IBM

# z/VM Platform Update

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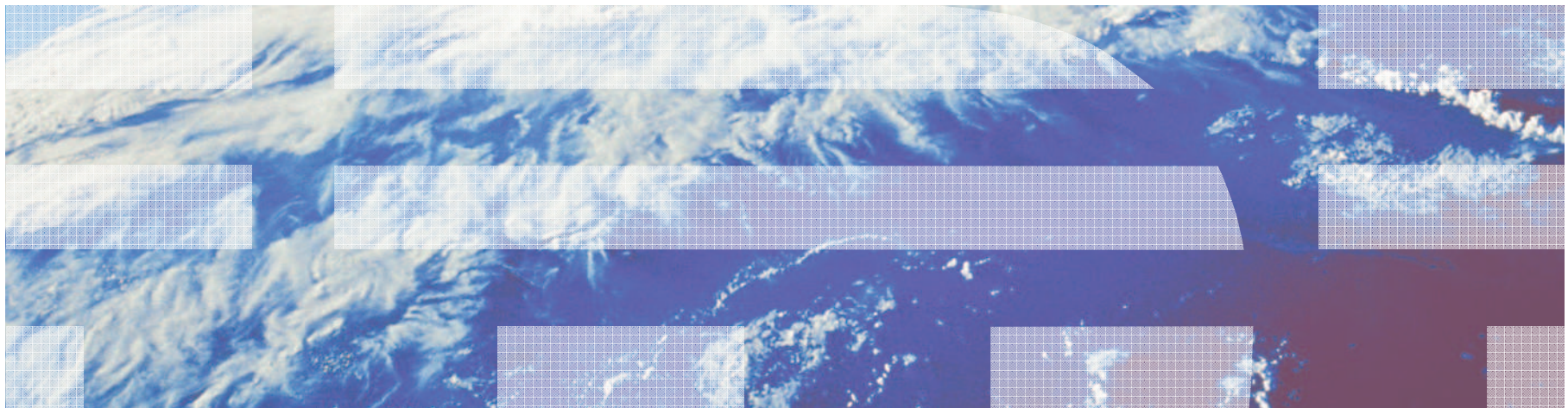
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| Dynamic Infrastructure* | z10 BC |
| GDPS* | z9 |
| HiperSockets | z/OS* |
| Parallel Sysplex* | z/VM* |
| RACF* | z/VSE |
| System z* | zEnterprise |

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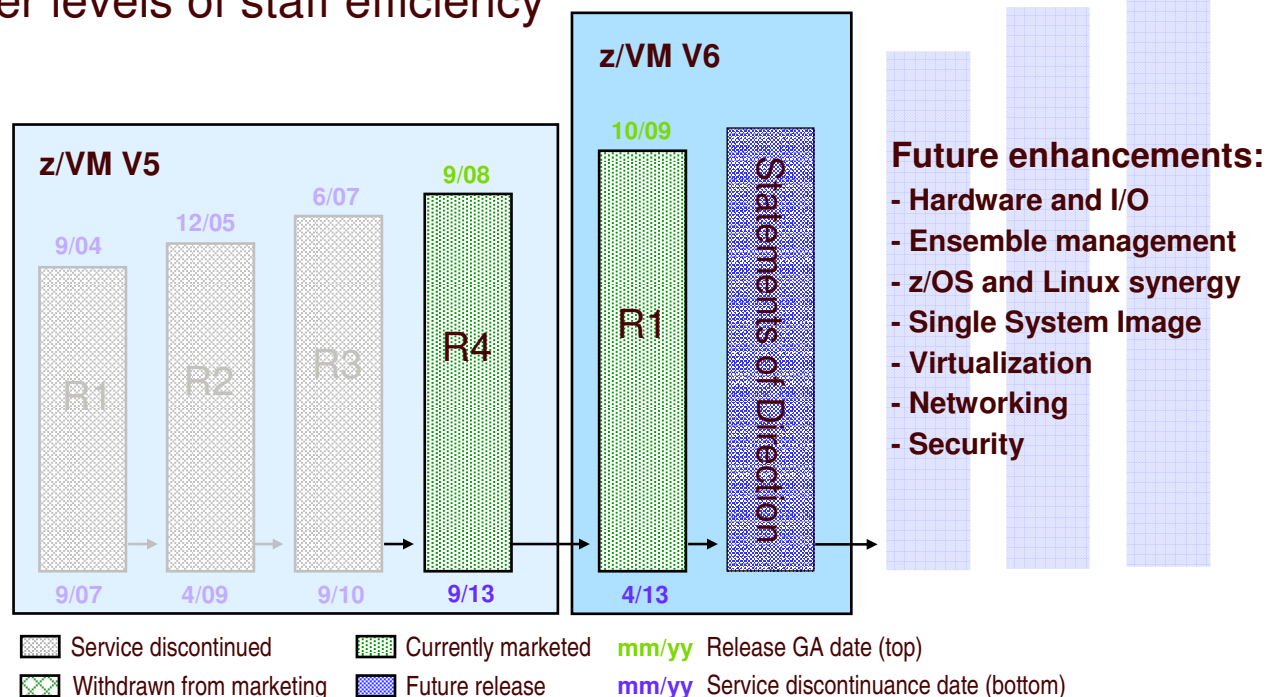
# Agenda

- z/VM Timeline

- z/VM Version 5
  - Enhancements

- z/VM Version 6
  - Enhancements
  - Statement of Direction

z/VM Platform Update

# z/VM Release Status

## z/VM: helping clients "do more with less"

★ Higher core-to-core consolidation ratios
★ Higher levels of resource sharing and utilization
★ Higher levels of staff efficiency

**z/VM V6**

**z/VM V5**

| 9/04 | 12/05 | 6/07 | 9/08 | 10/09 | |
|------|-------|------|------|-------|---|
| R1 | R2 | R3 | R4 | R1 | Statements of Direction |
| 9/07 | 4/09 | 9/10 | **9/13** | **4/13** | |

**Future enhancements:**
- **Hardware and I/O**
- **Ensemble management**
- **z/OS and Linux synergy**
- **Single System Image**
- **Virtualization**
- **Networking**
- **Security**

Service discontinued        Currently marketed        **mm/yy** Release GA date (top)

Withdrawn from marketing        Future release        **mm/yy** Service discontinuance date (bottom)

IBM received EAL 4+ certification of z/VM V5.3 from the German Federal Office of Information Security (Bundesamt für Sicherheit in der Informationstechnik) for conformance to the Controlled Access and Labeled Security protection profiles (CAPP and LSPP) of the Common Criteria standard for IT security, ISO/IEC 15408. z/VM V6.1 is currently undergoing evaluation against OSPP with the labeled security extention at EAL 4+.

# z/VM Version 5
# Marketing and Service Updates

- End of Service for z/VM V5.3 was September 30, 2010

- End of Service for z/VM V5.4 is September 30, **2013**

- z/VM V5.4 is still marketed and available
  - z/VM V5.4 and z/VM V6.1 are available concurrently
  - Clients with System z9 or prior generations should acquire z/VM V5.4

# z/VM Version 6.1
## The Foundation for System z Virtualization Growth
## Available October 23, 2009

- **Architectural Level Set establishes a new z/VM technology base on IBM System z10**
  - z/VM V6 operates only on z10 EC, z10 BC, and z196

- **Allows optimization of z/VM function for greater business value on newer hardware**
  - Prefetch Data instruction improves performance of streaming network connections between guests on a VSWITCH

- **Multi-system virtualization support (future release support)**
  - z/VM clustering and guest mobility statements of direction
  - A more manageable ecosystem for cloud computing
    - add hardware to the workload
    - move workload to hardware
  - Helps clients avoid the virtual machine sprawl challenges of x86 systems: fewer real systems hosting thousands of server images

# New Function

- XRC timestamps

- Hyperswap improvements

- Imbedded z/OS component upgrade to R11

- SSL Server Reliability and Scalability

- Memory Management

- zEnterprise zManager

# XRC Timestamps
- VM64814
- VM64816

- Limited support for STP
  - CP will sync with STP at IPL (no need to deactivate LPAR)
  - CP will, optionally, obtain time zone and leap seconds from STP
  - Time will be placed in all host and guest I/O
  - Time sync checks will be observed by CP
    - No change to the host or guest TOD
    - Delta applied to I/O only
  - Enabled via SYSTEM CONFIG
  - Option to skip timestamp or delay I/O if CP is unable to sync with STP

- Does NOT include STP virtualization
  - Can be configured to allow use by 2nd level systems
    - No STP synchronization
    - Cannot be used 1st level

# Hyperswap Improvements
## - VM64815
## - VM64816

- CP HYPERSWAP command now has additional controls for missing interrupt handling
  - Do not trigger automatic quiesce (default)
    - GDPS *will not* be notified.

  - Trigger automatic quiesce after specified number of MI detection intervals
    - GDPS will be notified

- Better management of PAV and HyperPAV devices

- Avoid unnecessary hyperswaps due to normal maintenance activities
  - Concurrent storage controller upgrade

- New wait state 9060 if abend occurs when Hyperswap is in progress
  - no checkpoint taken, no automatic dump
  - Restart dump if dedicated dump volume, else standalone dump

# z/OS R11 Upgrades - z/VM 6.1 only

- PM08418: Upgrade System SSL to z/OS R11
- VM64805: Add needed functions to LE
- VM64751: Upgrade Binder to z/OS R11
- PM10616: System SSL enablement of FIPS

- System SSL
  - FIPS capability
  - FIPS validation under consideration

- Binder
  - FIPS enablement for System SSL

- Configuration Information
  - http://www.vm.ibm.com/related/tcpip/vmsslinf.html

# SSL Server Reliability and Scalability
- PK97437: SSLADMIN, TCPRUN and Related Packaging Changes
- PK97438: SSLSERV Module Updates
- PK75662: TCPIP Module Updates

- Major rewrite

- Multiple SSL servers with 'resume' cache manager and shared database
    - Can balance total number of sessions against number of sessions per server

- Significant performance improvements
    - Interactive workloads such as telnet
    - Session establishment costs, particularly during mass 'reconnect'

- Migration required
    - http://www.vm.ibm.com/related/tcpip/tcsslspe.html

- Updates to TCPIP as well

z/VM Platform Update                                    © 2009, 2011 IBM Corporation

# Memory Management Updates

- VM64795: Coalesce free frames
- VM64715: Page release improvements *(pending)*
- VM64774: Set / Query Reorder

- Coalesce adjacent free frames
  - Solves contiguous frame problem for functions like virtual SIE that require multiple pages

- Guest Page Release (diagnose 0x10)
  - Reduced contention for data structures that stop guest from running

- SET / QUERY REORDER
  - CP periodically reorders resident guest pages in case CP needs to trim
  - Every 8 GB of resident memory results in 1 second of guest purgatory
  - Reorder can occur frequently in systems with high paging rate and a lot of guest CPU consumption
  - Can turn off reorder for any or all users
  - Recommended only at the direction of IBM support
    - Not all performance problems are Reorder problems!

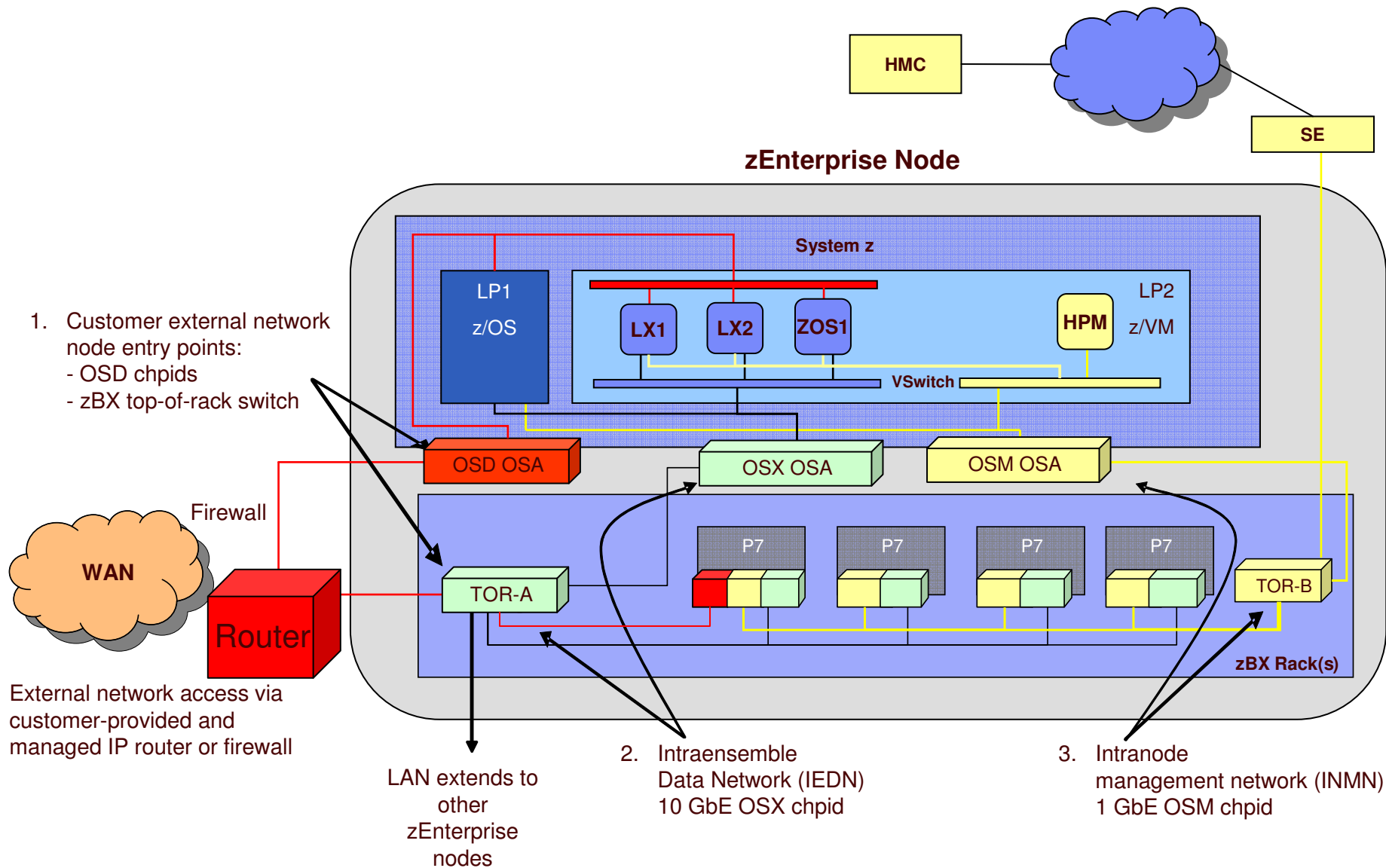# zEnterprise System Ensemble Management via zManager
- VM64822
- VM64904
- VM64917 *(pending)*

- "SuperPTF" includes all service required for z/VM for:
  - z196 compatibility
  - zManager

- Enable zManager to performs system and virtual server management tasks
  - Virtual server configuration
  - Disk storage management
  - Virtual network management
  - Performance monitoring

- Virtual networks are really real…
  - IntraEnsemble Data Network – IEDN – OSX chpid type (you)
  - IntraNode Management Network – INMN – OSM chpid type (IBM)
- …and really virtual
  - IEDN VSWITCH
    - z/VM guest access via dedicated OSX
  - INMN VSWITCH
    - Defined when SMAPI server is started

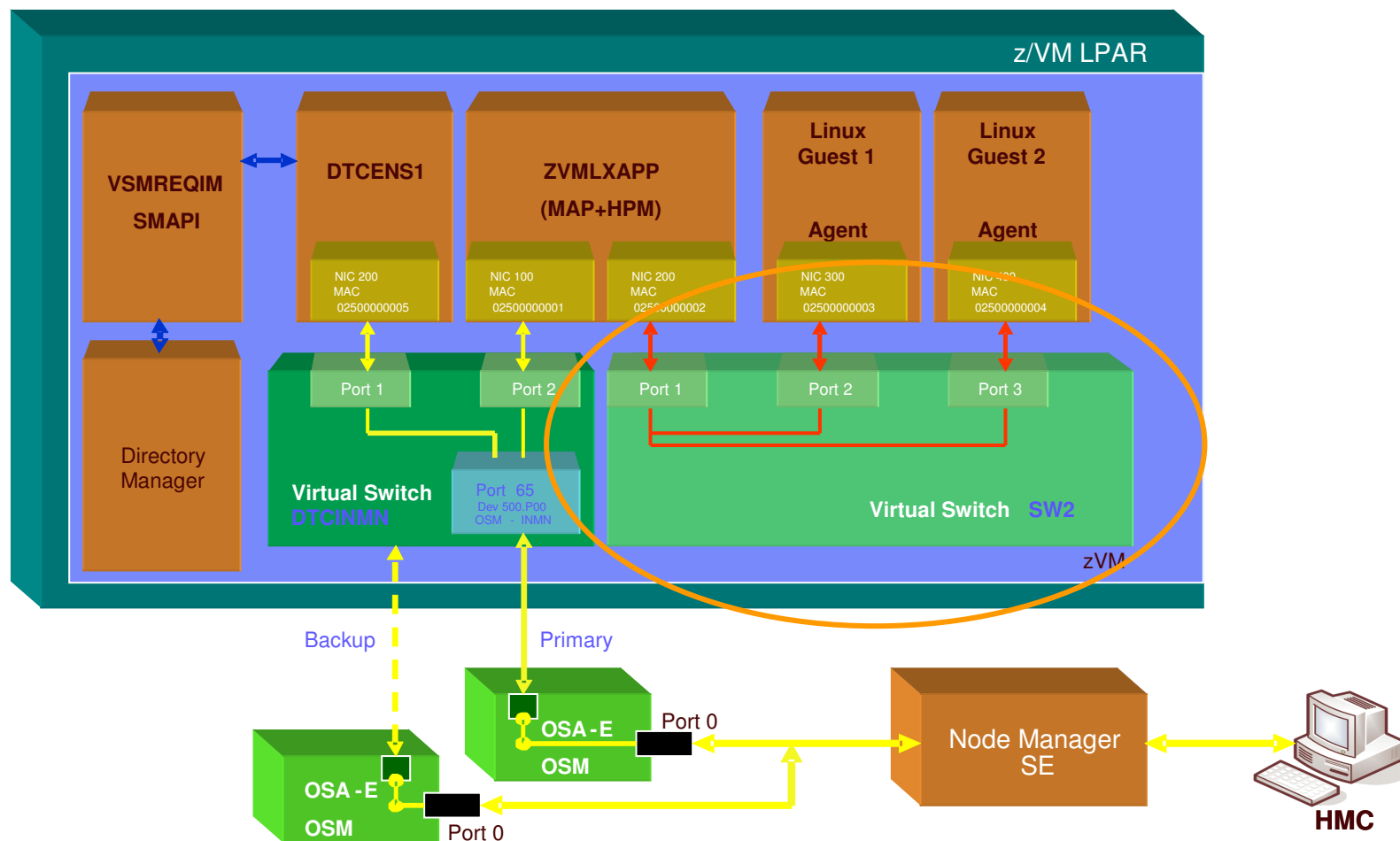- Traditional network connections via OSD

# zEnterprise System Ensemble Management via zManager …

- Choose ensemble management or traditional management for z/VM – do not use both

- If configured to participate in ensemble management, z/VM will automatically join the ensemble at IPL after configuration tasks are performed

- Configuration tasks
  - Set up OSM and OSX channel paths
  - Set up controllers for IEDN and INMN networks
    - Pre-defined controllers DTCENS1 and DTCENS2 for exclusive use by ensemble networks
    - DTCENS1 automatically creates a VSWITCH to provide SMAPI connectivity to INMN network
  - Configure directory manager (REQUIRED)
  - Configure SMAPI servers

- See chapter "Configuring z/VM for an Ensemble" in CP Planning and Administration manual

# zEnterprise Network interconnect

**zEnterprise Node**

HMC

SE

**System z**

LP1
z/OS

LP2
z/VM

LX1  LX2  ZOS1

HPM

VSwitch

1. Customer external network node entry points:
   - OSD chpids
   - zBX top-of-rack switch

OSD OSA

OSX OSA

OSM OSA

Firewall

WAN

Router

P7  P7  P7  P7

TOR-A

TOR-B

zBX Rack(s)

External network access via customer-provided and managed IP router or firewall

LAN extends to other zEnterprise nodes

2. Intraensemble Data Network (IEDN) 10 GbE OSX chpid

3. Intranode management network (INMN) 1 GbE OSM chpid

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# z/VM Virtual Switch Guest Uplink port Configuration for INMN

# Networking in an Ensemble - OSA

- When z/VM is not part of an ensemble, OSX and OSM chpids will not come online
  - Their use requires active participation of OSA firmware in cooperation with zManager

**8492: IBM zEnterprise Unified Resource Manager Overview**
Romney White
Wednesday 11:00 AM-12:00 PM
Room 204BC

IBM

# z/VM Statement of Direction
## Clustered Hypervisor with Guest Mobility

- Clients can cluster up to four z/VM systems in a **Single System Image** (SSI)
- Provides a set of shared resources for the z/VM systems and their hosted virtual machines
- z/VM system images can be run on the same or different System z10 or z196 servers
- Simplifies systems management of a multi-z/VM environment
  - Single user directory
  - Cluster management from any system
    - Apply maintenance to all systems in the cluster from one location
    - Issue commands from one system to operate on another
  - Built-in cross-system capabilities
  - Resource coordination and protection: network and disks
- Dynamically move Linux guests from one z/VM system to another with **Live Guest Relocation**
  - Reduce planned outages; enhance workload management
  - Non-disruptively move work to available system resources **and** non-disruptively move system resources to work
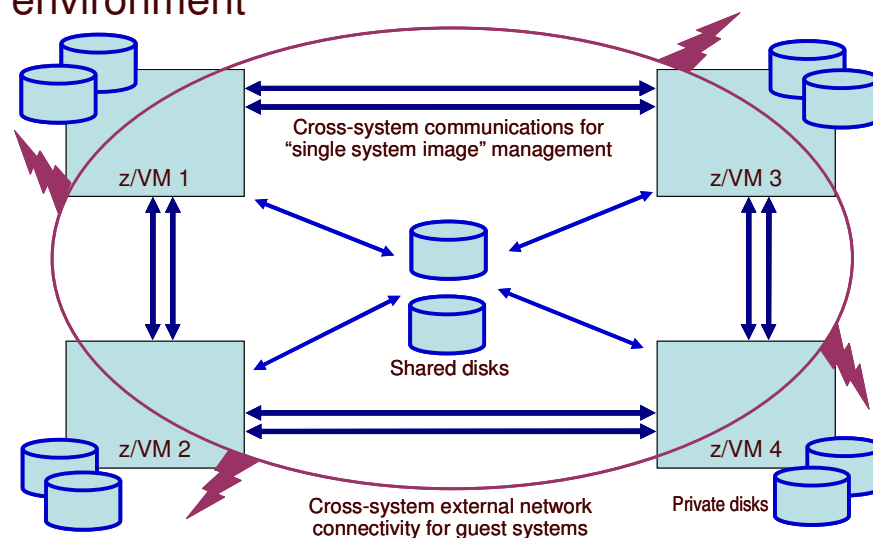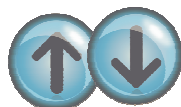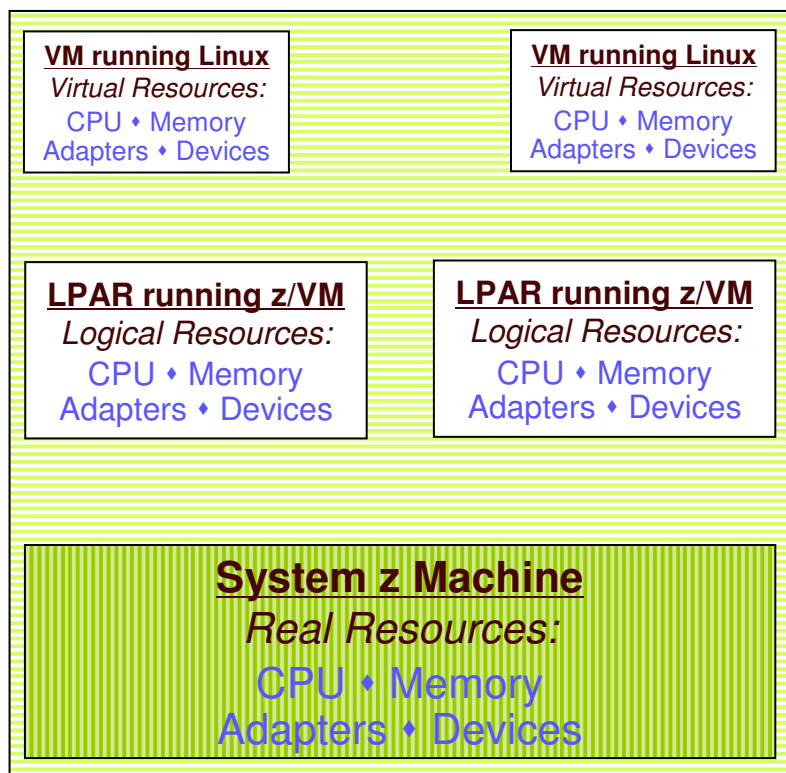
Note: All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice, and represent goals and objectives only.
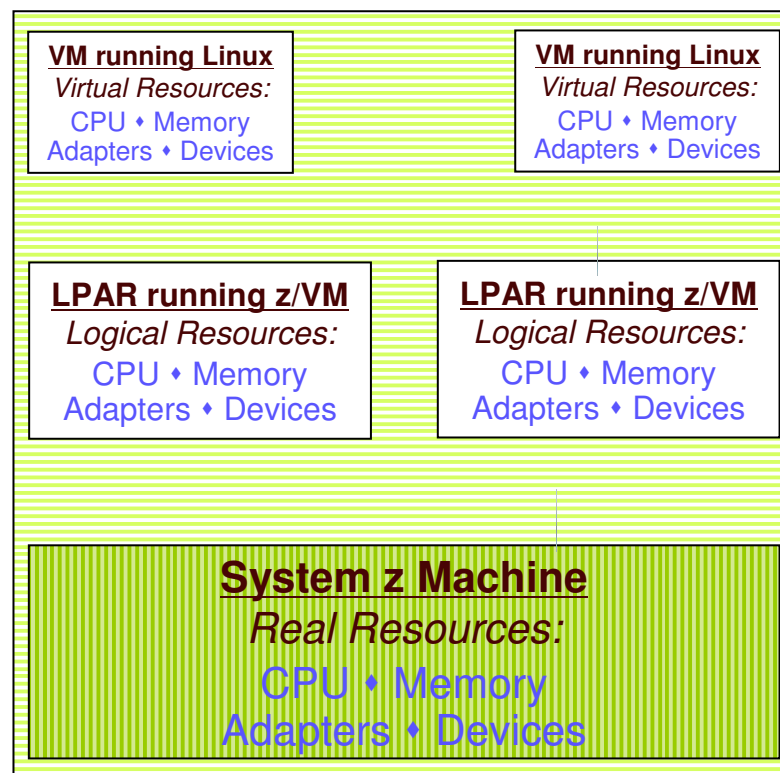


Cross-system communications for "single system image" management

z/VM 1

z/VM 3

Shared disks

z/VM 2

z/VM 4

Cross-system external network connectivity for guest systems

Private disks

# z/VM and System z Virtualization Leadership
## Multi-Level Workload and Resource Management
## Dynamically Add Resources to Workload **and** Move Workload to Resources



**VM running Linux**
*Virtual Resources:*
CPU ♦ Memory
Adapters ♦ Devices

**VM running Linux**
*Virtual Resources:*
CPU ♦ Memory
Adapters ♦ Devices

**VM running Linux**
*Virtual Resources:*
CPU ♦ Memory
Adapters ♦ Devices

**VM running Linux**
*Virtual Resources:*
CPU ♦ Memory
Adapters ♦ Devices

**LPAR running z/VM**
*Logical Resources:*
CPU ♦ Memory
Adapters ♦ Devices

**LPAR running z/VM**
*Logical Resources:*
CPU ♦ Memory
Adapters ♦ Devices

**LPAR running z/VM**
*Logical Resources:*
CPU ♦ Memory
Adapters ♦ Devices

**LPAR running z/VM**
*Logical Resources:*
CPU ♦ Memory
Adapters ♦ Devices

**System z Machine**
*Real Resources:*
CPU ♦ Memory
Adapters ♦ Devices

**System z Machine**
*Real Resources:*
CPU ♦ Memory
Adapters ♦ Devices

Concurrent Hardware Upgrade

Concurrent Hardware Upgrade

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# For more information on SSI and LGR….

**8453: z/VM Single System Image and Guest Mobility Preview**

John Franciscovich

Thursday  9:30 AM-10:30 AM

Room 203B

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# New Releases of IBM z/VM Management Software
## since September 2010

- **Operations Manager for z/VM V1.4**
  - Improved support for repeating events
  - Can define unique RACF or other ESM profiles per Operations Manager instance
  - Improve data sharing among action routines
  - Usability improvements when viewing consoles, spool files, and the Operations Manager log
  - Support for IPv6

- **Tape Manager for z/VM V1.3**
  - Share a single tape catalog among multiple Tape Manager instances
  - Usability enhancements
  - Support for RACF or other ESM control of commands and tape pool access
  - Manage and use StorageTek® tape devices

**8458: Automation and Backup Scenarios for z/VM and Linux on System z**
Tracy Dean
Tuesday  11:00 AM-12:00 PM
Room 203B

# *Thanks!*

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