

z/VM Platform Update

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Agenda

- Release Status and Information
- z/VM[®] Version 6 Release 3
 - -2014 Enhancements
 - -2015 Enhancements
 - -2016 Enhancements
- z/VM Version 6 Release 4 Preview
- Futures and Statements of Direction





Release Status and Information



z/VM Version 6 Release 3 Making Room to Grow Your Business



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IBM.

z/VM Release Status Summary



z/VM Level	GA	End of Service	End of Marktg.	Minimum Processor Level	Maximum Processor Level	Security Level
6.4	4Q2016			IBM System z196 & z114 [®]	-	
6.3	7/2013	12/2017[4]		IBM System z10 [®]	-	EAL 4+ OSPP-LS
6.2	12/2011	07/2017 ^[5]	7/2013	IBM System z10 [®]	z13 ^[3]	-
5.4	9/2008	12/2016 ^[1]	3/2012	IBM eServer zSeries 800& 900	zEC12	

^[1] Or later (Announced August 6, 2014)

^[2] Extended from original date (Announced February 4, 2014)

^[3] Announced January 14, 2015

^[4] Announced February 3, 2015

^[5] Announced February 2, 2016

Marketed & Serviced

Serviced, but not Marketed

End of Service & Marketing



February 24, 2014 Announcements



Enhancing the Foundation for Virtualization

- Release for Announcement zBX and zEnterprise System Enhancements
 - -February 24, 2014

-http://www.vm.ibm.com/zvm630/apars.html

- Software Enhancements
 - -CPU Pooling
 - -Environment Information Interface
- Hardware Support
 - -10GbE RoCE Express Feature
 - -zEDC Express Feature



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 Available
 - Part of RSU 1501







Environment Information Interface

- New interface allow 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
 - IBM License Metric Tool 9.0.1updated August 2014- http://ibm.biz/cpupoolilmt
 - -Greater flexibility for IBM Passport Advantage products
- Support details:
 - -z/VM 6.3 with APAR VM65419 Available
 - Part of RSU 1501





Allows new workloads and additional workload consolidation to be more cost effective

Note: All PVU Entitlement examples based on zEC12 (120 PVU per IFL) - will look proportionally the same on zBC12 (100 PVU per IFL)



January 14, 2015 Announcements



Expanding the Horizon of Virtualization

- Release for Announcement The IBM z13TM
 - -January 14, 2015
 - -Announcement Link
- z/VM Compatibility Support

 PTFs available February 13, 2015
 Also includes Crypto enhanced domain support
 z/VM 6.2 and z/VM 6.3
 No z/VM 5.4 support



- Enhancements and Exploitation Support only on z/VM 6.3
 - IBM z13 Simultaneous Multithreading
 - -Increased Processor Scalability
 - -Multi-VSwitch Link Aggregation Support (Link Aggregation with Shared OSAs)
- Performance Report at http://www.vm.ibm.com/perf/reports/zvm/html/



z/VM Support for Crypto Express5S

- z/VM supports the z13 and Crypto Express5S feature
 - $-\,z/VM$ 6.2 and z/VM 6.3 only
 - APAR VM65577
- Expanded domain selection for dedicated domains
 - z/VM supports architected limits for CryptoExpress domains
 - CryptoExpress5S supports 85 domains per feature, with a maximum of 16 features
- Selection of APVIRT domains in System Configuration
 - Avoid collisions when reassigning domains in user directory
 - Minimize need for LPAR restart





Session Pointer

The Value of z Systems Virtualization Security

Thursday 16:15 Room 116



Simultaneous Multithreading (SMT)

- Objective is to improve capacity, not performance.
- Allows z/VM to dispatch work on up to two threads of a z13 IFL
- VM65586 for z/VM 6.3 only
 PTFs available March 13, 2015
- At least z13 millicode bundle 11
- Transparent to virtual machine

 Guest does not need to be SMT aware
 SMT is not virtualized to the guest
- z13 SMT support limited to IFLs and zIIPs -z/VM support is only for IFLs
- SMT is disabled by default
 - Requires a System Configuration setting and re-IPL
 - -When enabled, applies to the entire system
- Potential to increase the overall capacity of the system —Workload dependent



Which approach is designed for the higher volume of traffic? Which road is faster?

*Illustrative numbers only

SMT Usage

- Physical IFL Cores with SMT allow up to two threads to be used. You purchase these.
- Logical IFL Cores are presented to z/VM as in the past. You define these in the logical partition definition on HMC.
- z/VM creates a CPU or logical processor associated with each thread for it to use. Reflected in commands like QUERY PROCESSORS.
- The virtual CPUs of guests can then be dispatched on different threads intelligently, based on topology information.





SMT Usage – Mixed Engine Environment

- In a mixed-engine environment, general purpose processors cannot do threading, but a second CPU address is consumed (CPU 1 in example).
- Virtual IFL CPUs would get dispatched to the logical IFLs and virtual CP CPUs would get dispatched on the logical CPs





Session Pointer

How Do You Spell SMT on z/VM? Thursday 16:15 in Room 120 A Look at z/VM Performance with SMT Saturday 10:00 in Multipurpose Room A



Increased CPU Scalability

- Various improvements to allow z/VM systems to be larger in terms of processors and more efficient, improving the n-way curve
- APARs VM65586 & VM65696 for z/VM 6.3 only – PTFs available March 13, 2015
- For z13
 - -With SMT disabled, increases logical processors supported from 32 to 64
 - -With SMT enabled, the limit is 32 cores (64 threads)
- For processors prior to z13
 - -Limit remains at 32 cores
 - -May still benefit from improved n-way curves



Areas Improved with Scalability Enhancements

- z/VM Scheduler Lock
 - -Management of internal stacked work
 - -Guests going into a wait state
- Locking for Memory Management
 - -Most benefit during system initialization and when very constrained with memory
- Serialization and processing of VDisk I/Os
- Batching and processor-local queues for VSWITCH buffers



Multi-VSwitch Link Aggregation

- Link Aggregation is ability to combine or aggregate up to 8 OSAs to increase the bandwidth available to a VSwitch
- This enhancement makes it possible to do Link Aggregation with VSwitches with shared OSAs rather than previous the requirement for dedicated OSAs
- Allows a port group of OSA-Express features to span VSwitches within a single or multiple z/VM systems.
 - Cannot be shared with non-z/VM logical partitions
- APARs VM65583 (CP), PI21053 (TCP/IP), VM65528 (Performance Toolkit), and VM65670 (SMAPI) for z/VM 6.3 only – PTFs planned to be available June 26, 2015
- Available only on the z13
 - Requires OSA enhancements introduced with the z13
- Allows better consolidation and availability while improving TCO



Multi-VSwitch LAG Configuration





September 2015 Updates



Securing the Path to Virtualization

- Updates to RACF for z/VM V6.3 APAR VM65719
 - PTFs available 14 September, 2015
 - -Security enhancements include:
 - Password Encryption upgrade
 - Helpdesk support
 - Special character support
 - Minimum password change intervals



- Updates to the z/VM TLS/SSL Server APARs PI40702, VM65717, VM65718
 - -PTFs available 14 September, 2015
 - -Maintains FIPS 140-2 and NIST SP 800-131a compliance
 - -Function includes:
 - System SSL V2.1 Equivalency (V6.3 only)
 - AES Galois/Counter Mode Encryption (V6.3 only)
 - Changes to default cipher suites and protocols (all releases)
- More information at <u>http://www.vm.ibm.com/security/</u>

RACF Password Encryption Upgrade

- Enables of a stronger encryption mechanism of passwords and/or passphrases in a RACF database
 - Matches support delivered by z/OS APAR OA43999
 - Strengthen RACF database against offline attacks
 - -Mitigate compliance issues of older encryption algorithms
- Migration to KDFAES is for an entire RACF database
 - -May cause problems if sharing this RACF database with another system!
 - -Utilities available to convert databases and clean password histories
- Some restrictions may apply
 - Support is for z/VM 6.3 only
 - -RACF template has been updated; run RACFCONV accordingly
 - -CPACF (Feature 3863) must be enabled



SMT Prorated Core Time Support

- APAR VM65680 available for z/VM 6.3 on September 2, 2015
- Applies only to z/VM systems where SMT has been enabled
- This support enforces capacity limits using core time rather than thread time so that a CPU Pool will not be limited prematurely.
- Following interfaces have been updated:
 - Commands: DEFINE CPUPOOL, QUERY CPUPOOL, SET CPUPOOL, SET SHARE
 - -Accounting records
 - -Monitor records
 - -Store hypervisor information (STHYI) instruction
- Also resolves SRN005 Abends in previous APAR VM 65613
- CPU Pooling and ILMT can now be used without the need to potentially adjust the pool values to be equivalent to non-SMT environment.
- Use QUERY CPUPOOL to determine if APAR is applied (shows core instead of cpu)



February & March 2016 Updates

Dynamically Migrate the SSI PDR Volume

- Enhancement to be able to relocate the Single System Image (SSI) Persistent Data Record (PDR) volume without a planned outage
- Avoid the need for a cluster-wide shutdown in order to move PDR volume to a new device or new storage server
 - -Facilitates moving to a new storage server
 - Does not addressed unplanned outage of the PDR volume
- New option on the CP **SET SSI** command
- VM65712 Closed February 5, 2016, PTF UM34736 – z/VM 6.3 Only



SIMD Guest Exploitation Support

- Allows guests with appropriate support to use the Vector Facility for z/Architecture, aka Single-Instruction Mulitple-Data (SIMD) functions introduced with the z13 servers.
 - -Access to 32, 128-bit registers.
 - -Potential performance improvements for exploiting software
- Supported by Live Guest Relocation
- VM65733 Closed February 19, 2016, PTF UM34752 – z/VM 6.3 Only
 - -Requires z13 or z13s and guest with support



OpenStack Enablement Changes

- Support of Liberty Release of OpenStack
- Integration of xCAT function into the z/VM Cloud Manager Appliance (CMA)
 - Running a fully functional z/VM OpenStack solution in a single virtual machine per z/VM system
 - -z/VM Cloud Manager Appliance 1.2.0
- Support for provisioning Red Hat RHEL 7 and SUSE SLES 12 servers
- Uses the following:
 - -OpenStack authentication (Keystone) V3 API.
 - RabbitMQ as the OpenStack message queue implementation.
 - -OpenStack Dashboard (Horizon) as the self service portal.
- Available March 24, 2016 via APAR VM65780



z/VM Cloud Management Appliance (CMA)





February 16, 2016 Announcement



Preview IBM z/VM 6.4

- Preview announcement 216-009, dated February 16, 2016
 <u>http://www.vm.ibm.com/zvm640/index.html</u>
- Planned availability date Fourth Quarter 2016
- A release born from customer feedback
- Key components:
 - Enhanced technology for improved scaling and total cost of ownership
 - Increased system programmer and management capabilities
- New Architecture Level Set (ALS) of z196 and higher




Improved Scalability and TCO

- z/VM Paging enhancements
 - -Use of HyperPAV when available to increase bandwidth for paging
 - -Increases number of paging I/Os that can be in-flight at once
 - Exploitation for Paging, Spooling, z/VM user directory, and minidisk pools that are mapped to z/VM data spaces.
- Guest large page support
 - -Enhanced DAT facility for guest use
 - -1 MB pages
 - Decreases memory needed for DAT structures by guest with Enhanced DAT support
 - -z/VM maps to 4KB pages at the host level.
- Guest Transactional Execution support
 - Potential efficiency and scaling improvements for guests and guest software that exploits
 - -Alternative for serializing a set of operations.



Improved Scalability and TCO

- Memory scalability improvements
 - Enhanced algorithms to further improve the efficiency of memory management
 - -Provide a foundation for future enhancements in scaling and efficiceny
- FlashSystems support for FCP-attached SCSI disks.
 - Removes requirement of a San Volume Controller (SVC) to use FlashSystems for z/VM system volumes and EDEVs

System Programmer & Management Capability

- QUERY SHUTDOWN command
 - -Allows better understanding of state of the system
 - -Allows for increased programmatical management of the system
- CP environment variables
 - New framework to allow information to be set and queried for automatic processing
 - Example: Indicate system is being started for Production or DR Test or Actual DR
- New management queries for SCSI environment.

 Allows SCSI detailed information to be gathered for emulated devices (EDEVs)

System Programmer & Management Capability

- CMS Pipelines enhancements
 - Pipelines is a powerful programming construct available in the CMS environment
 - -Objective is to make available, with the product, many of the advances made to Pipelines since it was last updated in the product
 - Allows use of various tools and programming without the need to download additional code
- DirMaint to RACF Connector
 - Modernizes the Connector with a collection of functional enhancements
 - -Brings processing in line with modern z/VM practices
 - -Allows better passing of directory information to RACF
 - Facilitates proper security policy in environment managed by IBM Wave for z/VM or OpenStack

System Programmer & Management Capability

Upgrade In Place migration enhancements

– Upgrade In Place migration was introduced in z/VM 6.3

- -Enhanced to allow migration to z/VM 6.4 from
 - z/VM 6.2 or z/VM 6.3 (but not both at same time in cluster)
 - Supports migration for clustered or non-clustered systems



Session Pointer

How CMS Changed My Life - Parts 1 & 2

Thursday 15:00 & 16:15 in Room 122



z/VM 6.4 Supported Hardware

- Following z Systems servers:
 - -z13
 - -z13s
 - -LinuxONE Emperor
 - -LinuxONE Rockhopper
 - -IBM zEnterprise EC12
 - –IBM zEnterprise BC12
 - -IBM zEnterprise 196
 - -IBM zEnterprise 114
- Electronic and DVD install –No tapes



Beyond the Hypervisor

IBM z Systems



What IBM Wave is NOT:

Not just for novice users

Not just a Graphical User Interface

Not a z/VM system programmer replacement

Not excluded by in-house scripts

Not just for 100s of servers

Not just a cloning tool





IBM Wave offers value in:

Advanced Visualization



- Shorten the learning curve needed to manage your Linux and z/V M environment
- Organize and simplify administration of virtual Linux servers;; automate and simplify management steps
- View servers and storage utilization graphically; view resource status at a glance
- Use graphical or tabular displays with layered drill down; customize and filter views
- Attach virtual notes to resources for additional policy-based management

Simplified Monitoring



- Monitor z/VM system status through an innovative and interactive UI
- Monitor performance of CPU, paging devices, spool disks and more;
- Use agentless and lightweight discovery for a current view of your environment
- Use advanced filters, tagging, layout and layer selection to manage in a meaningful way
- Complements IBM OMEGAMON[®] XE used for in-depth performance monitoring and historical views

Resource Management



- Manage your systems from a single workstation
- Assign and delegate administrative access using role based assignments
- Provision, clone, and activate virtual servers. Define and control virtual network and <u>storage devices</u>
- Perform complex tasks such as live guest relocation using a few keystrokes
- Execute complex scripts with a single mouse click
- Report on resources with flexible resource reporting

z/VM System Management – Related Products

■ Operations Manager for z/VM V1.5 → V1.6 just announced!!!

- 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 V1.3

- 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
 - IBM TS7700: needs firmware update available as code level 8.21.0.165 (EC: M13120 / PN: 2727271 & 2727272 (DVD1&2.))
 - Oracle StorageTek automated tape libraries (ATL) and virtual tape libraries (VTL) via either the STK VM Host Support
 Component or the STK VM Client
 - EMC Virtual Tape Libraries (VTL), such as the EMC DLm.

• 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

IBM Infrastructure Suite for z/VM and Linux 1.1.0

- Announced and Available
 - -Announced September 2, 2014
 - -Available September 5, 2014
 - -Announcement Letter ENUS214-350
- Includes following products:
 - -IBM Tivoli® OMEGAMON® XE on z/VM and Linux V4.3
 - –IBM Tivoli Storage Manager, part of IBM Spectrum Protect, Extended Edition V7.1
 - –IBM Operations Manager for z/VM V1.5
 - -IBM Backup and Restore Manager for z/VM V1.3
 - -IBM Wave for z/VM V1.2

IBM.

Session Pointer

Backup Strategies for z/VM Linux on z Systems and LinuxONE

Friday 16:15 in Room 120

Managing z/VM and Linux on z System Best Practices

Friday 11:30 in Room 120

Customer Experiences Managing the z/VM Linux on z Systems and LinuxONE

Thursday 13:45 in Room 120

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
 - 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.



Middleware Highlights

WebSphere Application Server Liberty Profile

For rapid development and light-weight production deployment with high scalability



- Web Profile certified (Liberty Core Edition)
- Small footprint (< 54MB), quick startup (< 3 sec)
- Developer-first design of simple, shareable XML configuration
- Dynamic runtime and configuration
- Unzip install and deploy
- Fidelity to WebSphere Application Server Full Profile
- Monitoring and mgmt through Admin Center or scripting
- Install new features from repository with no server restart
- Lightweight collective management scales to 10,000 servers
- Friendlier to a virtualized environment.



August 17, 2015 Announcements



IBM LinuxONE Portfolio [™]

FIL

Linux Your Way Linux without Limits Linux without Risk



- Announced: August 17, 2015
- General Availability: September 18, 2015
- An additional hypervisor for z Systems, joining z/VM & PR/SM
- Meant for customers with rich KVM skills on other platforms who want to leverage z Systems hardware and infrastructure.
- Not meant as a replacement for z/VM







KVM for IBM z Systems Requirements

KVM for IBM z v1.1.0 Pre-reqs				
Servers	IBM z13 [™] IBM zEnterprise [®] zEC12 IBM zEnterprise zBC12 IBM LinuxONE Rockhopper [™] IBM LinuxONE Emperor [™]			
Operating systems supported	SUSE Linux Enterprise Server (SLES 12 SP1)			
Networking features supported	IBM OSA-Express5S IBM OSA-Express4S IBM OSA-Express3S (zEC12 and zBC12 only) OSA-Express3S in KVM for IBM z does not support using VLANs or flat networks together with OpenvSwitch			
Storage devices are supported	ECKD [™] DASD: DS8000 [®] (FICON [®] -attached) FCP SCSI disks: XIV [®] Storwize [®] V7000 FlashSystems [™] SAN Volume Controller DS8000 (FCP-attached)			

Note: Refer to the KVM for IBM z Systems: Planning and Installation Guide (SC27-8236) for the most current information.



IBM LinuxONE Portfolio [™]

IBM LinuxONE Rockhopper ™



IBM LinuxONE EmperorTM



The most trusted, efficient and performant Linux platform for emerging high volume business critical applications

Positioning	An entry point into the LinuxONE Systems family offering all the same great capabilities, innovation and value of LinuxONE with the flexibility of a smaller package	The ultimate flexibility, scalability, performance and trust for business critical Linux applications. With a huge capacity range you can grow with virtually limitless scale to handles the most demanding workloads in a single system			
Hardware	Better environmentals, lowest cost, less memory, fewer cores, no SMT	SMT, large memory, more cores, more I/O, enhanced crypto performance, more Logical Partitions, zAware			
Cores	2 to 13 LinuxONE Cores	6 to 141 LinuxONE Cores Up to 10 TB			
Hypervisor	z/VM and/or KVM for IBM z				



Linux Your Way – Pricing Your Way

Pay-for-Use IBM Hardware AND Software

- Fixed monthly payments
- Costs can scale up or down based on usage
- "Use" in terms of cores on machine, not usage in terms of core time consumed.

Per-Core Pricing Model on IBM Software stack for Linux

- Software licenses only on designated core
- Order what you need, when you need it
- Decrease licenses with 30 days notice
- Cancellation with 30 days notice
- Rental model with No up front payment required
 - 36 month term: title remains with IBM
 - Choice at contract end return, buy, replace
 - Right to return hardware after only 1 year
- Note: Clients must run ILMT to produce reports for SW compliance



IBM





Hardware Support



Support for IBM z13

- Updates for z/VM 6.2 and 6.3
 - -http://www.vm.ibm.com/service/vmreqz13.html
 - -Many components affected
 - Note: Directory space requirements increased slightly.
- No z/VM 5.4 Support
- No z/VM 6.1 Support even if you have extended support contract.
- PSP Bucket
 - Upgrade 2964DEVICE
 - Subset 2964/ZVM
- If running Linux, please also check for required updates prior to migration.





Tested Linux Platforms

http://www.ibm.com/systems/z/os/linux/resources/testedplatforms.html

Distribution	LinuxONE Emperor					
Distribution	LinuxONE Rockhopper					
	z13s and z13	zEnterprise - zBC12 and zEC12	zEnterprise - z114 and z196	System z10 and System z9		
RHEL 7	(1)	(3)	v (3)	×		
RHEL 6	(1)	(4)	 Image: A set of the set of the	~		
RHEL 5	(1)	(5)	¥	~		
RHEL 4 (*)	×	×	(8)	~		
SLES 12	(2)	 Image: A second s	 Image: A set of the set of the	×		
SLES 11	(2)	(6)	¥	~		
SLES 10 (*)	×	(7)	¥	~		
SLES 9 (*)	×	×	(9)	~		



z/VM z13 GA2 / z13s Support



- z/VM 6.2 and 6.3 will be supported on z13 (Driver 27) and z13s. No specific PTFs beyond GA1 support are required for z/VM 6.2
- GA1 PTFs are required to be applied before applying GA2 Support
- z/VM support includes:
 - Support for the Mid-Range machine (6.2 and 6.3)
 - Guest Exploitation Support for GA2 Crypto (6.2 and 6.3)
 - Guest Exploitation for the GA1 Vector Facility (SIMD) (Improved performance for analytics) (6.3)
 - LPAR Group Absolute Capacity Capping
 - Set an absolute capacity cap by CPU type on a group of LPARs
 - Allows each of the partitions to consume capacity up to their individual limits as long as the group's aggregate consumption does not exceed the group absolute capacity limit
 - Includes updated SysEvent QVS support (used by vendors who implement SW pricing)
 - Guest Exploitation of SMC-D; Virtual PCI Devices type ISM (6.3)
 - Dynamic Memory Management (6.3)
 - Improves efficiencies when a dynamic memory upgrade uses only a portion of the reserved main storage for the partition; initialize and clear just the amount of storage requested





z/VM z13 GA2 / z13s Support

- z/VM 6.3 GA2 APARs (February 2016):
 - VM65716: CP Support
 - VM65698: Performance Toolkit support
 - VM65729: VMHCD support
 - VM64844: VMHCM support
 - VM65704: EREP support
 - VM65736: IOCP support
 - HLASM does not require an APAR for support
- Additional z/VM 6.3 GA1 Support
 - VM65680: SMT-2 Prorated Core Time Support (September 2015)
 - VM67533: Vector Facility (SIMD) support (March 2016)
- Updates will be available on the z/VM web page at announce: <u>http://www.ibm.com/vm</u>
- Hardware PSP bucket z/VM subset should also be reviewed
 - Upgrade 2965DEVICE
 - Subset 2965/ZVM

Statements of Direction July 23, 2013 January 14, 2015 February 16, 2015

- Subset of IBM Statements of General Direction that are most important to the z/VM environment. See announcement materials for additional statements.
- Subject to change or withdrawal without notice, representing IBM goals and objectives only.



Completed Statements of Direction

Statement of Direction	From Announce Letter
z/VM Support for Single Instruction Multiple Data (SIMD)	January 2015
Enhanced RACF [®] password encryption algorithm for z/VM	January 2015
KVM Offering for z Systems	January 2015
GDPS/PPRC Multiplatform Resiliency Capability	January 2015
Security Evaluation of z/VM 6.3	July 2013
FIPS 140-2 Validation of z/VM 6.3	July 2013
Support of 10 GbE RoCE Express Feature	July 2013
Support of zEDC Express Feature	July 2013
Stabilization of z/VM 5.4 Support	July 2013

- Requires support from hardware and/or guests operating systems as appropriate
- Refer to <u>www.vm.ibm.com</u> or <u>www.vm.ibm.com/security</u> for more information



Withdrawal of Support for Expanded Storage July 23, 2013

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.

Look for update with z/VM 6.4.



Removal of Support for Expanded Storage January 14, 2015

z/VM V6.3 is the last z/VM release that will support Expanded Storage (XSTORE) for either host or guest usage. The IBM z13 server family will be the last z Systems server to support Expanded Storage (XSTORE).

- The previous SoD spoke of removal of paging to expanded storage, but there is more.
- All z/VM support for expanded storage will be removed in future release
 - Attaching to guests
 - Minidisk Cache
 - Paging
 - etc.
- This SoD also goes on to speak to hardware support being removed as well, after the z13 server family.

Look for update with z/VM 6.4.



Removal of ESA/390 Architecture Mode January 14, 2015

The IBM z13 will be the last z Systems server to support running an operating system in ESA/390 architecture mode; all future systems will only support operating systems running in z/Architecture mode. This applies to operating systems running native on PR/SM as well as operating systems running as second level guests. IBM operating systems that run in ESA/390 mode are either no longer in service or only currently available with extended service contracts, and they will not be usable on systems beyond IBM z13. However, all 24-bit and 31-bit problem-state application programs originally written to run on the ESA/390 architecture will be unaffected by this change.

- While a hardware statement, there are potentially changes required for z/VM.
- Note implication of older operating systems.



Stabilization of z/VM 6.2 Support

January 14, 2015

The IBM z13 server family is planned to be the last z Systems server supported by z/VM V6.2 and the last z systems server that will be supported where z/VM V6.2 is running as a guest (second level). This is in conjunction with the statement of direction that the IBM z13 server family will be the last to support ESA/390 architecture mode, which z/VM V6.2 requires. z/VM V6.2 will continue to be supported until December 31, 2016, as announced in Withdrawal Announcement <u>914-012</u>, dated February 04, 2014.

- While z/VM 6.2 will be supported until the end of 2016, there will **not** be support for the next server family.
- Similar to the statement of direction with z/VM 5.4 not supported on z13.



Product Delivery of z/VM on DVD/Electronic Only January 14, 2015

Product Delivery of z/VM on DVD/Electronic only: z/VM V6.3 will be the last release of z/VM that will be available on tape. Subsequent releases will be available on DVD or electronically.

- No more tapes for z/VM product delivery for future z/VM releases.
- Allows testing resources to be spent else where.





Dynamically Managed Thread Activation Levels February 16, 2016

Dynamically managed thread activation levels. IBM intends to provide support in a future z/VM deliverable that will allow clients to dynamically manage the number of activated threads per configured core that can be enabled for simultaneous multithreading (SMT) without requiring an IPL of the z/VM system.

• Effectively, switch between 1 or 2 threads per IFL core via command



Stabilization of z/VM Support for the z10 Server Family February 16, 2016

Stabilization of z/VM support for the IBM System z10 server family. z/VM V6.3 is the last z/VM release planned to support the IBM System z10 server family of servers. Either an IBM zEnterprise 196 (z196) or an IBM zEnterprise 114 (z114) is the required minimum level of server for z/VM V6.4.

• New Architecture Level Set (ALS) for z/VM 6.4 of z196 and higher.


Summary

IBM z Systems

IBM.



Leadership

z/VM continues to provide additional value to the platform as the strategic virtualization solution for z Systems. Virtual Switch technology in z/VM is industry leading.



Innovation

z/VM 6.3 added HiperDispatch, allowing greater efficiencies to be realized. Adding SMT with topology awareness raises the bar again.



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. This year we continue to extend the limits with processor scalability improvements.



Backup Slides

Enhanced RACF Password Encryption Algorithm for z/VM January 14, 2015

Enhanced RACF® password encryption algorithm for z/VM: In a future deliverable an enhanced RACF/VM password encryption algorithm is planned. This support will be designed to provide improved cryptographic strength using AES-based encryption in RACF/VM password algorithm processing. This planned design is intended to provide better protection for encrypted RACF password data in the event that a copy of RACF database becomes inadvertently accessible.

- z/OS support for this currently exists.
- Lack of this support in z/VM complicates sharing RACF databases with z/OS where the support is used.



GDPS/PPRC Multiplatform Resiliency Capability January 14, 2015

In the first half of 2015, IBM intends to deliver a **GDPS/Peer to Peer Remote Copy (GDPS/PPRC) multiplatform resiliency capability** for customers who do not run the z/OS operating system in their environment. This solution is intended to provide IBM z Systems customers who run z/VM and their associated guests, for instance, Linux on z Systems, with similar high availability and disaster recovery benefits to those who run on z/OS. This solution will be applicable for any IBM z Systems announced after and including the zBC12 and zEC12.

• Lower the skill expense of running a GDPS environment, particularly for those customers with little, or no, z/OS background.





KVM offering for IBM z Systems January 14, 2015

In addition to the continued investment in z/VM, IBM intends to support a Kernel-based Virtual Machine (KVM) offering for z Systems that will host Linux on z Systems guest virtual machines.

The KVM offering will be software that can be installed on z Systems processors like an operating system and can co-exist with z/VM virtualization environments, z/OS, Linux on z Systems, z/VSE, and z/TPF.

The KVM offering will be optimized for z Systems architecture and will provide standard Linux and KVM interfaces for operational control of the environment, as well as providing the required technical enablement for OpenStack for virtualization management, allowing enterprises to easily integrate Linux servers into their existing infrastructure and cloud offerings.

• An additional option for virtualization on z Systems.



• The IBM commitment to z/VM remains steadfast.



Security Evaluation of z/VM 6.3 July 23, 2013

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+).

- Evaluation is with inclusion of RACF Security Server and Single System Image priced features enabled.
 - Evaluated configuration supports clusters of 1-n z/VM systems.
 - -No claims made about standalone systems, or systems without RACF for VM.
- See <u>http://www.vm.ibm.com/security/</u> for current z/VM Security information.





FIPS Certification of z/VM 6.3 July 23, 2013

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 <u>http://www.vm.ibm.com/security/</u> for current z/VM Security information.



*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 July 23, 2013

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 July 23, 2013

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 July 23, 2013

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, 2016, or until the IBM System z9[®] 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 for z/VM 5.4, 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 hardy Satisfied the same time.

z/VM Support for Single Instruction Multiple Data (SIMD) January 14, 2015

In a future deliverable IBM intends to deliver support to enable z/VM guests to exploit the Vector Facility for z/Architecture (SIMD).

- The Single Instruction Multiple Data (SIMD) was introduced as part of the z13, allowing use of the new Vector Facility.
- The initial z/VM support for z13 does not contain the virtualization of SIMD, which would allow guests to exploit it and gain potential performance benefits.

