Session E41

z/VSE – Does Life Begin at 40?

G. M. (Jerry) Johnston

zSeries® EXPO

FEATURING Z/OS, Z/VM, Z/VSE AND LINUX ON ZSERIES
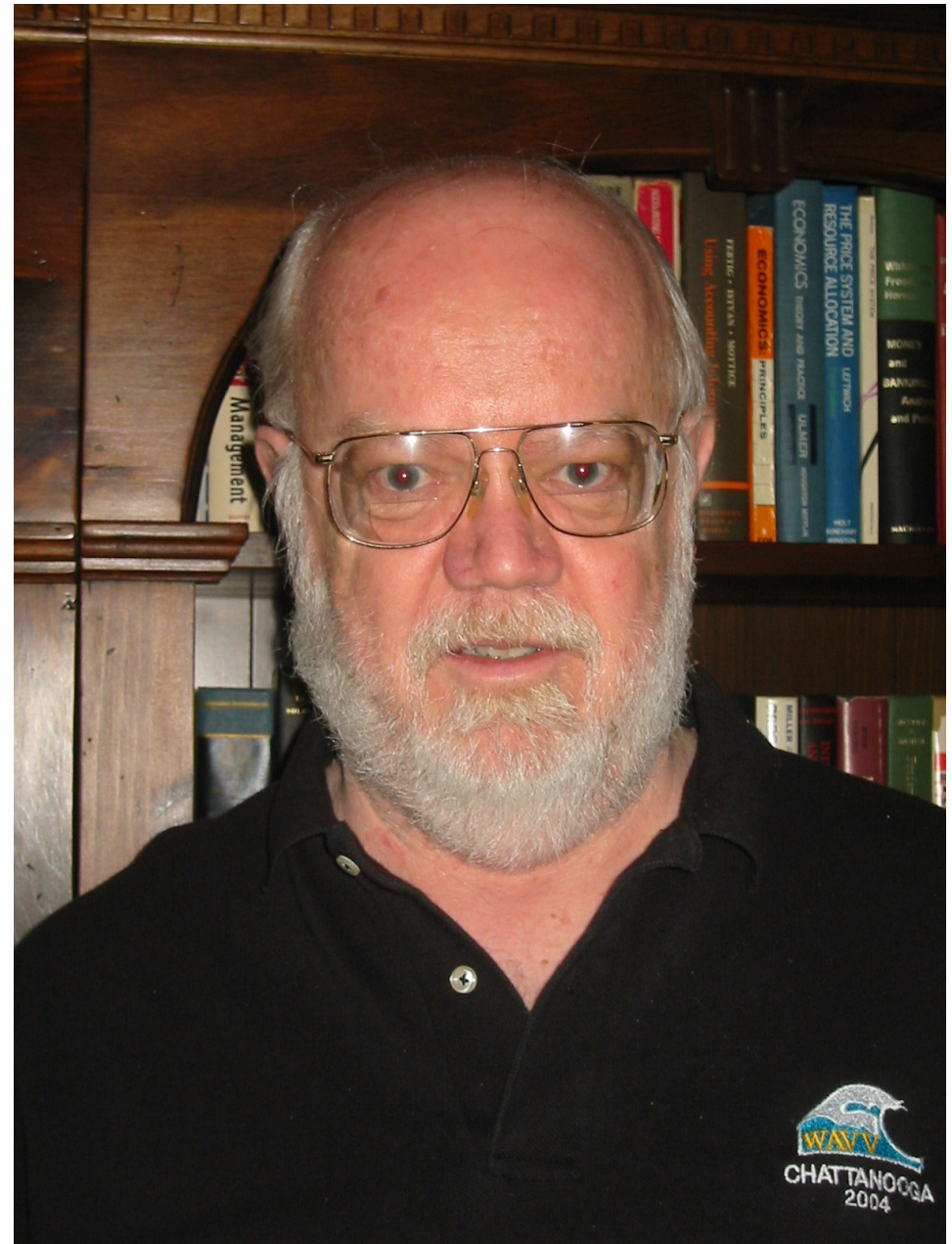
September 19 - 23, 2005   **San Francisco, CA**

9/2/2005

40 YEARS
z/VSE

Abstract:

Session E41 is a celebration of VSE. It covers the past, present, and future of VSE. Jerry will chronicle the remarkable 40 year history of VSE, review today's exciting z/VSE V3.1, and discuss the strategy for VSE.

ON DEMAND BUSINESS™

Trademarks

The following are trademarks of the International Business Machines Corporation in the United States and / or other countries.

VTAM*	IBM*	S/390*
CICS*	IBM logo*	zSeries
IMS	Multiprise*	z/Architecture
DB2*	MQSeries*	OS/390*
DB2 Connect	WebSphere*	z/OS
DB2 Universal Database	iSeries	z/VM
e-business logo*	pSeries	VSE/ESA
Enterprise Storage Server	xSeries	z/VSE*
HiperSockets	AIX	IBM System z9

* Registered trademarks of IBM Corporation

The following are trademarks or registered trademarks of other companies.

LINUX is a registered trademark of Linus Torvalds

Java and all Java-related trademarks and logos are trademarks of Sun Microsystems, Inc., in the United States and other countries

UNIX is a registered trademark of The Open Group in the United States and other countries.

Microsoft, Windows and Windows XP are registered trademarks of Microsoft Corporation.

SET and Secure Electronic Transaction are trademarks owned by SET Secure Electronic Transaction LLC.

Intel is a registered trademark of Intel Corporation.

What Doesn't Belong and Why?

- **Helen of Troy leaves her husband**

- **Citizens of Pompeii watch volcano with casual interest**

- **Montezuma invites Cortez to his palace for dinner**

- **Ann Boleyn marries King Henry VIII**

- **President Lincoln attends the theater**

- **Elite travelers book maiden voyage of *Titanic***

- **Thousands take out loans to buy stocks in 9/1929**

- **Ford introduces the Edsel**

- **Thousands worldwide depend on VSE for their IT needs**

We'll get the answer later……

VSE History

ON **DEMAND BUSINESS™**

"The further backward you look, the further forward you can see….."

…..*Sir Winston Churchill*
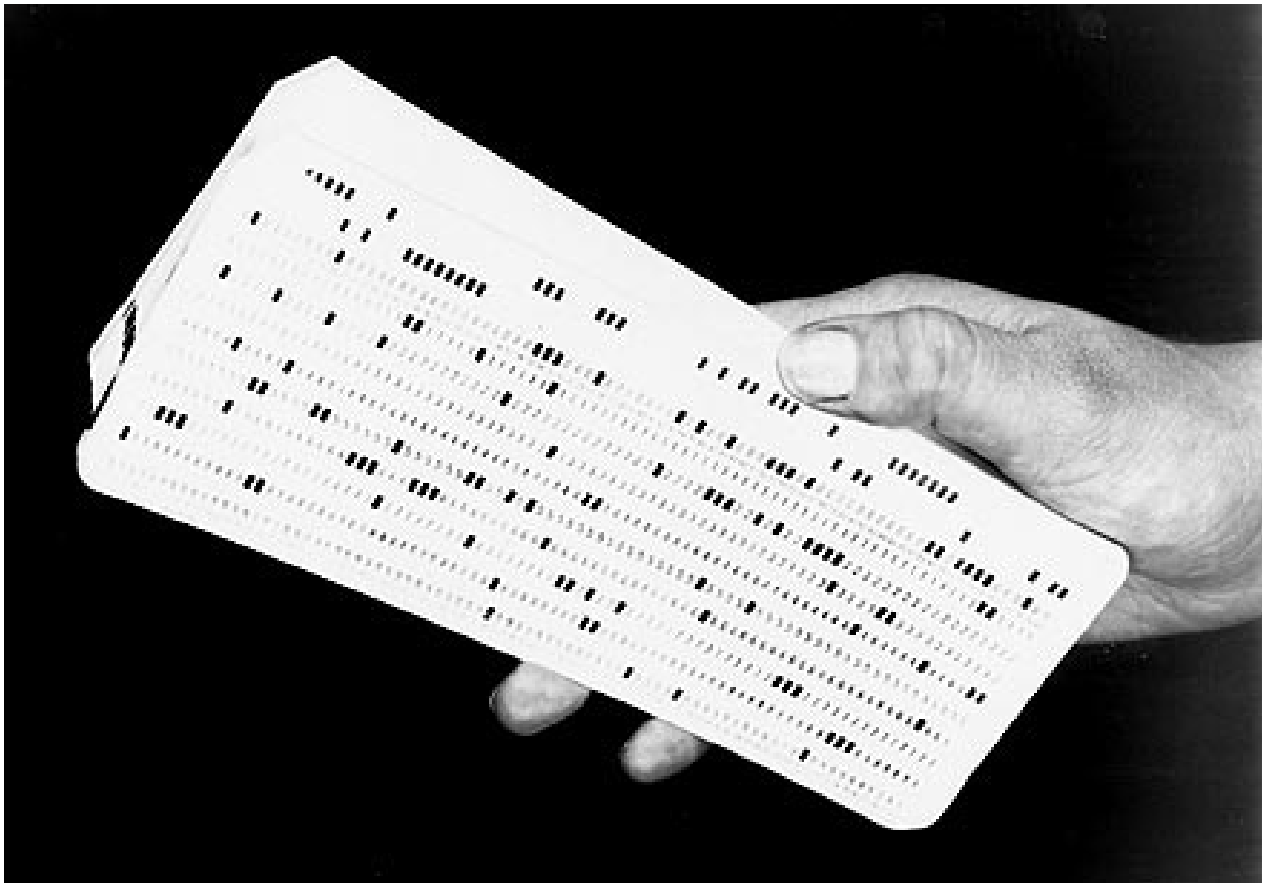
In the beginning was the punched card…..

… the card punch…..

… and the Hollerith machine.

The 1950's

….. OK - no VSE yet, but we have to start somewhere

ON DEMAND BUSINESS™

The IBM family tree – 1952 to 1964

- **Several mainframe families, each uniquely designed for different applications**

- **Each family had a different, incompatible architecture**

- **Even within families, moving from one generation to the next involved a migration**

  ► the advent of 'common' compilers (i.e. COBOL and FORTRAN) made migration a bit easier
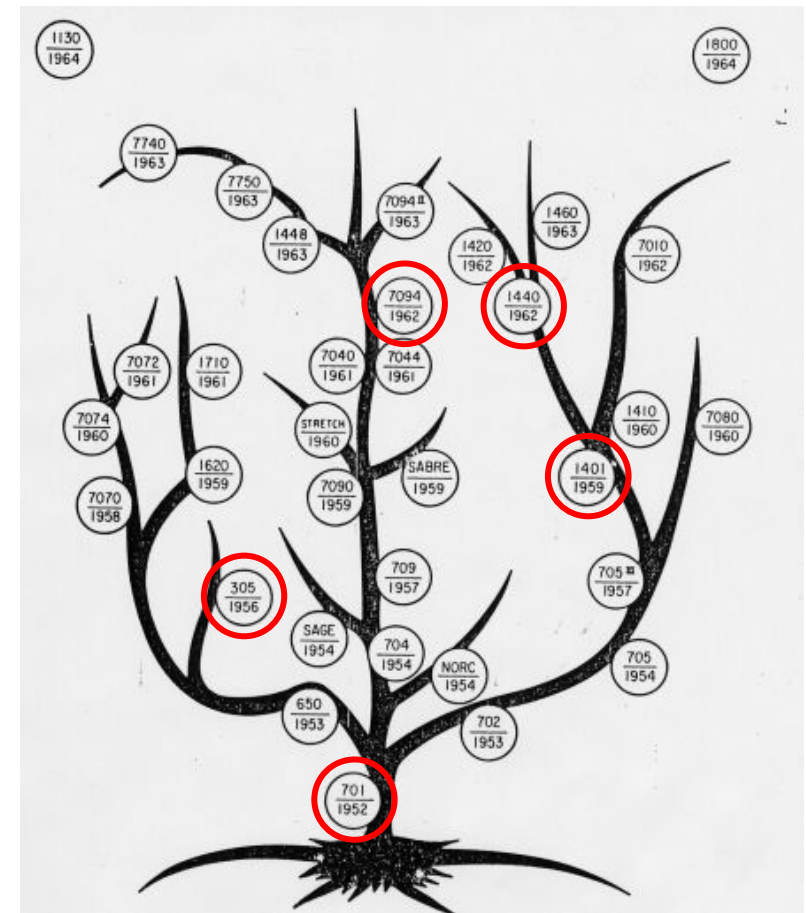
IBM 1401 – 1959
2nd generation

- **The all-transistorized IBM 1401 Data Processing System offered features found in electronic data processing systems to *smaller businesses*, previously limited to the use of conventional punched card equipment.**

- **Features included: high speed card punching and reading, magnetic tape input and output, high speed printing, stored program, and arithmetic and logical ability**

z/VSE Version 3 Release 1

The 1960's

……a mainframe revolution begins with IBM System/360 *and*

IBM System/360 Disk Operating System (DOS/360)

40 Years of VSE

9/2/2005

© 2005 IBM Corporation

IBM System/360 – 1964
3rd generation

- **Customers were frustrated with the migration costs that came with each processor upgrade**

- **IBM developed a family of processors using the same durable architecture**
  - ► published in the S/360 Principles of Operations
  - ► 24-bit addressing (31-bit architecture)

- **Solid logic circuit cards**

- **Common peripheral devices**

- **One operating system -** *initially*
  - ► Operating System/360 (OS/360)

The System/360 Family

Model	Announced	First Shipped	
30	April 7, 1964	June, 1965	
40	April 7, 1964	April, 1965	
50	April 7, 1964	August, 1965	
20*	November 18, 1964	April, 1966	**not a 'true' S/360**
65	April 22, 1965	November, 1965	
75	April 22, 1965	January, 1966	
44	August 16, 1965	June, 1966	**focused on scientific**
67	August 16, 1965	May, 1966	**early Virtual Storage**
91	January 18, 1966	October, 1967	
25	January 3, 1968	October, 1968	
85	January 30, 1968	December, 1969	
195	August 20, 1969	March, 1971	
22	April 7, 1971	August, 1971	**based on Model 30**

"[System/360] was the biggest, riskiest decision I ever made, and I agonized about it for weeks, but deep down I believed there was nothing IBM couldn't do."

Father, Son & Co. 1990
Tom Watson, Jr.
IBM President 1952
IBM President and CEO 1956
IBM Chairman and CEO 1961-1971

Fortune Magazine called S/360 a '$5 Billion Gamble'

1965

- **S/360 - Model 30 System**
  - ► Approx. 30-35 <u>KIPS</u> (.03 MIPS)
  - ► Solid Logic Technology
  - ► 16 to 64 <u>KB</u> main storage
    - ferrite core memory technology
  - ► 2311 Disk Storage Drive
    - 7.25 MB/removable pack
    - 75 ms average access time
  - ► 2401 Magnetic Tape Unit
    - 9 track, 1600 bpi
    - Up to 180,000 bps
  - ► 2540 Card Read/Punch
    - 1000 cpm read
    - 300 cpm punch
  - ► 1403-N1 Line Printer
    - up to 1100 lpm

- **Disk Operating System/360**
  - ► Releases 1 => 27
    - designed to run in 16 KB systems
    - disk used for program libraries, transient supervisor functions, etc.
  - ► 1 partition
    - up to 3 beginning in Release 3
    - batch multiprogramming in R16
  - ► BTAM for telecommunications
    - added in Release 3
  - ► User programming in Macro Assembler, COBOL, Fortran, PL/1, and RPG

What were things like in 1965?

- **US President: Lyndon Johnson**
- **Value (in 2004$) of $1 = $6.01**
- **Average income = $7,704**
- **Average price of a car = $2,350**
- **Average price of a house = $21,500**
- **Dow Jones Industrial Average = 969**
- **Some Top Songs**
  - ►Beatles 'Help'
  - ►Sonny & Cher 'I Got You Babe'
  - ►Rolling Stones 'Satisfaction'
- **Some Top TV Shows**
  - ►I Dream of Jennie
  - ►Batman
  - ►Daniel Boone
- **Best Picture**
  - ►The Sound of Music

The 1970's
……introduction of System/370 and DOS/VS

The System/370 Family

Model	Announced	First Shipped	
155	June 30, 1970	January, 1971	
165	June 30, 1970	April, 1971	
195	June 30, 1970	August, 1973	
145	September 23, 1970	June, 1971	
135	March 8, 1971	April, 1972	
158	August 2, 1972	April, 1973	**Virtual storage capable models**
168	August 2, 1972	May, 1973	
125	October 4, 1972	April, 1973	
115	March 13, 1973	March, 1974	
138	June 30, 1976	November, 1976	
148	June 30, 1976	January, 1977	

VSE Moved from Endicott to Boeblingen

1972

- **S/370 - Model 135 System**
  - ► Compatible upgrade from S/360
  - ► Integrated Circuit technology
  - ► 96 to 256 KB Processor Storage
    - • 'monolithic' storage technology
    - • virtual storage
  - ► 3330 Direct Access Storage
    - • 100 MB/removable pack
  - ► 3420 Magnetic Tape Subsystem
    - • 9 track, 1600 bpi
    - • up to 320,000 bps
  - ► 3505 Card Reader/3525 Card Punch
    - • 1200 cpm read
    - • 300 cpm punch
  - ► 3211 Printer up to 2000 lpm

- **DOS/VS**
  - ► Releases 28 => 34
  - ► up to 16 MB virtual storage
  - ► 5 partitions (up to 7 in R34)
  - ► Linkage Editor, Relocating Loader
  - ► VSAM
    - • balanced sequential/random
  - ► POWER (first a Type III in 1968)
    - • short for "**P**riority **O**utput **W**riters, **E**xception Processors, and Input **R**eaders"
  - ► 'DBDC' => CICS and DL/I

Starting to look like something
that's recognizable as VSE

ON DEMAND BUSINESS™

What were things like in 1972?

- **US President: Richard Nixon**
- **Value (in 2004$) of $1 = $4.53**
- **Average income = $12,625**
- **Average price of a car = $3,879**
- **Average price of a house = $30,500**
- **Dow Jones Industrial Average = 1020**
- **Some Top Songs**
  - ►Don McLean 'American Pie'
  - ►Sammy Davis, Jr. 'The Candy Man'
  - ►Johnny Nash 'I Can See Clearly Now'
- **Some Top TV Shows**
  - ►Bob Newhart Show
  - ►The Waltons
  - ►Monday Night Football
- **Best Picture**
  - ►The Godfather

ON DEMAND BUSINESS™

The 1980's

……decade began with the successful 4300 and DOS/VSE
……later, the pace picked up with the 9370 and VSE/SP

9/2/2005

1979

40 YEARS

IBM 4331 System

- ► Large Scale Integration (LSI) technology
- ► 512 and 1024 KB Processor Storage
  - 64K bit memory chip technology
  - Integrated I/O adapters
  - optional ECPS ('e' mode)
- ► 3310 Direct Access Storage
  - Fixed Block Architecture (FBA)
  - 64.5 MB/fixed (non-removable) media
- ► 8809 Magnetic Tape Subsystem
  - 9 track, 1600 bpi
  - up to 160,000 bps
- ► 3505 Card Reader/3525 Card Punch
  - 1200 cpm read
  - 300 cpm punch
- ► 3262 Printer
  - up to 650 lpm

DOS/VSE

- ► 7 partitions
  - up to 12 in Release 2
- ► Fixed Block Architecture (FBA)
- ► Misc. Enhancements
  - ASI procedures, channel switching, DASD sharing, add statements, missing interrupt handler, etc.
- ► MSHP
- ► ICCF (based on ETSS Type III)
- ► ACF/VTAM
- ► Priced Components

ON DEMAND BUSINESS™
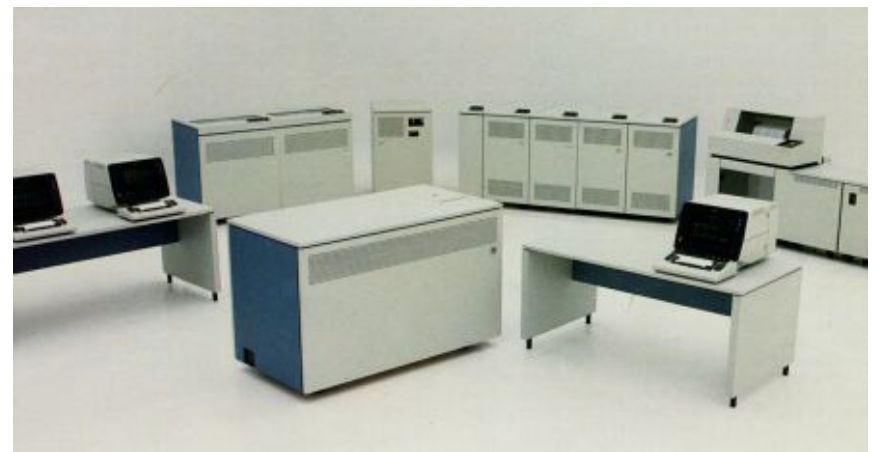
What were things like in 1979?

- **US President: Jimmy Carter**
- **Value (in 2004$) of $1 = $2.61**
- **Average income = $22,316**
- **Average price of a car = $6,847**
- **Average price of a house = $71,800**
- **Dow Jones Industrial Average = 839**
- **Some Top Songs**
  - ►Rupert Holmes 'Escape' (Pina Colada song)
  - ►Donna Summer 'Hot Stuff'
  - ►Rod Stewart 'Do Ya Think I'm Sexy'
- **Some Top TV Shows**
  - ►Dallas
  - ►All in the Family (Archie Bunker)
  - ►Knot's Landing
- **Best Picture**
  - ►Kramer vs. Kramer

ON DEMAND BUSINESS™

1987

IBM 9375 – Model 60 System

► Modular, 19" rack-mounted

► 8 or 16 MB Processor Storage
- Integrated I/O adapters
- office environment

► 9332 Direct Access Storage
- Fixed Block Architecture (FBA)
- 400 MB/2 actuator fixed media

► 9347 Magnetic Tape Subsystem
- 9 track, 1600 bpi
- up to 160,000 bps

VSE/SP V3

► 12 partitions

► Virtual Address Extensions (VAE)
- up to 9 address spaces

► New Librarian

► Interactive User Interface (IUI)

► Conditional JCL

► Packaging
- base and optional products
- base was designed, developed, tested, shipped, and serviced as if were a single integrated system

► Capacity-based Pricing

What were things like in 1987?

- **US President: Ronald Reagan**
- **Value (in 2004$) of $1 = $1.67**
- **Average income = $36,884**
- **Average price of a car = $13,386**
- **Average price of a house = $127,200**
- **Dow Jones Industrial Average = 1939**
- **Some Top Songs**
  - ►Los Lobos 'La Bamba'
  - ►Starship 'Nothing's Gonna Stop Us Now'
  - ►U2 'With or Without You'
- **Some Top TV Shows**
  - ►ALF
  - ►The Wonder Years
  - ►In the Heat of the Night
- **Best Picture**
  - ►The Last Emperor

ON DEMAND BUSINESS™

The 1990's –

.... many industry 'experts' ridiculed the mainframe. They said PCs and 'client/server' alone represent the future of IT.

One well known example….

- **"I predict that the last mainframe will be unplugged on March 15, 1996."**

  ► Stewart Alsop, March 1991
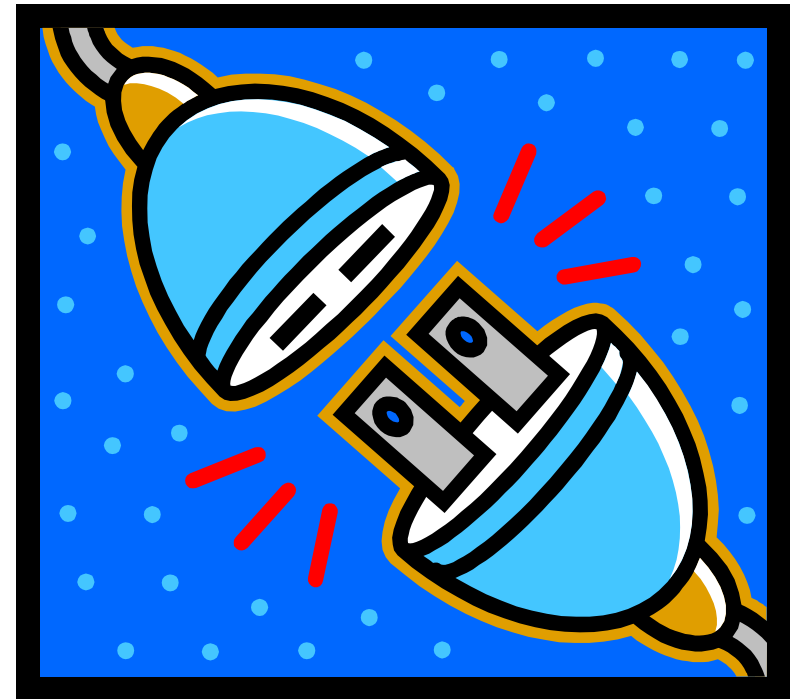
Source: IBM Annual Report 2001

The 1990's – revitalization of VSE!
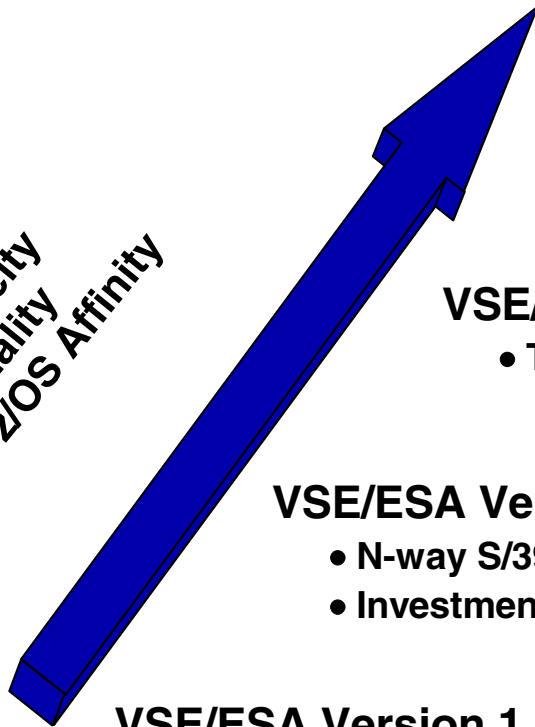
……the decade began with ES/9000 and VSE/ESA V1

……followed by IBM's CMOS Transition and VSE/ESA V2

VSE/ESA in the 1990s

Capacity
Quality
z/OS Affinity

VSE/ESA V2.4   1999
  ● **CICS Transaction Server for VSE/ESA**
  ● *e-business*

VSE/ESA V2.3   1997
  ● **TCP/IP**

VSE/ESA Version 2   1994
  ● **N-way S/390 Servers**
  ● **Investment Protection - Year 2000**

VSE/ESA Version 1   1990
  ● **Constraint Relief**
  ● **ESA exploitation**

1993

- **ES/9221 – Model 150 System**

  ► 16 to 256 MB Processor Storage

    • Modular, 19" rack-mounted
    • Integrated I/O adapters
    • PR/SM
    • Parallel and ESCON Channels

  ► 9336 Direct Access Storage

    • Fixed Block Architecture (FBA)
    • 857 MB/fixed media

  ► 3490 Magnetic Tape Subsystem

    • 200MB cartridges
    • up to 4.5M bps

- **VSE/ESA V1.3**

  ► 31-bit real and virtual addressing

  ► Dynamic partitions

    • number limited only by tasks
    • 1 partition per address space

  ► Access Registers

  ► Data Spaces

  ► Virtual Disk

  ► Virtual Storage Constraint Relief

  ► Dynamic (XA) Channel Subsystem

  ► ESCON Channels

What were things like in 1993?

- **US President: William Jefferson Clinton**
- **Value (in 2004$) of $1 = $1.31**
- **Average income = $47,221**
- **Average price of a car = $17,698**
- **Average price of a house = $147,700**
- **Dow Jones Industrial Average = 3754**
- **Some Top Songs**
  - ►Meat Loaf 'I'd Do Anything for Love'
  - ►Janet Jackson 'That's the Way Love Goes'
  - ►Mariah Carey 'Hero'
- **Some Top TV Shows**
  - ►Frasier
  - ►Homicide: Life on the Streets
  - ►N.Y.P.D. Blues
- **Best Picture**
  - ►Schindler's List

ON DEMAND BUSINESS™

1998

- **Multiprise 2000 System**
  - ► based on G3 CMOS technology
  - ► 1 to 5-way Processing Units
  - ► 128 MB to 4 GB Processor Storage
  - ► Parallel and ESCON Channels
  - ► Integrated DASD
    - • a portion of main memory for cache
    - • emulate 3380/3390 ECKD
    - • up to 288 GB capacity
  - ► and/or RAMAC External DASD
  - ► Open Systems Adapter (OSA)
  - ► 3490E Magnetic Tape Subsystem
    - • 2.4 GB/cartridge with IDRC

- **VSE/ESA V2.3**
  - ► Year 2000 ready
  - ► optional Turbo dispatcher
    - • support for n-way processors
  - ► VSAM KSDS > 4GB
  - ► set timezone/daylight savings time
  - ► TCP/IP for VSE/ESA (native)
    - • offered under agreement with CSI
  - ► ACF/VTAM V4.2
  - ► LE and LE-based languages
    - • COBOL for VSE/ESA
    - • PL/1 for VSE/ESA
    - • C for VSE/ESA
  - ► Improved console support

ON DEMAND BUSINESS™

What were things like in 1998?

- **US President: Bill Clinton**
- **Value (in 2004$) of $1 = $1.16**
- **Average income = $59,589**
- **Average price of a car = $19,560**
- **Average price of a house = $181,900**
- **Dow Jones Industrial Average = 9027**
- **Some Top Songs**
  - ►Shania Twain 'You're Still the One'
  - ►Destiny's Child 'No, No, No'
  - ►Third Eye Blind 'How's It Going to Be?'
- **Some Top TV Shows**
  - ►Ally McBeal
  - ►Everybody Loves Raymond
  - ►60 Minutes II
- **Best Picture**
  - ►Shakespeare In Love

ON DEMAND BUSINESS™

40 YEARS

IBM TotalStorage®

Linux on zSeries

Integration

z/VSE

IBM ^

zSeries

The 2000's

…a new century begins with Multiprise 3000 and VSE/ESA V2

…looking to the future with IBM System z9, zSeries, and z/VSE V3

9/2/2005
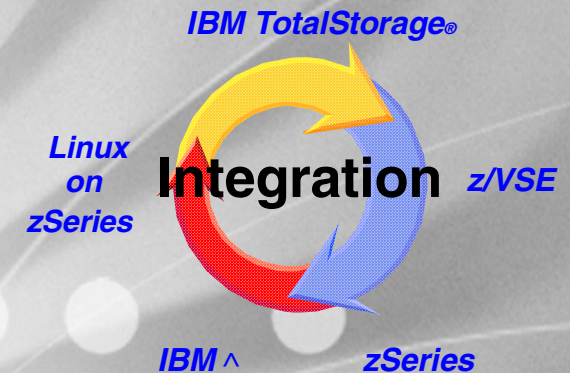
ON DEMAND BUSINESS™

Reports of the death of the mainframe ……………were premature

- **"I predict that the last mainframe will be unplugged on March 15, 1996."**

  ▶ Stewart Alsop, March 1991

- **"It's clear that corporate customers still like to have centrally controlled, very predictable, reliable computing systems—exactly the kind of systems that IBM specializes in."**

  ▶ Stewart Alsop, February 2002

Source: IBM Annual Report 2001
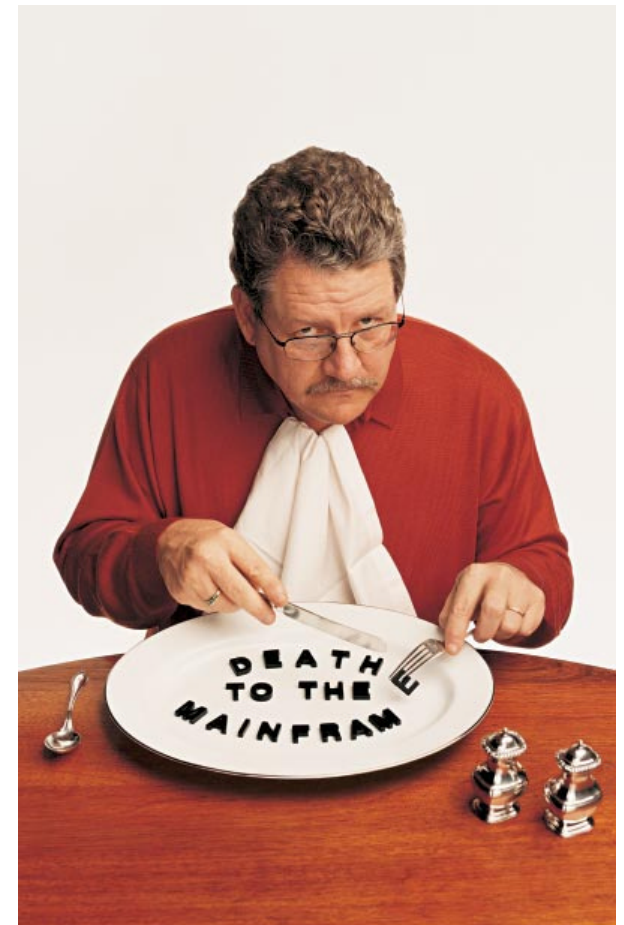
2004

IBM ^   zSeries 890

- ► based on innovative z990 technology
- ► 1 model, 28 capacity settings
  - • 1 to 4 Processing Units (PUs)
- ► 8 to 32 GB Processor Storage
- ► up to 30 LPARs, up to 2 LCSSs
- ► Hipersockets
- ► ESCON, FICON Express, FCP Channels
- ► PCICA encryption assist
- ► OSA Express & OSA-ICC
- ► Integrated Facility for Linux (IFL)
- ► IBM Enterprise Storage Server (Shark)
  - • high availability, high performance
  - • Flashcopy and PPRC
  - • 1 to 55.9 TB capacity
- ► IBM 3592 TotalStorage Enterprise Tape
  - • 900 GB/cartridge at 3:1 compression
  - • up to 40 MB transfer rates

VSE/ESA V2.7

- ► Turbo dispatcher
  - • support for n-way processors
- ► CICS TS for VSE/ESA
  - • availability and z/OS affinity
- ► TCP/IP for VSE/ESA
  - • offered under agreement with CSI
- ► VSE e-business connectors
- ► Web services
- ► Hipersockets
- ► PCICA encryption assist
- ► Shark Flashcopy and PPRC

These Classics Were Around in 1965
…. all are still going strong

- **VSE** - *in one form or another*
  - ► DOS/360, DOS/VS, DOS/VSE, (SSX), VSE/SP, VSE/ESA, z/VSE

- **Ford Mustang** – **have you seen the hot new 2005 models?**

- **Boeing B-52 Stratofortress** – **the grandsons of the original pilots will be flying the darned things for years to come.**

- **The Rolling Stones** - *OK, some classics eventually do get older*
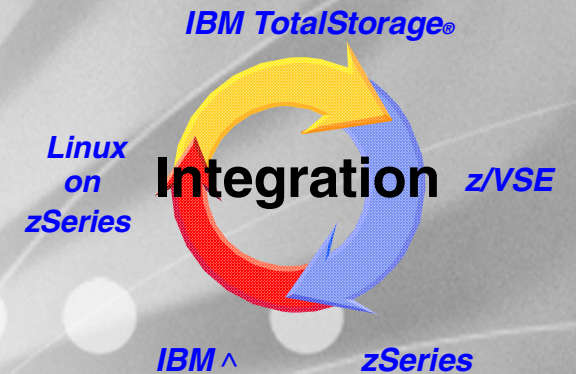
Recent Announcements

- 10/07/2004 - **z890** and **z990** enhancements
  - ► **OSA Express2** including 10 GbE and GbE
  - ► **Crypto Express2** with PCICA-equivalent function
- 10/12/2004 - TotalStorage DS Family
  - ► **DS8000** series with ESCON, FICON, and FCP zSeries attachment
  - ► **DS6000** series with FICON and FCP zSeries attachment (no ESCON)
- 11/19/2004 - **VSE/ESA V2.7.3** available
  - ► service integration
  - ► z890 and z990 items incl OSA Express2 and Crypto Express2
  - ► 3592 WORM
  - ► DB2 for VSE and VM V7.4 replaces V7.3 in base package
- 01/25/2005 - additional z890 and z990 enhancements
  - ► **FICON Express2**

Recent Announcements

- 2/01/2005 – **z/VSE V3.1**
  - ► General availability 3/04/2005

- 04/2005 - DB2 Server for VSE PRPQ
  - ► 'client' function only
  - ► PRPQ P10154 (requires approval)

- 06/21/2005 - VisualAge Generator EGL 'Plug-in' for VSE

- 07/11/2005 - WebSphere MQ Client for VSE
  - ► 'client' function only (no local queues)
  - ► downloadable and no charge

- 7/26/2005 - **IBM System z9 109 (z9-109) announced**

- 7/26/2005 - **z/VM V5.2 announced**

Introducing z/VSE V3.1

- Announcement: February 1, 2005

- General Availability: **March 4, 2005**

- IBM System **z9 109** and eServer zSeries **890** and **990**

  - ► **SCSI disks** (ESS) attached to zSeries FCP channels

  - ► **OSA Express2** and **FICON Express2** adapters

  - ► **Crypto Express2** (PCICA function) and **CPACF**

- up to 60 LPARS, up to 4 LCSS

- IBM TotalStorage **3494 Virtual Tape Server (VTS)**

- enhanced IBM **3494 Tape Library** support

- IBM TotalStorage **DS8000** and **DS6000** series disk

Introducing z/VSE V3.1 (Part 2)

- enhanced **Advanced Copy** support
  - ► NOCOPY
  - ► Flashcopy V2 (Dataset Copy, Multiple Relationships, eliminate LSS restrictions)

- **Language Environment** for VSE/ESA is now a standard component of VSE Central Functions (like VSE/VSAM, POWER, etc.)
  - ► price of new VSE CF < sum of parts

- **CICS/VSE V2.3** ships with CICS TS for VSE/ESA as before at no addl charge

- Fast Service Upgrade **(FSU)** available from VSE/ESA V2.6 and V2.7

- Customer **requirements,** productivity items, servicability improvements

- **z/VM V4 or later** required (if running z/VSE under VM)

- 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 System z9 and zSeries hardware.

z/VSE SCSI Overview

- **SCSI disks only (no SCSI tape, etc.)**

  ► FCP channels available on zSeries only (**CHPID = FCP**)

  • switched network /multipath for failover

  ► systems **and** data disks (**SCSI-only system possible**)

  • New IPL and JCL commands to define and query SCSI disks

- **Implementation based on existing FBA support**

  ► 512 byte block size

  ► FBA to SCSI emulation done on low level by z/VSE

  ► transparent to applications and subsystems, minimal impact on ISVs

- **SCSI volumes**

  ► up to **24GB** direct attached (up to 2GB if emulated FBA on z/VM V5)

  ► VSAM limited to 16GB

Server Support

IBM System z9, zSeries, and S/390 environments	z/VSE V3.1	VSE/ESA V2.7 (1)	VSE/ESA V2.6 (2)	Hdwr Service
IBM System z9 109	Yes	Yes*	Yes*	Yes
IBM eServer zSeries 990, 890, 900, 800	Yes	Yes*	Yes*	Yes
S/390 Parallel Enterprise Server™ G5/G6	Yes	Yes	Yes	Yes
S/390® Multiprise® 3000	Yes	Yes	Yes	Yes
S/390 Parallel Enterprise Server™ G3/G4	No	No	Yes	Yes (3)
S/390® Multiprise® 2000	No	No	Yes	Yes
S/390 Integrated Server	No	No	Yes	Yes
P/390 and R/390	No	No	Yes	No
S/390 Parallel Enterprise Server™ G1/G2	No	No	Yes	No
ES/9000® – 9221, 9121, 9021	No	No	Yes	No

Note 1: VSE/ESA V2.6 Service will end 3/2006, Note 2: V2.7 will end 2/2007

Note 3: S/390 G3 hardware service will end 12/2006

zSeries Storage Options

	New Standard in Pricing and Packaging	Foundation	New Standard in Functionality, Performance, TCO
	IBM TotalStorage DS6000	ESS 750 / 800	IBM TotalStorage DS8000

IBM TotalStorage	DS6000	ESS 750	ESS 800 & 800Turbo	DS8000
ESCON	N/A	Yes	Yes	Yes
FICON	Yes	Yes	Yes	Yes
FCP/SCSI	**Yes (1)**	N/A	**Yes**	**Yes (1)**

Note 1: z/VSE V3.1 DS8000 and DS6000 SCSI qualification date tbd

ON DEMAND BUSINESS™

40 YEARS

Release Status

VSE Version and Release	Marketed	Supported	End of Support
z/VSE V3.1	**Yes**	**Yes**	**tbd**
VSE/ESA V2.7	Yes (1)	Yes	02/2007
VSE/ESA V2.6	No	Yes	03/2006
VSE/ESA V2.5	No	No	12/2003

Note 1: VSE/ESA V2.7 will be marketed in parallel with z/VSE V3.1 until 9/2005

ON DEMAND BUSINESS™

z/VSE Version 3 Release 1

40 YEARS

Linux on zSeries

Integration

IBM TotalStorage®

z/VSE

IBM ∧   zSeries
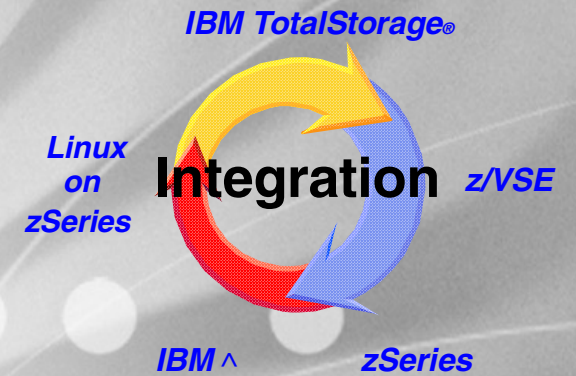
z/VSE Strategy

ON DEMAND BUSINESS™

Customer Application Portfolio:
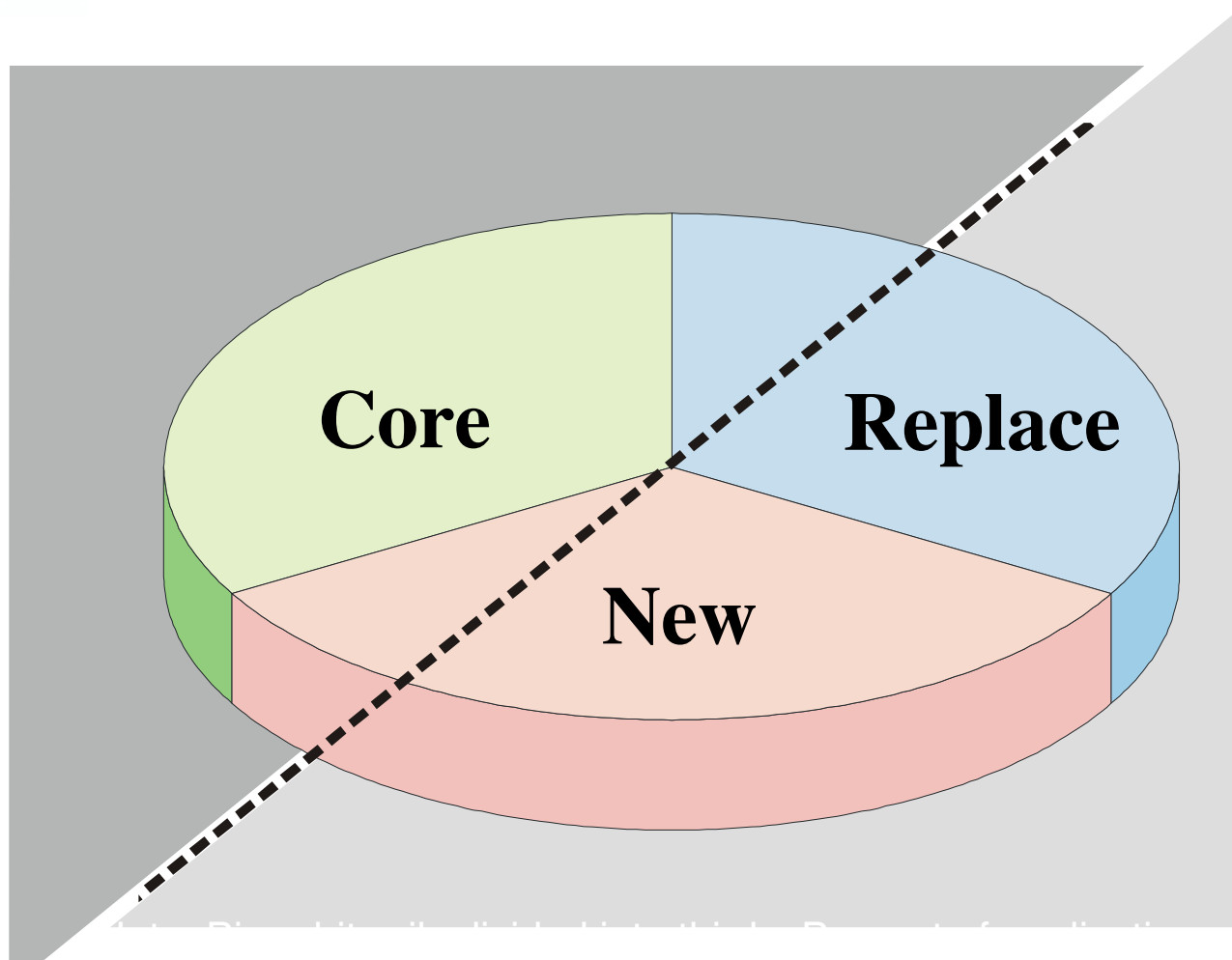
Pie arbitrarily divided into 1/3 segments

Integrating Hybrid Environments

Hybrid model

**BladeCenter
iSeries
pSeries
xSeries
zSeries**

**zSeries
Enterprise Server**

Web

Connectors

**CICS Transaction Gateway ECI
DB2 Connect / DB2 UDB DRDA
WebSphere MQ
VSE e-business connectors
VSE Web services**

IBM ^

| **Clients** | **Business Services** | **Tran/Data Services** |
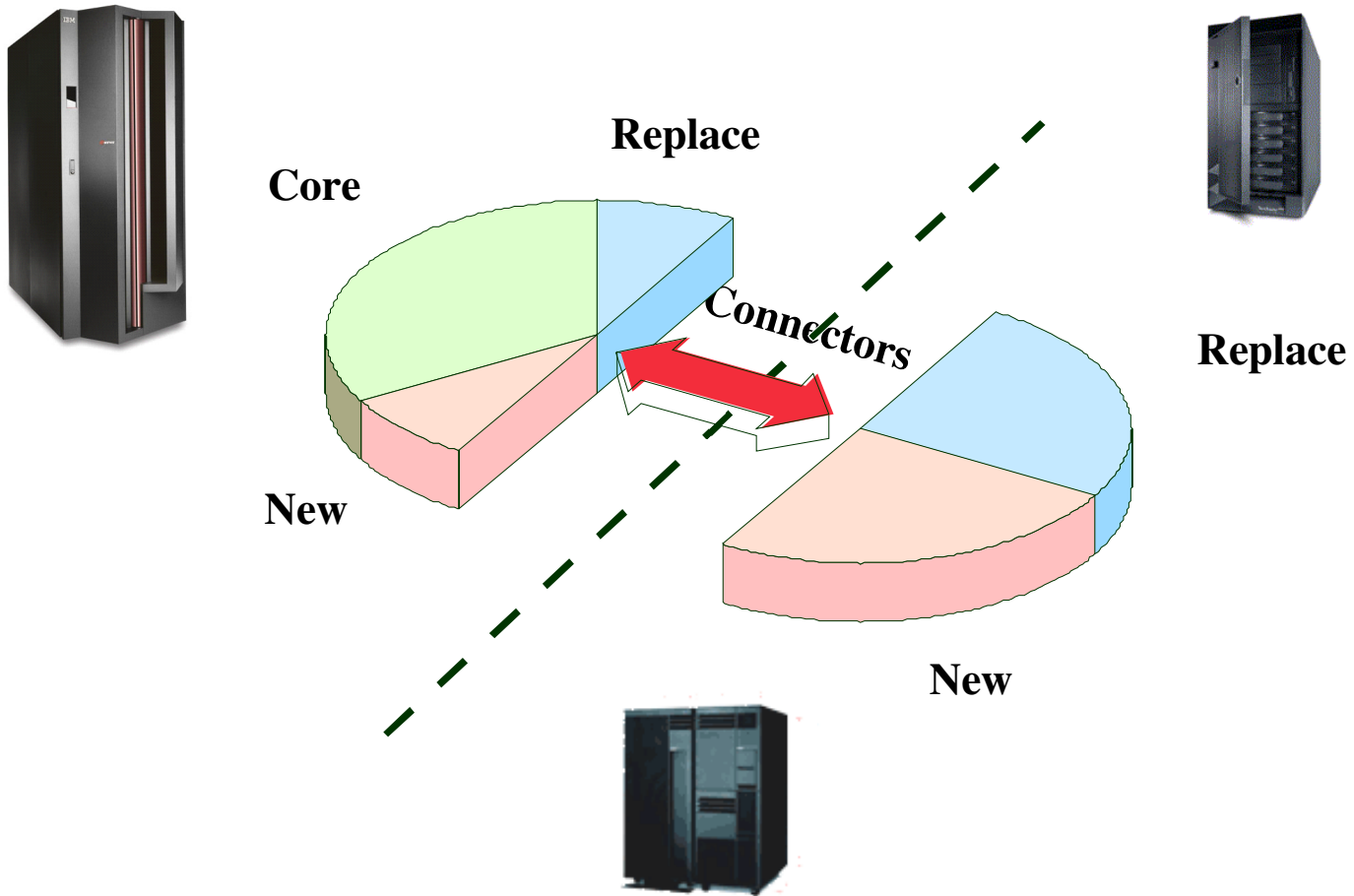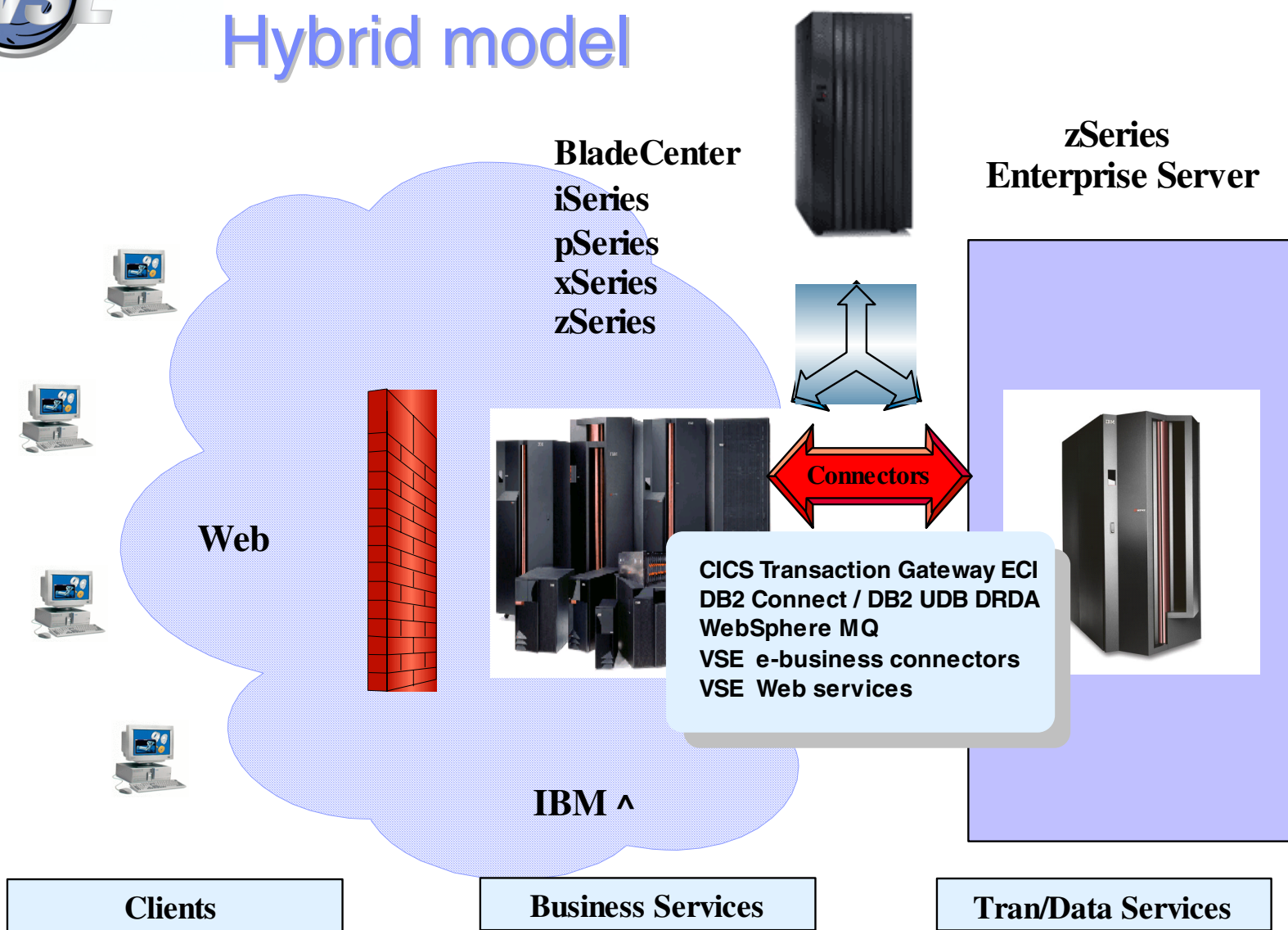
z/VSE Interoperability

zSeries Functions	z/VSE V3.1 (1)	VSE/ESA V2.7	VSE/ESA V2.6
VSE Connectors (no additional charge)			
Web Services, i.e. SOAP and XML	Yes	Yes	Yes* / service
VSEScript and DL/1	Yes	Yes	Yes*/ service
VSAM Redirector	Yes	Yes	Yes
VSAM, POWER, Librarian, ICCF lib, console	Yes	Yes	Yes
DB2 Stored Procedures for VSAM and DL/1	Yes	Yes	Yes
IBM Middleware (priced)			
CICS Transaction Gateway	Yes	Yes	Yes
DB2 Connect/DB2 UDB	Yes	Yes	Yes
WebSphere MQ (but VSE Client no charge)	Yes	Yes	Yes

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 System z9 and zSeries hardware
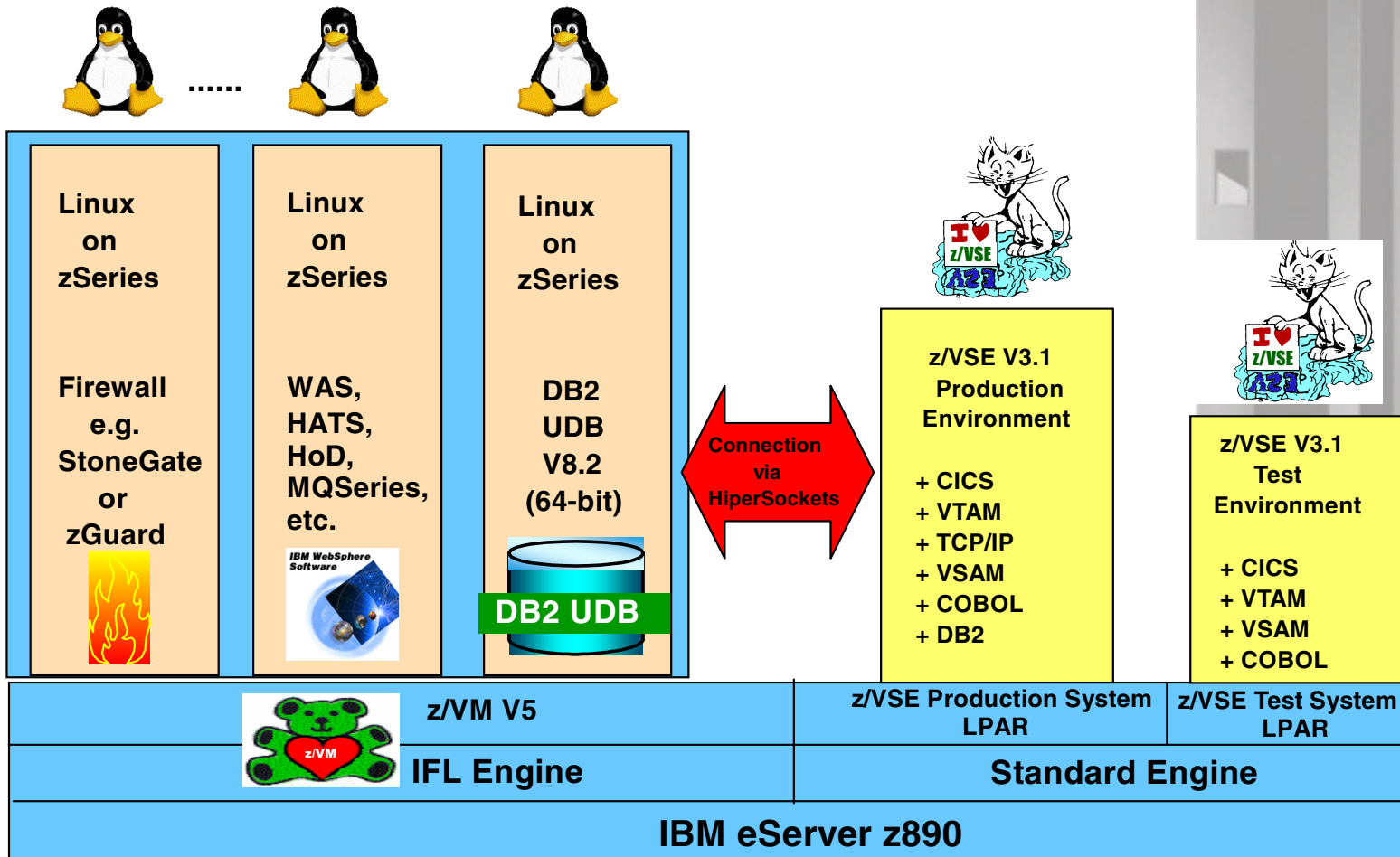
VSE Java-based Connectors
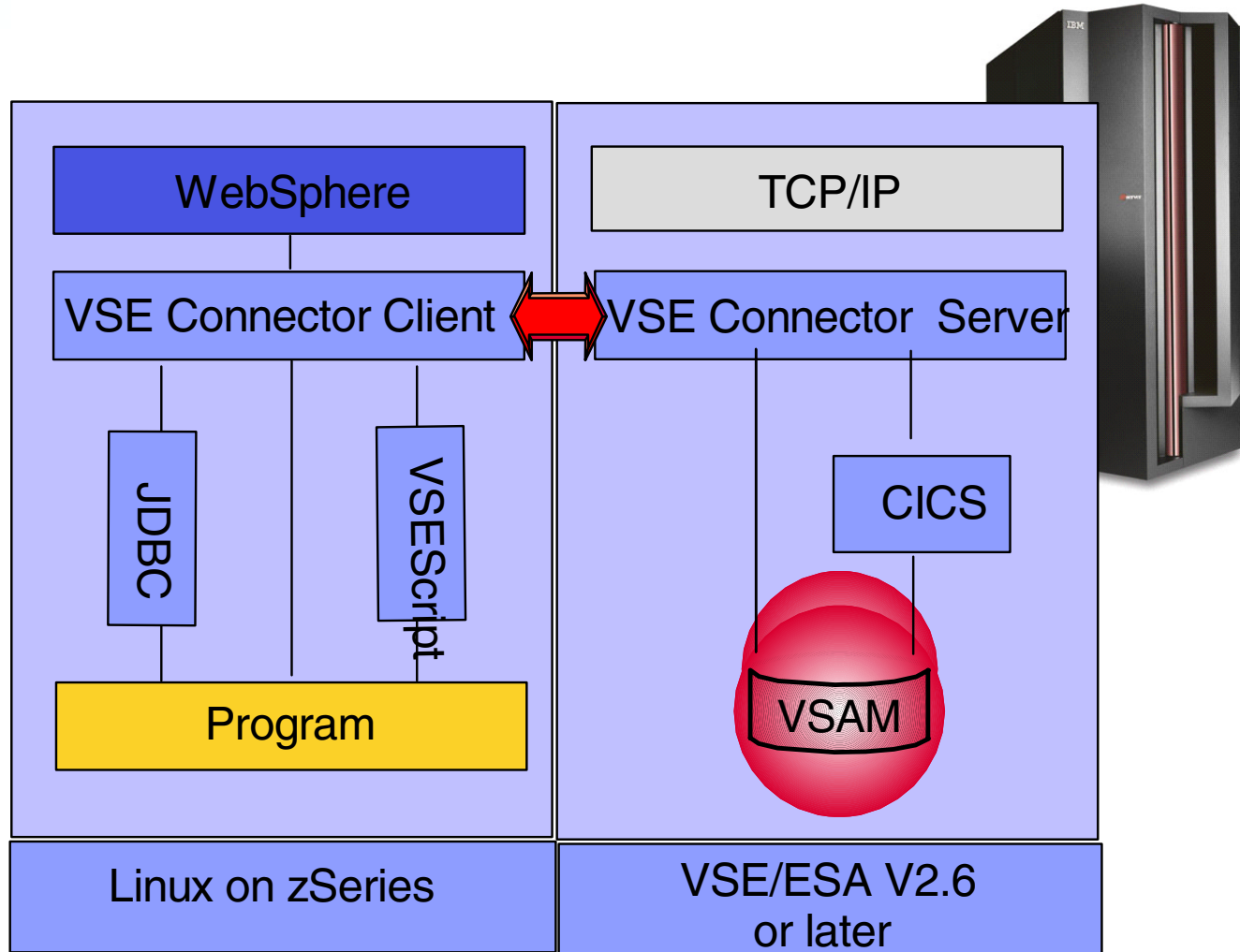
VSE/VSAM Redirector

Think *inside* the box

Linux for zSeries
(IFL engines)

z/VSE V3.1
(std engines)

Web

Connectors

CICS Transaction Gateway ECI
DB2 Connect / DB2 UDB DRDA
WebSphere MQ
VSE e-business connectors
VSE Web services

z/VM

LPAR or z/VM

z890

Clients

Business Services

Tran/Data Services

VSE and Linux on zSeries

Linux on zSeries

Firewall e.g. StoneGate or zGuard

Linux on zSeries

WAS, HATS, HoD, MQSeries, etc.

Linux on zSeries

DB2 UDB V8.2 (64-bit)

DB2 UDB

Connection via HiperSockets

z/VSE V3.1 Production Environment

+ CICS
+ VTAM
+ TCP/IP
+ VSAM
+ COBOL
+ DB2

z/VSE V3.1 Test Environment

+ CICS
+ VTAM
+ VSAM
+ COBOL

z/VM V5

z/VSE Production System LPAR

z/VSE Test System LPAR

IFL Engine

Standard Engine

IBM eServer z890

z/VSE Version 3 Release 1

40 YEARS

future?

z/VSE Trends & Directions

ON DEMAND BUSINESS™

z/VSE Positioning

z/OS

z/OS Parallel Sysplex
Systems Mgmt, Capacity (incl 64-bit), Availability

| IMS DC
TSO | CICS Trans Server,
ACF/VTAM, TCP/IP
LE COBOL, PL/1, C
DFSORT, MQSeries
DB2, IMS DB, VSAM | *Unix System Services*
heavy duty e-business
ie. WebSphere Appl Server
Enterprise JavaBeans
DB2 UDB |

Unique to MVS

No ←

| CICS Trans Server,
ACF/VTAM, TCP/IP
LE COBOL, PL/1, C
DFSORT, MQSeries
DB2, DL/1, VSAM | *WebSphere Appl Server*
Enterprise JavaBeans
DB2 UDB |

z/VSE   Linux for zSeries

z/VSE Directions

- **Protect**

  - ▶ basic hardware support and selective exploitation
    - • IBM System z9
    - • IBM TotalStorage
  - ▶ value
    - • availability/ integrity / reliability / security
    - • continuity / stability / z/OS affinity
    - • ease-of-use / maintainability / serviceability
    - • lower total cost of ownership (TCO) / flexible terms and conditions
    - • specific customer requirements (WAVV, GSE, individuals, etc.)

- **Integrate**

  - ▶ connectivity based on open and industry standards
  - ▶ network integration (including VSE Connectors)

- **Extend**

  - ▶ integrate / exploit capabilities of Linux on IBM System z9 and zSeries

IBM Mainframe &VSE Evolution

- **zSeries 890**
  - ►366 MIPS (1-way)
  - ►8 –32 GB

- S/370->4300->9370->ES9000->S/390

- **S/360-30**
  - ►30 KIPS (.03 MIPS)
  - ►16 – 64 KB

- **DOS/360**
  - ►1 batch partition
  - ►basic, but lovable

DOS/VS->DOS/VSE->(SSX)->VSE/SP
VSE/ESA V1->VSE/ESA V2

- **z/VSE V3.1**
  - ►Batch and OLTP
  - ►On-demand
    - • Web
    - • Linux
  - ►still lovable

| 1960s | 1970s | 1980s | 1990s | 2000s |

ON DEMAND BUSINESS™

40 YEARS

After 40 years providing robust, cost-effective solutions, VSE doesn't get older –
it gets better……

P rotect
I ntegrate
E xtend

Simple as P i e !

ON DEMAND BUSINESS™

New z/VSE Web Site

z/VSE Version 3 Release 1

40 YEARS

Miscellaneous retrospectives…

Do You Recall?

- **Wing Tip shoes and 'Onward, Ever Onward'**

- **'Think' signs and 'Think' writing pads**

- **'Blue' Letters? … how about 'Ivory' Letters**

- **BOS, TOS**

- **Future System (FS)**

- **April 11, 1980 at 8:00 GMT**
  - ► don't forget September 17, 2042

- **VM/BSEPP**

Do You Recall?

- **Wing Tip shoes and 'Onward, Ever Onward'**
- **'Think' signs and 'Think' writing pads**
- **'Blue' Letters? how about 'Ivory' Letters**
- **BOS, TOS**
- **Future System (FS)**
- **April 11, 1980 at 8:00 GMT**
  - ► don't forget September 17, 2042
- **VM/BSEPP**
- **IBM 1130, System 7, 8100 and DPPX, and Series 1**
- **Operations Research, Video Text, CASE**
- **Buildings heated by the heat of their mainframes**
- **Systems Application Architecture (SAA)**
- **Dr. Ed Altman and GUIDE**
- **Client/Server**
- **Year 2000**

What Doesn't Belong and Why?

- **Helen of Troy leaves her husband**

- **Citizens of Pompeii watch volcano with casual interest**

- **Montezuma invites Cortez to palace for dinner**

- **Ann Boleyn marries King Henry VIII**

- **President Lincoln attends theater**

- **Elite travelers book maiden voyage of *Titanic***

- **Thousands take out loans to buy stocks in 9/1929**

- **Ford introduces the Edsel**

- **Thousands worldwide depend on VSE for their IT needs**

What Doesn't Belong and Why?

- **Helen of Troy leaves her husband**

- **Citizens of Pompeii watch volcano with casual interest**

- **Montezuma invites Cortez to palace for dinner**

- **Ann Boleyn marries King Henry VIII**

- **President Lincoln attends theater**

- **Elite travelers book maiden voyage of *Titanic***

- **Thousands take out loans to buy stocks in 9/1929**

- **Ford introduces the Edsel**

- **Thousands worldwide depend on VSE for their IT needs**

…Because all the others lived to regret their actions

ON DEMAND BUSINESS™

Thanks for listening, and thanks for your business

Your friends, the VSE development team

40 Years of VSE

9/2/2005