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Business Development Manager z/VSE & Linux on System z

z/VSE Update and Outlook

IBM webcast - June 02, 2010

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DS8000	IBM logo*	System z10 Business Class	z9
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Agenda

§ z/VSE evolution
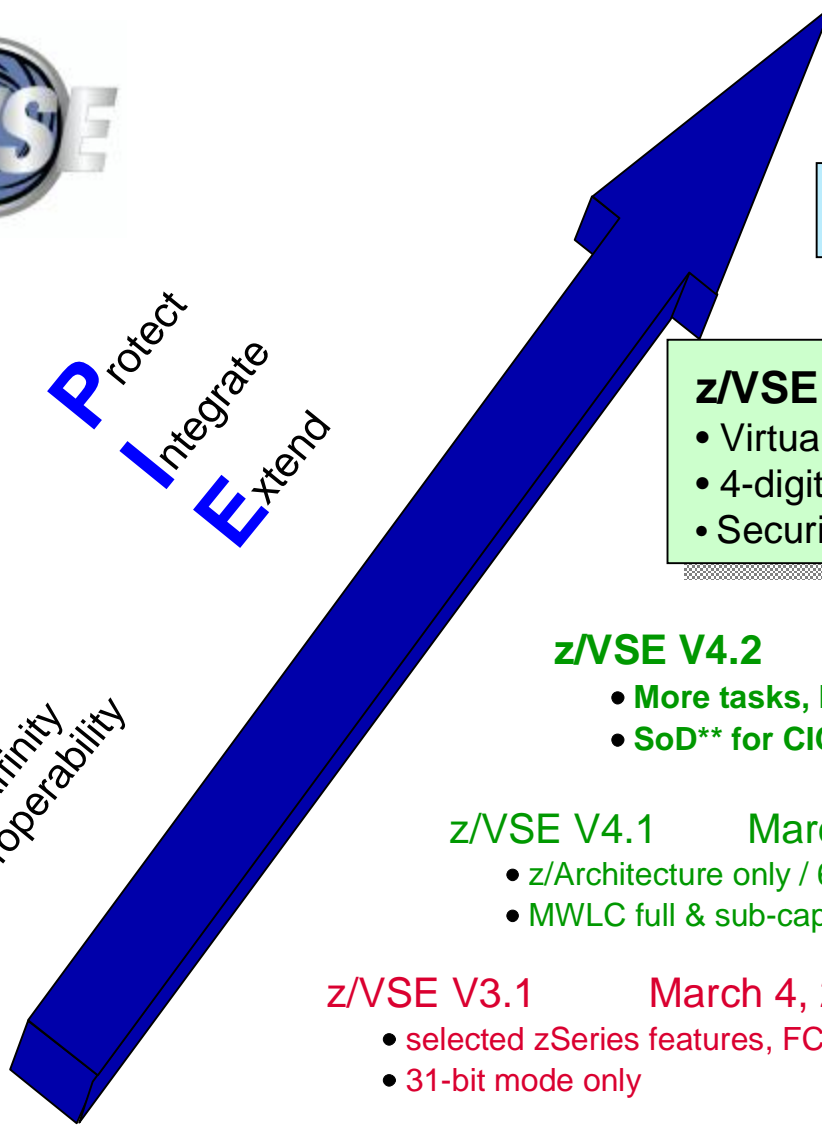
§ z/VSE support status

§ z/VSE V4.3 Preview

z/VSE Evolution

Protect Integrate Extend

Capacity
Quality
z/OS Affinity
Interoperability

z/VSE V4.3   GA 4Q2010

IPv6/VSE   Ann. 4/06/2010; GA 5/28/2010

z/VSE V4.3   Preview Oct 20, 2009
- Virtual storage (24-bit) constraint relief
- 4-digit device addresses
- Security/crypto/networking 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
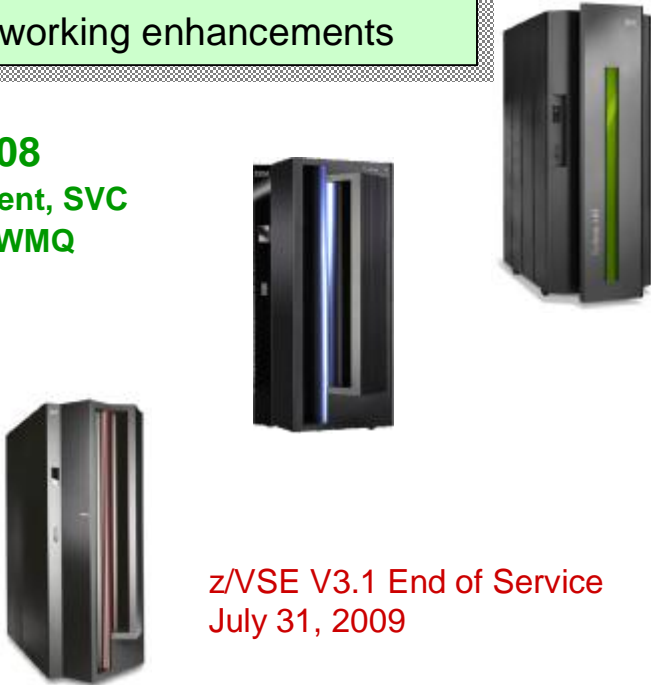
z/VSE V3.1 End of Service
July 31, 2009

Changes in 2009 and 2010

- § *02/26/2008 - IBM System z10 Enterprise Class*
- § 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
- § 05/28/2009 – Support for PAV available
- § 07/07/2009 - Preview: IBM z/VM V6.1
- § **07/17/2009 - z/VSE V4.2.1 available**
- § 07/17/2009 – Encryption Facility for z/VSE V1.2 available
- § 07/31/2009 - End-of-Service for z/VSE V3.1
- § **10/20/2009 - z/VSE V4.3 Preview announcement**
- § 10/20/2009 - z/VM V6.1 announced
- § 10/23/2009 - z/VM V6.1 available
- § 10/20/2009 - 2nd edition of Redbook 'Security on IBM z/VSE' (SG24-7691)
- § 02/02/2010 - z/VSE V4.1 end-of-service extended from 04/30/2010 to 04/30/2011
- § 02/03/2010 - New Redbook: 'z/VSE Using DB2 on Linux for System z' (SG24-7690)
- § **04/06/2010 – IPv6/VSE announced**

5

IBM

z/VSE Support Status

VSE Version and Release	Marketed	Supported	End of Support
z/VSE V4.2[2]	Yes	Yes	tbd
z/VSE V4.1[2]	No	Yes	04/30/2011
z/VSE V3.1[1]	No	No	07/31/2009
VSE/ESA V2.7	No	No	02/28/2007

[1]) z/VSE v3. 31-bit mode only. It does not implement z/Architecture, and specifically does not implement 64-bit mode capabilities. z/VSE is designed to exploit select features of IBM System z10, System z9, and zSeries hardware.

[2]) z/VSE V4 is designed to exploit 64-bit real memory addressing, but will not support 64-bit virtual memory addressing

z/VSE V4.3 preview (announced October 2009)

§ Virtual storage constraint relief:

– Move selected system programs and buffers from 24-bit into 31-bit storage

§ Ease of use through four-digit device addresses

§ IBM System z10 technology exploitation:

– Dynamic add of logical CPs

– Large page (1 megabyte page) support for data spaces

– FICON Express8 support

§ Enhanced storage options:

– Parallel Access Volume (PAV) feature of IBM Systems Storage DS8000 and DS6000

– DS8000 Remote Mirror and Copy (RMC) feature support through ICKDSF

– IBM System Storage TS7700 Virtualization Engine Release 1.5

§ Network, security and auditability enhancements

§ DOS/VS RPG II support for CICS Transaction Server for VSE/ESA (CICS TS)

– Allows RPG programs implemented for CICS/VSE V2.3 to run with CICS TS

§ IPv6 SOD

Virtual storage constraint relief

Move selected system programs and buffers from 24-bit into 31-bit storage

§ Fulfills several customer requirements

§ Will satisfy increasing 24-bit storage needs of customers -
  – with growing workloads (e.g. CICS)
  – who want to consolidate their z/VSE systems

§ Addresses (among others):
  – VSE/VSAM
  – DL/I
  – z/VSE supervisor

Note: 64-bit virtual addressing is not supported

16 EB

64-bit addressing

2 GB

31-bit addressing

16 MB

24-bit addressing
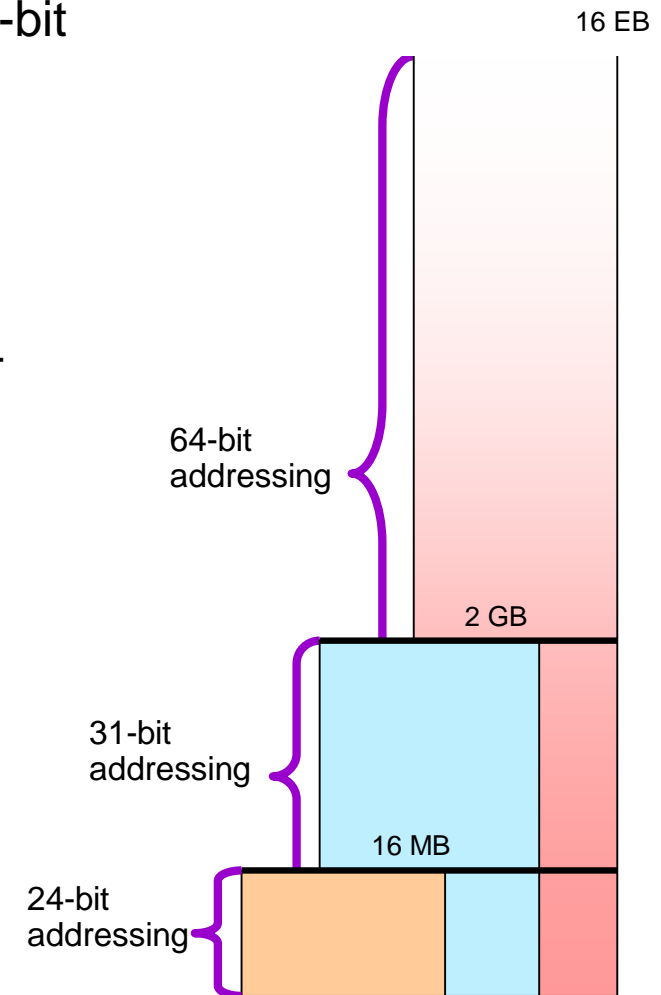
Four digit device addresses

§ Ease-of use configuration and infrastructure simplification
  – Specifically helpful in mixed IT environments where z/VSE runs together with other System z operating systems (z/VM, Linux on System z, z/OS)
  – More flexibility
  – Removes the requirement for a z/VSE specific I/O configuration

§ Transparent for system, vendor, and user applications that rely on 3-digit device numbers
  – z/VSE V4.3 will map a 4-digit number to a 3-digit one
  – After initial program load (IPL) only the 3-digit device address will be used

X'0000' to X'FFFF'

2 8 F

Mapped to 3-digit address in z/VSE

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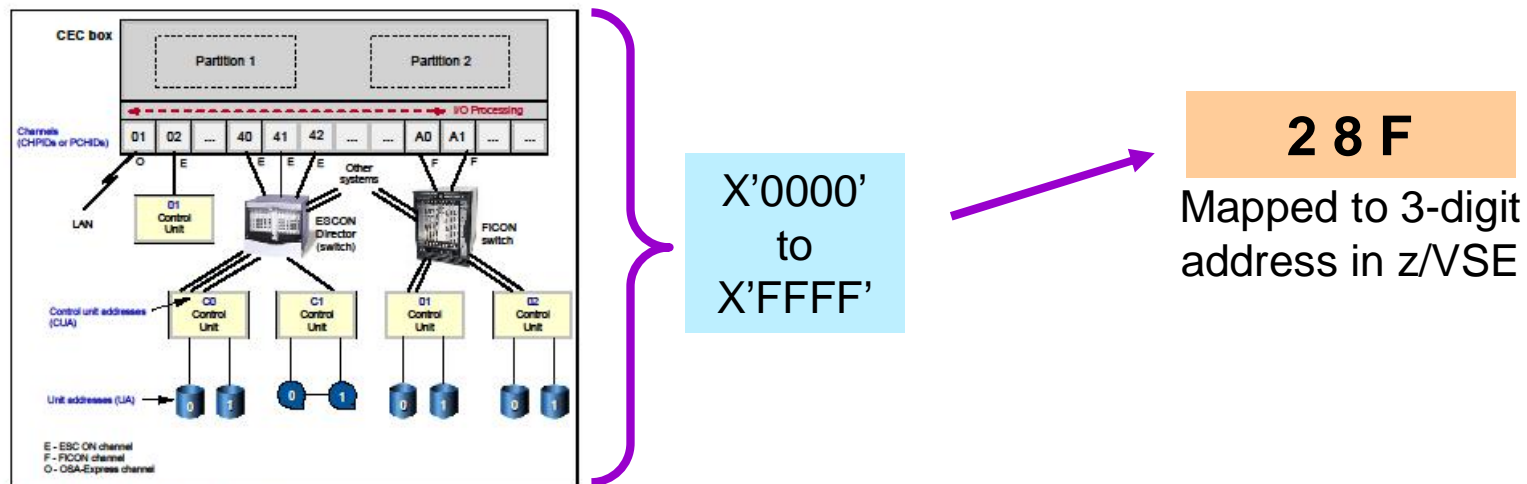
IBM System z10 technology exploitation

§ Dynamic add of logical CPs*

– Ability to dynamically add logical CPs without preplanning

– Allows adding central processors (CPs) to LPAR without re-IPL of the z/VSE system

– Clients can increase (and decrease) the capacity of the z/VSE V4.3 system dependent on workload needs

§ Large page (1 megabyte page) support for data spaces*

– Better exploitation of large processor storage

– Transparent to applications

§ FICON Express8 support

– Faster access to data with a link rate of 8 gigabits per second (Gbps)

– Two modes of operation: CHPID TYPE FC (FICON or CTC) and FCP (for SCSI disks)

– Ability to auto-negotiate to 2 or 4 Gbps

*) Not available in a z/VM guest environment

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z/VSE Support for IBM Mainframe Servers

IBM Servers	z/VSE V4.3 Plan	z/VSE V4.2	z/VSE V4.1
IBM System z10 Business Class (z10 BC)	**Yes**	**Yes**	Yes
IBM System z10 Enterprise Class (z10 EC)	**Yes**	**Yes**	Yes
IBM System z9 EC & z9 BC	**Yes**	**Yes**	Yes
IBM eServer zSeries 990 & 890	Yes	Yes	Yes
IBM eServer zSeries 900 & 800	Yes	Yes	Yes

IBM System z10 Exploitation

Functions	z/VSE V4.3 Plan	z/VSE V4.2	z/VSE V4.1
z/Architecture mode (with 64-bit *real* addressing)	Yes	Yes	Yes
64-bit *virtual* addressing	No	No	No
ESA/390 processor support	No	No	No
Processor storage (i.e. real memory) … *up to*	32 GB	32 GB	8 GB
Large page (1 megabyte page) support for data spaces	New	No	No
Dynamic add of logical CPs	New	No	No
CP Assist for Cryptographic Function (i.e. DES, TDES, etc.) § CPACF z9 extensions (i.e. AES 128-bit, etc.) § CPACF z10 extensions (i.e. AES 256-bit, etc.)	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes
up to 60 LPARs and 4 LCSSs	Yes	Yes	Yes
HiperSockets™ (including spanned HiperSockets)	Yes	Yes	Yes

IBM System z10 Exploitation

Functions	z/VSE V4.3 Plan	z/VSE V4.2	z/VSE V4.1
FICON Express8, Express4, FICON Express2 ('FICON' & 'FCP')	Yes	Yes	Yes
Fibre Channel Protocol (FCP) for SCSI Disks	Yes	Yes	Yes
OSA-Express3, OSA-Express2, OSA-Express features	Yes	Yes	Yes
§ z10 OSA-Express3 - 4-port exploitation	Yes	Yes	Yes
OSA Integrated Console Controller (OSA-ICC)	Yes	Yes	Yes
Crypto Express3 – 2P & 1P	Yes	Yes	No
Crypto Express2 – 2P & 1P	Yes	Yes	Yes
§ SSL clear key encryption assist	Yes	Yes	Yes
§ Configurable Crypto Express3	Yes	Yes	No
§ Configurable Crypto Express2	Yes	Yes	Yes
§ 2048-bit RSA keys	Yes	Yes	Yes
§ z10 Dynamic Add/Remove Cryptographic Processors	Yes	Yes	No

Note: selected FICON or OSA Express cards may not be supported on System z10 processors

Network, security and auditability enhancements

§ Network enhancements
  – z/VM Queue I/O (QIO) performance assist for real networking devices for z/VSE running in a z/VM guest environment
  – For OSA Express adapters and HiperSockets

§ Security enhancements
  – Protecting MQ resources in WebSphere MQ for z/VSE V3 by Basic Security Manager (BSM)

§ Systems management enhancements
  – Monitoring agent allowing SNMP version 1 clients to retrieve z/VSE specific system and performance data
  – Helps performance monitors in collecting data

DOS/VS RPG II support for CICS TS

RPG II compiler support for CICS Transaction Server for VSE/ESA (CICS TS)

§ Will allow RPG programs implemented for CICS/VSE to run with CICS TS

§ Support will also be made available with z/VSE V4.2

This support will ease the migration from CICS/VSE V2.3 to CICS TS on z/VSE V4.2

§ z/VSE V4.3 will no longer offer CICS/VSE V2.3 as part of z/VSE V4.3 base (SOD published in October 2007

§ Customers can migrate their online RPG programs to CICS TS on z/VSE V4.2

Internet Protocol Version 6 (IPv6)

§ IPv6 is the "next generation" protocol designed by the Internet Engineering Task Force (IETF) to replace the current version Internet protocol, IP Version 4 (IPv4).

§ IPv6 removes the IP addressing limitation of IPv4

§ IPv6 is expected to gradually replace IPv4, both coexisting for a number of years

§ Availability of IPv6 support addresses long term requirements of the commercial community and government agencies

   – *IPv6 is a strategic direction and a requirement of US Government projects*

   – *US DoD, GSA, and NASA require IPv6 compliant products in all new IT acquisitions*

   – *European Commission (EU) will specify IPv6 capabilities as a core requirement*

IPv4
2^{32} addresses
(RFC 791, 1981)

IPv6
2^{128} addresses
(RFC 2460, 1998)
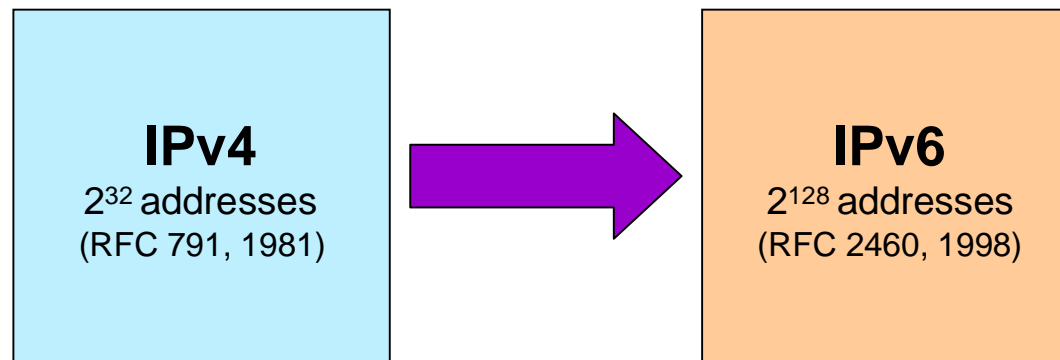
z/VSE - Delivering on our Strategy
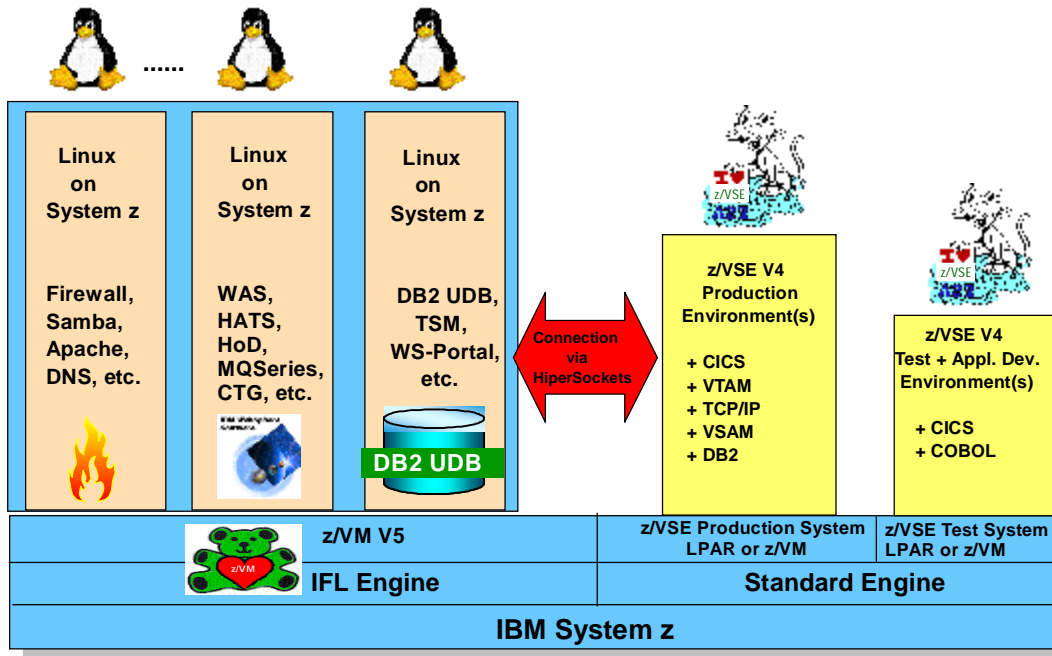
§ **P**rotect
- Virtual storage constraint relief
- System z10 technology exploitation
- Enhanced storage options

§ **I**ntegrate
- 4-digit device addresses
- IPv6
- Network & systems management enhancements

§ **E**xte
- IPv

New Red Book on z/VSE using DB2 on Linux

Contents:

§ Chapter 1. Overview of a future oriented DB2 environment

§ Chapter 2. Planning DB2

§ Chapter 3. Environment setup and customization

§ Chapter 4. DB2 data migration and application dependencies

§ Chapter 5. Monitoring and tuning

§ Appendix A. Configuration members

§ Appendix B. Database manipulation

http://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/sg247690.html?Open
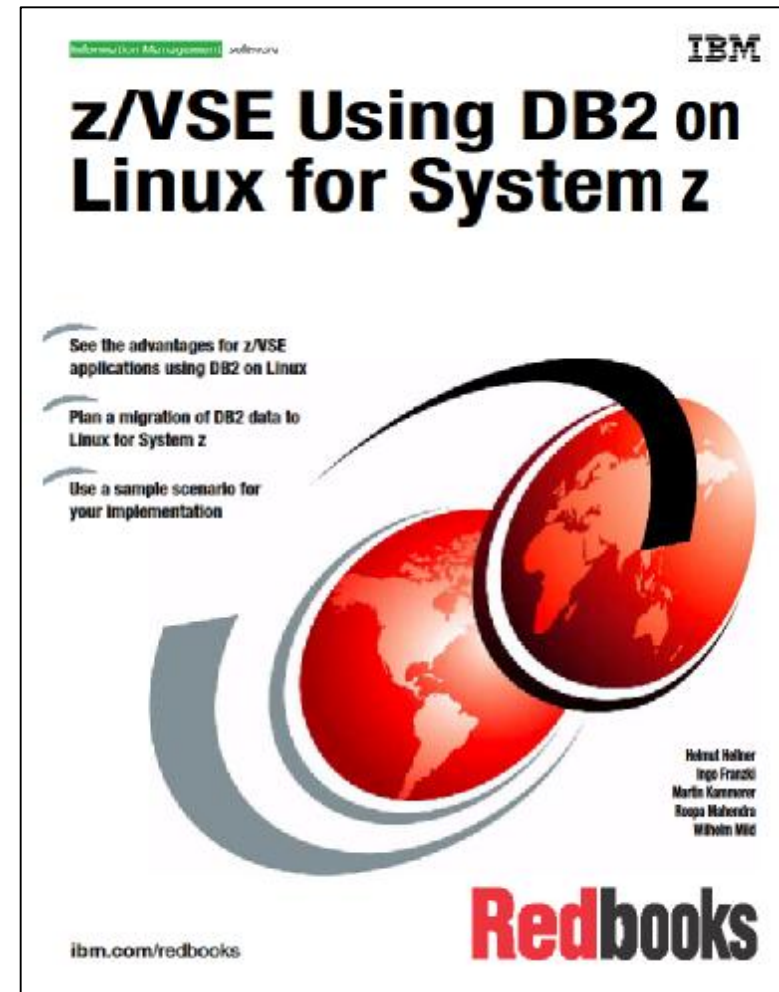
For more Information go to ...

§ z/VSE

– Homepage:

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

– Solution components:

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

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

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

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

– Downloads:

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

– Consulting and Q&A: zvse@de.ibm.com

BSI and IBM
IPv6/VSE and z/VSE

- Jeffrey Barnard
  Barnard Software, Inc.

News Flash!

- IBM licenses IPv6/VSE from BSI

- 5686-BS1 is IBM IPv6/VSE

- Announced April 6, 2010
- Available May 28, 2010

ARIN
American Registry for Internet Numbers

April 15, 2009

CEO/Executive Name
Organization Name
Postal Address Block

SUBJECT: Notice of Internet Protocol version 4 (IPv4) Address Depletion

Dear [Addressee],

This letter concerns the fact that Internet Protocol version 4(IPv4) addresses are running out and calls your attention to what we are doing about it. You are receiving this letter as your organization currently utilizes IPv4 number resources. [1]

IP addresses are the numbers behind domain names and are essential to the Internet. In May 2007, the American Registry for Internet Numbers (ARIN) advised the Internet community on IP address depletion in what is called Internet Protocol version 4 (IPv4) [2]. At the current rate of consumption, IPv4 will be depleted within the next two years [3]. After that, organizations that need additional IP addresses will need to adopt IPv6, a newer version of the Internet Protocol that provides a much larger pool of address space.

Please note the following two important items:

1. You should begin planning for IPv6 adoption if you are not doing so already. One of the most important steps is to make your organization's publicly accessible resources (e.g. external web servers and e-mail servers) available via IPv6 as soon as possible. This will maintain your Internet connectivity during this transition. For more information on IPv6, please refer to ARIN's online IPv6 Information Center [4].

2. ARIN is taking additional steps to ensure the legitimacy of all IPv4 address space requests. Beginning on or after 18 May 2009, ARIN will require applications for IPv4 address space to include an attestation of accuracy from an organizational officer. This ensures that organizations submitting legitimate requests based on documented need will have ongoing access to IPv4 address space to the maximum extent possible.

Please feel free to contact ARIN if you have any questions regarding this notice. Send e-mail to hostmaster@arin.net or call the registration services helpdesk at 703-227-0660.

Sincerely,

John Curran
Chairman, Board of Trustees
American Registry for Internet Numbers

Why IPv6?

- IPv4 Addresses Running Out
- Completely Allocated by 2H 2011
- Already difficult to obtain IPv4 Address blocks

- Begin Planning for IPv6 Now
- No Drop Dead Date

  – It's not like Year 2000
- IPv6 Co-Exists with IPv4

  – IPv6 is NOT backward compatible

Introducing IPv6/VSE for z/VSE 4.2

- Internet Protocol Version 6
  - IPng (IP Next Generation)

- IPv6 TCP/IP stack
- IPv6-Enabled Application Suite
- IPv6 Assist Mode IPv4 stack
  -Not a full function IPv4 stack
  -usable by IPv6-Enabled applications only

- TCP/IP-TOOLS IPv4 Stack is full function

IPv6

- IPv6 uses 16 byte addresses
- Presentation format is colon/hexidecimal
- For example

  `FEDC:BA98:7654:3210:0756:4228:1228:1641`

  `1080:0000:0000:0000:0008:0800:200C:0417`

  `1080:0:0:0:8:800:200C:417 (shortened)`

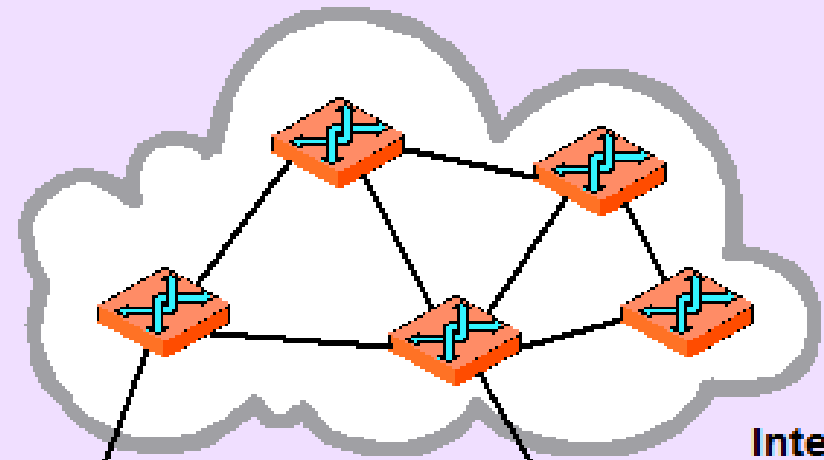 `1080::8:800:200C:417 (compressed)`

- ::1 is the loopback IPv6 address
- ::   is the unspecified IPv6 address

IPv6

- Network interfaces have 2 IPv6 addresses

  - Assigned (global) IPv6 address
    - 806::1:2

  - Link Local IPv6 address
    - FE80 ++ Mac Address (020000000008)
    - FE80:0:0:0:0200:0000:0100:0008
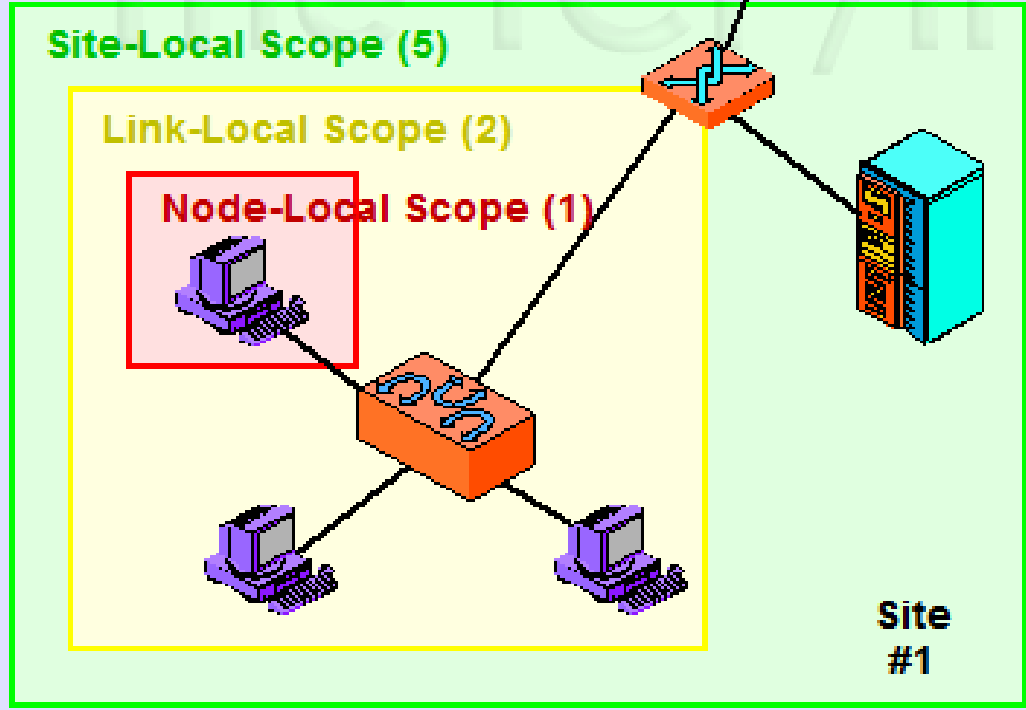   - FE80::200:0:100:8

Global Scope (14)

Internet

Organization-Local Scope (8)
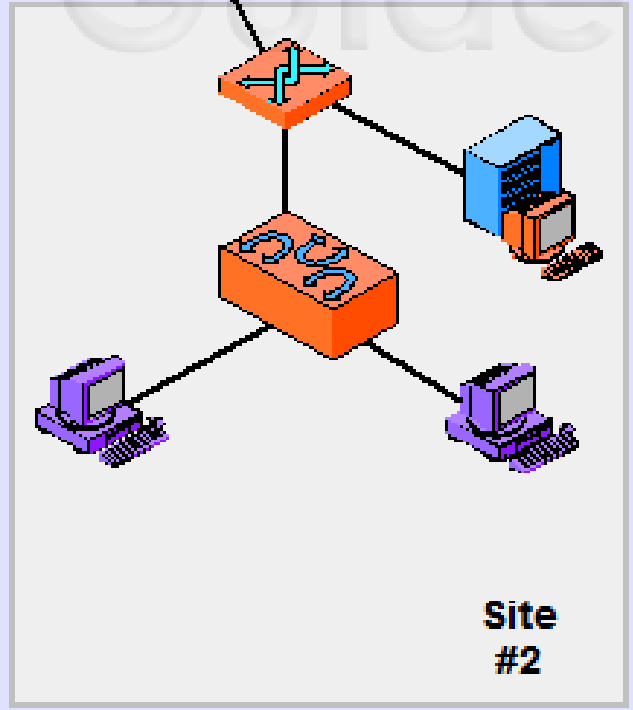
Site-Local Scope (5)

Link-Local Scope (2)

Node-Local Scope (1)

Site #1

Site #2

Deployment Issues

- Transitioning to IPv6…

- Contrary to popular belief, IPv6 is not backward compatible…

Dual IP Stacks

- Simplest method: Both stacks in parallel
- in hosts and routers
- Upgrade routers, and host OS
  Host upgrade can be gradual
- Application support:
  Existing applications continue to run
  IPv6 applications can be introduced
- Interoperation of v4 and v6 is another issue
- Applications to be modified to handle both?
- Hmm ...

IPv6/VSE Support in z/VSE

- Requires z/VSE 4.2 (DY47077)
  z/VSE 4.2 requires a z box
- Requires IJBOSA at DY47077 (or higher)
- OSA Express interface
  QDIO mode only!
- Hipersocket interface
- CTCA Linkage to Linux on zSeries
- 6in4 Tunneling Driver

  – Useful for testing and transition

BSI IPv6 Support

- IPv6/VSE Product
- New TCP/IP stack
- Separate partition
- Separate stack ID
- Uses new C compiler
  Faster code
  Full ESA/390 Instruction set
- IBM IPv6/VSE Available June 2010

BSI IPv6/VSE

- Dual stack configuration
- Continue to run existing applications
- Introduce IPv6 applications
- Gradual transition
- Simple conversion of applications ASM SOCKET API EZASOKET, EZASMI

BSI TCP/IP Applications

- All BSI applications IPv6-Enabled and Ready
- FTP server, FTP client
- TN3270E server and print drivers
- NTP server, NTP client
- System Logger client
- Batch Email client
- Batch LPR
- Batch Remote Execution Client
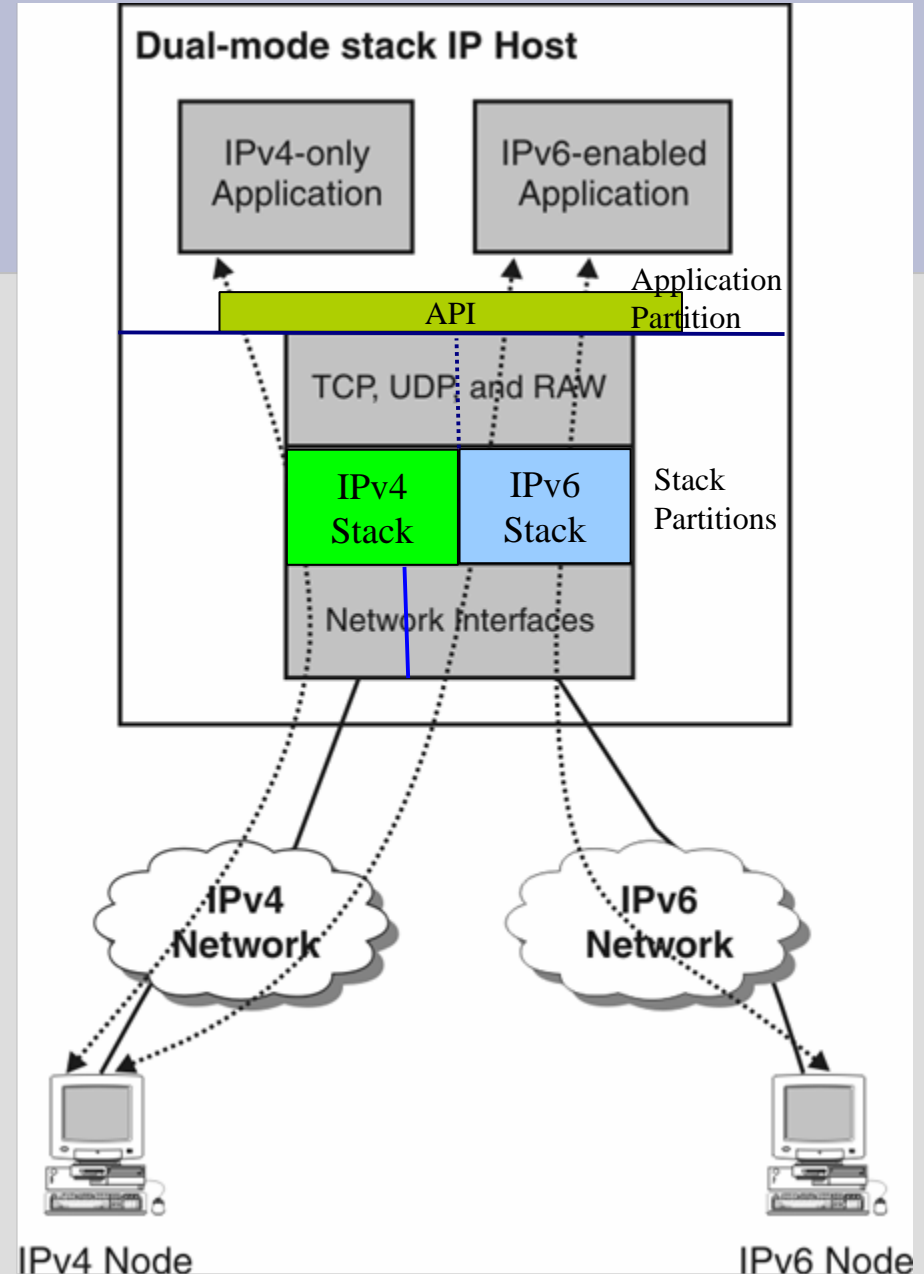- Batch PING
- And more ...

BSI IPv6/VSE Manuals

- TCP/IP-TOOLS Installation Guide
- TCP/IP-TOOLS Users Guide

- IPv6/VSE Installation Guide
- IPv6/VSE Design and Flow
- IPv6/VSE Users Guide
- IPv6/VSE Programming Guide

- Messages and Codes

BSI Pseudo-dual-mode Stack Implementation

Although there are actually two stacks running in two separate partitions, the Application Programming Interface (API) phase (located in the application partition) controls which stack is used for a specific request.

The application thinks it is talking to a dual-mode stack, yet the stacks are still isolated from each other enhancing performance and reliability.

Dual-mode stack IP Host

IPv4-only Application

IPv6-enabled Application

Application Partition

API

TCP, UDP and RAW

IPv4 Stack

IPv6 Stack

Stack Partitions

Network Interfaces

IPv4 Network

IPv6 Network

IPv4 Node

IPv6 Node

BSI IPv6/VSE

- Updated CONTROL Call GETVENDORINFO
- Returns ...
  'BSIIPv4' for IPv4 interface
  'BSIIPv6' for IPv6 interface
- If error then assume IPv4

BSI IPv6/VSE

- IPv6-Enabled ASM SOCKET API
- Simple change to ASM SOCKET API
- Enabled by moving a C'6' to the 1st byte of the ECB (SRBLOK) Field
- IPv4 uses Fullword IP address
- IPv6 uses Address of SAS

  - SAS is Socket Address Structure

- See BSI IPv6/VSE Programming Guide

BSI and IBM IPv6/VSE and z/VSE

- EZASOKET and EZASMI API
- BSI API is … z/VSE 4.2 (DY47077)
- Full z/OS 1.9 and z/VSE compatibility

- Other APIs to come as needed
  BSD/C, LE/C, etc.
  BSI simply maps these calls into EZA

BSI and IBM
IPv6/VSE and z/VSE

- Thank you!

- Jeffrey Barnard
  Barnard Software, Inc.