

# z/VM Platform Update

June 20, 2014 Version 3.5

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## Agenda

- Release Status and Information
  
- z/VM<sup>®</sup> Version 6 Release 2
  
- z/VM Version 6 Release 3
  - 2014 Enhancements
  
- Futures and Statements of Direction





# Release Status and Information

# z/VM Release Status Summary



z/VM	Level	GA	End of Service	End of Marketing	Minimum Processor Level	Security Level
Version 6	Release 3	7/2013	4/2017		IBM System z10®	EAL 4+[ <sup>2</sup> ] OSPP-LS
	Release 2	12/2011	12/2016[ <sup>3</sup> ]	3Q/2013	IBM System z10®	-
	Release 1	10/2009	4/2013	12 2011	IBM System z10®	EAL 4+ OSPP-LS
Version 5	Release 4	9/2008	12/2014[ <sup>1</sup> ]	3/2012	IBM eServer zSeries 800& 900 (z800, z900)	-
	Release 3	6/2007	9/2010	9/2010	z800, z900	EAL 4+ CAPP/LSPP

[1] Or later (Announced August 7, 2012)

[2] Targeted Security Level in V6.3 SOD

[3] Extended from original date (Announced February 4, 2014)

Marketed & Serviced

Serviced, but not Marketed

End of Service & Marketing

Extended support contracts are available.

## z/VM Version 5 Release 4

- The last release of z/VM to support IBM System z9<sup>®</sup> and older processors
  - **No longer available as of March 12, 2012**
  - Also supports the IBM zEnterprise<sup>®</sup> EC12 (zEC12) and IBM zEnterprise BC12 (zBC12)
  
- End of Service was been extended to **December 31, 2014** or end of IBM service for System z9, whichever is *later*
  - Statement of Direction 2013
    - The zEC12 and zBC12 will be the last processors to support z/VM V5.4



## z/VM Version 6 Security Certification Plans



- Common Criteria (ISO/IEC 15408)
  - z/VM V6.3 is **under evaluation**
  - z/VM V6.1 has been certified: [BSI-DSZ-CC-0752](#)
  - Evaluated to EAL 4+ for the Operating System Protection Profile (OSPP) with:
    - Virtualization extension (-VIRT)
    - Labeled Security extension (-LS)
  
- Federal Information Protection Standard (FIPS) 140-2
  - **\*new\***: z/VM V6.3 System SSL is FIPS 140-2 Validated<sup>(TM)</sup>
    - <http://csrc.nist.gov/groups/STM/cmvp/documents/140-1/1401val2014.htm#2139>
  - z/VM V6.1 System SSL is FIPS 140-2 Validated<sup>(TM)</sup>
    - <http://csrc.nist.gov/groups/STM/cmvp/documents/140-1/1401val2012.htm#1735>
  - Enablement requirements for certificate database and servers
  
- z/VM V6.2 is designed to conform to both Common Criteria and FIPS 140-2 evaluation requirements

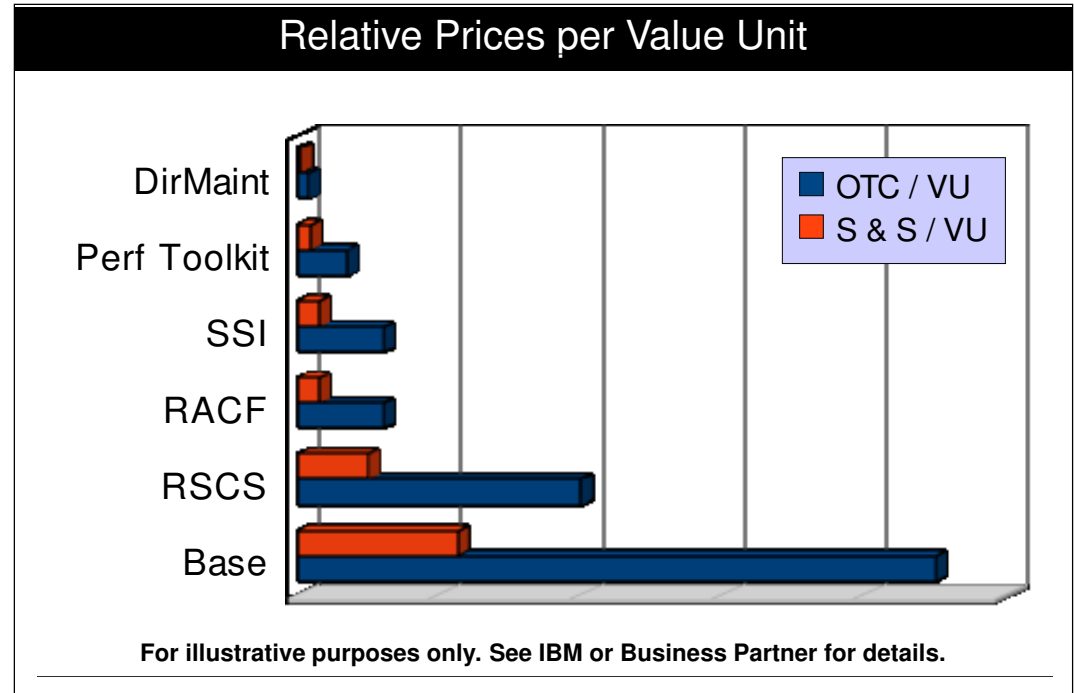



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## z/VM Pricing

- z/VM pricing consists of:
  - A one-time charge (OTC) per value unit
  - An annual charge for Service and Support, per value unit
- Number of value units is determined by number of engines, shown below on left.
- Prices are set per value unit, relative prices are illustrated below on right.
- The SSI feature includes LGR and it is priced in line with the RACF<sup>®</sup> feature

z/VM Value Unit Schedule	
Number of Engines	Value Units per Engine
1 to 3	10
4 to 6	9
7 to 9	8
10 to 12	7
13 to 16	6
17 to 20	5
21 to 25	4
26 and above	3



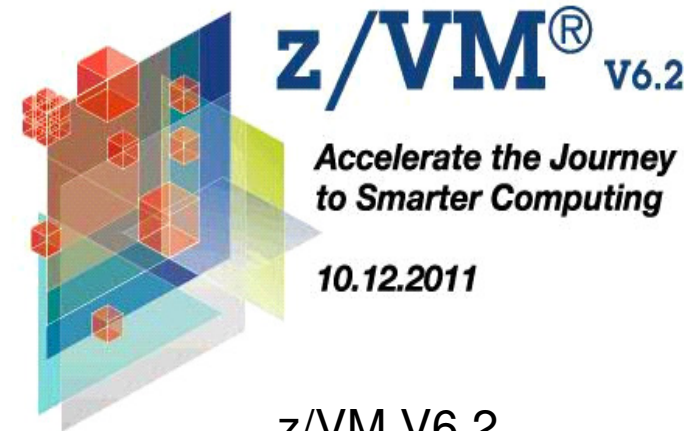


# z/VM Version 6 Release 2

*and other recent  
functional enhancements*

## z/VM Version 6 Release 2

- Generally available December 2, 2011
- Withdrawn from marketing in July 2013
  - Concurrent with z/VM V6.3 GA
- Major changes include:
  - Single System Image
  - Live Guest Relocation

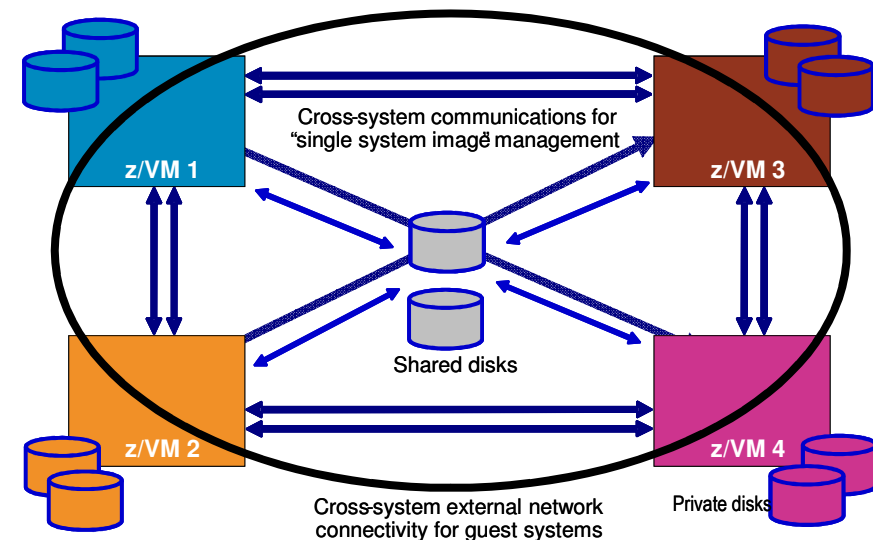


z/VM V6.2  
End of Service  
December 31, 2016

## Single System Image (SSI) Feature

### Clustered Hypervisor with Live Guest Relocation

- Optional priced feature
- Connect up to four z/VM systems as members of a Single System Image cluster
- Cluster members can be run on the same or different System z servers
- Simplifies management of a multi-z/VM environment
  - Single user directory
  - Cluster management from any member
    - Apply maintenance to all members in the cluster from one location
    - Issue commands from one member to operate on another
  - Built-in cross-member capabilities
  - Resource coordination and protection of network and disks



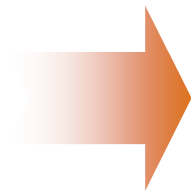
## SSI Cluster Management – Features for Greater Reliability

- Cross-checking of configuration details as members join cluster and as resources are used:
  - SSI membership definition and identity
  - Consistent definition of shared spool volumes
  - Compatible virtual network configurations (MAC address ranges, VSwitch definitions)
- Cluster-wide policing of resource access:
  - Volume ownership marking to prevent dual use
  - Coordinated minidisk link checking
  - Autonomic minidisk cache management
  - Single logon enforcement
- Communications failure “locks down” future resource allocations until resolved
- Comprehensive checking for resource and machine feature compatibility during relocation:
  - Adjustment of “virtual architecture level” to support customer relocation policy

## Single System Image Feature

### Clustered Hypervisor with Live Guest Relocation

- Dynamically move Linux<sup>®</sup> guests from one member to another with Live Guest Relocation
  - Reduce planned outages
  - Enhance workload management
  - Non-disruptively move work to available system resources and non-disruptively move system resources to work
- When combined with Capacity Upgrade on Demand, Capacity Backup on Demand, and Dynamic Memory Upgrade, you will get the best of both worlds



***Bring additional resources to the workload!***

***Move the workload to the resources!***



## Benefits and Uses of z/VM SSI Clusters

- Horizontal growth of z/VM workloads
  - Increased control over virtual server sprawl
  - Distribution and balancing of resources and workloads
- Flexibility for planned outages for service and migration
  - z/VM
  - Hardware
  - Less disruptive to virtual server workloads
- Workload testing
  - Different service/release levels
  - Various environments (stress, etc.)
  - New/changed workloads and applications can be tested before moving into production
- Simplified system management of a multi-z/VM environment
  - Concurrent installation of multiple-system cluster
  - Single maintenance stream
  - Reliable sharing of resources and data



## z/VM System Management – Related Products

- **Operations Manager for z/VM V1.4**
  - Facilitates automated operations
  - Monitor, view, and interact with consoles without logging on to service machines or Linux guests
  - Take actions based on service machine console messages and other system events
  - Schedule events for immediate execution or on a regular schedule
- **OMEGAMON® XE on z/VM and Linux V4.2**
  - Performance monitoring of z/VM and Linux guests
  - Part of the Tivoli® Management Services, including Tivoli Enterprise Portal
  - Uses IBM Performance Toolkit for VM as its data source
- **Backup and Restore Manager for z/VM V1.2**
  - Backup and restore file level data for CMS minidisks and Shared File System
  - Backup and restore images of Linux guests and/or z/VM volumes
    - Use Tivoli Storage Manager for file level backup and restore of Linux data
- **Tape Manager for z/VM V1.3**
  - Manage tapes: retention, access control, data security erase
  - Manage devices: share with other z/VM and non-z/VM systems
  - Manage mount requests for ATL, VTS, and manual mount devices
- **Archive Manager for z/VM V1.1**
  - Users and administrators manage disk space more efficiently and effectively
  - Archive infrequently used or large files to tape or other disk
- **zSecure™ Manager for RACF z/VM V1.11.1**
  - Automate complex, time consuming z/VM security management tasks
  - Quickly identify and prevent problems in RACF
  - Create comprehensive audit trails



## Systems Management and the Single System Image Feature

- Support for SSI and LGR by
  - xCAT 2.8 supports SSI and LGR
    - Available with March 2013 code drop
  
- No Support for SSI and LGR by
  - Unified Resource Manager (zManager) *does not* support SSI and LGR
  - IBM Systems Director *does not* support SSI and LGR
  
- Suggested best practice is to not combine SSI and LGR with zManager or Systems Director
  - Work with your IBM Sales Team, IBM Lab Services, or z/VM Development Lab to determine which technologies are most critical to your environment and business.

## z/VM 6.2 SSI and GDPS Support

- GDPS® V3.10 was generally available March 29, 2013
  - Adds support for Live Guest Relocation with Standard Actions panel and Automation scripts
  - If an SSI member is being shutdown, GDPS automatically asks if any virtual machines should be relocated prior to the shutdown.
  - See <http://www-03.ibm.com/systems/z/advantages/gdps/whatsnew.html> for details.
- GDPS/PPRC xDR 3.9 supports SSI configuration
  - All Members of the SSI cluster must be in the same GDPS managed group.
  - APAR PM64211
  - Requires z/VM APAR VM65176
- All supported GDPS releases (3.8, 3.9, & 3.10) supported with non-SSI environment
  - See GDPS PSP buckets for required service (z/OS®, Linux, & z/VM)
  - If GDPS environment shared with older z/VM releases, z/VM service is required on them before adding z/VM 6.2

Environment	3.8	3.9	3.10
z/VM 6.2 Non-SSI	Yes	Yes	Yes
z/VM 6.2 SSI	No	Yes	Yes
z/VM 6.2 SSI + LGR	No	No	Yes

## z/VM Single System Image and Live Guest Relocation Implementation Services

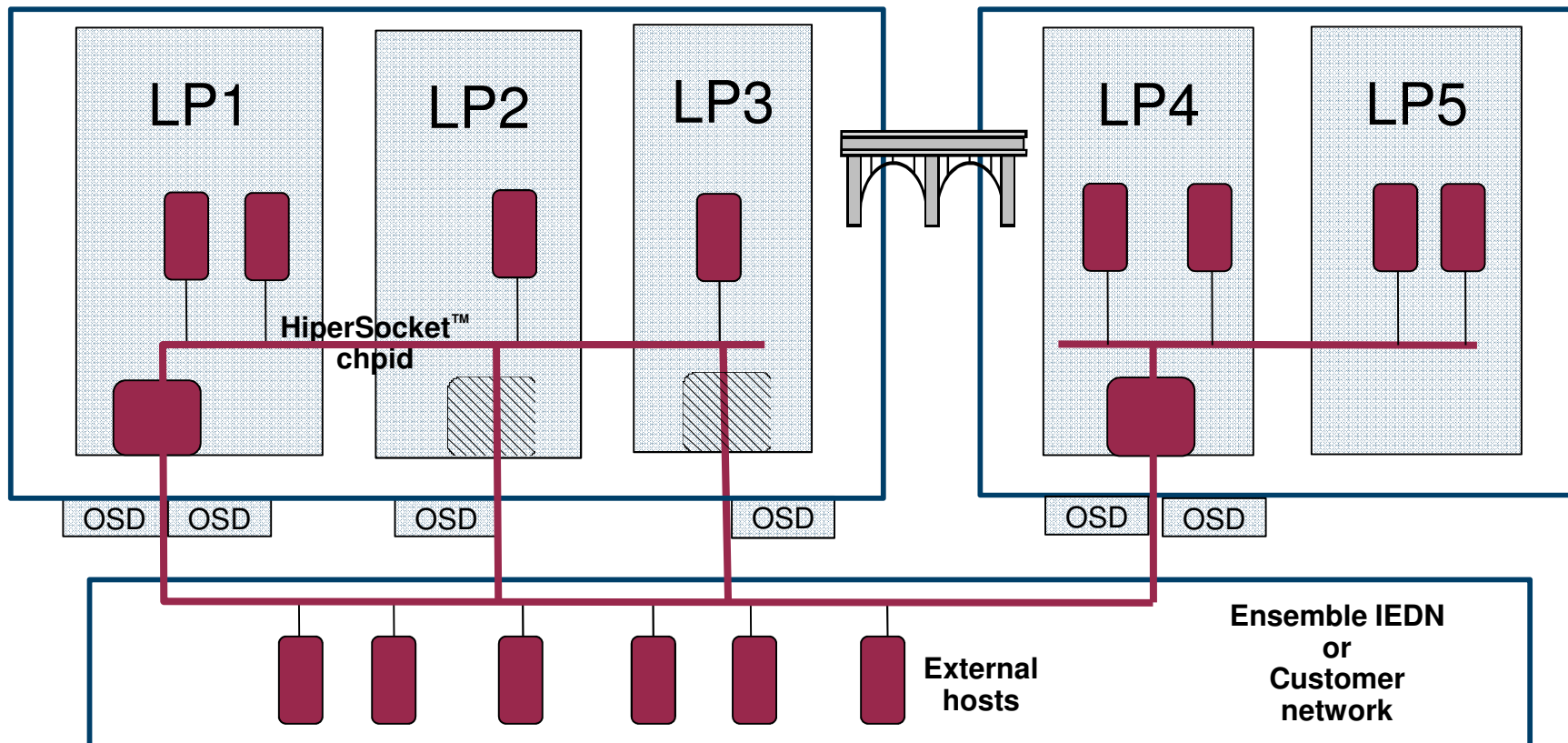
- IBM System z<sup>®</sup> **Lab Services Offering:**
  - In-depth **education** on the functions of Single System Image
  - Cluster **planning and deployment assistance**
  - Operational **guidance** and recommendations
  - **Migration assistance** for users of CSE
  - **Demonstrate** the technology in your own environment.
  - **Analyze** how SSI and LGR will affect your system initialization, recovery, and automation procedures
  - Early **identification of any inhibitors** to use
  - Identification of any required z/VM or Linux operating system **patches**

For more information, contact [systemz@us.ibm.com](mailto:systemz@us.ibm.com)



# HiperSocket VSWITCH Bridge

Available: April 13, 2012



- Built-in failover and failback
- CHPARM=x2 to bridge IEDN
- CHPARM=x4 to bridge customer network

- Same or different LPAR
- One active bridge per CEC
- PMTU simulation

## HiperSocket VSWITCH Bridge

*Available: April 13, 2012*

- Virtual Switch bridge between Ethernet LAN and HiperSockets
  - zEnterprise IEDN (OSX) or customer network (OSD) connections
  - Guests can use simulated OSA or dedicated HiperSockets
  - VLAN aware
  - One HiperSocket chpid only
  
- Full redundancy
  - Up to 5 bridges per CEC
  - One bridge per LPAR
  - Automatic takeover
  - Optionally designate one “primary”
    - Primary will perform “takeback” when it comes up
  - Each bridge can have more than one OSA uplink
  
- CP: VM65042 / UM33691, TCP/IP: PM46988 / UK77220
  
- z/OS currently does not support the HiperSockets Bridge

## High Performance FICON

*Available: April 13, 2012*

- Enable guests to use High Performance FICON for System z (zHPF)
  - Different I/O model
  - Single and multiple track I/O
  - CP APAR VM65041 PTF UM33646
  - DVF APAR VM65144 PTF UM33647
  
- Requires host and control unit compatibility
  - Consult a storage specialist for details
  
- z/OS and Linux provide exploitation
  
- Performance results available at:
  - <http://www.vm.ibm.com/perf/reports/zvm/html/620jb.html>

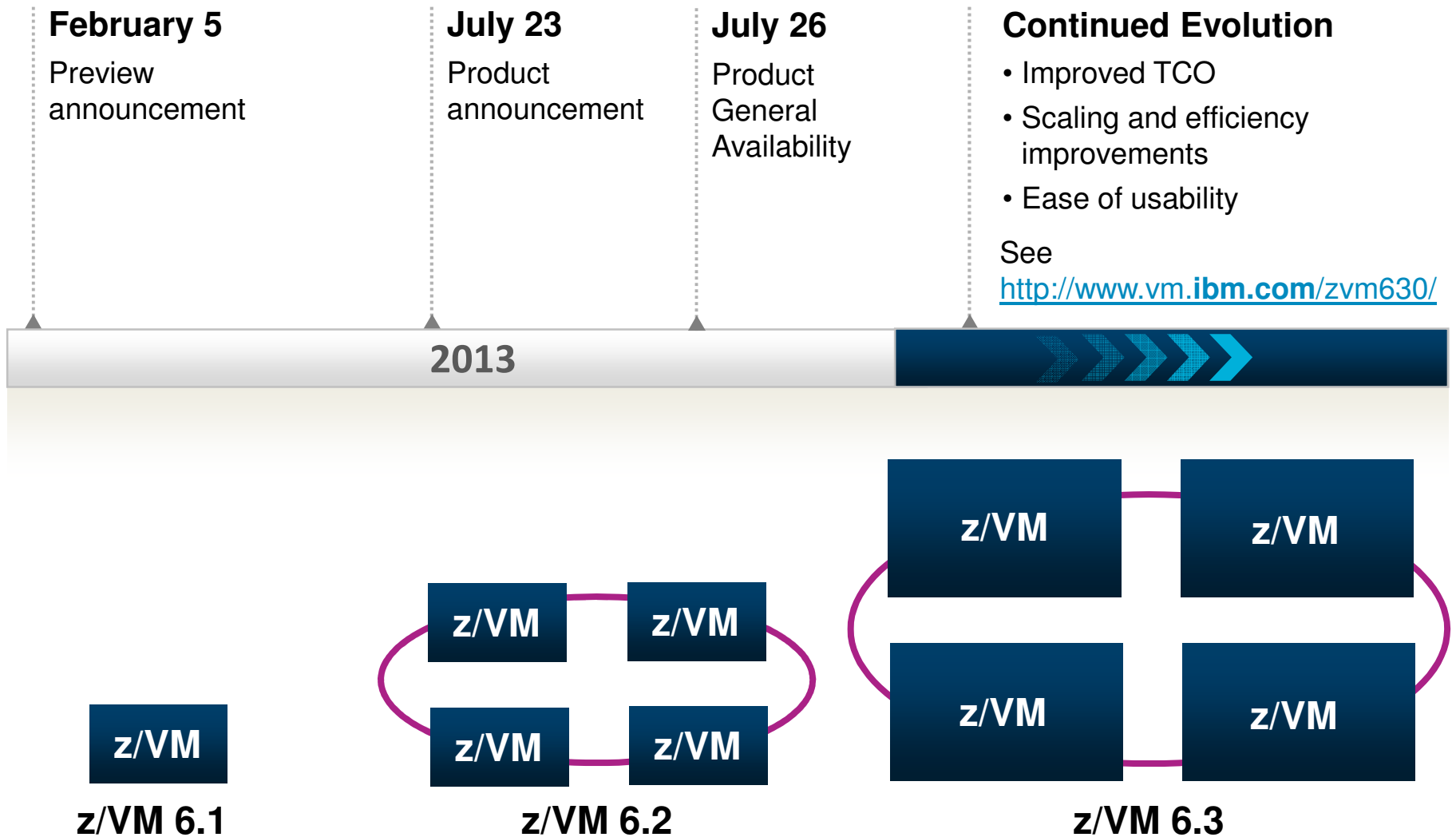


# z/VM Version 6 Release 3



# z/VM Version 6 Release 3

## Making Room to Grow Your Business



## Reduce the number of z/VM systems you need to manage z/VM 6.3



- Expand z/VM systems constrained by memory up to four times (almost two times on the zBC12), thus increasing the number of Linux virtual servers in a single z/VM system
- Exploit HiperDispatch to improve processor efficiency, allowing more work to be done per IFL and therefore supporting more virtual servers per IFL, potentially requiring fewer systems for applicable workloads
- Expand the real memory used in a Single System Image Cluster up to 4 TB
  - z/VM 6.3 has the ability to fully utilize memory of a zBC12 at a maximum of 496 GB
- Exploit multiple subchannel sets in GDPS environment to place secondary Peer-to-Peer volumes in alternate subchannel set

## Improved Memory Management Flexibility and Efficiency



- Benefits for z/VM systems of all memory sizes
- Prioritize virtual server use of real memory more effectively through enhanced memory reservation support
- Exploit improved management of memory on systems with diverse virtual server processor and memory use patterns
- Eliminate use of expanded storage for z/VM paging, allowing greater flexibility and avoiding some of the restrictions associated with expanded storage

## Simplify z/VM Systems Management



- Managing z/VM virtual servers with xCAT (Extreme Cloud Administration Toolkit) is ready to go after z/VM V6R3 installation; nothing else needs to be installed
- Adopt a foundation to allow future extensions for open source systems management solutions, in particular through OpenStack® support
- Enable scalable support for the larger systems that z/VM V6R3 supports
- Safely migrate an existing z/VM V6R2 SSI Cluster to z/VM V6R3 in a step-wise approach, without having to shut down the cluster, using the new “Installation Upgrade In Place” capability

## Large Memory Support

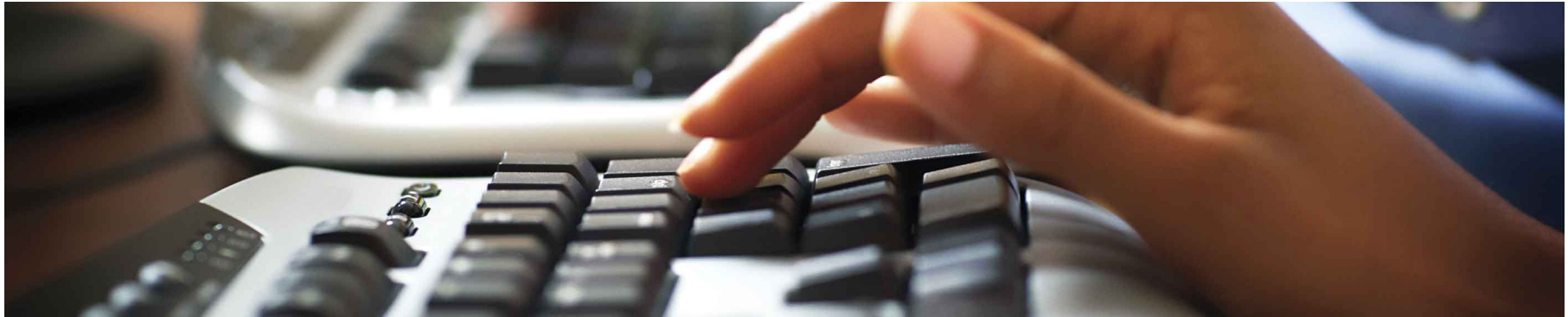


- Real memory limit raised from 256GB to **1 TB**
  - Proportionately increases total virtual memory based on tolerable over- commitment levels and workload dependencies
- Virtual machine memory limit remains unchanged at **1 TB**
- Paging DASD utilization and requirements change
  - Removed the need to double the paging space on DASD
  - Paging algorithm changes increase the need to have a properly configured paging subsystem
- Expanded Storage continues to be supported with a limit of **128 GB**

## Large Memory Support (cont.)

- Reorder processing removed
  - Commands remain, but have no impact
  - Improves environment for running larger virtual machines
  
- Improved effectiveness of the CP SET RESERVE command
  - Stronger “glue” to hold reserved pages in memory
  - Support for reserving pages of NSS or DCSS
    - Example: Use with the Monitor Segment (MONDCSS)
  - Ability to limit the overall number of reserved pages for the system

## Enhanced Dump Support



- Stand-alone Dump utility has been rewritten
  - Creates a CP hard abend format dump
  - Dump is written to ECKD™ or SCSI DASD
  
- Larger memory sizes supported, up to a maximum of 1 TB
  - Includes Stand-alone dump, hard abend dump, SNAPDUMP, DUMPLD2, and VM Dump Tool
  
- Performance improvements for hard abend dump
  - Reduces time to take a CP hard abend dump

## HiperDispatch

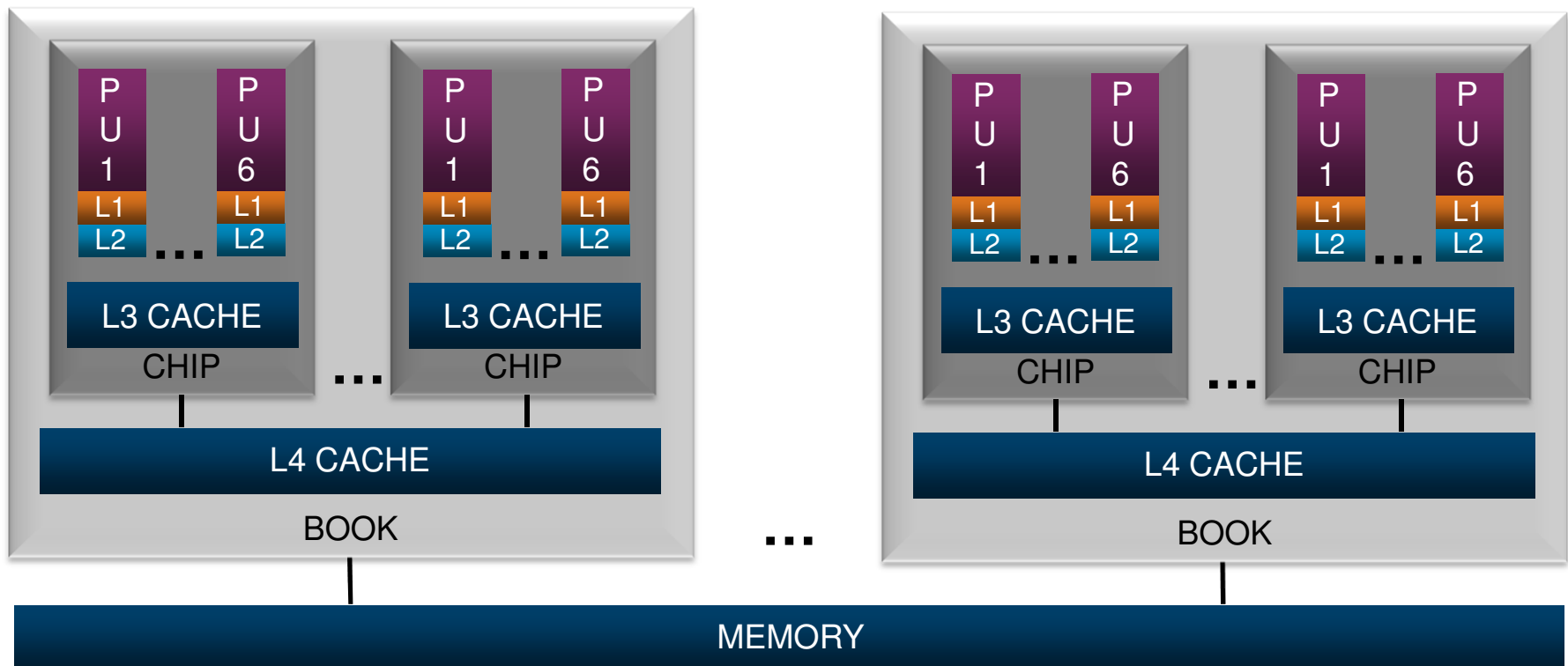


- Improved processor efficiency
  - Better n-way curves
    - Supported processor limit of 32 remains unchanged
  - Better use of processor cache to take advantage of cache-rich system design of more recent machines
  
- Two components:
  - Dispatching affinity
  - Vertical CPU management



## HiperDispatch – Dispatching Affinity

- Processor cache structures become increasingly complex and critical to performance
- Goal is to re-dispatch work close (in terms of topology) to where it last ran



## HiperDispatch – Dispatching Affinity



- Dispatcher is aware of the cache and memory topology
  - Dispatch virtual CPU near where its data may be in cache based on where the virtual CPU was last dispatched
- Better use of cache can reduce the execution time of a set of related instructions
- z/VM 6.2 and earlier uses “soft” affinity to dispatch virtual CPUs
  - No awareness of chip or book

## HiperDispatch – Vertical CPU Management



- Today's “horizontal” management distributes the LPAR weight evenly across the logical processors of the z/VM LPAR
- “Vertical” management attempts to minimize the number of logical processors, allowing LPAR to similarly manage logical CPUs

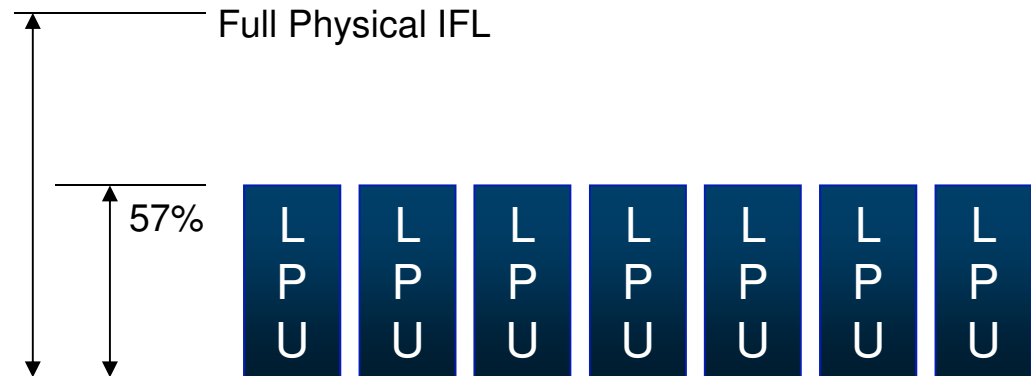
### Example:

- Ten Physical IFLs, seven logical IFLs, weight of 400 out of 1000
  - Each logical IFL (LPU) entitled to 57% of an IFL
- When CEC is constrained, the LPAR’s entitlement is reduced to four IFLs, so seven is more than required
- z/VM and LPAR will cooperate
  - z/VM will concentrate the workload on a smaller number of logical processors
  - LPAR will redistribute the partition weight to give a greater portion to this smaller number of logical processors (~100% of four CPUs)

# Horizontal vs. Vertical CPU Management

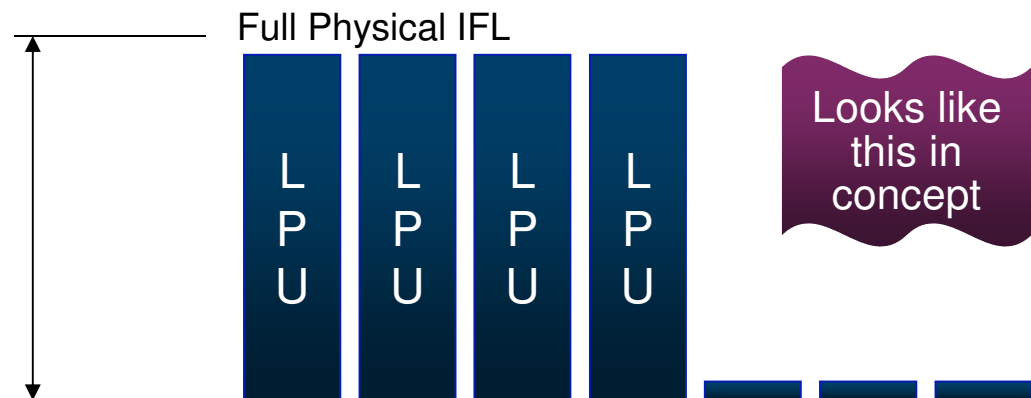
## Horizontal:

- The logical processors are all created/treated equally.
- z/VM dispatches work evenly across the seven logical processors



## Vertical:

- The logical processors are skewed to where some get greater share of the weight.
- z/VM dispatches work accordingly to the heavier weighted workload.



## Technology Exploitation

- Fibre Channel Protocol Data Router Support
  - FCP QEBSM support enhanced for guest support use of FCP Data Router
- FICON DS8000 Series New Functions
  - Storage Controller Health message
    - New attention message from hardware providing more details for conditions in past reflected as Equipment Check.
    - Intended to reduce the number of false HyperSwap® events.
  - Peer-to-Peer Remote Copy (PPRC) Summary Unit Check
    - Replaces a series of state change interrupts for individual DASD volumes with a single interrupt per LSS
    - Intended to avoid timeouts in GDPS environments that resulted from the time to process a large number of state change interrupts.
    - Satisfies a SOD from October 12, 2011
- Multiple Subchannel Set (MSS) support for mirrored DASD
  - Support to use MSS facility to allow use of an alternate subchannel set for Peer-to-Peer Remote Copy (PPRC) secondary volumes.
  - Satisfies a SOD from October 12, 2011

## z/VM 6.3 and GDPS Support

- z/VM 6.3 alternate subchannel set support
  - GDPS V3.10 prereqs the PM71447 New Function: GDPS/PPRC XDR MSS1 Support APAR
- z/VM 6.3 FICON DS8000 Series new function (DS8K synergy initiative)
  - GDPS/PPRC V3.8, V3.9, & V3.10 and prereqs the PM44141 New Function: GDPS/PPRC XDR PPRCSUM and Storage Controller Health Message APAR, and DS8K R6.2 u-code.
- Cannot mix new MSS support in an SSI environment with older z/VM systems.
- See <http://www-03.ibm.com/systems/z/advantages/gdps/whatsnew.html> for details.
- See GDPS PSP buckets for required service (z/OS, Linux, and z/VM)
  - Remember to check for required service for systems that share the GDPS environment.

Environment	3.8	3.9	3.10
z/VM 6.3 w/ MSS 1	No	No	Yes <sup>1</sup>
z/VM 6.3 DS8K Synergy	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>
z/VM 6.3 SSI + LGR	No	No	Yes <sup>1</sup>

1 – with appropriate service – Check Bucket

## Virtual Networking Improvements

- Live Guest Relocation support for port-based virtual switches built on existing support:
  - Allow relocation of port-based interface
  - Prevent relocation of an interface that will be unable to establish proper network connectivity
  - Adjust the destination virtual switch configuration, when possible, by inheriting virtual switch authorization from the origin
  
- MPROUTE server upgraded to z/OS V1.13 OMPROUTE functional equivalency
  
- Support for OSA-Express5S devices
  
- Virtual Switch recovery and stall prevention
  - New SET VSWITCH UPLINK SWITCHOVER command
  - Change from current device to one of the configured backup devices

## Security Enhancements

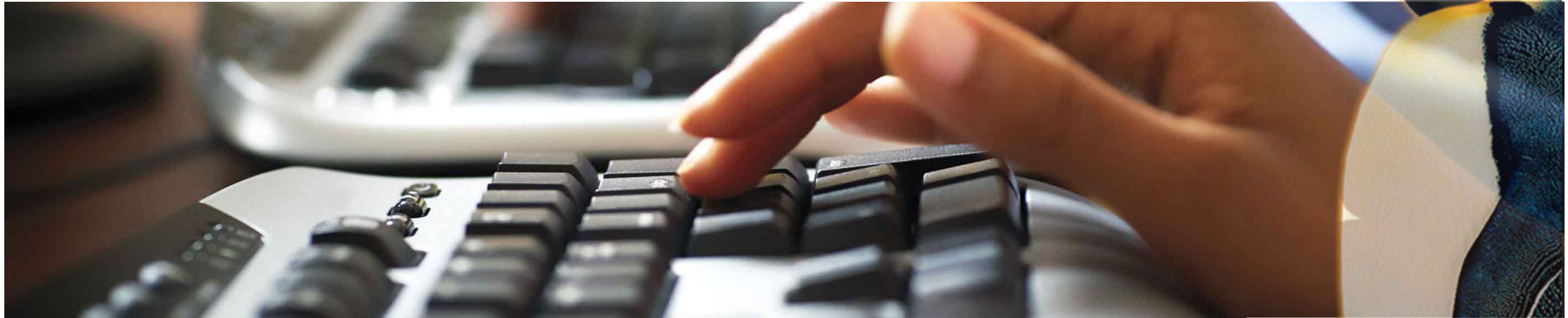
- Crypto Express4S
  - Guest support for Crypto Express4S which is a feature available on zEC12 and zBC12
  - Can be configured in one of three ways:
    - IBM Common Cryptographic Architecture (CCA) Coprocessor mode
    - IBM CCA Accelerator mode
    - IBM Enterprise Public Key Cryptographic Standards (PKCS) #11 (EP11) coprocessor
- SSL Server Upgrade
  - System SSL update to z/OS V1.13 equivalency
  - Client certificate validation
  - Includes support for:
    - Transport Layer Security (TLS) protocol, Version 1.2
    - SHA2 certificate support
    - TLS Protocol Selection
  - IPv6 support for SSL-enabled Telnet, FTP, and SMTP



## Installation Upgrade in Place Enhancement

- Upgrade an existing z/VM 6.2 system to z/VM 6.3 with minimal impact to the current running system.
  - Fewer manual steps such as directory merging and new virtual machine creation
  
- Upgrade Approach:
  - Install new release as temporary second level system
  - Move new level of z/VM to current system
  - For SSI Cluster, start with single member of the cluster on new level
  
- Provides a backup to support backing out in extreme cases
  
- Support for local modifications

## Linux Disk Dump Utility can now include the NSS



- The Linux Disk Dump utility is preferred over the CP VMDUMP command in most cases.
- Previously, the contents of an NSS could not be captured with Linux Disk Dump utility.
- Changes in IPL now allow the NSS to be included
  - New NSSDATA parameter
- For more background, see:
  - <http://download.boulder.ibm.com/ibmdl/pub/software/dw/linux390/docu/l26ddt01.pdf> for Linux Disk Dump utility information
  - <http://www.vm.ibm.com/perf/tips/vmdump.html> for information on differences between VMDUMP and Linux utility

## z/VM 6.3 Withdraws Cross System Extensions (CSE) Support

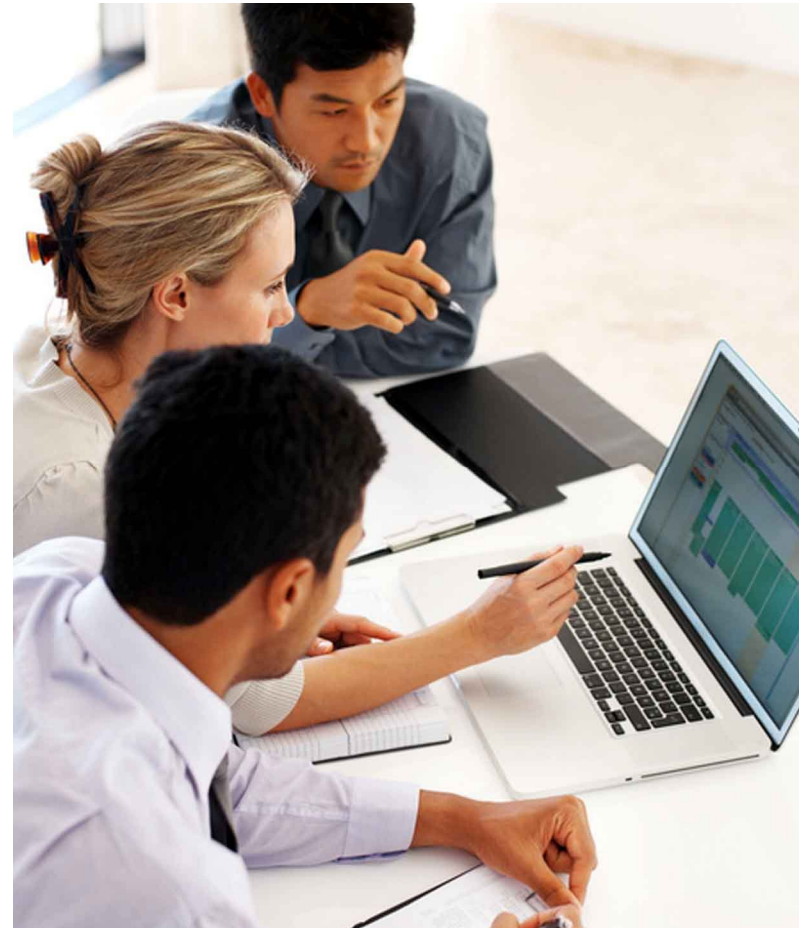
- Satisfies a previous Statement of Direction
- The z/VM Single System Image (VMSSI) feature replaces the functions provided by CSE:
  - Logon once in the cluster, with exceptions
  - Cross-system MESSAGE and QUERY commands
  - Shared spool
  - Shared source directory
- VMSSI has additional value such as autonomic minidisk cache management and a single point of maintenance
- XLINK shared disk support is **not** affected.



Change  
from SoD

## z/VM 6.3 Withdraws support for TCP/IP Devices and Daemons

- Satisfies a previous Statement of Direction
- A220 HYPERchannel devices
- CLAW devices
- DHCP daemon
- LPSERVE (LPD)
  - RSCS LPD is provided at no charge
  - Does not affect LPR (client)



# Hybrid computing model integrated and enabled for Cloud



z/VM    zManager    kvm    Hyper-V    Power VC    FSM    VMware



**Datawarehousing  
IBM DB2® Analytics  
Accelerator Solution**

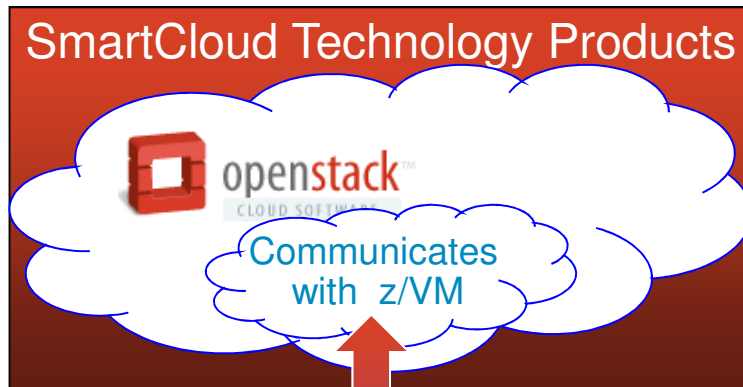
**zManager for z/OS  
and IBM zEnterprise  
BladeCenter®  
Extension (zBX)**

**Systems Director for Power®  
IBM System x® and storage**

**FSM for Intel®  
and Power ITEs**

**Third party  
Managers and  
Servers**

## The OpenStack Food Chain



### ▪ Top Half of the Solution:

- An IBM SmartCloud Technology product or other vendor product will include the OpenStack support.
- Portions of that OpenStack support will know z/VM (i.e. code that connects and understands how to talk to z/VM).

### ▪ Bottom Half of the Solution:

- Rest APIs are used to communicate with the OpenStack code from the top half.
- The xCAT Appliance utilizes new and existing Systems Management APIs (SMAPI) to interact with the z/VM system
- SMAPI can interact with additional optional products or features (e.g. a directory manager).

Product with OpenStack Support

z/VM 6.3 Product

Optional Product or Feature

## IBM Wave for z/VM V1.1 (IBM Wave)



- IBM Wave is a new virtualization management product for z/VM<sup>®</sup> and Linux<sup>®</sup> virtual servers that uses visualization to dramatically automate and simplify administrative and management tasks
- Enhanced Enterprise Linux Server (ELS\*) solution is also available with IBM Wave for z/VM
- New! Jumpstart Services to help customers get started with IBM Wave
- Read the announcement [here!](#)
- General availability - February 28<sup>th</sup>, 2014

Supported IBM System z<sup>®</sup> processors: IBM System z10<sup>®</sup> Enterprise Class (z10 EC<sup>™</sup>), IBM System z10 Business Class<sup>™</sup> (z10 BC<sup>™</sup>) and later

Supported z/VM versions/releases:

- z/VM 6.3
- z/VM 6.2
- z/VM 5.4

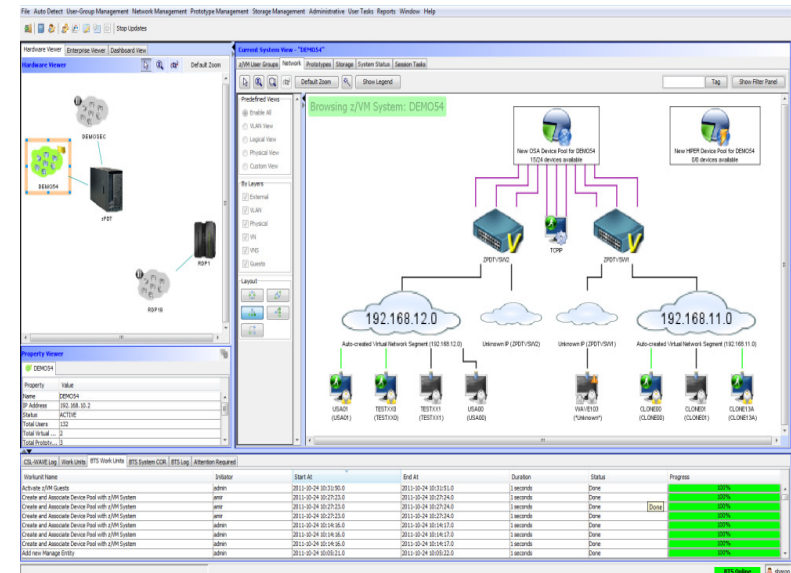


***\*Enterprise Linux Server is an integrated solution comprised of Hardware, Hypervisor, Memory, Easy to Use Virtualization Management and 3 years Service and Support designed to get customers including FIEs started with low cost scalable computing environment***

# IBM Wave for z/VM (IBM Wave) Overview

IBM Wave simplifies and helps automate management and administration of z/VM and Linux virtual servers, jumpstarting the steps needed to get to cloud. With its content rich interface IBM Wave extends the reach of your staff and lets you manage z/VM and Linux intuitively and cost effectively, reducing reliance on deep expert skills.

- Monitors and manages virtual servers and resources from a single interface
- Simplifies and automates administration and management tasks
- Provisions virtual resources (Guests, Network, Storage)
- Supports advanced z/VM capabilities such as Single System Image and Live Guest Relocation
- Allows delegation of administrative capabilities to the appropriate teams



*A simple, intuitive graphical management, provisioning, and automation tool to help you fully leverage the power of System z virtualization on z/VM.*



## IBM Cloud Manager with OpenStack V4.1

- Formerly offered as IBM SmartCloud Entry V3
  
- Benefits:
  - Full access to OpenStack APIs, backed with IBM support
  - Cloud management solution that is easy to use
  - Self service portal for workload provisioning and virtualized image management
  - Heterogeneous support for IBM PowerVM®, z/VM, IBM PowerKVM and x86, and more.
  - Deploy, resize and capture
  - Linux server backup and restore
  
- Requires z/VM 6.3 with appropriate service
  
- Dates:
  - Announced: May 19, 2014
  - Planned Availability: June 13, 2014



## IBM Cloud Management Suite for System z V1.1

- Benefits:
  - Quickly and easily provision a workload on System z
  - Self service portal running on distributed system
  - Monitor health of cloud environment
  - Linux server backup
  - Integration of various key management components
  
- Components include:
  - IBM SmartCloud® Orchestrator
  - OMEGAMON XE on z/VM and Linux
  - Tivoli Storage Manager Extended Edition
  
- Requires z/VM 6.3 with appropriate service
  
- See <http://www.vm.ibm.com/sysman/openstk.html>
  
- Dates:
  - Announced February 25, 2014
  - Generally Available March 14, 2014

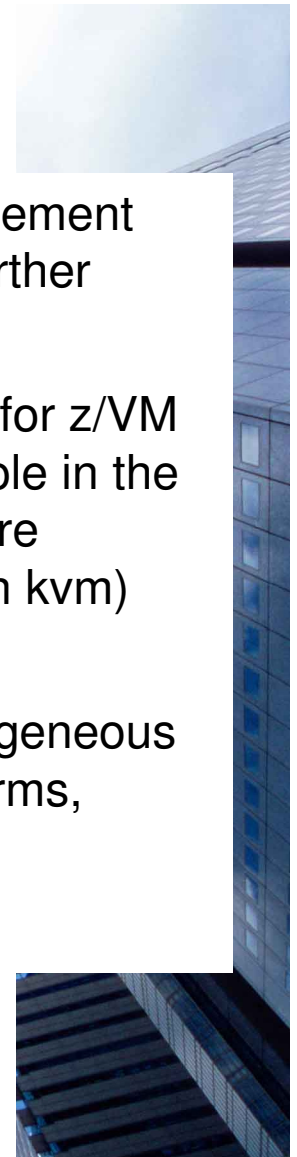


## Unified Resource Manager (zManager) and z/VM 6.3 Announcement

In light of IBM's cloud strategy and adoption of OpenStack, the management of z/VM environments in zManager is now stabilized and will not be further enhanced.

Accordingly, zManager will not provide systems management support for z/VM 6.3. However, zManager will continue to play a distinct and strategic role in the management of virtualized environments created by integrated firmware hypervisors (PR/SM™, PowerVM™, and System x hypervisor based on kvm) of zEnterprise.

Looking ahead, IBM's vision is to enable OpenStack to provide heterogeneous systems management across zEnterprise, z/VM and distributed platforms, which in turn can be exploited by IBM's future SmartCloud offerings.




## Positioning of z/VM and zManager

- The IBM zEnterprise Unified Resource Manager (zManager) is designed to provide systems management capabilities across the multi-architecture environment of zEnterprise.
- Many customers are planning to exploit these system management capabilities to deploy a framework for a heterogeneous cloud environment, thereby providing an effective means to deliver IT services.
- To accelerate the delivery of its cloud offerings, IBM recently announced plans to base all of its cloud services and software on open standards, including OpenStack and other cloud standards. OpenStack is an Infrastructure as a Service (IaaS) cloud computing open source project.
- IBM joined this project last year and in support of System z, is enhancing z/VM to be the first System z operating environment enabled for OpenStack.
- This capability is provided with z/VM 6.3.

## Positioning of z/VM and zManager (cont.)

- In light of IBM's cloud strategy and adoption of OpenStack, the management of z/VM environments in zManager is now stabilized and will not be further enhanced.
- Accordingly, zManager will not provide systems management support for z/VM 6.3.
- However, zManager will continue to play a distinct and strategic role in the management of virtualized environments created by integrated firmware hypervisors (PR/SM, PowerVM, and System x hypervisor based on kvm) of zEnterprise.
- Looking ahead, IBM's vision is to enable OpenStack to provide heterogeneous systems management across zEnterprise, z/VM and distributed platforms, which in turn can be exploited by IBM's future SmartCloud offerings.
- This will give customers greater flexibility by removing the need to develop specific interfaces for different cloud services and enabling enterprise-wide cloud deployments.

## z/VM System Management – Related Products

- **Operations Manager for z/VM V1.5** 
  - Facilitates automated operations
  - Monitor, view, and interact with consoles without logging on to service machines or Linux guests
  - Take actions based on service machine console messages and other system events
  - Schedule events for immediate execution or on a regular schedule
- **OMEGAMON® XE on z/VM and Linux V4.3**
  - Performance monitoring of z/VM and Linux guests
  - Part of the OMEGAMON and IBM Tivoli Monitoring infrastructure, including Tivoli Enterprise Portal
  - Uses IBM Performance Toolkit for VM as its data source
- **Backup and Restore Manager for z/VM V1.2**
  - Backup and restore file level data for CMS minidisks and Shared File System
  - Backup and restore images of Linux guests and/or z/VM volumes
    - Use Tivoli Storage Manager for file level backup and restore of Linux data
- **Tape Manager for z/VM V1.3**
  - Manage tapes: retention, access control, data security erase
  - Manage devices: share with other z/VM and non-z/VM systems
  - Manage mount requests for ATL, VTS, and manual mount devices
    - Supports IBM and Oracle STK libraries
- **Archive Manager for z/VM V1.1**
  - Users and administrators manage disk space more efficiently and effectively
  - Archive infrequently used or large files to tape or other disk
- **zSecure™ Manager for RACF z/VM V1.11.1**
  - Automate complex, time consuming z/VM security management tasks
  - Quickly identify and prevent problems in RACF
  - Create comprehensive audit trails



All support  
z/VM 6.2  
and 6.3!

## Other Considerations with z/VM 6.3

- You need to plan for Large Memory and for HiperDispatch. z/VM 6.3 changes some of the rules of thumb and planning guidelines from previous releases.
- DUMP Considerations
  - At time of publishing the calculations for dump space was not complete for the largest systems. This information has been made available on the z/VM Home Page
    - <http://www.vm.ibm.com/techinfo/> or <http://www.vm.ibm.com/service/zvmpladm.pdf>
  - Should learn DUMPLD2 which replaces DUMpload and has ability to segment a dump into multiple files.
- The size of CMS component grew significantly as a result of including an appliance server for xCAT, LOHCOST, and Stand-alone dump
  - Two additional install volumes
- If using z/VM 6.3 Upgrade in Place installation ensure required service is applied to z/VM 6.2 system being upgraded.

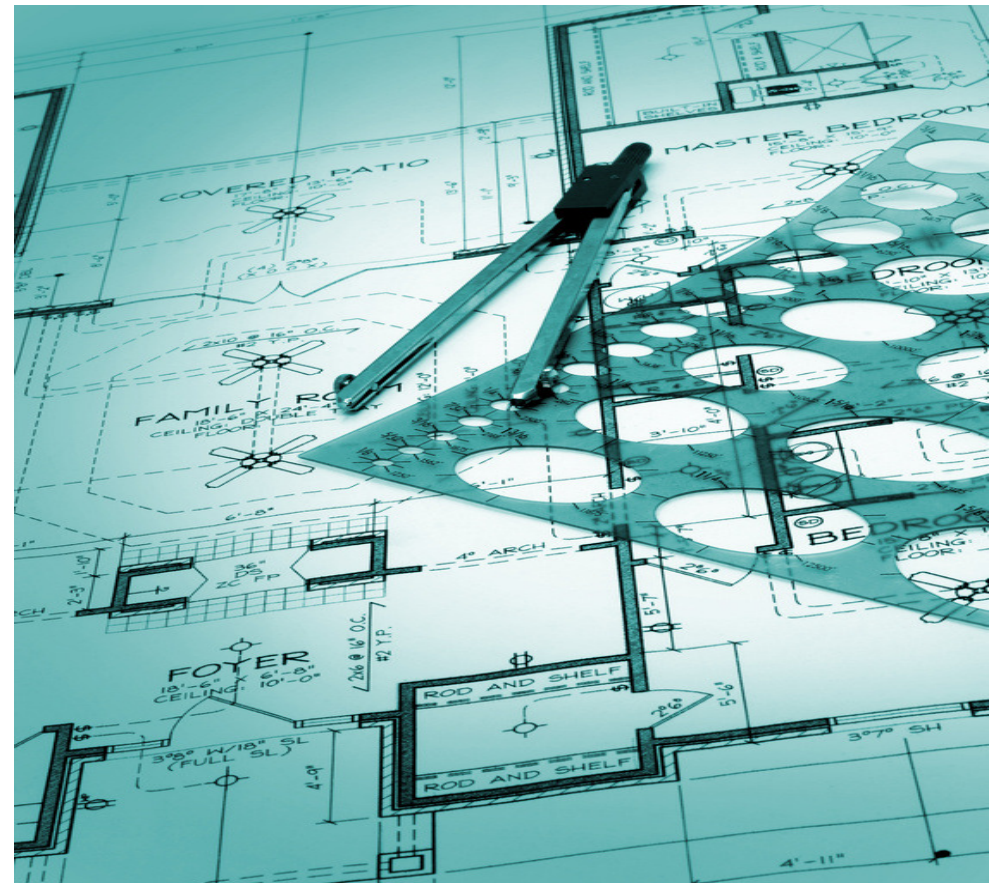


# February 24, 2014 Announcements



## Enhancing the Foundation for Virtualization

- [Release for Announcement – zBX and zEnterprise System Enhancements](#)
  - February 24, 2014
  
- Software Enhancements
  - CPU Pooling
  - Environment Information Interface
  
- Hardware Support
  - 10GbE RoCE Express Feature
  - zEDC Express Feature
  
- Available June 27, 2014



## CPU Pooling

- Fine-grained CPU limiting for a group of virtual machines
- Define one or more pools in which a limit of CPU resources is set.
- Two flavors of limits:
  - LIMITHARD - Percentage of system
  - CAPACITY – Number of CPUs
- Coexists with individual limit shares
  - More restrictive limit applies
- Support Details
  - z/VM 6.3 with APAR VM65418 - June 27, 2014



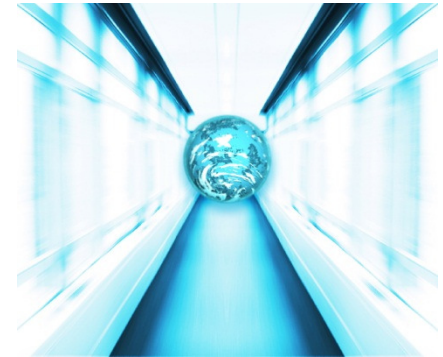
## Environment Information Interface

- New interface allows a guest to capture execution environment
  - Configuration and Capacity information
  - Various Levels:
    - Machine, logical partition, hypervisor, virtual machine
  
- New problem state instruction Store Hypervisor Information (STHYI)
  
- Includes support for CPU Pooling enhancement
  
- Foundation for future software licensing tools
  
- Support details:
  - z/VM 6.3 with APAR VM65419 – June 27, 2014



## 10GbE RoCE Express Feature

- Support for RDMA over Converged Ethernet for guests
- Based on new hypervisor PCIe support
- Designed to support z/OS's Shared Memory Communications-Remote Direct Memory Access (SMC-R) in z/OS V2.1
- Helps reduce CPU resource consumption
- Support details:
  - IBM zEC12 or zBC12 with appropriate updates – see support buckets
  - z/VM 6.3 with APAR VM65417 – June 27, 2014
  - z/OS 1.12, z/OS 1.13, z/OS 2.1 with APAR OA43256
  - Fulfills 2013 Statement of Direction



## zEDC Express Feature

- Guest support for zEDC Express Feature
  
- High performance, low latency, low CPU consumption compression
  
- Possible disk utilization reduction
  
- Support details:
  - IBM zEC12 or zBC12 with appropriate updates – see support buckets
  - z/VM 6.3 with APAR VM65417 – June 27, 2014
  - z/OS 1.12, z/OS 1.13, z/OS 2.1 with APAR OA43256
  - z/OS 1.12, z/OS 1.13, z/OS 2.1 with APAR OA44482
  - Fulfills 2013 Statement of Direction





# Hardware Support

## Support for IBM zEnterprise EC12

- **Updates for z/VM 6.2, 6.1, and 5.4**
  - VM65007 CP
  - VM65131 IOCP
  - VM65046 Performance Toolkit for VM™
  - VM65047 HCD
  - VM64747 HCM (z196 support: 6.1 and 5.4 only)
  - VM65130 EREP
  - OA38418 OSA/SF for OSA-Express4S
  - PM49761 High Level Assembler (new instructions)
- **PSP Bucket**
  - Upgrade **2827DEVICE**
  - Subset **2827/ZVM**
  - Subset **2827/ZOS** for ICSF service to support EP11 when running as a guest



## Support for IBM zEnterprise BC12

- **Updates for z/VM 6.3, 6.2 and 5.4**
  - VM65239: VMHCD support
  - VM65236: VMHCM support
  - VM65279: EREP support
  - VM65278: IOCP support
  - VM65360: SYSEVENT QVS support
    - VM65356: SYSEVENT QVS support (pre-req to VM65360)
  
- **Update for z/VM 6.2 and in base of z/VM 6.3**
  - PM83966: TCP/IP support
  
- **PSP Bucket**
  - Upgrade: **2828DEVICE**
  - Subset: **2828/ZVM**





## z/VM Disk Storage Support

- z/VM 6.3 supports
  - DS8000<sup>®</sup> Series (FCP or FICON<sup>®</sup>)
  - DS6000<sup>®</sup> Series (FICON)
  - XIV (FCP)
  - IBM San Volume Controller (FCP)
  - IBM Storwize<sup>®</sup> V7000 (FCP)
    - See [ibm.com/support/docview.wss?uid=ssg1S1003703#\\_zvm](http://ibm.com/support/docview.wss?uid=ssg1S1003703#_zvm)
  - IBM FlashSystem when behind an SVC (FCP)
  - As well as many of the older storage devices
  
- The IBM System Storage<sup>®</sup> Interoperation Center (SSIC) support page:
  - [ibm.com/systems/support/storage/ssic/interoperability.wss](http://ibm.com/systems/support/storage/ssic/interoperability.wss)



## z/VM Tape Storage Support

- z/VM 6.3 Supports:
  - 3494 Virtual Tape Server (VTS) Library
  - TS3500 (3584) Tape Library
  - Virtualization Engine TS7700 (7720,7740) Tape Library
  - TS3400 Tape Auto-Stacker
  - Emulated 3490 Tape Subsystems
  - 3590, 3592, TS1120, TS1130, & TS1140 Enterprise Tape Subsystems
  
- z/VM provides CP native support for FICON only
  - FCP attachment supported by Linux guests via FCP subchannels
  - FICON supported by Linux for stand-alone tape only; no FICON library support
  
- The IBM System Storage® Interoperation Center (SSIC) support page:
  - [ibm.com/systems/support/storage/ssic/interoperability.wss](http://ibm.com/systems/support/storage/ssic/interoperability.wss)



# IBM Enterprise Cloud System Trusted Cloud. Simply Delivered.



### Open Linux Environment

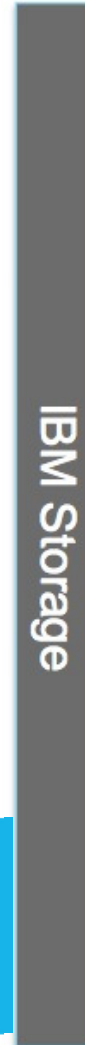
- Red Hat/SUSE
- 3000+ Applications



### Fully Automated Cloud Orchestration & Monitoring



### Hypervisor and Virtualization Management



### Utility Pricing and MSP Flexible Financing



### Trusted, 24/7 IBM Support



### Award Winning Hardware Design



- Integrated
- Delivered in 30-45 Days
- Production Ready in Hours

- 99.99%+ Availability
- EAL4 Server Security
- Available June 20, 2014

## Enterprise Cloud System- Offering Components

### ▪ Server:

- IBM zEnterprise® EC12 **or** IBM zEnterprise BC12 (zEC12, zBC12)

### ▪ Storage:

- IBM DS8870 **or** Storwize® V7000

### ▪ Software:

- z/VM® 6.3 with following features:
  - Directory Maintenance (DirMaint™) Feature
  - Resource Access Control Facility (RACF®)
  - Performance Toolkit for VM™ Feature
  - Single System Image (SSI) Feature – (Requires ECKD DASD)
- IBM Wave for z/VM
- Cloud Management Suite:
  - OMEGAMON® XE on z/VM and Linux
  - Tivoli Storage Manager
  - SmartCloud Orchestrator
- Operations Manager for z/VM
- Backup and Restore Manager for z/VM





# Statements of Direction July 23, 2013

Subject to change or withdrawal without notice,  
representing IBM goals and objectives only.

## Security Evaluation of z/VM 6.3

IBM intends to evaluate z/VM V6.3 with the RACF Security Server feature, including labeled security, for conformance to the Operating System Protection Profile (OSPP) of the Common Criteria standard for IT security, ISO/IEC 15408, at Evaluation Assurance Level 4 (EAL4+).

- We continue the practice of taking every other release through certification.
- Evaluation is with inclusion of RACF Security Server optional feature.
- See <http://www.vm.ibm.com/security/> for current z/VM Security information.

## FIPS Certification of z/VM 6.3

IBM intends to pursue an evaluation of the Federal Information Processing Standard (FIPS) 140-2 using National Institute of Standards and Technology's (NIST) Cryptographic Module Validation Program (CMVP) for the System SSL implementation utilized by z/VM V6.3.

- Federal Information Protection Standard (FIPS) 140-2
  - Target z/VM 6.3 System SSL is FIPS 140-2 Validated\*
  - Enablement requirements for certificate database and servers
    - <http://csrc.nist.gov/groups/STM/cmvp/documents/140-1/1401val2012.htm#1735>
  
- See <http://www.vm.ibm.com/security/> for current z/VM Security information.



Satisfied

*\*A Certification Mark of NIST, which does not imply product endorsement by NIST, the U.S. or Canadian Governments.*

## Support of the 10GbE RoCE Express Feature

In a future z/VM deliverable IBM plans to offer support for guest exploitation of the 10GbE RoCE Express feature (#0411) on the IBM zEnterprise EC12 and IBM zEnterprise BC12 systems. This is to allow guests to utilize Remote Direct Memory Access over Converged Ethernet (RoCE) for optimized networking.

- RoCE is high bandwidth, low latency link layer protocol
- Guest support for devices dedicated to z/VM guests that support RoCE
- Requires 10GbE RoCE Express feature on either the IBM zEC12 or IBM zBC12



## Support of the zEDC Express Feature

In a future z/VM deliverable IBM plans to offer z/VM support for guest exploitation of the IBM zEnterprise Data Compression (zEDC) Express feature (#0420) on the IBM zEnterprise EC12 and IBM zEnterprise BC12 systems.

- New data compression hardware feature to improve ability to do compression by offloading to zEDC
- Support is planned for guest usage
- Requires zEDC Express feature on either the IBM zEC12 or IBM zBC12

## Stabilization of z/VM 5.4 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<sup>®</sup> Enterprise Class (z9 EC) and IBM System z9 Business Class (z9BC) are withdrawn from support, whichever is later. Refer to Withdrawal Announcement 912-144, (RFA56762) dated August 7, 2012.

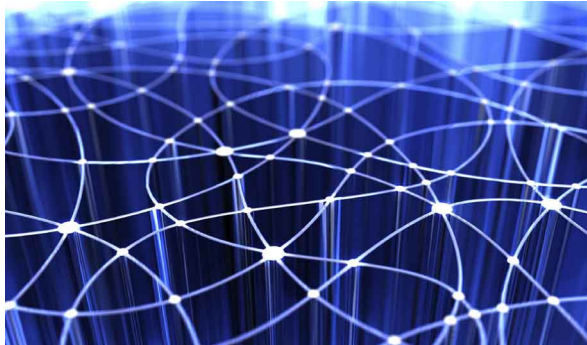
- While support will continue to the later date of December 31, 2014 or until the z9 processors are withdrawn from future, support for new function and processors is being stabilized.
- z/VM 5.4 will not be supported on processors after the zEC12 and zBC12.
  - This includes running as a guest of a supported z/VM Version 6 release.
- Plan now to avoid a migration which would involve both hardware and software at the same time.

## Withdrawal of Support for Expanded Storage

z/VM 6.3 will be the last release to support expanded storage (XSTOR) as part of the paging configuration. With the enhanced memory management support added in z/VM V6.3, expanded storage is no longer recommended as part of the paging configuration. z/VM can run efficiently in a configuration using only central storage

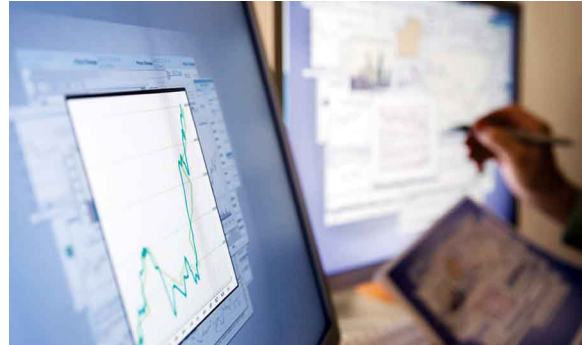
- In z/VM 6.3, it is recommended to configure all processor memory as central storage.
  - Support remains to use expanded storage in z/VM 6.3, but is suggested for use only in special cases.

# Summary



## Leadership

z/VM continues to provide additional value to the platform as the strategic virtualization solution for System z.



## Innovation

z/VM 6.2 introduced horizontal scalability and guest mobility through SSI Clustering and Live Guest Relocation with RAS in the forefront of the design. z/VM 6.3 continues the innovation with improved algorithms for memory and processor management.



## Growth

z/VM 6.3 increases the vertical scalability and efficiency to complement the horizontal scaling introduced in z/VM 6.2, because we know our customers' systems continue to grow.