System z9® and all IBM System z10™ servers
Storage hardware:	IBM XIV Storage System (2810-A14)
Environment:	1. Native LPAR mode: Linux on System z SLES 10 SP2 2. Guest OS mode: Linux on System z SLES 10 SP2 z/VM® is supported as a Hypervisor only. VM System volumes must reside on non XIV storage. z/VM release 5.4 and 5.3 are supported.
Linux code level:	SLES 10 2.6.16.60-0.34-default (or higher) is required
XIV code releases:	IBM XIV Storage System Software release 10.0.1.b (or higher) is required
Known restrictions:	255 WWPNs in a zone with an XIV FC port 128 WWPNs per single Host connected to an XIV FC port
Date:	April 30, 2009
URL:	http://www-03.ibm.com/systems/support/storage/config/psic/displaysearch?wch=0&wss=7&tarl_ovrt=y09 Under Product Family, you would select IBM System Storage Enterprise Disk Under Product Model, you would select IBM XIV Storage System You would then see IBM System z and S/390 listed under Host Platform select that and you see SUSE SLES 10 under OS

IBM, IBM logo, IBM eServer, System z, System z9, System z10, XIV, zSeries, and zVM are trademarks of IBM Corporation in the United States, other countries or both. Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

IBM Linux on System z / XIV – Support Statement

Business Intelligence with System z

New announcements to deliver enhanced value



Designed to simplify the delivery of warehousing solutions on System z

IBM InfoSphere Warehouse on System z

Enables the business to make more informed, faster, and more aligned decisions

IBM Cognos 8 BI for Linux on System z v4



Deliver information to business users whenever and wherever they need it

IBM Cognos 8 Go! Mobile for Linux on System z

Delivers dynamic and customizable information with drag-and-drop

IBM Cognos 8 Go! Dashboard for Linux on System z

Announced 04/28/2009

Agenda

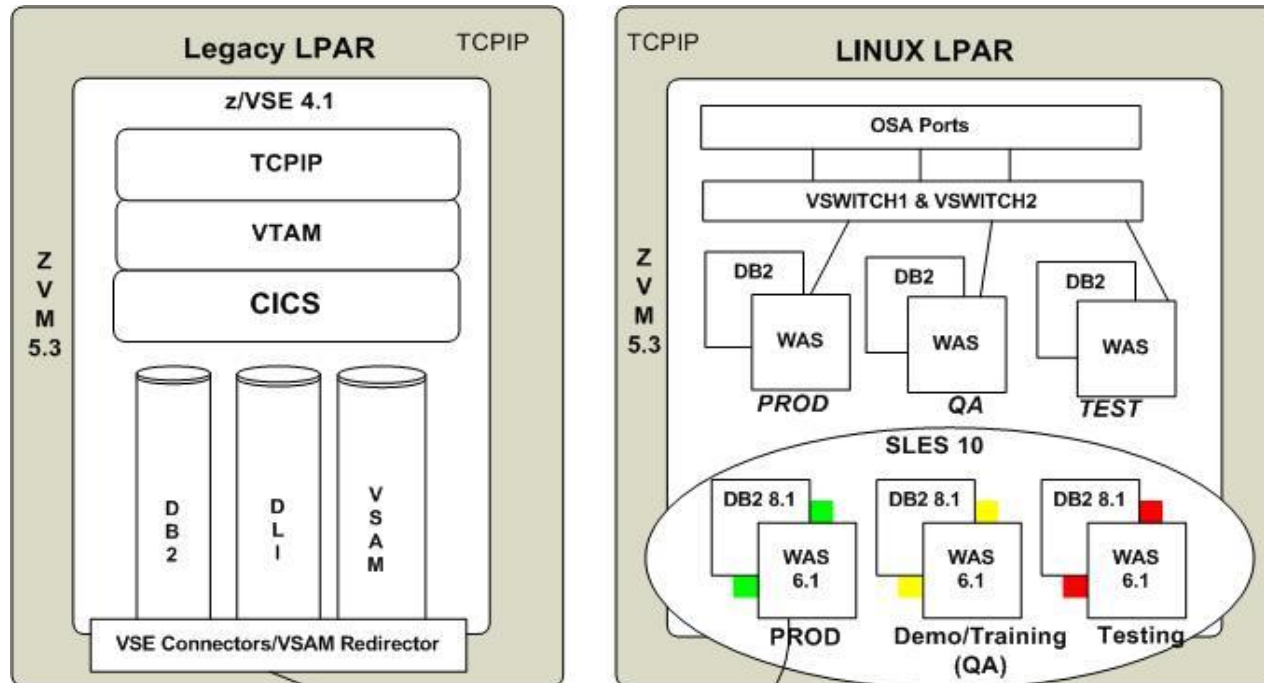
- § z/VSE strategy
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→ § Customer examples



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 applications



Systems for Car Parks and
Leisure Centres

Fare Collection Systems

Systems for Petrol Stations

Systems for Signal Technology

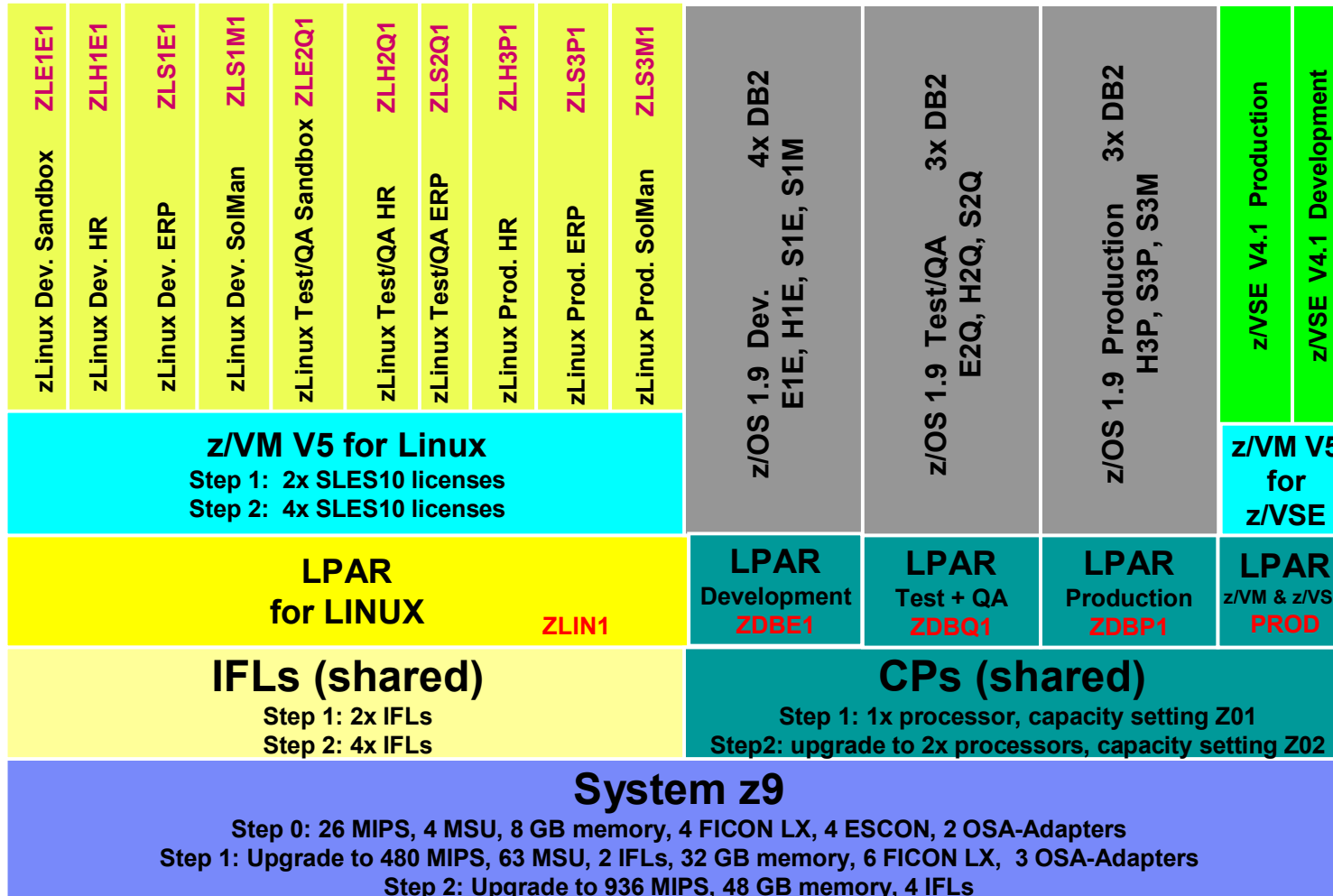
Systems for a mobile world

Scheidt & Bachmann

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



Scheidt & Bachmann: Introducing SAP on System z



Peter Hahn

IBM Systems enrich performance, availability and flexibility

Business challenge:

Peter Hahn, a European clothier, was growing rapidly and needed to improve data availability. With call centers operating 24/7, they could not accommodate any downtime. They also faced challenges with database performance and downtime required for backups.

Solution:

With the help of IBM and IBM Premier Business Partner COMPAREX, Peter Hahn upgraded their legacy IBM zSeries® mainframe to IBM System z9®. Peter Hahn then migrated their IBM DB2® database with IBM z/VSE™ applications to a Linux® environment. To enable automated backups, they installed IBM System Storage™ DS8100, connected to the company network by IBM System Storage SAN Volume Controller.

Benefits:

- § Improves availability and performance of the IT environment
- § Provides flexibility and capacity for the DB2 database
- § Reduces risk by enabling automated backups with zero downtime

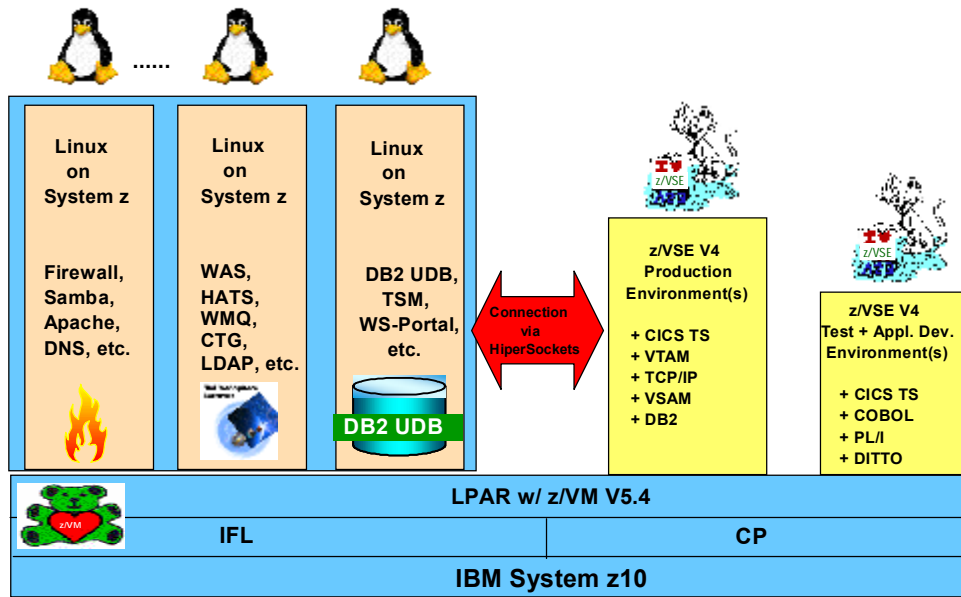
“The change was like switching to a Porsche without having to modify our applications for this purpose.”

*— Holger Schönenmann,
department manager
of the computer
center at Peter Hahn*

Solution components:

- § IBM System z9 with Integrated Facility for Linux
- § IBM System Storage DS8100
- § IBM SAN Volume Controller
- § IBM DB2

IBM System z10 can do IT all - Smart, Cool, Affordable



§ 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



For more Information go to ...

§ z/VSE

- Homepage:

www.ibm.com/servers/eserver/zseries/zvse/

- Solution components:

www.ibm.com/servers/eserver/zseries/zvse/solutions/

- Presentations:

www.ibm.com/servers/eserver/zseries/zvse/documentation/presentations.html

- Redbooks: www.ibm.com/servers/eserver/zseries/zvse/documentation/redbooks.html

- News & announcements: www.ibm.com/servers/eserver/zseries/zvse/news/index.html

- Downloads:

www.ibm.com/servers/eserver/zseries/zvse/downloads/

- Consulting and Q&A: zvse@de.ibm.com



