IBM Enterprise2013 z/VSE Exploitation of System z Hardware and 5.1 Latest Enhancements

Enterprise2013

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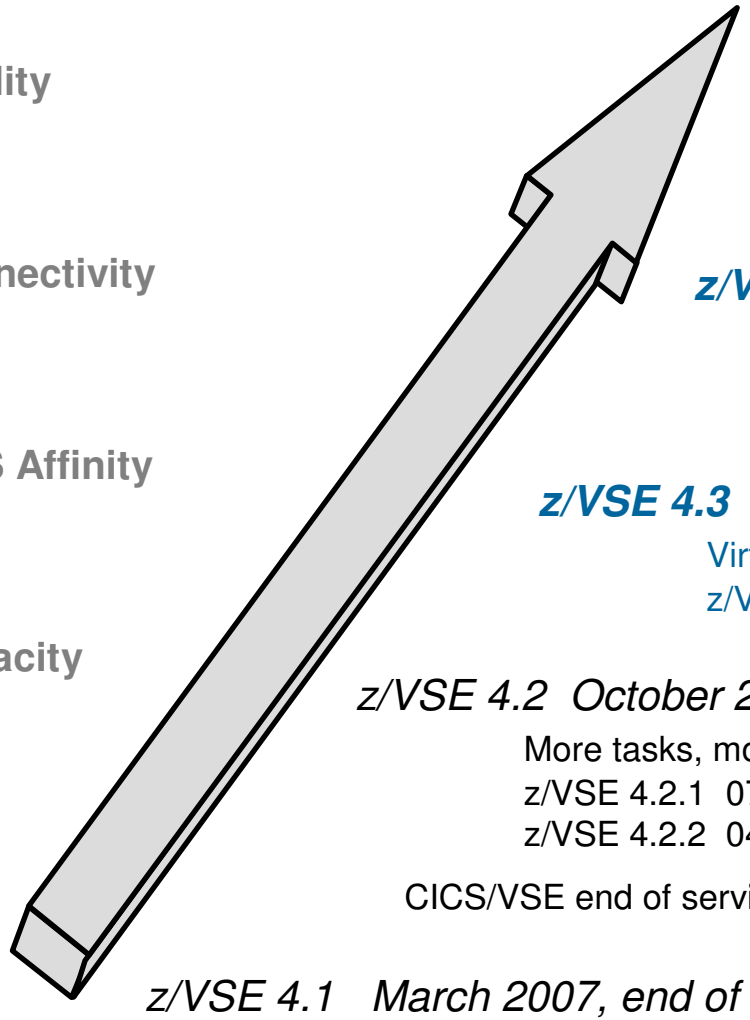
Agenda

- Roadmap
- z/VSE 5.1 key functions
- z/VSE 5.1 additional enhancements
- CICS Explorer
- z/VSE 5.1.2
- System z Hardware Exploitation

z/VSE roadmap



z/VSE Statement of Direction (SOD)

Install from DVD
CICS Explorer update

z/VSE 5.1.1 (+ Enhancements) GA 06/14/2013

TS1140, 64 bit I/O, openSSL and
database connector enhancements

z/VSE 5.1 GA 11/25/2011

64 bit virtual, zEnterprise exploitation, z9 or higher
z/VSE 5.1.1 06/2012: CICS Explorer, LFP in LPAR,
database connector

z/VSE 4.3 11/2010, *end of service 05/31/2014*

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

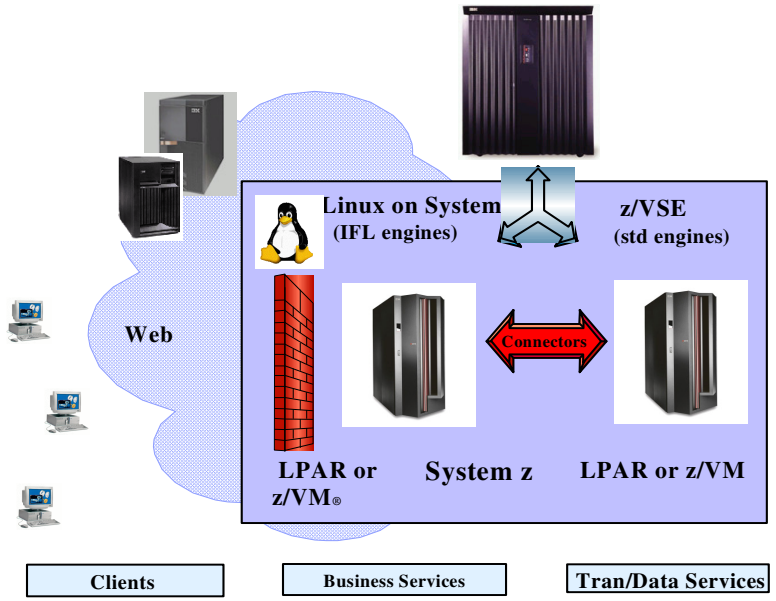
z/VSE 4.1 March 2007, end of service 04/30/2011

z/Architecture only, 64 bit real addressing, MWLC – full and sub-capacity pricing

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 V5.1

- z/VSE 5.1: Preview 04/12/2011, Announcement 10/12/2011, GA 11/25/2011
- z/VSE 5.1.1: GA 06/15/2012, z/VSE 5.1.2: GA 06/14/2013

- 64-bit virtual addressing

- Introduces Architectural Level Set (ALS) that requires System z9 or later

- IBM zEnterprise support (z196, z114, zEC12, zBC12)
  - Support Static Power Save Mode for MWLC clients with subcapacity option (z196, zEC12 only)
  - 4096-bit RSA keys with Crypto Express cards for enhanced security
  - Support of OSA-Express for zBX (CHPID OSX) to participate in an Intra Ensemble Data Network (IEDN) in z/VM guest or LPAR

- Exploitation of IBM System Storage options
  - Copy Export function of TS7700 Virtualization Engine for disaster recovery
  - Multi-Cluster Grid support of the TS7700 Virtualization Engine Series (TS7700)
  - IBM Storwize V7000 Midrange Disk System (z/VSE 4.2 and later)
  - IBM XIV (z/VSE 4.2 and later)

- Fast Service Upgrade (FSU) from z/VSE 4.2 and z/VSE 4.3

- Pricing
  - 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 V5.1 …

- Networking enhancements
  - IPv6 support for Linux Fast Path
  - z/VSE z/VM IP Assist (VIA) exploitation
  - TCP/IP communication using Layer 2 (Data Link Layer)
  - Virtual Local Area Network (VLAN) support for OSA Express and Hipersockets
    - Global VLAN supported by TCP/IP for VSE/ESA and IPv6/VSE
    - General VLAN supported by IPv6/VSE

- IPv6/VSE
  - Large TCP window support, can increase throughput
  - 64 bit virtual exploitation, large TCP window storage allocated above the bar
  - Layer 2 support (OSA Express, IPv6 only)
  - VLAN support

- System management enhancements
  - SNMP Trap Client Extension monitoring – API

- High availability and disaster recovery enhancements
  - Copy Export function of TS7700 Virtualization Engine for disaster recovery
  - Multi-Cluster Grid support of the TS7700 Virtualization Engine Series (TS7700)
  - GDPS (Geographically Dispersed Parallel Sysplex) client (in a z/VM guest)
    - z/VSE supports heartbeat only
    - GDPS K-system can only monitor z/VSE
    - GDPS K-system can manage z/VM and therefore can manage z/VSE indirectly

z/VSE V5.1 …

- System enhancements
  - Language Environment enhancements
    - PL/I multitasking enhancements
    - C run-time socket API to include IPv6 related functions
    - Callable service sample for programs
    - Additions to system programmer C samples
    - Updated LE/C support for Librarian Members
    - Updates to the CEETRACE utility
  - E-business connector enhancements
    - VSE Script Connector to support LIBR access
  - VSE/POWER
    - Token as new job attribute to address spooled output
  - VTAPE enhancements
    - VTAPE Auto Close at EOJ dependent on new SCOPE keyword
  - TAPE UNLOAD at EOJ (TAPE UNL=EOJ)

z/VSE 5.1 additional enhancements 2012

- IBM z/VSE V5.1 - Additional enhancements: Announced 04/03/2012, GA 06/15/2012
- CICS Explorer for z/VSE
- Linux Fast Path in LPAR
- Linux Fast Path via z/VSE z/VM IP Assist (z/VSE VIA)
- z/VSE database connector
- VSE/POWER enhancement to ease job output handling (IPWSEGM to generate duplicates)
- IBM System Storage Tape Controller 3592 Model C07
- New symbolic parameter IJBVMID containing the z/VM userid if running on z/VM
- PTFs: GA 11/2012
  - 64-bit input/output (I/O) processing for applications
  - IPv6/VSE V1.1 enhancements
    - Secure Sockets Layer (SSL) for secure data transmission
    - Layer 2 support for OSA Express devices for IPv4 links

TCP/IP connectivity for z/VSE

- TCP/IP connectivity for IPv4 communication
  - TCP/IP for VSE/ESA 1.5 – licensed from CSI International
  - 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 (z/VSE 5.1)

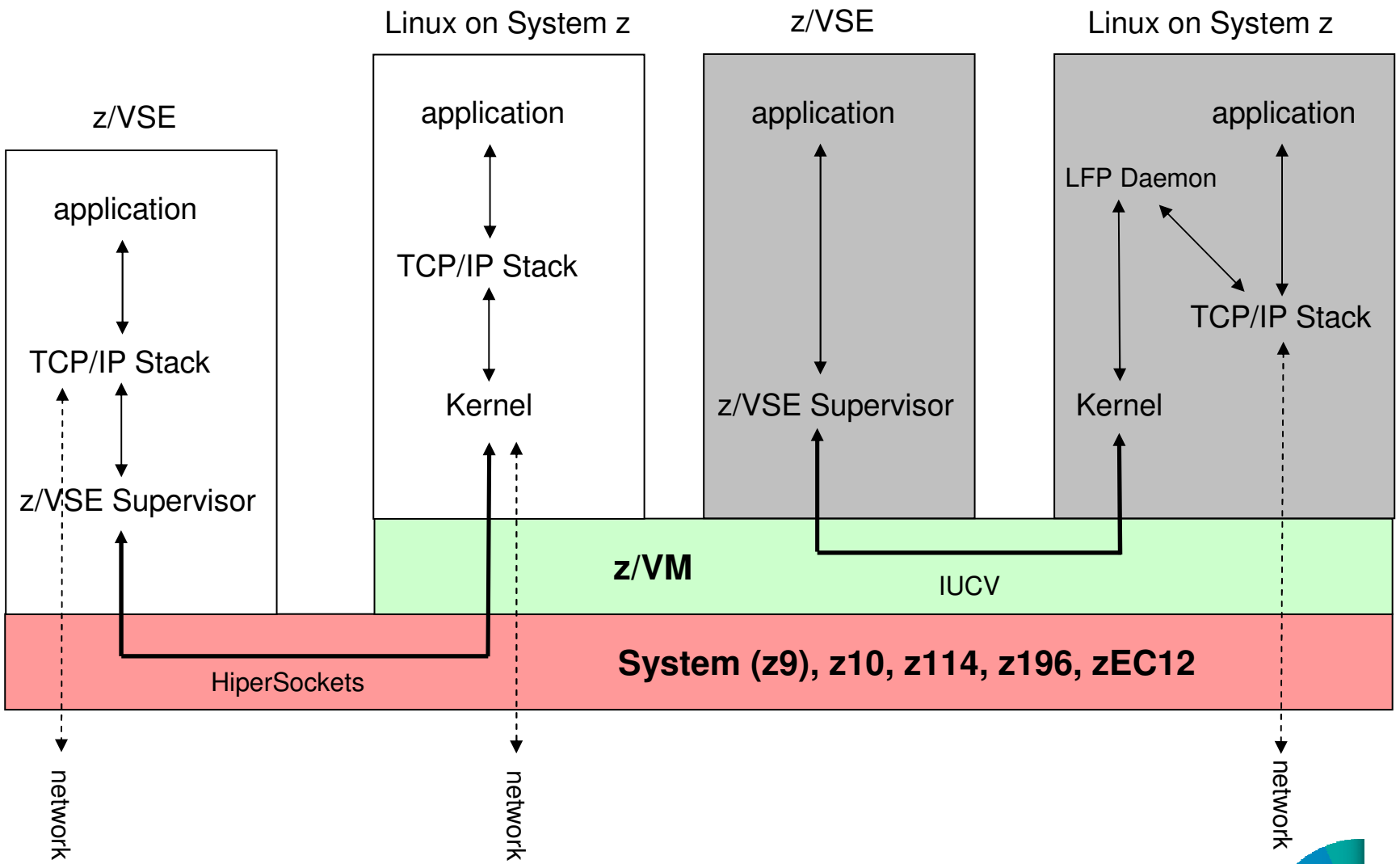
  - EZA socket interface, new function calls

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

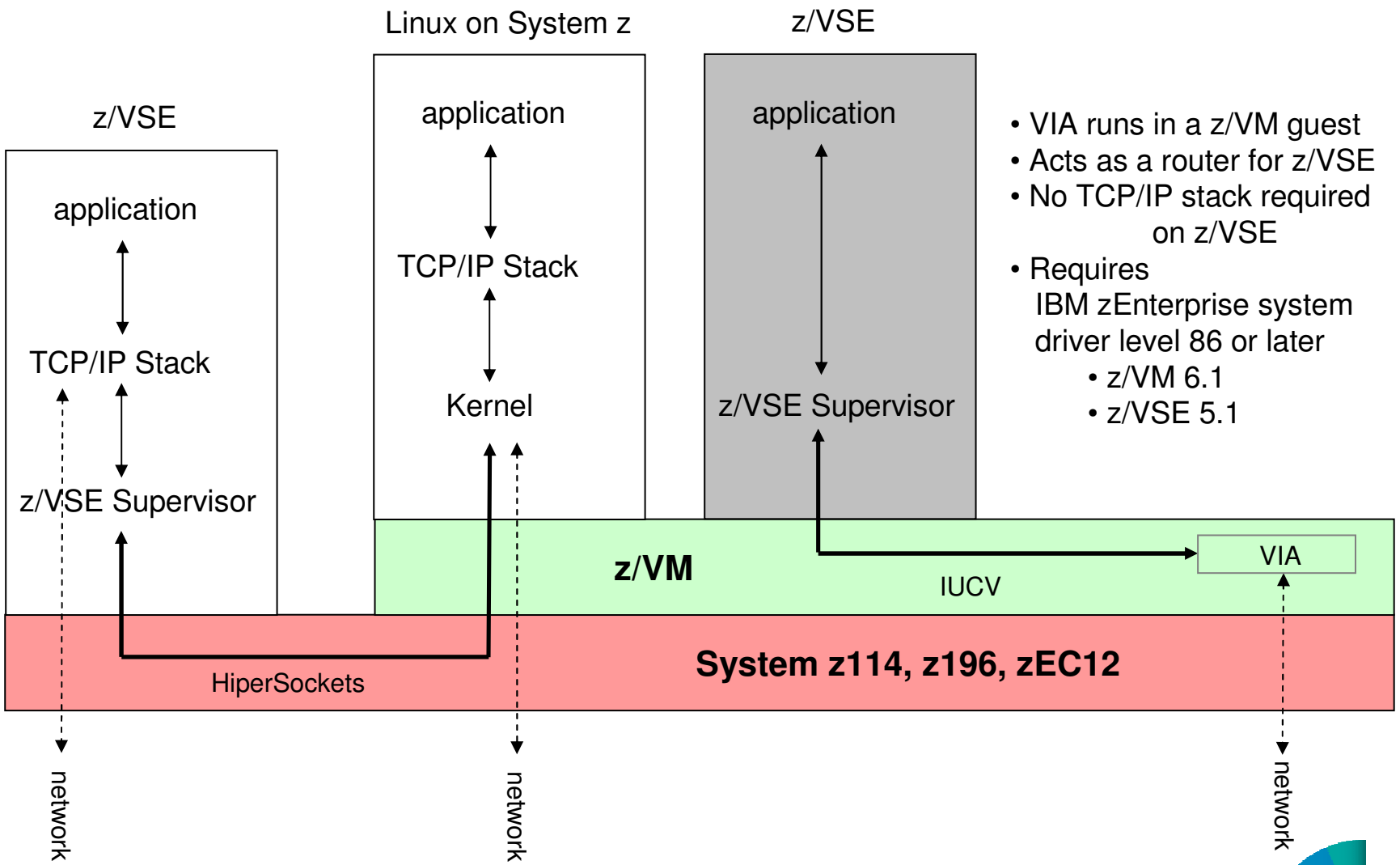
Linux Fast Path (LFP)

- Routes IPv4 or IPv6 socket request to Linux on System z
  - Without using the local TCP/IP stack
- LFP on z/VM (z/VSE 4.3 or higher)
  - 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 – z/VSE 5.1)
  - Both – z/VSE need to be a z/VM guests
- Linux Fast Path in LPAR (z/VSE 5.1 + enhancements – GA 06/15/2012)
  - 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

Linux Fast Path on z/VM



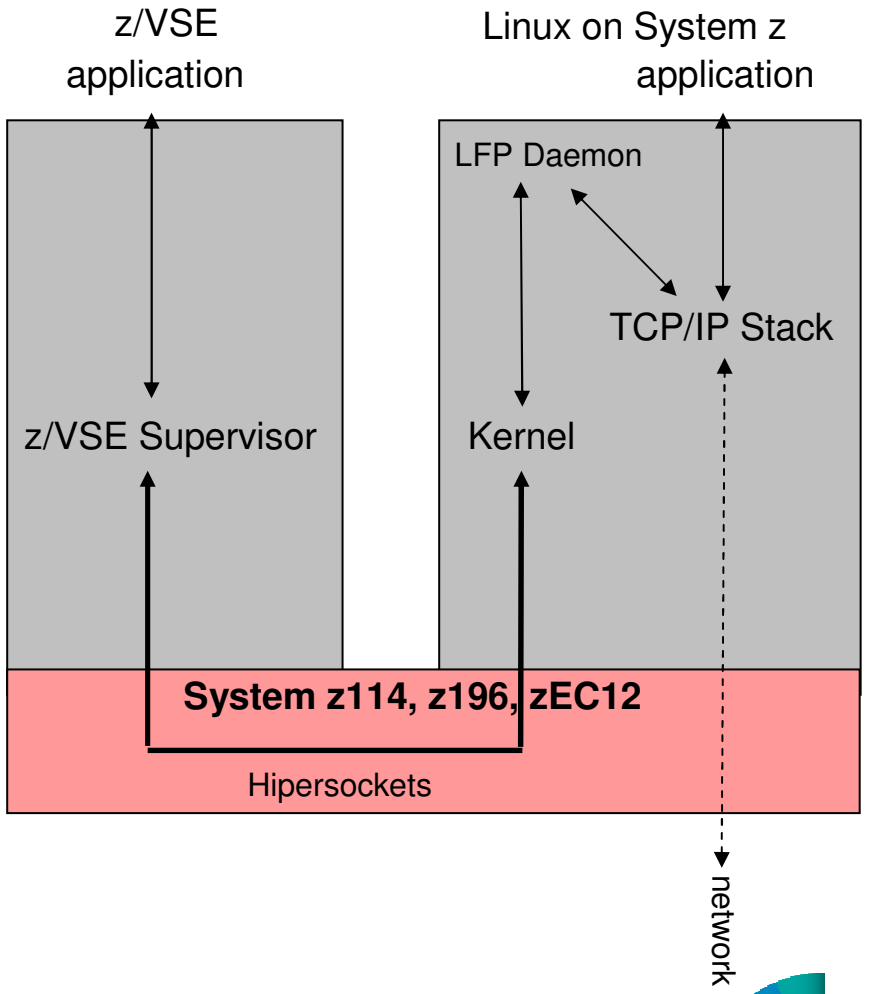
LFP - z/VSE z/VM IP Assist (VIA) – z/VSE 5.1



- VIA runs in a z/VM guest
- Acts as a router for z/VSE
- No TCP/IP stack required on z/VSE
- Requires IBM zEnterprise system driver level 86 or later
  - z/VM 6.1
  - z/VSE 5.1

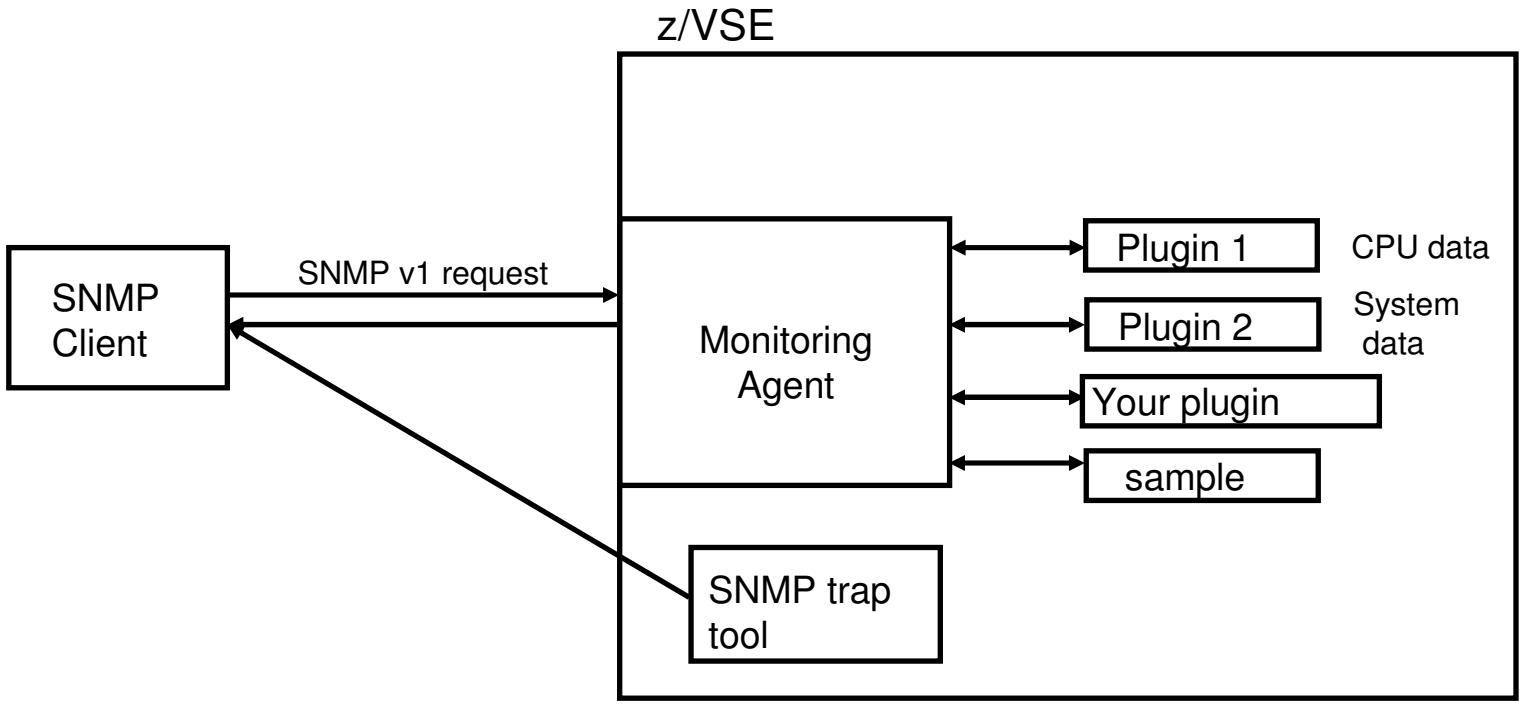
Linux Fast Path in LPAR

- No TCP/IP stack required on z/VSE
- System requirements
  - Supported on zEnterprise
    - Exploits HiperSockets completion queue
  - Linux on System z distribution (RHEL, SLES)
  - Available with z/VSE 5.1.1 (z/VSE 5.1 + PTF)



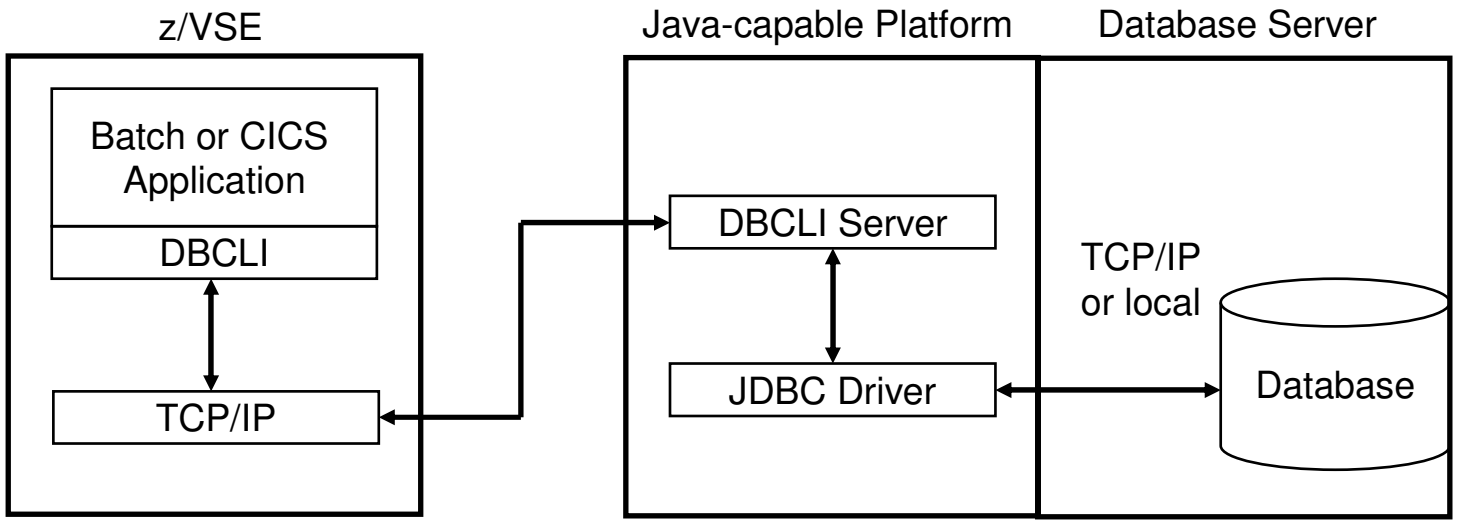
Connectors

- SNMP Connector
  - SNMP (Simple Network Management Protocol) V1 protocol
  - Allows to monitor system events on a network
  - Clients can retrieve z/VSE specific system and performance data
  - Performance monitors may collect the data for planning purposes
  - SNMP Trap Client Extension monitoring – API



Data base connector

- Available since June 15, 2012
- Provides a database call level interface (DBCLI)
  - For HLASM, COBOL, PL/I, C or REXX applications
- Connects to a remote database
- Consists of
  - DBCLI cient on z/VSE
  - DBCLI server on any Java-capable platform



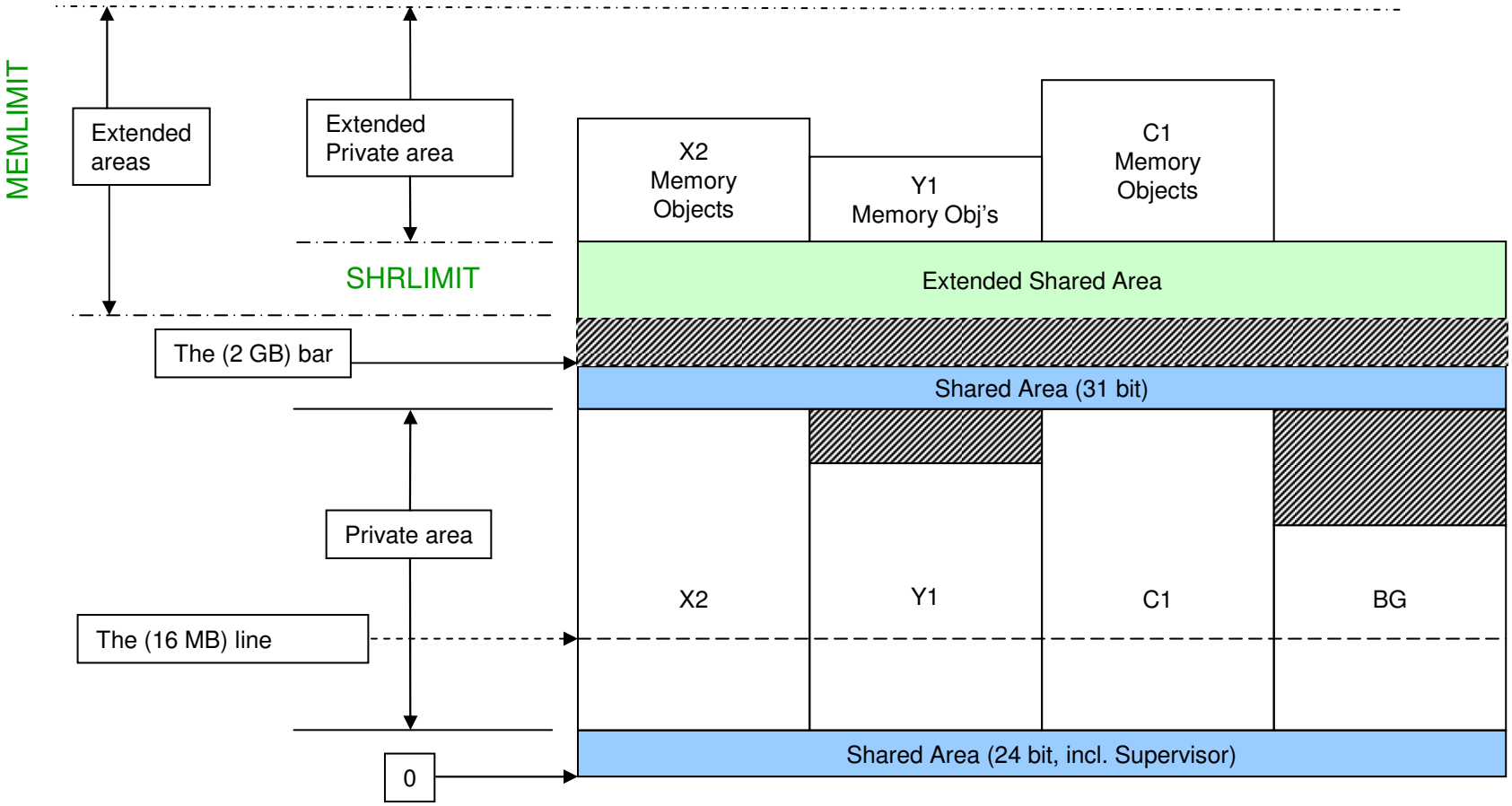
z/VSE 5.1: 64 bit virtual

- 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

IARV64 Macro

- IARV64 macro - ported from z/OS – provides services to
  - Creates and frees storage areas above the bar
  - Manage the physical frames behind the storage
- Programs use the IARV64 macro to obtain memory objects
- Services (IARV64 REQUEST=):
  - GETSTORE – create a private memory object
  - GETSHARED – create a memory object that can be shared across multiple address spaces
  - SHAREMEMOBJ – request that the specified address space be given access to a shared memory object
  - DETACH – free one or more memory objects
  - PAGEFIX – fix pages within one or more private memory objects
  - PAGEUNFIX – unfix pages within one or more private memory objects
  - GETSTORE / GETSHARED KEY parameter (default key = key of caller)
    - Unauthorized caller can set key 9 (all tasks can run in key 9)
    - Authorized callers can set any key

64 bit virtual - address space layout



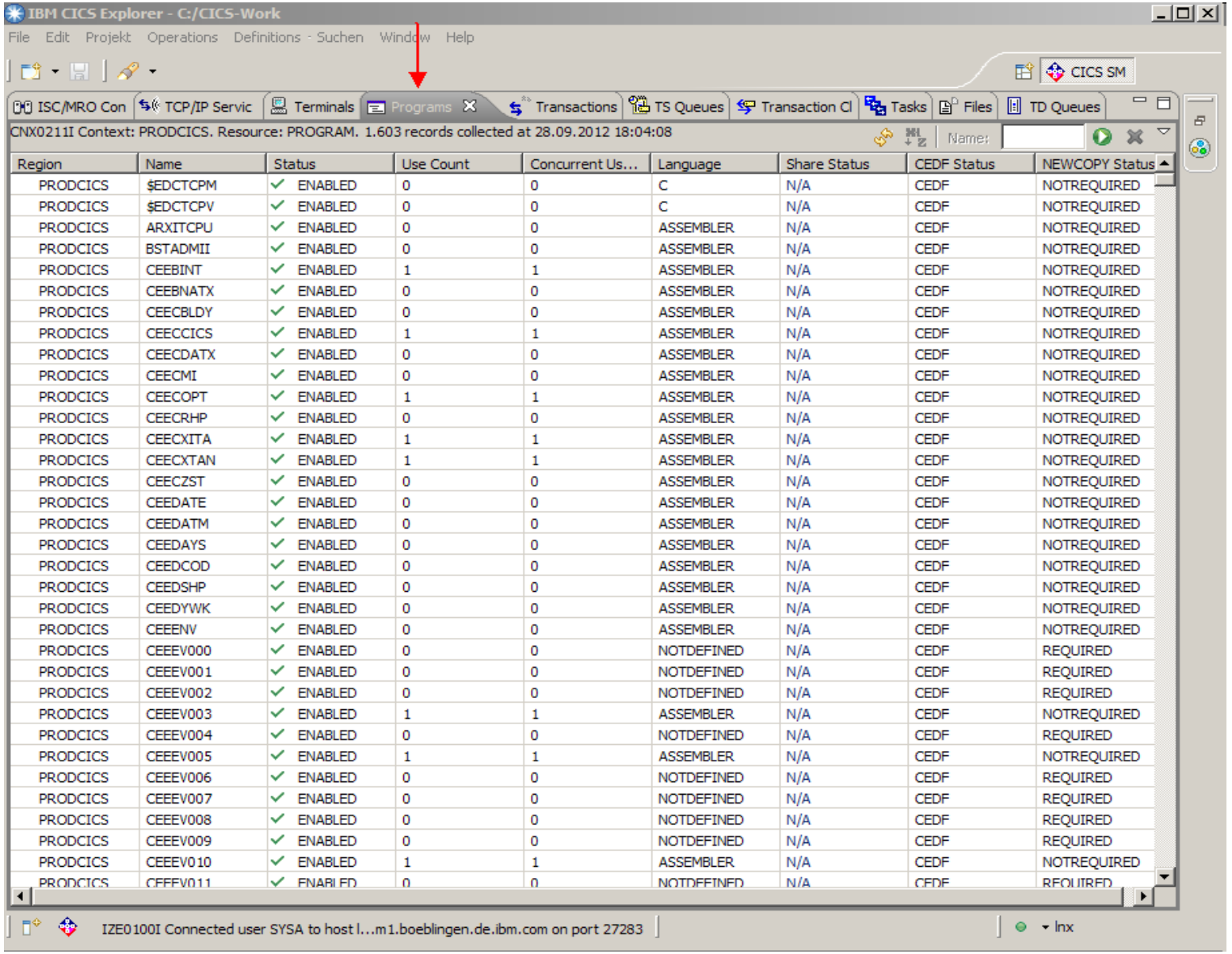
CICS Explorer for z/VSE

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

- CICS Explorer – The new face to CICS
  - New 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 PTFs for CICS TS for VSE/ESA 1.1.1
    - z/VSE 5.1 only



Region	Name	Status	Use Count	Concurrent Us...	Language	Share Status	CEDF Status	NEWCOPY Status
PRODCICS	$EDCTCPM	ENABLED	0	0	C	N/A	CEDF	NOTREQUIRED
PRODCICS	$EDCTCPV	ENABLED	0	0	C	N/A	CEDF	NOTREQUIRED
PRODCICS	ARXITCPU	ENABLED	0	0	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	BSTADMII	ENABLED	0	0	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEEBINT	ENABLED	1	1	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEEBNATX	ENABLED	0	0	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEECBLDY	ENABLED	0	0	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEECCICS	ENABLED	1	1	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEECDATX	ENABLED	0	0	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEECMI	ENABLED	0	0	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEECOPT	ENABLED	1	1	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEECRHP	ENABLED	0	0	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEECXITA	ENABLED	1	1	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEECXTAN	ENABLED	1	1	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEECZST	ENABLED	0	0	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEEDATE	ENABLED	0	0	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEEDATM	ENABLED	0	0	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEEDAYS	ENABLED	0	0	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEEDCOD	ENABLED	0	0	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEEDSHP	ENABLED	0	0	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEEDYWK	ENABLED	0	0	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEEENV	ENABLED	0	0	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEEEV000	ENABLED	0	0	NOTDEFINED	N/A	CEDF	REQUIRED
PRODCICS	CEEEV001	ENABLED	0	0	NOTDEFINED	N/A	CEDF	REQUIRED
PRODCICS	CEEEV002	ENABLED	0	0	NOTDEFINED	N/A	CEDF	REQUIRED
PRODCICS	CEEEV003	ENABLED	1	1	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEEEV004	ENABLED	0	0	NOTDEFINED	N/A	CEDF	REQUIRED
PRODCICS	CEEEV005	ENABLED	1	1	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEEEV006	ENABLED	0	0	NOTDEFINED	N/A	CEDF	REQUIRED
PRODCICS	CEEEV007	ENABLED	0	0	NOTDEFINED	N/A	CEDF	REQUIRED
PRODCICS	CEEEV008	ENABLED	0	0	NOTDEFINED	N/A	CEDF	REQUIRED
PRODCICS	CEEEV009	ENABLED	0	0	NOTDEFINED	N/A	CEDF	REQUIRED
PRODCICS	CEEEV010	ENABLED	1	1	ASSEMBLER	N/A	CEDF	NOTREQUIRED
PRODCICS	CEEEV011	ENABLED	0	0	NOTDEFINED	N/A	CEDF	REQUIRED

z/VSE 5.1.2

- z/VSE 5.1.2 includes z/VSE V5.1 - Additional enhancements: Ann 03/02/2013, GA 06/14/2013

  – Support of zEC12, zBC12
    - Configurable Crypto Express4S
    - OSA Express4S / OSA Express5S (1000BASE-T)

  – Support of IBM System Storage
    - IBM System Storage TS1140 (3592 E07)
    - IBM System Storage TS7700 Virtualization Engine Release 3.0
    - IBM System Storage DS8870
    - IBM System Storage Storwize V7000 Release 6.4

  – 64-bit input/output (I/O) processing for applications
  – HiperSockets configurable input buffers

- z/VSE 5.1.2 – latest Recommended Service Level (RSL): September 30, 2013

z/VSE 5.1.2 …

- z/VSE 5.1.2 includes z/VSE V5.1 - Additional enhancements …
  - System dump support for memory objects
  - z/VSE Database connector enhancements
  - OpenSSL update
  - IPv6/VSE V1.1 enhancements
    - Secure Sockets Layer (SSL) for secure data transmission
    - Layer 2 support for OSA Express devices for IPv4 links
  - Statement of general direction (SOD) of April announcement:
    - IBM intends in the future
      to enhance IBM CICS Explorer for IBM CICS Transaction Server for VSE/ESA to provide updates to CICS resources.
      to add functionality that allows initial installation of z/VSE without requiring a physical tape.
    - It is planned to reduce the AEWLC and MWLC list price of IPv6/VSE V1.1.

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

64 bit virtual I/O for applications

- Available with z/VSE 5.1 APAR DY47419
- 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 devices, tape devices, LIOCS

System / Standalone Dump support for memory objects

- 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
  - Memory object dumps are written to SYSLST only
    - Partitions dumps will be written to dump library or SYSLST dependent on OPTIONs
- 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**

OpenSSL update

- openSSL support for z/VSE is available since z/VSE 5.1
- November 2012 updated with APAR DY47397
- openSSL code level: openSSL 1.0.0d
- 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

z/VSE database connector (DBCLI) enhancement

- DBCLI connection pooling
  - Connection pooling of database connections for DBCLI applications on CICS TS
  - Pooling and reusing existing connection
    - Instead to establish a new connection
  - CICS DBCLI application can request to use a connection pool by setting a new DBCLI environment variable
  - SSL connections are not supported

- If connection pooling is enabled
  - CONNECT function will first check if a matching connection is available (same host name/IP address, port, DB name, user-ID, password, …)
  - If available, the connection will be reused
  - If no active connection available, a new connection is established
  - During DISCONNECT the connection is put back to the connection pool

z/VSE 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
  - ….
- Initial installation of z/VSE without requiring a physical tape
  - Use an install image on a DVD or download it from the web (Shopz)
  - Create an installation disk
  - Base install z/VSE from installation disk

VSE support for System z

VSE Release	z800 / z900	z890 / z990	System z9 / z10 / z196 / z114 / zEC12 / zBC12	VSE EoS
z/VSE V5.1	No	No	Yes	tbd
z/VSE V4.3	Yes	Yes	Yes	05/31/2014
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

Supported System z Environments

- z/VSE 4.3 support
  - IBM e-server zSeries processors (z800, z900, z890, z990)
  - IBM System z9 (z9 BC, z9 EC)
  - IBM System z10 (z10 BC, z10 EC)
  - IBM System zEnterprise (z114, z196, zEC12, zBC12)

- z/VSE 5.1 supports
  - IBM System z9 (z9 BC, z9 EC)
  - IBM System z10 (z10 BC, z10 EC)
  - IBM System zEnterprise (z114, z196, zEC12, zBC12)

… and can run on
  - uni- and multiprocessors
  - In basic mode (z/VSE 4.3 on z800, z900 only), in LPAR mode or in z/VM guest
  - z/VSE 4.3 and 5.1 run under all supported z/VM releases.

IBM zEnterprise exploitation

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

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

- Linux Fast Path (LFP) in z/VM mode LPAR (z10, zEnterprise)
- Exploitation of the z/VSE z/VM IP Assist (zEnterprise)

- 4096-bit RSA key support with configurable Crypto Express3 (z10, zEnterprise)
  …. and Crypto Express4S (zEC12, zBC12) – z/VSE 5.1 only

- zEnterprise and zEnterprise BladeCenter Extension (zBX) support
  - "native" Intra Ensemble Data Network (IEDN) - z/VSE 5.1 only
  - Virtual LAN support
  - Layer 2 support
  - IEDN communication using the z/VM VSWITCH

- HiperSockets Completion Queue on z196, z114, zEC12, zBC12

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

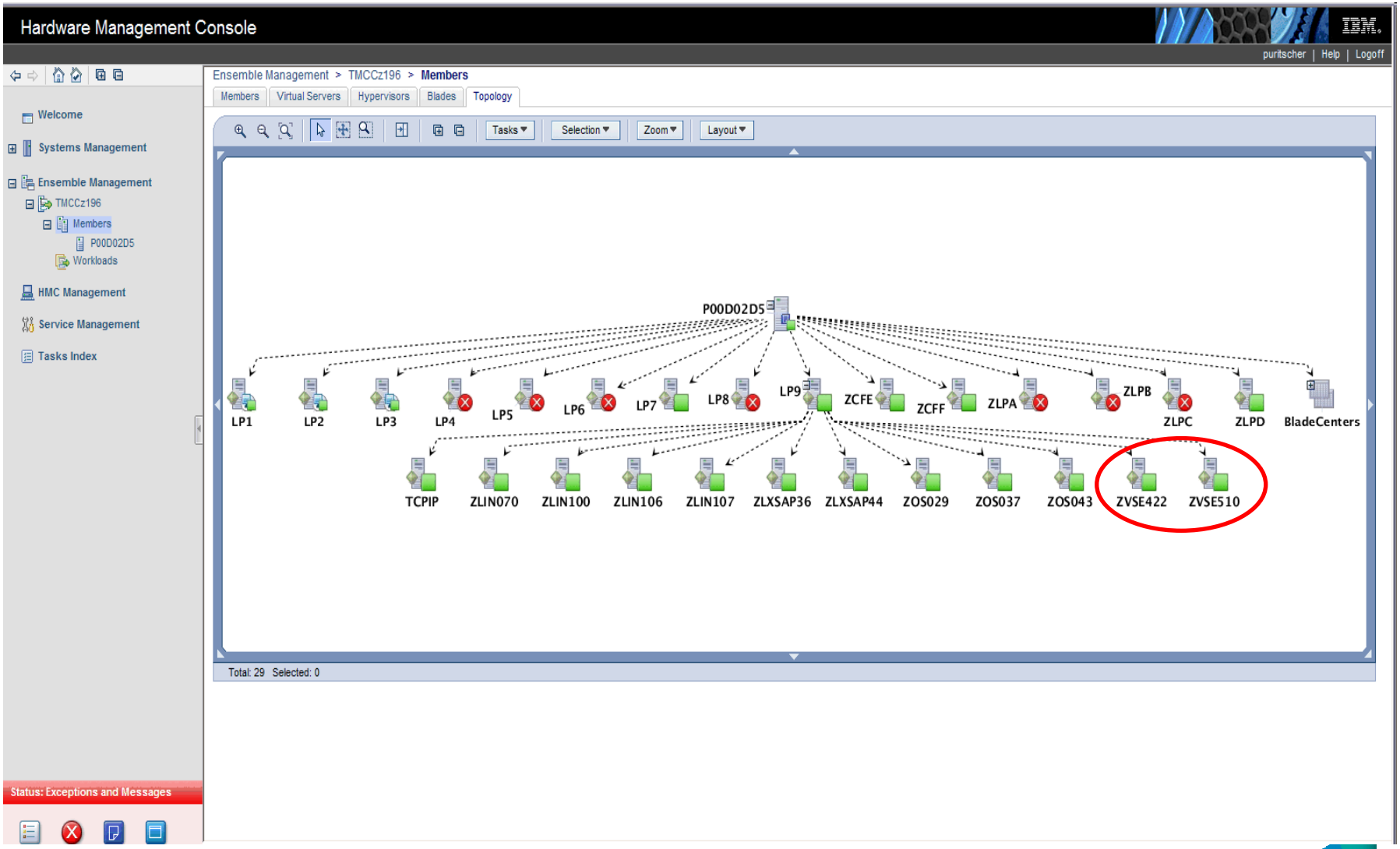
- zEC12 / zBC12 do not support ESCON channels

IBM zEnterprise exploitation

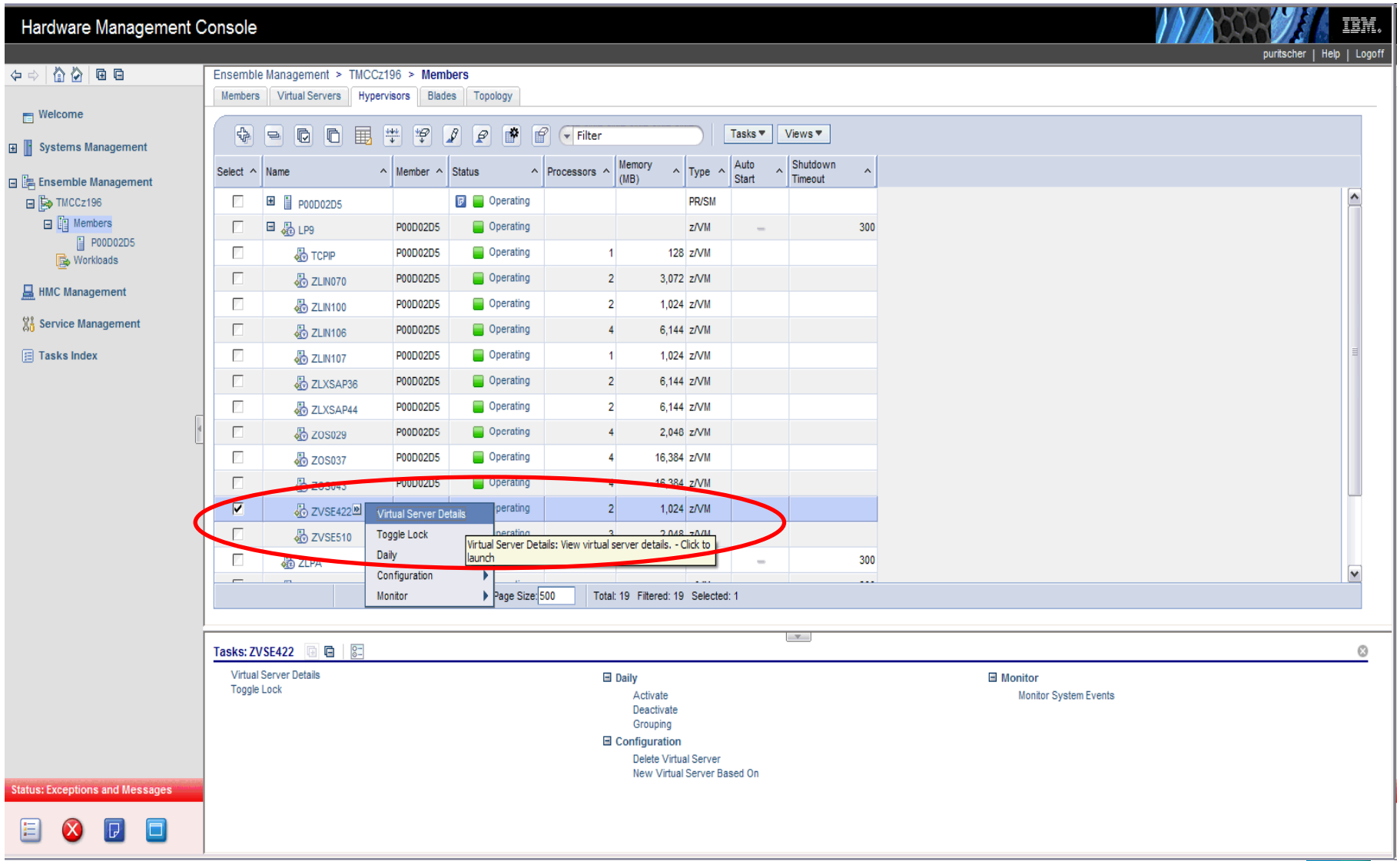
- Following functions are not supported in z/VM guests:
- Large page (1 megabyte page) support for data spaces (z10, zEnterprise)
  - Better exploitation of large processor storage, may improve performance
  - No configuration options required
  - Transparent to applications
- Dynamic add of logical CPs (z10, zEnterprise)
  - Ability to dynamically add logical central processors (CPs) without preplanning
  - Logical processor add from HMC/SE
  - Allows adding CPs to LPAR without re-IPL of the z/VSE system
  - Capacity of the z/VSE V4.3 system may be in-/decreased dependent on workload needs
  - New SYSDEF TD parameters (STARTSBY / STOPSBY) to manage the additional CPs

```
query td
AR 0015  CPU    STATUS     SPIN_TIME     NP_TIME  TOTAL_TIME  NP/TOT
AR 0015    00   ACTIVE             0       16367       26978   0.606
AR 0015    01   INACTIVE
AR 0015    02   INACTIVE
AR 0015    03   STANDBY
AR 0015                  ----------------------------------------
AR 0015  TOTAL                      0       16367       26978   0.606
AR 0015
AR 0015                NP/TOT:  0.606       SPIN/(SPIN+TOT):  0.000
AR 0015  OVERALL UTILIZATION:     0%        NP UTILIZATION:     0%
AR 0015
AR 0015  CPU BALANCING:         NOT ACTIVATED
AR 0015
AR 0015  ELAPSED TIME SINCE LAST RESET:        4026069
AR 0015 1I40I  READY
```

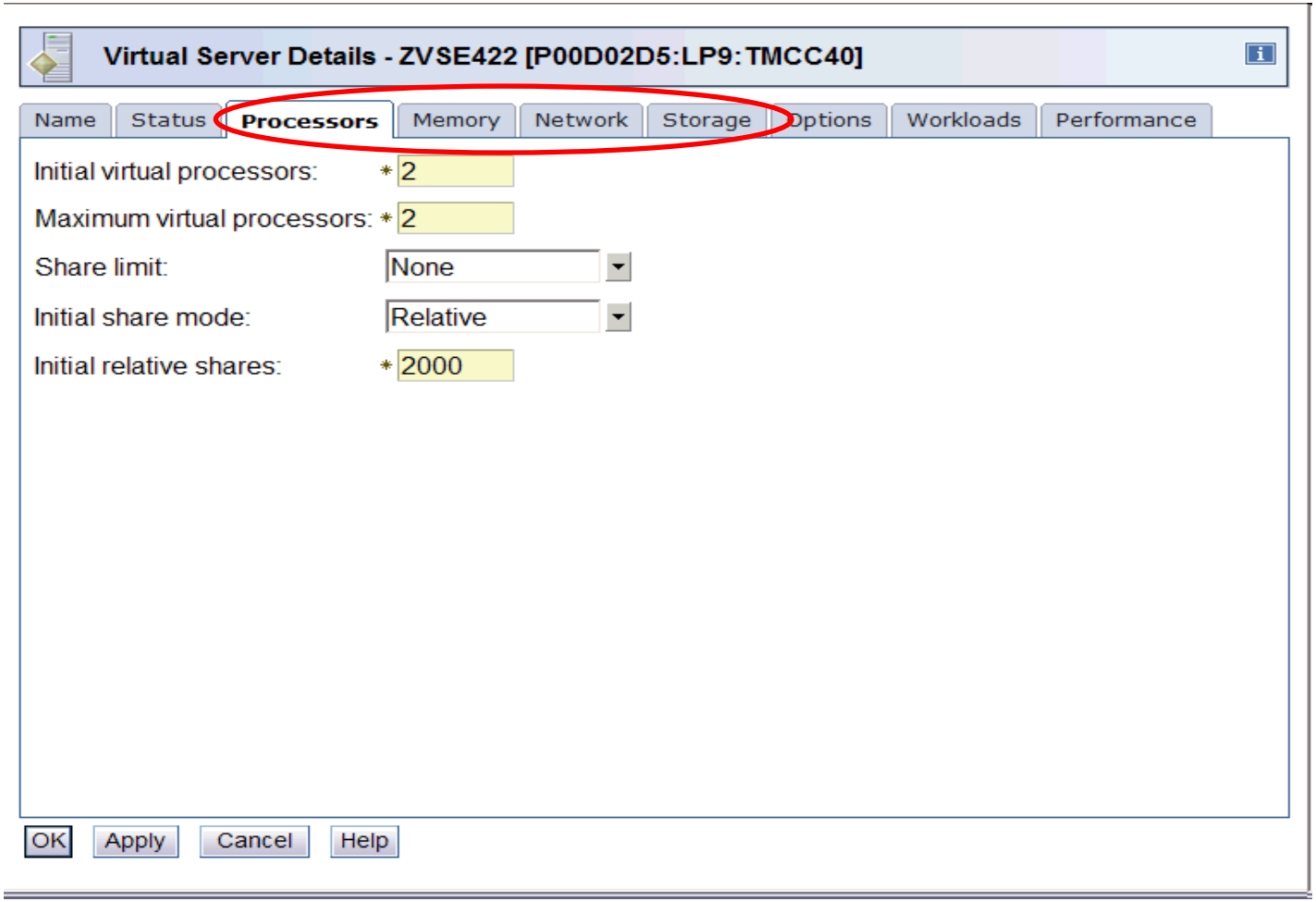
zEnterprise zManager (HMC) and z/VSE



zEnterprise zManager (HMC) and z/VSE



zEnterprise zManager (HMC) and z/VSE



System z Exploitation

- FICON Express8 - Higher I/O bandwidth
- Adapter interruptions (performance improvements)
  - OSA-Express3 / OSA-Express4S / OSA-Express5S (QDIO mode)
  - FICON Express8 / FICON Express8S (FCP)

- OSA-Express features
  - 10 Gigabit Ethernet, Gigabit Ethernet
  - 1000BASE-T Ethernet (4 modes of operation)
    - ICC (Integrated Console Controller)
    - QDIO (Queued Direct I/O) for TCP/IP traffic
    - Non-QDIO for TCP/IP and SNA traffic
    - OSN (Open System Adapter for NCP) works with IBM Communication Controller for Linux on System z
- z/VM queued-I/O assist for real networking devices
  - OSA Express adapters (CHIPID type OSD)
  - Hipersockets (CHIPID type IQD)

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 may communicate with
  - Linux on System z
  - z/OS
  - z/VM
  - z/VSE V4 or z/VSE 5.1
- Virtual HiperSockets via z/VM Guest LAN support
- HiperSockets Completion Queue (z/VSE 5.1)

HiperSockets configurable input buffers

- Available as APAR DY47394
- QDIO input queue buffers were set to 8 before
- More QDIO input buffers can improve performance
- In z/VSE you may increase the number of buffers to up to 64
- With a new configuration option you may select 8 (default), 16, 32 or 64 in the configuration file (IJBOCONF.PHASE)
- QDIO input buffers are allocated in 31 bit partition GETVIS space
- The buffers are to be PFIXed.
  - The limit for PFIX storage has to be defined with the JCL SETPFIX command
- QDIO input buffers are available for HiperSockets and OSA Express (CHPID OSD)

OSA Express Support

- OSA-Express for high-speed communication
  - OSA-Express3 on z10, z196, z114, zEC12, zBC12
  - OSA-Express4S on z114, z196 and zEC12, zBC12
  - OSA-Express5S on zEC12, zBC12
- OSA-Express for non-QDIO environments (CHPID type OSE)
  - SNA and passthru traffic require configuration via OSA/SF
    - OSA-Express4S / OSA-Express5S on HMC

- z/VSE supports the Gigabit Ethernet (GbE) and 10 Gigabit Ethernet (10 GbE) features
  - To be configured in IOCDS as CHPID type OSD (other CHPID types not supported)
  - Exploited by TCP/IP via DEFINE LINK,TYPE=OSAX command
  - OSA-Express 10 GbE (2 ports), GbE (4 ports)

- Port specification for TCP/IP
  - OSA-Express 10 GbE features: one port per CHPID to connect to the network
  - OSA-Express GbE: two ports per CHPID – port 0 and port 1
    - To use port 0, no port specification is necessary
    - To use port 1, the port needs to be specified, e.g.:

      DEFINE LINK,TYPE=OSAX,DEV=D00,DATAPATH=D02,OSAPORT=1

System z hardware cryptographic support

- Enhances Internet security
- Encryption support via crypto cards or on the processor itself (CPACF)
- Cryptographic assists
  - Exploited by the SSL support of TCP/IP transparently
  - Encryption Facility for z/VSE (CPACF)
- Transparent for “TCP/IP” applications
  - VSE connector server, CICS Web Support, VSE/Power PNET, …
- No definition necessary

System z hardware cryptographic support …

- CPACF – for symmetric encryption
  - AES for 128-bit keys (z9 EC, z9 BC), AES for 256 keys (z10 EC or higher)
- Crypto Express2 / Express3 / Express4S – for asymmetric encryption
  - Encryption hardware assist for increased SSL throughput
    - Supports SSL handshaking only for applications that use the SSL crypto API
  - Crypto Express4S support (z/VSE 5.1 + PTF)
  - 2048-bit RSA key with Crypto Express2
  - 4096-bit RSA key support with configurable Crypto Express3 / Crypto Express 4S
  - Configurable Crypto Express
    - Dynamically configurable in coprocessor or accelerator mode
  - AP (adjunct processor)-queue adapter-interruption facility
    - May accelerate the SSL throughput

Signal Quiesce (Signal Shutdown) Support

- If e.g. an IML or IPL is performed via the HMC / SE or z/VM SIGNAL SHUTDOWN , a signal-quiesce event is generated.
- Need to be enabled via IPL SYS QUIESCE=YES | NO
- If QUIESCE=YES a message is generated:

```
0W01D DO YOU WANT TO CONTINUE SYSTEM SHUTDOWN (WILL BE FORCED AFTER TIMEOUT)?
REPLY 'YES' TO ENTER HARD WAIT STATE OR 'NO'
```

- If the operator reply is **yes**,
  - The system will enter the disabled wait state
- If the operator reply is **no** or does not reply, the system will wait for a predefined time interval
  - Console automation can initiate a controlled system shutdown
- z/VSE does not provide controlled shutdown processing

More information

- z/VSE Homepage: www.ibm.com/vse
- Ingolf's z/VSE blog: 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
- 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