



GSE: z/VSE and z/VM with Linux on System z

z/VM Update and Technology Outlook

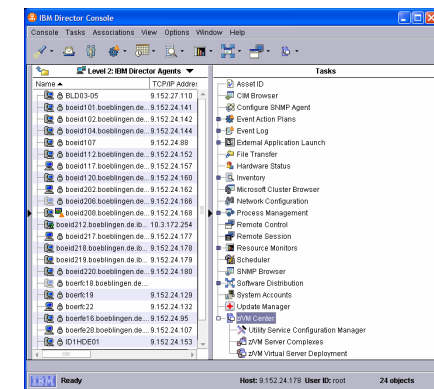
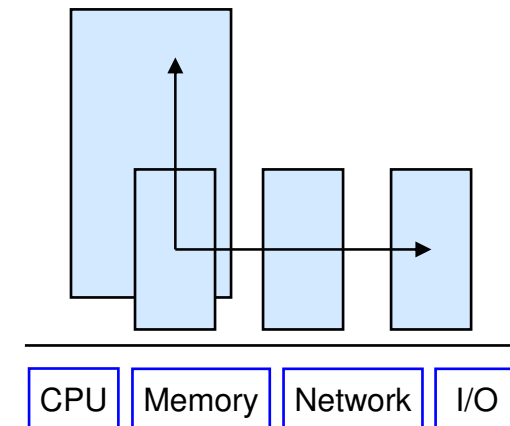
Session V14

Romney White

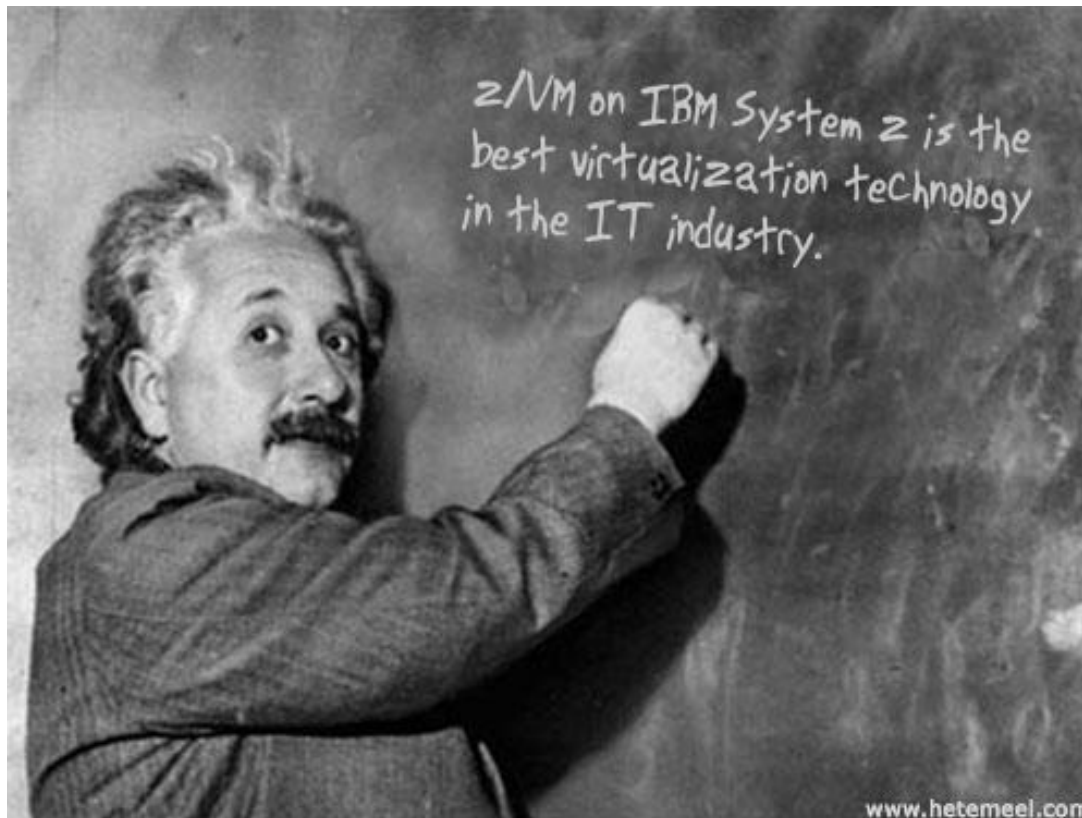
IBM Systems and Technology Group

Key z/VM V5.3 Business Value Propositions

- **Large, single-image, resource-balanced “Scale up” and “Scale out” support for hosting virtual server workloads**
 - Large real *memory* exploitation support (greater than 128 GB)
 - Single-image *CPU* support for 32 processors
 - Enhanced *networking* bandwidth and availability support with OSA-Express2 Link Aggregation
 - HyperPAV *I/O* support for IBM System Storage DS8000
 - Concurrent FlashCopy *I/O* support for one-to-many volumes
 - Enhanced *memory* management for Linux guests running on System z9 servers
- **Specialty processor support for z/OS guests**
 - Enhanced z/OS-on-z/VM development / test support
- **LDAP support for guest authentication**
 - Enhanced virtual server security infrastructure support
- **Staff productivity gains with IBM Director for Linux on System z and z/VM Integrated Systems Management**



This Just In... *z/VM Helps Clients Save Money, Take Control*



This Just In... *z/VM Helps Clients Save Money, Take Control*

IBM Case Study

Marist College educates the next generation of mainframe administrators with IBM System z, IBM z/VM and IBM System Storage



Marist installed their first IBM System z over six years ago—an IBM System z900 mainframe running IBM z/OS® and IBM z/VM. Pleased with the ongoing performance and benefits of System z, Marist recently decided to replace the z900 with a new IBM System z9® mainframe.

Virtualization on IBM System z mainframes

Not long ago, the popularity of personal computers and rack servers meant that



This Just In...

z/VM Helps Clients Save Money, Take Control

■ **The Analyst community speaks about System z Virtualization**

- Gartner Case Study: Nationwide Uses Linux and High-Power Virtualization
 - <http://mediaproducts.gartner.com/gc/reprints/ibm/external/volume2/article13/pdf/article13.pdf>
- WinterGreen Research: Mainframe as a Green Machine – and More
 - ftp://ftp.software.ibm.com/systems/z/pdf/Mainframe_vs._Distributed_2007_all.pdf
- Branham Group: Unleashing the Business Value of Today's Mainframe
 - ftp://ftp.software.ibm.com/systems/z/pdf/mainframe_business_value_102007.pdf
- Ian Bramley of Software Strategies: Mass Distributed Server Consolidation
 - Subtitle: “*System z Mainframe Linux-on-z/VM Extreme Virtualization far Outclasses Over-hyped x86/x64 Approaches*”
 - Find a copy at: www.vm.ibm.com/devpages/mullenra/IANBRAM.pdf

“Scale-out distributed servers are like the 'crack-cocaine of the IT systems business', highly addictive and extremely damaging.”

This Just In... *Bosses Everywhere Recognize the Importance of Virtualization*



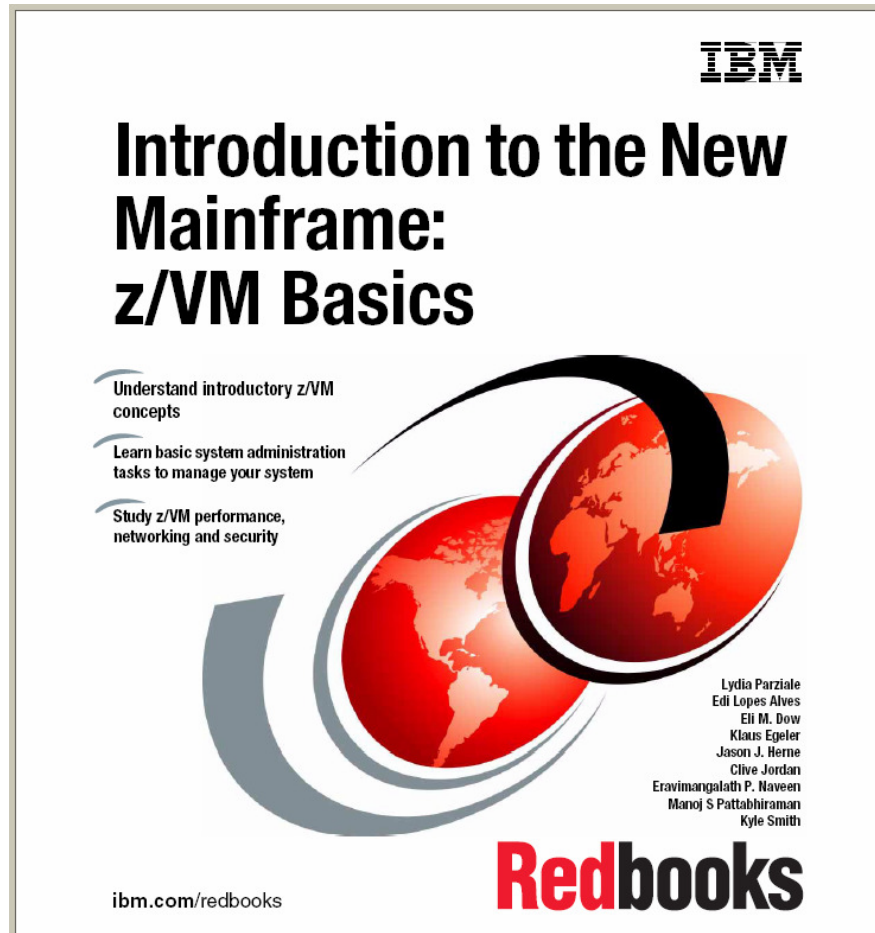
z/VM V5 Now Available for Download at ShopzSeries

- **Base z/VM operating system and features can now be ordered and delivered electronically via ShopzSeries**
- **Learn more at:**
 - ibm.com/software/ShopzSeries
 - www.VM.ibm.com/buy/edelivery

The screenshot shows the IBM ShopzSeries website. At the top left is the IBM logo. To the right is a search bar and a "Country/region [select]" dropdown. Below the logo is a navigation menu with links for Home, Solutions, Services, Products, Support & downloads, and My IBM. A "Welcome [IBM Sign in] [Register]" message is displayed on the right side of the page. The main content area is titled "ShopzSeries" and contains a welcome message: "Welcome to ShopzSeries, IBM's productivity tool for planning and ordering zSeries software. With ShopzSeries you can:" followed by a list of features: "order tailored product packages," "order tailored service packages," "review your software licenses, and" "plan for future upgrades." To the left of the main content is a sidebar with a "ShopzSeries" header and links for "Product catalog," "Help," "News," "Feedback," and "Customer service." Below this sidebar is a "Related links" section with links to "zSeries home," "zSeries software," "Operating systems," and "Enhanced HOLDDATA." To the right of the main content is a "My ShopzSeries" section with links for "Sign in" and "Register," and a note: "If you do not have access to ShopzSeries, request access now." At the bottom right is a banner for "zSeries software for the on demand world" with the tagline "Make on demand a reality." A "Sign in" button is located at the bottom left of the main content area.

Revised IBM Redbook

“Introduction to the New Mainframe: z/VM Basics”



1. Introduction to the mainframe hardware systems
 2. Introduction to virtualization and z/VM
 3. History of z/VM
 4. z/VM – job roles and basic concepts
 5. Control Program for new users
 6. Conversational Monitor System
 7. The REXX programming language
 8. CMS pipelines
 9. System administration tasks
 10. Performance
 11. Networking and connectivity
 12. z/VM security
 13. Guest operating systems
- Appendix A. Enhancements in z/VM Version 5, Release 3
Appendix B. Answer key

<http://www.redbooks.ibm.com/redpieces/abstracts/sg247316.html>

Extreme Virtualization with System z

Understanding the Value Proposition

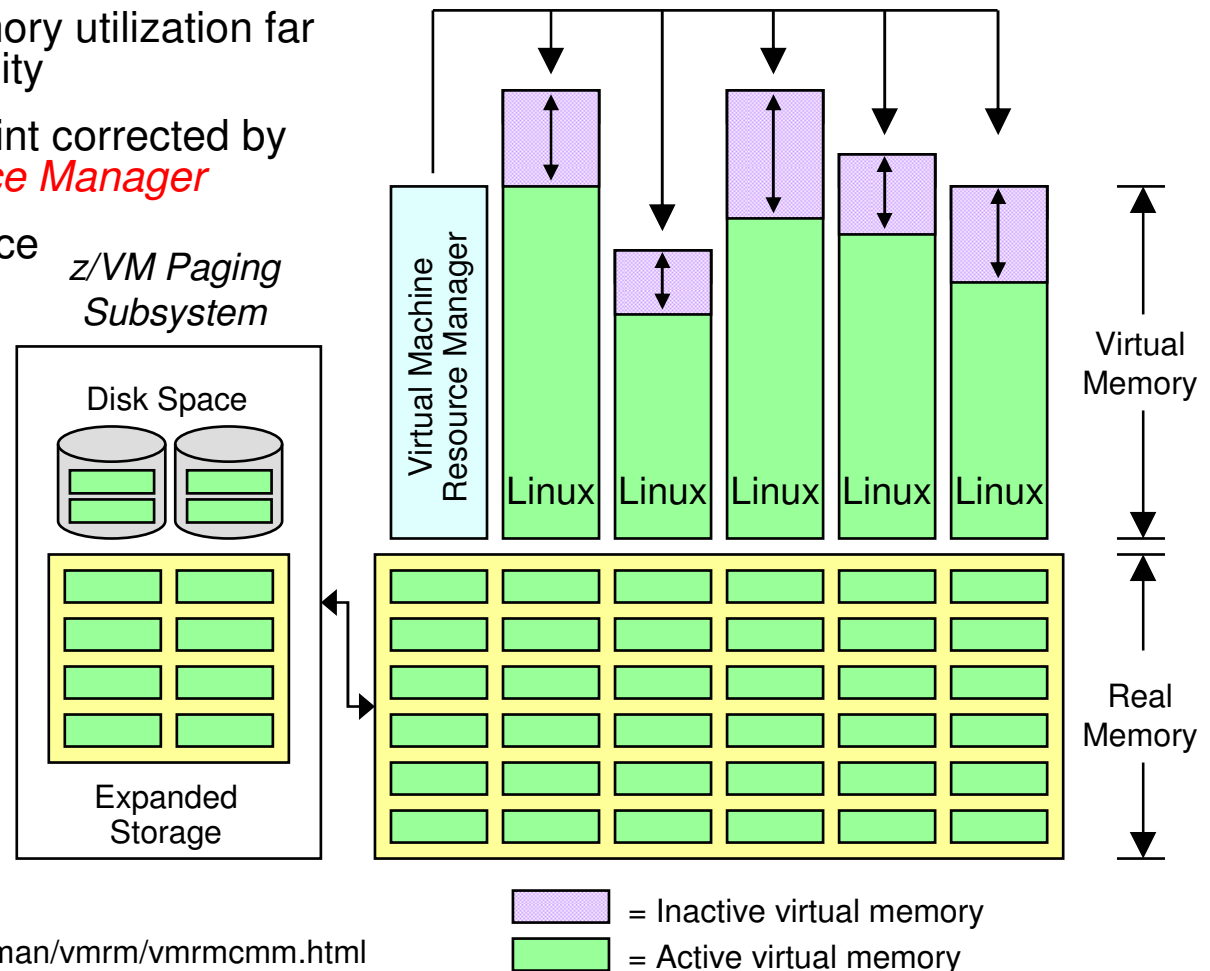
- **Business pain points addressed by server virtualization:**
 - Underutilized IT assets
 - Environmental costs
 - Linear software costs per server image
 - Staff inefficiencies managing multiple real servers
 - Spiraling people costs
- **x86 virtualization pain points addressed by System z**
 - Virtual server workload management
 - Reliable high-bandwidth I/O virtualization
 - Virtual server and total system performance reporting and planning
 - Virtual server reconfiguration outages
 - Virtual machine security and integrity
 - Server sprawl with added complexity

Clients need to develop an enterprise-wide virtualization strategy that leverages the strengths of mainframe virtualization

Extreme Virtualization with Linux on z/VM

VMRM Cooperative Memory Management (VMRM-CMM)

- Problem scenario: virtual memory utilization far exceeds real memory availability
- Solution: real memory constraint corrected by z/VM *Virtual Machine Resource Manager*
- Linux images signaled to reduce virtual memory consumption
- Demand on real memory and z/VM paging subsystem is reduced
- Helps improve overall system performance and guest image throughput



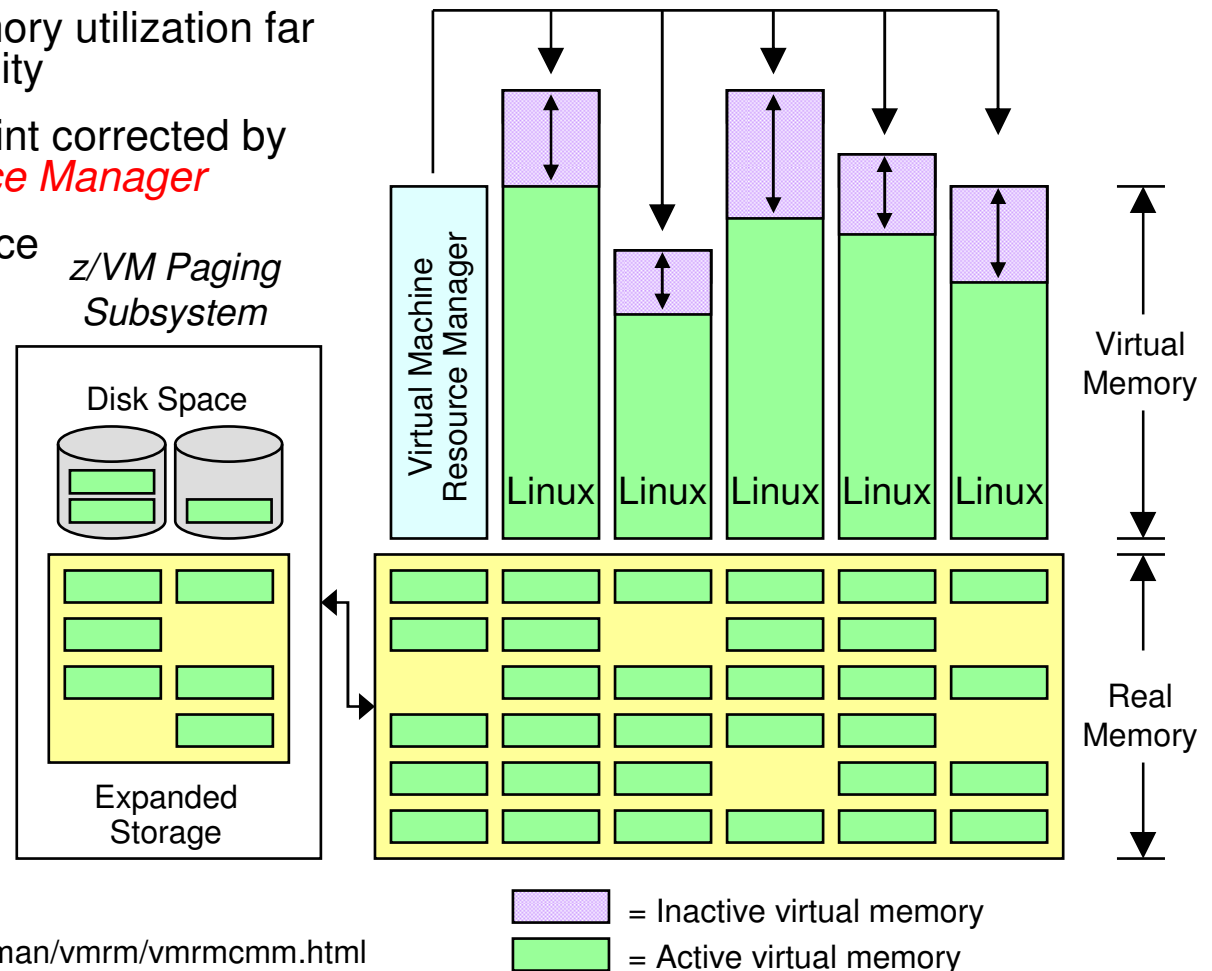
Learn more at:

ibm.com/servers/eserver/zseries/zvm/sysman/vmr/vmrmmcm.html

Extreme Virtualization with Linux on z/VM

VMRM Cooperative Memory Management (VMRM-CMM)

- Problem scenario: virtual memory utilization far exceeds real memory availability
- Solution: real memory constraint corrected by z/VM *Virtual Machine Resource Manager*
- Linux images signaled to reduce virtual memory consumption
- Demand on real memory and z/VM paging subsystem is reduced
- Helps improve overall system performance and guest image throughput



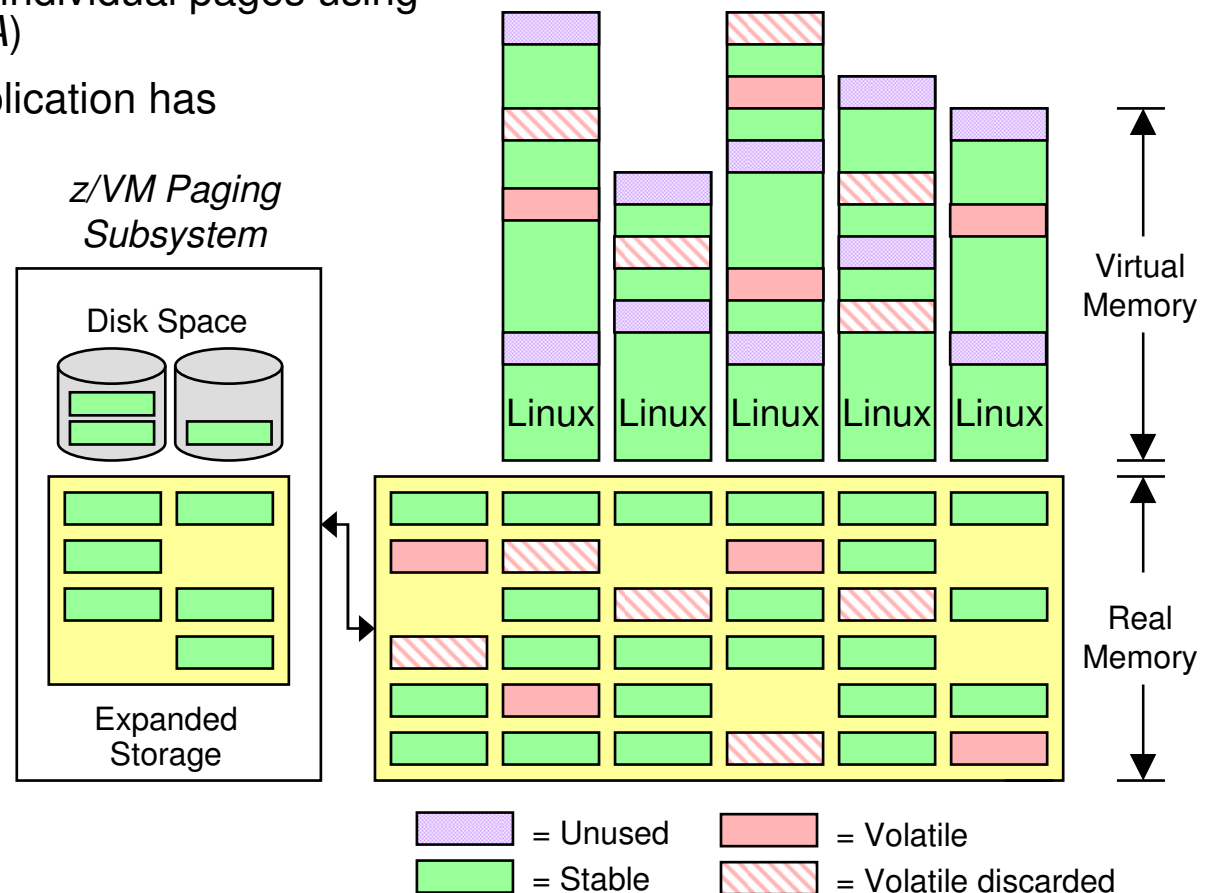
Learn more at:

ibm.com/servers/eserver/zseries/zvm/sysman/vmr/vmrmmcm.html

Linux and z/VM Technology Exploitation

Collaborative Memory Management Assist (CMMA)

- Extends coordination of memory and paging between Linux and z/VM to the level of individual pages using a new hardware assist (*CMMA*)
- z/VM knows when a Linux application has released a page of memory
- Host Page-Management Assist (*HPMA*), in conjunction with *CMMA*, further reduces z/VM processing needed to resolve page faults
- Can help z/VM host more virtual servers in the same amount of memory
- Supported by System z9 and z/VM V5.3

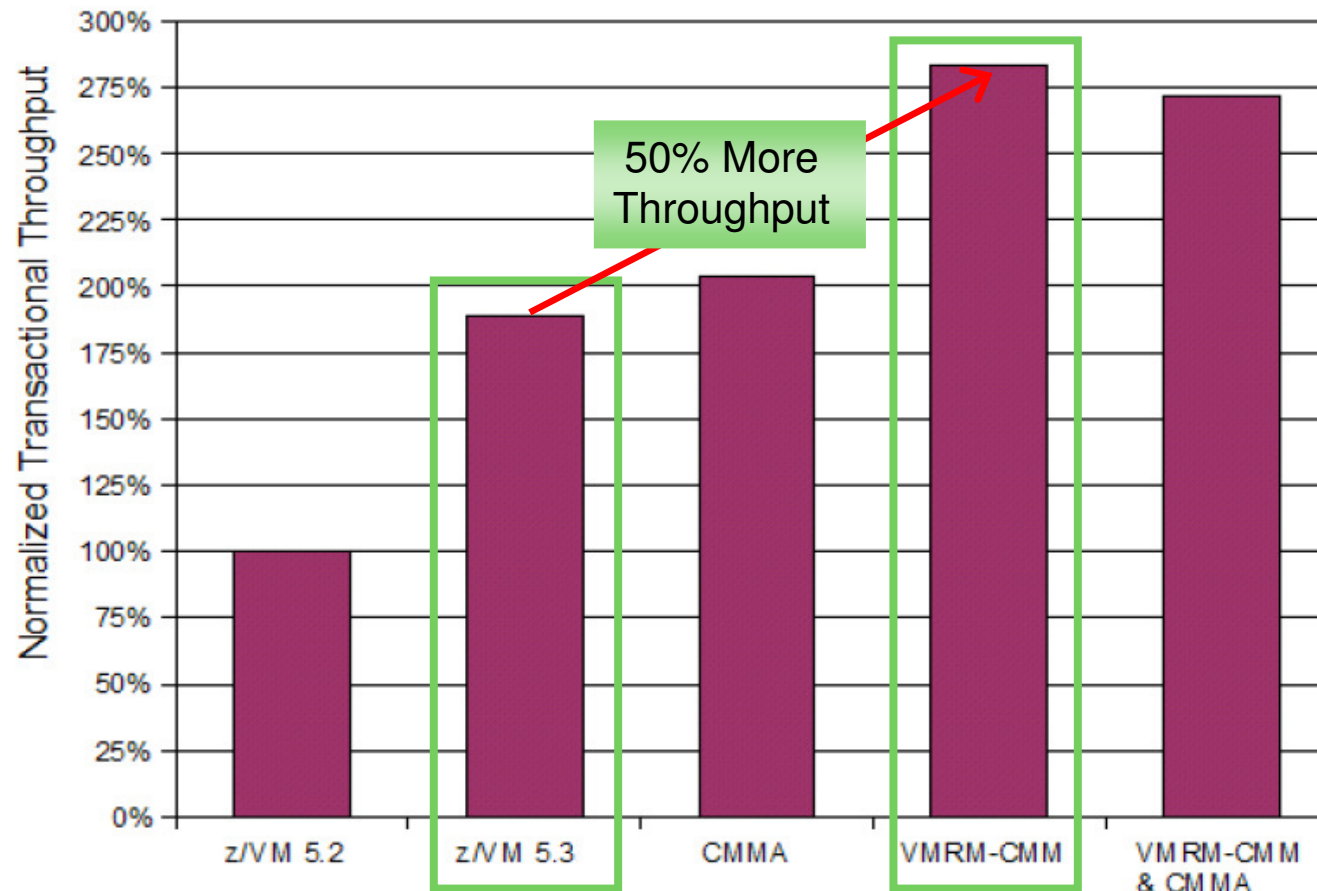


OLTP Database Environment with VMRM-CMM and CMMA

Excerpt from “z/VM Large Memory – Linux on System z” Whitepaper

Throughput for 10 guests

z/VM 5.2, z/VM 5.3, CMMA, VMRM-CMM, VMRM-CMM & CMMA

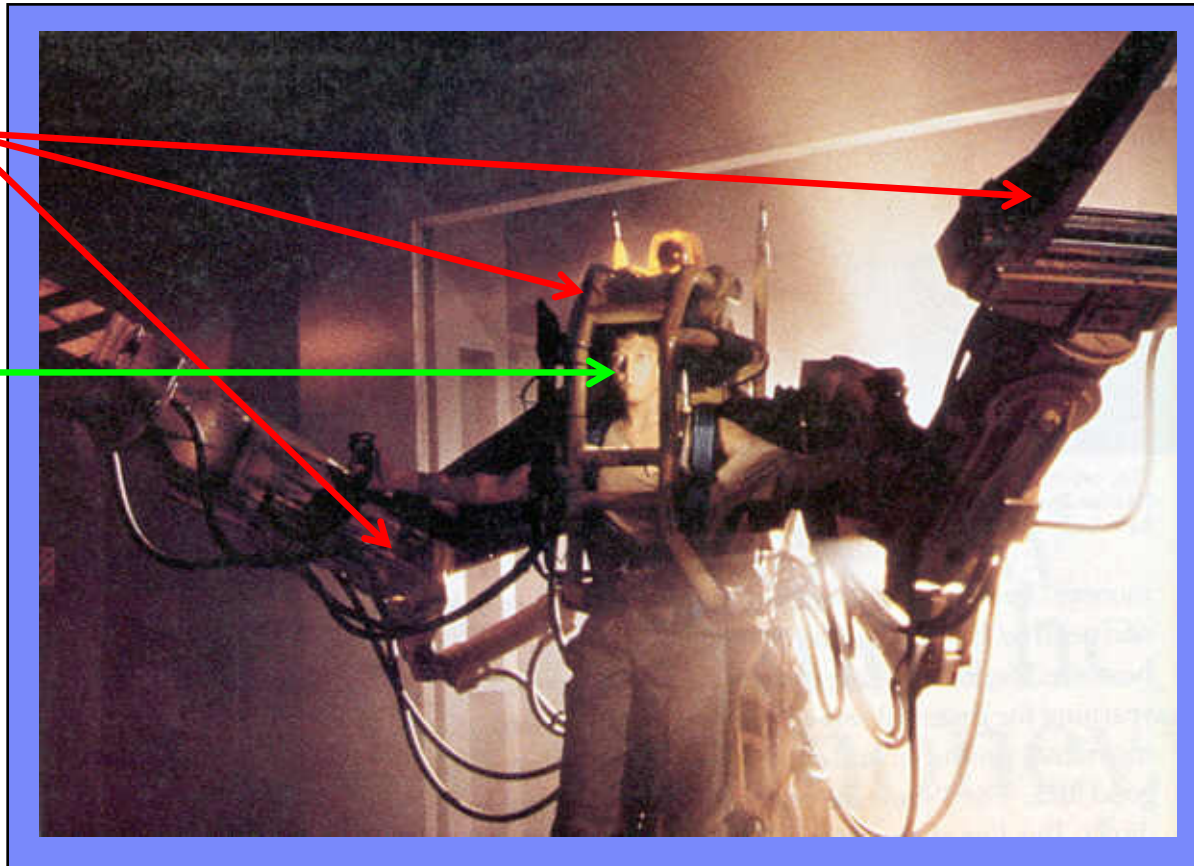


Linux Running on z/VM...

More Powerful Than Running Linux Anywhere Else

**z/VM Virtual
Machine**

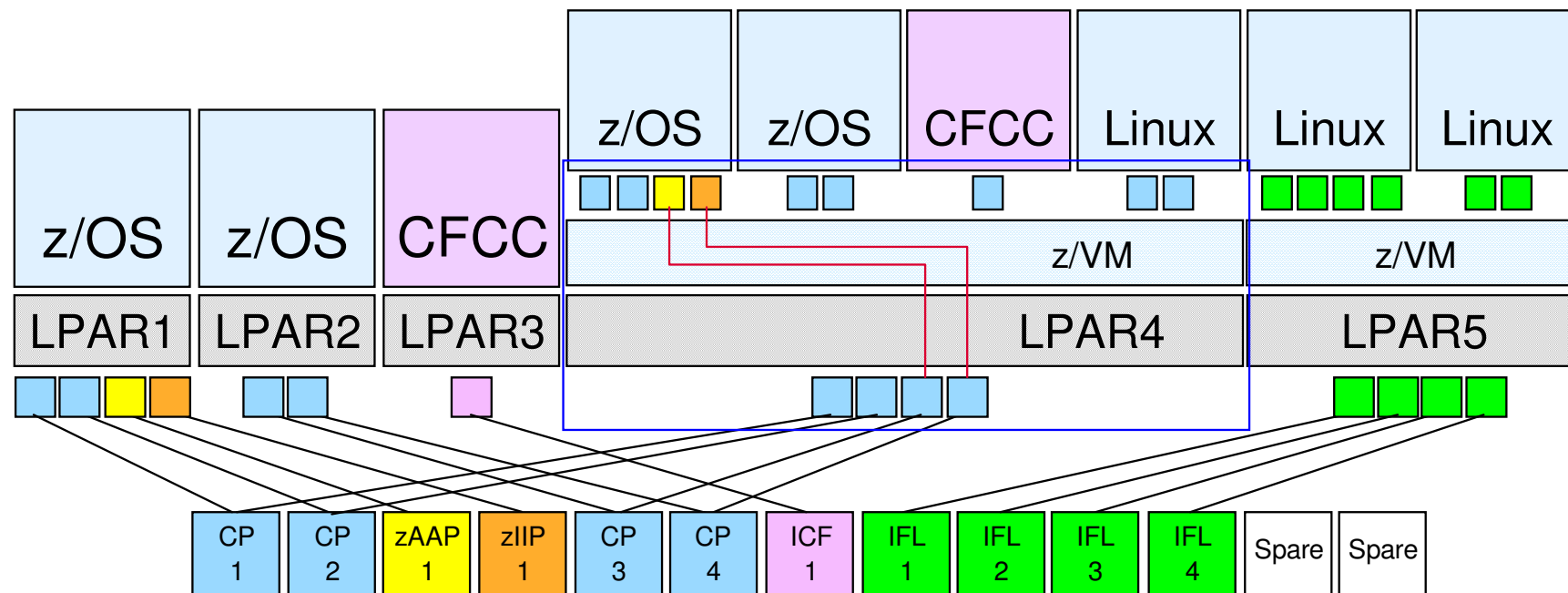
Linux



z/VM V5.3 Specialty Processor Support Example

Simulating Specialty Engines in Virtual Machines

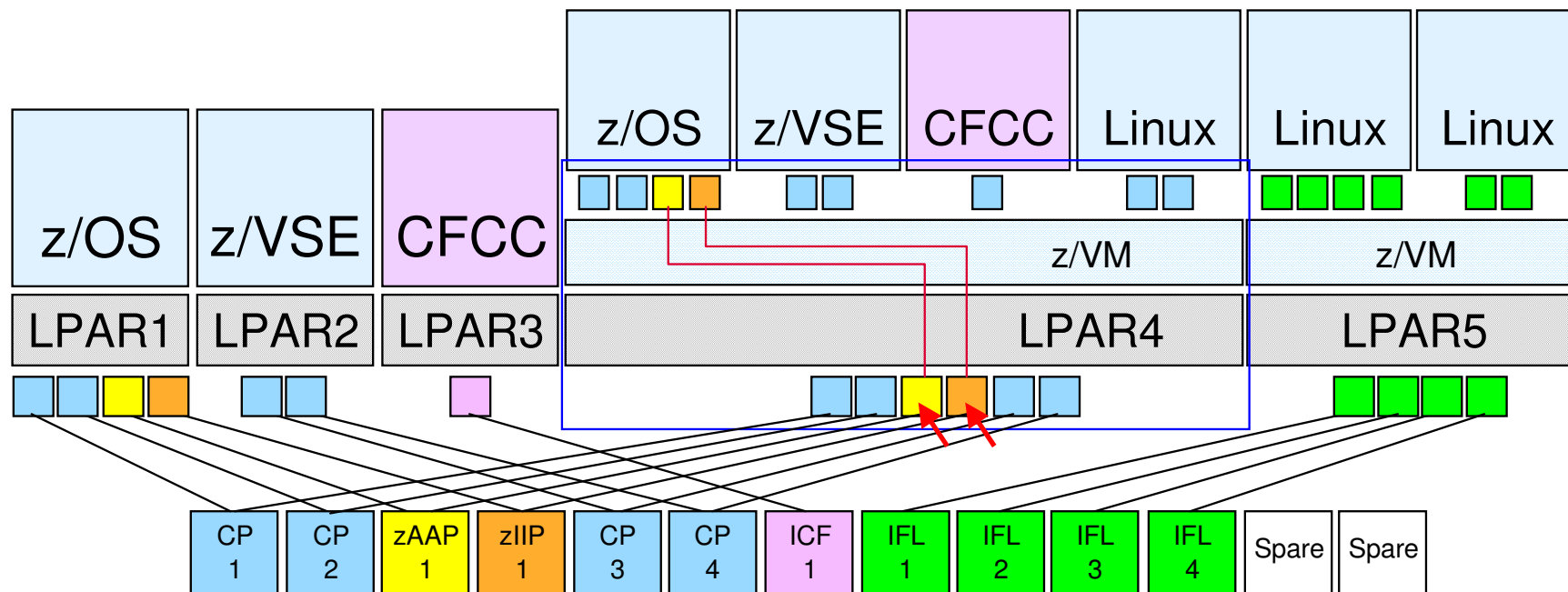
- Allows users to discover the operational aspects of using zAAPs and zIIPs in a z/OS environment without having to purchase real specialty processors
- May help users assess specialty-processor eligible workloads in a z/OS environment
- Provides a function test environment for z/OS workloads that use specialty processors
- Consumes CP processor capacity to host virtual zAAP and zIIP processor cycles



z/VM V5.3 Specialty Processor Support Example

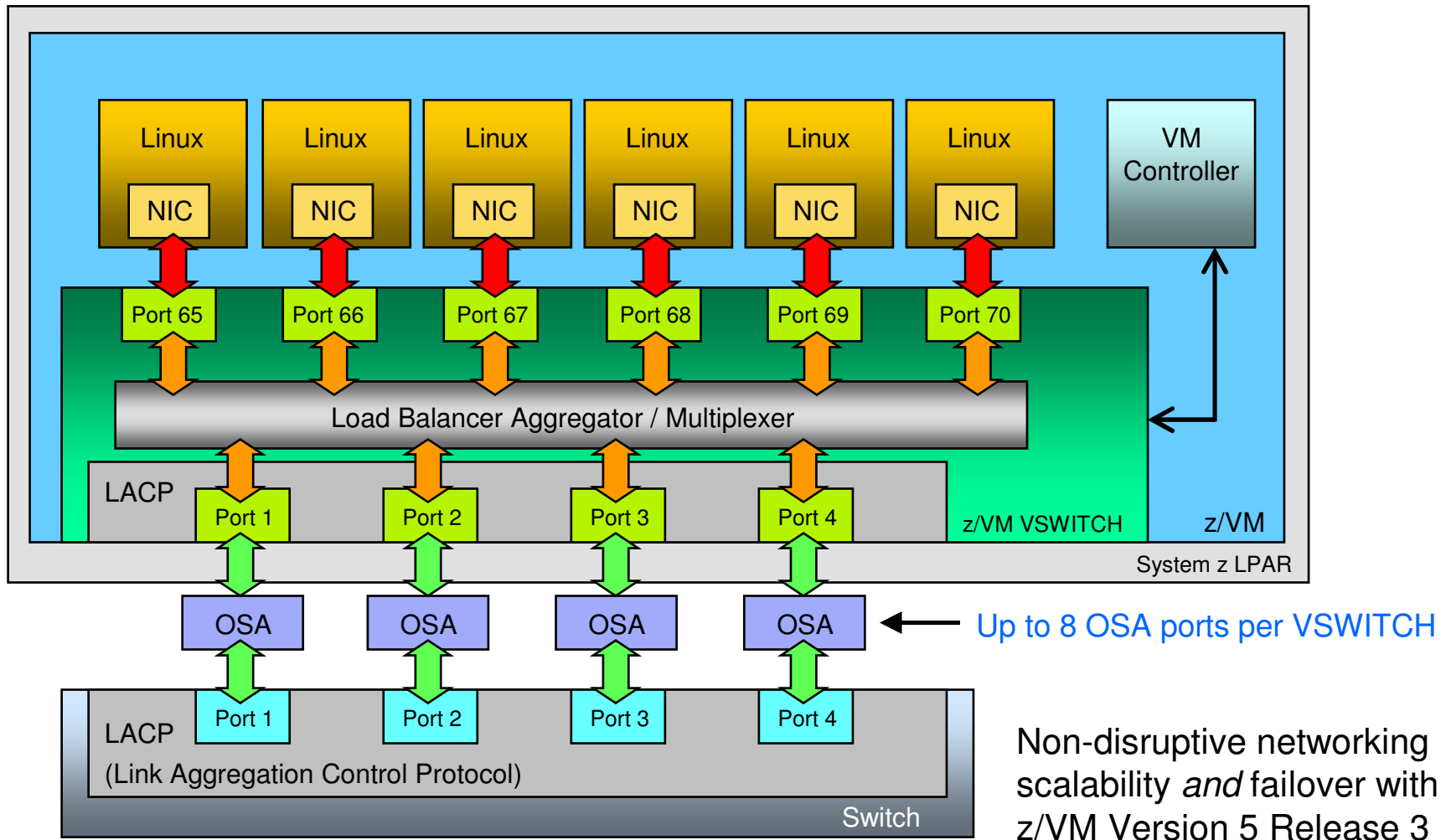
Using Real Specialty Engines in Virtual Machines

- Allows users to test and verify z/OS specialty processor support on the real hardware
- Users can maximize real specialty processor utilization by sharing processors among production and test LPARs
- Consumes specialty processor capacity to host virtual zAAP and zIIP processor cycles



z/VM Virtual Switch Link Aggregation Support

Enhanced Networking Bandwidth and Business Continuance



Non-disruptive networking scalability *and* failover with z/VM Version 5 Release 3

Note: Requires OSA-Express2 support available with IBM System z9 and later servers

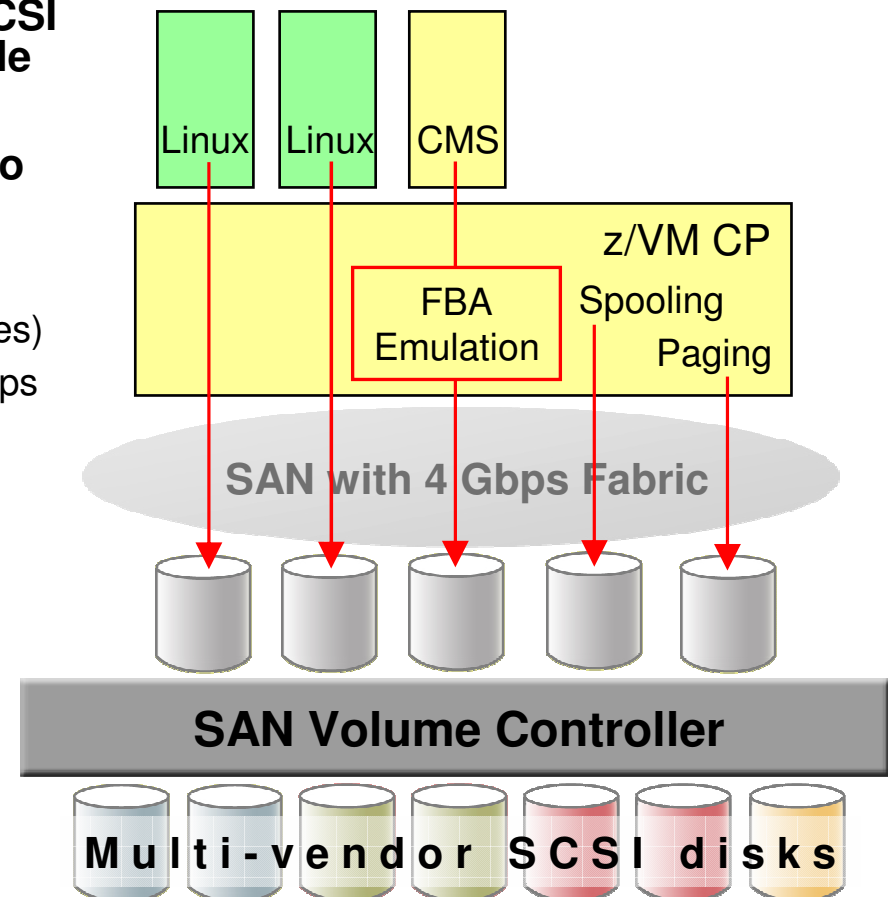
z/VM V5.3 Storage Support Enhancements

- **Additional SCSI disk support**
 - Support for Point-to-Point Fibre channel links
 - z/VM will dynamically determine preferred paths for emulated FBA devices on SCSI disks in an IBM System Storage DS6000
 - Faster formatting of emulated FBA devices on SCSI disks in an IBM Enterprise Storage Server (ESS) or IBM System Storage DS8000
- **IBM System Storage DS8000 HyperPAV support**
 - Potentially reduce the number of alias-device addresses needed for parallel I/O operations
 - Provide support of HyperPAV volumes as linkable minidisks for guest operating systems, such as z/OS, that exploit this new PAV architecture
 - Provide the potential benefits of HyperPAV volumes for minidisks owned or shared by guests that do not specifically exploit HyperPAV volumes (e.g., CMS, Linux)
- **Additional FlashCopy I/O support**
 - Help simplify tasks required to automate backups and make multiple copies of disk data
 - Allow multiple targets (up to 12) of one source to be copied with a single operation
 - Determine the status of FlashCopy requests by allowing users to query the number of FlashCopy relationships active for one or more of their virtual disks

IBM System Storage SAN Volume Controller Software V4.2

- **z/VM and Linux for System z support SAN Volume Controller (SVC) V4.2**
- **SVC allows z/VM and Linux to access SCSI storage from multiple vendors as a single pool of disk capacity**
- **z/VM FBA emulation allows CMS users to access SVC-managed disk space**
- **New function in SVC V4.2:**
 - Multi-target FlashCopy support (up to 16 images)
 - Higher number of active FlashCopy relationships at the cluster level
 - Designed for improved cluster performance, especially when installed on IBM System Storage SVC 2145-8G4 storage engine
 - Support for additional OEM devices
- **Supported in z/VM V5.3 base product**
 - z/VM V5.2 support available with PTF for APAR VM64128

Learn more at: ibm.com/storage/support/2145



Additional z/VM Guest Support

- **ASCII console support**
 - Allows the real System z ASCII console to be dedicated to a guest system
 - Can facilitate recovery of a Linux guest system during an emergency situation
 - Supports a VT220 data stream
- **Modified Indirect Data Address Words (MIDAW) support**
 - Allows guest use of MIDAWs when z/VM is running on MIDAW-capable servers
 - z/Architecture MIDAW facility offers an alternative to using CCW data chaining in channel programs
 - May reduce channel, director, and control unit overhead by reducing number of CCWs and frames that have to be processed
 - May improve I/O throughput, especially on faster FICON channels
 - Allows z/OS guests to exercise their MIDAW support in a z/VM test environment
- **Program-directed IPL support**
 - Enables a virtual machine to programmatically re-IPL using CCW-type or List-Directed (SCSI) IPL architectures
 - Linux is the exploiter of this function
 - Includes support to allow the setting and storing of IPL parameters

Enhanced z/VM Systems Management Functions *For Allocating and Managing Guest Resources*

- **New sockets-based server interface for z/VM Systems Management API**
 - Multitasking capable and supports both AF_INET and AF_IUCV socket requests
 - Replaces the Remote Procedure Call (RPC) and CSL routines of prior z/VM releases
 - RPC server is still available at a function level that matches z/VM V5.2
 - IBM intends to remove the RPC server in a future z/VM release
- **New APIs available with new server include:**
 - Create, delete, and query the IPL statement in a virtual image's directory entry
 - Create and delete virtual switches and guest LANs
 - Obtain processor, memory, and device information for active virtual images
 - Check the validity of a given user ID and password combination
- **Enhancements to existing functions include:**
 - Exploitation of new Asynchronous CP Command function
 - Password phrase support
 - Providing a list of active virtual images
 - Architected output is provided for some query functions that previously returned command responses in a data buffer



IBM Director for Linux on System z V5.20

With z/VM Center and Software Distribution Premium Edition

IBM Director Base Functions

- Discovery
- Group Management
- Inventory
- Basic Resource Monitor
- Event Action Plan (EAP)
- Process Management
- Remote Session
- File Transfer
- Network Configuration
- Software Distribution
- SNMP Browser

z/VM Center

- Utility Service Configuration Manager
- z/VM Virtual Server Deployment
- z/VM Server Complexes

Software Distribution Premium Edition

- Software package distribution

The screenshot displays the IBM Director Console interface. The main window is titled "IBM Director Console" and shows a tree view of the system hierarchy. The "Level 2: IBM Director Agents" section is expanded, showing a list of agents with their names and TCP/IP addresses. A red box highlights the "z/VM Center" node, which is expanded to show its sub-nodes: "Utility Service Configuration Manager", "z/VM Server Complexes", and "z/VM Virtual Server Deployment". Another red box highlights the "z/VM Center" node in the "Tasks" pane, which is also expanded to show its sub-tasks: "Utility Service Configuration Manager", "z/VM Server Complexes", and "z/VM Virtual Server Deployment". A red arrow points from the "z/VM Center" node in the "Tasks" pane to the "z/VM Center" node in the main tree view.

Name	TCP/IP Address
BLD03-05	9.152.27.110
boeid101.boeblingen.de...	9.152.24.141
boeid102.boeblingen.de...	9.152.24.142
boeid104.boeblingen.de...	9.152.24.144
boeid219.boeblingen.de.ib...	9.152.24.179
boeid220.boeblingen.de...	9.152.24.180
boerfc18.boeblingen.de...	
boerfc19	9.152.24.129
boerfc22	9.152.24.132
boerfe16.boeblingen.de...	9.152.24.95
boerfe28.boeblingen.de...	9.152.24.107
ID1HDE01	9.152.24.153

z/VM Integrated Systems Management

Using the System z Hardware Management Console (HMC)

Included in z/VM V5.3

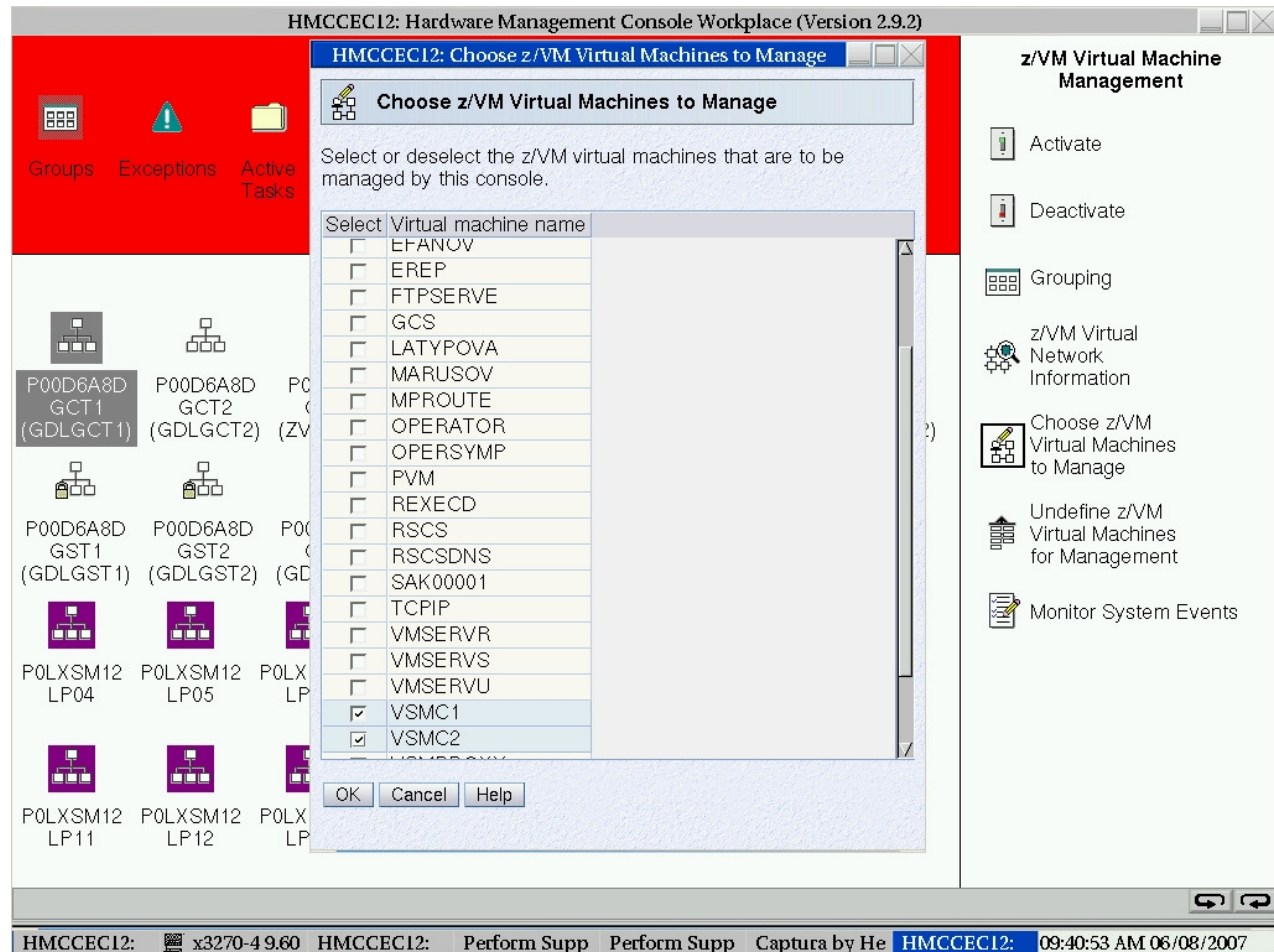
- Allows basic z/VM functions to be performed from HMC
- Network connection not required
- Uses SCLP hardware interface to access z/VM systems management APIs
- Requires PTFs for APARs VM64233 and VM64234

Supported operations:

- View z/VM guests
- Activate z/VM guests
- Deactivate z/VM guests
- Display guest configuration and status

Supported systems:

- z9 EC and BC machines
- z800, z900, z890, z990



Provisioning Linux Virtual Machines on System z Using IBM Director for Linux on System z with z/VM Center

z/VM Virtual Server Deployment: TMCC01

z/VM System

- TMCC01
 - z/VM Profile
 - z/VM Virtual Servers
 - lin139
 - TMCC01.40SASF40
 - TMCC01.5684042J
 - TMCC01.5767002P
 - TMCC01.5VMDIR10
 - TMCC01.5VMHCD20
 - TMCC01.5VMPTK20
 - TMCC01.5VMTCP20
 - TMCC01.ADMSEV
 - TMCC01.AMREHN
 - TMCC01.AUDITOR

Provisioning Resources

- Virtual Server Templates
 - LIN13xx_server_template
 - LIN15xx_server_template
- Operating System Templates
 - rhel4_s390x_os_template
 - sles9_s390_os_template
 - sles9_s390x_os_template
- Disk Pools
 - TMCC01.LINGROUP
 - TMCC01.LINUX
 - TMCC01.SAPGROUP
 - TMCC01.USERGRP

z/VM Virtual Server: lin139

Overview | **Disks** | Processors | Memory | Network Ports

Disks

Name	Virtual Disk	Access Mode	Boot Disk
TMCC01.LIN139.0350	0350	MR	<input type="checkbox"/>
	0353		
	0352		
	0351		

Owned by: LIN139 as 0350

Device Type: 3390 Volume ID: LX6740

Start: 8401 Range: 300 Units: Cylinder

Organization: ded Count Key Data Blocks: 254907000 Size: 1

Description:

Save Refresh Help

**IBM Director deployment scope:
Templates for z/VM virtual machines and Linux**

Provisioning Software in System z Virtual Linux Servers Using IBM Tivoli Provisioning Manager

Tivoli Provisioning Manager

tioadmin Log off Home Welcome About Information Center

Software Definition: DB2 Universal Database Enterprise Server Edition

General Variables Workflows Edit Set as Home Help

Name: DB2 Universal Database Enterprise Server Edition
Description:
Version: 8.2.0
Title: N/A
Vendor: IBM
Software Type: RDBRT:RDB RDBRT:JDBC

Installable Files

Name
(DDL Package) - DDL Import file for DB2
(AIX) - DB2 8.2 ESE Installable Package (32/64bit) - EN/SP/BR/PT
(AIX) - DB2 8.2 ESE Installable Package (32/64bit) - DBCS
(AIX) - DB2 8.2 ESE Installable Package (32/64bit) - EN/IT/DE/FR
(LinuxPPC) - DB2 8.2 ESE Installable Package (64bit)
(zLinux) - DB2 8.2 ESE Installable Package (64bit)
(zLinux) - DB2 8.2 ESE Installable Package (31bit)
(Linux-2.4 Kernel) - DB2 8.2 ESE Installable Package (64bit)
(Linux-2.6 Kernel) - DB2 8.2 ESE Installable Package (64bit)
(Linux-2.4 Kernel) - DB2 8.2 ESE Installable Package (32bit)
(Linux-2.6 Kernel) - DB2 8.2 ESE Installable Package (32bit)
(Solaris) - DB2 8.2 ESE Installable Package (32bit)
(Windows) - DB2 8.2 ESE Installable Package (64bit)
(Windows) - DB2 8.2 ESE Installable Package (32bit)

Page 1 of 1

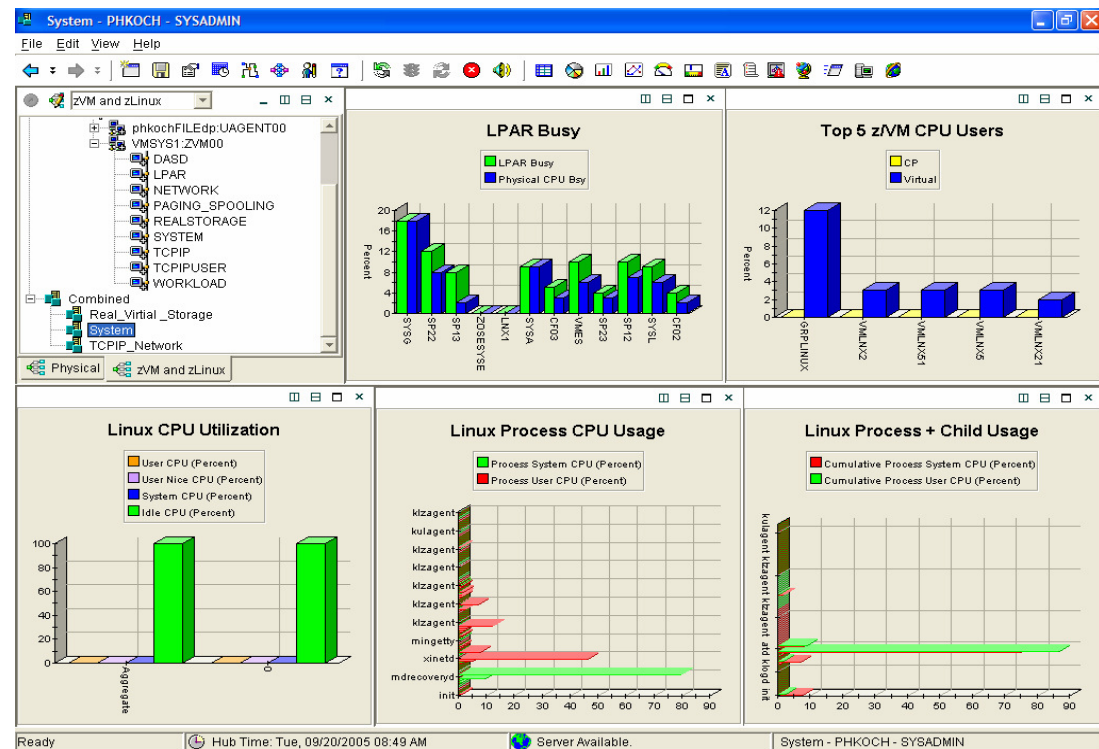
Configuration Templates

- UNIX (AIX, Linux, and Solaris) - DB2 ESE Installation Template
- Windows - DB2 ESE Installation Template

Tivoli Provisioning Manager deployment scope:
 Operating systems like Linux, AIX, Windows
 Middleware like DB2 and WebSphere Application Server

Monitoring System z Virtual Linux Servers Using IBM Tivoli OMEGAMON XE on z/VM and Linux

- **Combined product offering*** that monitors z/VM and Linux for System z
- **Provides work spaces that display:**
 - Overall system health
 - Workload metrics for logged-in users
 - Individual device metrics
 - LPAR Data
- **Provides composite views of Linux running on z/VM**



* Refer to IBM Software
Announcement 206-251

z/VM Systems Management Products from IBM

- **IBM Backup and Restore Manager for z/VM**
 - Provides z/VM system administrators and operators the ability to efficiently and effectively backup and restore files and data on z/VM systems
 - Can also backup and restore images of non-z/VM guest systems such as Linux
- **IBM Tape Manager for z/VM**
 - Manages and monitors tape resources, helping increase data availability and improve operator efficiency
 - Automates common daily tape operations and helps eliminate tedious, often error-prone, manual tasks
- **IBM Archive Manager for z/VM**
 - Addresses storage and data management concerns by allowing users to archive historical or other infrequently used data to increase data availability
 - Helps companies comply with data storage requirements mandated by fiscal or legal regulations and policies
- **IBM Operations Manager for z/VM**
 - Helps improve the monitoring and management of z/VM virtual machines by automating routine maintenance tasks
 - Enables users to automatically respond to predictable situations that require intervention

z/VM Version 5 Release 3 New Function Highlights

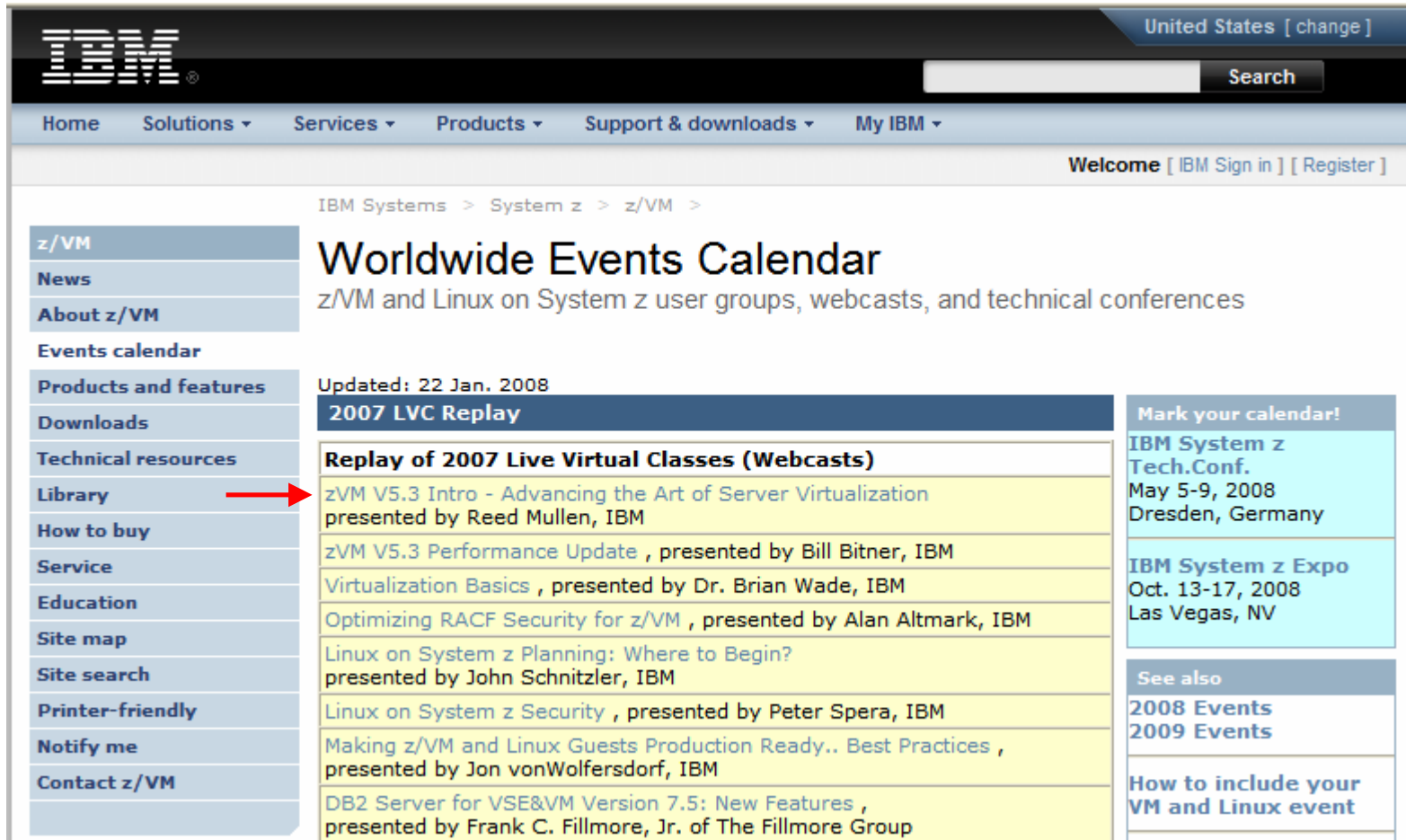
Available Since June 29, 2007

- **Processor and I/O support**
 - Single-image support for up to 32 CPUs
 - Guest support for specialty processors
 - Enhanced SCSI support
 - HyperPAV support for IBM DS8000
 - FlashCopy I/O support enhancements
- **Virtualization support**
 - Additional z/VM support for large real memory configurations
 - Collaborative Memory Management Assist
 - OSA-Express2 link aggregation
 - Virtual Switch SNMP agent support
 - Enhanced usability for z/VM Virtual Switch and Guest LAN support
 - Guest program-directed IPL support
 - Guest MIDAW support
 - Guest ASCII console support
- **Networking**
 - z/VM TCP/IP support enhancements
 - Enhanced IP failover
 - Currency support for SSL server
 - Dynamic SSL/TLS support
- **Systems management**
 - z/VM system management API enhancements
 - z/VM integrated systems management with the System z HMC
 - User Directory COMMAND support
 - Asynchronous CP command API
 - RACF support enhancements
 - Password phrase support
 - LDAP server and client support
 - Installation and service enhancements
 - Performance Toolkit support



Learn More About z/VM Version 5.3 Live Virtual Classes (LVC)

- Visit www.VM.ibm.com/events for available webcasts



United States [change]

IBM

Home Solutions ▾ Services ▾ Products ▾ Support & downloads ▾ My IBM ▾

Welcome [IBM Sign in] [Register]

IBM Systems > System z > z/VM >

z/VM

News

About z/VM

Events calendar

Products and features

Downloads

Technical resources

Library →

How to buy

Service

Education

Site map

Site search

Printer-friendly

Notify me

Contact z/VM

Worldwide Events Calendar

z/VM and Linux on System z user groups, webcasts, and technical conferences

Updated: 22 Jan. 2008

2007 LVC Replay

Replay of 2007 Live Virtual Classes (Webcasts)

z/VM V5.3 Intro - Advancing the Art of Server Virtualization presented by Reed Mullen, IBM
z/VM V5.3 Performance Update , presented by Bill Bitner, IBM
Virtualization Basics , presented by Dr. Brian Wade, IBM
Optimizing RACF Security for z/VM , presented by Alan Altmark, IBM
Linux on System z Planning: Where to Begin? presented by John Schnitzler, IBM
Linux on System z Security , presented by Peter Spera, IBM
Making z/VM and Linux Guests Production Ready.. Best Practices , presented by Jon vonWolferdsdorf, IBM
DB2 Server for VSE&VM Version 7.5: New Features , presented by Frank C. Fillmore, Jr. of The Fillmore Group

Mark your calendar!

IBM System z Tech.Conf.
May 5-9, 2008
Dresden, Germany

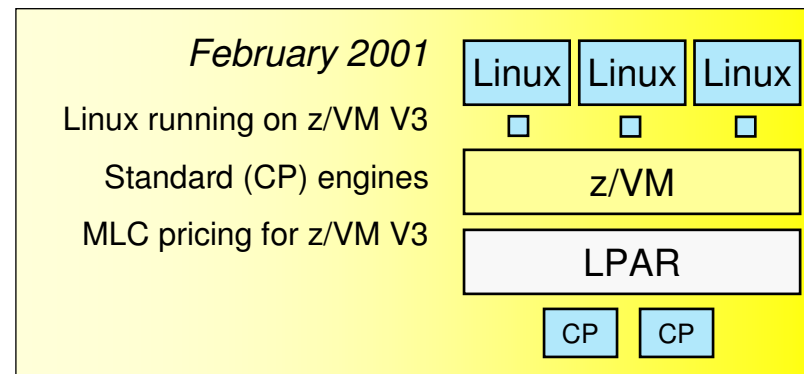
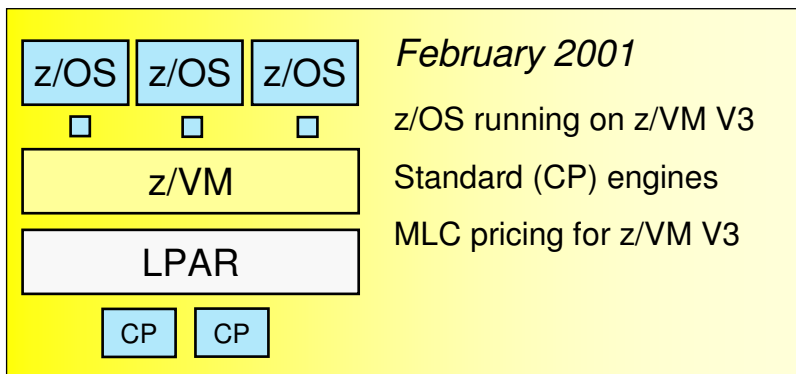
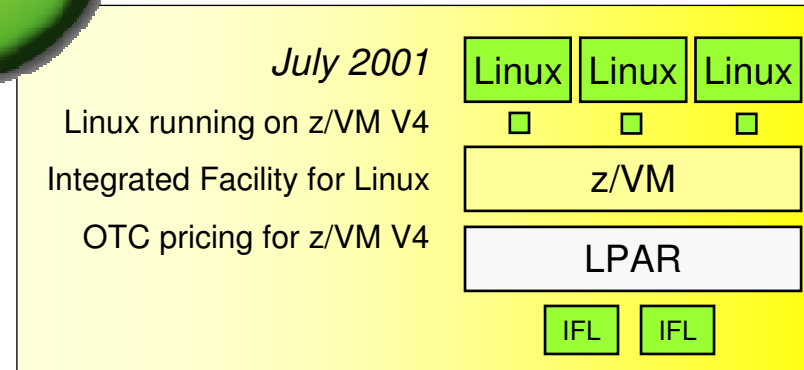
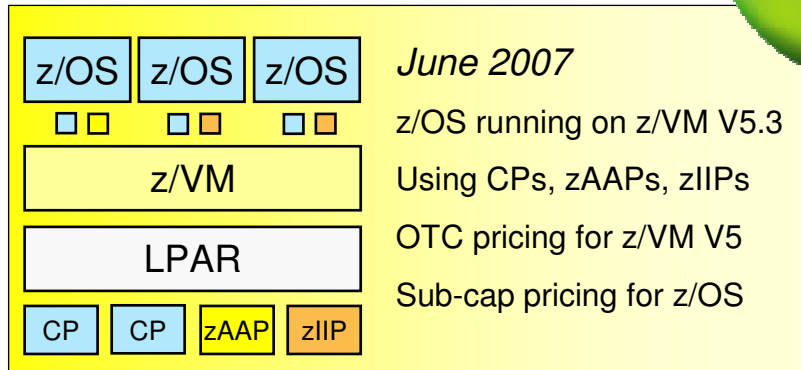
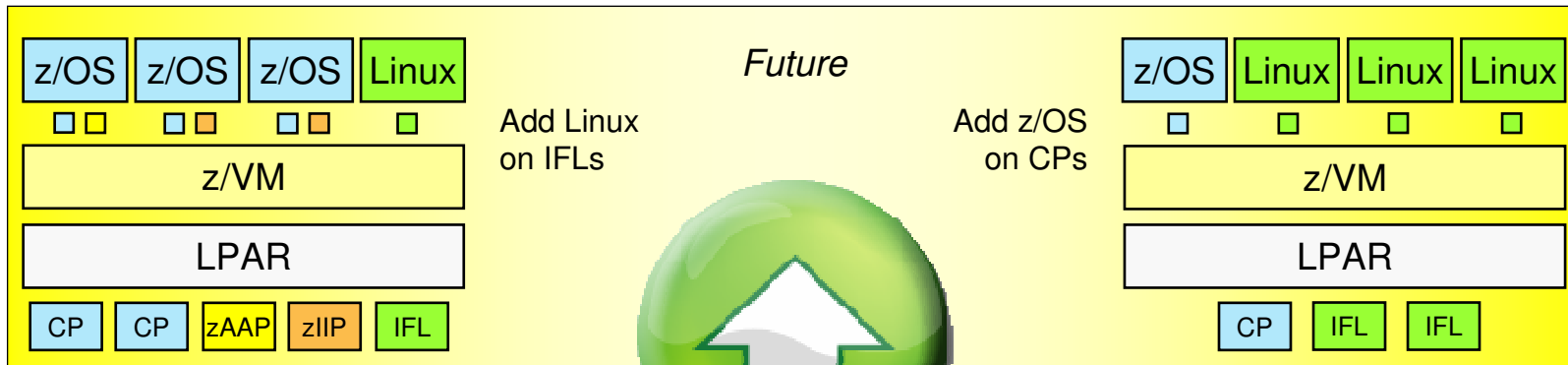
IBM System z Expo
Oct. 13-17, 2008
Las Vegas, NV

See also

2008 Events

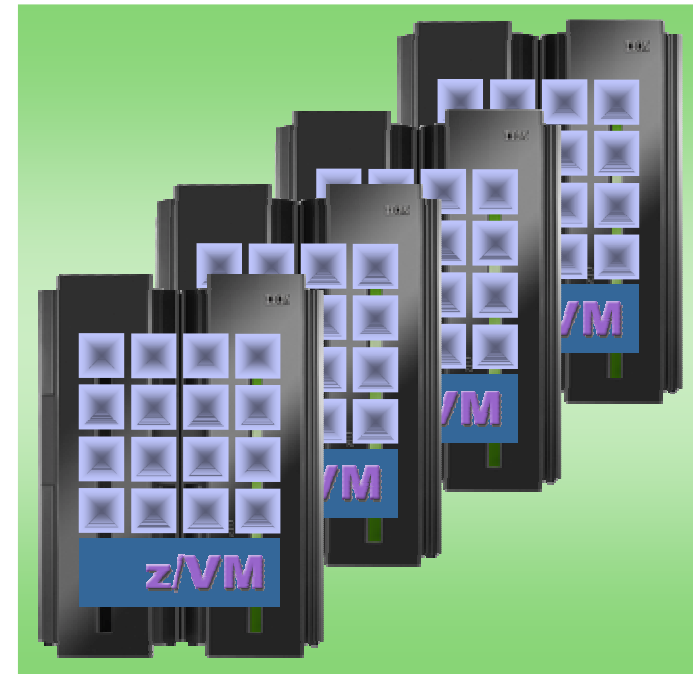
2009 Events

How to include your VM and Linux event



Potential z/VM Product Futures

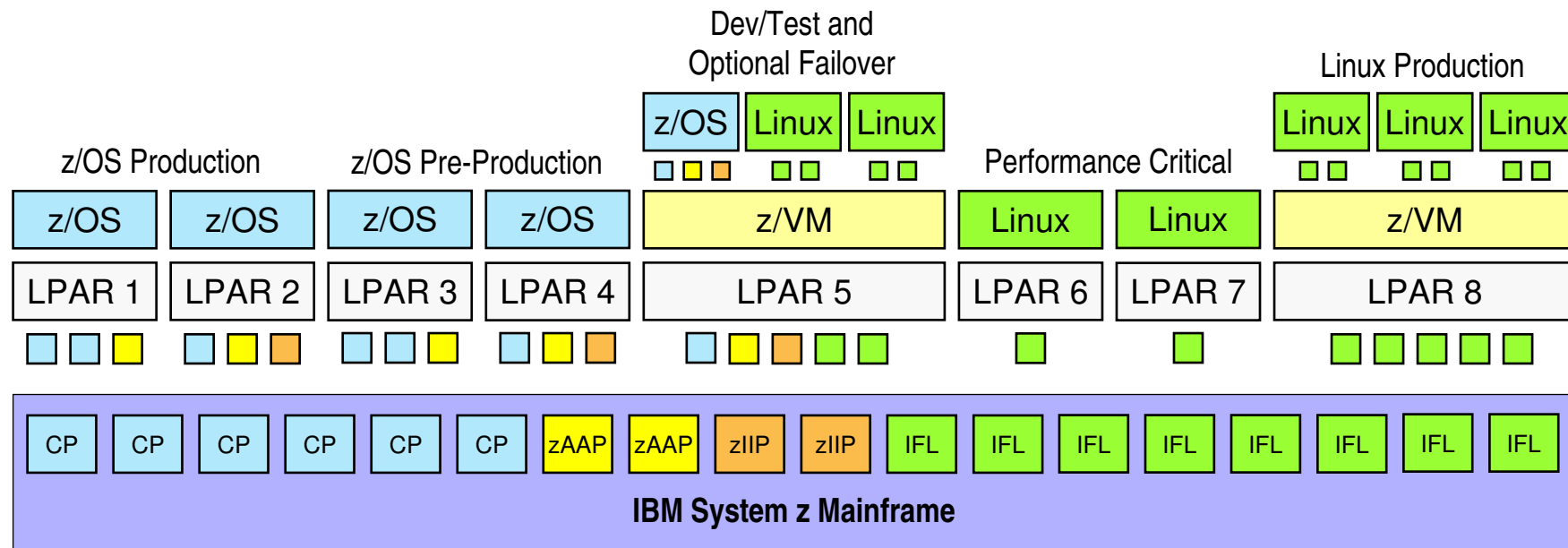
- **Support for “VM-mode” LPARs**
 - Enabling clients to mix standard CPUs and IFLs in a single z/VM LPAR
 - Add IFLs to an existing z/VM standard-engine LPAR to host Linux workloads
- **Simplify end-users tasks for managing a z/VM-hosted virtual Linux environment**
 - Install Linux into a virtual machine using the HMC
 - Enhanced HMC GUI functionality for managing z/VM hypervisor-configuration tasks
- **Dynamic memory upgrade for z/VM LPARs**
 - Delivers added flexibility and virtual server availability to meet workload growth requirements
 - Add CPU, I/O, networking, *and* memory to a z/VM LPAR without disruption
- **Rapid data provisioning for test systems**
 - Generate test data quickly and affordably with space-efficient FlashCopy
- **Multi-system virtualization support**
 - Enhanced workload management and scalability across a cluster of z/VM images – improves workload availability and virtual server provisioning



Note: All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

The Power and Flexibility of System z Virtualization

- ➔ Over 40 years of continuous innovation in virtualization technologies
- ➔ Multiple images concurrently share all physical resources
- ➔ Resources delivered as required, automatically, based on business-oriented goals
- ➔ New OS images can be started without affecting ongoing work
- ➔ Hardware assists used to accelerate virtualization operations (e.g., SIE)



Trademarks

The following are trademarks of the International Business Machines Corporation in the United States and/or other countries. For a complete list of IBM Trademarks, see www.ibm.com/legal/copytrade.shtml: AS/400, DB2, e-business logo, ESCON, eServer, FICON, IBM, IBM Logo, iSeries, MVS, OS/390, pSeries, RS/6000, S/390, System Storage, System z9, VM/ESA, VSE/ESA, WebSphere, xSeries, z/OS, zSeries, z/VM.

The following are trademarks or registered trademarks of other companies

Java and all Java-related trademarks and logos are trademarks of Sun Microsystems, Inc., in the United States and other countries.

LINUX is a registered trademark of Linux Torvalds in the United States and other countries.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Microsoft, Windows and Windows NT are registered trademarks of Microsoft Corporation.

SET and Secure Electronic Transaction are trademarks owned by SET Secure Electronic Transaction LLC.

Intel is a registered trademark of Intel Corporation.

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

NOTES:

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

IBM hardware products are manufactured from new parts, or new and serviceable used parts. Regardless, our warranty terms apply.

All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions.

This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Information about non-IBM products is obtained from the manufacturers of those products or their published announcements. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

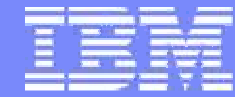
Prices subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.

References in this document to IBM products or services do not imply that IBM intends to make them available in every country.

Any proposed use of claims in this presentation outside of the United States must be reviewed by local IBM country counsel prior to such use.

The information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.



GSE: z/VSE and z/VM with Linux on System z

z/VM Customer Feedback

Session V15

Romney White

IBM Systems and Technology Group