

2009 System z Expo
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z/VSE V4.2 News and Views

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Agenda

§ **z/VSE Review**

§ **z/VSE Strategy**

§ **z/VSE Version 4 Release 2.1 (z/VSE V4.2.1)**

– Encryption Technology

§ **z/VSE Modernization Options**

§ **Wrap-up**





z/VSE Review

45-Years of IBM Mainframe and z/VSE Heritage

§ S/360->S/370->4300->9370->ES9000->S/390->zSeries->System z

§ DOS/360->DOS/VS->DOS/VSE->(SSX)->VSE/SP
->VSE/ESA V1->VSE/ESA V2->z/VSE V3->z/VSE V4

§ S/360 Model 30

- 30 KIPS (.03 MIPS)
- 16 – 64 KB

§ DOS/360

- 1 batch partition
- basic, but lovable

§ System z10 BC/EC

- 26-900+ MIPS (1-way)
- 4 GB – 1.5 TB

§ z/VSE V4

- Batch and OLTP
- SOA
- still lovable



1960s



1970s



1980s

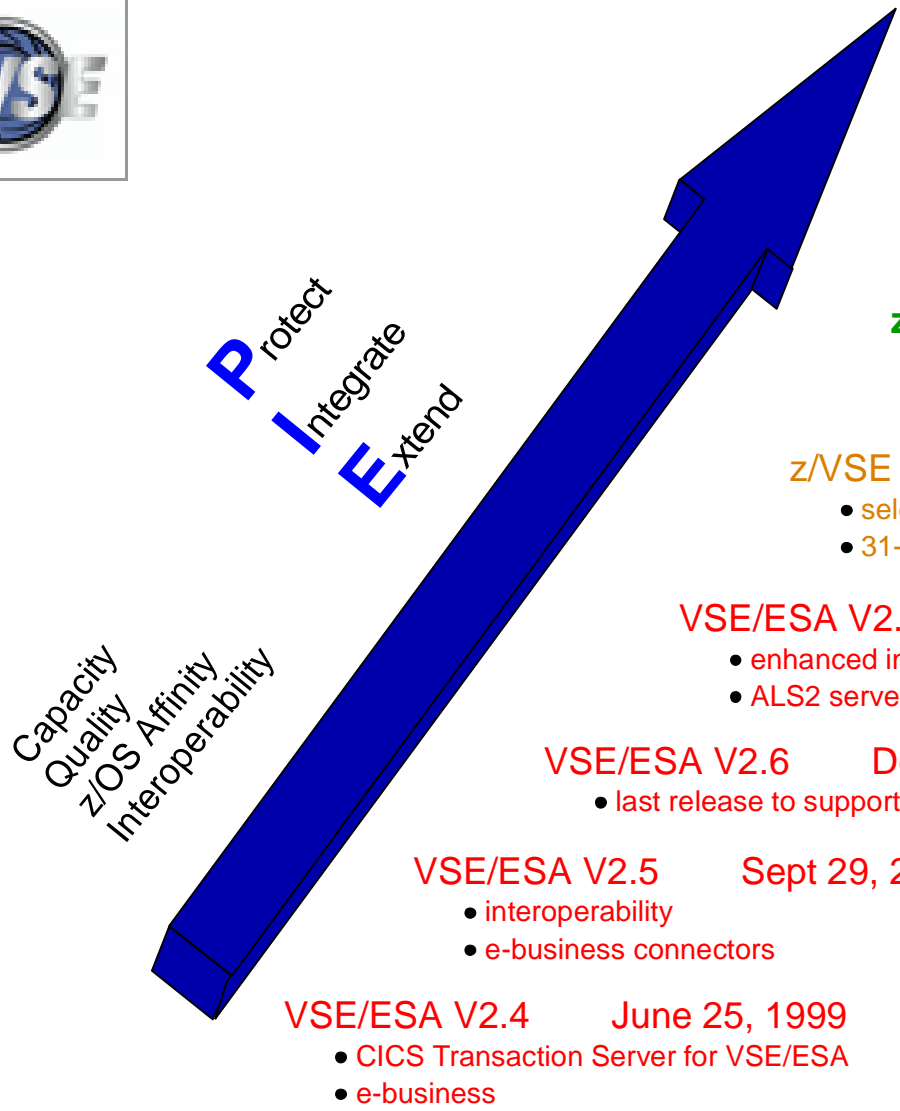


1990s



2000s

z/VSE Evolution



z/VSE V4.2.1 July 17, 2009

- Delivering on SoD
- Additional enhancements

z/VSE V4.2 Oct 17, 2008

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

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



* 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 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 Software 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 Hardware Support Status

IBM Servers	z/VSE V4.2	z/VSE V4.1	z/VSE V3.1 (Note 1 & 2)
IBM System z10 Enterprise Class (z10 EC)	Yes	Yes	Yes
IBM System z10 Business Class (z10 BC)	Yes	Yes	Yes
IBM System z9 Enterprise Class (z9 EC, formerly z9-109)	Yes	Yes	Yes
IBM System z9 Business Class (z9 BC)	Yes	Yes	Yes
IBM eServer zSeries 990, 890, 900, 800	Yes	Yes	Yes
S/390® Parallel Enterprise Server™ G5/G6	No	No	Yes
S/390® Multiprise® 3000	No	No	Yes

Note 1: 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.

Note 2: z/VSE V3 support ended 7/31/2009.



z/VSE Strategy

z/VSE “PIE” Strategy

§ Help **P**rotect existing customer investments in core z/VSE programs, data, equipment, IT skills, *plus* business processes, end user training

- Grow and Modernize, i.e. extend z/VSE resources to Web
- Exploit IBM servers, storage, middleware, security/encryption & related technology
- z/OS affinity
- IBM Academic Initiative

§ Help **I**ntegrate z/VSE with the rest of IT, based on open and industry standards

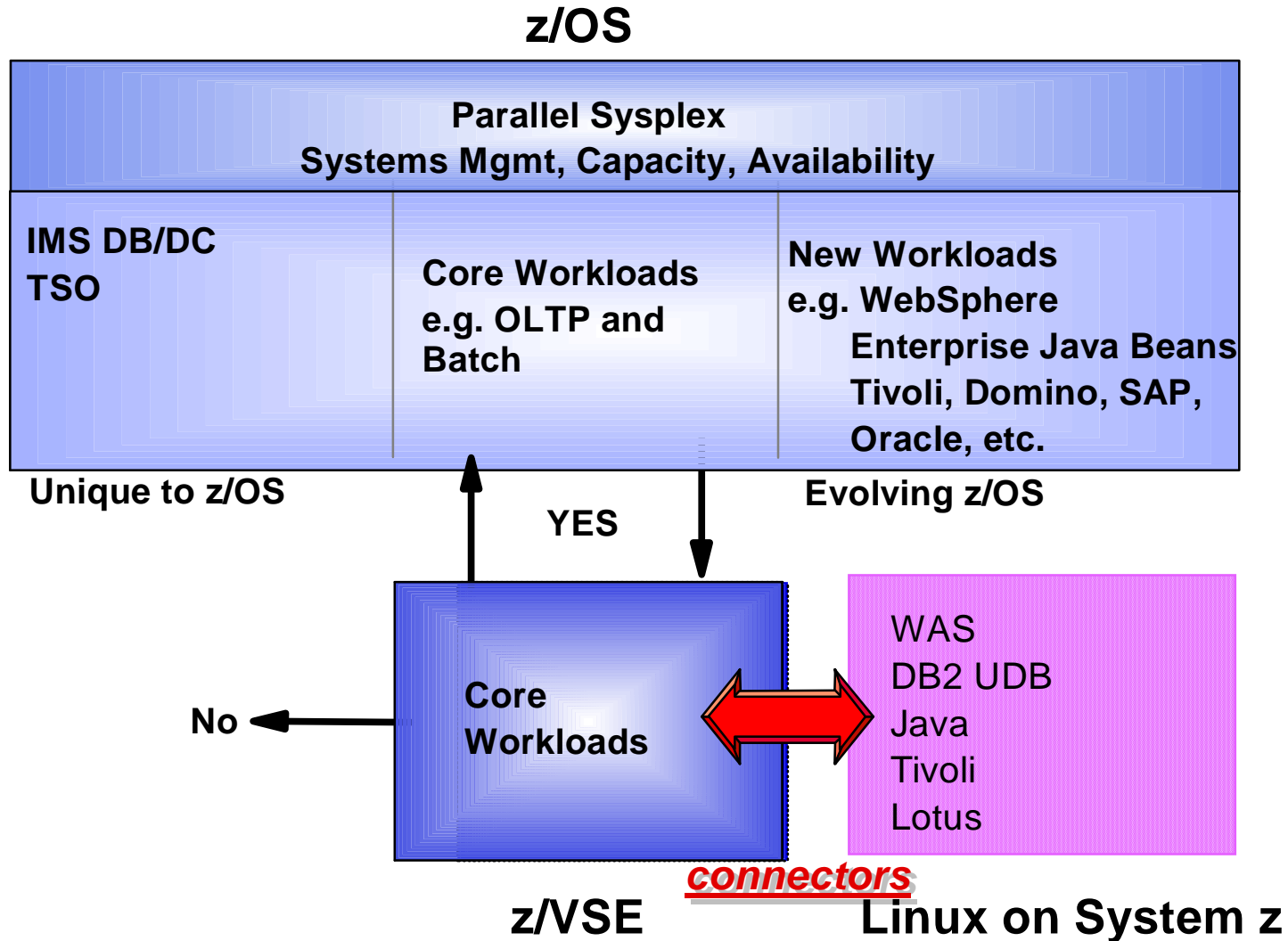
- z/VSE connectors and SOA Web services
- IBM middleware

§ Help **E**xtend solutions with Linux on System z

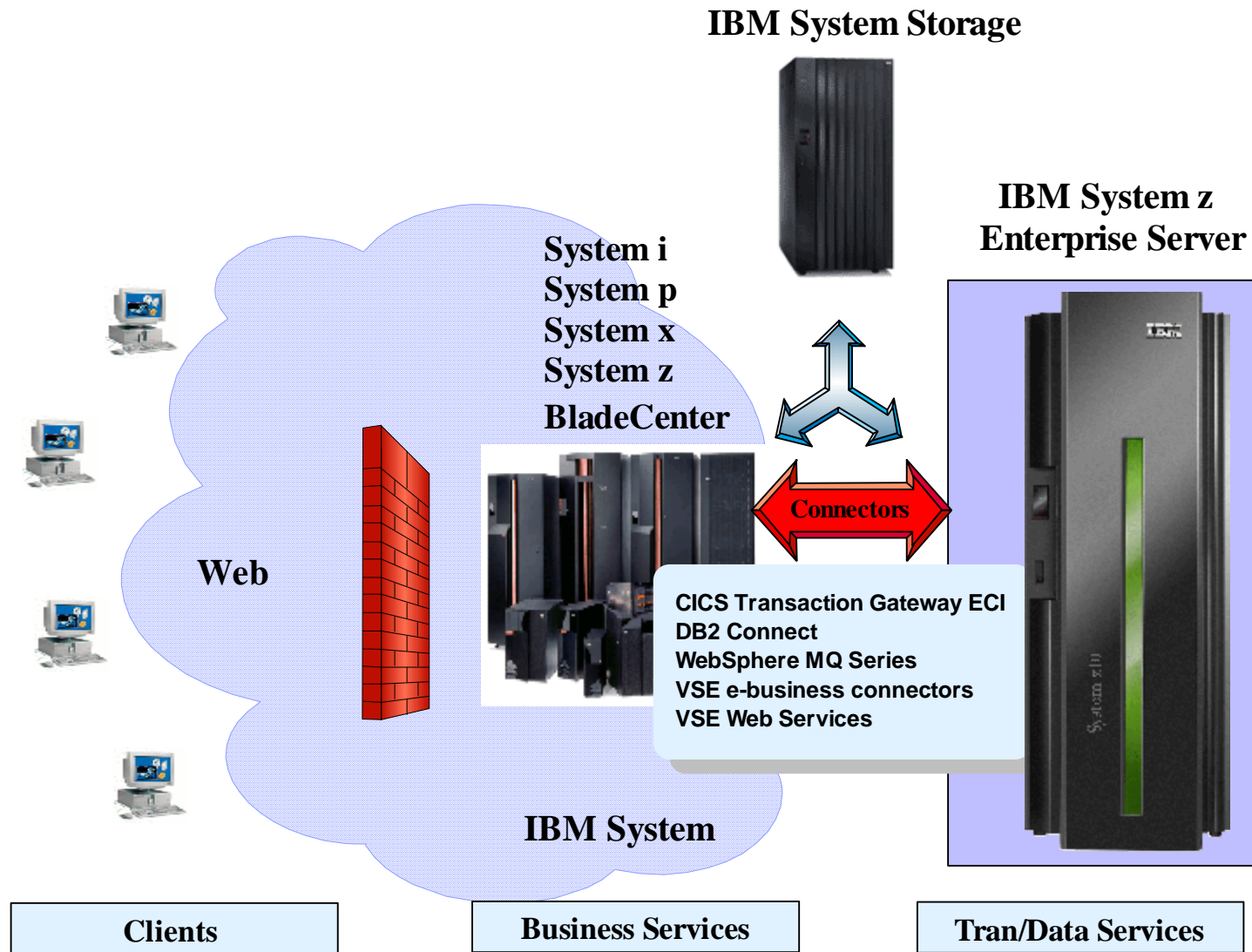
- Preferred platform for new workloads
 - leverage existing core VSE investments
 - low cost, low risk, fast time-to-market for new solutions
 - new line-of-business applications
- Low TCO and infrastructure simplification



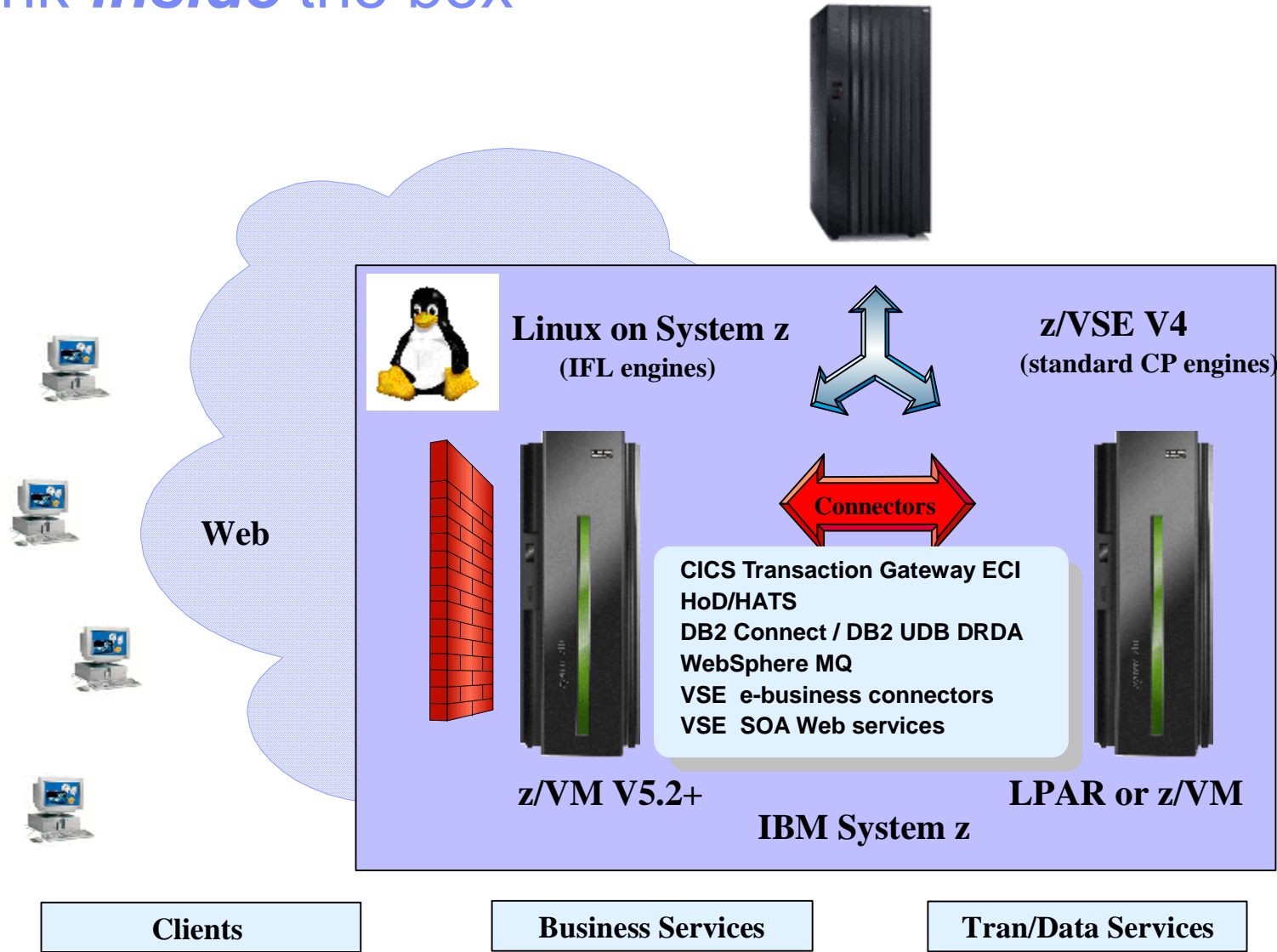
z/VSE and z/OS Affinity



z/VSE Strategy – based on a Hybrid model

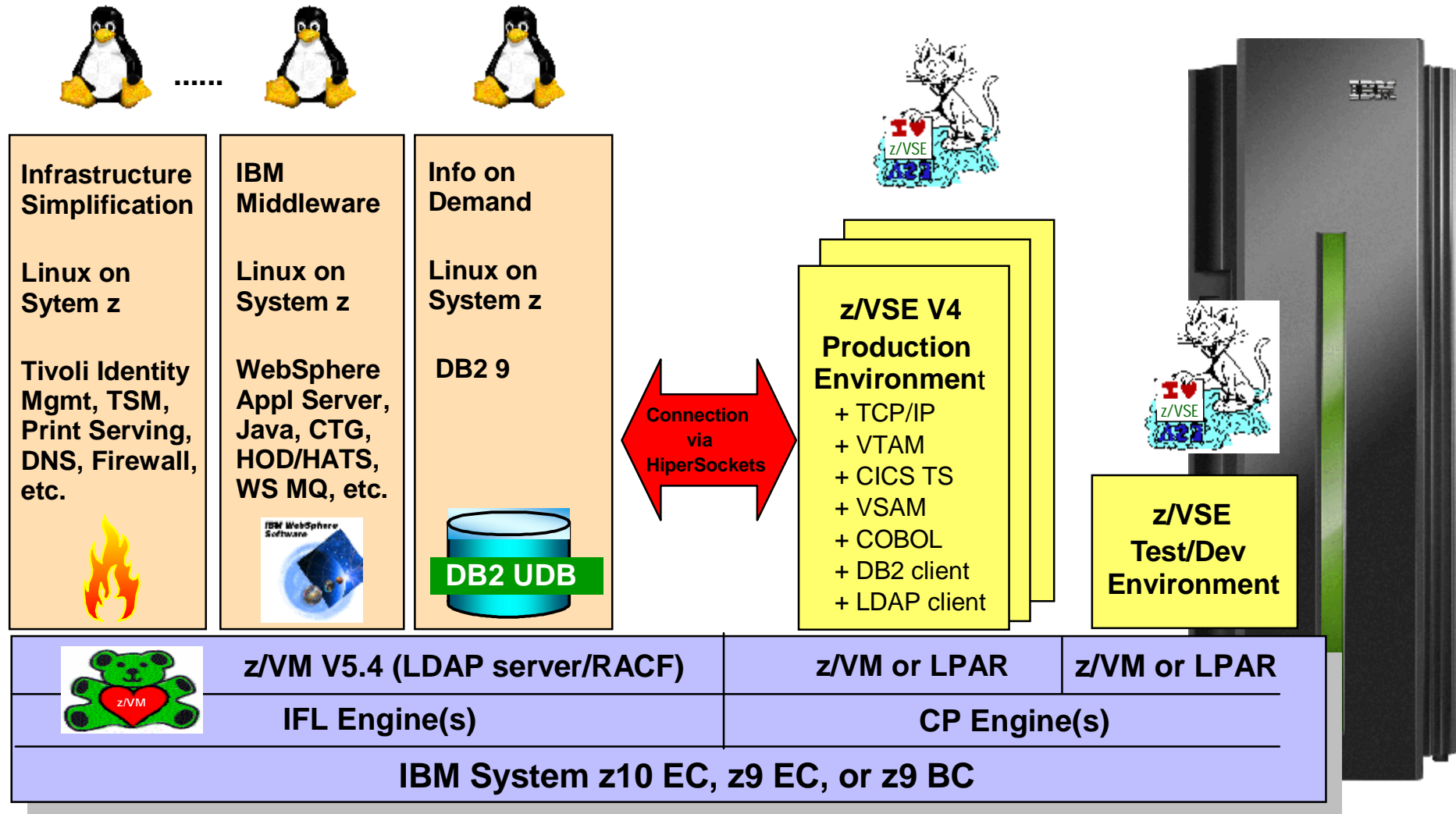


Think *inside* the box



z/VSE Vision

Hybrid environment leveraging z/VSE V4, z/VM V5, and Linux on System z





z/VSE Version 4 Release 2.1 available since July 17, 2009



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 V4.2.1 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- 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 Statement of Direction (SoD)*



§ Delivering on the SoD:

- New Enterprise Generation Language (EGL) extension to Rational Business Developer (RBD)
- 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.

More Tasks



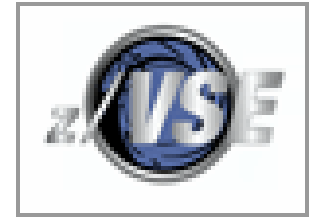
§ Up to 512 concurrent VSE tasks

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

§ Potential benefits

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

Parallel Access Volumes (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

§ Potential Performance Gain

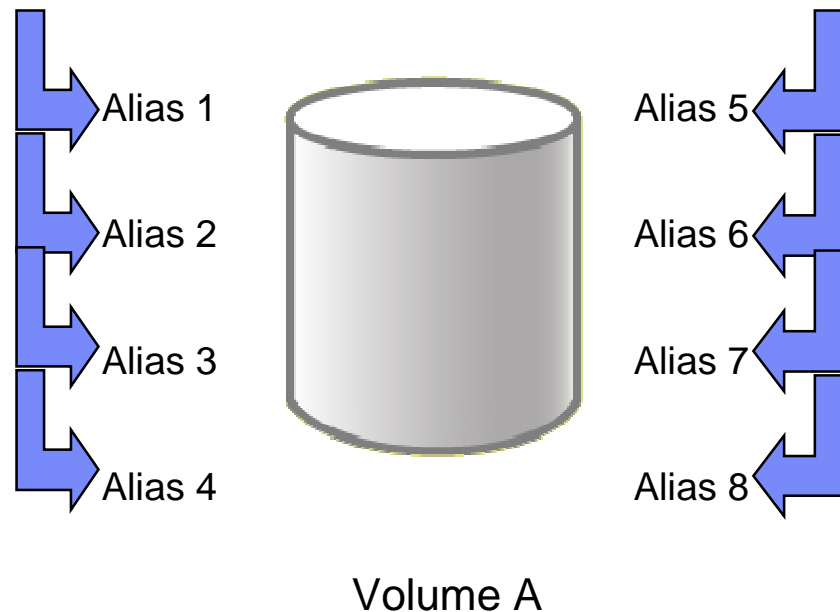
- multiple jobs, multiple partitions, CICS
- gains are highly dependent on workload

§ PAV Candidates

- VSAM catalogs, shared clusters, libraries
- Spool files, work files, log files

§ PAV is an optional, licensed feature of IBM DS8000, DS6000, and ESS

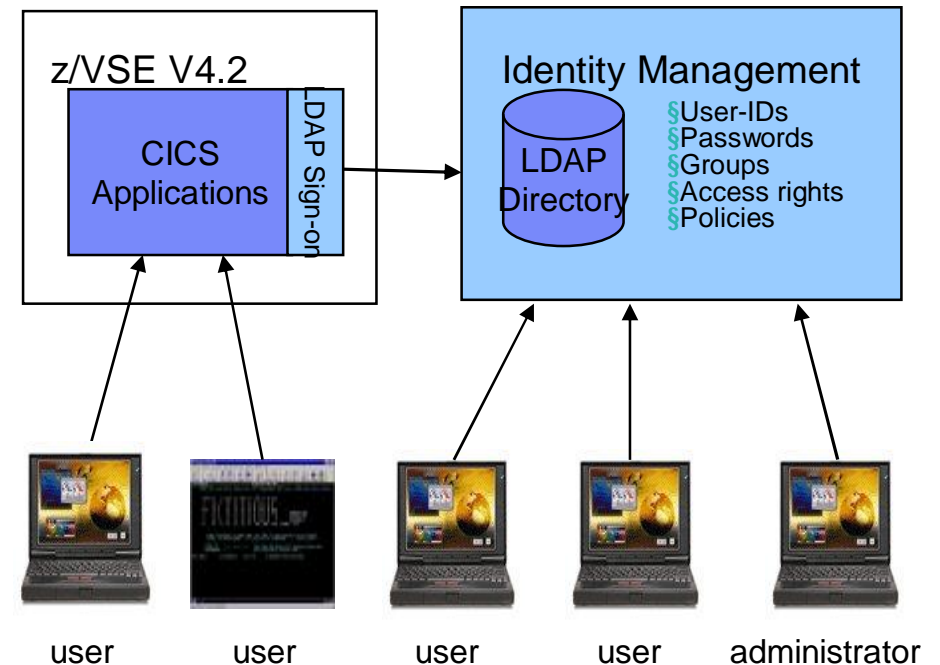
- no changes needed for application programs





LDAP Client

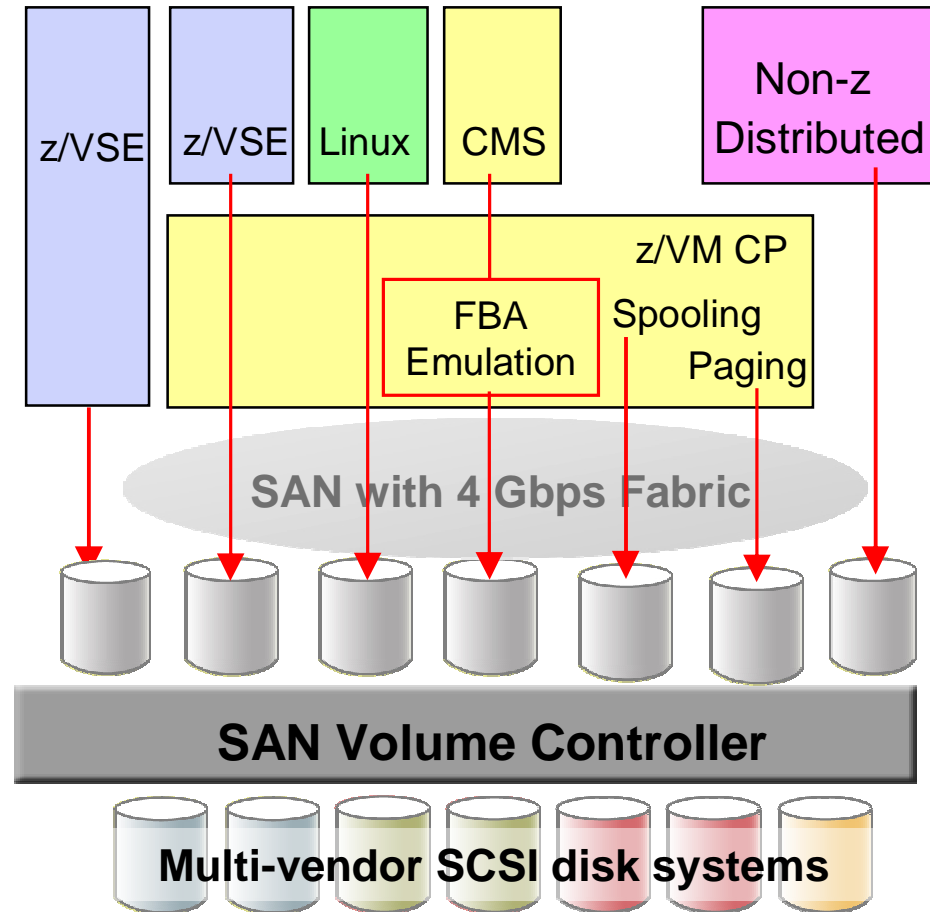
- § Enables users to sign on to z/VSE using single, comprehensive, corporate-wide 'Identity Management' systems (i.e. IBM Tivoli Identity Manager, etc.)
- § LDAP user-IDs and passwords can be up to 64 characters. Helps overcome current VSE limits
 - 4 character VSE/ICCF user-IDs
 - 4 and 8 character 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 the common LDAP servers
 - IBM Tivoli Directory server
 - z/VM LDAP server (optional RACF repository)
 - Microsoft Active Directory, OpenLDAP, Apache Directory server, CA Directory, Novell eDirectory, and many others.





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 hardware 'nodes' provide redundant components plus cache
 - Systems Storage Productivity Center (SSPC) software provides administrative and copy services
- § **SVC helps create a simpler, more flexible, less costly disk storage infrastructure**
- § **Also supported in z/VM V5.3 and later, as well as Linux on System z**



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

IBM System Storage TS7700 Virtualization Engine Release 1.5



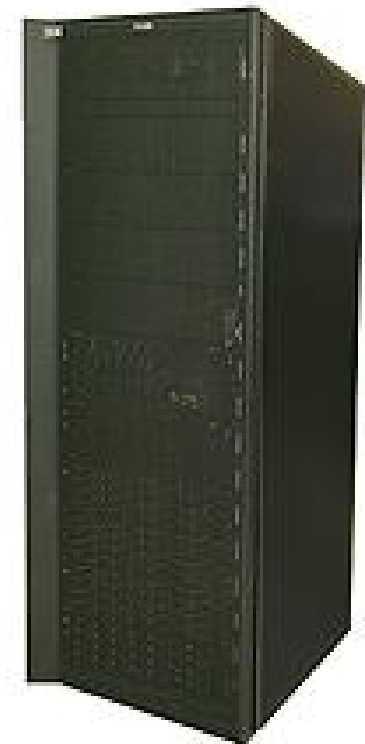
§ TS7720 is a new member of IBM's family of virtualization products

- 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

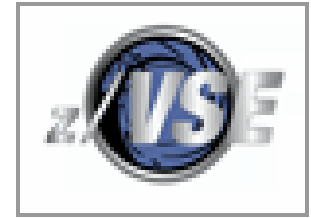
§ TS1130 Model E06 and Model EU6 Tape Drive support

The TS7700 Virtualization Engine tape solution is well suited for

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



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

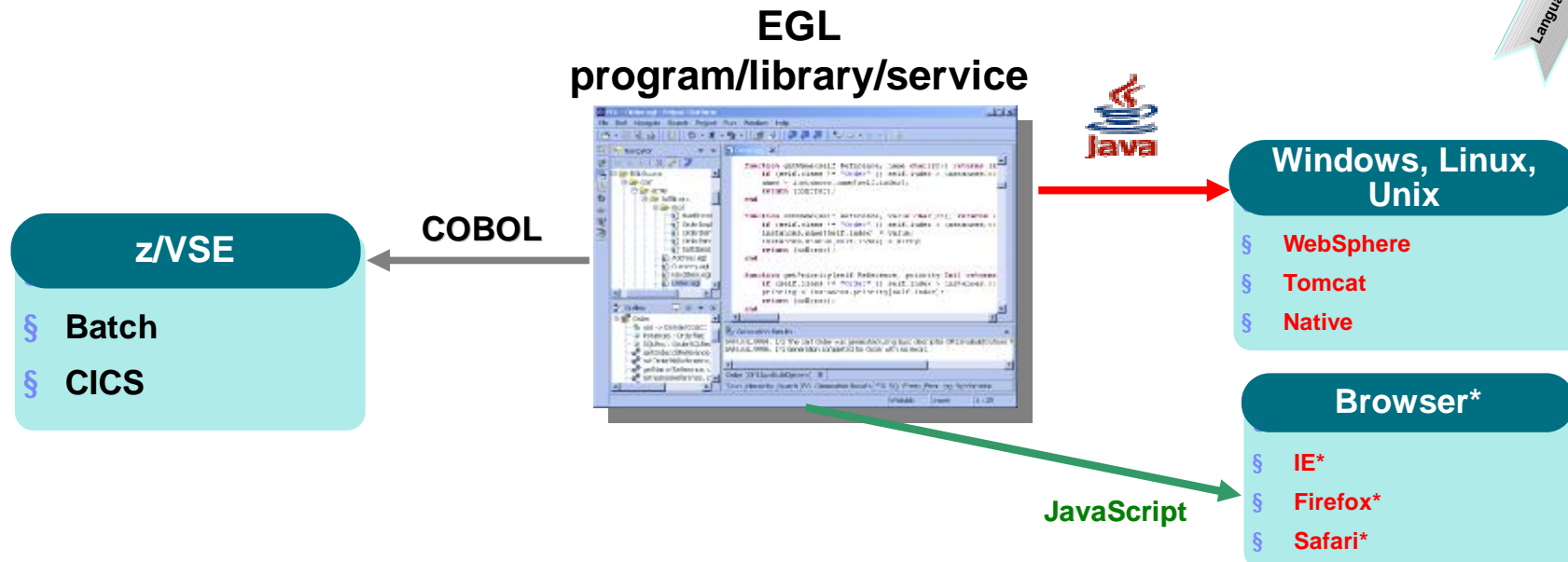
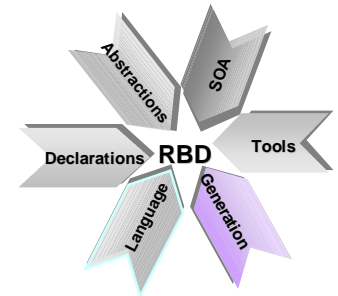
- Reliable application connectivity
- SOA connectivity with a proven messaging backbone
- Universal, multipurpose data transport





Modern Development Environment with RBD

- § Continued 4GL support for z/VSE is available
- 1. z/VSE host component: **IBM Rational COBOL Runtime for z/VSE V7.5**
 - Replaces the VisualAge Generator Server for VSE
- 2. 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)





z/VSE Encryption Technology

System z Hardware Encryption Assist

§ CPACF

- Symmetric Encryption
 - used for encrypting 'bulk' data
- Additional instructions
- No charge feature on z990/890, z9 EC/BC, and z10 EC/BC

§ Crypto Express2

- Asymmetric Encryption (Public/Private key pair)
 - used in SSL session initiation
- Coprocessor Card
- Priced feature on z9 EC/BC and z10 EC/BC



Hardware Crypto Support on System z and z/VSE

by release

	z/VSE 4.2	z/VSE 4.1	z/VSE 3.1	VSE/ESA 2.7	VSE/ESA 2.6/5/4..
CPACF	Yes	Yes	Yes	-	-
PCICA	Yes	Yes	Yes	Yes	-
PCIXCC	Yes	Yes	-	-	-
CEX2C	Yes	Yes	Yes	-	-
CEX2A	Yes	Yes	Yes	-	-

	S/390	z800	z900	z890	z990	z9	z10
CPACF	-	-	-	Yes	Yes	Yes	Yes
PCICA	-	Yes	Yes	Yes	Yes	-	-
PCIXCC	-	-	-	Yes	Yes	-	-
CEX2C	-	-	-	Yes	Yes	Yes	Yes
CEX2A	-	-	-	-	-	Yes	Yes

by server



CEX2C = Crypto Express2 in coprocessor mode

CEX2A = Crypto Express2 in accelerator mode

See: <http://www.ibm.com/systems/z/security/cryptography.html>

z/VSE V4 Exploitation of Hardware Cryptography

Functions	z/VSE V4.2	z/VSE V4.1
CP Assist for Cryptographic Function (i.e DES, TDES, etc.)	Yes	Yes
.....CPACF z9 extensions (i.e. AES 128-bit, etc.)	Yes	Yes
.....CPACF z10 extensions (i.e. AES 256-bit, etc.)	Yes	Yes
Crypto Express2 (SSL clear key encryption assist) – 2P & 1P	Yes	Yes
.....Crypto Express2 (configurable)	Yes	Yes
.....Crypto Express2 2048-bit RSA keys	Yes	Yes

Encryption in TCP/IP for z/VSE

SSL (Secure Socket Layer)

- § SSL is part of TCP/IP for z/VSE
- § Supports SSL 3.0 and TLS 1.0
 - Key exchange: RSA (asymmetric)
 - Data Encryption: DES and Triple DES, AES (symmetric)
 - Hash algorithm: MD5, SHA
 - Supports X.509v3 PKI Certificates
- § SSL daemon implementation for HTTPS, Telnet
- § SSL API compatible with the OS/390 SSL API
- § Transparently uses Hardware Crypto acceleration *if available*



SecureFTP

- § The FTP protocol provides an easy and straight-forward protocol for transferring files between systems on different platforms
 - Many installations rely on it to efficiently transmit critical files that can contain vital information such as customer names, credit card account numbers, social security numbers, corporate secrets and other sensitive information
 - FTP protocol transmits data without any authentication, privacy, or integrity
- § SecureFTP provides user authentication, privacy, and integrity by using RSA digitally signed certificates, DES encryption and SHA-1 secure hash functions
 - SecureFTP is integrated into TCP/IP with z/VSE V4.1 & later

IBM TS1120 / TS1130 Tape Drive Encryption

§ IBM System Storage TS1120 - first encrypting tape drive

- Standard feature on new TS1120 tape drives
- Supports “traditional” and “encrypted” modes of operation
 - encryption “disabled” unless otherwise specified
- Implements data encryption using AES-256 encryption
- Data is automatically compressed *then* encrypted – no change in media utilization
- Encryption performed with minimal (< 1%) data rate performance impact



TS1120
500 GB
100 MB/sec

§ Systems Managed Encryption with z/VSE V4.2, V4.1, and V3.1

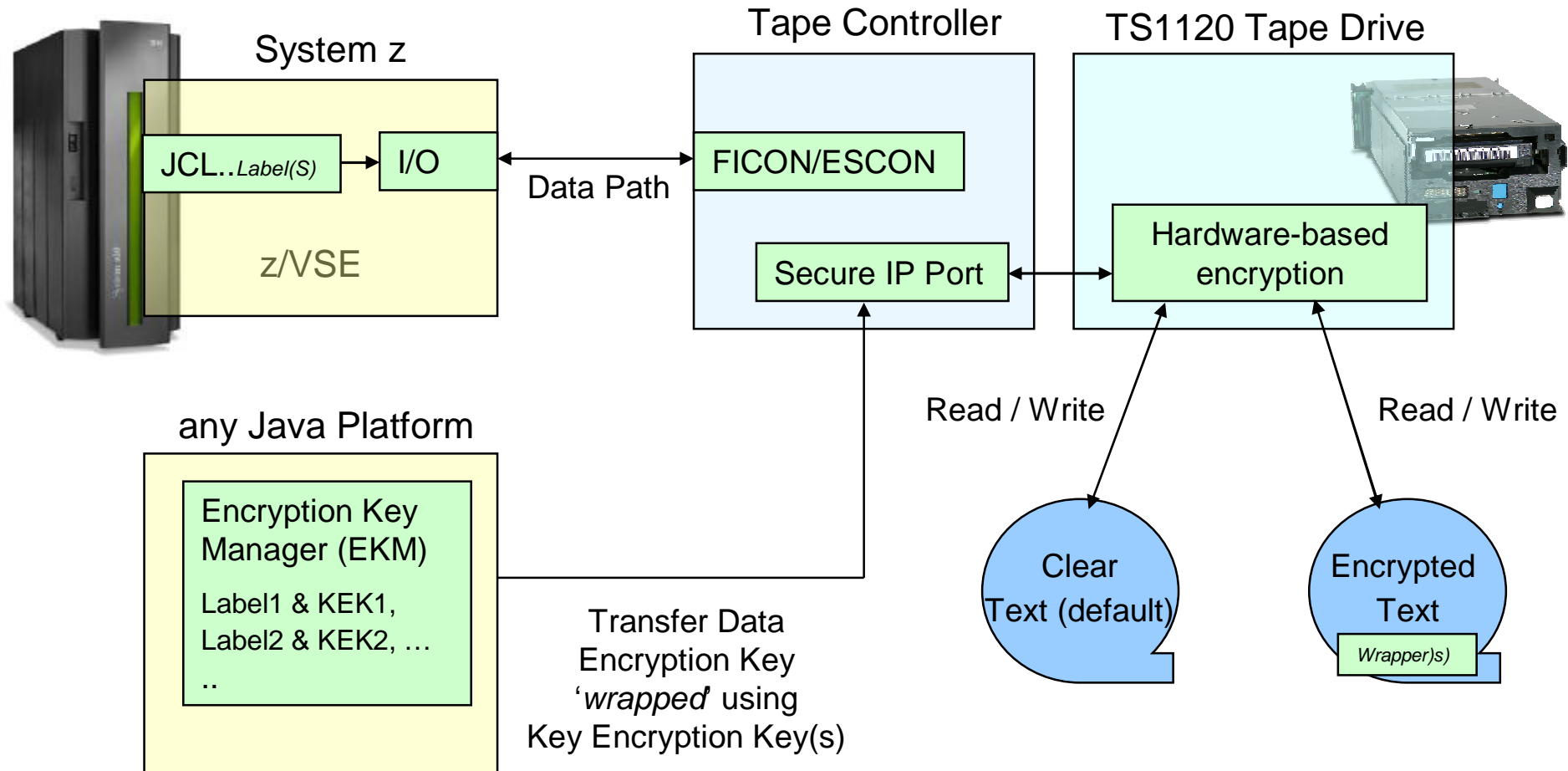
§ IBM Encryption Key Manager (EKM) for Java platform™

- EKM stores and manages *labels* and *key encrypting keys (KEK)*
 - runs on z/OS, AIX, Linux (incl System z), i5/OS, HP, Sun, & Windows
- Secure TCP/IP connection between EKM and TS1120
- ESM supplies data encrypting keys to TS1120 on request
- TS1120 encrypts files using data encrypting key (DEK)
- TS1120 stores *encrypted* data encrypting key on cartridge
 - DEK can be encrypted using two different KEKs

**Encryption Key
Manager**



IBM Tape Encryption – TS1120 / TS1130



IBM Tape Encryption – TS1120 / TS1130

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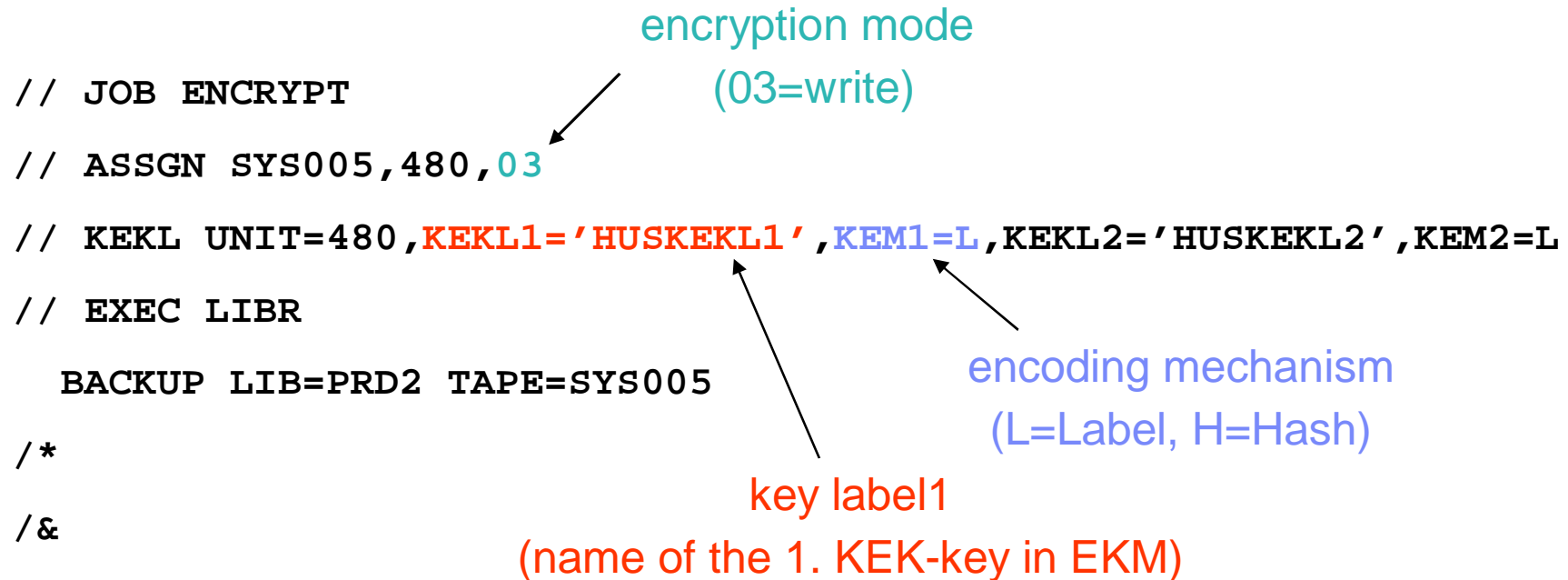
// JOB ENCRYPT
// ASSGN SYS005,480,03
// KEKL UNIT=480,KEKL1='HUSKEKL1',KEM1=L,KEKL2='HUSKEKL2',KEM2=L
// EXEC LIBR
  BACKUP LIB=PRD2 TAPE=SYS005
/*
/ &

```

encryption mode
 (03=write)

key label1
 (name of the 1. KEK-key in EKM)

encoding mechanism
 (L=Label, H=Hash)



- § The Data-Key can be encrypted using 2 different public keys (KEK = Key Encrypting Keys), to be able to send the tape to 2 different receivers
- § More info can be found in the *z/VSE 4.1 Administration* manual (see *z/VSE Homepage*)

Full Disk Encryption on DS8000

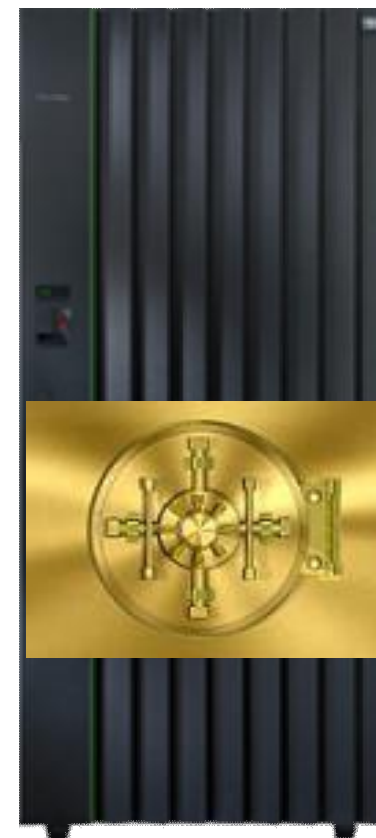
available since July 17, 2009

§ 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
- Loss of critical data



Encryption Facility for z/VSE V1.1 (EF)

available since 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)

- CPACF is a no charge feature on System z10 EC/BC, z9 EC/BC, z990, and z890 servers

§ Protection using Password-based or RSA-based (Public/Private) Key Encrypting Keys

- TCP/IP for VSE/ESA V1.5 required for RSA-based keys
- KEYMAN (or equivalent) no charge, downloadable tool recommended for RSA-based keys

§ Option to compress data (compression must occur prior to encryption)

§ Extends affinity between z/VSE and z/OS

- function roughly equivalent to EF for z/OS V1.1
- data format compatible with EF for z/OS V1.1/1.2 (Encryption Facility System z format)
 - EF for z/VSE tapes can be read by 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 / TS1130 is the preferred solution for high volume backup/archive*
- *EF option for limited backup/archive and/or exchange with partners who have no TS1120 / TS1130*

Encryption Facility for z/VSE V1.2 (EF) available since July 17, 2009



§ OpenPGP

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

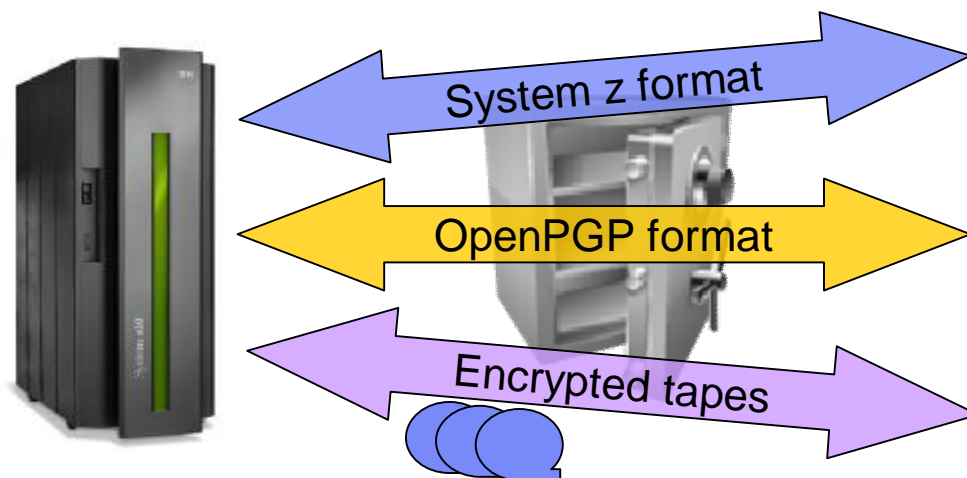
§ Choice of two formats:

- 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 and Crypto Express2



- Data exchange with IBM System z servers
- Data exchange with external business partners
- High volume backup/archive



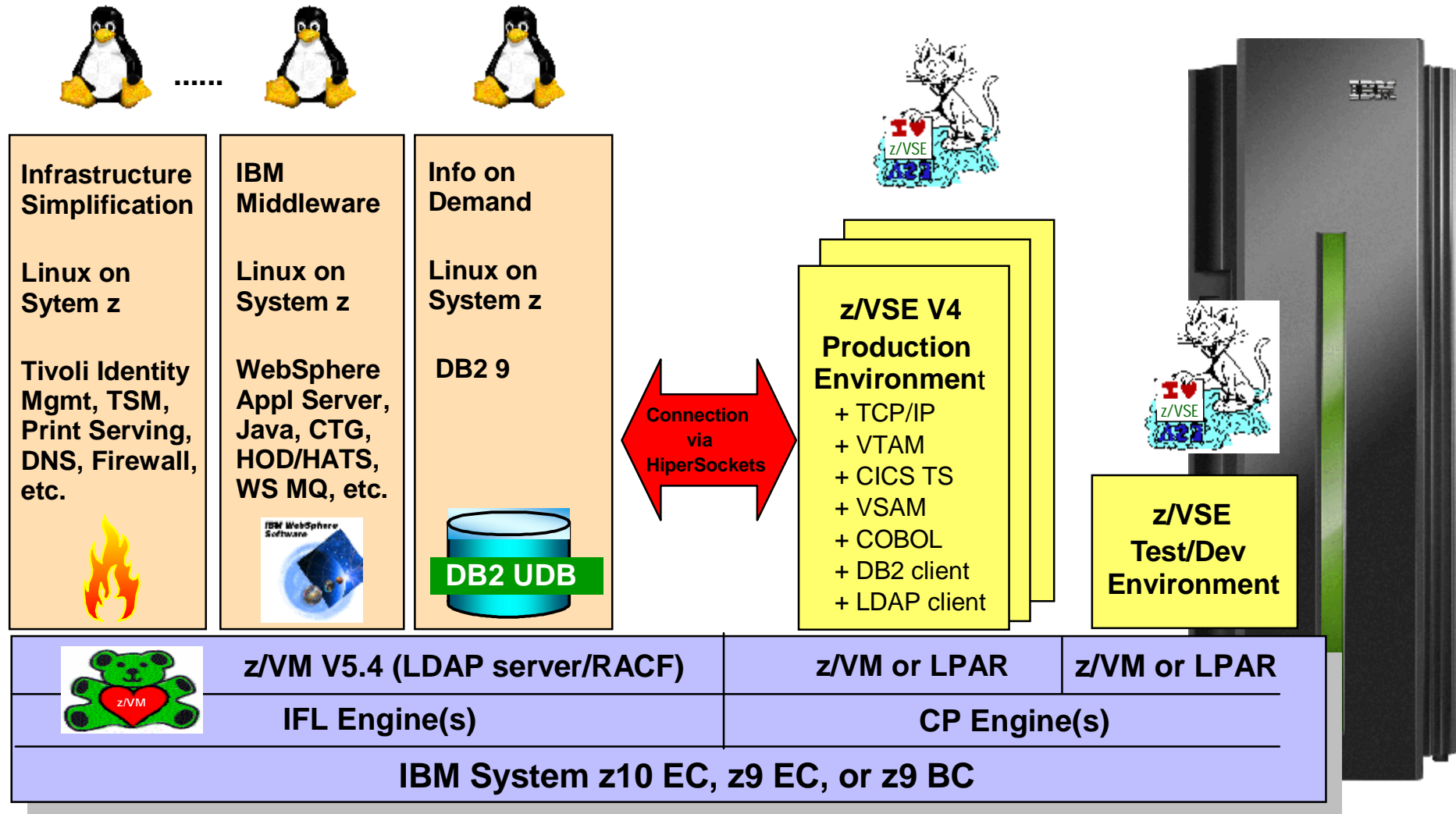
TS1120
TS1130



z/VSE Modernization Options

z/VSE Vision

Hybrid environment leveraging z/VSE V4, z/VM V5, and Linux on System z

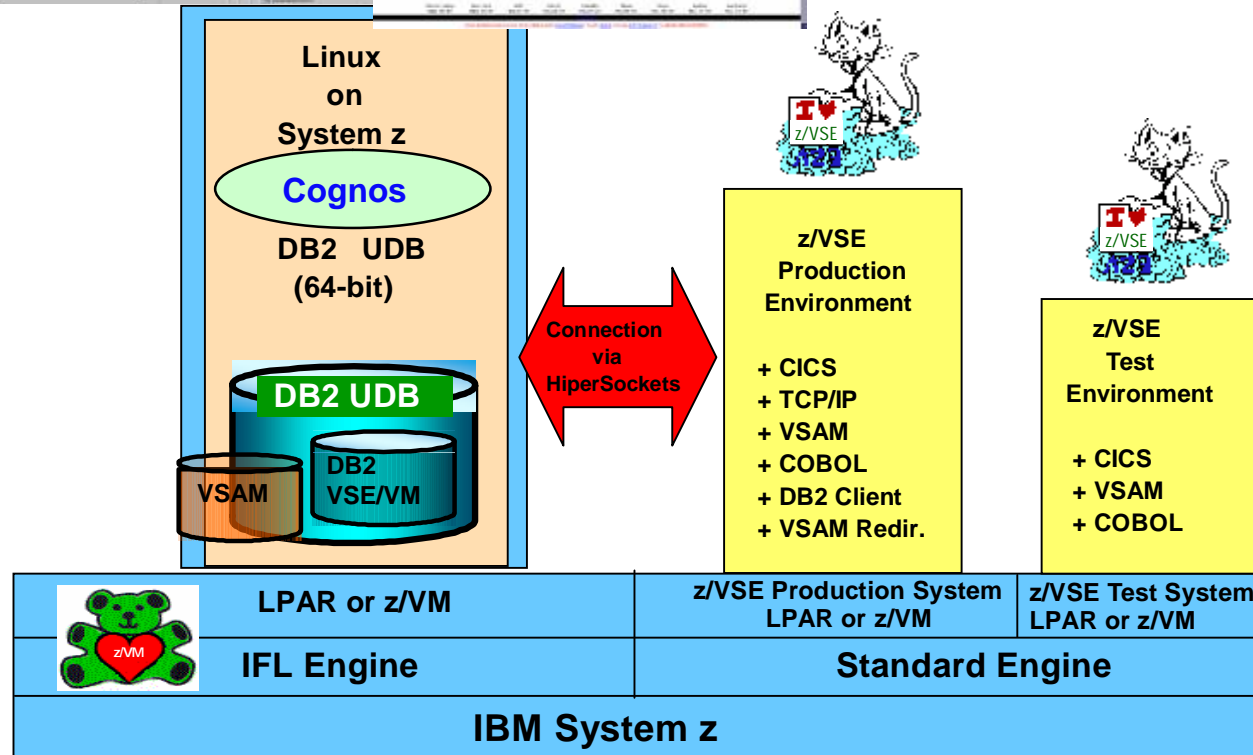
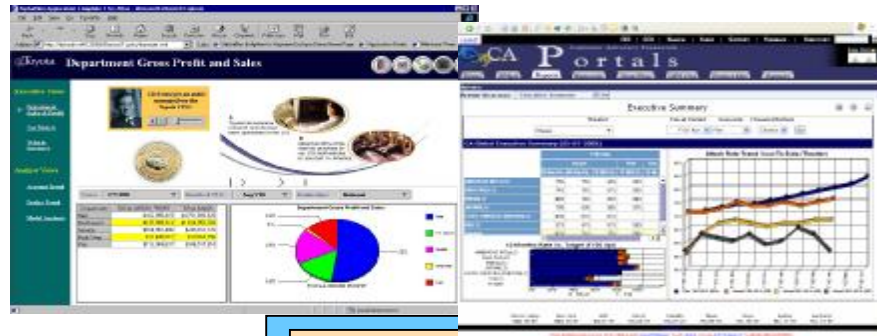


z/VSE SOA and Interoperability

Connector Functions	z/VSE V4.2	z/VSE V4.1
VSE Connectors (no additional charge)		
VSAM, POWER, Librarian, ICCF lib, console	Yes	Yes
VSAM Redirector	Yes	Yes
SOA Web Services, i.e. SOAP and XML	Yes	Yes
z/VSE Script and DL/1	Yes	Yes
DB2 Stored Procedures for VSAM and DL/1	Yes	Yes
VTAPE interface to IBM Tivoli Storage Manager (TSM)	Yes	Yes
LDAP client (LDAP server on another platform required)	Yes	
IBM Middleware (priced)		
CICS Transaction Gateway ECI	Yes	Yes
Host on Demand / Host Application Transformation	Yes	Yes
DB2 Connect/DB2 UDB (DB2 Server for z/VSE V7.5 Client)	Yes	Yes
WebSphere MQ (z/VSE Client no charge)	Yes	Yes

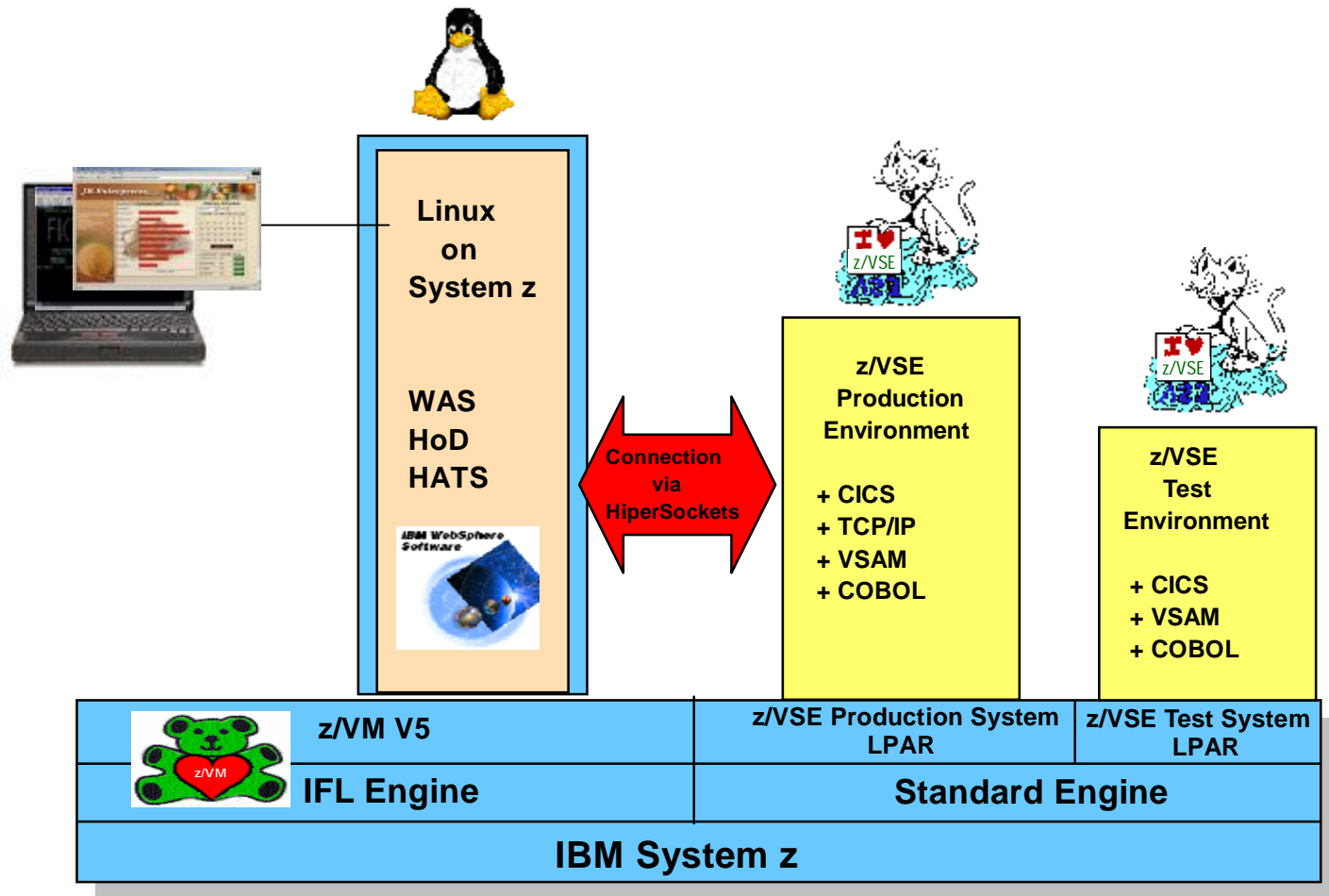
Scenario 1: DB2 LUW for z/VSE Customers

Data consolidation & data warehouse solutions with DB2 UDB on System z



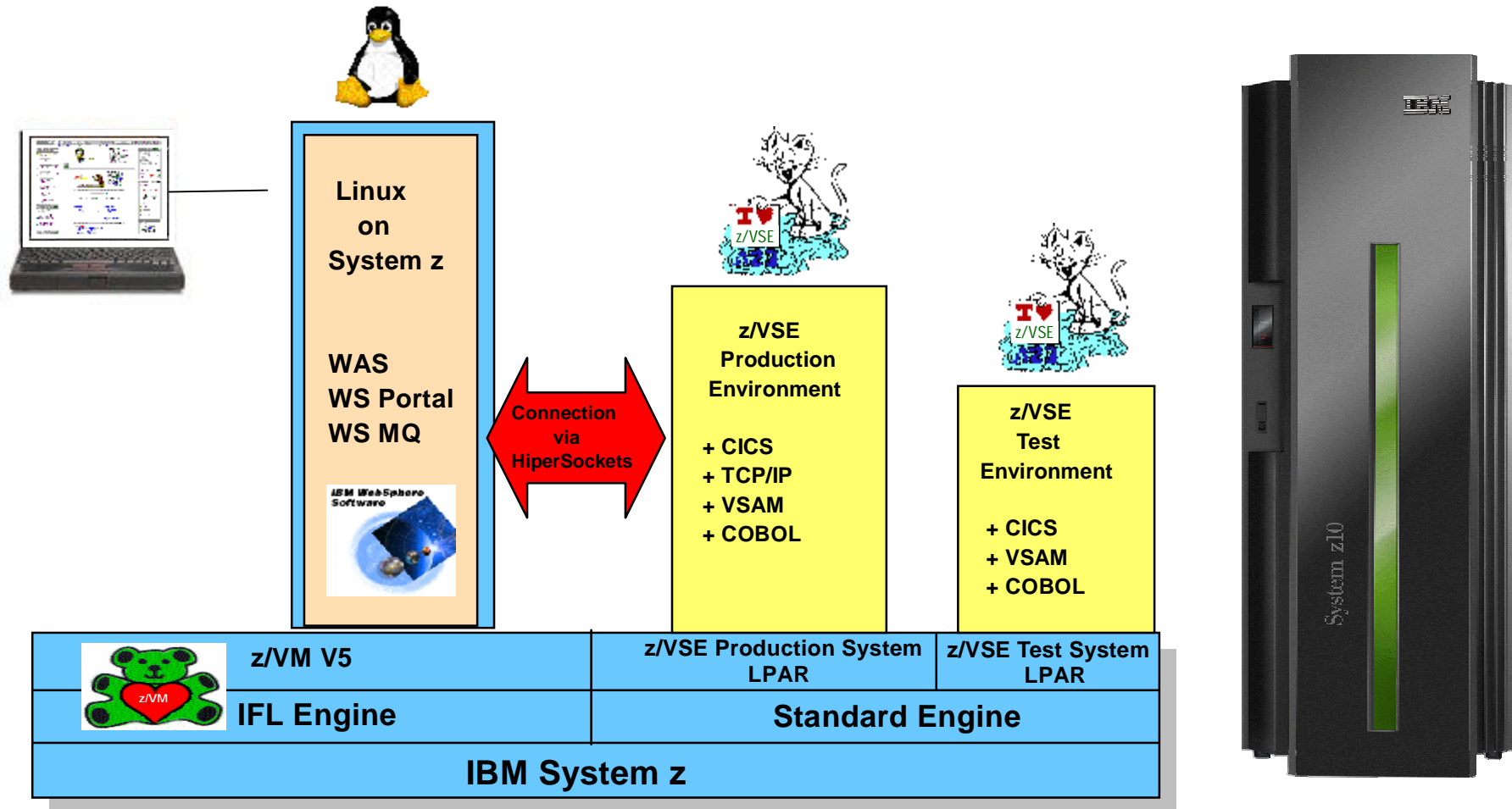
Scenario 2: “Webification“ for z/VSE Applications

Web enable existing applications with Inter/Intranet frontend



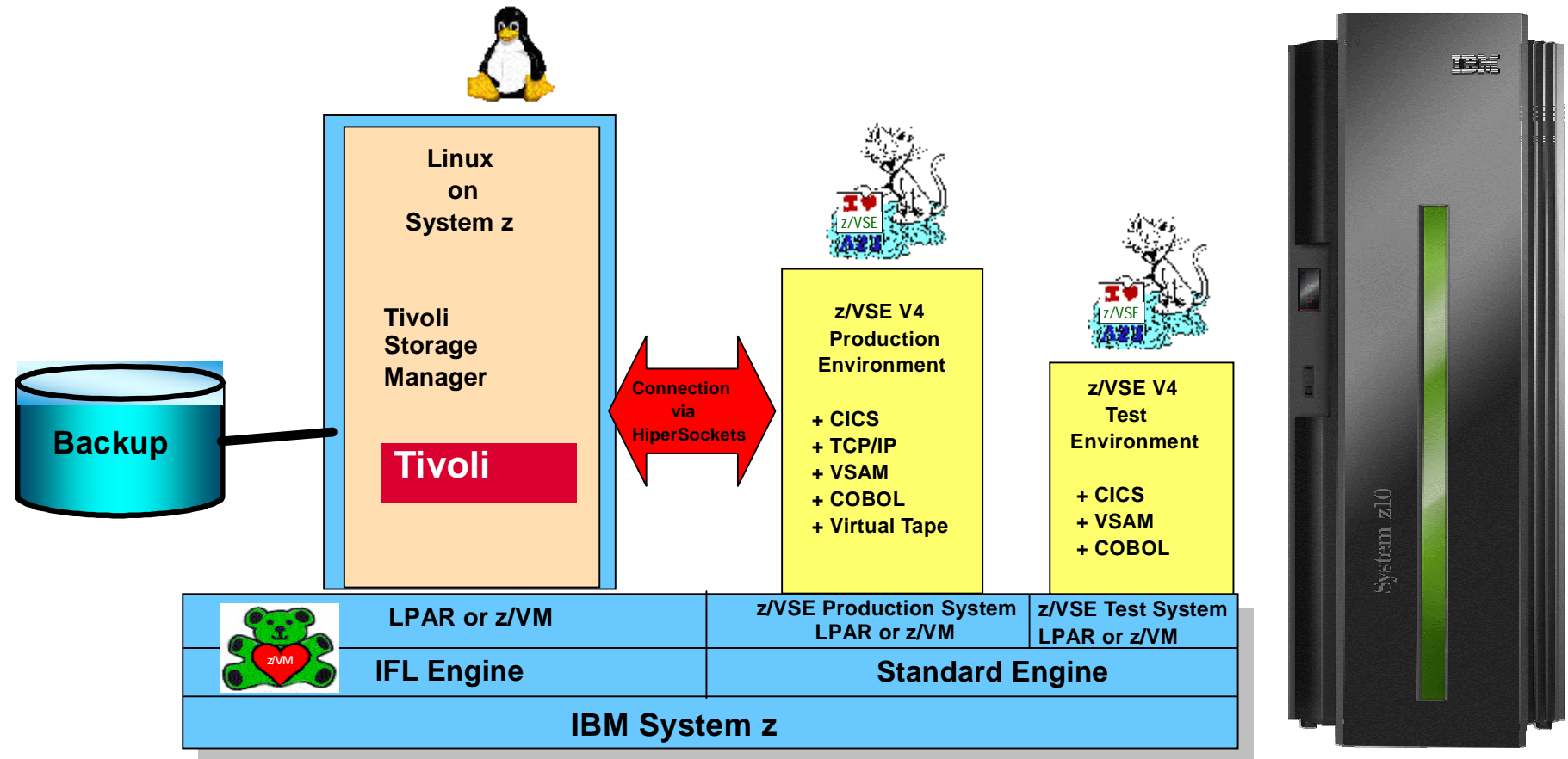
Scenario 3: WebSphere Portal for z/VSE Customers

A portal for administration & integration of employees/customers/providers



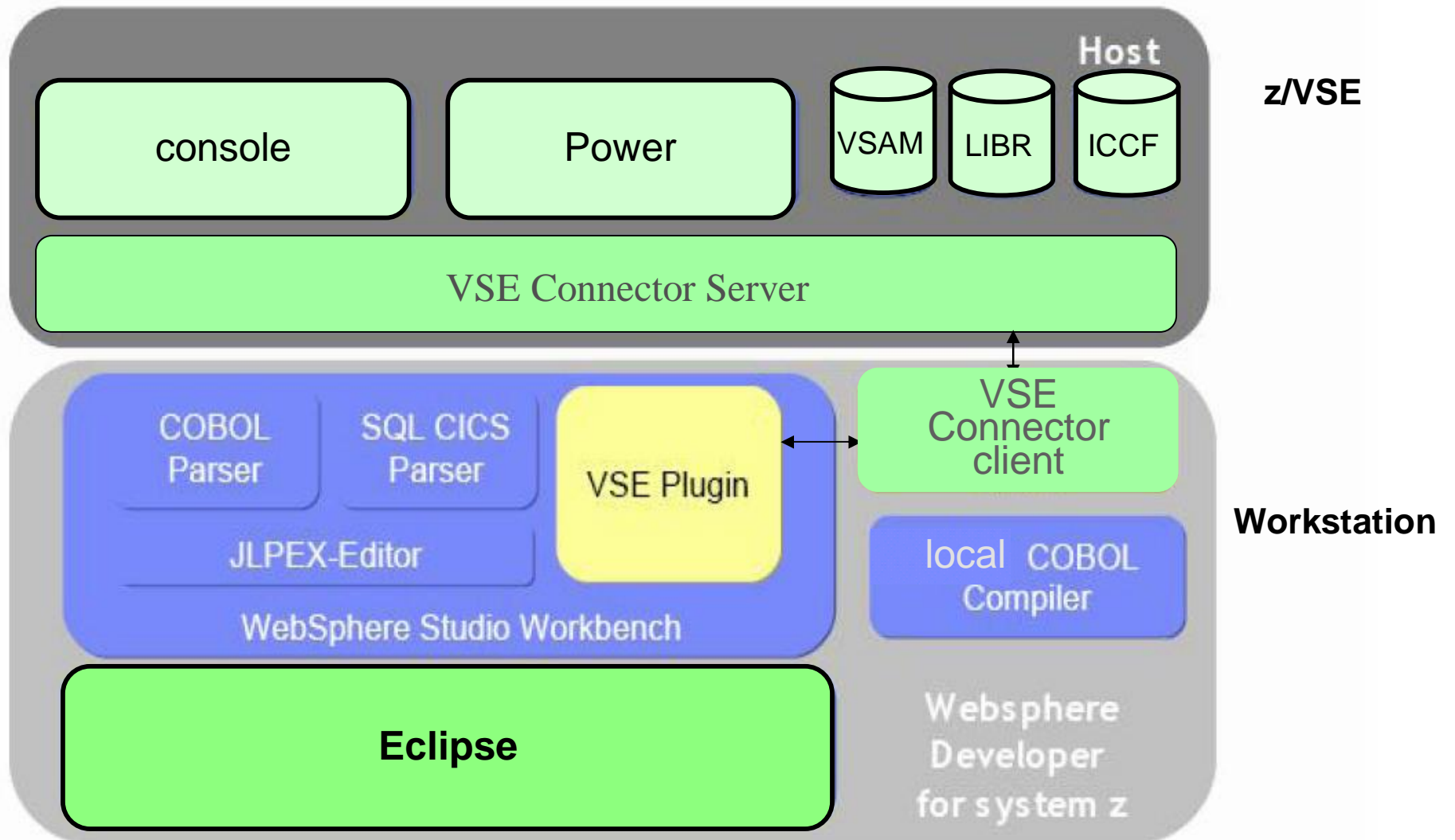
Scenario 4: Backup / Restore Concept for z/VSE

Integrate z/VSE with TSM on Linux on System z

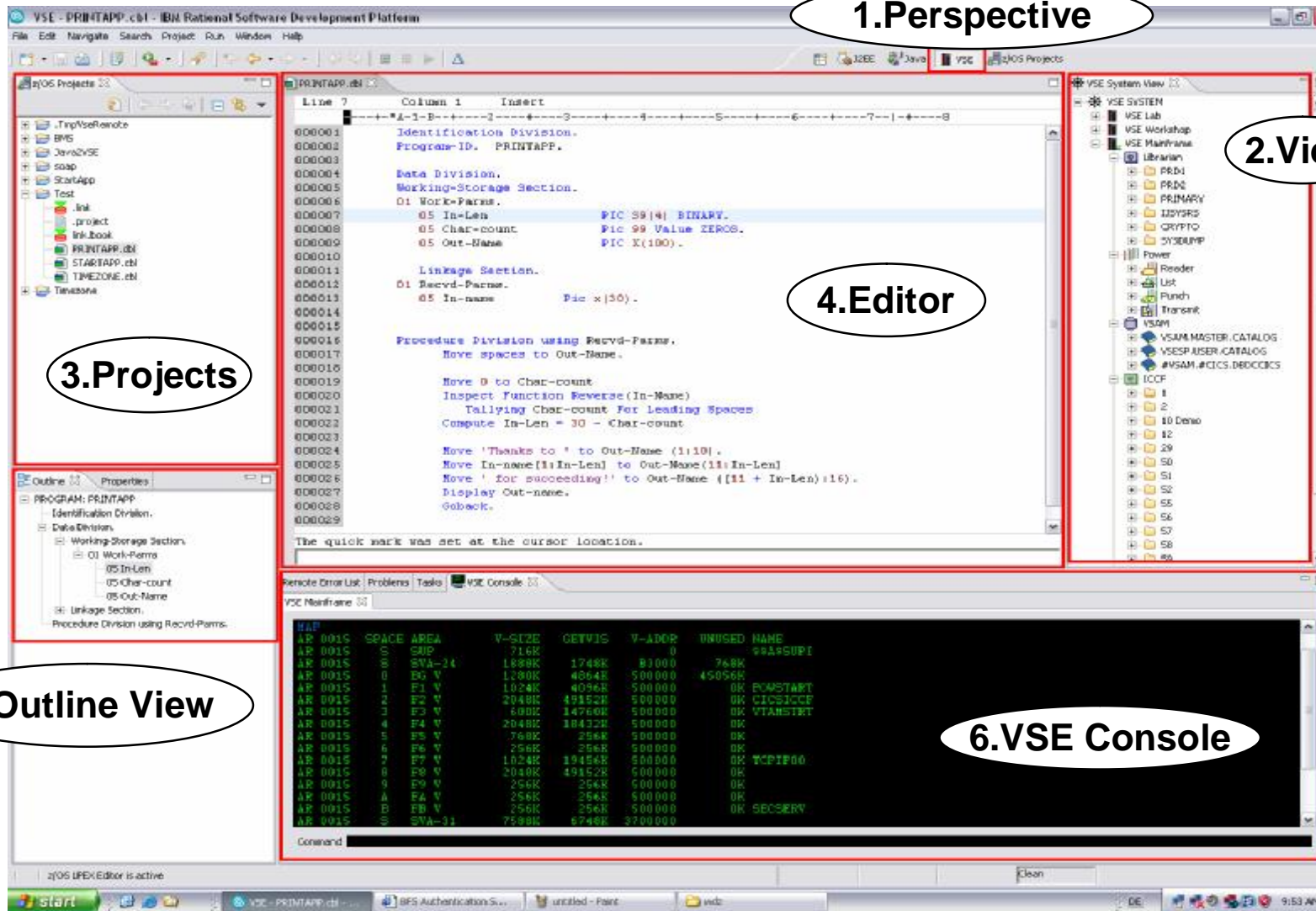


Scenario 5: Application Development

Modern Appl Dev with Eclipse and Rational Developer (RDz) for System z



IBM Rational Developer from z/VSE Perspective



1.Perspective

2.View

4.Editor

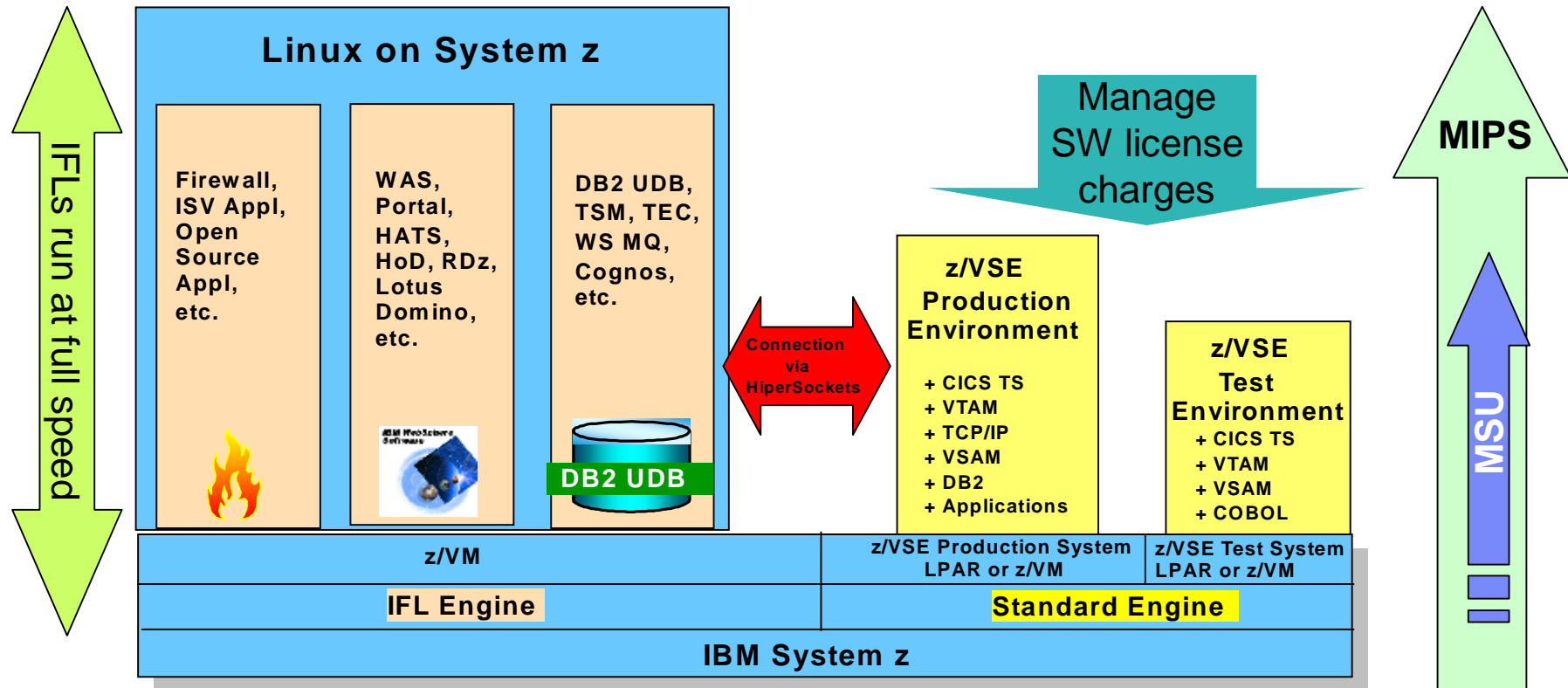
3.Projects

5.Outline View

6.VSE Console

Combine the Scenarios, Manage Software Cost

- P**rotect existing z/VSE investments
- I**ntegrate using middleware and z/VSE connectors
- E**xtend with Linux on IBM System z technology & solutions

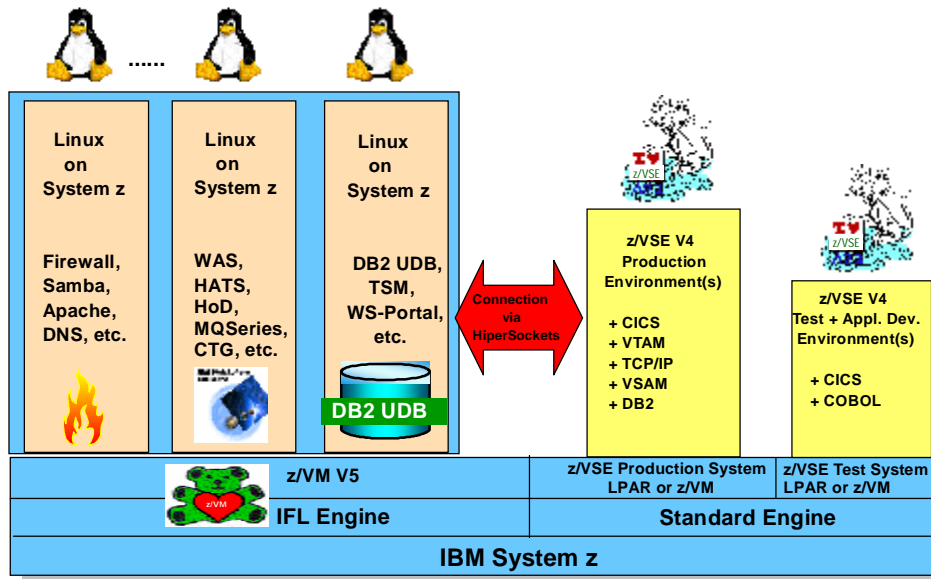




Summary / Wrap-up

z/VSE Strategy enables Customer Growth

with IBM System z, IBM System Storage, and IBM Middleware



§ z/VSE V4

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

§ z/VM V5

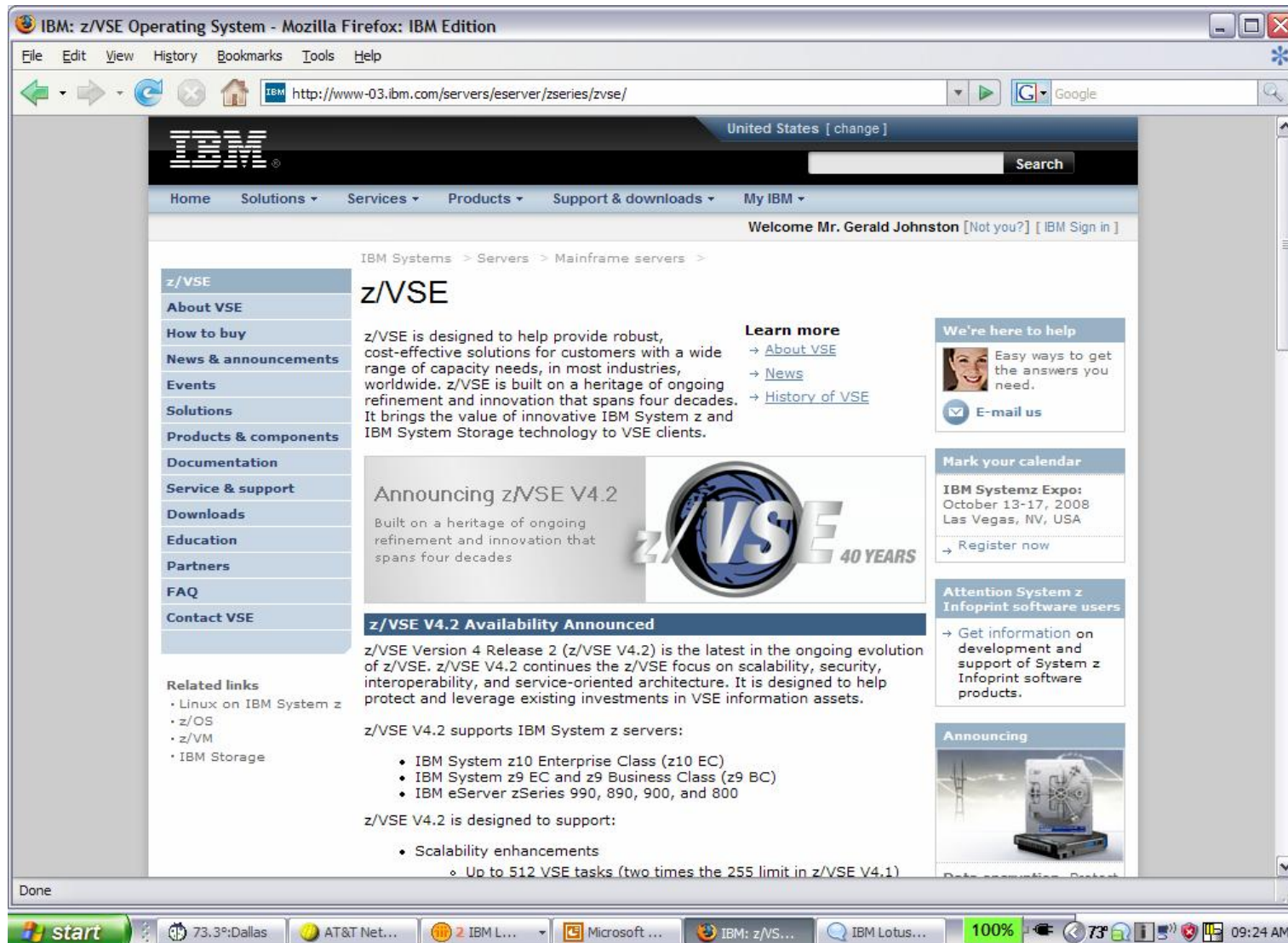
- Highly flexible, industrial strength
- Advanced virtualization
- Multiple z/VSE and Linux images
- Designed to exploit System z10

§ Linux on System z

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



For more information, please see the z/VSE web site:
<http://www-03.ibm.com/servers/eserver/zseries/zvse/>



IBM: z/VSE Operating System - Mozilla Firefox: IBM Edition

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- Linux on IBM System z
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- z/VM
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z/VSE

z/VSE is designed to help provide robust, cost-effective solutions for customers with a wide range of capacity needs, in most industries, worldwide. z/VSE is built on a heritage of ongoing refinement and innovation that spans four decades. It brings the value of innovative IBM System z and IBM System Storage technology to VSE clients.

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Announcing

Announcing z/VSE V4.2

Built on a heritage of ongoing refinement and innovation that spans four decades

z/VSE V4.2 Availability Announced

z/VSE Version 4 Release 2 (z/VSE V4.2) is the latest in the ongoing evolution of z/VSE. z/VSE V4.2 continues the z/VSE focus on scalability, security, interoperability, and service-oriented architecture. It is designed to help protect and leverage existing investments in VSE information assets.

z/VSE V4.2 supports IBM System z servers:

- IBM System z10 Enterprise Class (z10 EC)
- IBM System z9 EC and z9 Business Class (z9 BC)
- IBM eServer zSeries 990, 890, 900, and 800

z/VSE V4.2 is designed to support:

- Scalability enhancements
 - Up to 512 VSE tasks (two times the 255 limit in z/VSE V4.1)

Done

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