z/VSE Version 5 Update

Ingolf Salm

salm@de.ibm.com
Ingolf's z/VSE Blog: https://www.ibm.com/developerworks/mydeveloperworks/blogs/vse

Trademarks

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

Not all common law marks used by IBM are listed on this page. Failure of a mark to appear does not mean that IBM does not use the mark nor does it mean that the product is not actively marketed or is not significant within its relevant market.

Those trademarks followed by ® are registered trademarks of IBM in the United States; all others are trademarks or common law marks of IBM in the United States.

For a complete list of IBM Trademarks, see www.ibm.com/legal/copytrade.shtml:

*, AS/400®, e business(logo)®, DBE, ESCO, eServer, FICON, IBM®, IBM (logo)®, iSeries®, MVS, OS/390®, pSeries®, RS/6000®, S/30, VM/ESA®, VSE/ESA, WebSphere®, xSeries®, z/OS®, zSeries®, z/VM®, System i, System i5, System p, System p5, System x, System z, System z9®, BladeCenter®

The following are trademarks or registered trademarks of other companies.

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.
Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc. in the United States, other countries, or both and is used under license therefrom.
Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.
Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.
Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.
UNIX is a registered trademark of The Open Group in the United States and other countries.
Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.
ITIL is a registered trademark, and a registered community trademark of the Office of Government Commerce, and is registered in the U.S. Patent and Trademark Office.
IT Infrastructure Library is a registered trademark of the Central Computer and Telecommunications Agency, which is now part of the Office of Government Commerce.

* All other products may be trademarks or registered trademarks of their respective companies.

Notes:
Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.
IBM hardware products are manufactured from new parts, or new and serviceable used parts. Regardless, our warranty terms apply.
All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions.
This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.
All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.
Information about non-IBM products is obtained from the manufacturers of those products or their published announcements. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.
Prices subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.

Notice Regarding Specialty Engines (e.g., zIIPs, zAAPs and IFLs):

- Any information contained in this document regarding Specialty Engines ("SEs") and SE eligible workloads provides only general descriptions of the types and portions of workloads that are eligible for execution on Specialty Engines (e.g., zIIPs, zAAPs, and IFLs). IBM authorizes customers to use IBM SE only to execute the processing of Eligible Workloads of specific Programs expressly authorized by IBM as specified in the "Authorized Use Table for IBM Machines" provided at http://www.ibm.com/systems/support/machine_warranties/machine_code/aut.html ("AUT").

- No other workload processing is authorized for execution on an SE.

- IBM offers SEs at a lower price than General Processors/Central Processors because customers are authorized to use SEs only to process certain types and/or amounts of workloads as specified by IBM in the AUT.

VSE Roadmap

Quality

z/VSE Statement of Direction (SOD)
CICS Explorer update, Cannels & Containers,
new CICS TS for z/VSE release,
future z/VSE releases: ALS to z10 or higher

Connectivity

z/VSE 5.2   *Ann: 04/07/2014, GA 04/25/2014*
zEnterprise exploitation, device support
Tapeless installation, networking / security enhancements

z/OS Affinity

z/VSE 5.1 *11/2011*
64 bit virtual, zEnterprise exploitation, z9 or higher
z/VSE 5.1.1 06/2012: CICS Explorer, LFP in LPAR, database connector
z/VSE 5.1.2 06/2013: TS1140, 64 bit I/O, openSSL, db connector enhancements

Capacity

z/VSE 4.3   *11/2010, end of service 10/31/2014*
Virtual storage constraint relief, 4 digit cuus, z/VSE 4.3.1 08/2011

z/VSE 4.2 *October 2008, end of service 10/31/2012*
More tasks, more memory, EF for z/VSE 1.1, CPU balancing, SCRT on z/VSE
z/VSE 4.2.1 07/2009 - PAV, EF for z/VSE 1.2, **z/VSE 4.2.2** 04/2010 - IPv6/VSE 05/2010
CICS/VSE end of service 10/31/2012

z/VSE 4.1 *March 2007, end of service 04/30/2011*
z/Architecture only, 64 bit real addressing, MWLC – full and sub-capacity pricing

z/VSE 5.2 – Quick Overview

- Announcement: 04/07/2014, GA: 04/25/2014

- Hardware support
  - IBM System z Enterprise support
  - Device support
    - Tape, ECKD and FCP-attached SCSI disks

- 64 bit virtual exploitation
  - Virtual disk in memory objects

- Networking enhacements
  - IPv6 support for selected z/VSE functions

- Security enhancements
  - Basic Security manager (BSM) and VSE/POWER audit enhancements

- Ease of use
  - Tapeless installation from ECKD devices
  - Stacking tape support

- Fast Service Upgrade (FSU) from z/VSE 4.3 and z/VSE 5.1

- Pricing
  - z9, z10, z196, zEC12: Midrange Workload License Charge (MWLC) pricing with sub-capacity option
  - z114, zBC12: Advanced Entry Workload License Charge (AEWLC) pricing with sub-capacity option

z/VSE 5.2 – Hardware Support

Hardware support

- Support for IBM zEnterprise EC12 and IBM zEnterprise BC12

    - Configurable Crypto Express4S feature
    - OSA-Express5S features
    - HMC based configuration for OSA-Express4 and OSA-Express5S (OSA/SF)

- Support for IBM System Storage

    - Tape support
        - Systems Managed Encryption with IBM System Storage TS1140
        - IBM System Storage TS7700 Virtualization Engine Release 3.1

    - ECKD / FCP-attached SCSI disk support
        - IBM System Storage DS8870 Release 7.2
        - Upgrade of the z/VSE support for the Parallel Access Volume (PAV) feature (ECKD)

    - FCP-attached SCSI disk support
        - IBM Storwize V7000
        - IBM Storwize V5000 Midrange Disk
        - IBM Storwize V3700 Entry Disk

Hardware / z/VM support

- z/VSE V5 supports IBM System z servers:

  - IBM zEnterprise EC12 (zEC12)
  - IBM zEnterprise BC12 (zBC12)
  - IBM zEnterprise 196 (z196)
  - IBM zEnterprise 114 (z114)
  - IBM System z10 (z10 EC, z10 BC)
  - IBM System z9 (z9 EC, z9 BC)

  ... and z/VSE V5 can run in an LPAR or as a z/VM guest on all supported z/VM releases
  ... in uni- or multiprocessor mode

  Please see the statement of direction in the z/VM 6.3 announcement (July 2013):

  Stabilization of z/VM V5.4 support: The IBM zEnterprise EC12 and IBM zEnterprise BC12 are planned to be the last System z servers supported by z/VM V5.4 and the last System z servers that will support z/VM V5.4 running as a guest (second level). z/VM V5.4 will continue to be supported until December 31, 2014, or until the IBM System z9 EC and IBM System z9 BC are withdrawn from support, whichever is later.

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

VSE Support for IBM System z

VSE Release	z800 / z900	z890 / z990	System z9 / z10 / z196 / z114 / zEC12 / zBC12	VSE EoS
z/VSE V5.2	No	No	Yes	tbd
z/VSE V5.1	No	No	Yes	tbd
z/VSE V4.3	Yes	Yes	Yes	10/31/2014
z/VSE V4.2	Yes	Yes	Yes	10/31/2012
z/VSE V4.1	Yes	Yes	Yes	04/30/2011
z/VSE V3.1	Yes	Yes	Yes	07/31/2009
VSE/ESA V2.7	Yes	Yes	Yes	02/28/2007
VSE/ESA V2.6	Yes	Yes	Yes	03/2006
VSE/ESA V2.5	Yes	No	No	12/2003
VSE/ESA V2.4	Yes	No	No	06/2002
VSE/ESA V2.3	No	No	No	12/2001

9

IBM zEnterprise exploitation

- 64 bit real addressing - up to 32 GB (System z), 64 bit virtual addressing – up to 90 GB

- Large page support (z10, zEnterprise)
- Dynamic add / remove of logical CPs (z10, zEnterprise)

- OSA-Express 3, OSA-Express 4, OSA-Express 5S support
- HiperSockets Completion Queue on z196, z114, zEC12, zBC12 (z/VSE 5.1.1 and higher)
- Linux Fast Path (LFP) in z/VM mode LPAR (z10, zEnterprise)
- Exploitation of the z/VSE z/VM IP Assist (zEnterprise)

- zEnterprise and zEnterprise BladeCenter Extension (zBX) support
  - Intra Ensemble Data Network (IEDN)
  - Virtual LAN support, Layer 2 support
  - IEDN communication using the z/VM VSWITCH

- 4096-bit RSA key support with configurable Crypto Express3 (z10, zEnterprise)
  …. and Crypto Express4S (zEC12, zBC12) – z/VSE V5 only

- Static power save mode supported for SCRT (z196, zEC12)

- **zEC12 / zBC12 do not support ESCON channels**

10

z/VSE 5.2 – 64 bit virtual exploitation

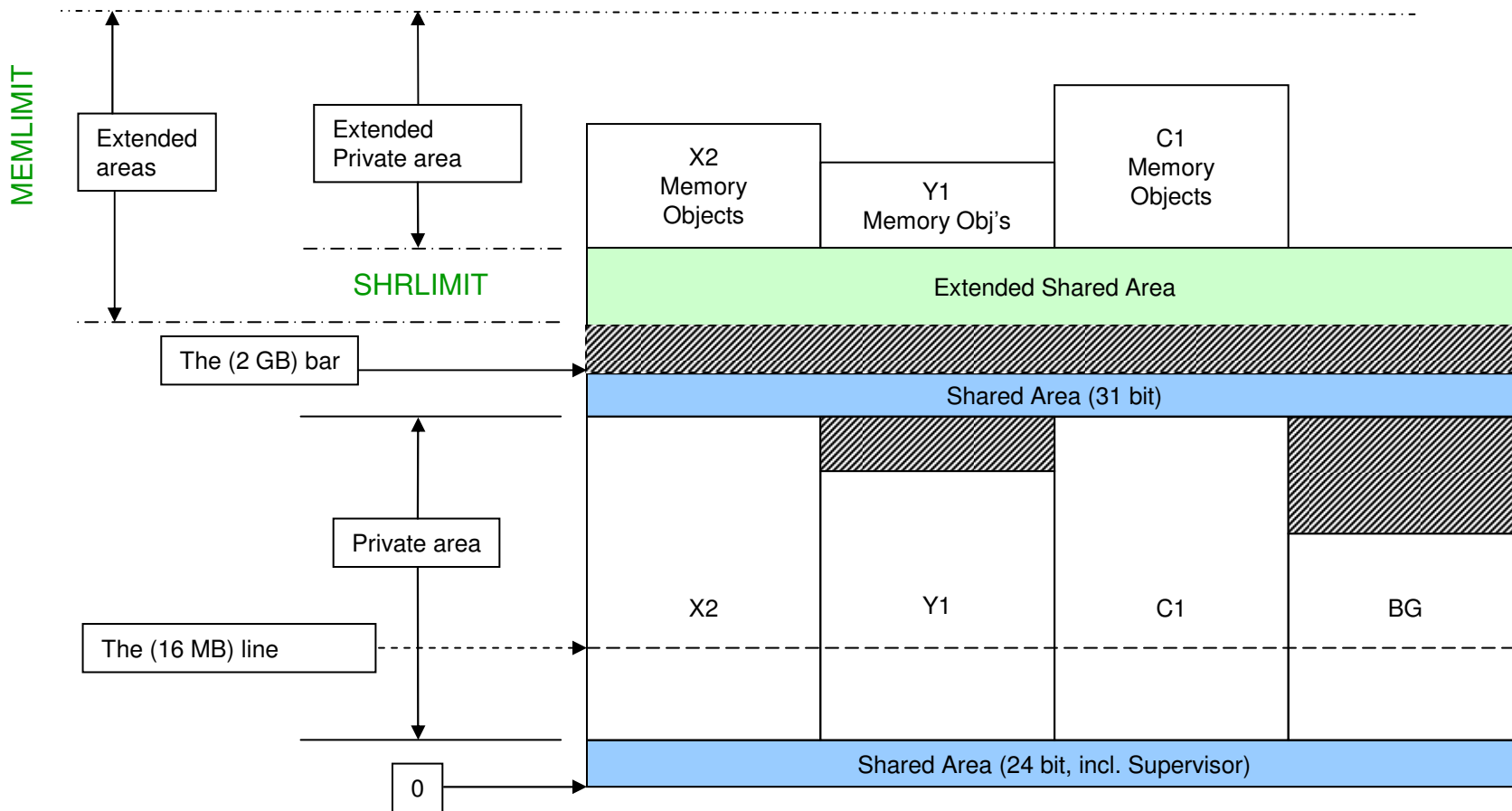# z/VSE 5.1: 64 bit virtual

- Support 64 bit virtual addressing

- 64 bit area can be used for **data only**
  - No instruction execution above the bar

- **z/OS affinity:** APIs (IARV64 services) - to manage memory objects – compatible with z/OS
  - Private memory objects for use in one address space
  - Shared memory objects to be shared among multiple address spaces

- Maximum VSIZE still limited to 90 GB

- Advantages:
  - Eases the access of large amounts of data
    - E.g. instead of using and managing data spaces
  - Reduces complexity of programs
    - Data contained in primary address space
  - Chosen design has no dependencies to existing APIs, minor impact on existing system code

64 bit virtual - Address Space Layout

64 bit virtual I/O for applications

- Available with z/VSE 5.1.2
- SYSCOM bit IJBIO64E in IJBIOFL1, if 64 bit virtual I/O support available

- I/O buffers can now be created above the bar (above 2 GB)
- I/O buffers in **private memory objects** supported only
- I/O control blocks to be allocated below the bar (in 31 bit storage)

- Supported for ECKD devices

- CCB macro with a new parameter: IDAW=FORMAT2
- CCB points to a Format-0 or Format-1 CCW
- CCW with IDA-flag and data address point to a single Format-2 IDAW containing a 64 bit virtual address.

- I/O buffer will be TFIXed by I/O Supervisor, not necessary to PFIX the I/O buffer

- Not supported for FBA / SCSI / tape devices, LIOCS

Virtual Disk in Shared Memory Objects

- A Virtual Disk
  - is emulating a FBA disk device;
  - may be used for temporary data, such as
    - temporary files and libraries,
    - temporary VSE/VSAM space and user catalogs
  - „lives" until the next IPL
  - has to fit into the availabe virtual storage (VSIZE)

- A Virtual Disk may be created in
  - a Data Space or
  - a shared memory object

- Maximum Virtual Disk size, if allocated in
  - Data Space: up to 2 GB
  - Shared memory object: up to 4 GB

- Virtual Disks are defined with the VDISK command

- If there is enough space is available in the extended shared area,
  the Virtual Disk will be created in a shared memory object;
  otherwise in a Data Space.

Memory Objects enhancements

System Dump

- System dump may be taken in case of abnormal termination dependent on JCL options
  - New JCL option MODUMP, NOMODUMP
- If program running in 64 bit mode and registers hold 64 bit addresses
  - The dump routine will take 4K on either side of this address
- Partitions dumps will be written to dump library or SYSLST dependent on OPTIONs
- May be processed with IUI Storage Dump dialog

Standalone Dump

- New standard option: STDOPT SADMPSMO=YES|NO
  - Controls, if standalone dump should include **shared memory objects**
- (Standard) option STDOPT SADUMP=(n,m,o)
  - Controls, if standalone dump should include **private memory objects**

IUI dialog Display Storage Layout

- Displays system values MEMLIMT and SHRLIMIT

z/VSE 5.2 – Ease of Use

Tapeless installation

- Initial installation of z/VSE from physical tape or bootable installation disk

- Installation disk is supported
  - for LPAR and z/VM guest environments
  - on ECKD devices, not on FBA / SCSI devices
  - for initial installation only

- Installation disk contains the **z/VSE base tape** in AWS format, a boot program and the VTOC

- Installation disk created on LPAR may be used by a z/VM guest or vice versa
  - LPAR: create installation disk by using the DVD with the HMC or SE Load function

- z/VSE provides tools to create an installation disk on ECKD devices

- Installation from installation disk possible on ECKD, FBA and FBA-SCSI

- System requirements
  - Installation disk space
    - LPAR & z/VM guest: 500 cylinders on 3390 disk device
    - z/VM guest: about 400 cylinders (CMS disk) in addition for the tools and AWS file
  - Minimum processor storage is 64 MB (general z/VSE 5.2 requirement)
  - LPAR: minimum processor storage for installation disk creation 512 MB

- Files required for the creation of the installation disk delivered on DVD or via the Internet

Tapeless installation ...

- Steps to create installation disk for LPAR
  - Creation from FTP server wirh access to directory with DVD or physical DVD in DVD drive of HMC or SE
  - Log on tothe HMC / SE
  - Select LPAR and Recovery
  - Select Load from Removable Media or Server
  - In the task window, select one of the following:
    - Hardware Management Console SD-ROM / DVD
    - FTP source
  - Select Software to Install task window is displayed. -> OK to continue
  - Continue on your 3270 console
  - z/VSE base tape image and boot phase loaded into processor storage and creation of installation disk is started.
  - Enter the VOLID of the installation disk
  - Enter the physical cuu of the installation disk
  - If you continue after message, the installation disk will be created
  - If completed, message „End of stand alone processing is displayed

- Steps to create installation disk for z/VM guest
  - Transfer installation tape image (AWS file) and tools to CMS disk
  - Reblock tools (VSEIDISK) files
  - Use the z/VSE Installation Disk Tool (VSEIDISK) to create the installation disk
    - VSEIDISK fn ft fm vdev VOLID=

- Start installation of z/VSE 5.2
  - IPL the installation disk
  - Installation process is the same as installation from physical tape.

Stacking Tape Support

- Standard labeled tape of type 3592, where several tape images (files) can be stored

- Based on z/VSE's Virtual Tape (VTAPE) support

- Contains multiple virtual tape files

- Job Control VTAPE command extended to support stacking tape

- Writing to a stacking tape
  - VTAPE INIT to initialize a stacking tape
  - VTAPE START with WRITE opens a new tape file
  - VTAPE STOP closes the tape file

- VTAPE function LIST to list the contents of a stacking tape

- VTAPE START with READ positions to the requested tape file

- Reasons to use stacking tape support:
  - Useful for tape migration of older tapes, such as 3480 and 3490
  - Exploit the capacity of modern tape volumes, such as TS1140
  - May reduce cost
  - ...

- Restrictions
  - No alternate tape support,
  - tape file can not be accessed via MTC command,
  - concurrent tape file access not supported,
  - existing tape files can not be deleted, modified or replaced
    However, new tape files can be appended

z/VSE 5.2 – Networking

TCP/IP Connectivity for z/VSE

- TCP/IP connectivity for IPv4 communication
  - IBM TCP/IP for VSE/ESA 1.5F – licensed from CSI International
  - IBM IPv6/VSE – licensed from Barnard Software, Inc. (BSI)
  - Linux fast path (LFP)

  - EZA socket interface, new function calls
  - LE/C socket API

- TCP/IP connectivity for IPv6 communication
  - IPv6/VSE
  - Linux Fast Path

  - EZA socket interface, new function calls

- All TCP/IP options can run concurrently within one z/VSE system

TCP/IP Connectivity for z/VSE – New with z/VSE 5.2

- IPv6 support in for z/VSE components, such as
    - z/VSE Connectors
        - Connector server & client, script server & client,
        - VSAM Redirector, HTTP & SOAP client, LDAP client, Monitoring agent & trap client
    - Virtual Tape (VTAPE)

- CICS listener
    - Enhanced listener support
    - Configuration dialog enhancements (selection: TCP/IP stack, standard / enhanced listener)
    - IPv6 support

- LE/C multiplexer
    - Controls access to TCP/IP C-socket API depending on SYSID
    - New parameter: SSLPHASE allows to select openSSL independent on TCP/IP stack

- IPv6/VSE V1.1 enhancements
    - Secure Sockets Layer (SSL) for secure data transmission, exploits openSSL provided by z/VSE V5

- IBM TCP/IP for VSE/ESA in separate AF sublibrary PRD2.TCPIPC

Linux Fast Path (LFP)

- Routes IPv4 or IPv6 socket request to Linux on System z
  - Without using the local TCP/IP stack

- LFP on z/VM
  - Uses an IUCV connection between z/VSE and Linux on System z
  - Both – z/VSE and Linux – need to be z/VM guests of the same z/VM

- Linux Fast Path using z/VSE z/VM IP Assist (VIA)
  - Both – z/VSE need to be a z/VM guests

- Linux Fast Path in LPAR
  - LFP daemon on Linux forwards the socket request to the Linux TCP/IP stack

- LFP is transparent to IBM socket APIs
  - Supported APIs: LE/C socket API, EZA socket / EZASMI interface, …
  - Transparent to IBM applications (DB2 client, Connectors, Power PNET)
  - No standard TCP/IP applications (Telnet, FTP, …) provided
  - IPv6/VSE: TCP/IP applications can exploit LFP

- Provided with the z/VSE base product – no additional charge

z/VSE 5.2 – Security

OpenSSL

- openSSL support for z/VSE is available since z/VSE 5.1

- openSSL code level: openSSL 1.0.1e (updated)
  – Supports Transport Layer Security (TLS) 1.2
- z/VSE supports a subset of openSSL functions

- IPv6/VSE and Linux Fast Path exploit openSSL

- z/VSE supports the GSK (z/OS SSL API) and openSSL API

- New APARs available.
  - z/VSE 5.1: DY47532 / PTF UD54020
  - z/VSE 5.2: DY47534 / PTF UD54027
  - Fixes the Heartbleed vulnerability

Security enhancements

- Basic Security Manager (BSM) / IUI enhancements
  - Separation of auditor from administration function
    - New user type AUDITOR
  - Extension of IUI security dialog for MQ classes
  - Unique group (GRP) and user id (UID) names ensured

- Key store conversion to manage multiple key stores
- (openSSL) LE multiplexer to separate SSL function from TCP/IP API

- LDAP batch tools to support search, add, modify, delete

- Monitoring agent security enhancement through IP filter support
  - Checks if incoming source IP / packet matches the information in the configuration file

- VSAM IDCAMS security
  - IDCAMS protected via RACROUTE

z/VSE 5.2 – Further Enhancements

z/VSE Component Enhancements

- VSE/VSAM
  - Chaining VSAM requests (chained RPL support) – reduces system overhead
    - Whole RPL chain released when error detected
  - Remove duplicate VOLSERs on DEFINE CLUSTER
    - Eliminates duplicate VOLSERs automatically
  - SHOWCB macro enhancements
  - New catalog management trace
  - CISIZE definition on DLBL statement for VSAM files
  - VSAM IDCAMS security

- VSE/POWER
  - Extended generation messages (XEM)
    - Generated for created, altered or deleted Q-entries
    - May be retrieved by SAS users
  - Delete SLI member after reading (DEL=YES/NO keyword in SLI statement)

z/VSE Component Enhancements

- z/VSE Connectors
  - SOAP enhancements
  - VSE/POWER XEM messages may be retrieved by Java applications

- Language Environment
  - Easy activation of Run-unit work area (RUWA) tracing (CRUT transaction)
    - Can help to debug and monitor CICS program storage requirements

- IUI dialogs
  - Display VTOC dialog – sort by volid
  - Updated device information dialog

- Base install without VTAM terminals (with TCP/IP terminal instead)

- Duplicate volumes are detected during installation and set to device down

- FCOPY performance improvements
  - new OPTIMIZE=5 parameter to read 15 tracks per I/O

z/VSE 5.2 – Statement of Direction (SOD)

z/VSE Statement of Direction (SOD) in z/VSE 5.2 Announcement

- IBM intends to provide

  new capability in a future release of IBM CICS Transaction Server for z/VSE, to provide:
  - (i) Updates to CICS resources for CICS Explorer, and
  - (ii) Channels and Containers to enable the transfer of large amounts of data between CICS applications.

- IBM intends to rename

  the product z/VSE Central Functions to z/VSE in a new z/VSE version.

- z/VSE V5.2 will be the last release that supports IBM System z9.
  Future releases of z/VSE will support IBM System z10 and higher.

- Stabilization of support and discontinued functions:
  - CICS DDM: Support for CICS Distributed Data Management (DDM) is stabilized in CICS TS for VSE/ESA V1.1.1. In a future release of CICS TS for z/VSE, IBM intends to discontinue support for CICS DDM.

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

CICS Explorer for z/VSE

- Announced 04/03/2012, GA 06/15/2012

- CICS Explorer – The new face to CICS

  - System management framework for CICS TS
  - Consists of CICS Explorer client and a CICS TS server extension
  - CICS Explorer client
    - Read-only capabilities
    - Eclipse-based user interface on workstation
    - Connects to CICS TS via TCP/IP - Communication via HTTP requests
  - CICS Explorer server extension
    - Delivered as PTF for CICS TS for VSE/ESA 1.1.1
    - z/VSE V5 only

- Statement of direction (SOD)

  - IBM CICS Explorer to provide updates to CICS resources
    - Update resources as you would do with transactions on your CICS terminal
    - Enable / disable CICS resources
    - Change selected CICS definitions
    - ….

Channels and Containers (Statement of Direction)

- Requirements
  - Lift 32 KB data limit (RFE 28905 / 29432 / 29422, MR1115112844, MR1114113031)
  - CICS Temporary Storage Upgrade (32K Limitation - RFE 28892, WAVV200826, MR1024084142)
  - Support for channels and containers (RFE 28883, WAVV200614, MR0526066847)

- Channels and Containers will allow more than 32k of data to be passed between CICS applications
  - Program to program - LINK and XCTL
  - Transaction to transaction - START and RETURN

- Allow better structuring of application data

- Minimal application changes required for exploitation

- Allow for data conversion between different code pages

- The following examples show the Channels and Containers usage in CICS TS for z/OS

Containers

'Employee'

'Branch'

'Payslip'
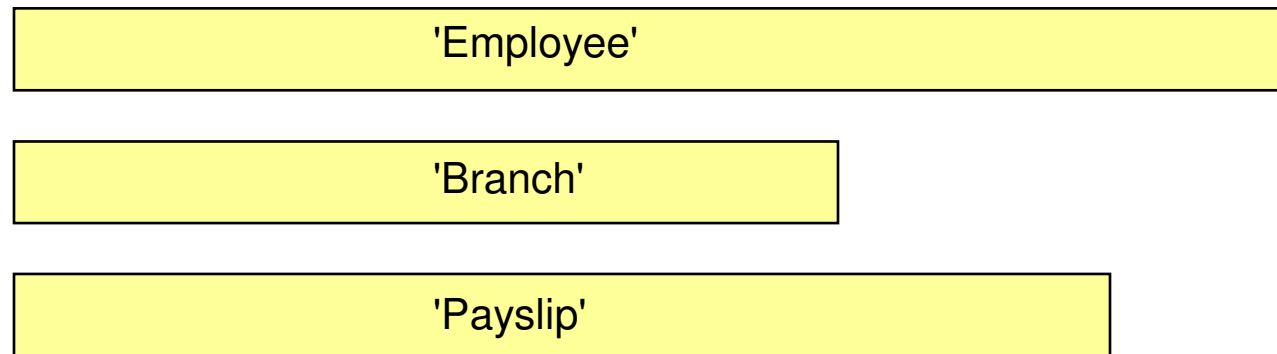
- Named block of data designed for passing information between programs
  - Like named COMMAREAs

- CONTAINER API
  - Created using (EXEC CICS) PUT CONTAINER, defines the size of the container
  - Read   using (EXEC CICS) GET CONTAINER
  - Delete   using (EXEC CICS) DELETE CONTAINER, to free storage, if no longer required

- No CICS enforced size limitation
  - Containers are stored within the CICS EDSA (31 bit partition virtual storage)

Channels

```
┌─────────────────────────────────────────────────────────────────┐
│ 'Payroll'                                                         │
│   ┌───────────────────────────────────────────────────────────┐  │
│   │                        'Employee'                          │  │
│   └───────────────────────────────────────────────────────────┘  │
│                                                                   │
│   ┌────────────────────────────────────┐                         │
│   │               'Branch'             │                         │
│   └────────────────────────────────────┘                         │
│                                                                   │
│   ┌─────────────────────────────────────────────┐                │
│   │                 'Payslip"                    │                │
│   └─────────────────────────────────────────────┘                │
│                                                                   │
└─────────────────────────────────────────────────────────────────┘
```
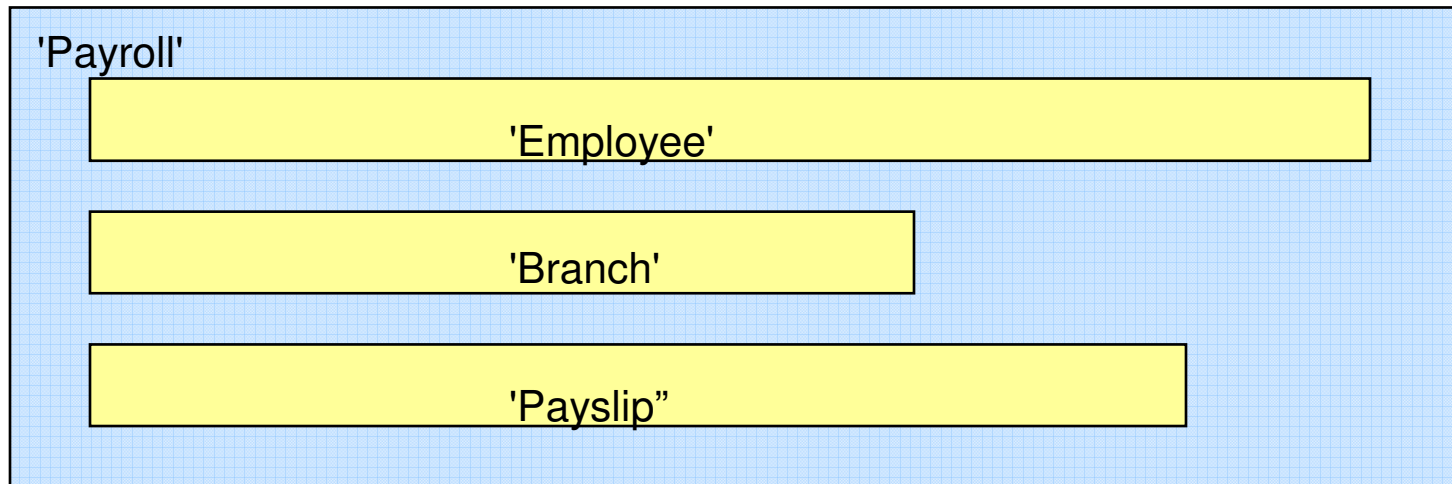
- A group of Containers
  - No limit on the number of Containers in a Channel

- A Channel is a sort of program interface
  - Passed on LINK, XCTL, pseudoconversational RETURN, and START commands

- Non-persistent
 - Non-recoverable resource similar to COMMAREAs

A Simple Example

PROGA

PUT CONTAINER('Employee') CHANNEL('Payroll') FROM(emp-data)

PUT CONTAINER('Branch') CHANNEL('Payroll') FROM(branch-data)

LINK PROGRAM('PROGB') CHANNEL('Payroll')

GET CONTAINER('Payslip') CHANNEL('Payroll') INTO(pay-data)

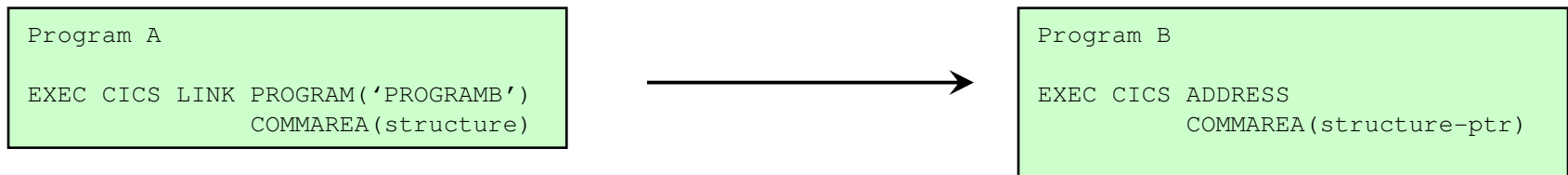**PROGB**

GET CONTAINER('Employee') INTO(emp-data)

GET CONTAINER('Branch') INTO(branch-data)

...

PUT CONTAINER('Payslip') FROM(pay-data)

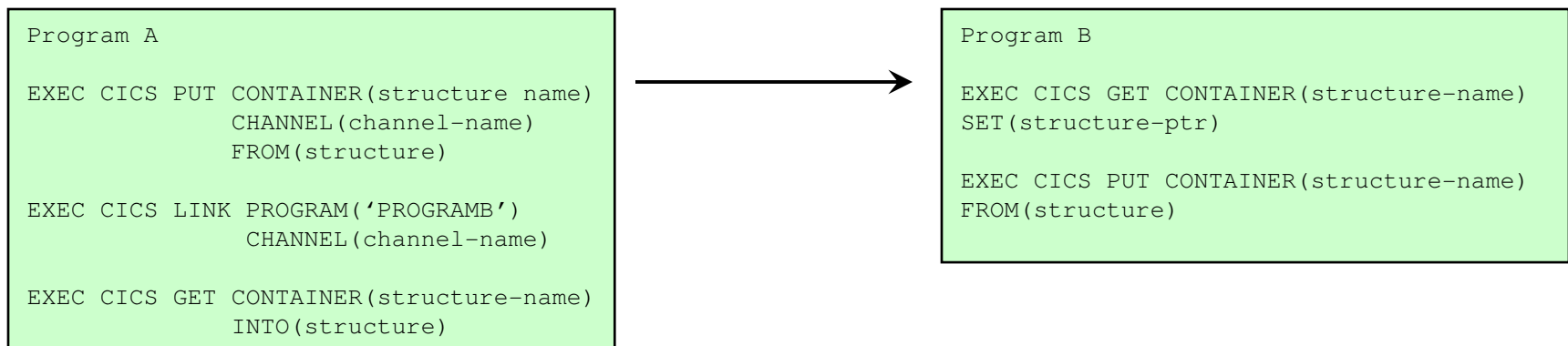'Payroll'

'Employee'

'Branch'

'Payslip'

38
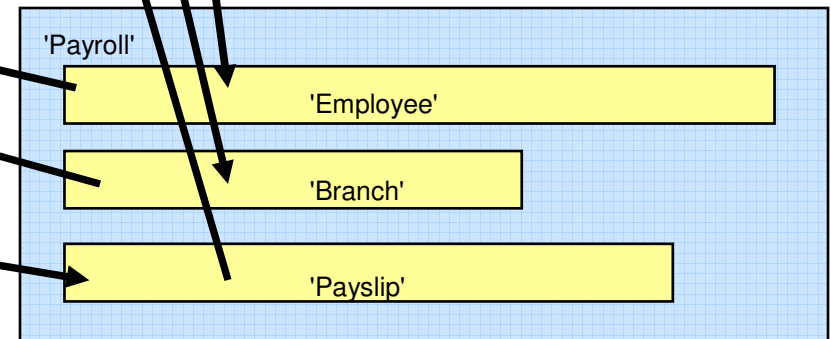
Migration of Programs
(only if you want to exploit Channels and Containers)

- Existing application with COMMAREA

```
Program A

EXEC CICS LINK PROGRAM('PROGRAMB')
            COMMAREA(structure)
```

```
Program B

EXEC CICS ADDRESS
            COMMAREA(structure-ptr)
```

- Changed application using Channels

```
Program A

EXEC CICS PUT CONTAINER(structure name)
            CHANNEL(channel-name)
            FROM(structure)

EXEC CICS LINK PROGRAM('PROGRAMB')
            CHANNEL(channel-name)

EXEC CICS GET CONTAINER(structure-name)
            INTO(structure)
```

```
Program B

EXEC CICS GET CONTAINER(structure-name)
SET(structure-ptr)

EXEC CICS PUT CONTAINER(structure-name)
FROM(structure)
```

Note that, if Program B changes the Container data, it must PUT the Container back before returning, or the changes will not be visible to the caller.

z/VSE Requirements

- You may submit requirements at conferences (WAVV, GSE, …)

- … or via our z/VSE requirements page:
    - https://www-03.ibm.com/systems/z/os/zvse/contact/requirement.html

    ➢ Will be replaced by the Request for Enhancements (RFE) database:
        - http://www.ibm.com/developerworks/rfe/

    ➢ Please select the following for z/VSE requirements
        - *Brand = Servers and System Software*
        - *Product family = zSeries Software*
        - *Product = z/VSE*
        - *Component = General, z/VSE, VSE/AF, VSE/VSAM, VSE/POWER, VSE Unique Code, ...*
        - *Operating system = IBM z/VSE*
        - *Source = Share, IBM user group, IBM Conference, ..., Other*

- ... or you may enter **CICS Transaction Server** requirements via the
    - Request for Enhancement (RFE) database:
        - http://www.ibm.com/developerworks/rfe/
    - Please select the following for z/VSE-CICS requirements:
        - *Brand = WebSphere*
        - *Product family = Transaction Processing*
        - *Product = CICS Transaction Server*
        - *Component = Runtime or Explorer*
        - *Operating system = IBM z/VSE*

Migration to a supported z/VSE Version 5 release

- Please migrate to a supported z/VSE release
  to get the latest software service, hardware exploitation and functionality

- z/VSE 4.3 end of service is October 31, 2014.

- After October 31, 2014, the only supported releases are z/VSE 5.1 and z/VSE 5.2.
  – Just 6 month remain to migrate to a z/VSE Version 5 release.

- Since the z/VSE 5.2 GA – April 25, 2014, z/VSE 5.1 can no longer

- Consider the single version charging requirements.
  – IBM System z software pricing: http://www-03.ibm.com/systems/z/resources/swprice/reference/

IBM

More Information

- … on VSE home page: http://ibm.com/vse

- Ingolf's z/VSE blog: https://www.ibm.com/developerworks/mydeveloperworks/blogs/vse

- Hints and Tips for z/VSE 5.1:
  – http://www.ibm.com/systems/z/os/zvse/documentation/#hints

- 64 bit virtual information:
  – IBM z/VSE Extended Addressability,   Version 5 Release 1
  – IBM z/VSE System Macro Reference, Version 5 Release 1

- CICS Explorer: http://www.ibm.com/software/htp/cics/explorer/

- IBM Redbooks:
  – Introduction to the New Mainframe: z/VSE Basics
    http://www.redbooks.ibm.com/abstracts/sg247436.html?Open
  – Security on IBM z/VSE – updated
  –   http://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/sg247691.html?Open
  – z/VSE Using DB2 on Linux for System z
  –   http://www.redbooks.ibm.com/abstracts/sg247690.html?Open
  – New: Enhanced Networking on IBM z/VSE
    http://www.redbooks.ibm.com/Redbooks.nsf/RedpieceAbstracts/sg248091.html?Open

- Please contact z/VSE: https://www-03.ibm.com/systems/z/os/zvse/contact/contact.html
  or me – Ingolf Salm – salm@de.ibm.com – for any questions

Questions ?

z/VSE Live Virtual Classes

z/VSE   @ http://www.ibm.com/zvse/education/

LINUX + z/VM + z/VSE   @ http://www.vm.ibm.com/education/lvc/

Read about upcoming LVCs on   @ http://twitter.com/IBMzVSE

Join the LVC distribution list by sending a short mail to alina.glodowski@de.ibm.com