Linux on System z ?
IBM has you covered

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Topics

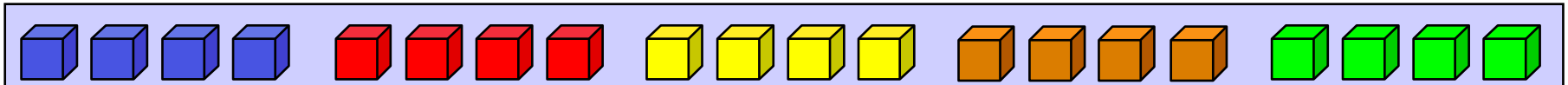
- **Why ?**
  - Linux, Virtualization, System z
- **Getting Started**
- **A Roadmap - Crawl, Walk, Run**
  - What's available ?
  - Scenarios
- **Summary**

Why Linux ?

- **Open source – IBM is committed to open standards**
- **Platform agnostic**
- **IBM has you covered – Linux Technology Center**
  - *Austin, TX*
  - *Beaverton, OR*
  - *Research Triangle Park, NC*
  - *Rochester, MN*
  - *Bangalore, India*
  - *Bejing, China*
  - *Boeblingen, Germany*
  - *Hortolandia, Brazil*
  - *Yamamoto, Japan*
- **http://ltc.linux.ibm.com/**

Why Virtualization ?

- **Concept**
- **Business Value**



Virtual Resources

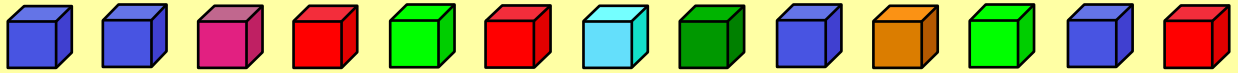
- Proxies for real resources: same interfaces/functions, different attributes.
- May be part of a physical resource or multiple physical resources.

Virtualization

- Creates virtual resources and "maps" them to real resources.
- Primarily accomplished with software and/or firmware.

Resources

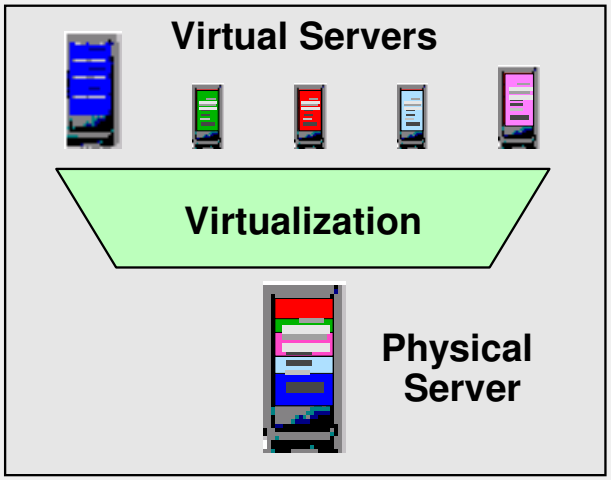
- Components with architected interfaces/functions.
- May be centralized or distributed. Usually physical.
- Examples: memory, disk drives, networks, servers.



- **Separates presentation of resources to users from actual resources**
- **Aggregates pools of resources for allocation to users as virtual resources**

Server Virtualization Business Value

Roles:
- Consolidations
- Dynamic provisioning/hosting
- Workload management
- Workload isolation
- Software release migration
- Mixed production and test
- Mixed OS types/releases
- Reconfigurable clusters
- Low-cost backup servers



Possible Benefits:
- High resource utilization
- Great usage flexibility
- Enhanced workload QoS
- High availability / security
- Low cost of availability
- Low management costs
- Enhanced interoperability
- Legacy compatibility
- Investment protection

In the final analysis, the potential virtualization benefits take three forms:

- **Help reduce hardware costs**
  - Help increase physical resource utilization
  - Small footprints
- **Can improve flexibility and responsiveness**
  - Virtual resources can be adjusted dynamically to meet new or changing needs and to optimize service level achievement
  - Virtualization is a key enabler of on demand operating environments
- **Can reduce management costs**
  - Fewer physical servers to manage
  - Many common management tasks become much easier

Can reduce Energy costs! Can reduce Energy costs! Can reduce Energy costs!

Why z ?

- **The Ultimate platform**
- **Customer example**
- **Again – why z ? A 30 year head start**
- **Project Green**
- **http://www-03.ibm.com/systems/z/os/linux/**

IBM System z: The Ultimate Virtualization Platform

- ***Virtualize*** **everything with up to 100% utilization rates**
  - CPU, memory, network, I/O, cryptographic features, coupling facility, ...

Consolidate all types of workloads

- ***Massively scale*** **your workload on a single System z mainframe**
  - The Linux-on-z/VM record is 97,943 virtual machines
  - Each virtual machine on z/VM can access up to 24,576 devices

Smart economics: start small and grow big in the same box

- ***Security*** **for everything**
  - Highest security classification for general purpose servers in the world
  - System z LPAR technology is EAL 5 certified

Secure your virtual servers and reduce business risk

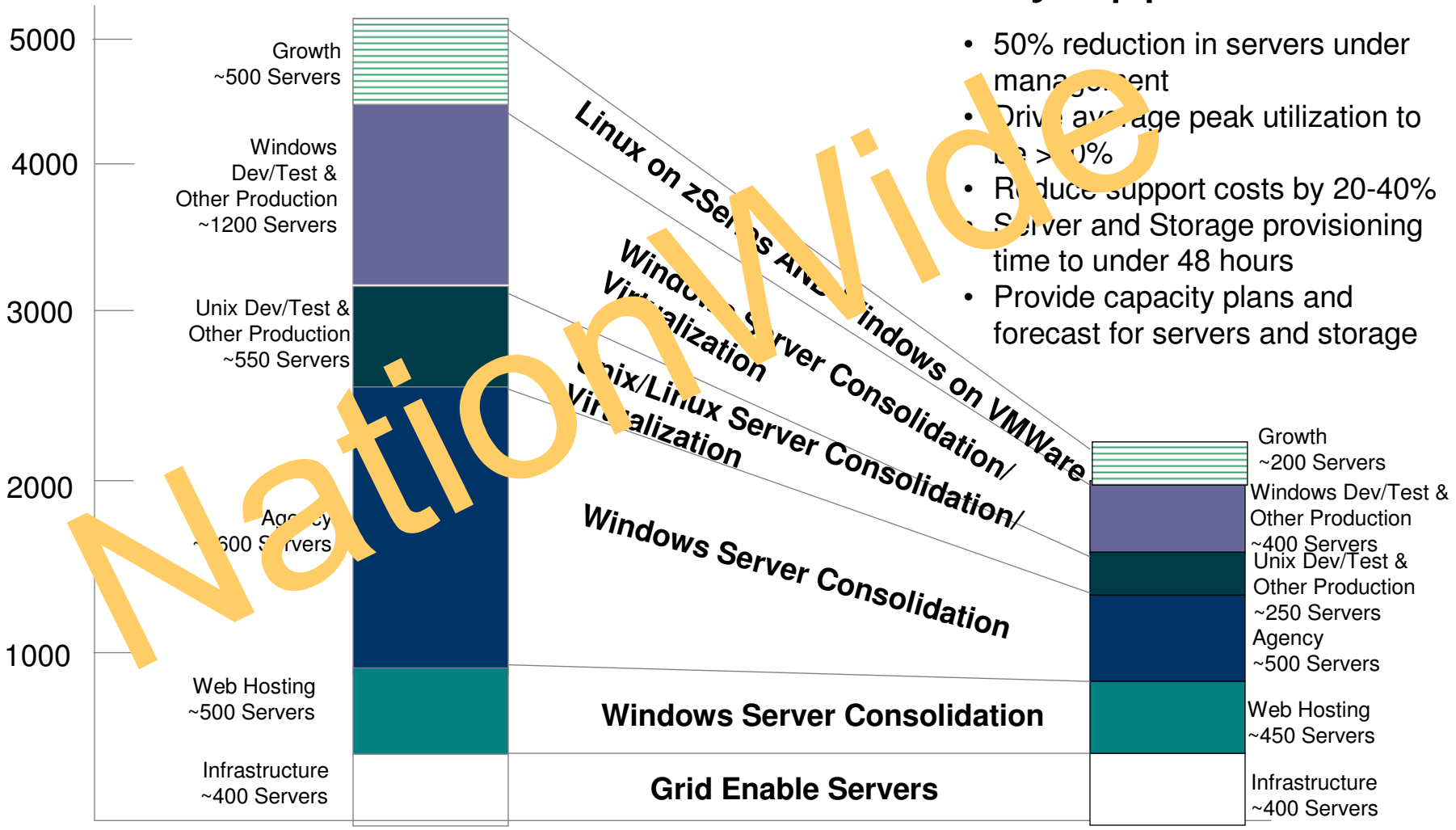
- ***Non-disruptively add*** **anything**
  - 54x CPU scalability per mainframe, 32x CPU scalability per z/VM LPAR
  - z/VM is designed to support up to 8 TB of active virtual memory

Rapidly respond to workload spikes

- ***Optimize and integrate*** **it all with the IBM software portfolio**

Increase staff productivity and virtualize the enterprise

Server Optimization is our overall goal. zLinux Virtualization one of the many approaches.



- 50% reduction in servers under management
- Drive average peak utilization to > 80%
- Reduce support costs by 20-40%
- Server and Storage provisioning time to under 48 hours
- Provide capacity plans and forecast for servers and storage

http://www-01.ibm.com/software/success/cssdb.nsf/CS/JSTS-7JERD7?OpenDocument&Site=eserverzseries&cty=en_us

System z Virtualization: a Multidimensional Solution

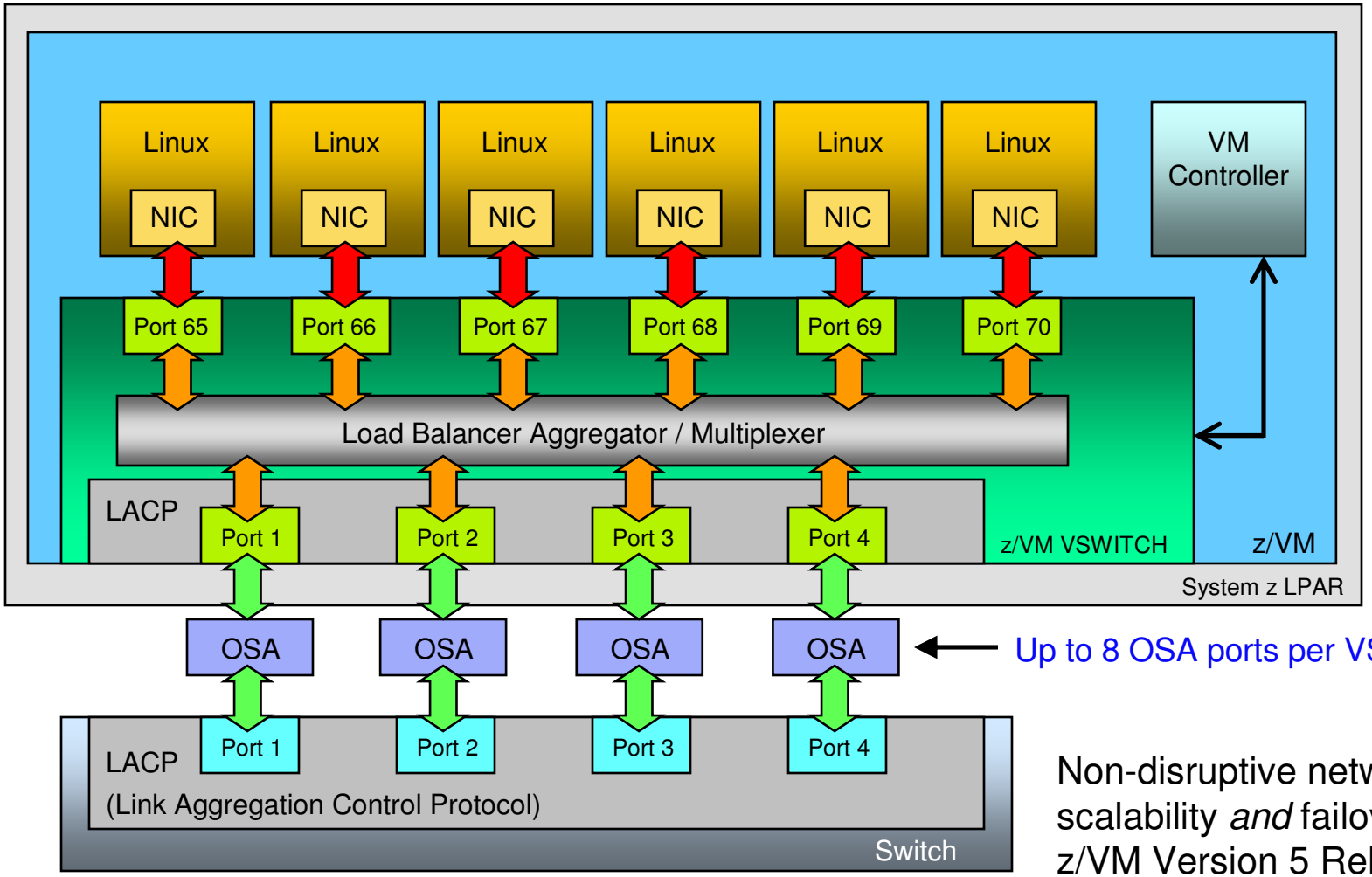
Virtualization Support is Built In, Not Added On

With coordinated investments in the virtualization technology stack

- **Application support layer**
  - Open, reliable operating system
  - Virtual server awareness infrastructure
  - Enterprise applications
- **Hypervisor layer (z/VM)**
  - Shared-memory based virtualization model
  - Highly granular resource sharing and simulation
  - Flexible virtual networking
  - Resource control and accounting
  - Server operation continuity (failover)
  - Server maintenance tools and utilities
- **Hardware layer**
  - Legendary reliability, scalability, availability, security
  - Logical partitioning (LPAR)
  - Processor and peripheral sharing
  - Interpartition communication
  - Virtualization support at the hardware instruction level

z/VM Virtual Switch Link Aggregation Support

Enhanced Networking Bandwidth and Business Continuance



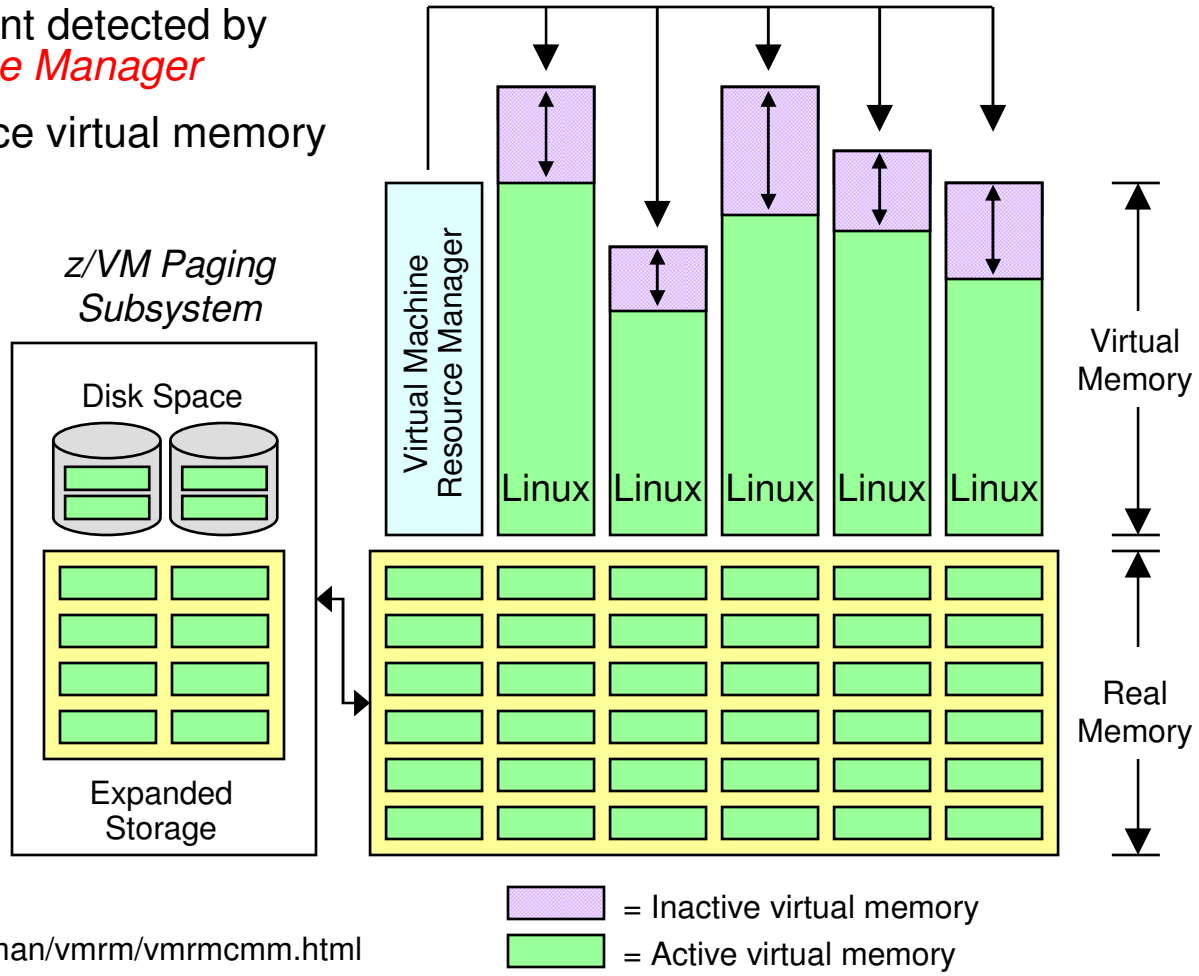
Note: Requires OSA-Express2 support available with IBM System z9 servers

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

Linux and z/VM Technology Exploitation

Cooperative Memory Management (CMM)

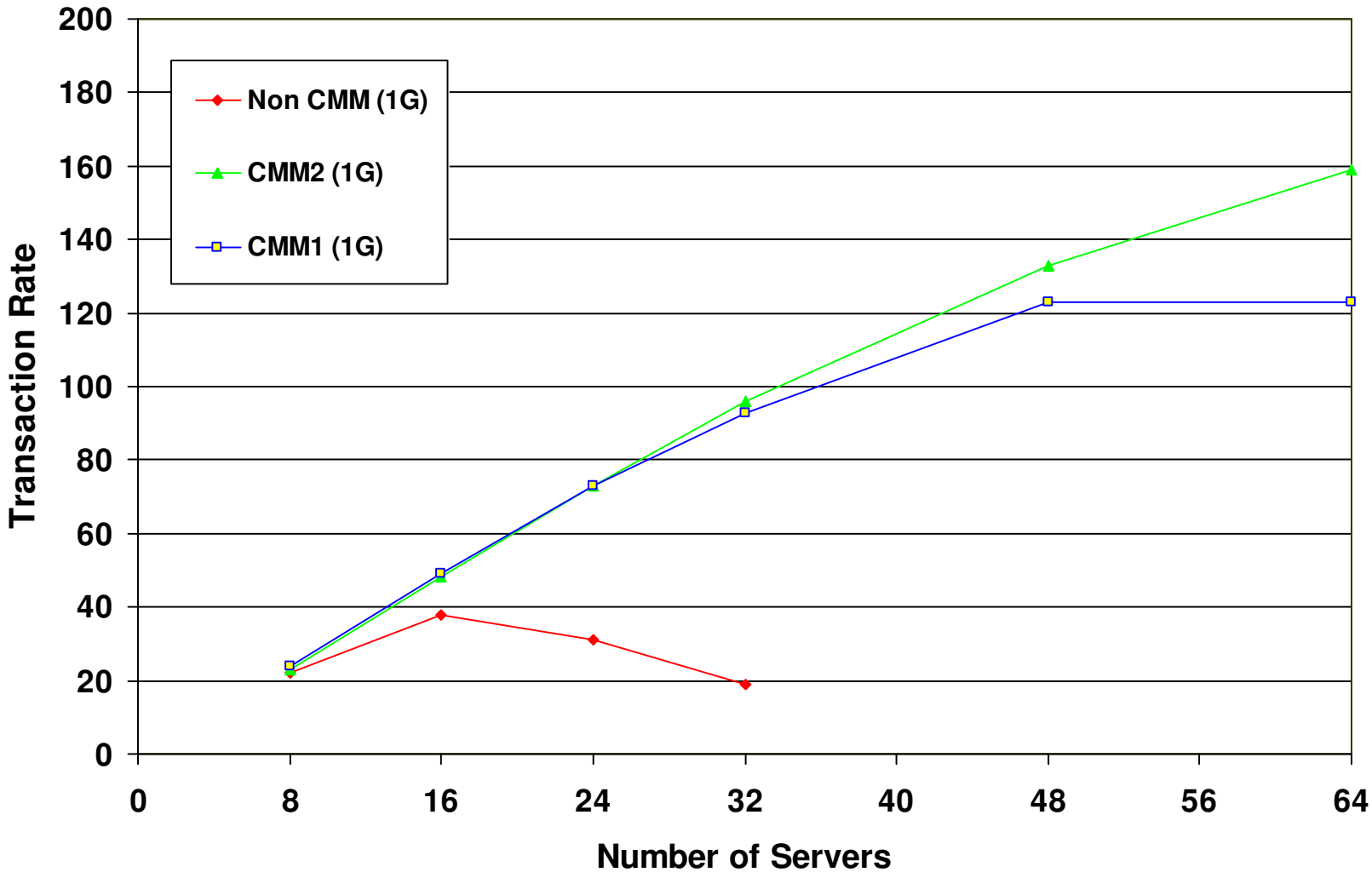
- Solution: real memory constraint detected by z/VM *Virtual Machine Resource Manager*
- Linux images signaled to reduce virtual memory consumption
- Linux memory pages are released
- Demand on real memory and z/VM paging subsystem is reduced
- Helps improve overall system performance and guest image throughput



Learn more at:
ibm.com/servers/eserver/zseries/zvm/sysman/vmrm/vmrmcmm.html

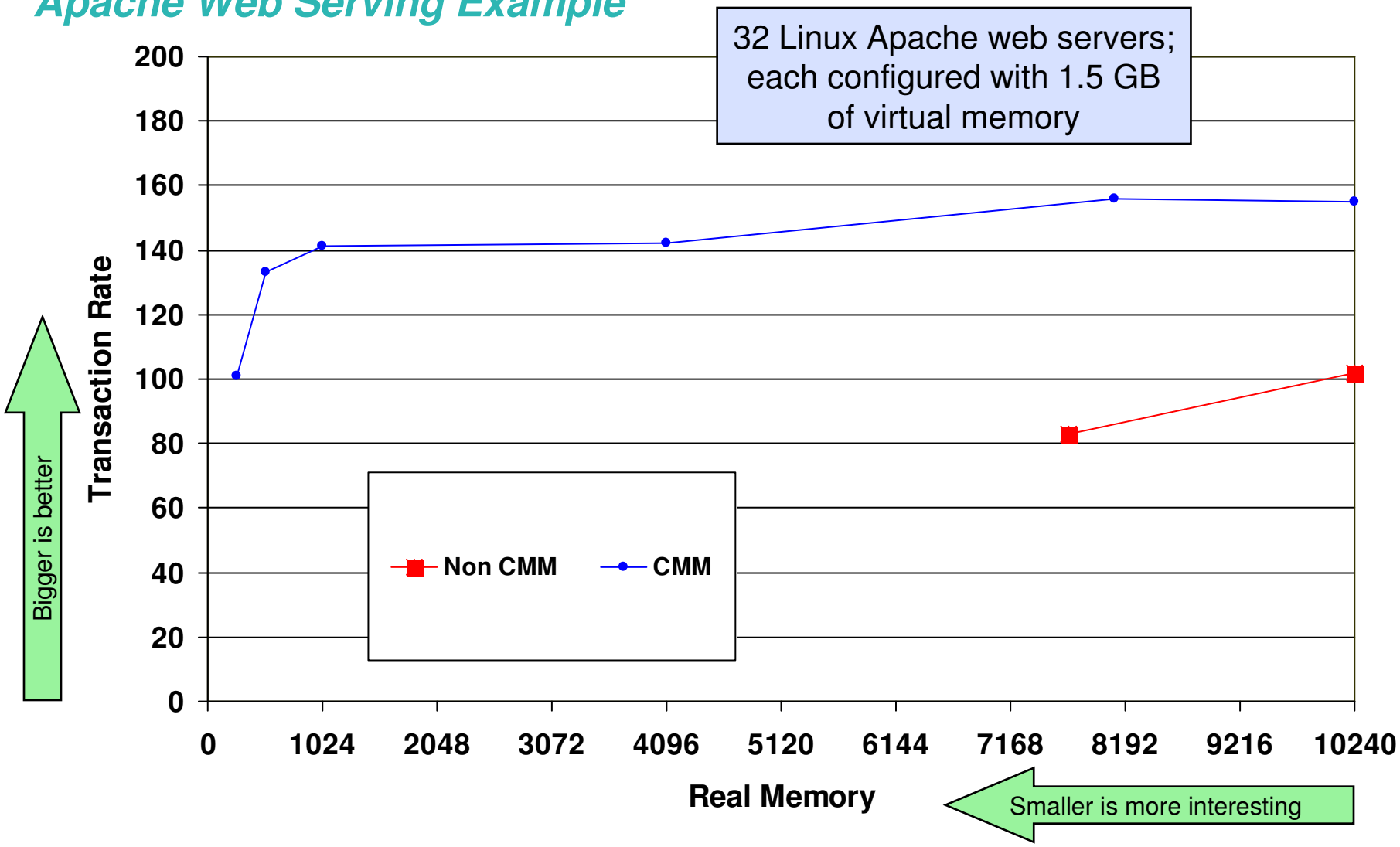
Transaction Rate vs. Number of Servers

for various Storage Management Products using Apache servers with a virtual storage size as shown in parenthesis in the legend; z9 6GB / 2GB



Cooperative Memory Management with Linux on z/VM

Apache Web Serving Example

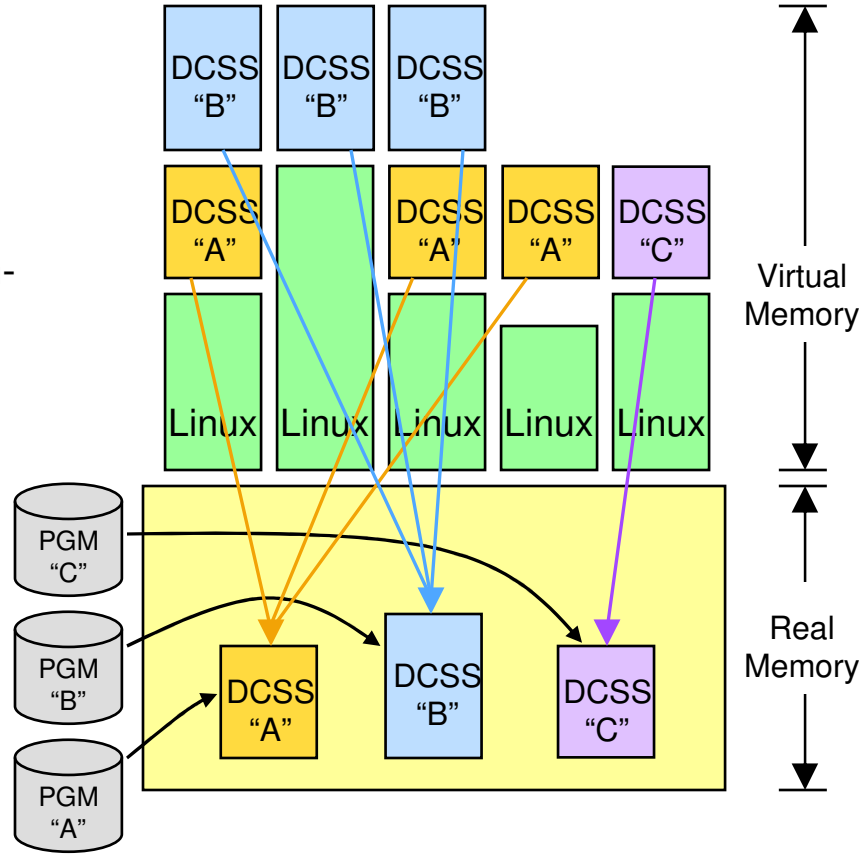


Linux and z/VM Technology Exploitation

Linux Exploitation of z/VM Discontiguous Saved Segments (DCSS)

- DCSS support is Data-in-Memory technology
  - Share a single, real memory location among multiple virtual machines
  - High-performance data access
  - Can reduce real memory utilization
- Linux exploitation: shared program executables
  - Program executables are stored in an execute-in-place file system, then loaded into a DCSS
  - DCSS memory locations can reside outside the defined virtual machine configuration
  - Access to file system is at memory speeds; executables are invoked directly out of the file system (no data movement required)
  - Avoids duplication of virtual memory and data stored on disks
  - Helps enhance overall system performance and scalability

Learn more:
"Using DCSS/XIP with Oracle 10g on Linux for System z"
www.redbooks.ibm.com/redpieces/abstracts/sg247285.html



IBM Consolidation Announcement Highlights

- IBM will consolidate thousands of servers onto approximately 30 System z mainframes
- We expect substantial savings in multiple dimensions: energy, software and system support costs
- Major proof point of IBM's 'Project Big Green' initiative
- The consolidated environment will use 80 percent less energy
- This transformation is enabled by sophisticated virtualization capability provided by System z

IBM'S PROJECT BIG GREEN SPURS GLOBAL SHIFT TO LINUX ON MAINFRAME

Plan to shrink 3,900 computer servers to about 30 mainframes targets 80 percent energy reduction over five years

Optimized environment to increase business flexibility

ARMONK, NY, August 1, 2007 – In one of the most significant transformations of its worldwide data centers in a generation, IBM (NYSE: IBM) today announced that it will consolidate about 3,900 computer servers onto about 30 System z mainframes running the Linux operating system. The company anticipates that the new server environment will consume approximately 80 percent less energy than the current set up and expects significant savings over five years in energy, software and system support costs.

At the same time, the transformation will make IBM's IT infrastructure more flexible to evolving business needs. The initiative is part of Project Big Green, a broad commitment that IBM announced in May to sharply reduce data center energy consumption for IBM and its clients.

Topics

- **Why ?**
  - Linux, Virtualization, System z
- **Getting Started**
- **A Roadmap - Crawl, Walk, Run**
  - What's available ?
  - Scenarios
- **Summary**

Getting started

- **General resources**
  - Linux Technology Center
  - z/VM web site
  - Linux on System z web site
- **Tools for picking an application/workload and TCO**
  - Tim Hayford - thayfor@us.ibm.com
  - Liz Holland - hollande@us.ibm.com
  - zPSG – sizing to run app on z
  - zPCR – consolidation sizer
  - Linux ROT Quicksizer – App and server peak utilization
  - Linux Server Consolidation – App and server peak and workload characteristics
  - CCL Sizer – Trans per sec, bytes per sec, or CCU%
  - CP2KVMXT & zCP3000 – existing servers
- **Architectural guidance**
  - Bill Reeder – breeder@us.ibm.com
- **Migration Factory**
  - http://www-03.ibm.com/systems/migratetoibm/factory/

Topics

- **Why ?**
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What's available ?

- **STG**
  - HMC
  - IBM Director
- **Tivoli**
  - A lot

z/VM Integrated Systems Management

Using the System z Hardware Management Console (HMC)

Included in z/VM V5.3

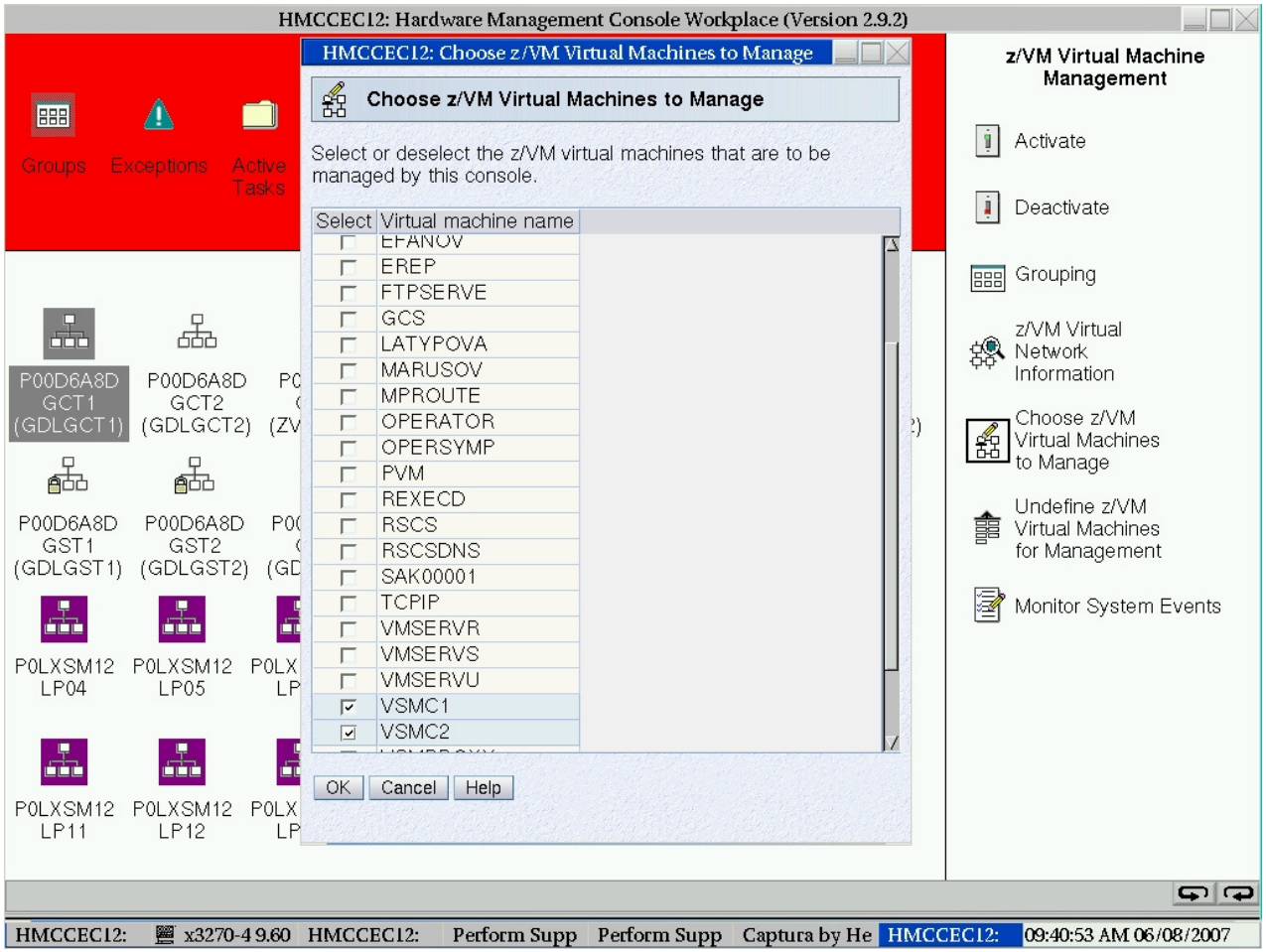
- Allows basic z/VM functions to be performed from HMC
- Network connection not required
- Uses SCLP hardware interface to access z/VM systems management APIs
- Requires PTFs for APARs VM64233 and VM64234

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 Virtual Linux Servers on System z

Using IBM Director for Linux on System z V5.20 with z/VM Center

IBM Director Base Functions

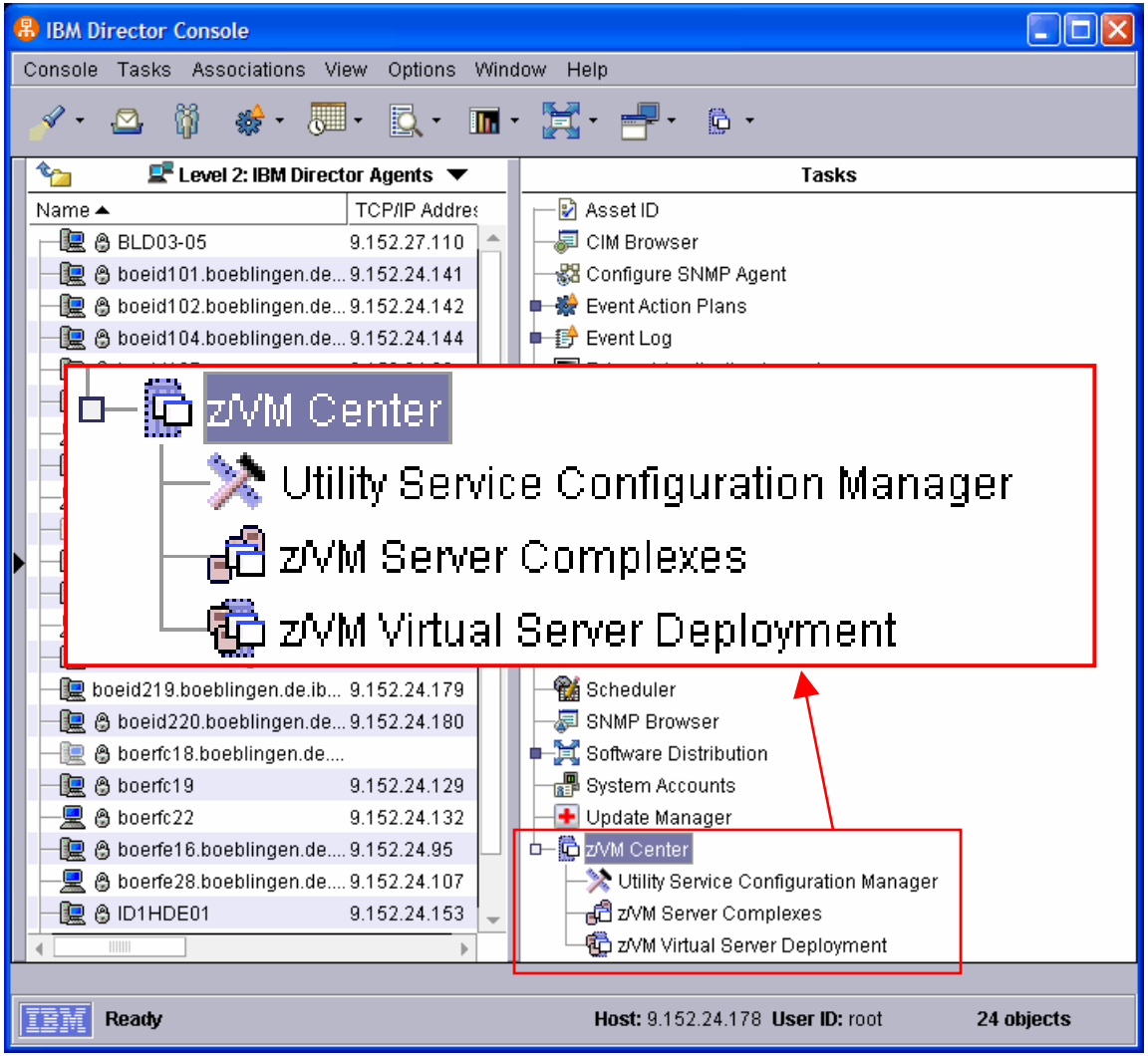
- Discovery
- Group Management
- Inventory
- Basic Resource Monitor
- Event Action Plan (EAP)
- Process Management
- Remote Session
- File Transfer
- Network Configuration
- Software Distribution
- SNMP Browser

z/VM Center

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

Software Distribution Premium Edition New

- Software package distribution



IBM Virtualization Management for Linux on z/VM – 2008

IBM System z Virtualization Infrastructure
- IBM System z hardware (including LPAR hypervisor)
- IBM z/VM Version 5.3

Monitoring for Virtualization Infrastructure
- z/VM Virtual Machine Resource Manager (1)
- IBM z/VM Performance Toolkit for VM feature (3)
- IBM Director
- IBM Tivoli OMEGAMON XE on z/VM and Linux
- IBM Tivoli Monitoring
- IBM Tivoli Composite Application Manager for SOA

Automation for Virtualization Infrastructure
- IBM Operations Manager for z/VM
- IBM Tivoli Enterprise Console
- IBM Tivoli Workload Scheduler
- IBM Tivoli Netcool/OMNIbus
- IBM Tivoli Event Manager (OMNIbus) (4)

Resiliency and Provisioning Management
- IBM z/VM DirMaint feature (3)
- z/VM Center task of IBM Director
- IBM Tivoli Provisioning Manager (4)
- IBM Tivoli System Automation for Multiplatforms
- IBM Tivoli Remote Control
- IBM Tivoli Security Compliance Manager

Application Layer Management
- IBM Tivoli Application Dependency Discovery Manager
- IBM Tivoli Service Level Advisor
- IBM Tivoli OMEGAMON XE for Messaging
- IBM Tivoli Composite Application Manager for __ (5)
- IBM Tivoli License Compliance Manager

Extended Infrastructure Management *(Security)*
- IBM z/VM RACF Security Server feature (3)
- IBM Tivoli zSecure
- IBM Tivoli Access Manager for e-business
- IBM Tivoli Access Manager for OS
- IBM Tivoli Federated Identity Manager
- IBM Tivoli Identity Manager
- IBM Directory Server
- IBM Directory Integrator
- IBM Tivoli Compliance Insight Manager
- IBM Tivoli Risk Manager
- IBM Tivoli Security Operations Manager
- IBM Tivoli Federated Identity Manager Business Gateway (4)

Extended Infrastructure Management *(Storage)*
- z/VM DFSMS/VM feature (2)
- IBM SAN Volume Controller (SVC)
- IBM Tivoli Storage Manager
- IBM TotalStorage Productivity Center (SLES 9 only)
- IBM Backup and Restore Manager for z/VM
- IBM Tape Manager for z/VM
- IBM Archive Manager for z/VM

Extended Infrastructure Management *(Network)*
- z/VM RSCS feature (3)
- IBM Tivoli Network Manager for IP (4)

Business Services Management
- IBM Tivoli Business Service Manager (4)
- IBM Tivoli Service Request Manager (4)
- IBM Change and Configuration Management Database (CCMDB) (4)
- IBM Tivoli Business Continuity Process Manager (4)
- IBM Tivoli Asset Management for IT (4)
- IBM Tivoli Maximo Asset Management (4)

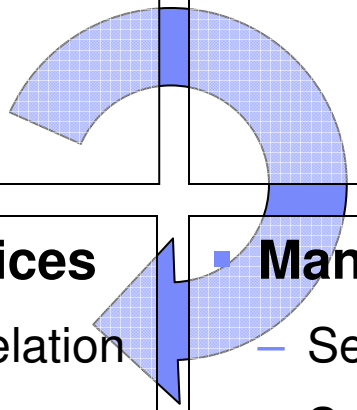
(1) No-charge function included in z/VM (2) No-charge feature of z/VM (3) Priced feature of z/VM (4) Coming in 2008 (5) __ = Response Time, Web Resources, Transactions.

For specific releases, please refer to the Tivoli Platform Support Matrix at: http://www-306.ibm.com/software/sysmgmt/products/support/Tivoli_Supported_Platforms.html

Incremental management value – Crawl, walk run

- **Manage the environment**
  - Base monitoring feature
  - Storage & Data Protection feature
  - Security & compliance feature

- **Manage the workload**
  - Automation feature
  - Application management feature
  - Capacity planning feature



- **Manage the business services**
  - Event consolidation and correlation feature
  - Financial management feature
  - Business Service Management feature
  - High availability feature

- **Manage service delivery**
  - Service operations feature
  - Service transition feature

Manage the Environment

- **Base monitoring**
  - Performance Tool Kit
  - Operation Manager for z/VM
  - OM XE on z/VM and Linux
- **Storage & Data Protection**
  - Backup and Restore Manager for z/VM
  - Tape Manager for z/VM
  - Archive Manager for z/VM
- **Security & compliance**
  - zSecure
  - TSEIM
  - License Compliance Manager

Manage the Workload

- **Automation feature (production control)**
  - System Automation for Multiplatforms
  - System Automation for App Manager
  - Tivoli Workload Scheduler
- **Application management**
  - ITCAM for Applications
  - ITCAM for WebSphere
  - TADDM
- **Capacity planning**
  - TDSz
  - TADDM- consolidation analysis/ impact
  - Performance Modeler

Manage Service Delivery

- **Service operations feature**
  - Service Request Manager (Incident and Problem Management)
  - OMEGAMON
  - Monitoring
  - NetView
- **Service transition feature**
  - Change & Configuration Management Database (TADDM Inclusive)
  - z/OS DLA
  - Release Process Manager
  - Provisioning Manager

Manage the Business Services

- **Event consolidation and correlation**
  - Monitoring
  - OMEGAMON
  - NetView
  - Event Pump
  - Omnibus
- **Financial management**
  - Usage and Accounting Manager
  - Decision Support z
  - Asset Management for IT
- **Business Service Management**
  - Event Pump for z/OS
  - Business Services Manager
- **High availability**
  - Tivoli Dynamic Workload Broker
  - System Automation for Multiplatform
  - NetViewz

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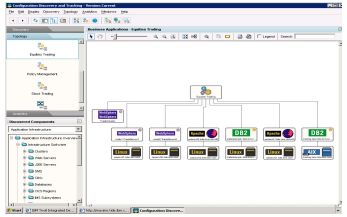
Server Consolidation onto z/VM and Linux

Server Consolidation for z/VM and Linux

Executive Directive

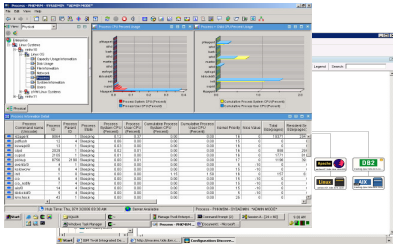
The customer executive has received a report that their System z machines have surplus capacity with a total cost of ownership saving recommendation to move a set of workload running on distributed servers onto Linux on System z guests hosted on zVM.

IT Asset Discovery



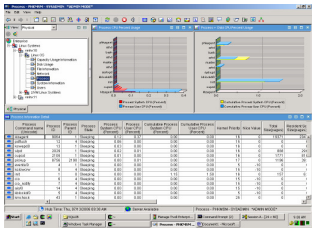
Using Tivoli Workload Scheduler, the capacity planner starts the auto-discovery and population of distributed IT assets and relationships into TADDM to create an IT dependency map including pre-configured business applications and related distributed IT components into TADDM.

Application Identification



Using ITM, Performance Analyzer reports, and TADDM's physical and application infrastructure views, the Capacity Planner identifies which business processes have software components running on under utilized UNIX servers. As initial candidates, he identifies applications that are either self contained or whose software components are easily isolatable.

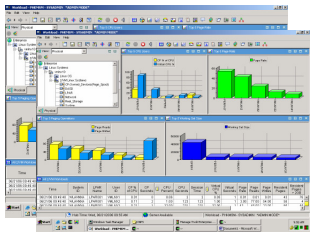
Benchmarking



Prior to moving any of the applications, the capacity planner uses ITM and ITCAM to monitor the availability and performance of the selected applications running on the distributed servers and evaluates how they are tracking compared to the SLAs.

Mainframe services installs and configures a z/VM host on a System z LPAR and subsequently Linux guests on that zVM host.

The Linux System Programmer installs the selected applications and associated middleware onto the Linux on System z guests. As part of the installation and configuration process, he converts from the software approach for data replication implemented on distributed data servers to a hardware process available on System z.



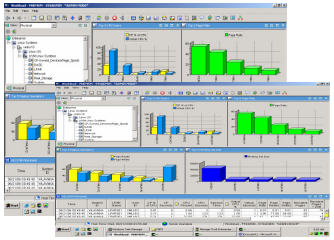
In addition the System Programmer installs OMEGAMON XE on zVM and Linux and Operations Manager for z/VM for systems management.

As applications are moved to Linux on System z, the Capacity Planner will use RMF, OMEGAMON and ITCAM to determine the impact of each workload moving to Linux on System z. As additional load is placed on the environment, the Capacity Planner needs to assess whether additional workloads can be moved without over committing resources, and/or plan for the acquisition of additional hardware. In addition, the Software Process Engineer will be comparing performance and throughput measurements for distributed servers versus System z to demonstrate that performance is not adversely impacted. To perform this task he will be using tools such as ITM for green, ITCAM for RT and ITCAM for Transactions.

Workload Management on z/VM and Linux - Crawl

SMCz for z/VM and Linux

Systems Monitoring

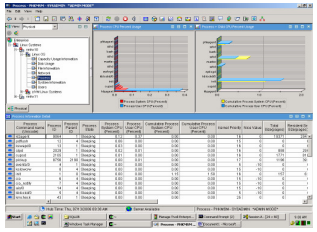


OMEGAMON XE on z/VM and Linux detects that a z/VM Linux Guest CPU utilization is very high. A situation is triggered that issues a message via automation.

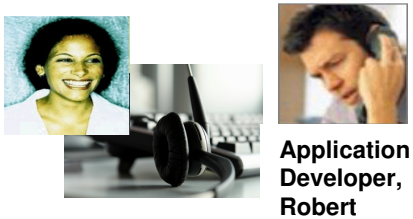
Operations Management

Operations Manager for z/VM is monitoring the messages. Operations Manager for z/VM detects the Linux Guest CPU utilization message. Operations Manager invokes a rule to execute a CP tuning command to allocate more resource to the Linux Guest.

Workload Monitoring



Even after more resources are allocated, the Linux guest CPU utilization is still higher than desired. Linux OS monitoring agent determines what processes hosted on the guest are consuming the CPU.



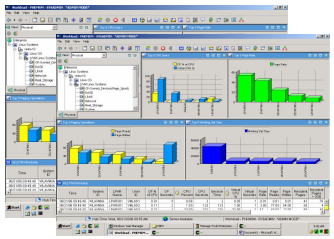
Application Developer, Robert

Annette calls the application developer to determine and resolve the root cause of the problem.

Workload Management on z/VM and Linux - Walk

SMCz for z/VM and Linux

Systems Monitoring



OMEGAMON XE on z/VM and Linux detects that a z/VM Linux Guest CPU utilization is very high. A situation is triggered that issues a message via automation.

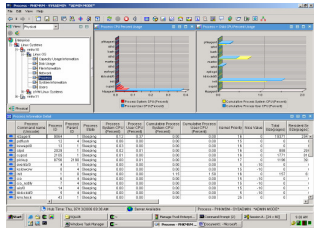
→

Operations Management

Operations Manager for z/VM is monitoring the messages. Operations Manager for z/VM detects the Linux Guest CPU utilization message. Operations Manager invokes a rule to execute a CP tuning command to allocate more resource to the Linux Guest.

→

Workload Monitoring



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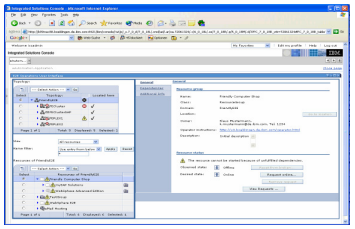
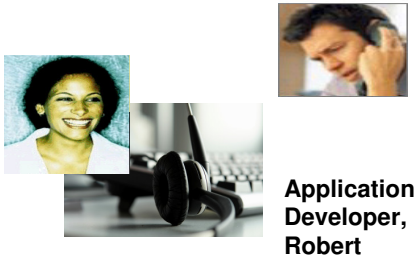
→

Workload Automation



System Automation for Multiplatforms moves all resources belonging to the processes to another less utilized Linux guest and restarts them.



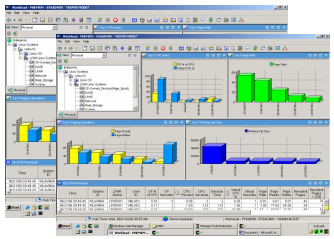
Application Developer, Robert

→ Annette calls the application developer to determine and resolve the root cause of the application hish CPU usage.

Workload Management on z/VM and Linux - Run

SMCz for z/VM and Linux

Systems Monitoring



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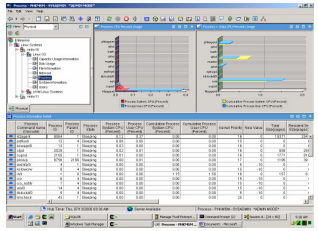
Workload Monitoring



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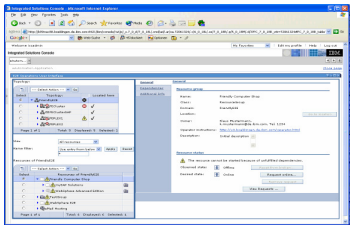
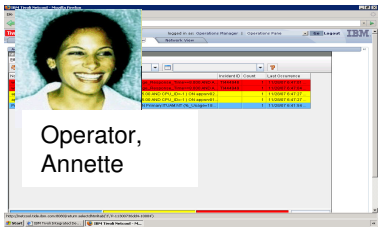
→

Workload Automation



An important production application fails on the sick system. System Automation for Multiplatforms moves all resources belonging to that application to another Linux guest and restarts them and sends a notification to Operations.

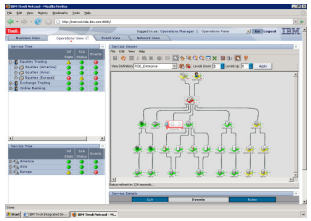
Operations Dashboard: Event View



Operator Annette monitors business services using the Operations Dashboard. Suddenly, a high priority incident alerts her that Linux for System z processes are consuming significantly higher CPU even after automation was triggered.

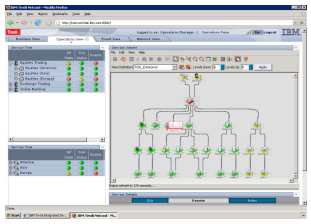
→

Operations Dashboard: Operations View



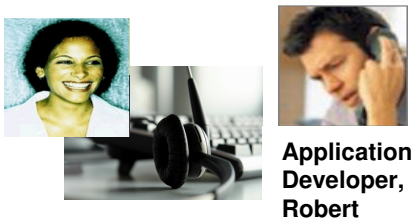
She navigates to the graphical business service hierarchical view on the business service dashboard to help isolate the problem.

→



From the business service hierarchical view that had been manually built, Annette determines that the Linux processes are an accounts payable application.

→



Application Developer, Robert

Annette calls the application developer to determine and resolve the root cause of the problem.

Tivoli OMEGAMON XE on z/VM and Linux - a Scenario

Problem

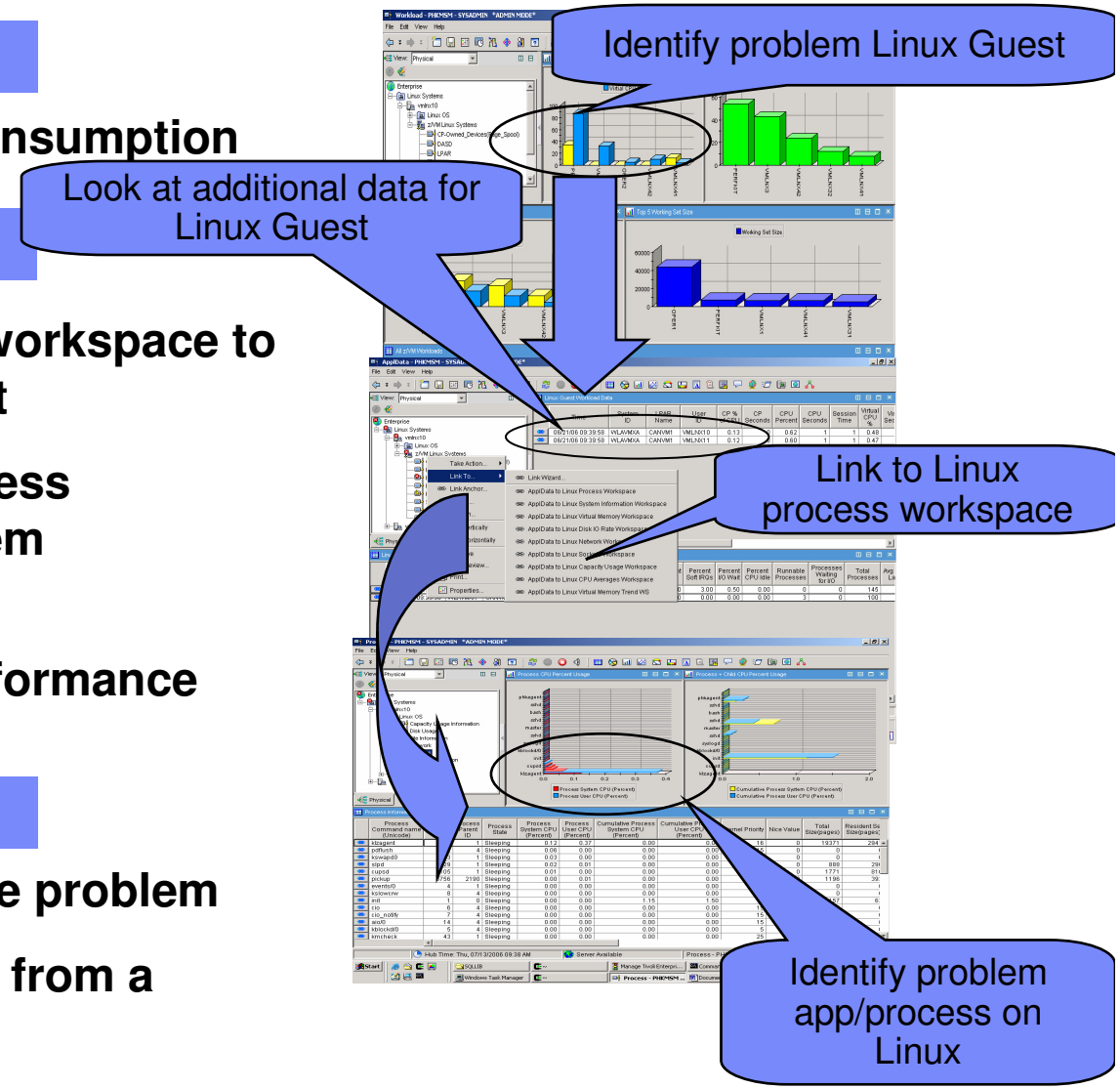
- Uneven Linux Guest CPU consumption

Solution

- Use Linux Guest Workload workspace to identify problem Linux guest
- Link to Linux workload/process workspace to identify problem app/process
- Notify app owner of app performance problem

Potential Benefits

- Quicker identification of base problem
- Can manage z/VM and Linux from a single point of control



Tivoli OMEGAMON XE on z/VM and Linux a Scenario

Problem

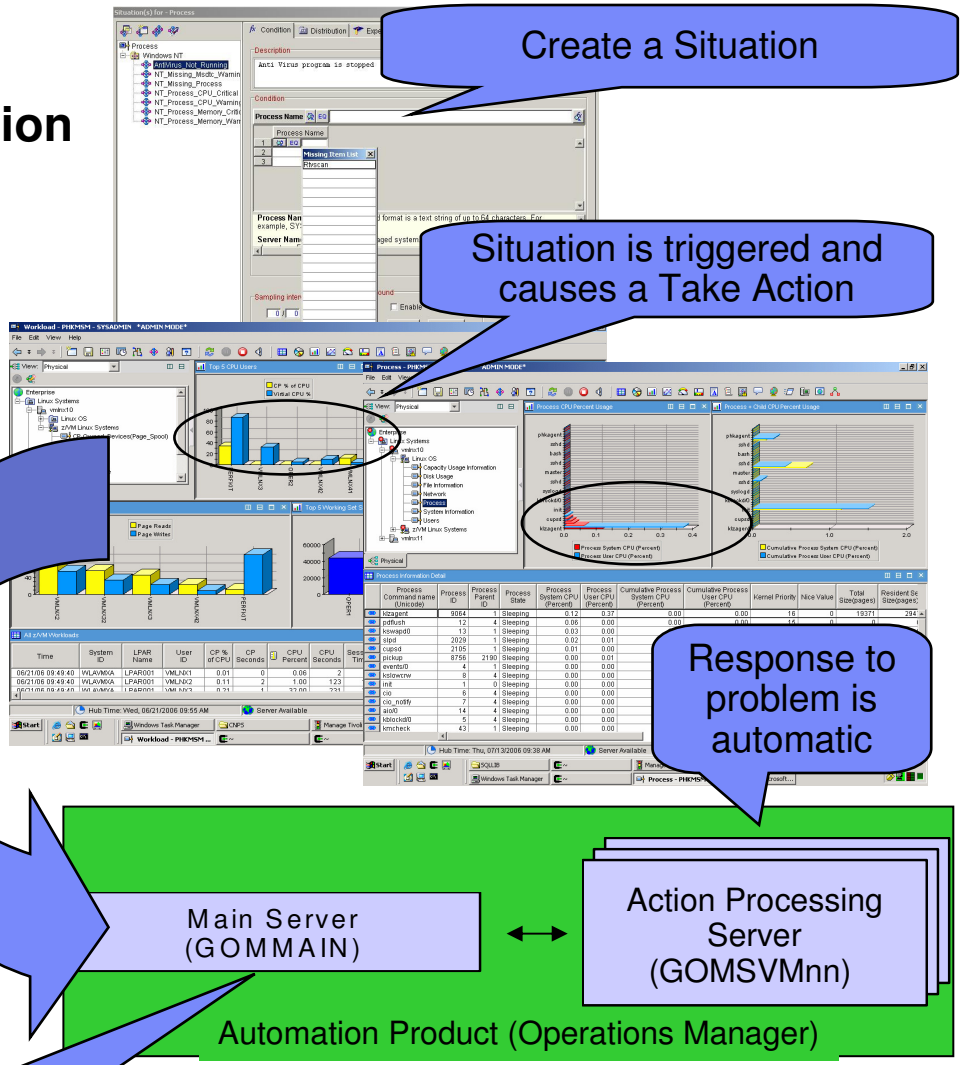
- Uneven Linux guest CPU consumption

Solution

- Use situation to recognize high swapping with high CPU and working set size
- Send message to Operations Manager
- Operations Manager invokes a rule to execute a CP tuning command to allocate more resource to the Linux Guest

Potential Benefits

- Automated problem resolution
- Integrated solution



Topics

- **Why ?**
  - Linux, Virtualization, System z
- **Getting Started**
- **Time to manage - Crawl, Walk, Run**
  - What's available ?
  - Scenarios
- **Summary**

System z Virtualization/Linux Leadership

Offering Virtual Server Solutions the IT Industry Demands

- **Highly scalable, granular, and efficient virtual server hosting**
  - Capable of running thousands of virtual servers on a single mainframe
  - Designed to run memory-rich and I/O-intensive (disk and network) workloads with data integrity
  - Able to achieve extremely high levels of physical CPU, memory, networking, and disk resource sharing
  - Allows significant over commitment of real resources, resulting in higher utilization while processing peak business demands and maintaining service levels – “doing more with less”
- **Infrastructure simplification and flexible operations**
  - Can improve the efficiency of your IT staff with robust and powerful systems management capabilities, allowing staff to quickly provision and manage more virtual servers
  - Provides non-disruptively adding and removing of physical resources to satisfy virtual server requirements in response to changing business demands
  - Can host Linux applications side-by-side LPARs on the same mainframe with fast and secure connectivity, leveraging z/TPF, z/VSE, and z/OS secure data serving
- **Virtual server integrity and security**
  - For decades z/VM and the mainframe have been architected for secure processing, offering high levels of integrity and security
  - System z servers have achieved EAL 5 certification; z/VM has achieved EAL 3+ certification and IBM intends to pursue EAL 4 certification of z/VM V5.3, offering system solutions that have been methodically designed, tested, and reviewed for secure operations

Extreme Virtualization with System z
Understanding the Value Proposition

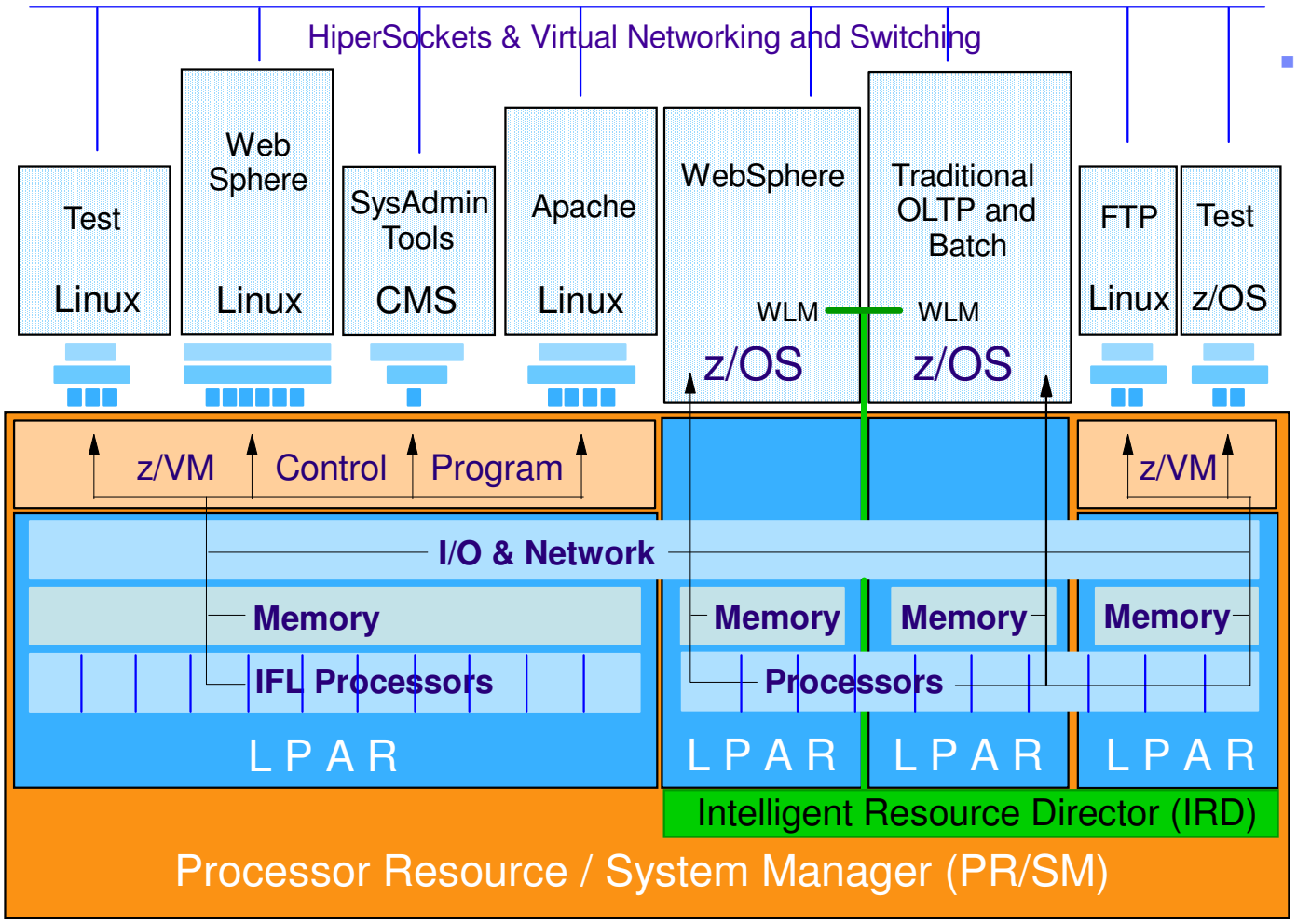
- **Business pain points addressed by server virtualization:**
  - Underutilized IT assets
  - Environmental costs
  - Linear software costs per server image
  - Staff inefficiencies managing multiple real servers
  - Spiraling people costs
- **x86 virtualization pain points addressed by System z**
  - 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

Questions ?

Backup Material

IBM System z Virtualization Architecture

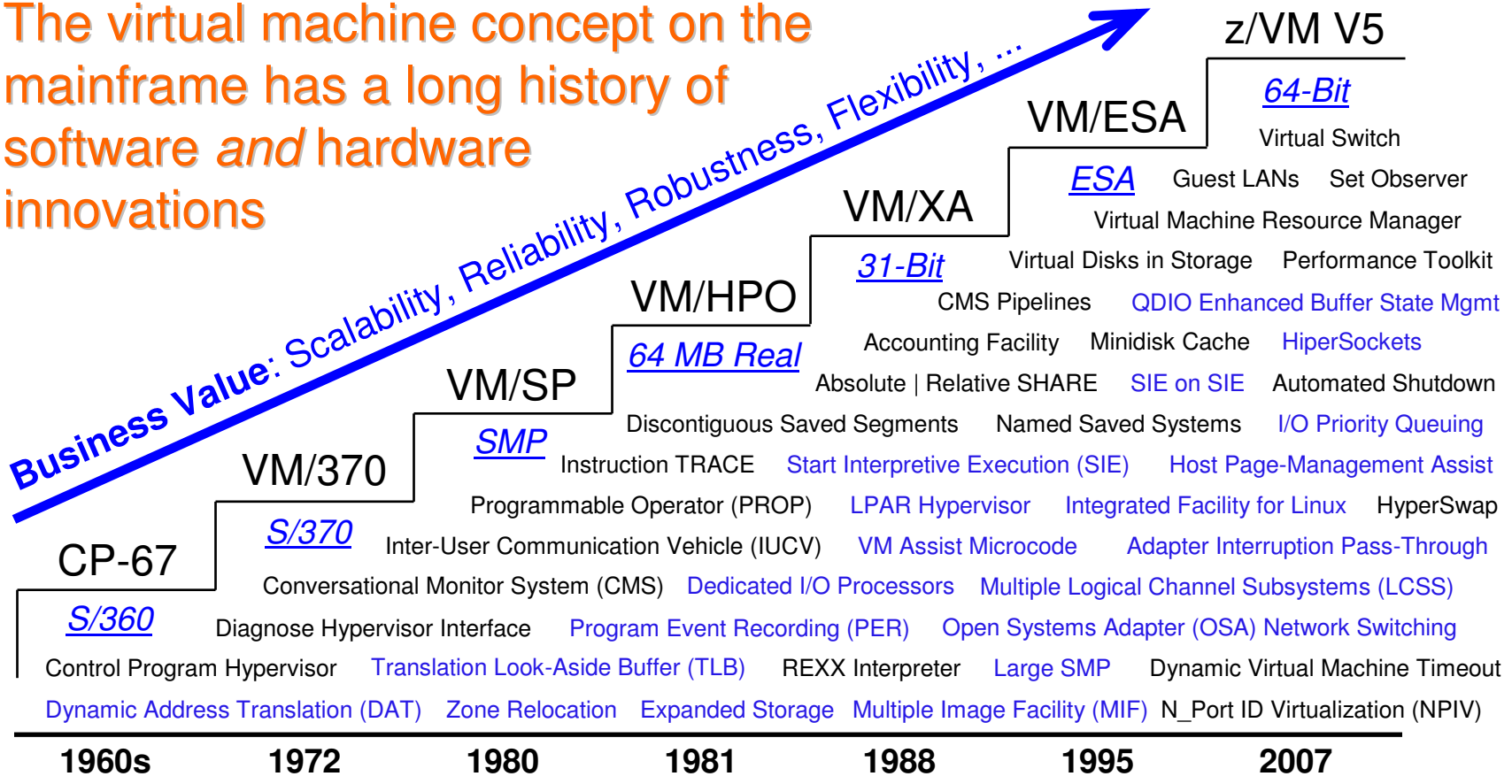


- **Multi-dimensional virtualization technology**
  - System z provides logical (LPAR) and software (z/VM) partitioning
  - PR/SM enables highly scalable virtual server hosting for LPAR *and* z/VM virtual machine environments
  - IRD coordinates allocation of CPU and I/O resources among z/OS and non-z/OS LPARs*

* Excluding non-shared resources like Integrated Facility for Linux processors

IBM System z Virtualization Genetics

The virtual machine concept on the mainframe has a long history of software *and* hardware innovations



System z virtualization starts on the chip; an integration of hardware, firmware, and software functionality

When Do You Need More Than "Good Enough"?

Business Drivers – Making the Case for Mainframe Virtualization

- **When business continuance is a high priority**
- **When you want to spend less on environmental expenses such as floor space and energy**
- **When business results suffer as a result of IT resources not matching customer demand**
- **When speed to market affects your business results**
- **When your IT staff wants to optimize their productivity for deploying and managing virtual servers**
- **When workload growth and decline is difficult to predict, be it production, development, or test and assurance systems**
- **When your server applications need fast and flexible access to z/OS data and applications**
- **When innovation is stifled because your staff cannot experiment or develop new solutions using existing resources**

RedBooks

- **Linux on IBM System z: Performance Measurement and Tuning**
  - http://w3.itso.ibm.com/abstracts/sg246926.html?Open
- **Security on z/VM**
  - http://w3.itso.ibm.com/abstracts/sg247471.html?Open
- **IBM System z Connectivity Handbook**
  - http://w3.itso.ibm.com/abstracts/sg245444.html?Open
- **Using z/VM for Test and Development Environments: A Roundup**
  - http://w3.itso.ibm.com/abstracts/sg247355.html?Open
- **Tivoli Management Services Warehouse and Reporting**
  - http://w3.itso.ibm.com/abstracts/sg247290.html?Open
- **IBM Communications Controller for Linux on System z V1.2.1 Implementation Guide**
  - http://w3.itso.ibm.com/abstracts/sg247223.html?Open
- **z/VM and Linux on IBM System z: The Virtualization Cookbook for SLES9**
  - http://w3.itso.ibm.com/abstracts/sg246695.html?Open

Red Papers and Tech Notes

- **Red Papers**

- **Sharing and maintaining Linux under z/VM**
  - http://w3.itso.ibm.com/abstracts/redp4322.html?Open
- **Linux Performance and Tuning Guidelines**
  - http://w3.itso.ibm.com/abstracts/redp4285.html?Open
- **Managing Linux Guests Using IBM Director and z/VM Center**
  - http://w3.itso.ibm.com/abstracts/redp4312.html?Open

- **Technotes**

- **Best Practices for Situation Creation in IBM Tivoli Monitoring V6.1**
  - http://w3.itso.ibm.com/abstracts/tips0617.html?Open
- **Implementation Considertions for Pure Versus Sampled Events in IBM Tivoli Monitoring 6.1**
  - http://w3.itso.ibm.com/abstracts/tips0616.html?Open

OPAL

- **OMEGAMON XE for z/VM and Linux Reports for use with Tivoli Common Reporting**
  - http://catalog.lotus.com/wps/portal/topal/details?catalog.label=1TW10OM14
- **IBM Tivoli Monitoring Resiliency and High Avialability**
  - http://catalog.lotus.com/wps/portal/topal/details?catalog.label=1TW10TM4H
- **Clustering IBM Tivoli Monitoring Components in a IBM Tivoli System Automation for Multiplatforms Environment**
  - http://catalog.lotus.com/wps/portal/topal/details?catalog.label=1TW10TM4F&catalog.catalogName=Tivoli%20OPAL
- **A Guide to Performing a IBM Tivoli Monitoring Health Check**
  - http://catalog.lotus.com/wps/portal/topal/details?catalog.label=1TW10TM4I

Miscellaneous

- **Installing OMEGAMON XE on z/VM and Linux Video**
  - http://w3-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS2753
- **Installation fo OMEGAMON XE on z/VM and Linux PowerPoint Presentation**
  - http://w3-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS3050
- **Installing IBM Tivoli Monitoring TEPS and TEMS on Linux for System z**
  - http://w3-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS2978
- **Installing OMEGAMON XE on z/VM and Linux: Where to learn how to do what!**
  - http://w3-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/TD103909
- **Tips on where to install the Hub TEMS in a multi platform environment**
  - http://w3-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/TD103946
- **High Availability Architectures for Linux on IBM System z**
  - http://w3-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP100752
- **z/VM Large Memory - Linux on System z**
  - http://w3-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP101151

z/VM Web Sites

Key web sites

- http://www.vm.ibm.com/
- http://www.linuxvm.org/

- **Key trade shows**
  - SHARE - http://www.share.org/
  - IBM System z Expo - http://www-304.ibm.com/jct03001c/services/learning/ites.wss/us/en?pageType=page&c=a0000715