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z/VM Platform Update
&
Linux and VM Program Opening

Rick Barlow - Nationwide Insurance

Richard Lewis - IBM

Bill Bitner - IBM

March 10, 2014

Session 14562

SHARE in Anaheim

Agenda

- Welcome!
- SHARE LVM Program Overview and Information
- Survey
- z/VM Platform Update

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Welcome to SHARE: Introduction to Linux and VM Program

Rick Barlow
Nationwide Insurance

SHARE in Anaheim

LVM Opening Agenda

- What is LVM?
- Information
  - SHARE – “It’s what we do”
  - LVM organization - what are the projects and brief description
  - LVM team; IBM reps & Special guests
- How to connect - Look for bears and penguins
- This week…
  - Highlights and Grid
  - Program Dinner announcement
- Evaluations Please!

Welcome to SHARE
"It's what we do!"

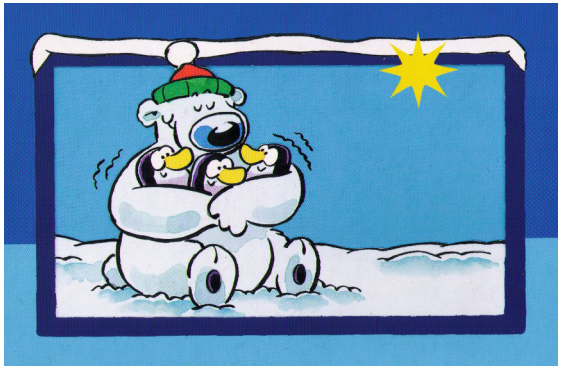
- A volunteer, customer run organization.
- Dedicated to providing top-tier education on IBM and related technologies
- Networking with peers, sharing information and experience
- Industry influence – direct contact with IBM, vendors
- Trade Show – SHARE Technology Exchange (STE) – the latest in commercial offerings

Linux and VM Program (LVM)

More information:

http://tinyurl.com/SHARE-LVM-info

- Dedicated to supporting and promoting the two best operating systems in the known universe
- Provide quality education on both environments, plus the power of combining them.
- Forum for expressing concerns, problems, opinions on future of Linux, VM and System z.
- Find support and help from fellow sysprogs and admins.



Understanding the “Program”

- SHARE programs consist of “projects” dedicated to specific subjects or issues
- LVM Program has three projects:
  - Linux Project
  - VM Project
  - Virtualization Project
  - Linux and VM Technical Steering Committee

LVM TSC

- Technical Steering Committee
- Small group representing SHARE LVM community
- Membership by individual, not company
- Works year round with IBM under CDA
  - Face-to-face meetings at SHARE Conferences
- Reviews, understands, and assesses certain IBM directions related to Linux and Virtualization
- Provides early feedback and guidance to IBM

Its all about the Volunteers!

All of our Speakers and Session Chairpersons!

- Project Managers:
  - Linux: Mark Post (SUSE)
  - VM: Dan Martin (Rocket)
  - TSC Chair: Marcy Cortes (Wells Fargo)
- Deputies:
  - Neale Ferguson (SineNomine)
  - Openings available
- Scheduler:
  - Rich Smrcina (Velocity)
- Chair Wrangler:
  - Brian Jagos (CA)
- Program Dinner Host:
  - Jim Moling (Dept. of Treasury)
  - Gail Riley (EMC)

Couldn't do this without them….

- IBM Representatives:
  - Richard Lewis
  - Alan Altmark
  - Bill Bitner
  - Jim Elliott
  - John Franciscovich
  - Romney White

- Special Guests
  - Steffen Thoss
    System z Linux and Virtualization Product Development Team (PDT) Leader
  - George Madl
    z/VM Product Development Manager

z/VM Product Dialogue & Feedback BoF

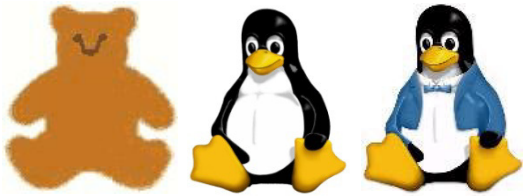
- Birds of Feather session with George and Steffen

- Thursday evening:
  - Location: To Be Announced
  - Time: To Be Announced

- A chance to hear from George and Steffen and provide feedback, verbal and written
  - Pick up a copy of the worksheet for written feedback

How to Connect

- Many ways to connect
  - Look for the Bears and Penguins



  - SHARE Linux and VM Program web page http://www.share.org/p/cm/ld/fid=44
  - SHARE Linux and VM Program community http://www.share.org/p/co/ly/gid=1832
    - Requires member login

Highlights for LVM in Anaheim

- Direct, “hands-on” experience
  - Traditional labs (Platinum Ballroom Salon 7)
    - 14551: Linux for Beginners Hands-on Lab (3 parts) Monday 9:30
    - 14601: z/VM Installation *or* Migration *or* Upgrade Migration Hands-on Lab (3 Parts) Tuesday 1:30
  - “BYOC” labs (Grand Ballroom Salon D)
    - 14579: Introduction to REXX Workshop (2 Parts) (BYOC) Tuesday 9:30
      - *For “BYOC” – make sure you have a TN3270 emulator installed and fully charge your laptop*

Highlights for LVM in Anaheim

- Customer experience sessions
  - SICOOB, ADP, Wells Fargo
  - Customer panels:
    - z/VM Single System Image and Live Guest Relocation Panel Discussion
      - *Wed at 9:30 in Platinum 5*
    - z/VM 6.3 Early Support Program and Early Adopter Experiences
      - *Thu at 9:30 in Platinum 6*
    - Experiences With Oracle on Linux on System z – Customer Panel
      - *Thu at 8:00 in Platinum 6*
    - Experiences With Linux and System z – Customer Panel
      - *Thu at 11:00 in Platinum 6*

- "Grids" – All of the LVM sessions and some other session of interest
  - **http://tinyurl.com/SHARE122lvm**
  - Cards available with QR code

Linux and VM Program Dinner
Eat, Drink and Be Merry

- Wednesday 7:00 – Location: TBD
  We will gather in a lobby for the trip (Dutch treat)
- Have dinner; unwind; meet other Linux and VM people
- See Jim Moling if you didn't already sign up

Evaluations are Important!
Tell us how we are doing…

- LVM planners really use information from evaluations to determine what to offer
  - Which sessions are in demand?
  - Which are not?
  - What is missing?
- SHARE uses evaluations to determine best session awards. All speakers are volunteers, so this is recognition is important.
- Evaluate sessions:
  - **SHARE.org/AnaheimEval**
  - **Online and via smart device**

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The Survey!

Richard Lewis
IBM
Official Statistician and Triviaologist

SHARE in Anaheim

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z/VM Platform Update

Bill Bitner
IBM
bitnerb@us.ibm.com

SHARE in Anaheim

Agenda

- Release Status and Information
- 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+[2] OSPP-LS
	Release 2	12/2011	**12/2016** [3]	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[1]	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.

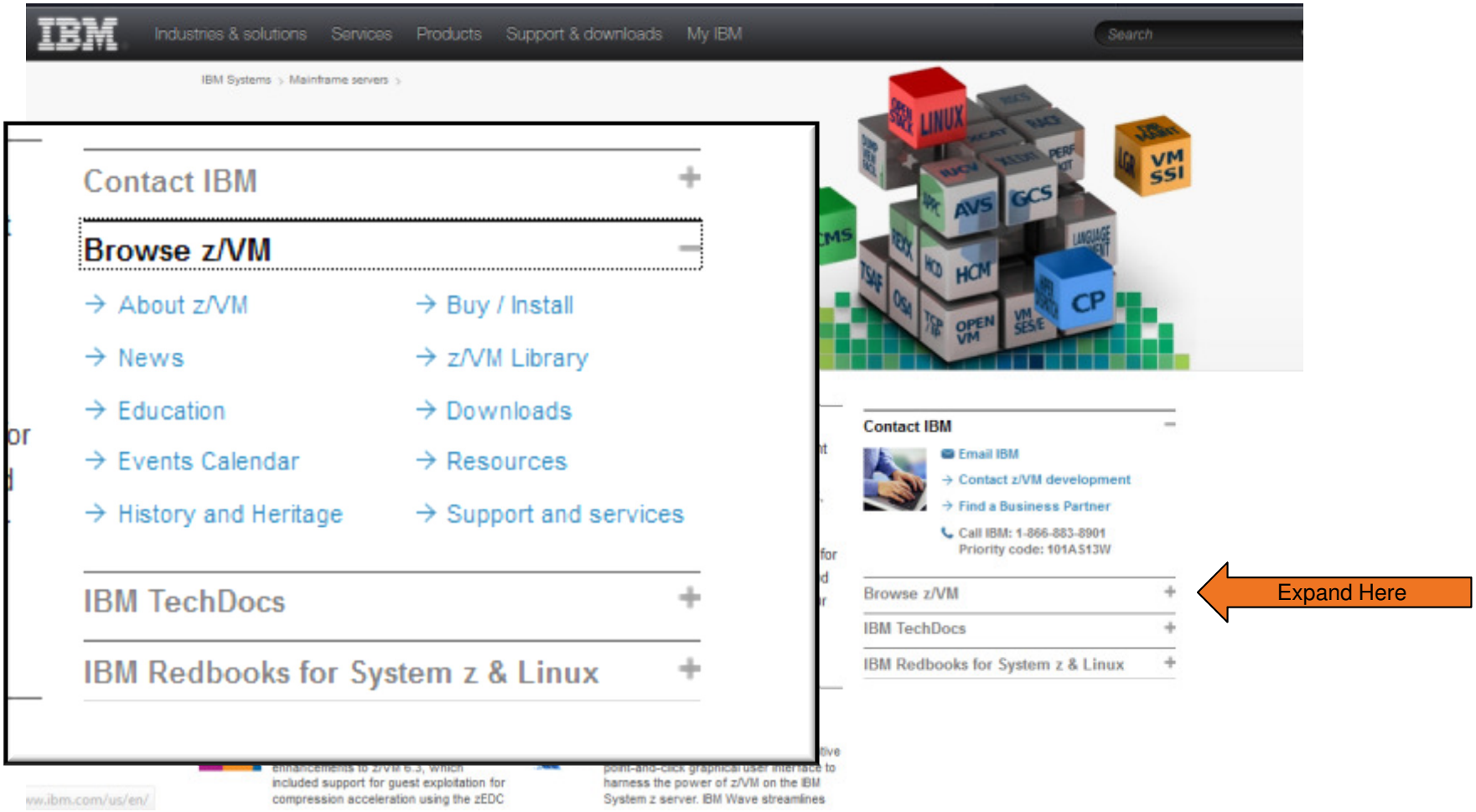
z/VM Version 5 Release 4

- The last release of z/VM to support IBM System z9® and older processors
  - **No longer available as of March 12, 2012**
  - Also supports the IBM zEnterprise® EC12 (zEC12) and IBM zEnterprise BC12 (zBC12)

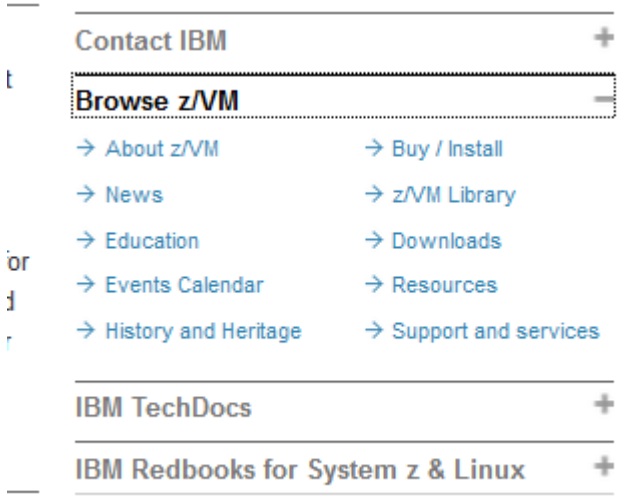
- End of Service was been extended to **December 31, 2014** or end of IBM service for System z9, whichever is ***later***
  - Statement of Direction 2013
    - The zEC12 and zBC12 will be the last processors to support z/VM V5.4

z/VM Home Page – New Look and Feel

z/VM Home Page – Navigation Bar



z/VM Home Page Navigation Bar



z/VM Related Events

http://www.vm.ibm.com/events

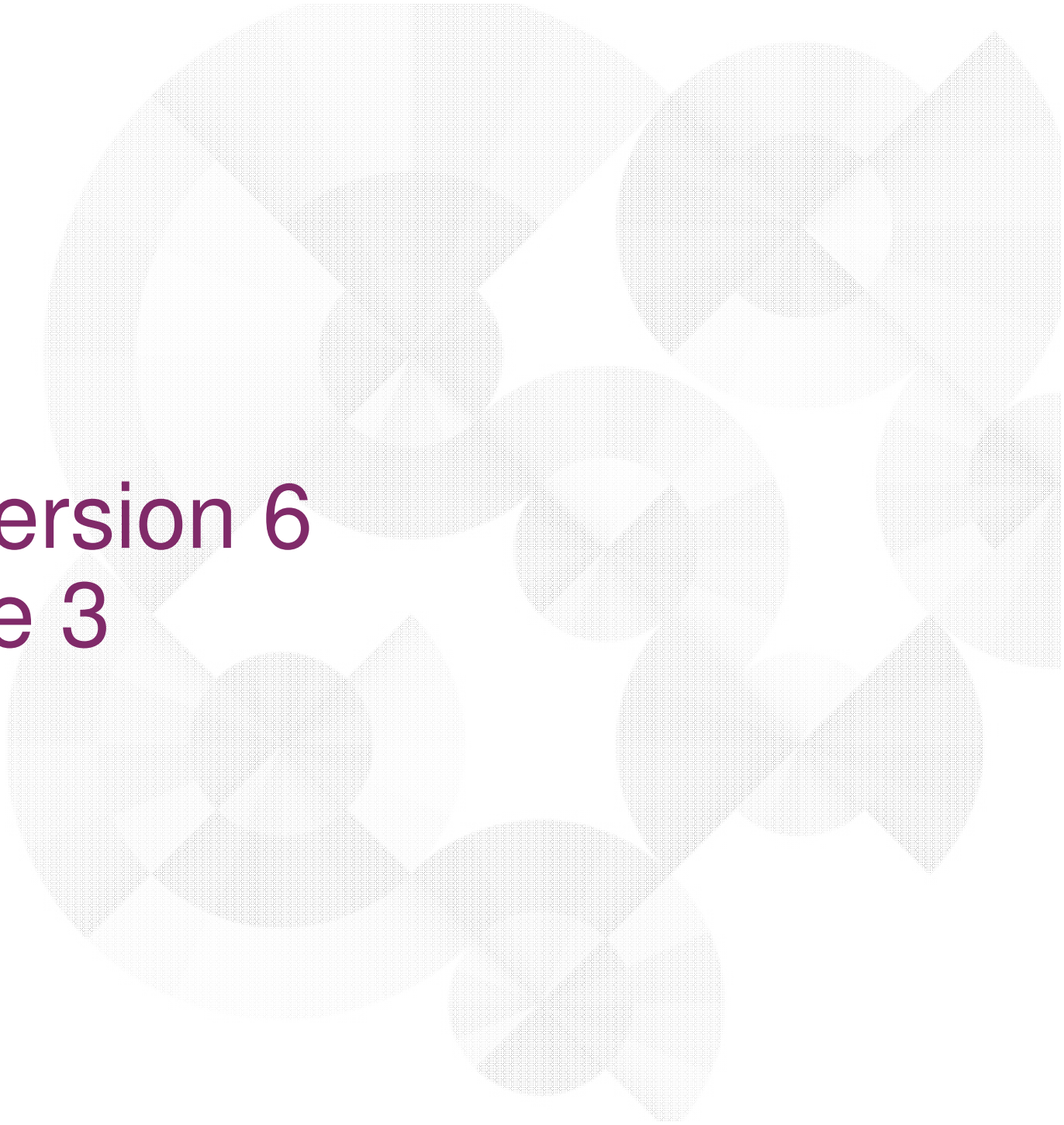
Southern California System z User Group Invitation

Pacific Life

700 Newport Center Drive

Newport Beach, CA 92660

Friday, March 28th, 2014 - 11:00 AM to 1:30 PM



z/VM Version 6 Release 3

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

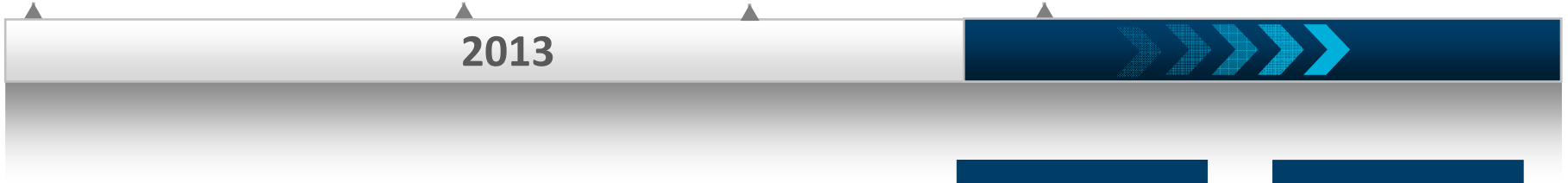
February 5
Preview announcement

July 23
Product announcement

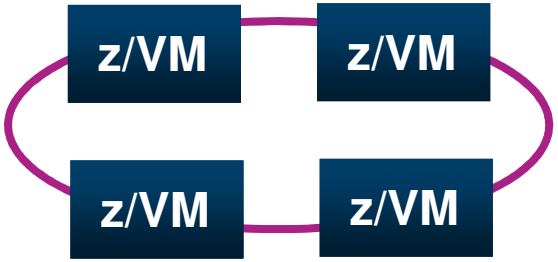
July 26
Product General Availability

Continued Evolution
- Improved TCO
- Scaling and efficiency improvements
- Ease of usability

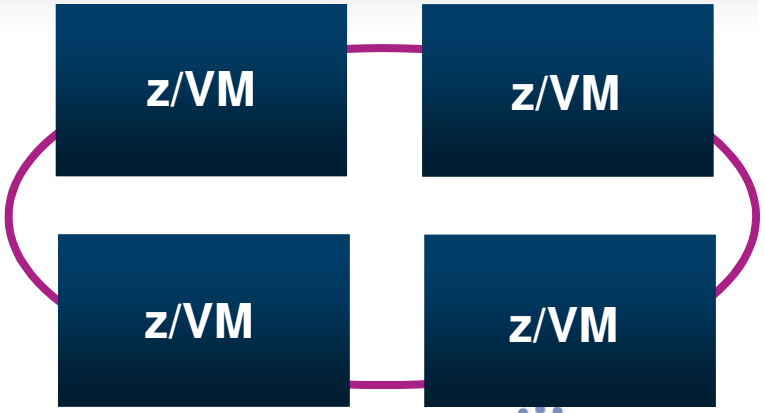
See http://www.vm.ibm.com/zvm630/



z/VM 6.1



z/VM 6.2



z/VM 6.3

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

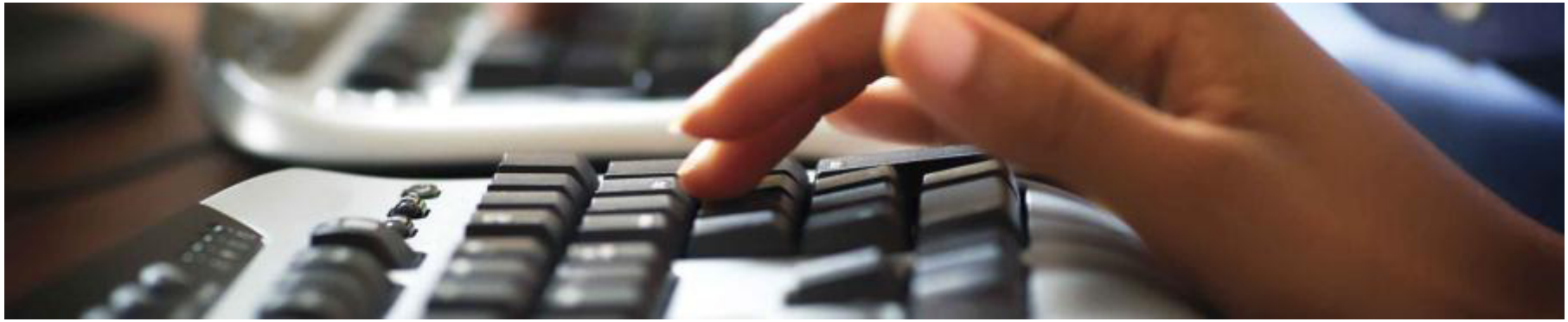
- Real memory limit raised from 256GB to **1 TB**
  - Proportionately increases total virtual memory based on tolerable over- commitment levels and workload dependencies
- Virtual machine memory limit remains unchanged at **1 TB**
- Paging DASD utilization and requirements change
  - Removed the need 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
  - No longer have a trade-off and need to determine whether to set Reorder On or Off
  - 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

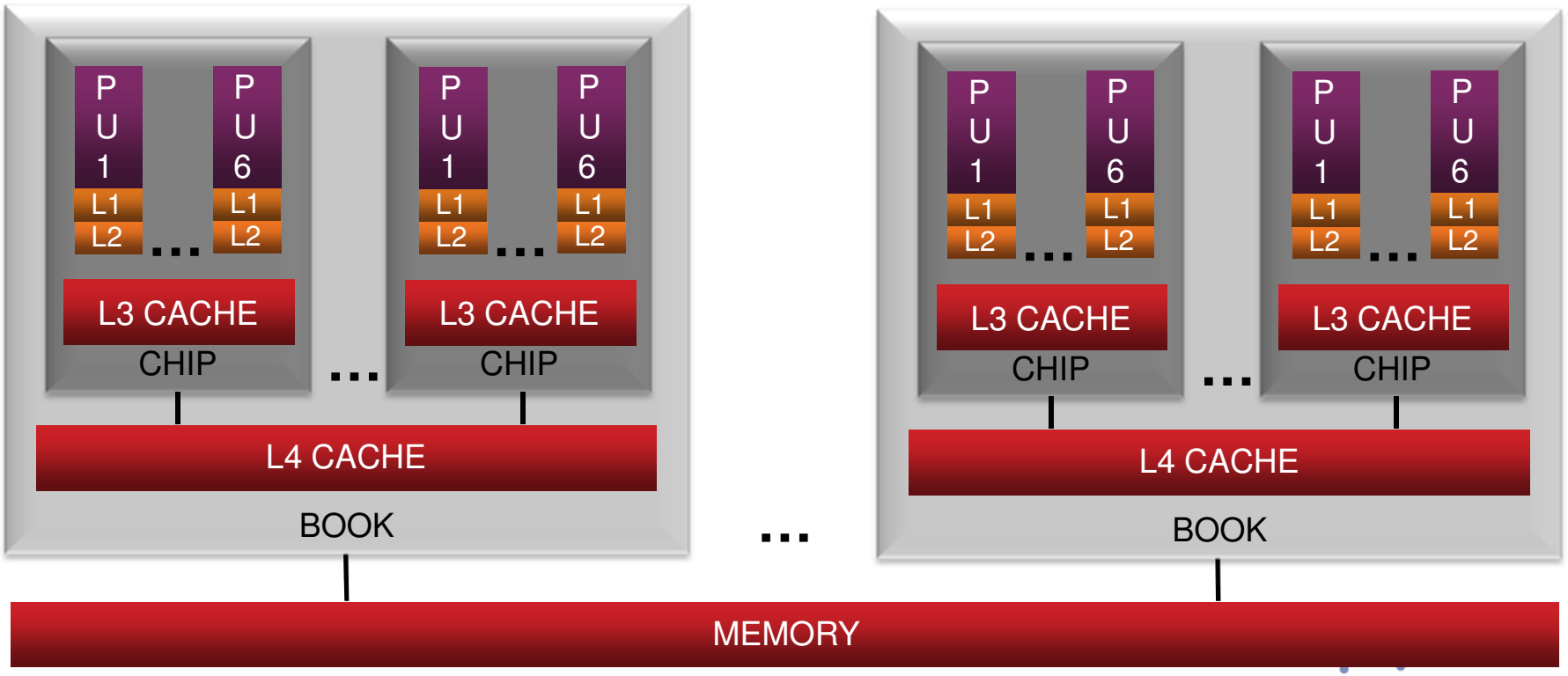
HiperDispatch

- 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

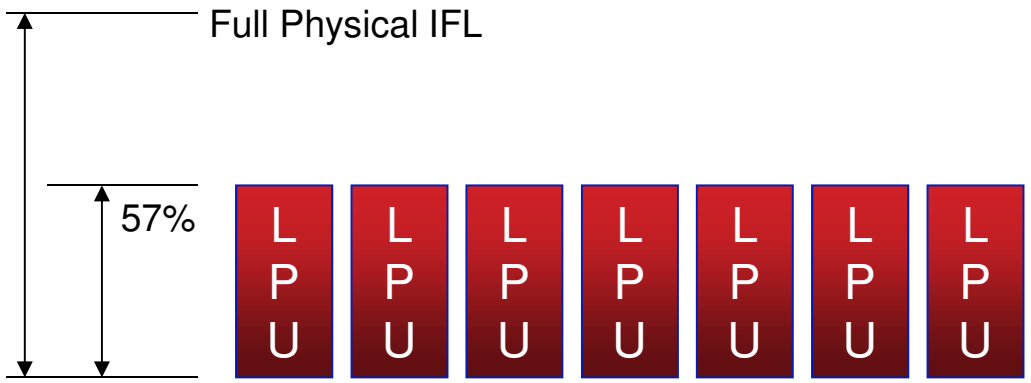
Example:

- 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)

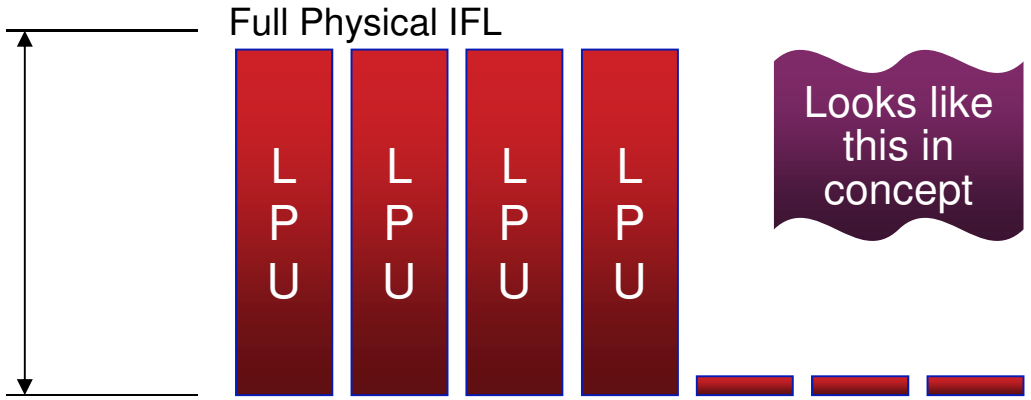
Horizontal vs. Vertical CPU Management

Example:
- 10 Physical IFLs
- 7 Logical IFLs in LPAR
- Weight/Entitlement of 40% (4 IFLs)

Horizontal:
- The logical processors are all 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[1]
z/VM 6.3 DS8K Synergy	Yes[1]	Yes[1]	Yes[1]
z/VM 6.3 SSI + LGR	No	No	Yes[1]

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

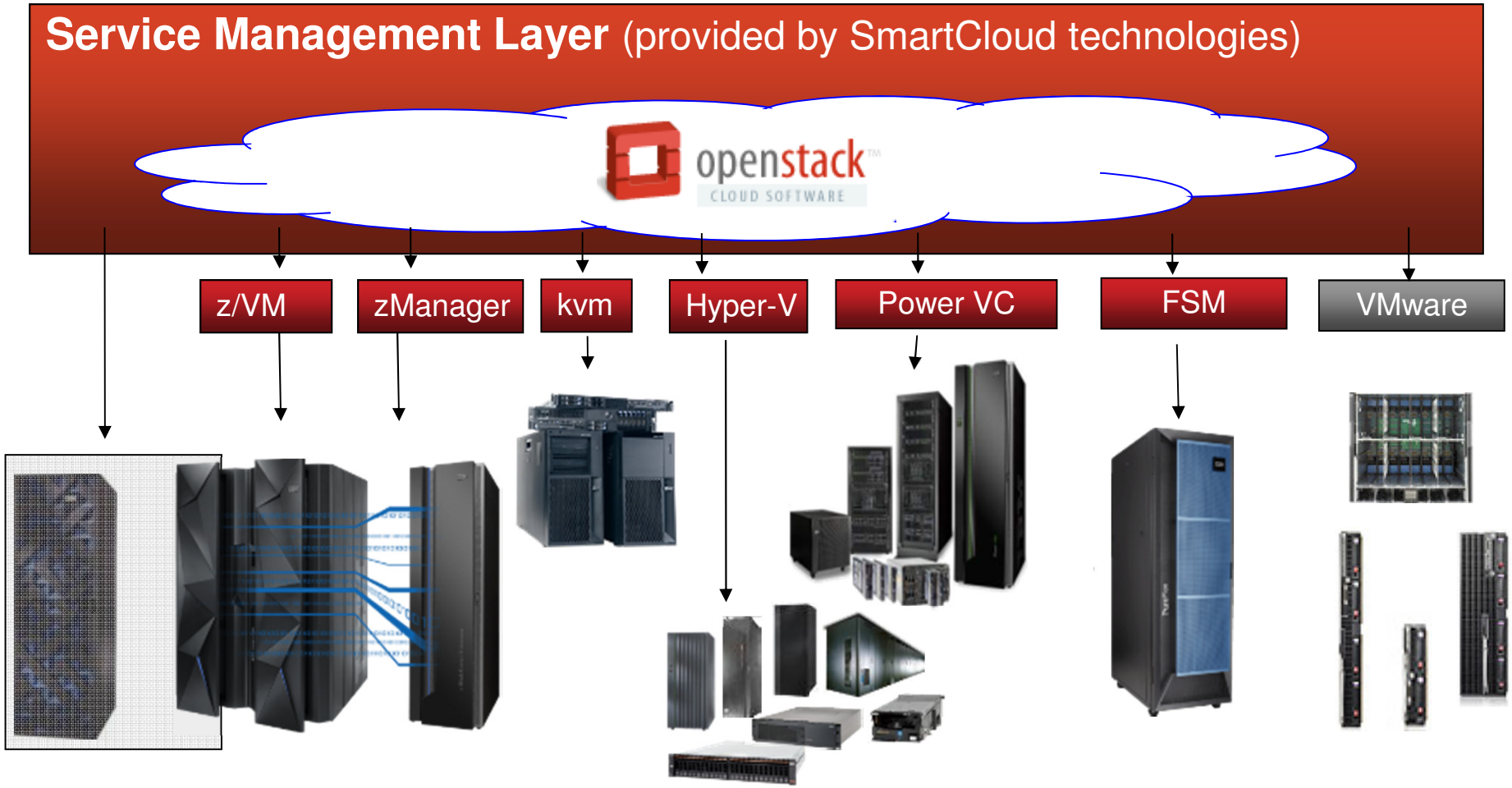
z/VM 6.3 Withdraws Cross System Extensions (CSE) Support

- 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.

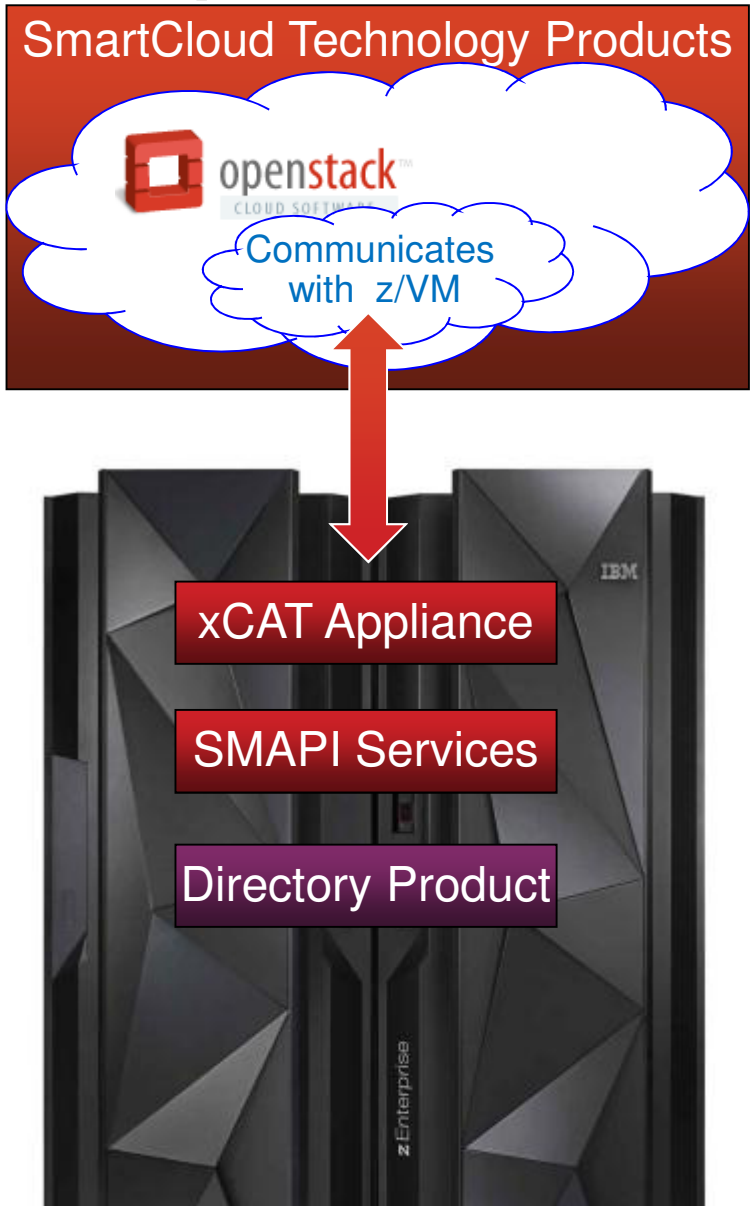
z/VM 6.3 Withdraws support for TCP/IP Devices and Daemons

- 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



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® and Linux® 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 28th, 2014

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

Supported z/VM versions/releases:

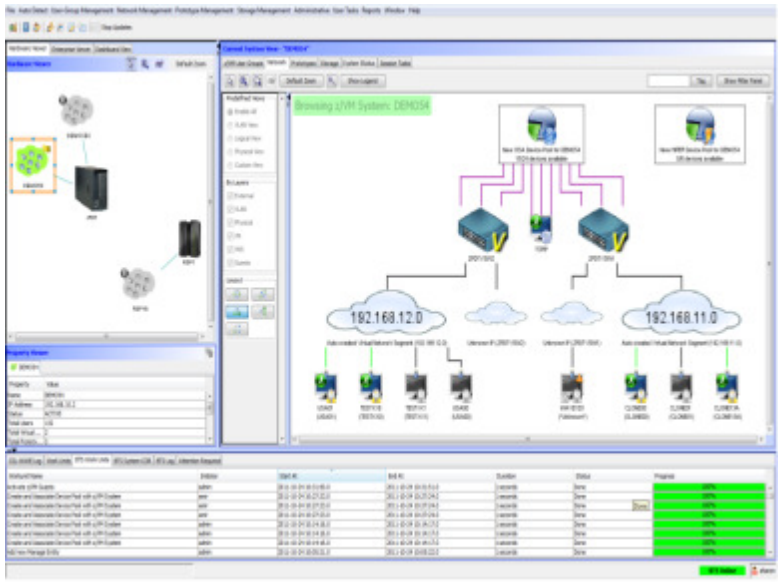
- z/VM 6.3
- z/VM 6.2
- z/VM 5.4

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

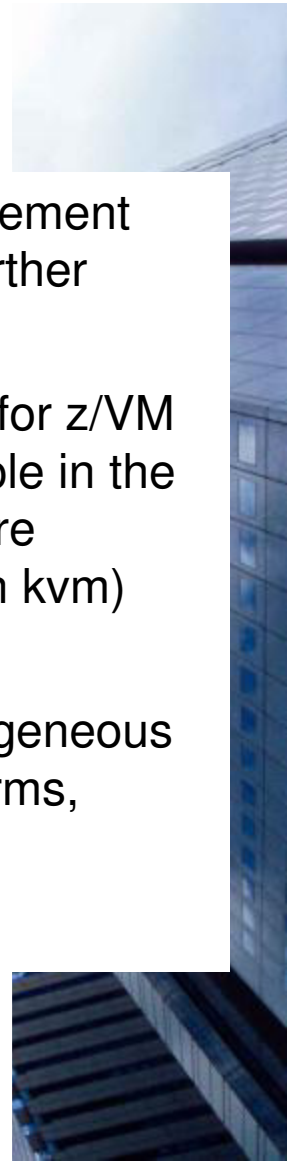
IBM Wave simplifies and helps automate management and administration of z/VM and Linux virtual servers, jumpstarting the steps needed to get to cloud. With its content rich interface IBM Wave extends the reach of your staff and lets you manage z/VM and Linux intuitively and cost effectively, reducing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

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.

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

New

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.

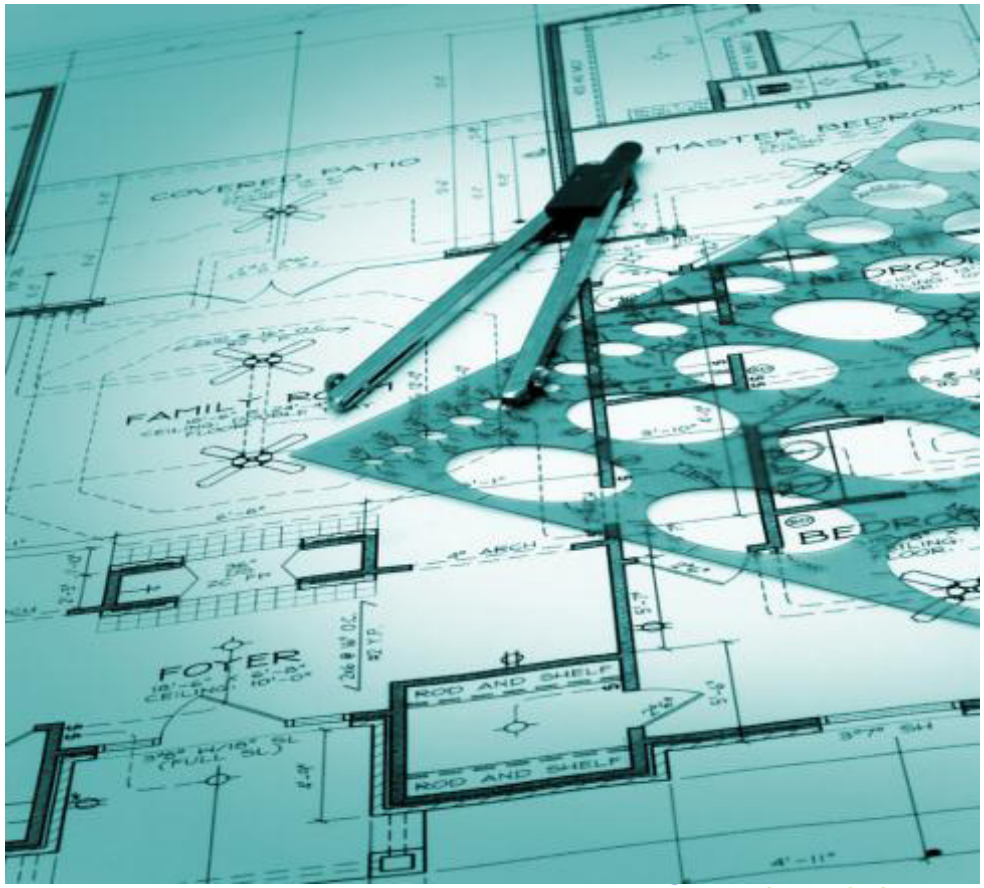
- The size of CMS component grew significantly as a result of including an appliance server for xCAT, LOHCOST, and Stand-alone dump
  - Two additional install volumes

- 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 grain 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 allow guest to capture execution environment
  - Configuration and Capacity information
  - Various Levels:
    - Machine, logical partition, hypervisor, virtual machine
- New problem statement 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 millicode (driver 15)
  - 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 millicode (driver 15)
  - 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

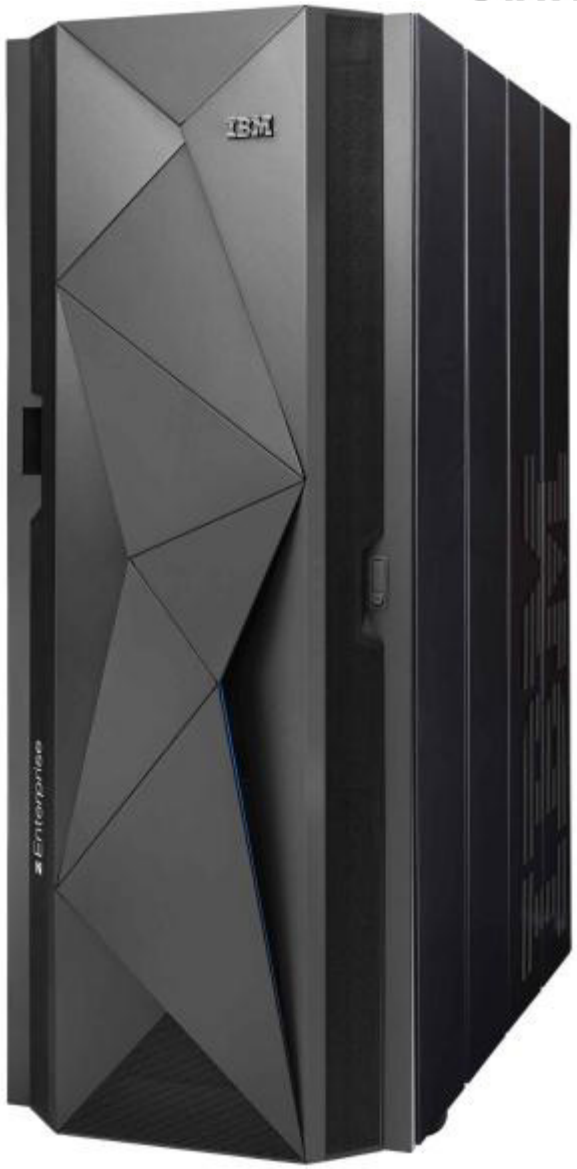
Hardware Support

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® Series (FCP or FICON®)
  - DS6000® Series (FICON)
  - XIV (FCP)
  - IBM San Volume Controller (FCP)
  - IBM Storwize® V7000 (FCP)
    - See **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® Interoperation Center (SSIC) support page:
  - **ibm.com**/systems/support/storage/ssic/interoperability.wss

Warning: Interoperation Center Support page is incorrect for z/VM 6.3!!

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

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.

*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® 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.

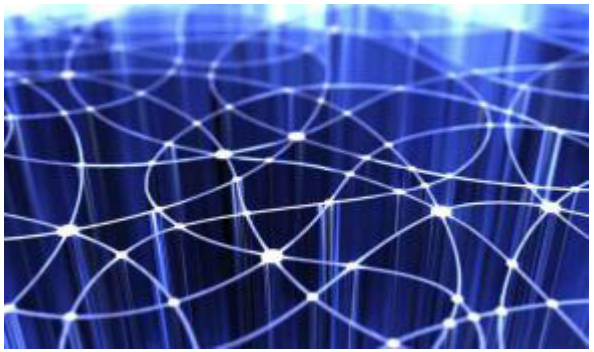
- While support will continue to the later date of December 31, 2014 or until the z9 processors are withdrawn from future, support for new function and processors is being stabilized.
- z/VM 5.4 will not be supported on processors after the zEC12 and zBC12.
  - This includes running as a guest of a supported 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

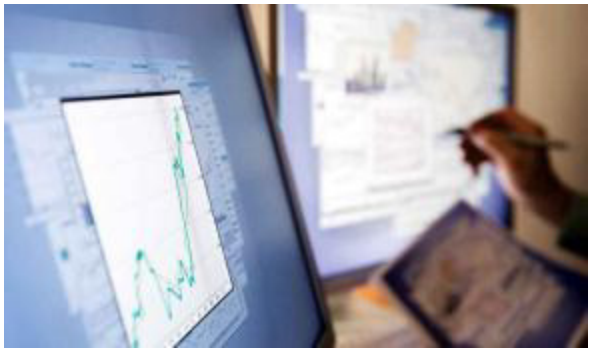
- In z/VM 6.3, it is recommended to configure all processor memory as central storage.
  - Support remains to use expanded storage in z/VM 6.3, but is suggested for use only in special cases.

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.

Have a great week!

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