What's new with z/VM, z/VSE, and Linux on System z ?

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IBM / GSE Conference, Oct 2007, Boeblingen

IBM Systems

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Agenda

→ § **New Announcements**

§ **z/VSE**

§ **z/VM and Linux on System z**

§ **Middleware and Systems Management Solutions**

§ **IBM Academic Initiative for System z**

§ **Summary**

§ Appendix

- IBM System z9 Business Class
- IBM System Storage
- IBM Global Financing

Important Announcements -- You shouldn't have missed!

§ **April 2006**

  ► IBM System z9 Enterprise Class (EC) and Business Class (BC), GA May-26-2006

§ **June 2006**

  ► End-of-Service for all models of 2003, 3006, and 9672-G4, effective Dec-31-2007

§ **January 2007**

  ► **z/VSE V4.1**, GA March-16-2007

  ► z/VSE **MWLC** Software Pricing

  ► z/OS zNALC Software Pricing

§ **February 2007**

  ► **z/VM V5.3**, GA June-29-2007

  ► End-of-Service for VSE/ESA V2.7, effective Feb-28-2007

§ **April 2007**

  ► z9 BC and z9 EC enhancements

  ► Project '**Gameframe**': Mainframe plus Cell Broadband Engine

§ **June 2007**

  ► End-of-Marketing for all models of the z890, effective Dec-31-2007

  ► Withdrawal of all model and MES features within z890, effective June-30-2008

  ► End-of-Marketing for z/VSE V3.1, effective May-31-2008

Announcements

§ **July 2007**

- ► System Storage TS1120 Tape Controller supports TS3400 Tape Library attachment for System z

§ **August 2007**

- ► Project '**Big Green**'
- ► **IRMM Integrated Removable Media Manager**, GA Sep-14-2007
- ► End-of-Service for z/VSE V3.1, effective July-31-2009
- ► End-of-Service for z/VM V5.1, effective Sep-30-2007
- ► z/OS V1.9, GA Sep-28-2007
- ► z/OS.e V1.8 is the last release of z/OS.e (support is planned to end in Sep 2009)

§ **October 2007**

- ► **z/VSE V4.2 Preview**
- ► **SCRT V14.2**, GA Oct-10-2007
- ► **Encryption Facility for z/VSE V1.1**, GA Nov-30-2007
- ► **Statement-of-Direction for CICS/VSE**

§ **Coming soon**

- ► **DB2 for VSE and VM V7.next**

Agenda

§ **New Announcements**

→ § **z/VSE**

- **Sub-Capacity Tools**
- **z/VSE V4.2 Preview**
- **Encryption Facility for z/VSE V1.1**

§ **z/VM and Linux on System z**
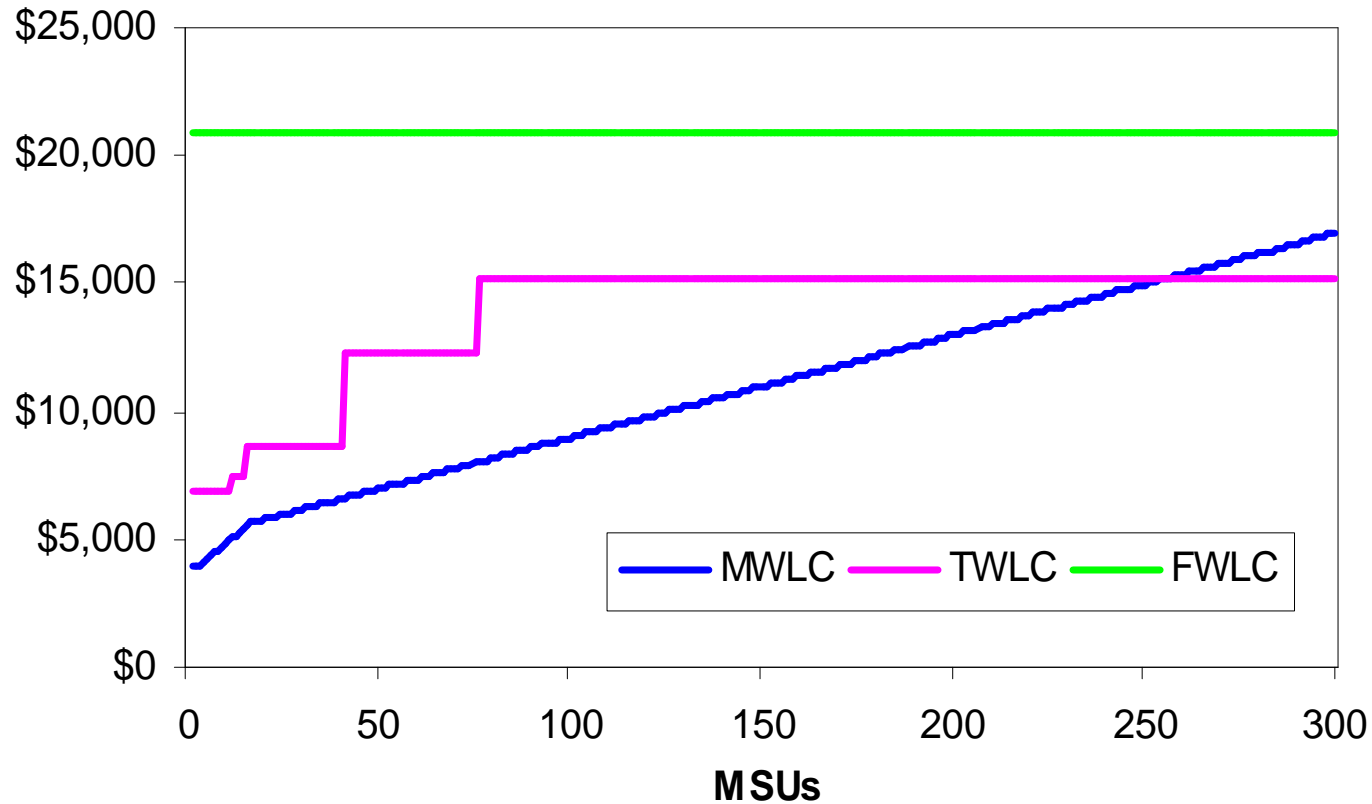
§ **Middleware and Systems Management Solutions**

§ **IBM Academic Initiative for System z**

§ **Summary**

§ **Appendix**

- **IBM System z9 Business Class**
- **IBM System Storage**
- **IBM Global Financing**

MWLC - Introduced with z/VSE V4.1 on System z9

- § Customers may choose between MWLC/TWLC or MWLC/FWLC as appropriate to their machine

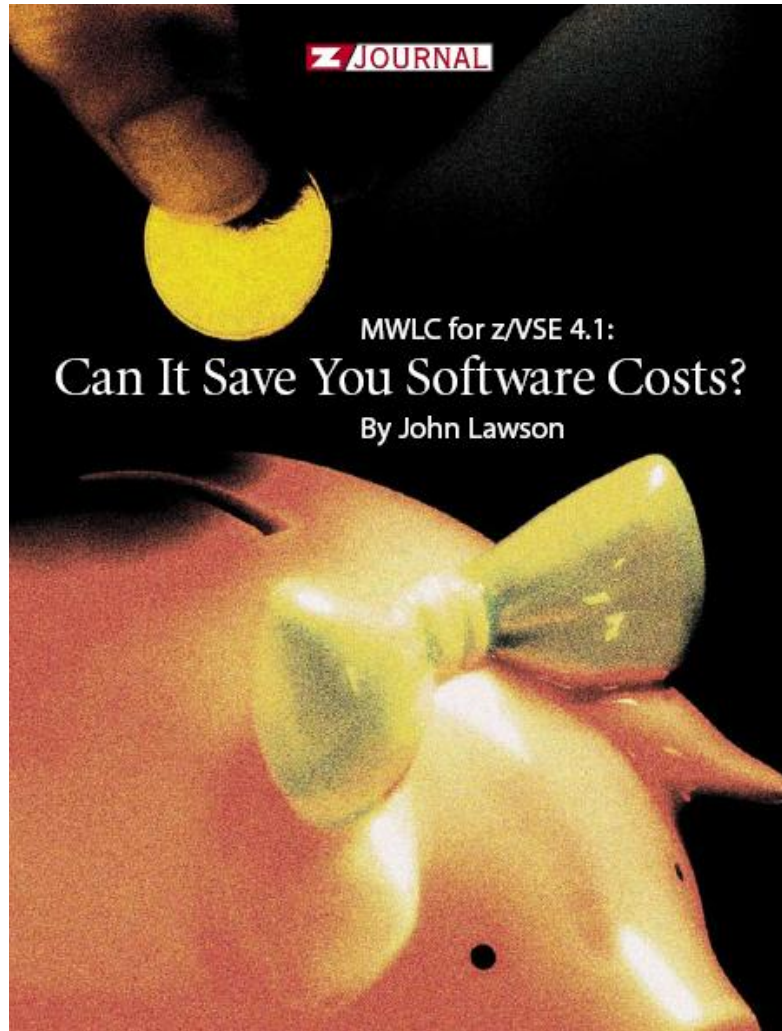- § Additional price/performance may be possible with sub-capacity mode

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§ *"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 Judical Datacenter, Alabama

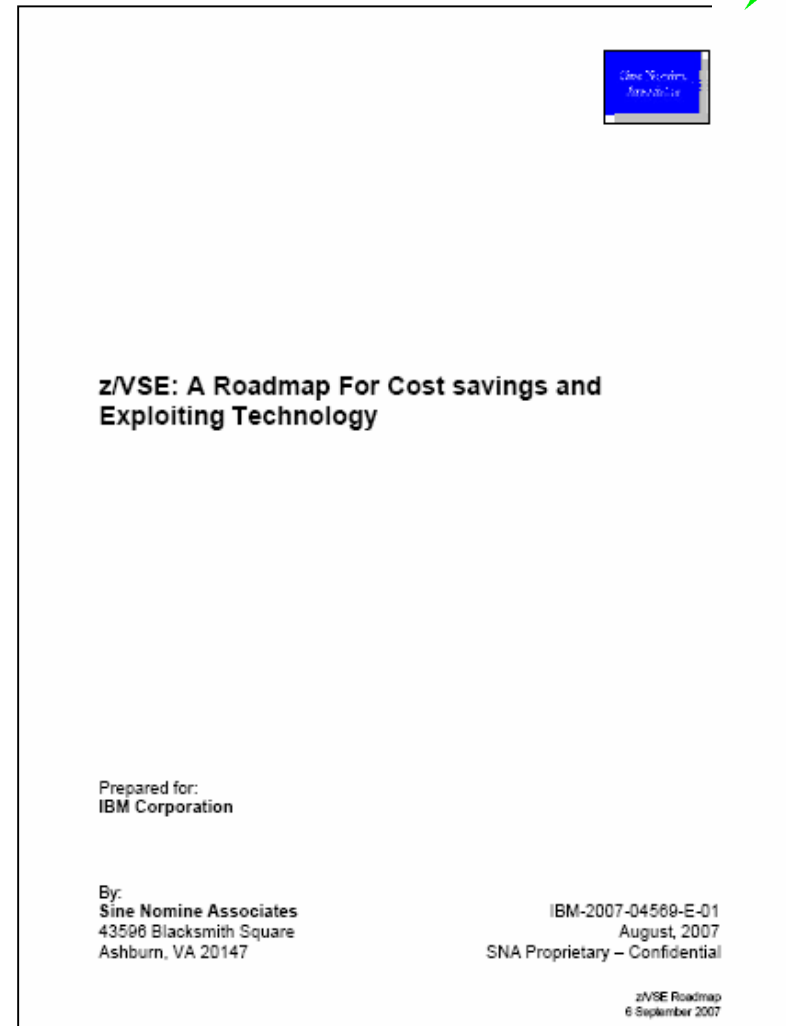*Sample software stack includes: VSE CF V8, HLASM, VTAM, DITTO, COBOL

*Prices subject to change without notice; all prices shown in USD

Press and Analyst Articles

z JOURNAL

MWLC for z/VSE 4.1:

Can It Save You Software Costs?

By John Lawson

z/VSE: A Roadmap For Cost savings and Exploiting Technology

Prepared for:
IBM Corporation

By:
Sine Nomine Associates
43596 Blacksmith Square
Ashburn, VA 20147

IBM-2007-04569-E-01
August, 2007
SNA Proprietary – Confidential

z/VSE Roadmap
6 September 2007

Source: z/Journal, April / May 2007

Source: Sine Nomine Associates, August 2007

IBM Systems

z/VSE Sub-Capacity Tools

§ **CMT: Capacity Measurement Tool**

► Announced and available with z/VSE V4.1 since March 16, 2007

► Can be activated on z9 BC and z9 EC models only

► Requires z/Architecture mode è z/VSE V4.1 only

► Collects data for LPARs and/or guest machines running under z/VM 5.2 (or later)

► Implemented as a new z/VSE V4.1 system task

► Output from CMT is input for SCRT
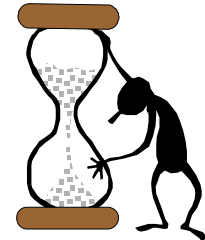
§ **SCRT: Sub-Capacity Reporting Tool**

► ~~Not announced and not available for z/VSE V4.1~~

► ~~Requires z/OS system to execute~~

► Analyzes SCRT89 records as produced by CMT on z/VSE V4.1

► ~~Customers must send SCRT89 records to IBM, and IBM runs SCRT on z/OS~~

► Output from SCRT is a report, similar to a spreadsheet report

► Customers must send that report to the IBM billing department via Web interface

§ **SCRT: Sub-Capacity Reporting Tool**

► Now announced for z/VSE V4.1

► Available as SCRT V14.2 since October 10, 2007

► Planned to be integrated into z/VSE V4.2 (when available)

z/VSE V4.1 Overview

z/VSE V4.2 Preview

§ Preview 4/27/2006, Announce 1/9/2007, **General Availability 3/16/2007**

§ **z/Architecture mode only**
  ► 64-bit *real* addressing (31-bit *virtual* addressing)
    • up to 8 GB real processor storage
  ► IBM System z9 EC and z9 BC servers
  ► IBM eServer zSeries 990, 890, 900, 800 servers

§ **Capacity Measurement Tool (CMT)**
  ► Fulfills SoD from July 2005

§ **New MWLC pricing metrics (System z9 only)**
  ► Attractive full-capacity MWLC price points
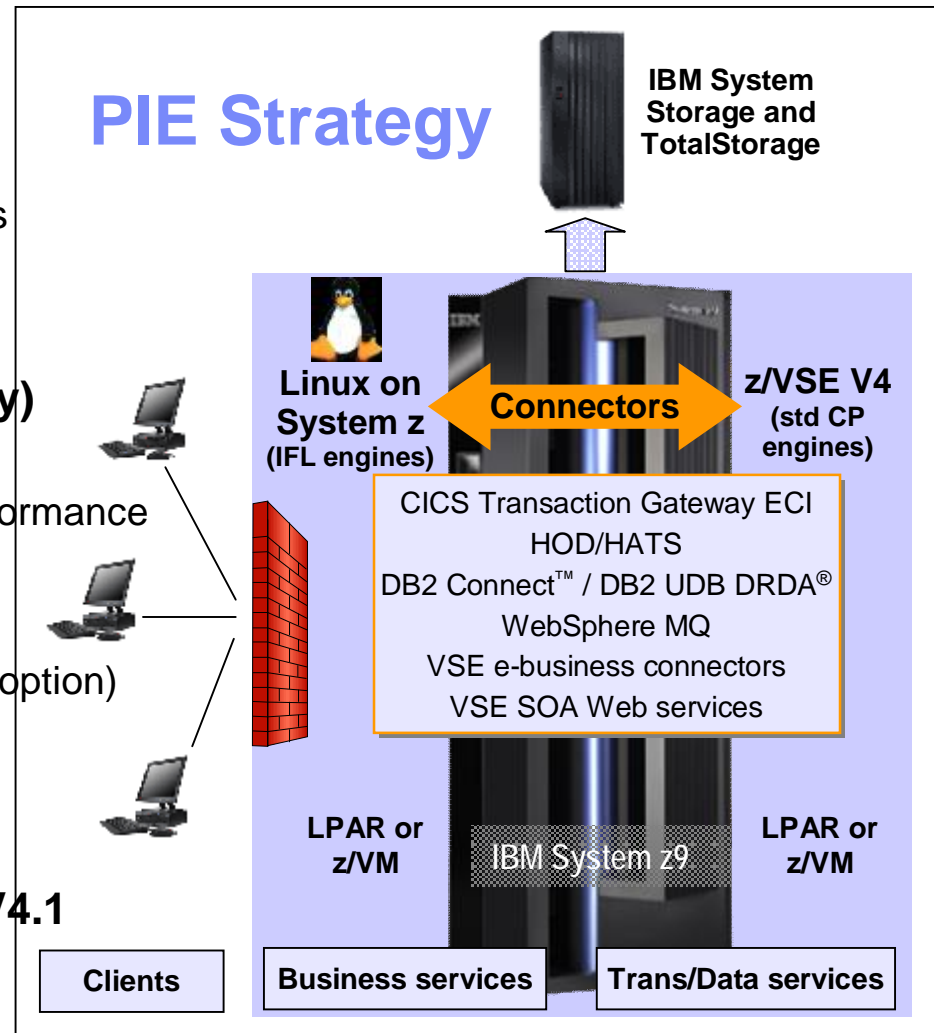 ► Sub-capacity MWLC option for added price/performance

§ **Encryption enhancements**
  ► CPACF enhancements (AES-128)
  ► Configurable Crypto Express2 (add accelerator option)
  ► TS1120 encrypting tape
  ► SecureFTP

§ **SOA and interoperability improvements**

§ **CICS TS & CICS/VSE supported w/ z/VSE V4.1**

§ **FSU from z/VSE V3.1 and VSE/ESA V2.7**

§ **Implemented 22 customer requirements**

PIE Strategy

IBM System Storage and TotalStorage

Linux on System z (IFL engines) ◄ **Connectors** ► z/VSE V4 (std CP engines)

CICS Transaction Gateway ECI
HOD/HATS
DB2 Connect™ / DB2 UDB DRDA®
WebSphere MQ
VSE e-business connectors
VSE SOA Web services

LPAR or z/VM — IBM System z9 — LPAR or z/VM

Clients | Business services | Trans/Data services

Windows

A fatal exception 0E has occurred at 0028:C00068F8 in VxD VMM(01) +
000059F8. The current application will be terminated.

* Press any key to terminate the application.
* Press CTRL+ALT+DEL to restart your computer. You will
  lose any unsaved information in all applications.

            Press any key to continue

z/VSE V4.2 – What's changed, what's new ?

NEW!

§ **Preview Oct 9, 2007;** planned availability 4Q2008

§ **z/Architecture mode <u>only</u>**
  - ► 64-bit *real* addressing (31-bit *virtual* addressing)
    - • up to 32 GB real processor storage
  - ► IBM System z9 EC and z9 BC servers
  - ► IBM eServer zSeries 990, 890, 900, 800 servers

§ **More than 255 VSE tasks**
  - ► Enable growth, ease migration to CICS TS

§ **Sub-Capacity Reporting Tool (SCRT)**
  - ► Available now with z/VSE 4.1 (and later)

§ **Encryption Facility for z/VSE V1.1**
  - ► Optional priced feature on z/VSE V4.1 (and later)
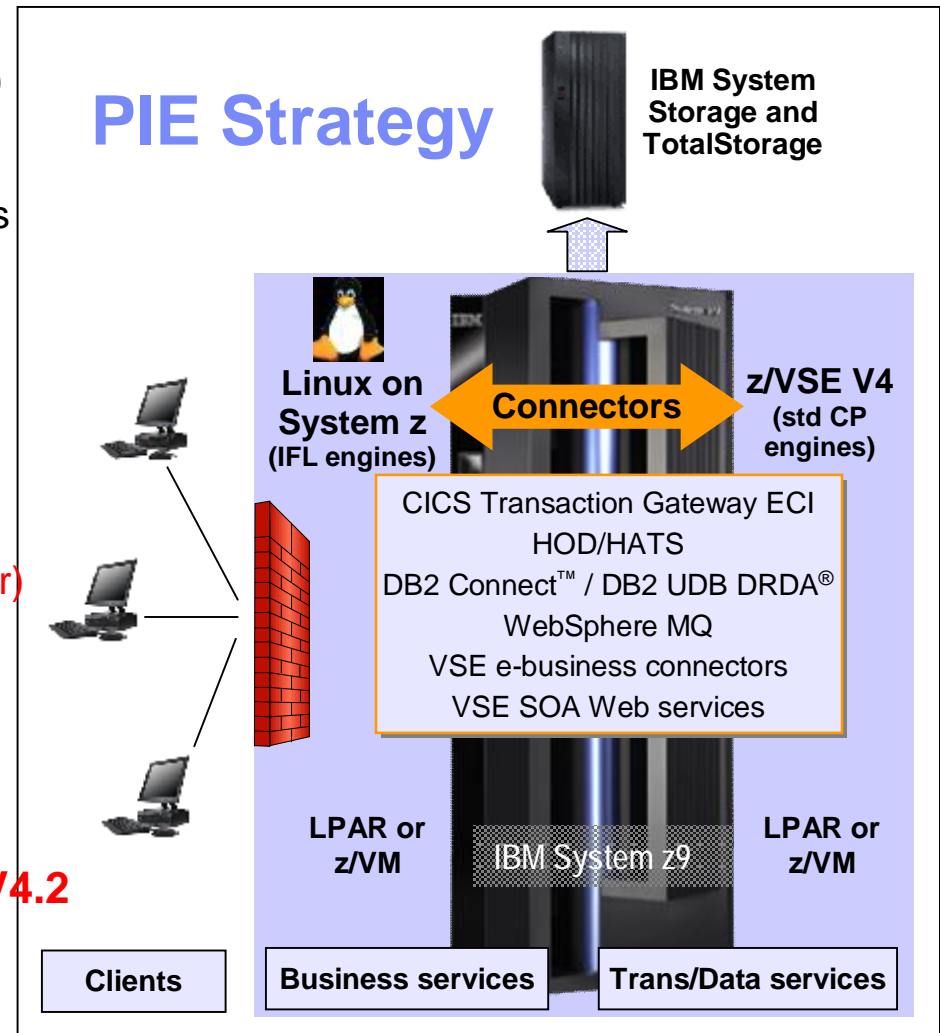 - ► MWLC enabled

§ **Added support for System Storage**
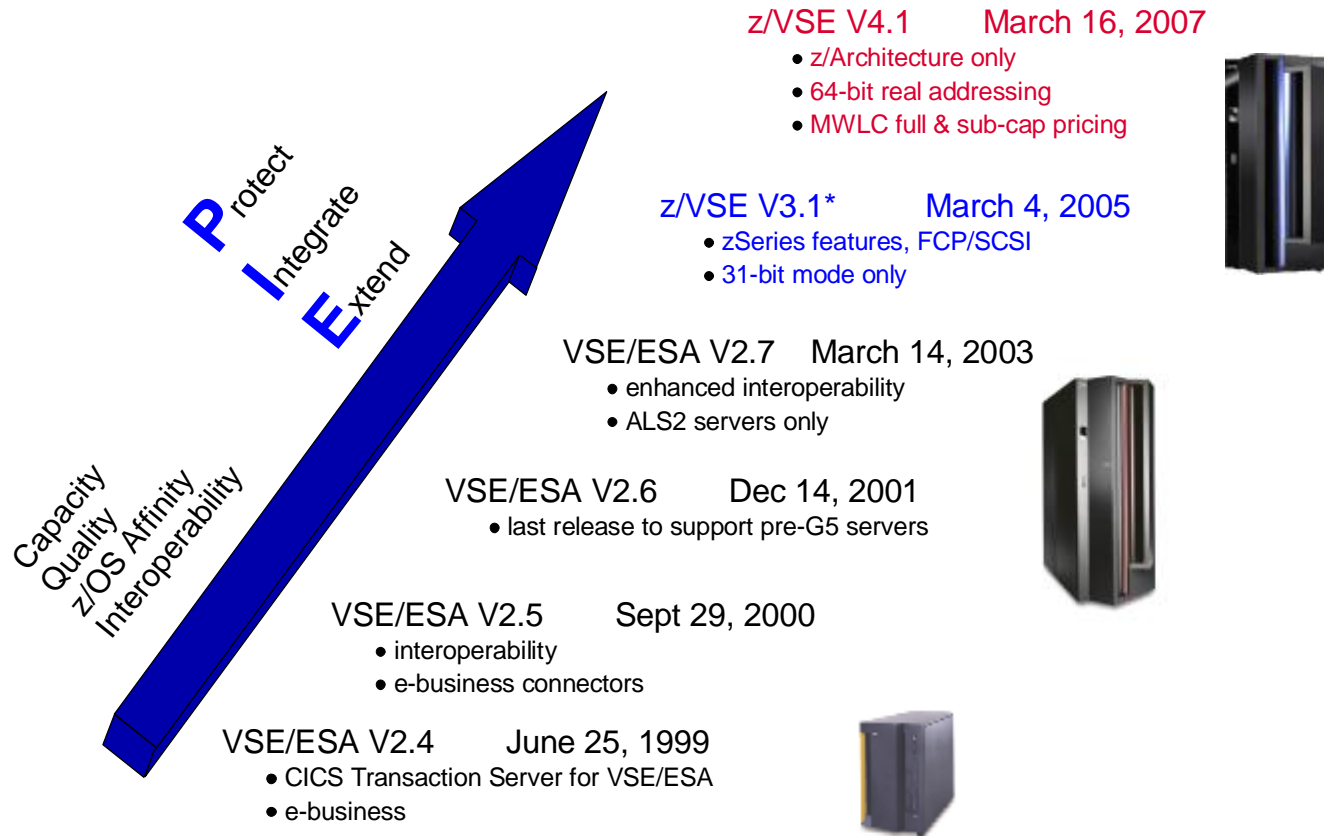 - ► TS3400 Tape Library
  - ► TS7740 Virtualization Engine

§ **CICS TS & CICS/VSE supported w/ z/VSE V4.2**
  - ► Statement of Direction (SoD) for CICS/VSE

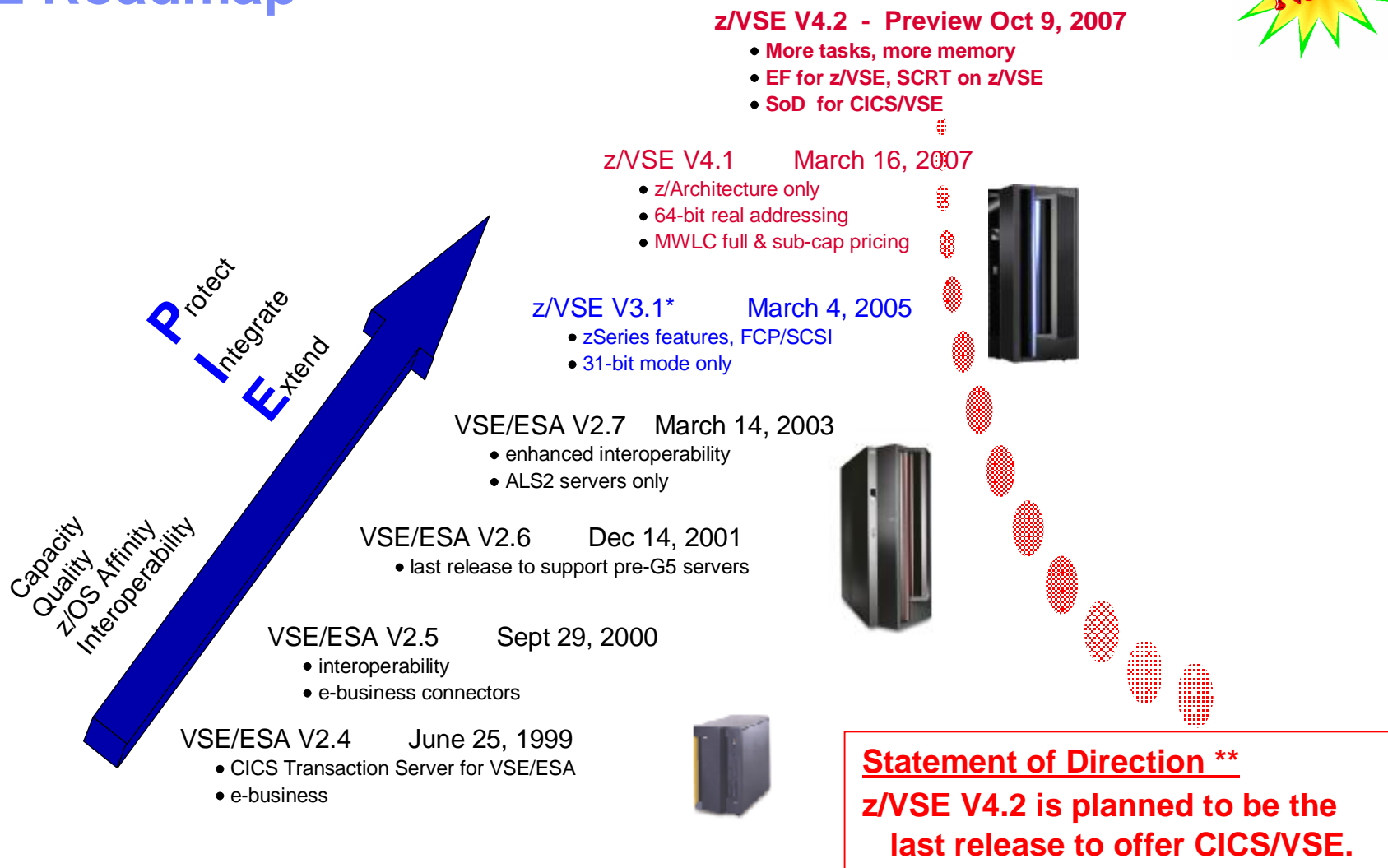§ **FSU from z/VSE V3.1 and z/VSE V4.1**

PIE Strategy

IBM System Storage and TotalStorage

Linux on System z (IFL engines) ⟷ **Connectors** ⟷ z/VSE V4 (std CP engines)

CICS Transaction Gateway ECI
HOD/HATS
DB2 Connect™ / DB2 UDB DRDA®
WebSphere MQ
VSE e-business connectors
VSE SOA Web services

LPAR or z/VM — IBM System z9 — LPAR or z/VM

Clients | Business services | Trans/Data services

z/VSE Roadmap

Protect
Integrate
Extend

Capacity
Quality
z/OS Affinity
Interoperability

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

z/VSE V3.1*   March 4, 2005
- 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.

z/VSE Roadmap

NEW!

z/VSE V4.2 - Preview Oct 9, 2007
- **More tasks, more memory**
- **EF for z/VSE, SCRT on z/VSE**
- **SoD for CICS/VSE**

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

z/VSE V3.1*   March 4, 2005
- zSeries features, FCP/SCSI
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- CICS Transaction Server for VSE/ESA
- e-business

Protect
Integrate
Extend

Capacity
Quality
z/OS Affinity
Interoperability

**Statement of Direction **
z/VSE V4.2 is planned to be the last release to offer CICS/VSE.

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

Encryption Facility for z/VSE V1.1

§ **Announce:**   **Oct-09-2007**

§ **GA:**   **Nov-30-2007**

§ **Optional priced feature for VSE Central Functions V8**

   ▶ requires z/VSE V4.1 or later

   ▶ MWLC-eligible

§ **Requires CP Assist for Cryptographic Function (CPACF)**

   ▶ no charge feature

   ▶ only on z990, z890, z9 EC, and z9 BC servers

§ **Extends affinity between z/VSE and z/OS**

   ▶ function roughly equivalent to EF for z/OS V1.1

   ▶ compatible with EF for z/OS V1.1 (Encryption Facility System z format)

      ● EF for z/VSE tapes can be read by EF for z/VSE, EF for z/OS, EF for z/OS Java Client, and Decryption Client for z/OS

      ● EF for z/OS V1.1 and EF for z/OS Java client tapes can be read by EF for z/VSE V1.1

§ **Complements z/VSE support for IBM TS1120 tape**

   ▶ TS1120 preferred solution for high volume backup/archive

   ▶ EF option for limited backup/archive and/or exchange with partners with no TS1120

IBM Systems

Agenda

§ **New Announcements**

§ **z/VSE**

→ § **z/VM and Linux on System z**

- **Consolidation Effect**
- **Project 'Gameframe'**
- **Project 'Big Green'**

§ **Middleware and Systems Management Solutions**

§ **IBM Academic Initiative for System z**

§ **Summary**

§ Appendix

- IBM System z9 Business Class
- IBM System Storage
- IBM Global Financing

Impact of Virtualization

% Growth x86 Shipments

4Q Rolling x86 Customer Spending ($M)
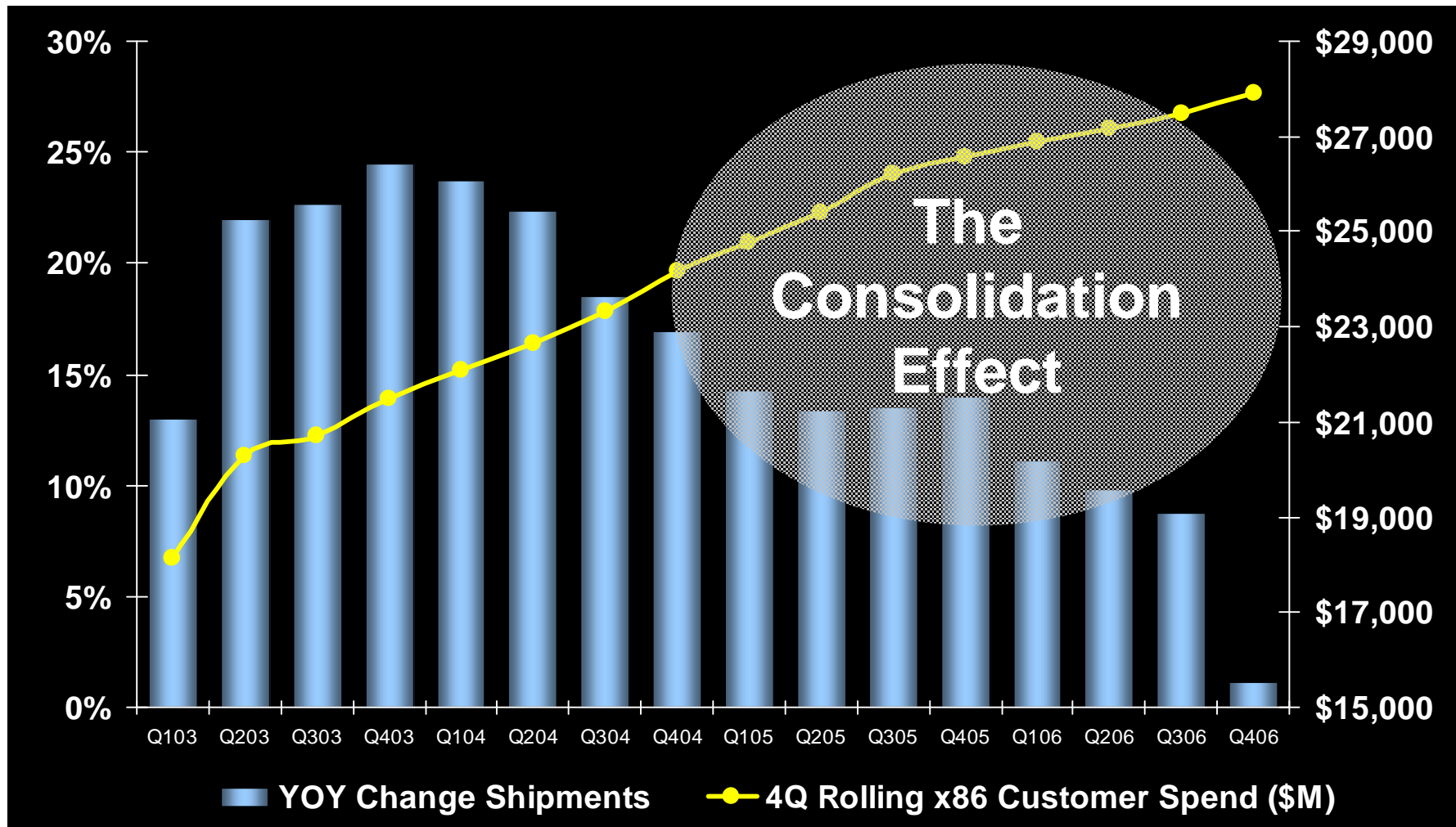
Source: IDC, "Virtualization and Multicore Innovations Disrupt the Worldwide Server Market," March 2007

System z – IBM's industry leading Virtualization Platform

Too many servers – drives too much complexity – requires too much power – generates too many software licenses – costs too much to manage and support

System z designed for large scale consolidation:

§ 100s of virtual servers in a single footprint

§ Hardware utilization rates of around 85%+, compared to around 15%-30% for distributed server

§ Servers can be provisioned in seconds rather than days

§ Processors, memory and channels shared across multiple virtual servers

§ Advanced workload management and automation

The power of many . . .

. . . the simplicity of ONE

Nationwide has undergone a significant consolidation project with an 80% reduction in floor space and power requirements, and expects savings of $16M over 3 years.

Consolidation and Virtualization Case Studies

Case Study: Nationwide Uses Linux and High-Power Virtualization for Web Presence

Gartner RAS Core Research Note G00145213, John R. Phelps, Mike Chuba, 29 June 2007

Nationwide Insurance significantly reduced expenditures by consolidating nonmainframe server workloads using Linux-only System z mainframes, while improving quality of service and providing for growth that has minimal impact on floor space, power and cooling. Its approach will interest any organization that houses a combination of Windows (where its applications have Linux equivalents), Linux, Unix and IBM mainframe operating environments and that is looking at new and innovative ways to consolidate its server environment.

Key Findings
- Mainframes running Linux can be used to consolidate some workloads that run on x86 servers, deliver substantial operational savings and avoid/defer potentially costly data center expansions.
- The large number of Linux virtual servers that Nationwide needed made the total cost of ownership (TCO) benefits easier to prove. Those implementing the solution with a small number of potential virtual servers (one to 30) will need closer evaluation.
- In-house skills that can be leveraged should be considered as part of any virtualization/consolidation strategy.
- Nationwide achieved very significant results. Although not all situations lend themselves as readily to the Nationwide approach, there are a growing number of opportunities in which this approach might yield significant benefits and should at least be considered.

Recommendations
- Use cross-disciplinary teams that are dedicated to the project to gain broad commitment.
- Be prepared to change your billing models as you move from individual dedicated servers to a virtualized shared-resource model.
- Do not implement virtualization as a "knee jerk" reaction to the issue of underutilized servers, but rather introduce it as part of a process that incorporates meeting performance, availability and security objectives while also allowing for possible volatility in usage.

WHAT YOU NEED TO KNOW
Nationwide was able to significantly reduce expenditures by consolidating nonmainframe server workloads using Linux-only System z mainframes. The nature of this consolidation solution also has improved quality of service and provided for growth within the same footprint of the two installed mainframes. This growth will have minimal impact on floor space, power and cooling in the data center.

Gartner

Source: http://mediaproducts.gartner.com/gc/reprints/ibm/external/volume2/article13/pdf/article13.pdf

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IBM Case Study

Nexxar Group transfers to IBM System z9 Business Class for cost savings

Overview

Challenge
Enable very high availability to support business growth; develop an IT Service Management solution to enable integration, automation and optimization of IT resources; provide high security for customer-specific data and applications; enable rapid, low-cost provisioning of new servers

Solution
Worked with IBM Global Technology Services to consolidate more than 80 physical servers to virtual servers running under Linux® on an IBM System z9™ Business Class mainframe; implemented IBM Service Management methodologies to enable easy management of complex environment

Key Benefits
Significant reduction in physical complexity of infrastructure for improved security and greater ease of management; fewer processors means reduction in software licensing fees, while virtualization improves utilization of resources; overall 30 percent reduction in operational costs; faster time-to-market for new customer solutions; greater ease and speed of integrating new corporate acquisitions

Founded in 2003, Nexxar Group, Inc. is a money transfer company that also offers bill payment, check cashing and money order services. Headquartered in the US, Nexxar Group has a network of agents and branches in more than 40,000 locations across 105 countries. The company provides money transfer services under several of its own brands and also as a white-label offering to other financial services providers.

Nexxar has grown rapidly through corporate acquisitions, and plans to continue growing in this way. To enable acquisitions to be swiftly integrated into its business, and to support the

Source: http://www-306.ibm.com/software/success/cssdb.nsf/CS/STRD-6VHGK2?OpenDocument&Site=swzseries&cty=en_us
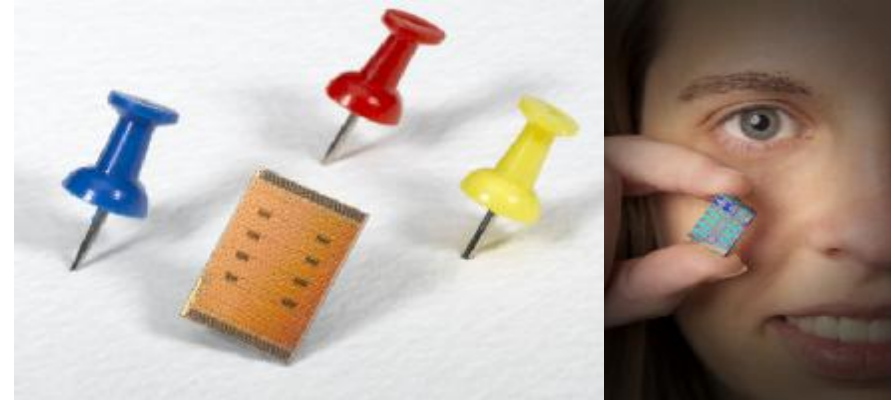
New Customers, New Markets, New Wins
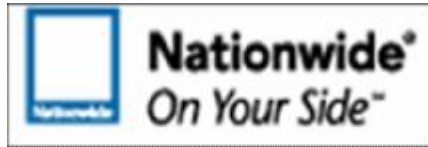
Project 'Gameframe'

"Taikodom": Massive Multiuser
Online Game (MMOG)

April 26, 2007:
IBM and Hoplon Infotainment announced a joint
project to integrate Cell/B.E. as a front-end
processor for IBM System z.

Cell Broadband Engine (Cell/B.E.) is a trademark of Sony Computer
Entertainment Inc.

z/VM V5.3 – Business Value Proposition

§ **Large, single-image, resource-balanced "Scale out" and "Scale up" support for hosting virtual server workloads**

- ► Large real *memory* exploitation support (greater than 128 GB)
- ► Single-image *CPU* support for 32 processors
- ► Enhanced *networking* bandwidth and availability support with OSA-Express2 Link Aggregation (Statement of Direction)
- ► HyperPAV *I/O* support for IBM System Storage DS8000
- ► Concurrent FlashCopy *I/O* support for one-to-many volumes
- ► Enhanced *memory* management for Linux guests running on System z9 servers

§ **Specialty processor support for z/OS guests**

- ► Enhanced z/OS-on-z/VM development / test support

§ **LDAP support for guest authentication**

- ► Enhanced virtual server security infrastructure support

§ **Staff productivity gains with IBM Director for Linux on System z**
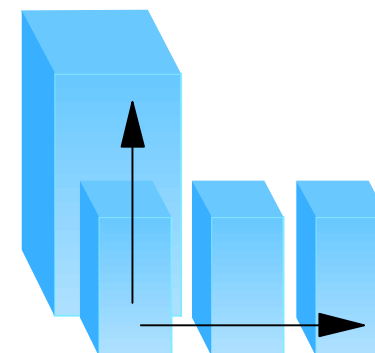
On demand *Scale Up* and *Scale Out*

Analyze and troubleshoot

Optimize

Open

IBM Director

Deploy

Easy to use

Integrated

Monitor and alert

Maintain and update
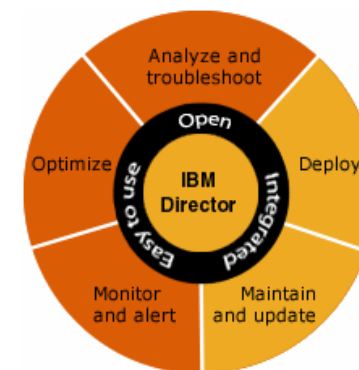
Project 'Big Green'

§ **IBM to reallocate $1 billion each year:**

- To accelerate "green" technologies and services

- To offer a roadmap for clients to address the IT energy crisis while leveraging IBM hardware, software, services, research, and financing teams

- To create a global "green" team of almost 1,000 energy efficiency specialists from across IBM

§ **Re-affirming a long standing commitment at IBM:**

- Energy conservation efforts from 1990 – 2005 have resulted in a 40% reduction in CO_2 emissions and a quarter billion dollars of energy savings

- Annually invest $100M in infrastructure to support remanufacturing and recycling best practices

- *Will double compute capacity by 2010 without increasing power consumption or carbon footprint saving 5 billion kilowatt hours per year ... equals energy consumed by Paris – "the City of Lights".*

§ **What "green" solutions can mean for clients:**

- For the typical 25,000 square foot data center that spends $2.6 million in power annually, energy costs could be cut in half

- Equals the reduction of emissions from taking 1,300 automobiles off of the road
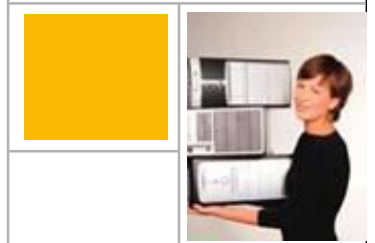
IBM Consolidation Announcement Highlights

§ *IBM will consolidate thousands of servers onto approximately 30 System z mainframes*

§ *We expect substantial savings in multiple dimensions: energy, software and system support costs*

§ *Major proof point of IBM's 'Project Big Green' initiative*

§ *The consolidated environment will use 80% less energy*

§ *This transformation is enabled by the System z's sophisticated virtualization capability*

IBM'S PROJECT BIG GREEN SPURS GLOBAL SHIFT TO LINUX ON MAINFRAME

Plan to shrink 3,900 computer servers to about 30 mainframes targets 80 percent energy reduction over five years

Optimized environment to increase business flexibility

ARMONK, NY, August 1, 2007 – In one of the most significant transformations of its worldwide data centers in a generation, IBM (NYSE: IBM) today announced that it will consolidate about 3,900 computer servers onto about 30 System z mainframes running the Linux operating system. The company anticipates that the new server environment will consume approximately 80 percent less energy than the current set up and expects significant savings over five years in energy, software and system support costs.

At the same time, the transformation will make IBM's IT infrastructure more flexible to evolving business needs. The initiative is part of Project Big Green, a broad commitment that IBM announced in May to sharply reduce data center energy consumption for IBM and its clients.

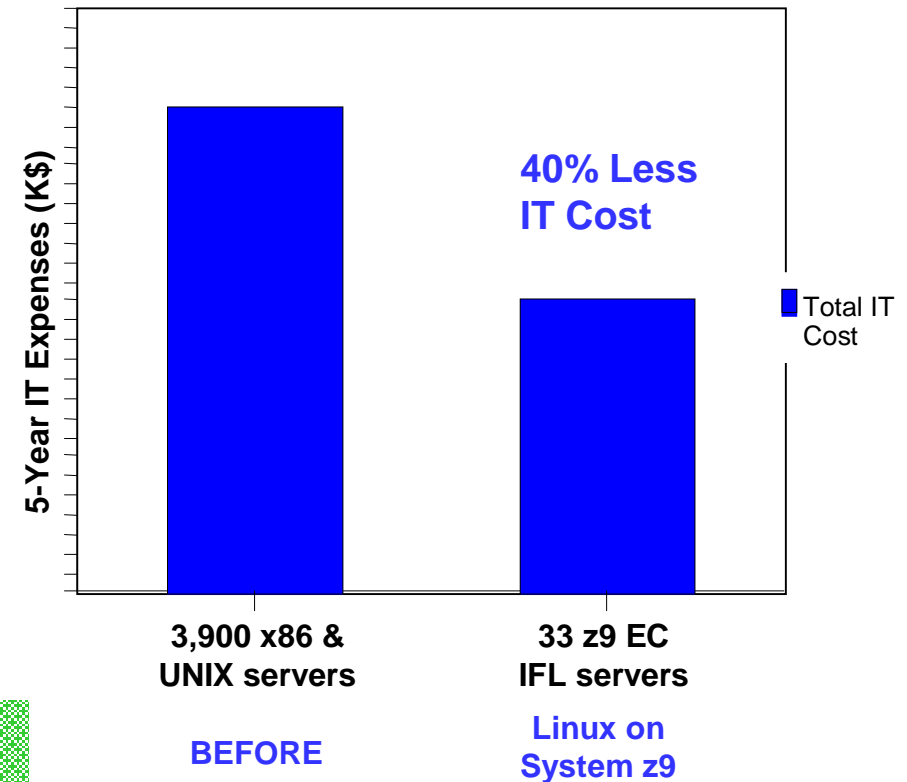# IBM consolidates its own Data Centers for large Savings

Your IT Cost may vary:

§ **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.

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

Potential 5-Year IT Cost Savings

40% Less IT Cost

Total IT Cost

3,900 x86 & UNIX servers

33 z9 EC IFL servers

BEFORE

Linux on System z9

Agenda

§ **New Announcements**

§ **z/VSE**

§ **z/VM and Linux on System z**

→ § **Middleware and Systems Management Solutions**

- **DB2 for VSE and VM V7.next**
- **IRMM**

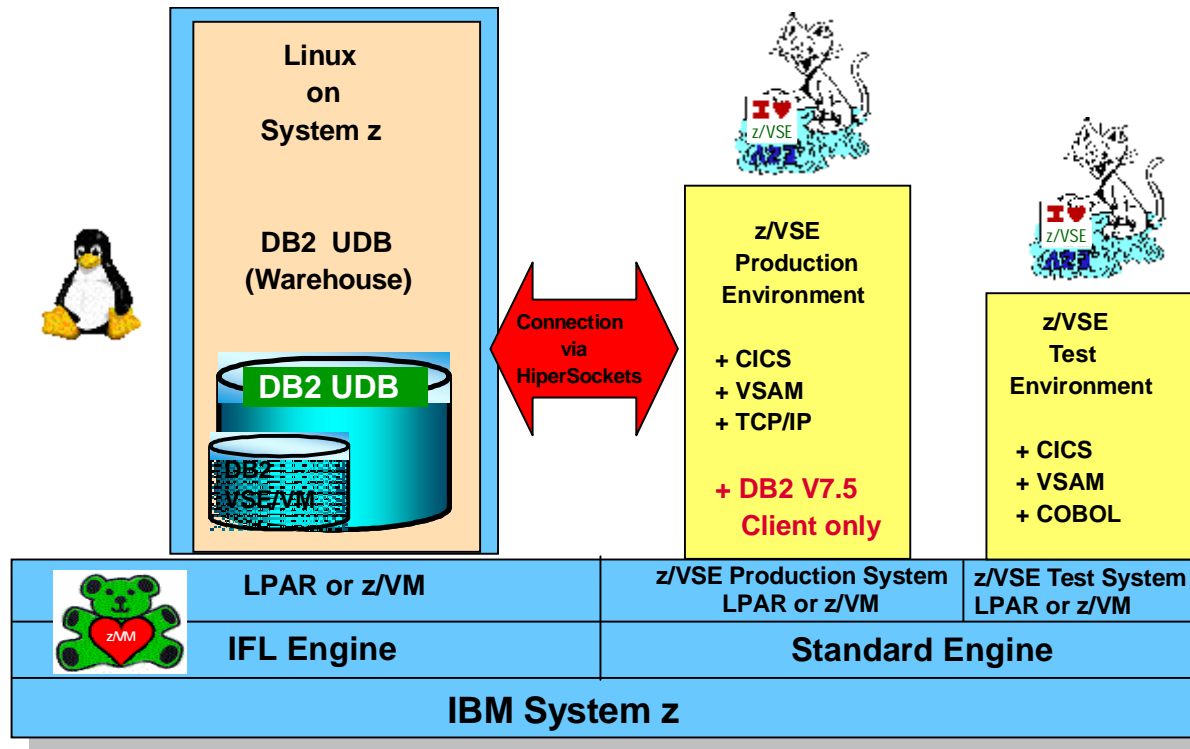§ **IBM Academic Initiative for System z**

§ **Summary**

§ **Appendix**

- **IBM System z9 Business Class**
- **IBM System Storage**
- **IBM Global Financing**

IBM Systems

DB2 for VSE and VM V7.next

§ **In the past, DB2 VSE client functionality could be obtained via PRPQ P10154**

§ **Now, DB2 offers a <u>runtime only client edition</u> for z/VSE and z/VM (no PRPQ required)**

§ **Plus performance enhancements, e.g.**

► **bind file support**

► **reduced DRDA code path length**

► **and many more ...**

Linux on System z

DB2 UDB (Warehouse)

DB2 UDB

DB2 VSE/VM

Connection via HiperSockets

z/VSE Production Environment

+ CICS
+ VSAM
+ TCP/IP

+ DB2 V7.5 Client only

z/VSE Test Environment

+ CICS
+ VSAM
+ COBOL

LPAR or z/VM

z/VSE Production System LPAR or z/VM

z/VSE Test System LPAR or z/VM

IFL Engine

Standard Engine

IBM System z

IBM Systems

IRMM – announced Aug-7-2007, GA Sep-14-2007

§ **Integrated Removable Media Manager is:**

  ► A new robust systems management product for Linux® on IBM System z™ that manages open system media in heterogeneous distributed environments and virtualizes physical tape libraries, thus combining the capacity of multiple heterogeneous libraries into a single reservoir of tape storage that can be managed from a central point
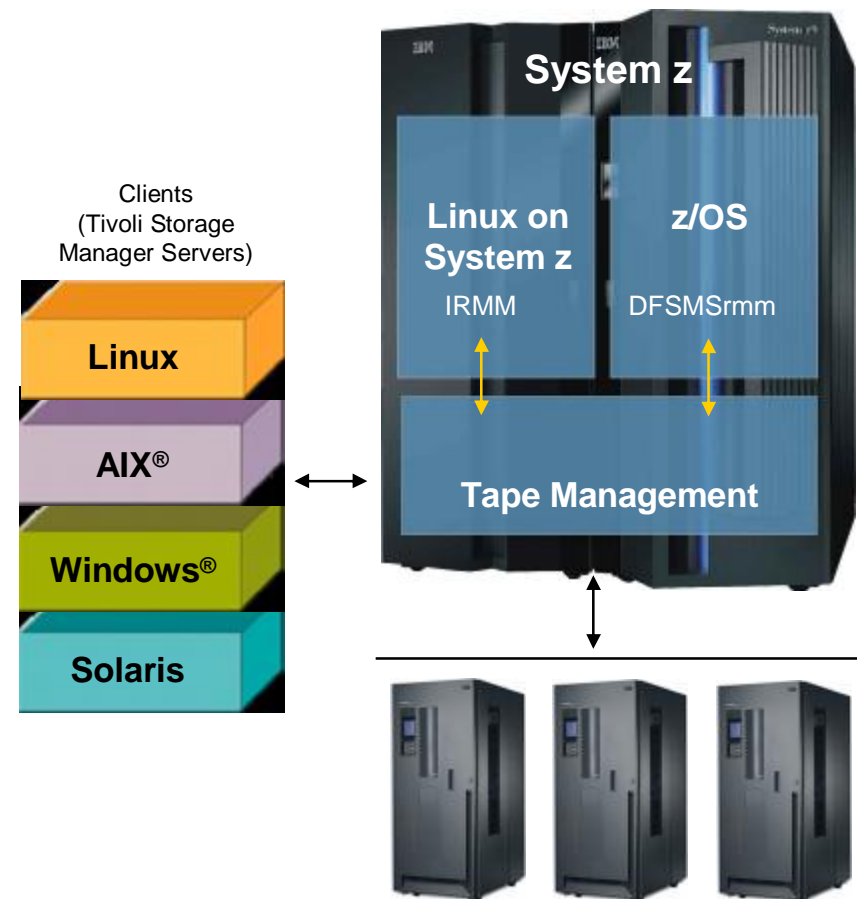
§ **IRMM is designed to provide:**

  ► Centralized media and device management

  ► Dynamic resource sharing

§ **IRMM extends IBM's virtualization strategy to tape library resources**

  ► Drives and cartridge pools

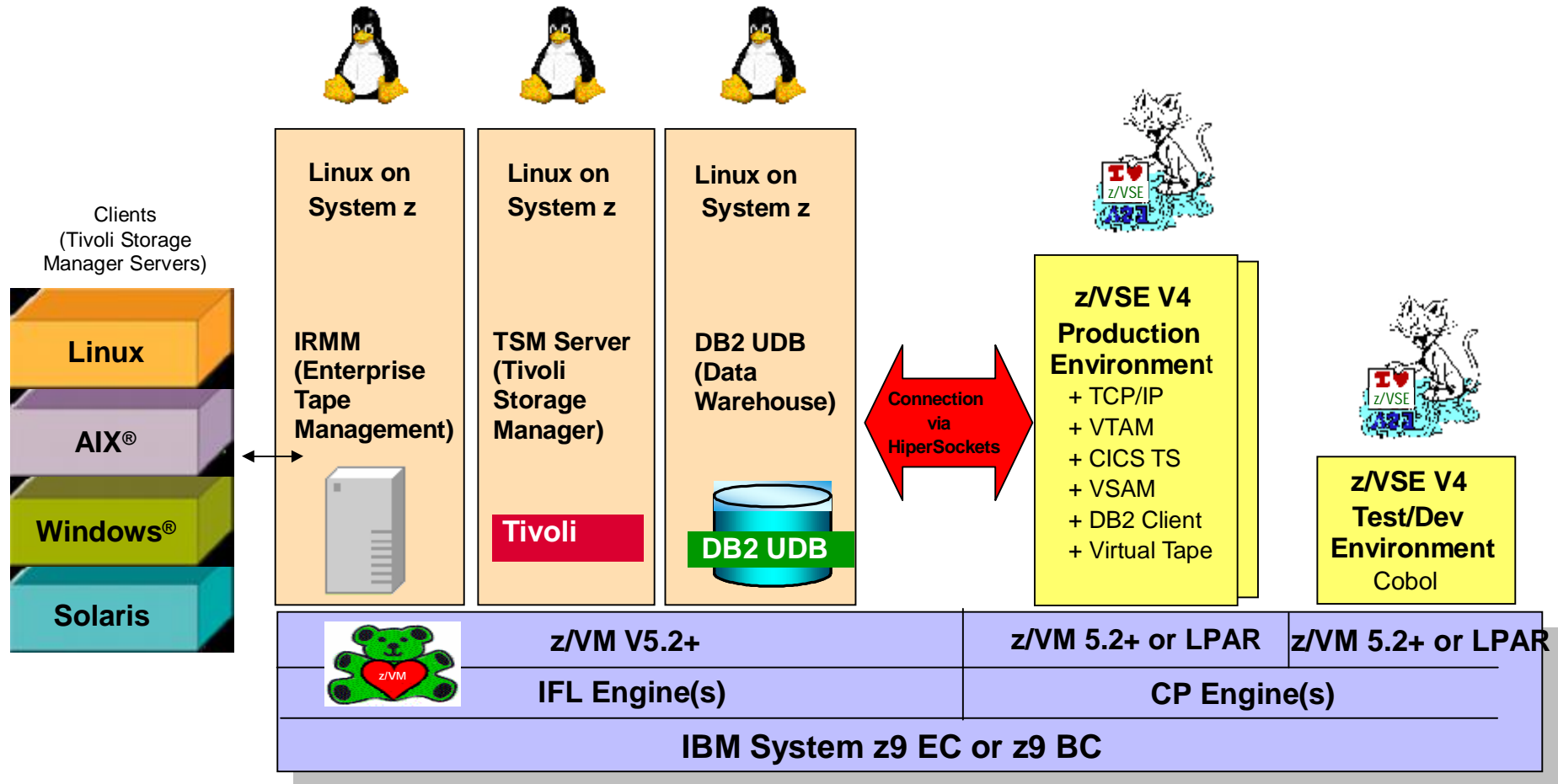§ **IRMM complements Linux on System z consolidation efforts**

TSM in a VM/VSE and Linux Environment
Integration with z/VSE V4.1

Linux on System z

Linux on System z

TSM Server (Tivoli Storage Manager)

DB2 UDB (Data Warehouse)

Tivoli

DB2 UDB

Connection via HiperSockets

z/VSE

z/VSE V4 Production Environment
+ TCP/IP
+ VTAM
+ CICS TS
+ VSAM
+ DB2 Client
+ Virtual Tape

z/VSE

z/VSE V4 Test/Dev Environment
Cobol

z/VM V5.2+	z/VM 5.2+ or LPAR	z/VM 5.2+ or LPAR
IFL Engine(s)	CP Engine(s)	

z/VM

IBM System z9 EC or z9 BC

IRMM in a VM/VSE and Linux Environment

NEW!

Clients
(Tivoli Storage
Manager Servers)

Linux

AIX®

Windows®

Solaris

Linux on System z	Linux on System z	Linux on System z
IRMM (Enterprise Tape Management)	TSM Server (Tivoli Storage Manager)	DB2 UDB (Data Warehouse)
	Tivoli	**DB2 UDB**

Connection via HiperSockets

z/VSE V4 Production Environment
+ TCP/IP
+ VTAM
+ CICS TS
+ VSAM
+ DB2 Client
+ Virtual Tape

z/VSE V4 Test/Dev Environment
Cobol

z/VM V5.2+	z/VM 5.2+ or LPAR	z/VM 5.2+ or LPAR
IFL Engine(s)	CP Engine(s)	

IBM System z9 EC or z9 BC

Agenda

§ **New Announcements**

§ **z/VSE**

§ **z/VM and Linux on System z**

§ **Middleware and Systems Management Solutions**

→ § **IBM Academic Initiative for System z**

- **Academic Initiative by the numbers**
- **Learning Opportunities**

§ **Summary**

§ **Appendix**

- **IBM System z9 Business Class**
- **IBM System Storage**
- **IBM Global Financing**

IBM Systems

Building Skills: IBM Academic Initiative for System z
IBM is committed to training 20,000 new students on the mainframe by 2010

❑Growing Academic Initiative – YE Data

Schools in Program
Students Taught

47,000
328
294
27,000
213
10,000
70
24

YE2003   YE2004   YE2005   YE2006   3Q2007

❑Over half of schools are outside of US
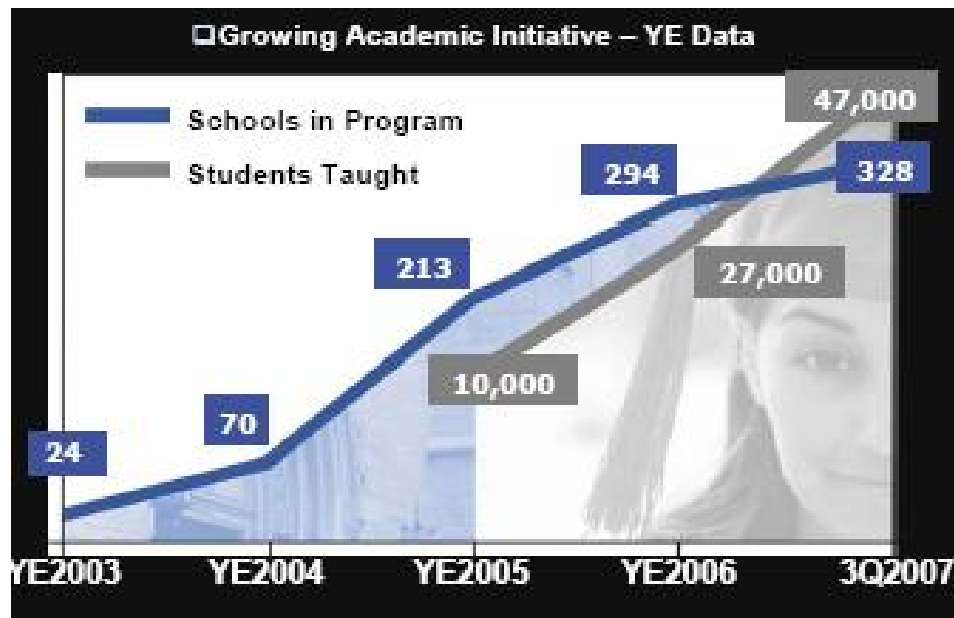
§ **Academic Initiative by the numbers:**
 ► Participation – Over 325 schools registered, over 47,000 students
 ► Courses – 21 Courses (10 more coming) & Mastery Exam Certification
 ► zCommunity – Running local roundtables with Client / School / ISV
 ► Resources – Systems at 6 university HUBs + loaned systems and SW
 ► Student MF Contests - >4,500 students, >700 schools ... more coming WW
 ► IBM Help – zSkills Help Desk (zskills@us.ibm.com) + over 200 IBM MF ambassadors
 ► Assist Professors – Education seminars, Faculty awards
§ **Web site – www.ibm.com/university/systemz**

Beginner's Education

NEW!

Introduction to the New Mainframe: z/VSE Basics

Basic mainframe concepts and architecture

z/VSE fundamentals for students and beginners

Mainframe hardware and peripheral devices

Wolfgang Bosch
Hans Joachim Ebert
Helmut Hellner
Jerry Johnston
Wilhelm Mild
Ingolf Salm
Joerg Schmidbauer
Martin Wolbrueht

ibm.com/redbooks

Redbooks

Virtualization Cookbook

▶ **SLES 10**

▶ **RHEL 5**

z/VM and Linux on IBM System z
The Virtualization Cookbook

A cookbook for installing and customizing z/VM 5.2 and Linux SLES 10 on the mainframe

Marian Gasparovic, Michael MacIsaac, Carlos Ordonez, Jin Xiong

Introduction to the New Mainframe: z/VM Basics

Understand introductory z/VM concepts

Learn basic system administration tasks to manage your system

Study z/VM performance, networking and security

Lydia Parziale
Eli M. Dow
Klaus Egeler
Jason J. Herne
Clive Jordan
Edi Lopes Alves
Eravimangalath P. Naveen
Manoj S Pattabhiraman
Kyle Smith

ibm.com/redbooks

Redbooks

SG24-7436-00
(March 2007)

www.redbooks.ibm.com

SG24-7316-00
(Sep 2007)

linuxvm.com/present

IBM Systems

Expert Education

§ z/VSE Live Virtual Class Offerings *

- ► z/VSE and MWLC Announcement Overview
- ► Midrange Workload Licence Charges (MWLC)
- ► z/VSE V4.1 Solutions based on SOA and DB2
- ► z/VSE Security
- ► z/VSE V4.1 User Experience
- ► IBM System z Hardware
- ► New VSAM Tools
- ► more planned ...

§ z/VM Live Virtual Class Offerings

- ► z/VM V5.3 Introduction
- ► z/VM V5.3 Performance Update
- ► Virtualization Basics
- ► more planned ...

§ Linux on System z Class Offerings

- ► Linux Implementation for zSeries (ZL100)
- ► Linux Basics (ZL120)
- ► Advanced Solutions for Linux on zSeries (ZL150)
- ► Automated Deployment of Linux Images under z/VM (ZL18G)

• Note: Replay and charts available on the web:
http://www-03.ibm.com/servers/eserver/zseries/zvse/

§ Conferences for VM/VSE & Linux

- ► EMEA 2007 System z Technical Conference
  - • Munich, Germany, April 2007

- ► WAVV 2007 Conference
  - • Green Bay, WI, May 2007

- ► US IBM 2007 System z Expo
  - • San Antonio, TX, Sept 2007

- ► European 2007 GSE Conference
  - • Boeblingen, Germany, Oct 2007

- ► WAVV 2008 Conference
  - • Chattanooga, TN, April 2008

- ► EMEA 2008 System z Technical Conference
  - • Dresden, Germany, May 2008

- ► US IBM 2008 System z Expo
  - • Las Vegas, NV, Oct 2008

- ► European 2008 GSE Conference
  - • tbd
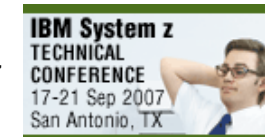
§ z/VM Class Offerings

- ► z/VM Introduction and Concepts (ZV02G)
- ► Installing, configuring, servicing z/VM for Linux Guests (ZV062)
- ► z/VM & Linux Connectivity & Management (ZV100)

Agenda

§ **New Announcements**

§ **z/VSE**

§ **z/VM and Linux on System z**

§ **Middleware and Systems Management Solutions**

§ **IBM Academic Initiative for System z**

→ § **Summary**

§ Appendix

- IBM System z9 Business Class
- IBM System Storage
- IBM Global Financing

# Summary: Exploiting the best of all Worlds
with IBM System z9, IBM System Storage, and IBM Middleware
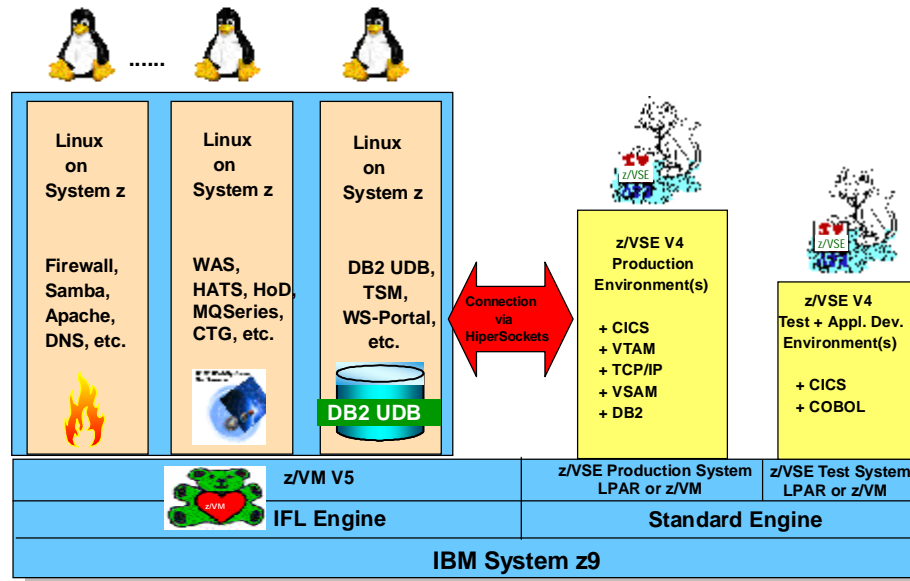
§ **z/VSE V4**

- ►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

§ **Linux on System z**

- ►Large portfolio of new applications
- ►Platform for IBM middleware
- ►Infrastructure Simplification
- ►Massive scalability / consolidation

Q&A

धन्यवाद
Hindi

Спасибо
Russian

Grazie
Italian

شكراً
Arabic

多謝
Traditional Chinese

多谢
Simplified Chinese

ขอบคุณ
Thai

Thank You
English

Questions?

あります がとうございました
Japanese

תודה רבה
Hebrew

Gracias
Spanish

Obrigado
Portuguese

Merci
French

Danke
German

감사합니다
감사합니다
감사합니다
감사합니다
감사합니다
감사합니다
Korean

நன்றி
Tamil

Agenda

§ **New Announcements**

§ **z/VSE**

§ **z/VM and Linux on System z**

§ **Middleware and Systems Management Solutions**

§ **IBM Academic Initiative for System z**

§ **Summary**

→ § **Appendix**

- **IBM System z9 Business Class**
- **IBM System Storage**
- **IBM Global Financing**

z9 BC – Delivering increased Capacity and Performance*
Flexibility for Growth

§ **Greater granularity and scalability**

- ► Two models with one machine type (2096)
- ► 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)
- ► 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 the 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

75% more Processor Units

z9 BC

z800

z890

37% improvement

Capacity
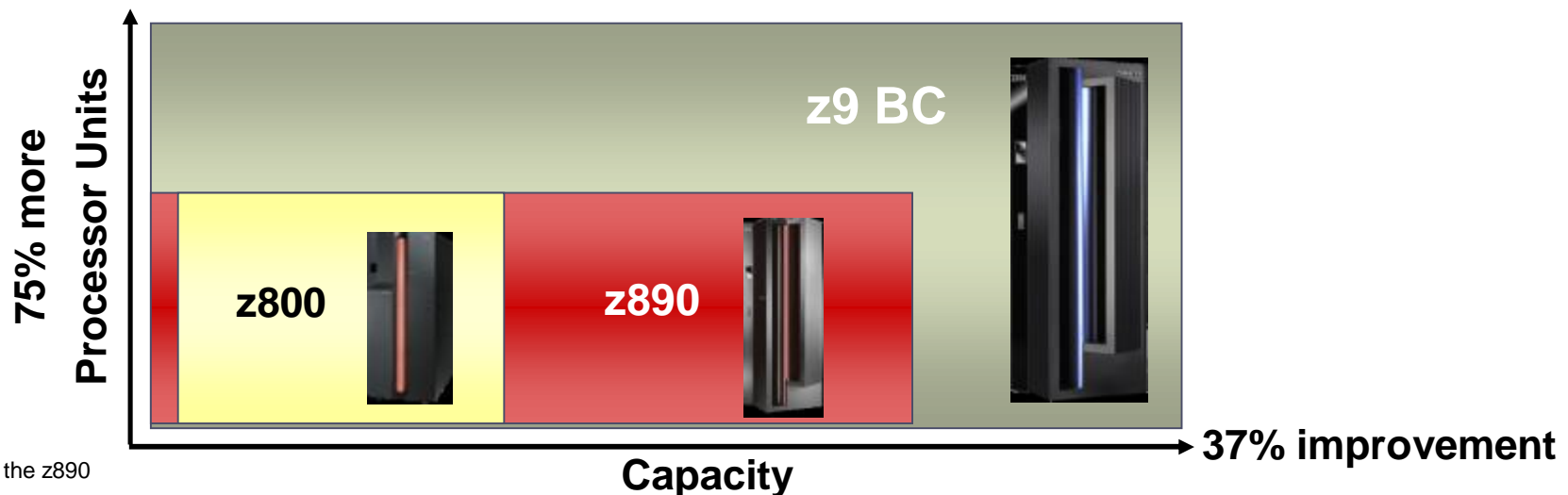
* Compared to the z890

IBM System Storage Disk: Supports FICON Express4

Enterprise Disk Continuum

New Standard in Pricing and Packaging
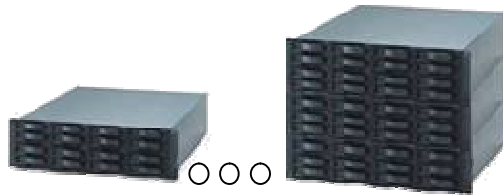
DS6000

§ Affordable pricing with the capabilities of traditional enterprise products

§ Great performance in a modular package, up to 64TB

§ Can start small and grow in physical capacity – a great entry to midrange solution

§ Up to 8 2 Gbps auto-sensing FICON/FC host ports

§ **Supports major types of servers including IBM System z, System i™ Linux, UNIX®, Microsoft® Windows®.**

§ **Industry-leading copy services - compatible between IBM System Storage DS6000, DS8000, IBM TotalStorage Enterprise Storage Server® (ESS) 800, ESS 750**

§ **Common management tools and interfaces**

§ **Designed for enterprise class reliability to help support continuous operations**

New Standard in Functionality, Performance, TCO

DS8000

§ Excellent performance

§ First class storage consolidation platform with physical capacity up to 320 TB

§ Options for model-to-model field upgrades help protect investment

§ Up to 128 4 Gbps auto-sensing FICON/FC ports or 64 ESCON ports

Complements mainframe scalability, performance, and cost effectiveness

IBM System Storage Disk: Positioning with System z

Choose IBM TotalStorage DS8000 if need:

Highest Performance / Scalability,

ESCON or FICON/FC attach,

Storage System LPAR Capability with DS8300

Many customer references

Choose IBM TotalStorage DS6800 if need:

Lowest price,

FICON/FC attach,

Modular/small footprint,

Easy install / serviceability

Many customer references

Previous Generation DASD

IBM TotalStorage ESS Refurbished with Warranty

ESCON or FICON/FC attachment,

Many older references showing wide customer acceptance

1 - 192 TB

DS8300

1 - 115 TB

DS8100

0.5 - 67 TB

DS6800

z9 EC

z9 BC

0.5 - 55 TB

ESS 800

0.5 - 55 TB

ESS 800 Turbo
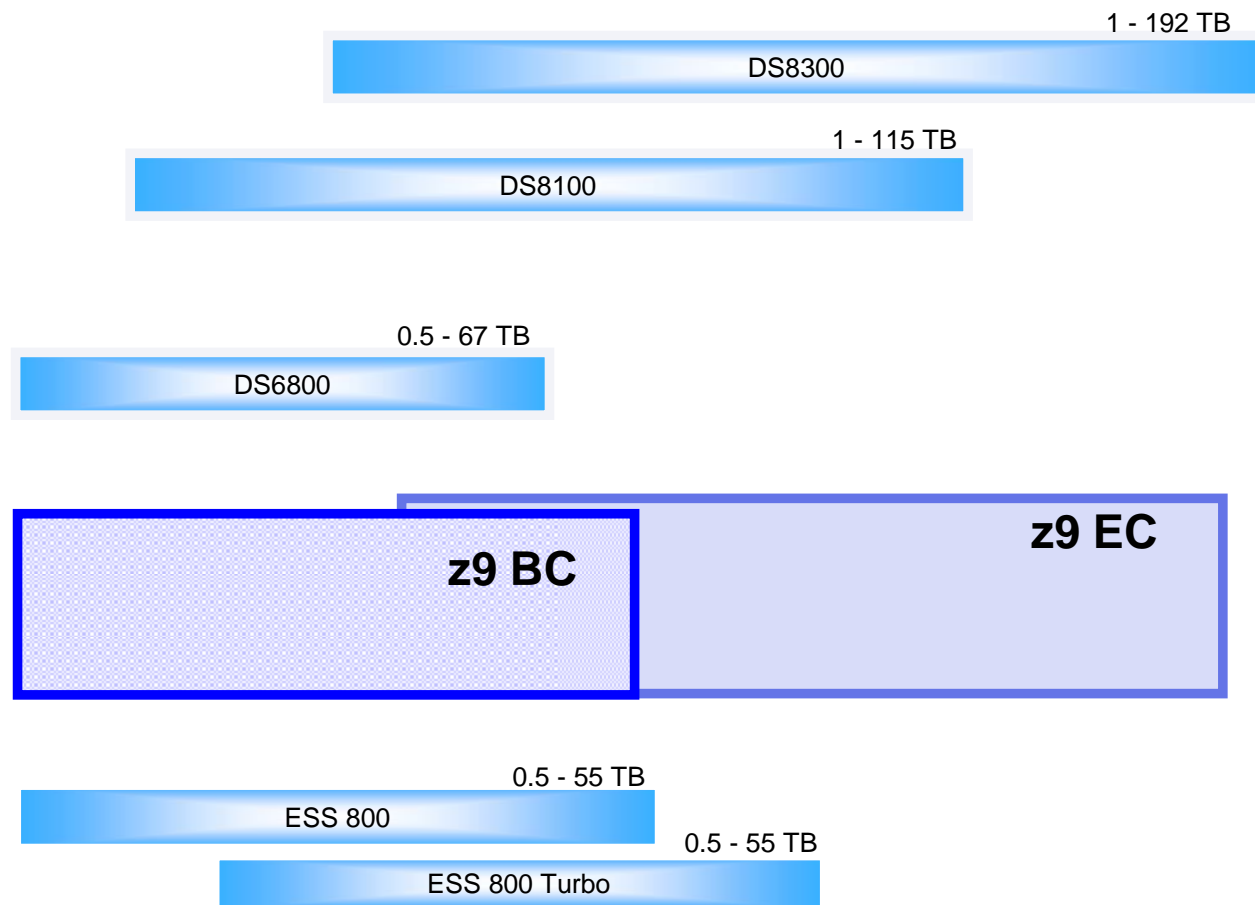
IBM System Storage Tape: Supports FICON Express4

Enterprise Tape Continuum

TS1120

3494

TS3400

TS3500

TS7700

Tape Drives

§ **TS1120 tape drive/controller**
- ►Tape drive data encryption
- ►Second generation tape drive
- ►Controller supports ESCON & FICON
- ►100, 500, 700 GB cartridge capacity[1]

§ **3592 tape drive**

Tape Libraries

§ **TS3400 tape library**
- ►Small footprint, TS1120 drive support
- ►Supported on System z

§ **TS3500 tape library**
- ►TS1120 tape drive with advanced management function

§ **3494 tape library**
- ►Investment protection
- ►TS1120 and 3590 drive support

Virtualization

§ **TS7700 Virtualization Engine**
- ►Standalone or Grid deployment
  - ●Third site support in plan
- ►Advanced function
- ►Higher Performance
- ►Robust Roadmap

1 Uncompressed Capacity

IBM Financing Solutions

> " 765 CEOs across the globe cited limited funding for investment as their second most significant obstacle to innovation. "
>
> – *IBM CEO-Study 2006*

Simple and flexible financing solutions from IBM Global Financing can help you to overcome this obstacle:

v **Offerings:**

  v **leases, loans and IPP, sale&lease back solutions**

  v **IT and non-IT hardware, software and services, IBM and non-IBM**

  v **customised offerings for large enterprises and small&medium companies**

v **Customized payment streams, not limited by budget restrictions**

v **Environmentally friendly disposal, reliable data overwriting at end of lifecycle**

For further information please visit ibm.com/financing

Backup

IBM Systems

Press on z/VSE V4.1

IBM VSE mainframe operating system gets upgrade

By Mark Fontecchio, News Writer
21 Mar 2007 | SearchDataCenter.com

RSS FEEDS: IT infrastructure news

RSS▶ ☒ Add to Google

IBM has upgraded the VSE mainframe operating system to include storage, security and networking improvements, as well as introduced pricing schemes that can lower mainframe software licensing costs.

Source: SearchDataCenter.com, March 2007

Pete Clark on z/VSE

z/VSE 4.1

www.ejournal.com
FEBRUARY/MARCH 2007

z/JOURNAL

PETE CLARK

On Jan. 9, 2007, IBM announced that March 16, 2007 is ... were in 24-bit System GETVIS, so moving them is a big deal for many users. ... for automatic spool deletions,

IBM Systems
MAGAZINE

Features   Print 🖨

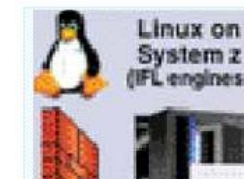## Ahead of the Pack

July 2007

Linux on System z (IFL engines)

Figure 1

Although z/OS* is correctly regarded as the flagship OS for the IBM* System z* platform, z/VSE* remains an important part of IBM's mainframe portfolio and a viable option for many satisfied IBM customers. At the risk of oversimplification, z/VSE is similar to z/OS but relatively smaller, simpler and less capable. z/VSE is designed for smaller IBM mainframe clients with somewhat less demanding requirements. For z/VSE users, many of whom have been using it for decades, z/VSE is robust enough without additional applications found in z/OS, and comes with a lower TCO than z/OS. However, both z/OS and z/VSE are equally committed to product quality and customer service that are second to none.

Heritage

z/VSE V4 has a long tradition that spans more than four decades. DOS/360 was launched in 1965 along with the famed IBM System/360*. Originating as a basic alternative to OS/360*, a distant ancestor of z/OS, DOS/360 quickly became a workhorse OS, especially for the popular S/360 Model 30. In the 1970s and '80s,

VSE users receive an offer they can't refuse

Most of the activity in the IBM mainframe world not surprisingly focuses on the z/OS environment, but there is still a sizeable population of users running systems based on VSE, often in conjunction with the VM hypervisor.

Many of these sites are slow growers with limited in-house technical skills and a reluctance to upgrade their hardware or software even in exchange for significant cost savings. As a result their relationship with IBM (and with other ISVs supporting their applications) is a difficult one.

In its recent announcement of z/VSE 4.1, IBM has shown some of the 'carrot and stick' tactics that often characterize its product developments in this part of the market.

The latest version of the operating system offers many attractions for small mainframe users, including some important enhancements to SOA/web service support and tape encryption. Moreover the software is accompanied by a new pricing scheme (Midrange Workload License Charge), which can bring sub-capacity benefits and very significant savings to VSE users. But to get the savings they need to upgrade to a z9 BC or EC.

Even for VSE users, it is becoming increasingly difficult to make a cost case for avoiding an upgrade to the latest hardware, and the months ahead are likely to witness a steady stream of VSE-base upgrades to the z9 BC.

© Arcati Limited, 2007   Source: The Arcati Mainframe Yearbook 2007, UK   33   Source: Systems Magazine, July/August 2007

EF for z/VSE V1.1 (Backup)

IBM Encryption Facility for z/VSE V1.1

Program number: 5686-CF8-40

Runs on: System z9 EC, z9 BC
               zSeries 890 or 990

Requires: z/VSE 4.1 (with DY46717) or higher

IBM Encryption Facility for z/OS V1.1

Program number: 5655-P97

Runs on: System z9 EC, z9 BC
               zSeries 900 or 990
               zSeries 800 or 890

Requires: z/OS 1.4 or higher; z/OS.e 1.4 or higher

Optional Priced z/VSE Feature*

§ Supports encrypting, decrypting, and compression of data at rest (tapes, disk).

§ Supports either Public Key/Private keys or passwords to create highly-secure exchange between partners.

§ Can use z/OS Java Client or Decryption Client for z/OS for data exchange with client systems or decryption on z/OS.

§ Use zvse@de.ibm.com mailbox for questions about z/OS Java Client and Decryption Client for z/OS when used in conjunction with z/VSE.

Java Client
Web Downloadable

Java technology-based code that allows client systems (z/OS and non-z/OS) to decrypt and encrypt data for exchange with z/OS and z/VSE systems.

Decryption Client for z/OS
Web Downloadable

Decryption only code designed to run on z/OS systems. Can process data encrypted and compressed or just encrypted by the Encryption Facility for z/OS or Encryption Facility for z/VSE.

Feature: Encryption Services

Optional Priced Feature*
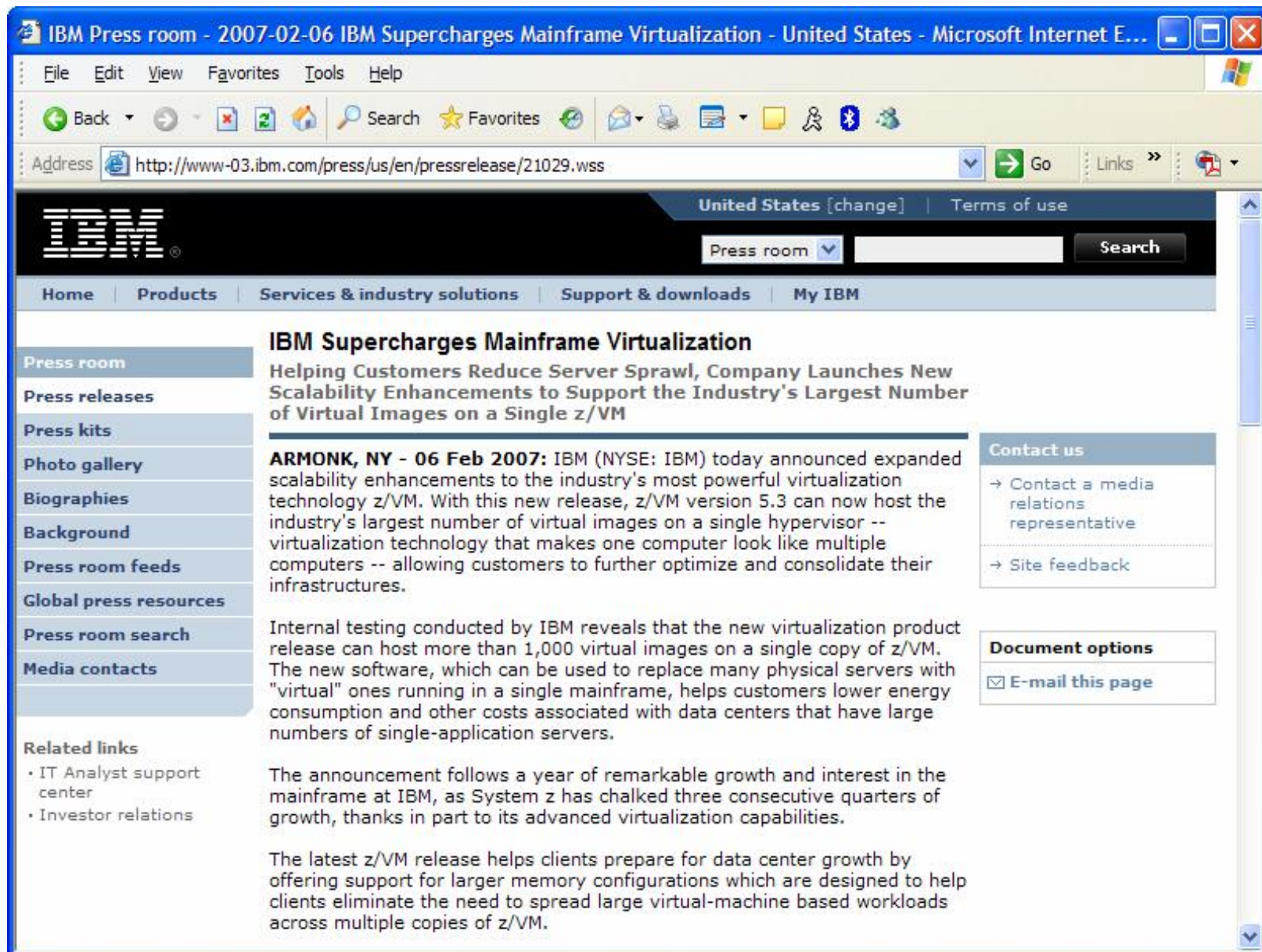
§ Supports encrypting and decrypting of data at rest (tapes, disk)

§ Supports either Public Key/Private keys or passwords to create highly-secure exchange between partners

Feature: DFSMSdss Encryption

Optional Priced Feature*

•Variable Workload License Charges (VWLC, MWLC), Entry Workload License Charges (EWLC), zSeries Entry License Charges™ (zELC), Parallel Sysplex® License Charges (PSLC) **Statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Press on z/VM V5.3

Nationwide leverages Linux and saves $16M over 3 years

Key Benefits (Value Proposition)

Expect to save over $16M over the next 3 years.

Initial phase consolidated 250+ Production, Development & Test servers to 6 IFLs

Savings will be in cooling, maintenance, software and equipment costs, said Guru Vasudeva, a Nationwide computer expert who is overseeing the technology's implementation

Lower middleware and application costs, 50% reduction in monthly charges for Web infrastructure 80% reduction in data center floor space utilization, optimized CPU utilization

Greater operational and managerial efficiencies and lower cost per virtual server

Building better capacity management processes and workload modeling to better assess which applications and workloads most appropriate to migrate to the z platform for additional cost savings

Leveraged IBM services, server and software expertise for best practices in tuning and capacity management, better management and resource optimization to drive down costs

Solution:

GTS Capacity Planning and Capacity Management Services

IBM zSeries 990 IFLs with 136 GB memory and associated systems software licenses

Novell SUSE Enterprise Linux 9

IBM WebSphere

IBM DB2 Universal Database™ (UDB)

IBM WebSphere MQ

z/VM-Linux and Support Line Linux support

http://www.linuxworld.com/events/key notes/lwsf06-guru.html

IBM Systems