



E12

z/VSE Status

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IBM
SYSTEM z9 AND zSERIES EXPO
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FlashCopy*		IBM System z9
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Agenda

- Roadmap
- VSE strategy
- VSE e-business connectors
- z/VSE 3.1
 - Exploitation of
 - SCSI disks
 - zSeries processors
 - IBM TotalStorage devices
- z/VSE 4.1 Preview
- Documentation

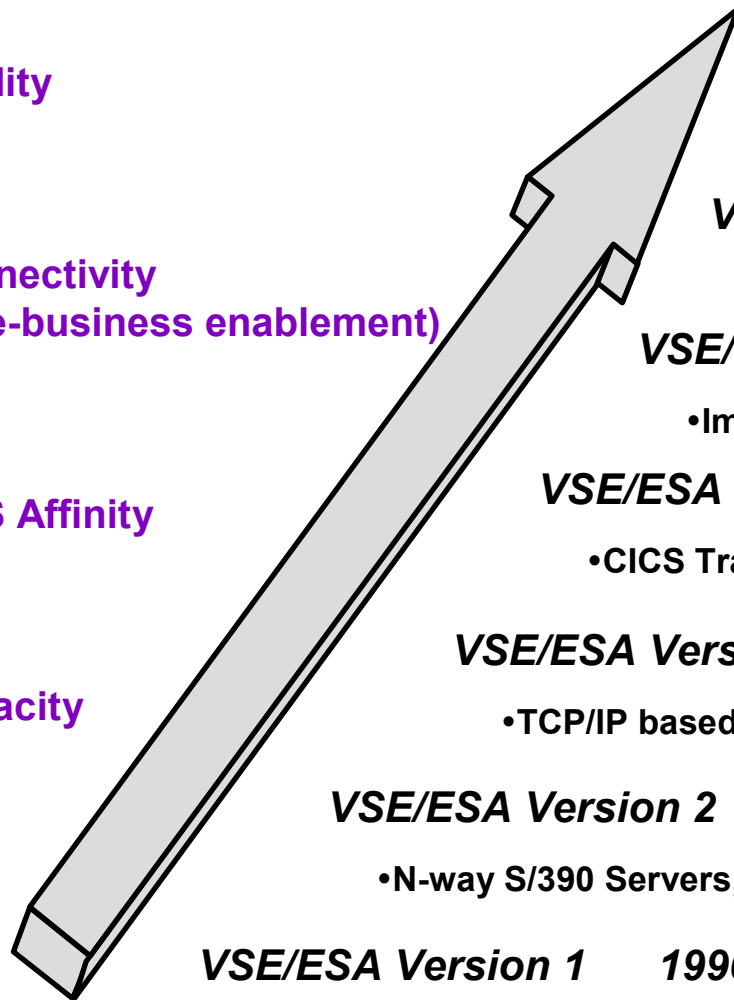
VSE/ESA Roadmap

Quality

Connectivity
(e-business enablement)

z/OS Affinity

Capacity



z/VSE 3.1 ***March 2005***

- Focus on zSeries and infrastructure simplification

VSE/ESA V2.7 ***March 2003***

- Extends interoperability, e.g. to Linux on zSeries

VSE/ESA V2.6 ***December 2001***

- Interoperability continued

VSE/ESA V2.5 ***September 2000***

- Improved Interoperability

VSE/ESA V2.4 ***June 1999***

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

VSE/ESA Version 2.3 ***1997***

- TCP/IP based communication

VSE/ESA Version 2 ***1994***

- N-way S/390 Servers, Investment Protection - Year 2000

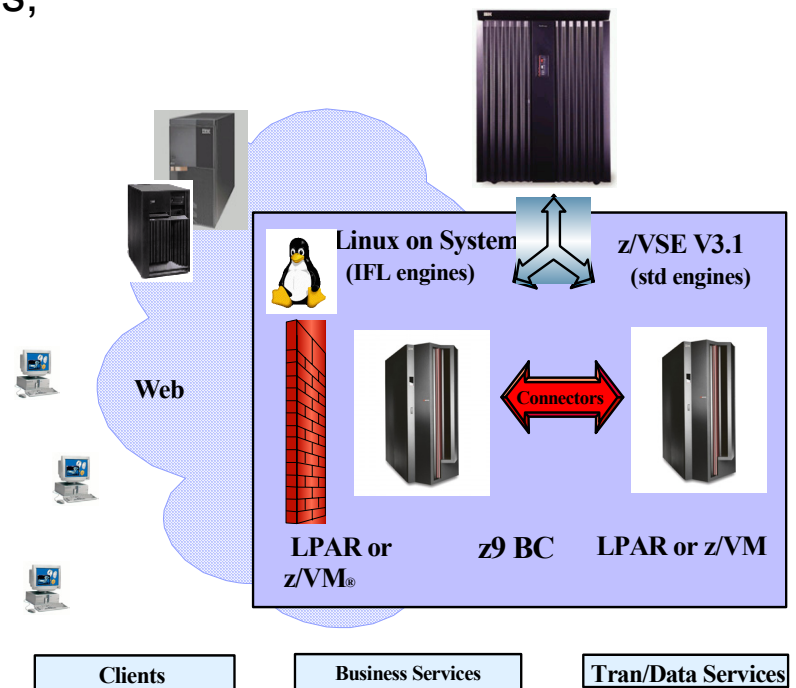
VSE/ESA Version 1 ***1990***

- Constraint Relief, ESA exploitation

VSE Strategy

- Helps **Protect** your existing investments in core VSE programs, data, equipment, IT skills, *plus* business processes, end user training, etc.
 - modernize, i.e. extend VSE resources to Web
 - exploit IBM servers, storage, and software
- **Integrate** VSE with the rest of your IT based on open and industry standards
 - IBM middleware
 - VSE connectors and web services
- **Extend** with Linux on System z
 - infrastructure consolidation/simplification
 - add new infrastructure and/or line-of-business applications

Why Not Think Inside the Box?

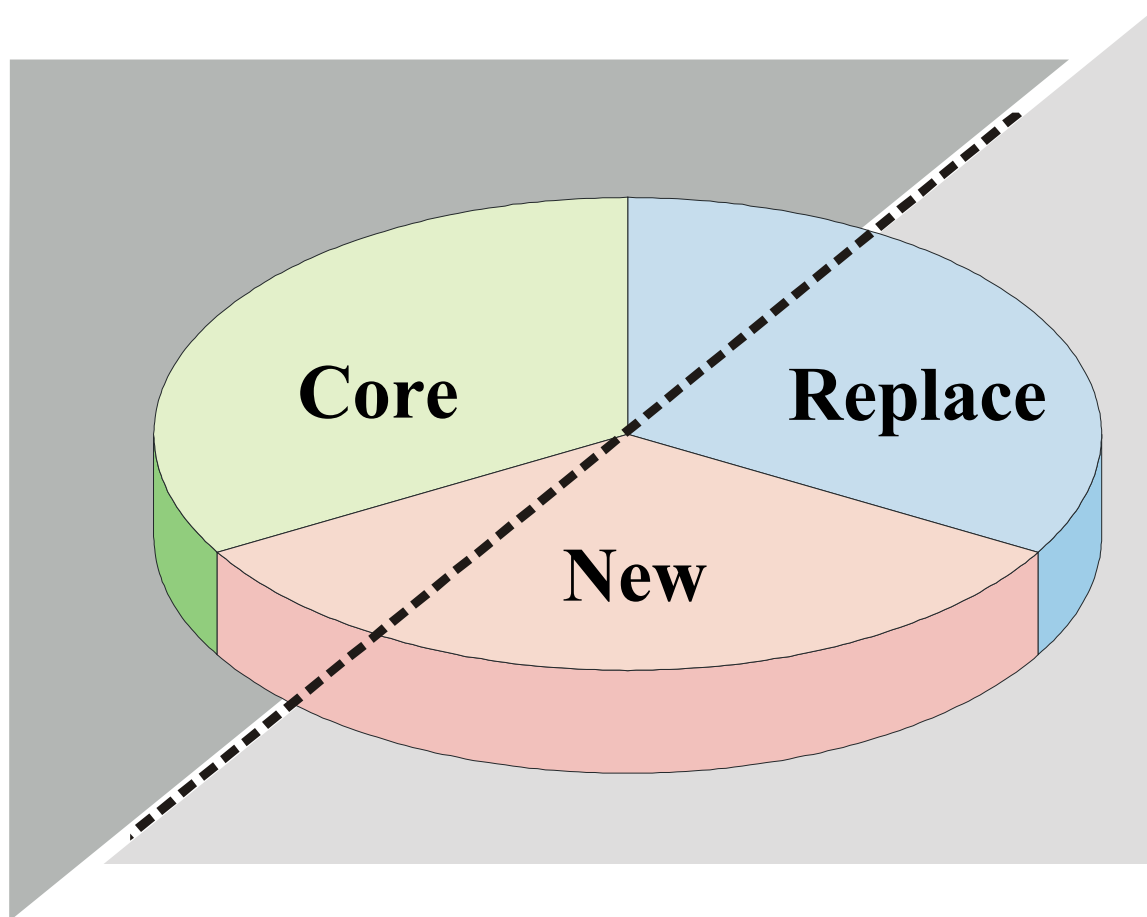


z/VSE ⁽¹⁾ 3.1

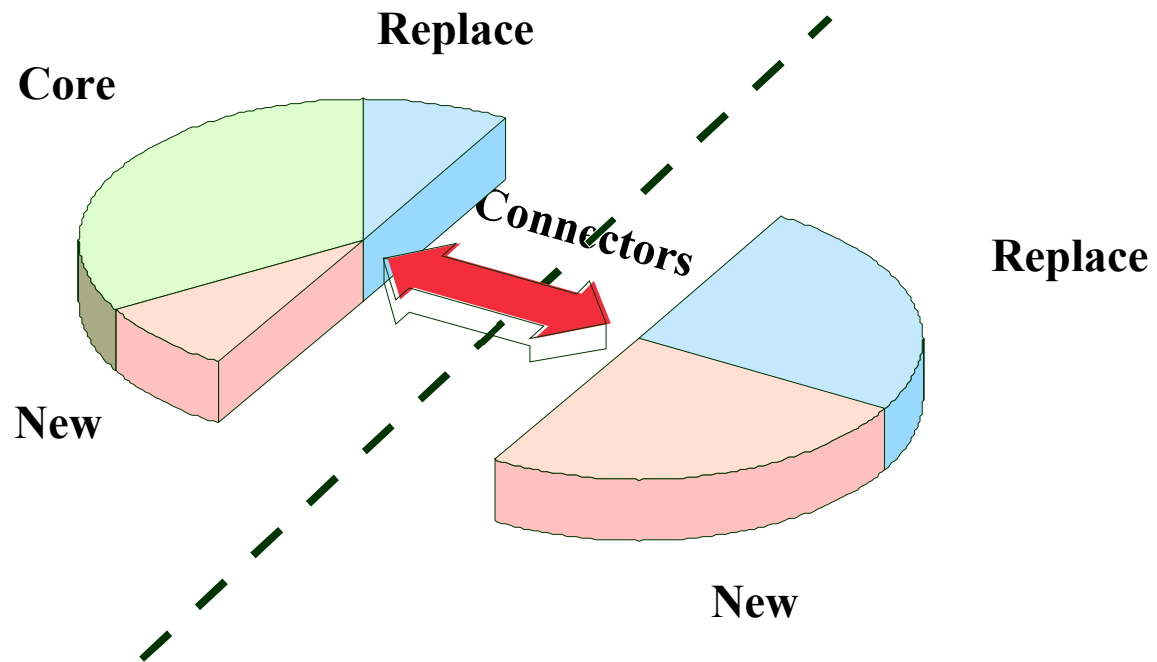
- Helps **Protect** investments in your core VSE assets
 - **Fibre Channel Protocol (FCP) Channel attached SCSI disk**
 - HiperSockets, incl spanned HiperSockets
 - PCICA hardware encryption assist
 - Adapter interrupts for OSA-Express
 - OSA-Express, incl Ethernet and Token Ring
 - OSA-Integrated Console Controller
 - Up to 30 LPARs
 - Up to 2 LCSSs on z890 - 4 on z990
 - FICON-Express
- **Integrate** VSE with the rest of your IT
 - VSE Connectors and web services
 - IBM middleware
- **Extend** with Linux on System z

Note 1: z/VSE can operate in 31-bit mode only. It does not implement z/Architecture and specifically does not implement 64-bit mode capabilities. z/VSE is designed to support selected features of the IBM System z platform.

Customer Application Portfolio:



Integrating Hybrid Environments



VSE e-business Connectors

(introduced with VSE/ESA 2.5)

- Easy access to VSE/ESA resources from other systems

- VSE e-business connectors include
 - Server code running on z/VSE
 - JAVA beans, servlets and samples on Java capable clients
 - Such as IBM's WebSphere Application Server
 - which may run on Windows, Linux, AIX, z/OS, ...

- Advantages
 - Exploitation of non-VSE e-business infrastructure
 - Always newest e-business components
 - Java, web server, security
 - Platform independent
 - z/VSE resources can be easily integrated into new e-business applications
 - VSE e-business connectors
 - Other IBM connectors (DB2 Connect, MQ Series client, CICS TS Gateway, ...)

VSE/ESA e-business Connectors ...

- DB2 based connectors for VSAM and DL/I
 - Exploitation of DB2 infrastructure
(JDBC/ODBC, DB2 Connect, DB2 server, DB2 stored procedures)
 - Mapping of SQL requests to VSAM and DL/I data
 - Sample mappings and applications provided
 - Communication via DRDA (SNA or TCP/IP based with DB2 V7 or higher)

- External services based VSE connectors
 - Access to z/VSE resources, such as
VSE/VSAM files, VSE/POWER, VSE/ICCF, VSE Librarian, VSE console,
DL/1, JDBC to VSAM, VSE Print
 - Access provided via
 - external services running on z/VSE
 - Java-based services running on
e.g. web application server environments
 - Java samples are provided
 - Communication TCP/IP based

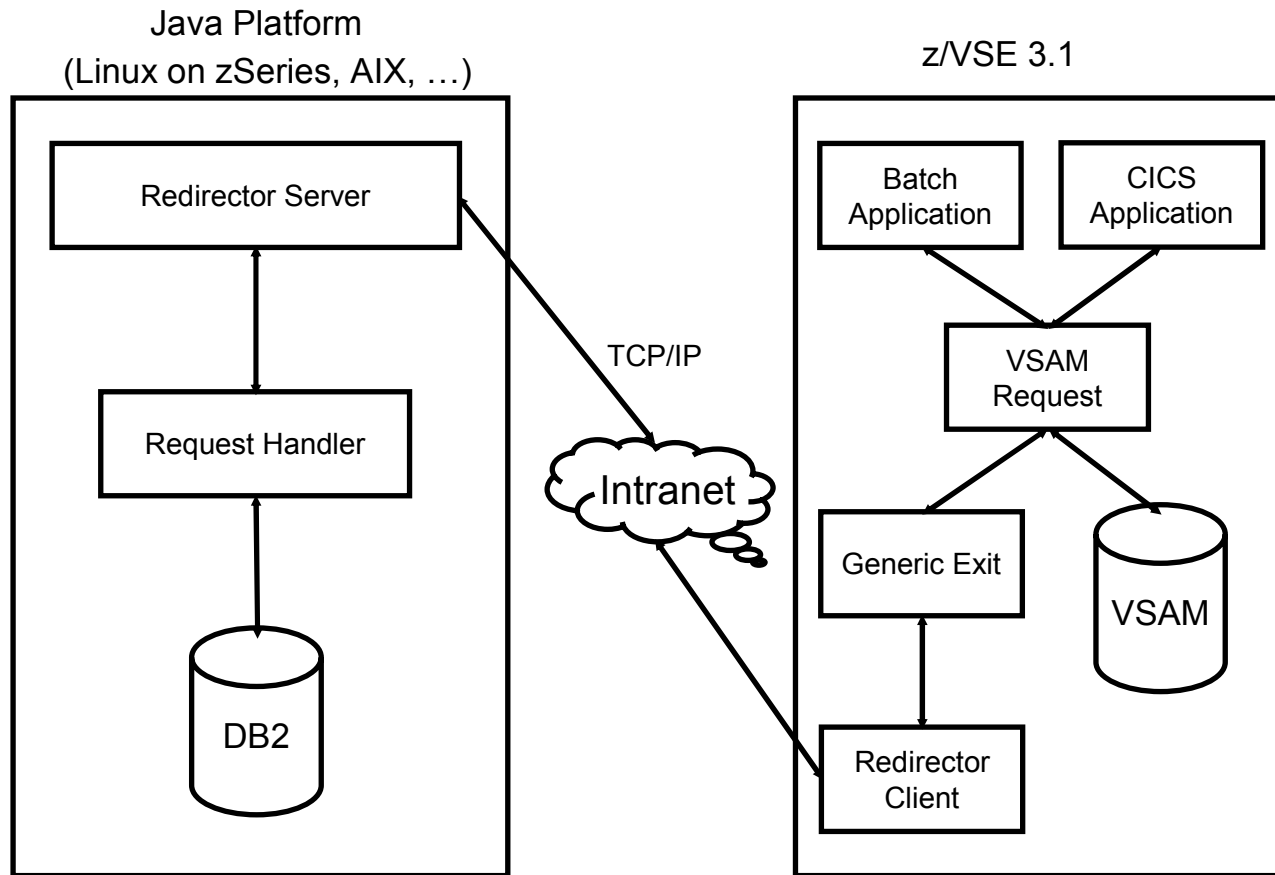
VSAM Redirector

(introduced with VSE/ESA 2.6)

- VSAM Redirector provides
 - Access to remote data
 - on Java capable platform (e.g.Linux on zSeries)
 - transparent to VSE/ESA program (batch or online)
 - Samples to access flat files and DB2 UDB
 - Interfaces to include other data
 - Communication to other platform via TCP/IP

➔z/VSE as a client

VSAM Redirector...



Virtual Tape

(introduced with VSE/ESA 2.6)

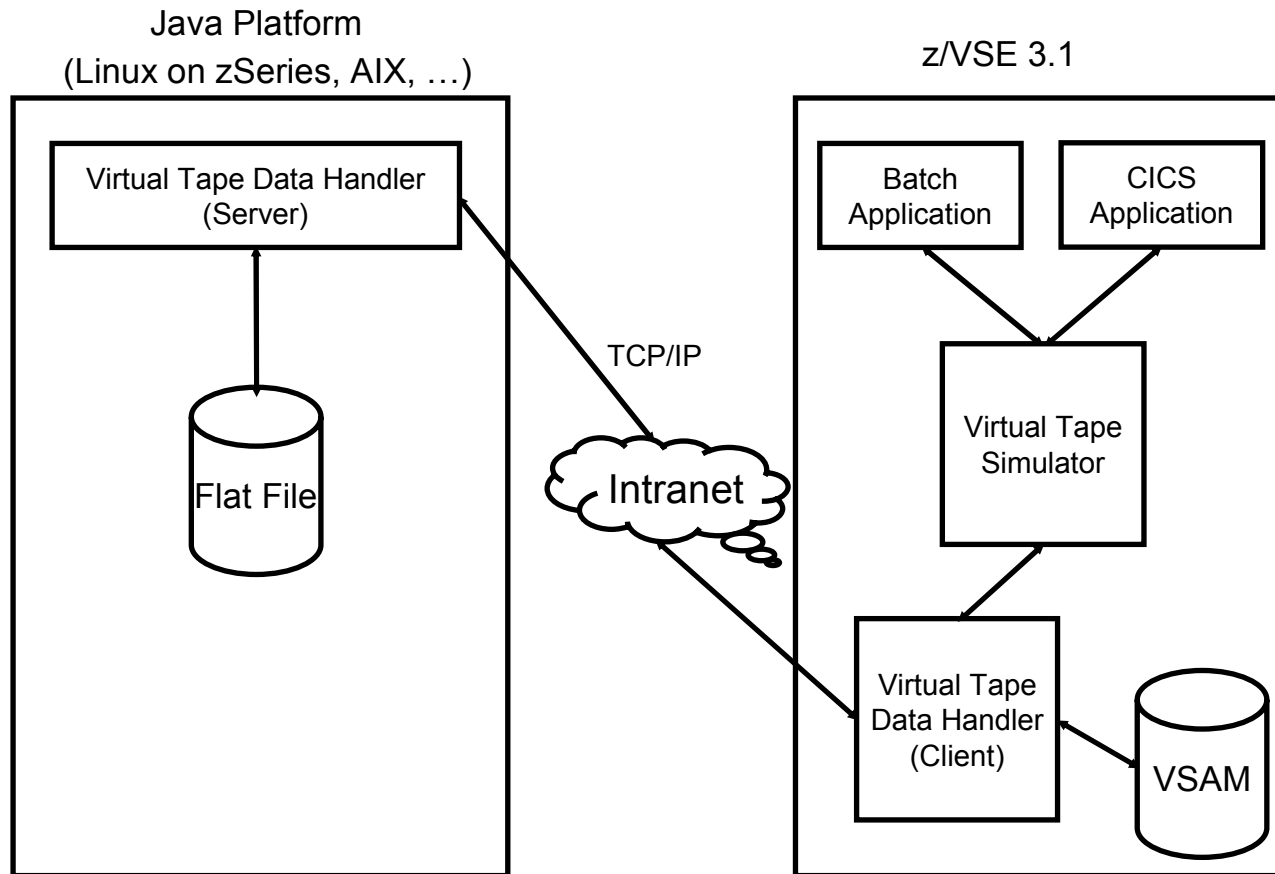
- File or dataset containing a tape image, that is
 - VSE/VSAM ESDS file on z/VSE
 - Remote file on Java-capable server platform (Windows, Linux, ...)

- Has most functions of physical tape
 - Some functions not supported
e.g. SDAID to tape, Ditto Erase function

- "virtual tape" device need to be ADDED at IPL

- New VTAPE command to manage virtual tapes

Virtual Tape ...

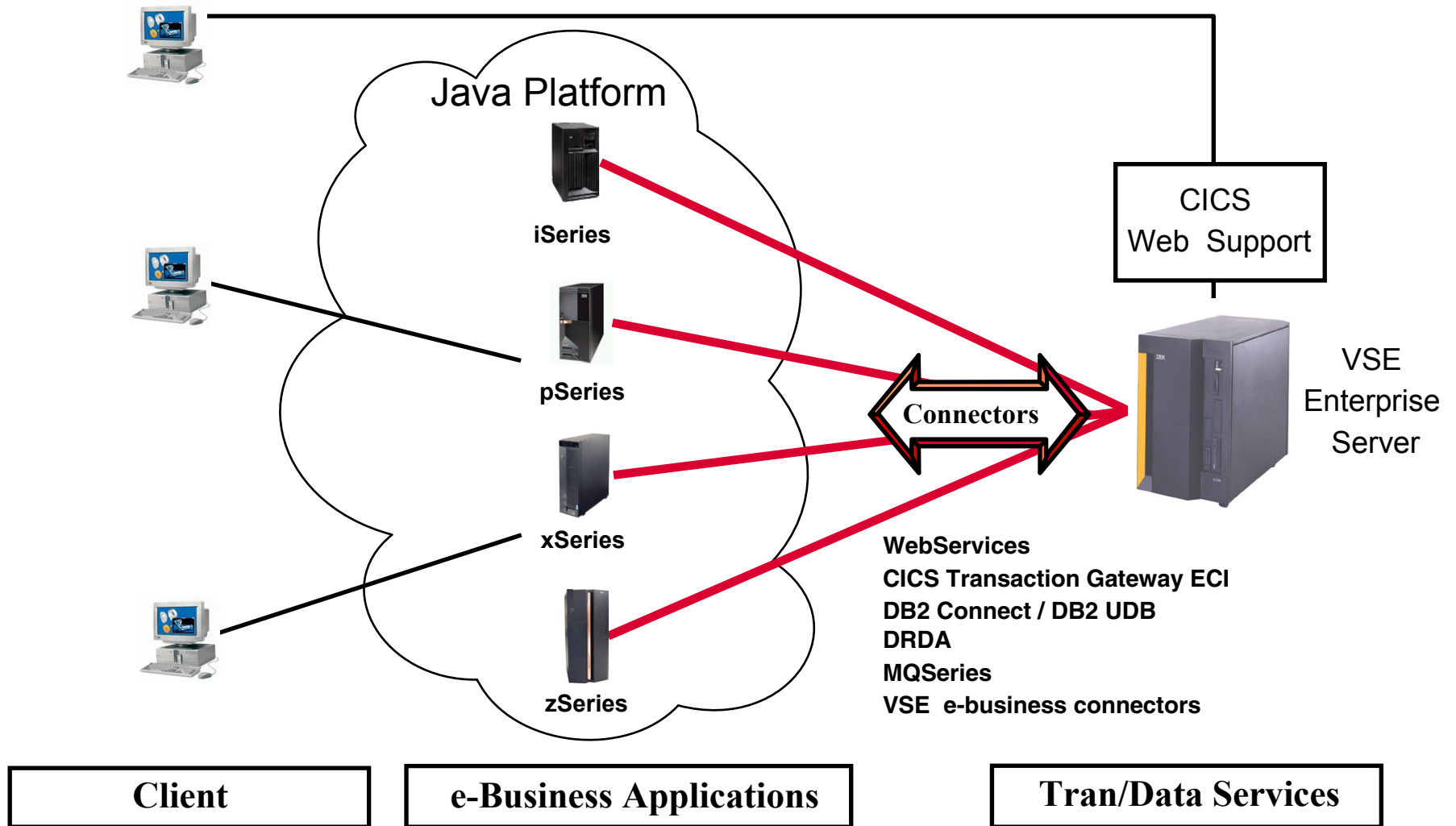


Web Services

(introduced with VSE/ESA 2.7)

- Enhanced interoperability through
 - Simple Object Access Protocol (SOAP)
 - information exchange over the internet (e.g. with CICS apps)
 - VSE/ESA SOAP server/client
 - implemented as CICS program using CICS Web Support (CWS)
 - Any SOAP enabled platform may call a web service running as a CICS application
 - SOAP based on XML
 - Extensible Markup Language (XML)
 - creation and parsing XML data streams from VSE applications
 - Can be called from batch and CICS applications

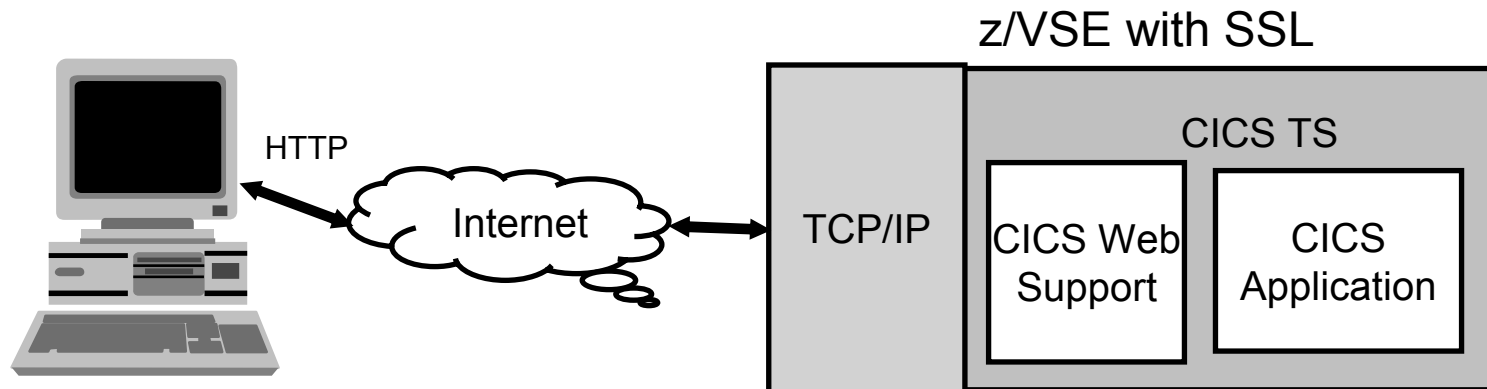
z/VSE e-business Connectors ...



Internet Security

(introduced with VSE/ESA 2.6)

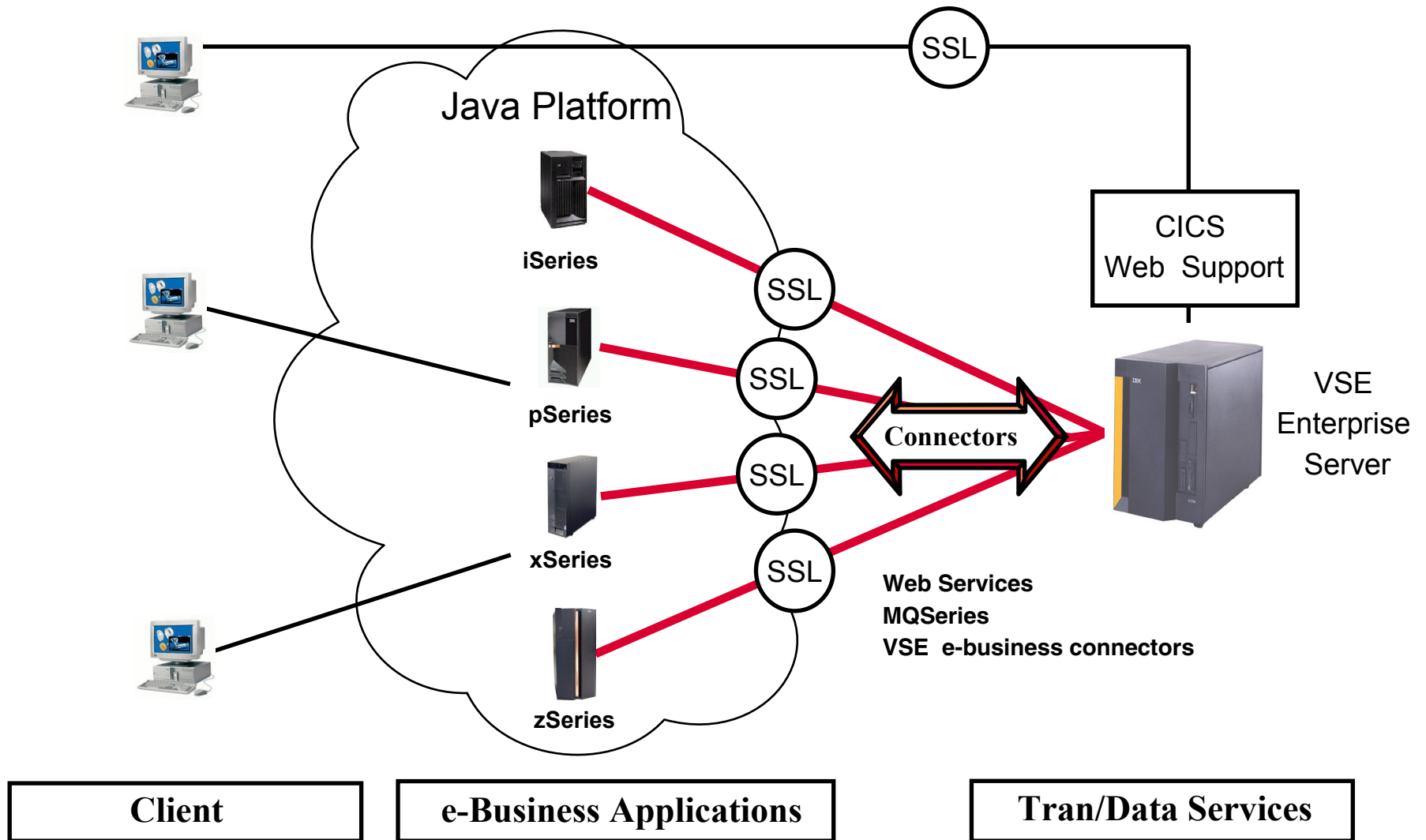
- Secured TCP/IP connections through SSL encryption services
 - Includes Data Encryption Standard (DES) and triple-DES
 - Licensed from Connectivity Systems Incorporated (CSI)
- SSL API can be exploited by any applications
 - Compatible with the z/OS SSL API
- SSL exploiters: TN3270, HTTP server, TCP/IP EZA API, CICS web support, VSE connectors, VSE/Power PNET, MQ Series 2.1.1 or higher



Internet Security ...

- Hardware cryptographic support with VSE/ESA 2.7 or higher
 - Enhances Internet security
 - Encryption hardware assist for increased SSL throughput
 - Exploits PCI Cryptographic Accelerator (PCICA) card
 - Supports SSL handshaking only
 - for applications that use the SSL crypto API
 - Transparent for TCP/IP applications
 - (VSE connector server, CWS, VSE/Power PNET)
 - No definition necessary

Internet Security ...

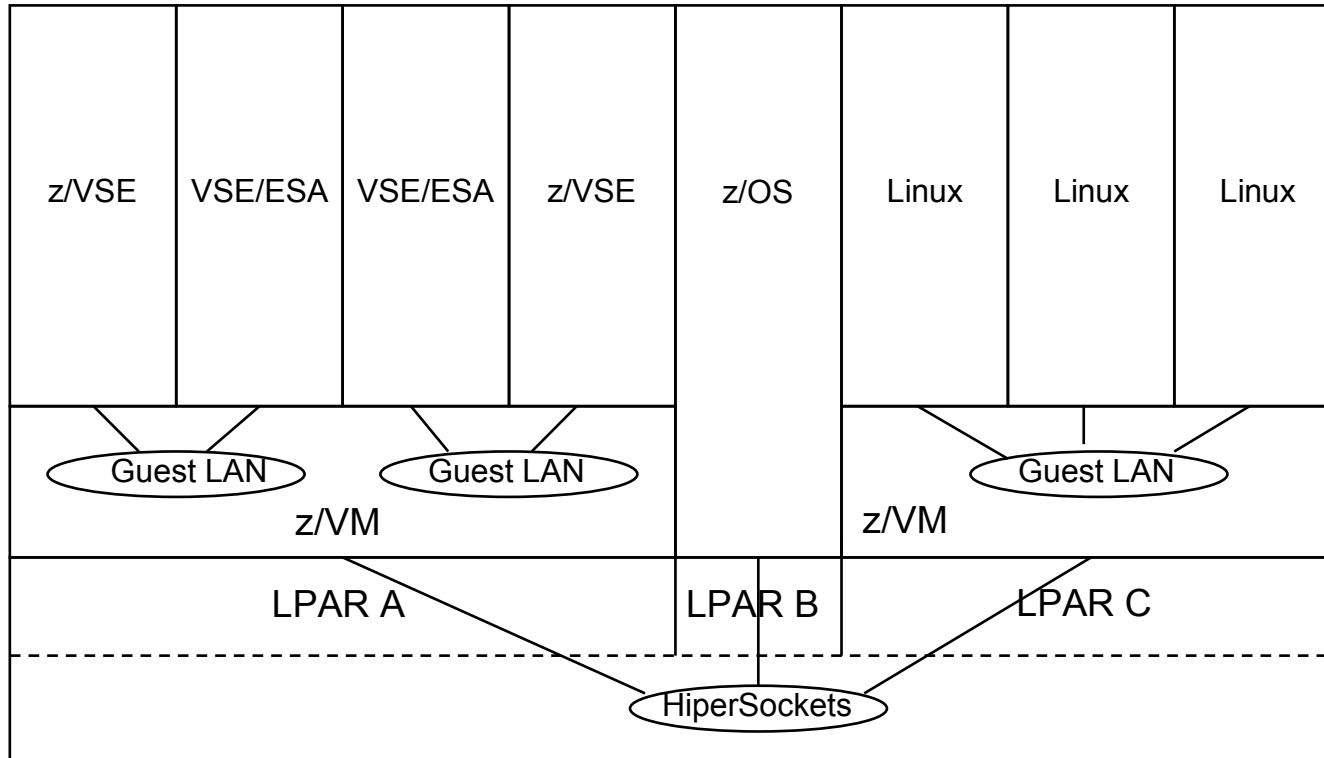


System z HiperSockets

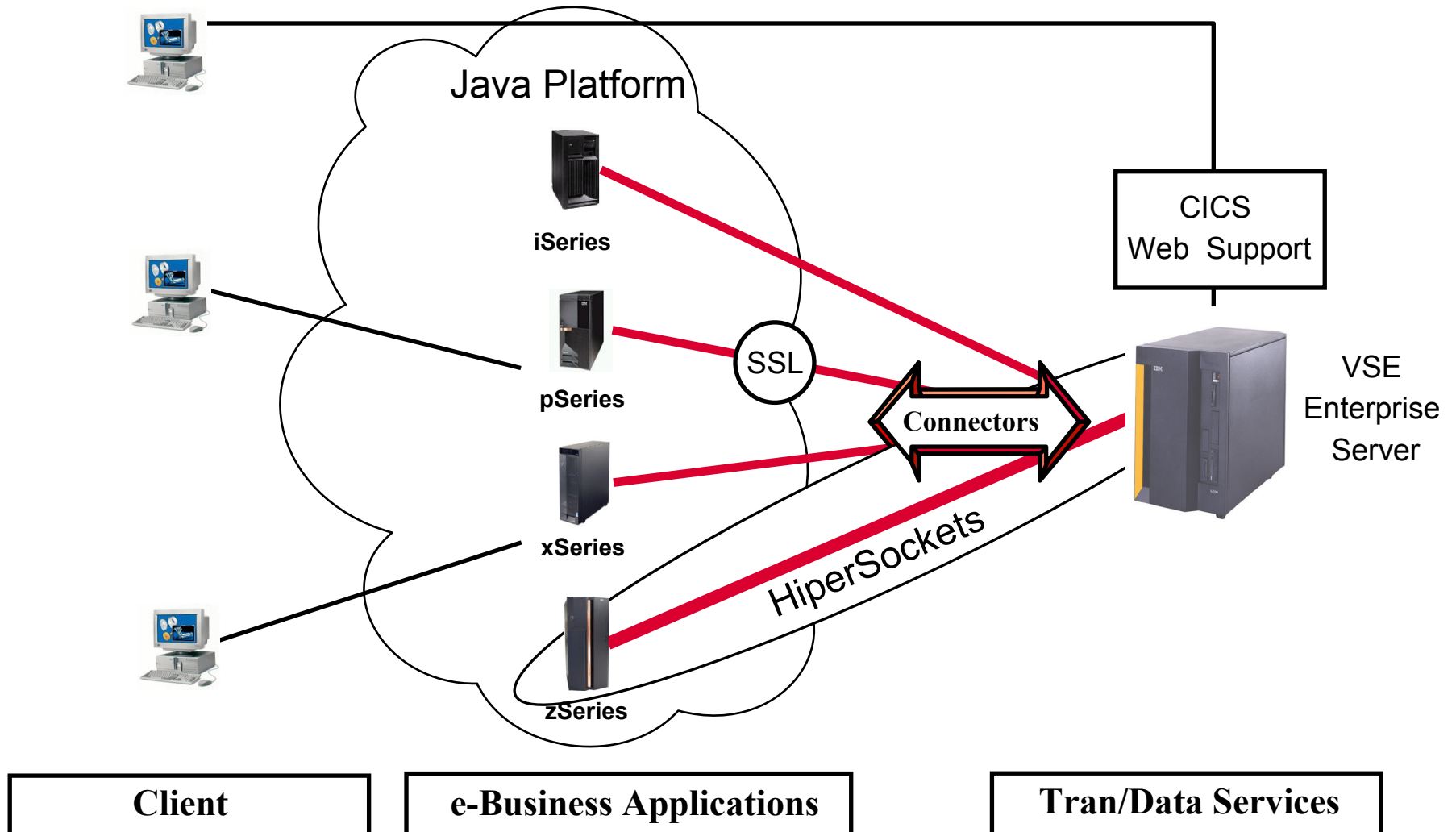
(introduced with VSE/ESA 2.7)

- System z HiperSockets
 - “network in the box”,
TCP/IP based communication at near memory speed within one system
 - System z Logical Partitions (LPARs)
 - z/VM guests (via virtual guest LAN)
 - z/VM guests and LPARs
 - z/VSE 3.1 may communicate with
 - Linux on System z
 - z/OS
 - z/VM
 - VSE/ESA 2.7 or z/VSE 3.1
 - Virtual HiperSockets available on S/390 processors
via z/VM Guest LAN support (z/VM 4.2 or higher)
 - Implemented as device driver (owned by IBM) for the TCP/IP stack

HiperSockets Example



z/VSE (Hw Crypto + HiperSockets)



z/VSE 3.1

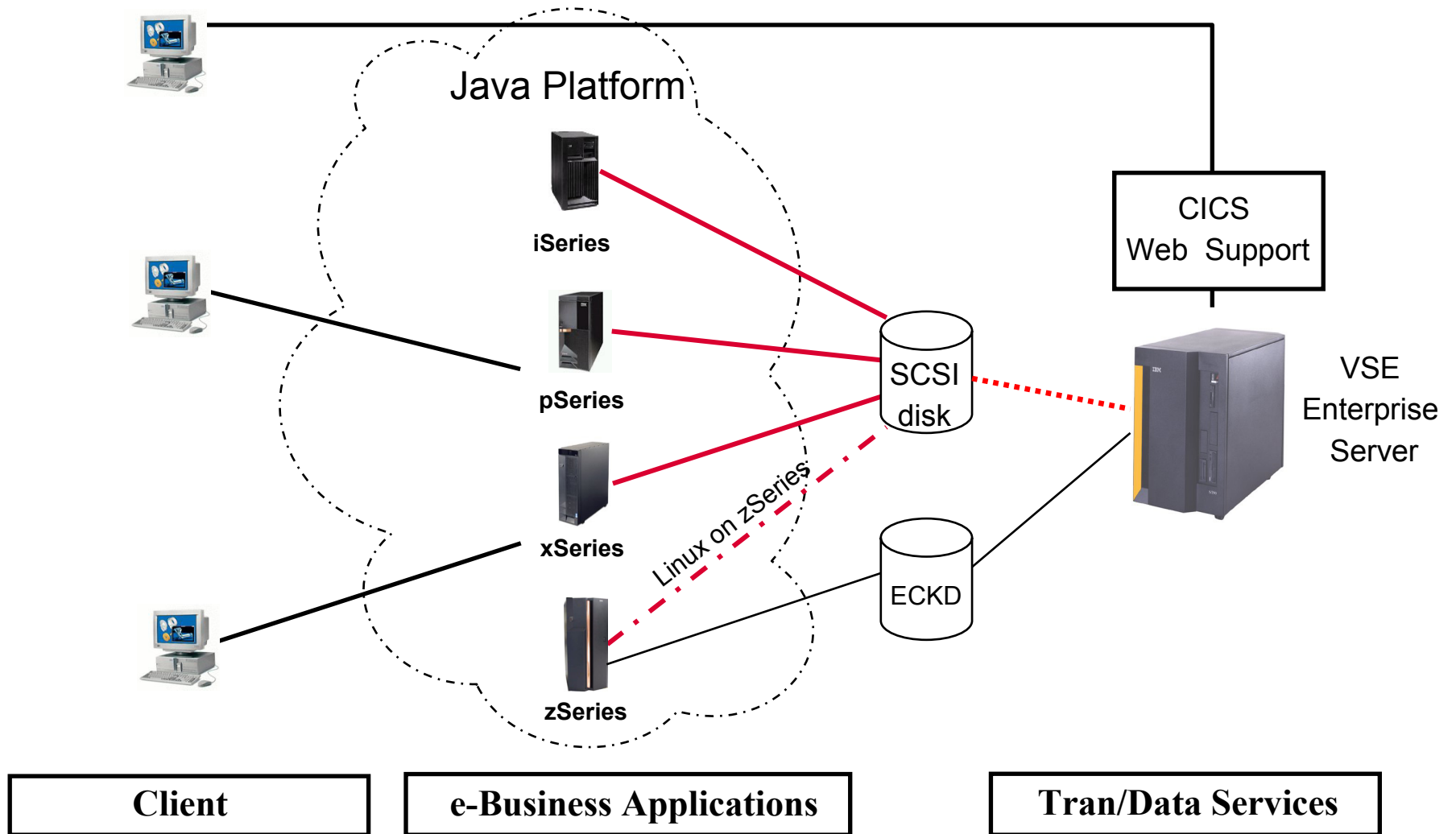
- Schedules
 - 4/7/2004 – Previewed
 - 2/1/2005 - Announced
 - 3/4/2005 - GA
- Support of Small Computer System Interface (SCSI) devices
- Expand focus on interoperability
 - Especially with Linux on System z
- Simplified packaging
 - Language Environment as part of VSE Central Function
- Options for electronic internet delivery and CD-ROM shipment
- z/VSE can execute in 31-bit mode only
- FSU from VSE/ESA 2.6, 2.7 (ECKD devices)

Supported z/VSE Environments

- z/VSE 3.1 runs on the following platforms only
 - S/390 Multiprise 3000
 - S/390 Parallel Enterprise Server G5, G6
 - IBM e-server zSeries processors (z800, z900, z890, z990)
 - IBM System z9 109
 - IBM System z9 Business Class (z9 BC)
 - IBM System z9 Enterprise Class (z9 EC)
 - Linux on zSeries, z/VM V4.x support same architecture level

- and supports
 - uni- and multiprocessors
 - (Native), as z/VM guest or in LPAR

SCSI Support for z/VSE



Overview - Supported SCSI Environments

- SCSI disks as emulated FBA disks on z/VM 5.1
 - z/VSE supports a max. size of 2 GB
- Direct attached SCSI disks
 - z/VSE supports up to 24 GB (VSAM: 16 GB)

Overview - SCSI Support in z/VSE

- z/VSE supports SCSI disk devices only
- Impact on applications
 - Transparent to all VSE applications and subsystems,
 - Minimal impact on ISV system management tools
 - Reasons for transparency:
 - z/VSE's SCSI implementation is based on FBA support
 - Applications can not exploit SCSI commands directly
 - FBA to SCSI emulation on low level I/O interface

SCSI Support in z/VSE

- Access SCSI devices through Fibre Channel Protocol (FCP)
 - Support available on zSeries processors
 - OS interfaces
 - Operating system communicates with FCP adapter
 - FCP adapter communicates with the SCSI device
 - SCSI disk devices utilize fixed block sectors
 - Therefore VSE treats them as FBA devices

Overview - SCSI Support – Content / Limitations

- z/VSE's SCSI support includes:
 - SCSI for system and data device (SCSI only system)
 - Multipathing for fail-over
- SCSI support transparent to existing (I/O) APIs
- Block size restricted to 512 bytes, even if the SCSI device can be configured with larger block sizes
- Max. SCSI disk size about 24 GB, VSAM 16 GB
- FSU from VSE/ESA 2.6, 2.7 to SCSI device is not possible

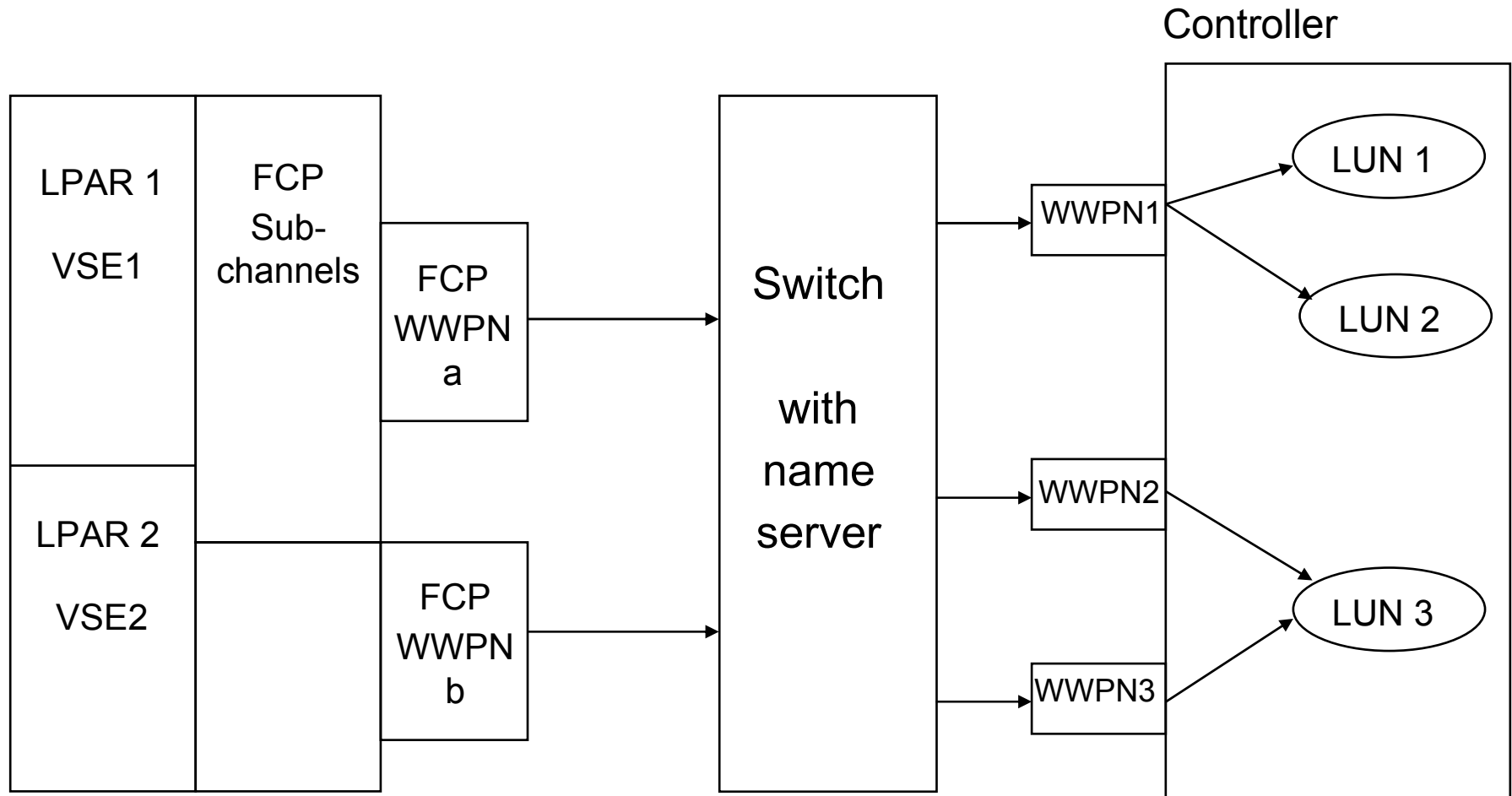
Overview - SCSI Support - Configuration

- New IPL / JCL commands and dialog to define and query a SCSI device
- Required steps to get a SCSI device known to z/VSE
 - Device / Switch configuration
 - FCP Adapter to be configured in IOCDs (CHIPID type FCP)
 - FCP adapter and SCSI disk to be defined in VSE via
 - IPL ADD commands to define FCP and FBA device
 - IPL DEF or JCL SYSDEF command to define connection to LUN

SCSI Support - Configuration

- zSeries FCP adapter supports switched network only:
 - Each FCP adapter has an associated port (WWPN)
 - FCP adapter configured in IOCDs with subchannel type FCP
 - FCP adapter connects to a switch
 - Switch connects to a controller with one or multiple ports
 - Controller accesses one or more SCSI devices (LUNs)

SCSI Support - Configuration



zSeries Exploitation

- OSA Express2 – new generation of zSeries LAN adapters
 - 10 Gigabit Ethernet
 - Gigabit Ethernet
- HiperSockets
 - Spanned channels – across different LCSSs
- Spanned external channels
 - FICON Express2 / Express, OSA Express 2 / Express adapters across multiple LCSSs
- FICON Express 2 / Express
 - Higher I/O bandwidth
- Adapter interruptions
 - Performance improvements can be expected for OSA Express2/Express (QDIO mode), FICON Express2/Express (FCP)
- OSA Express Integrated Console Controller (OSA-ICC)
 - May eliminate the need for non-SNA 3174 controllers or replace existing 3174 and 2074 controllers

zSeries Exploitation ...

- Cryptographic assists - Exploited by TCP/IP SSL support transparently
 - CPACF – for symmetric encryption
 - PCICA (crypto card) – for asymmetric encryption
 - Crypto Express2 – for asymmetric encryption
 - Only PCICA function supported
 - Will be support via PTF at a later time
- Up to 30 LPARs
- Up to 4 LCSSs
 - z890 supports up to 2 LCSSs, z990 up to 4 LCSSs

VSE Support for z800, z890 and System z9

VSE Version and Release	z800	z890 / System z9	VSE EoS
z/VSE V3.1	Yes (2)	Yes (2)	tbd
VSE/ESA V2.7	Yes (2)	Yes (2)	02/28/2007
VSE/ESA V2.6	Yes (2)	Yes (2)	03/2006
VSE/ESA V2.5	Yes (2)	No	12/2003
VSE/ESA V2.4	Yes (2)	<u>No</u>	06/2002
VSE/ESA V2.3	No	<u>No</u>	12/2001

Note 1: z/VSE can operate in 31-bit mode only. It does not implement z/Architecture and specifically does not implement 64-bit mode capabilities. z/VSE is designed to support selected features of IBM zSeries hardware

Note 2: 31-bit mode only

Exploitation of IBM TotalStorage Products

- IBM TotalStorage 3494 Virtual Tape Server (3494 VTS)
 - 3494 Tape Library supports 3490E, 3590, 3592 tape drives and 3592 WORM media
 - Support through S/390 channel command interface via
 - Perform Subsystem Function (PSF)
 - Perform Library Function (PLF) commands
- IBM TotalStorage 3592 Enterprise Tape Drive J1A
 - High capacity, fast access media (300 GB / 60 GB cartridges)
 - Cartridges in WORM format for long-term records retention

Exploitation of IBM TotalStorage Products

- IBM TotalStorage Servers
 - Via ESCON (not DS6000), FICON, FCP channels
 - IBM TotalStorage Enterprise Storage Servers (ESS)
 - DS6000, DS8000
- Exploited features
 - Improved FlashCopy – NOCOPY option
 - direct copy to backup device
 - FlashCopy Version 2
 - Datasetcopy – should not be used for VSAM files
 - Elimination of Logical Subsystems
 - Source and target volume can span LSS
 - Multiple relationship FlashCopy
 - Allow to create up to 12 volumes from one source in a single FlashCopy operation
 - Peer-to Peer Remote Copy (PPRC) Version 2
 - Allows remote data replication
 - Supported via ICKDSF

z/VSE 3.1 base and optional products

- IBM High Level Assembler for z/OS, z/VM, and z/VSE V1.5 (HLASM)
- IBM DB2 Server for VSE and VM V7.4
- CICS Transaction Server for VSE/ESA V1.1.1
 - CICS/VSE shipped with CICS TS
- MQSeries for VSE V2.1.2
 - MQSeries bridge
 - Non-CICS applications may run a CICS program
 - Extended MQI function
 - Synchpoint control support of MQGET, MQPUT, MQPUTI
 - Message transmission between MQSeries queue managers
 - Extended system administration

z/VSE 3.1 Components

- Language Environment (LE/VSE)
 - Now component of VSE Central Function V7
 - Improvements to storage issues and messages
 - LE/VSE GETVIS usage monitor
 - Improved trace and problem determination
- Connectors support newest platforms
- VSE/POWER enhancements
 - Queue/data file migration during warmstart
 - Data file extension by 'n' extends possible during warmstart

z/VSE 3.1 Components ...

- Virtual Tape (VTAPE) enhancements
 - Zipped AWSTAPE (.zip)
 - One or more tape images can be included into one PKZIP file
 - Binary PTF data (.ptf)
 - Can be used directly with the PTF apply dialogs
 - Zipped PTF data
 - Can reside in a ZIP file
- Job Control Enhancements
 - System logical units can be assign to disk in dynamic partitions
- Librarian enhancements
 - New DATE operand
 - Controls setting of time stamps for LIBR COPY and MOVE
 - New SORT operand
 - Allows sorting of LIBR LISTDIR SDL output – by phase name or location

z/VSE 3.1 Components ...

- SDAID enhancements
 - Enlarged wrap buffer, moved to SVA (31 bit)
 - New trace to track locking/unlocking of resources
- WTOR security
 - Routing code 9
 - Secure information no longer shown on console or hardcopy file
- New predefined environment 'C'
 - Large environment of 2GB VSIZE can be selected at initial installation

z/VSE 3.1.x

- z/VSE 3.1.1 - 11/2005
 - Support for
 - IBM System z9 109 processors
 - N_Port ID Virtualization (NPIV) of IBM System z9
 - Preferred paths to SCSI disks
 - IBM TotalStorage 3584 UltraScalable Tape Library
 - IBM TotalStorage 3592 Model E05 Tape Drive
 - Security enhancements
 - VSE/POWER enhancements
- z/VSE 3.1.2 - 7/2006
 - Support for IBM System z9 BC and z9 EC processors
 - VTAM constraint relief

IBM System z9 Exploitation

- z/VSE 3.1.1 supports the following System z9 features:
 - Up to 60 LPARs
 - Configurable Crypto Express2 feature
 - OSA Express2 1000Base-T Ethernet
 - OSA Express2 OSN (Open System Adapter for NCP)
 - N_Port ID Virtualization (NPIV)

Security Enhancements

- Additional security by using the z/VSE control file
 - CICS resource security for
 - Application programs
 - Files
 - Journals
 - Temporary storage queues
 - Transient data queues
 - Transaction initiated through CICS START command
 - Application security
 - Facility security
 - Usage of control file instead of DTSECTXN
 - Includes migration program
- BSTADMIN PERFORM PASSWORD to set limit for invalid sign-on attempts

VSE/POWER Enhancements

- Display of PAGES (Instead of LINES) in the XMT Queue Display
- Manipulation of the Job Disposition of Executing Jobs
 - Previously executing jobs could not be altered
 - Now you may change the original disposition (new PDISPLAY parameter)
- Specification of Dynamic Partition Default-Output Class
 - Previously the default output class was the class of the executing job
 - Now you can use a new parameter on the SET statement to define the default output class
- Display of Queue-Entry Creation Time (instead just the creation date)
- Scheduling of Reader Jobs Relative to Read-In Time

VSE/POWER Enhancements ...

- Optional Specification of Punch Output DISP=I
 - Previously the created job had the DISP=D
 - Now you can specify a DISP for the created DISP=I output
- Sequencing on Tape of POFFLOAD Tape Entries
 - Provides a physical link to the POFFLOAD journal items
- Trailing-Blank Truncation Suppressed for Received PNET Entries
- Spool-Entry Display Sorted by Creation-Date and Time
- Internal Access to Active VSE/POWER Job Class

VTAM Constraint Relief

- VSE/VTAM 31bit IO Buffer Support
 - IO buffer pool and all IO CTC packing buffers can be moved above the 24 bit line
 - Allows to grow communication workloads
 - New VTAM start option IOBUF31 (default 24 bit buffers)
 - If IOBUF31=YES, ICA resources can not be activated
 - New setting can be displayed via VTAM command
 - Requires VTAM and z/VSE PTFs
 - VTAM support - APAR DY46471 PTF UD52964
 - z/VSE support - APAR DY46396 PTF UD52873 (AF Base) or UD52874 (Generation Feature)

z/VSE 4.1 Preview

- Previewed in April 2006
- z/VSE 4.1 is designed to
 - Support the new z9 BC and z9 EC processors
 - Execute in z/Architecture mode only
 - Support 64 bit real addressing
 - Support more than 2 GB real storage (up to 8 GB)
 - Support point-to-point connections for FCP-attached SCSI disks
- z/VSE 4.1 will provide
 - LPAR-based subcapacity monitoring tool
 - Support for selected IBM System z9 features
- FSU from VSE/ESA 2.7 and z/VSE 3.1

Data Encryption

- IBM TS1120 Tape Drive Model E05 with encryption announced
 - Supports data encryption within the drive itself
 - The announcement contains a Statement of Direction concerning z/VSE support:
 - z/VSE V3.1 support planned for first half 2007
 - Intent to support z/VSE V4.1 (when made available)
 - Using Systems Managed Encryption with the TS1120
 - z/VSE support will require the Encryption Key Manager component running on another operating system other than z/VSE using an out-of-band connection.
 - More details on z/VSE home page

Documentation

- Connectors for z/VSE
<http://www.ibm.com/servers/eserver/zseries/os/vse/support/vseconn/>
- e-business Connectors User's Guide, SC33-6719
- Redbook: Getting Started with TCP/IP for VSE/ESA 1.4, SG24-5626
- Redbook: e-business Solutions for VSE/ESA, SG24-5662
- Redbook: e-business Connectivity for VSE/ESA, SG24-5950
- VSE Applications - How e-business Fits, GF22-5137
- Hints and Tips for VSE/ESA, SC33-6757
- z/VSE home page
<http://www-1.ibm.com/servers/eserver/zseries/zvse/>