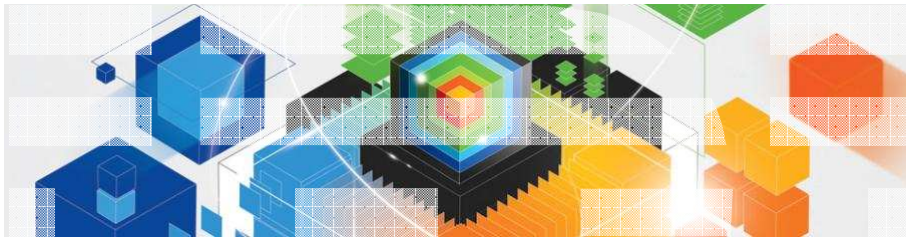


New aspects for Virtualization Management: IBM zEnterprise Unified Resource Manager



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DataPower*	IBM eServer	RP/SM	z9*	z/VSE
DB2*	IBM (logo)*	RACF*	z10 BC	
FICON*	InfiniBand*	System x*	z10 EC	
GDPS*	Parallel Sysplex*	System z*	zEnterprise	
Geographically Dispersed Parallel Sysplex	POWER*	System z9*	z/OS*	

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Notes:

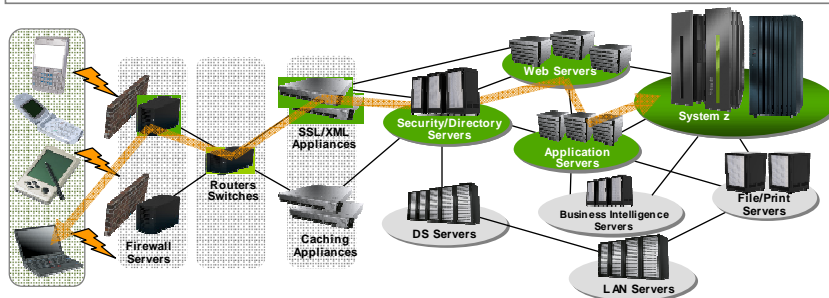
Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job 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.
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Agenda

- Managing on zEnterprise
- Examples
- Performance Management
- Conclusion

Information Technology Today: Limitations

Information technology today is limited by the technology and architecture configurations available.



- Business processes and the applications that support them are becoming more service oriented, modular in their construction, and integrated.
- The components of these services are implemented on a variety of architectures and hosted on heterogeneous IT infrastructures.
- Approaches to managing these infrastructures along the lines of platform architecture boundaries cannot optimize: alignment of IT with business objectives; responsiveness to change; resource utilization; business resiliency; or overall cost of ownership.
- **Customers need better approach: The ability to manage the IT infrastructure and Business Application as an integrated whole.**

IBM zEnterprise System – Best in Class Systems and Software Technologies

A system of systems that unifies IT for predictable service delivery



Unified management for a smarter system:
zEnterprise Unified Resource Manager

Scale out to a trillion instructions per second:
IBM zEnterprise BladeCenter® Extension (zBX)

- Selected IBM POWER7® blades and IBM System x® Blades¹ for tens of thousands of AIX® and Linux applications
- High performance optimizers and appliances to accelerate time to insight and reduce cost
- Dedicated high performance private network

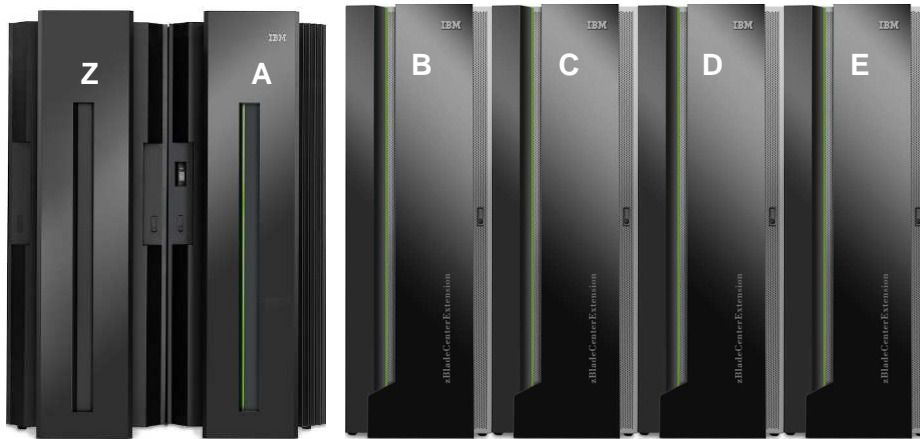
- Unifies management of resources, extending IBM System z® qualities of service end-to-end across workloads
- Provides platform, hardware and workload management

The world's fastest and most scalable system:
IBM zEnterprise™ 196 (z196)

- Ideal for large scale data and transaction serving and mission critical applications
- Most efficient platform for Large-scale Linux® consolidation
- Leveraging a large portfolio of z/OS® and Linux on System z applications
- Capable of massive scale up, over 50 Billion Instructions per Second (BIPS)



IBM zEnterprise System



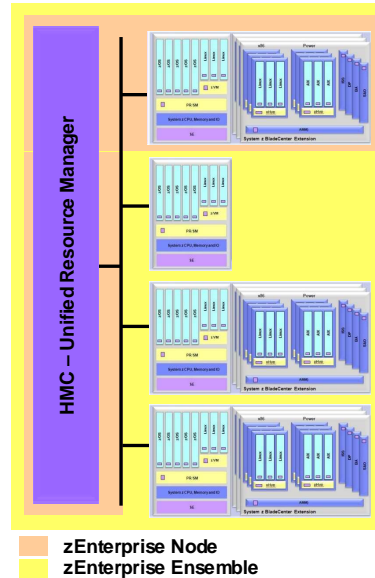
IBM zEnterprise 196 (z196)

IBM zEnterprise BladeCenter Extension (zBX)

IBM zEnterprise Unified Resource Manager (zManager)

What is a zEnterprise Ensemble?

- A zEnterprise ensemble is a collection of 1 to 8 z196 CPCs with/without zBX managed collectively by the Unified Resource Manager as a single logical virtualized system using the HMC
- A zEnterprise node is a z196 CPC with 0 to 4 racks up to 2 BladeCenters per rack
 - zEnterprise nodes are deployed within a single site
 - A zEnterprise node can be a member of at most one ensemble
- z196 CPCs are deployed within a single site
- Blade based fit-for-purpose Solutions
- Integrated Advanced Virtualization Management
- Implements well-defined external interface to Data Center Service Management functions
- Virtual Resource Management and Automation



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zEnterprise Unified Resource Manager

Transforming the way resources are managed and deployed

What is it?

Unified Resource Manager provides **workload awareness** to optimize the system resources in accordance with understanding the policies assigned to that particular workload. Functions are grouped into two suites of tiered functionality that enable different levels of capability - Manage suite and Automate suite.

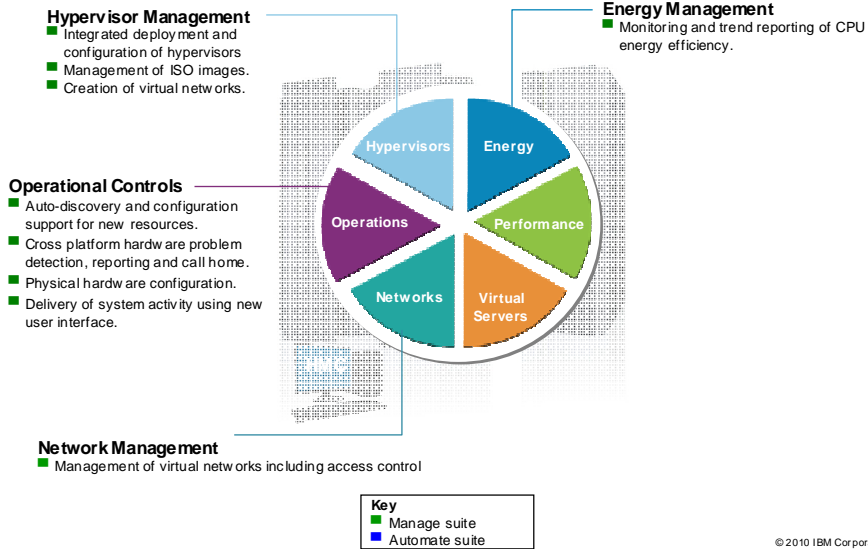
How is it different?

- **Heterogeneous management:** Total systems management across heterogeneous resources
- **Integration:** Single point of control, common skills for resources, reduced complexity of day to day operations
- **Monitoring.** New dashboard for CPU resources and energy management
- **Simplified installation:** Auto discovery and configuration of resources and workloads with single interface
- **Secure:** Improved network security with lower latency, less hops and less complexity. Improved control of access due to management of hypervisors as firmware
- **Service and support management:** Hardware problem detection, reporting and call home supported for virtual machines and blades

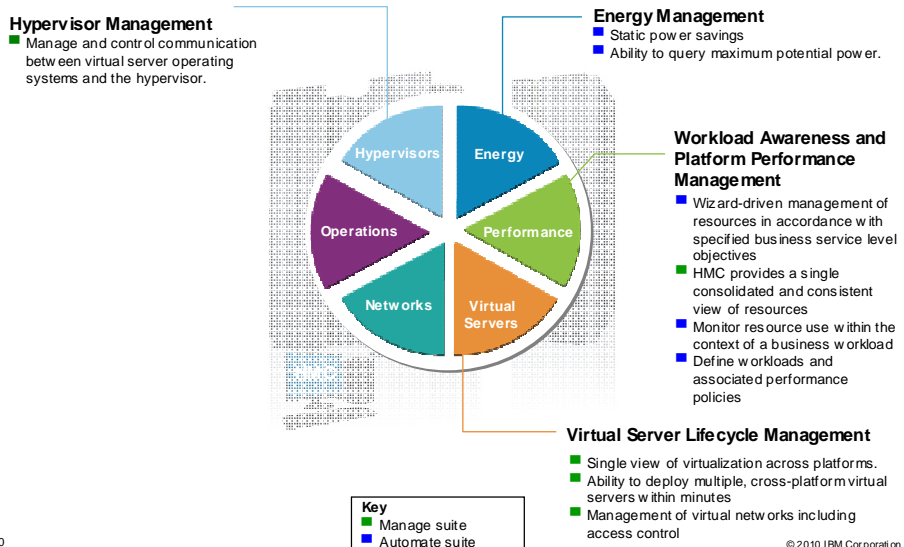


8

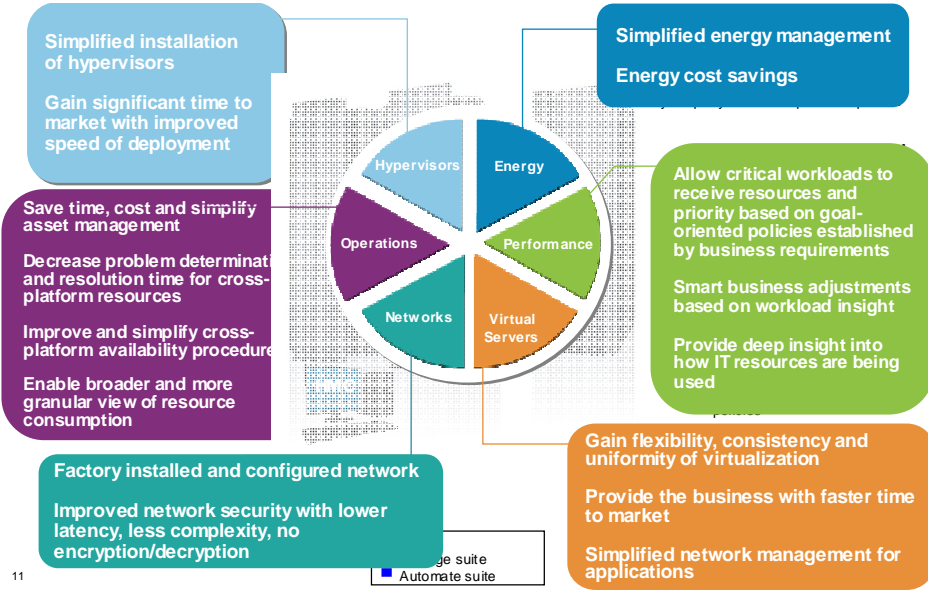
zEnterprise Unified Resource Manager Hardware Management



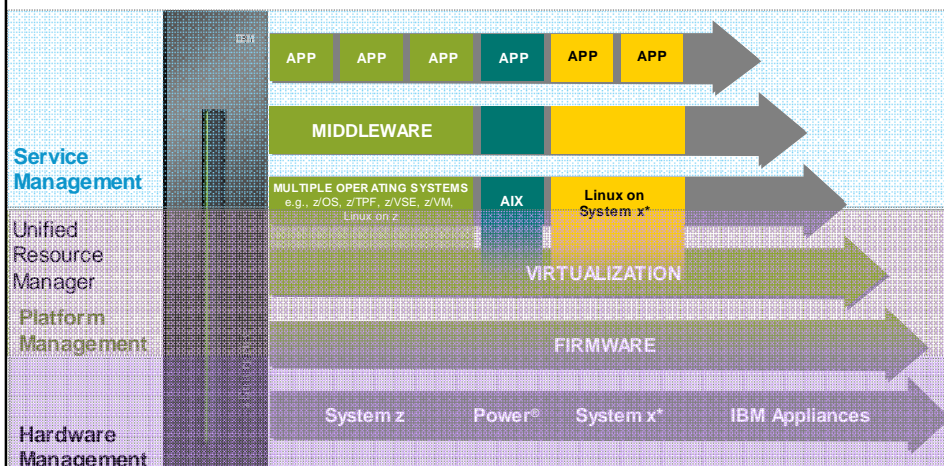
zEnterprise Unified Resource Manager Platform Management



... Value Made Possible By the Unified Resource Manager



Built on this construct – zEnterprise – Innovation at every level

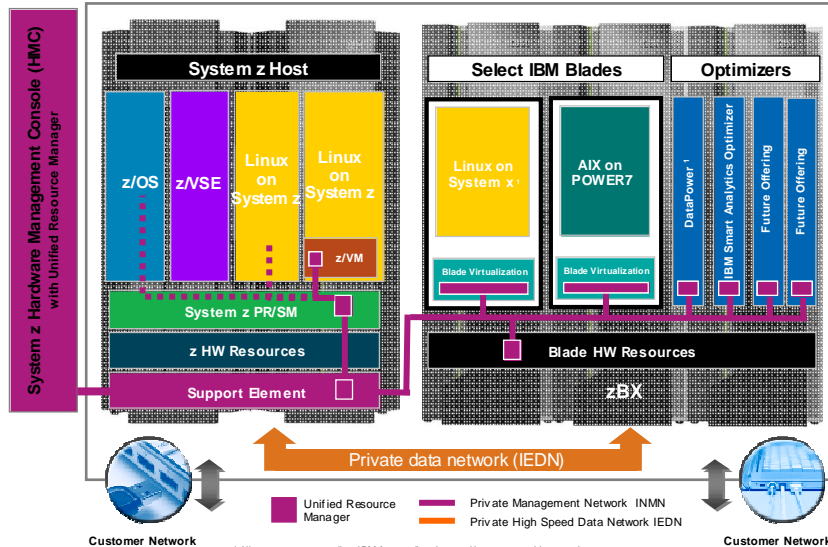


Focused, collaborative innovation
A “complete systems” approach

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

Putting zEnterprise System to the task

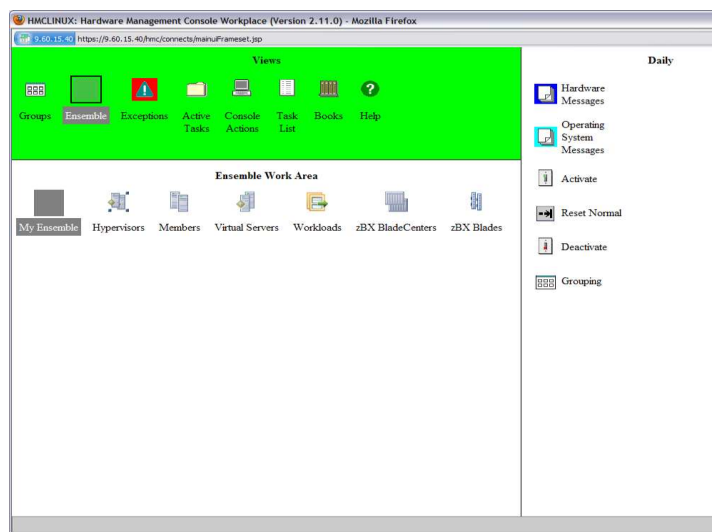
Use the smarter solution to improve your application design



13

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zEnterprise HMC-Based z/VM Management



14

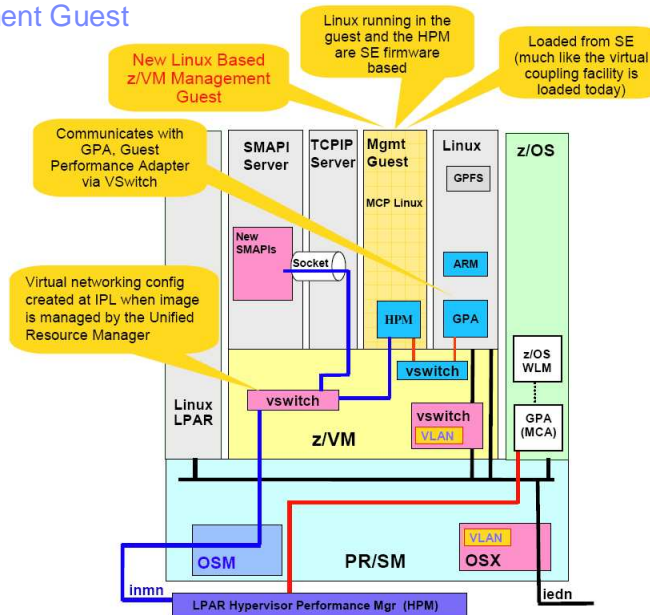
Ensemble Management Users and Roles

- New task and resource roles enable isolation across management disciplines
- New predefined users EnsOperator and EnsAdmin

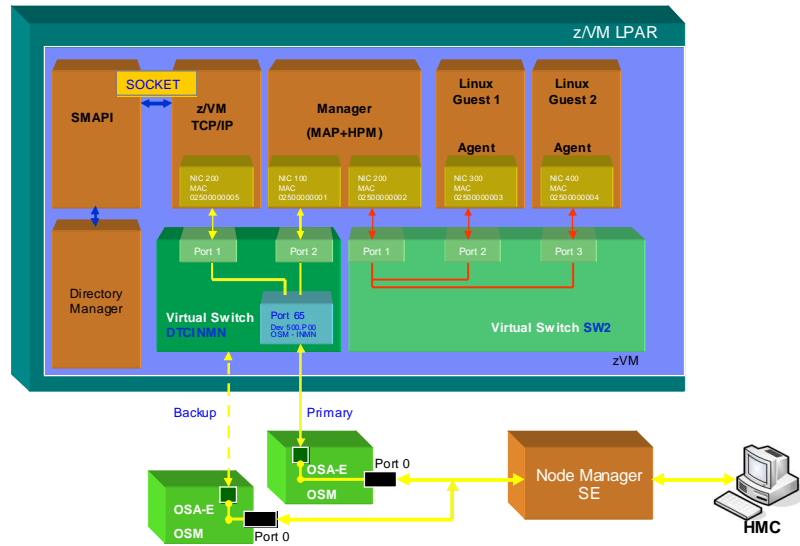
Role	Description
Ensemble Administrator	Responsible for creating and managing the zGryphon ensemble Create Ensemble, Add Member...
Virtual Network Administrator	Responsible for Managing Virtual Networks, Hosts, and MAC Prefixes Manage Virtual Networks, Add Hosts to Virtual Networks, Create VLAN IDs...
Virtual Server Administrator	Responsible for managing virtual servers New /Modify Virtual Server, Add Virtual Disk, Migrate...
Virtual Server Operator	Responsible for performing and scheduling virtual server activation/deactivation, mounting virtual media Activate, Deactivate, Mount Virtual Media, Console session...
Storage Resource Administrator	Responsible for managing storage resources – Storage Access Lists, WWPNs, z/VM Storage Groups Export WWPN, Import SAL, Add Storage Resources...
Workload Administrator	Responsible for managing workloads New /Modify workload, Add / Remove Virtual Servers..
Performance Management Administrator	Responsible for managing performance policies New /Modify performance policy, import policy
Performance Management Operator	Responsible for performing and scheduling policy activations and creating threshold notifications Activate, Export Policy, Monitor System Events
Energy Management Administrator	Responsible for managing power settings including power capping and power savings Set Power Cap, Set Power Savings Mode, Set zBX Power Policy

New z/VM Management Guest

- Linux based guest
- Loaded from SE (much like the virtual coupling facility is loaded today)
- Communicates with Guest Performance Adapters (GPA)
- The Linux running in the guest and the HPM application do not ship with z/VM, rather with the firmware
- Virtual networking config created at IPL when image is managed by the Unified Resource Manager.

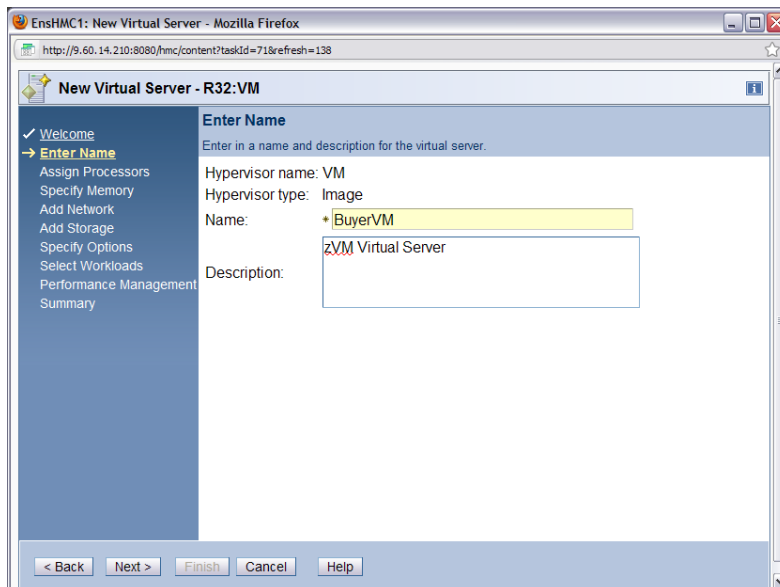
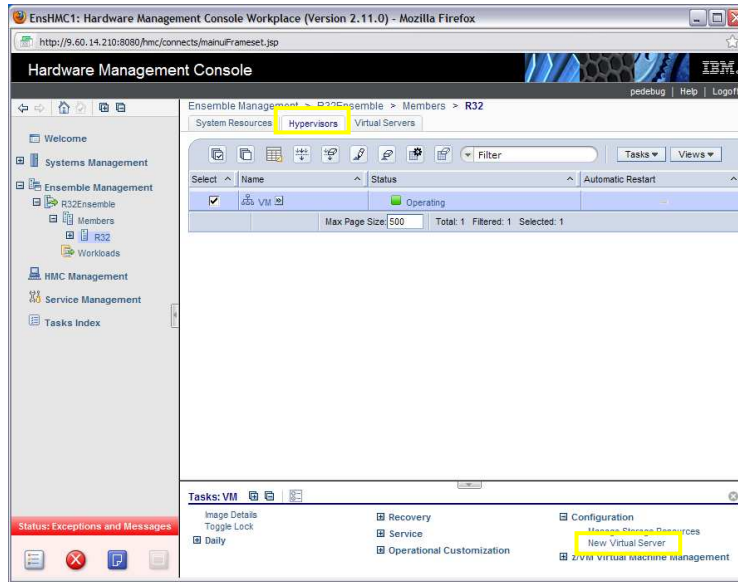


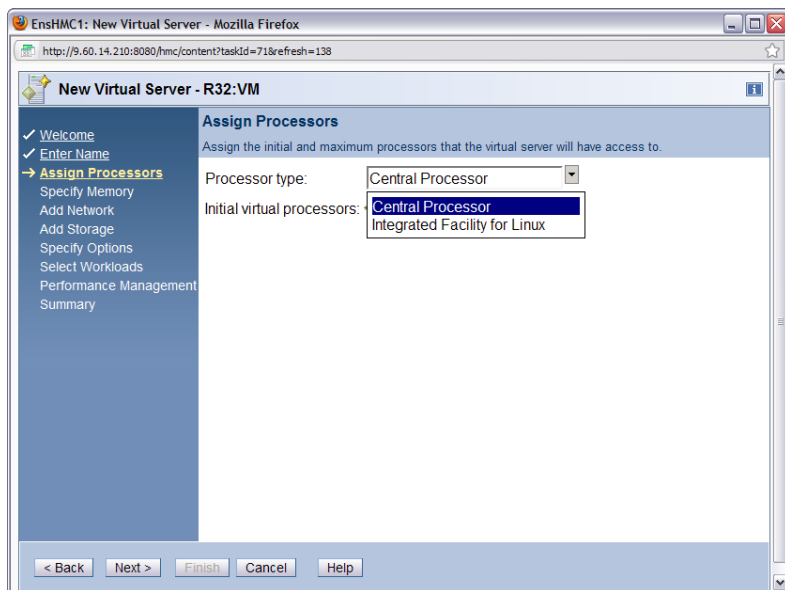
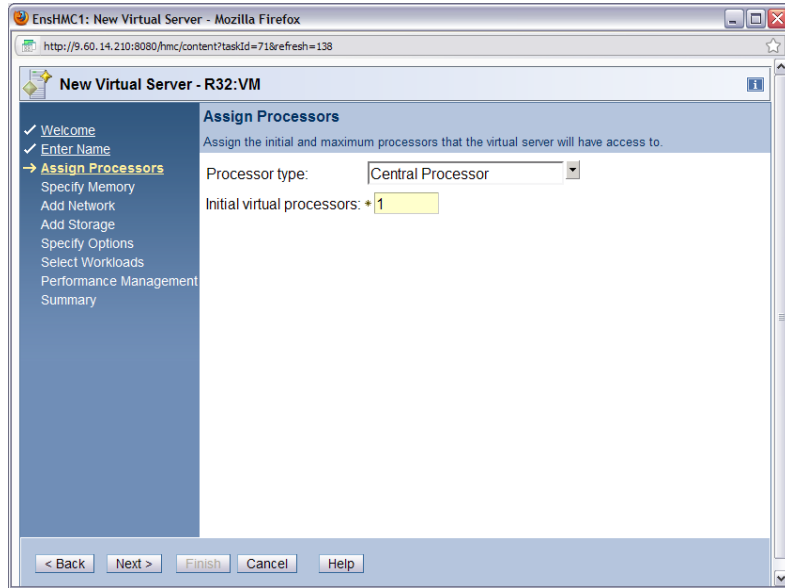
z/VM Management Infrastructure

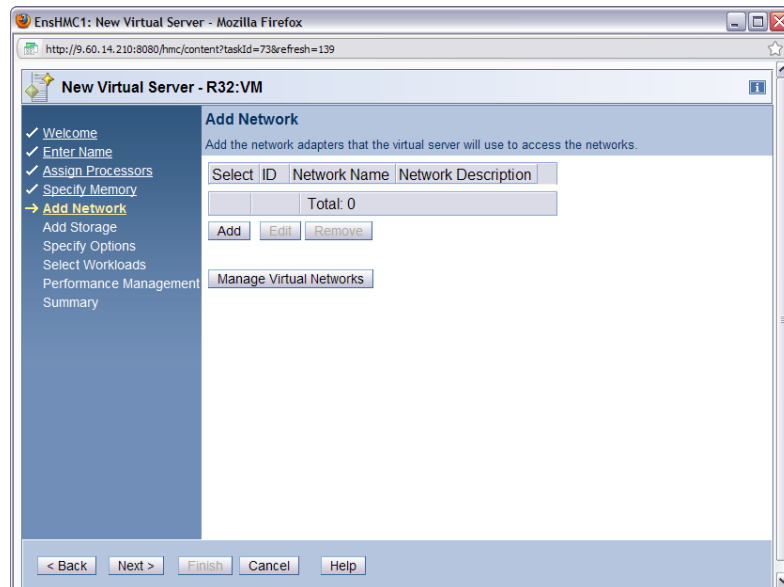
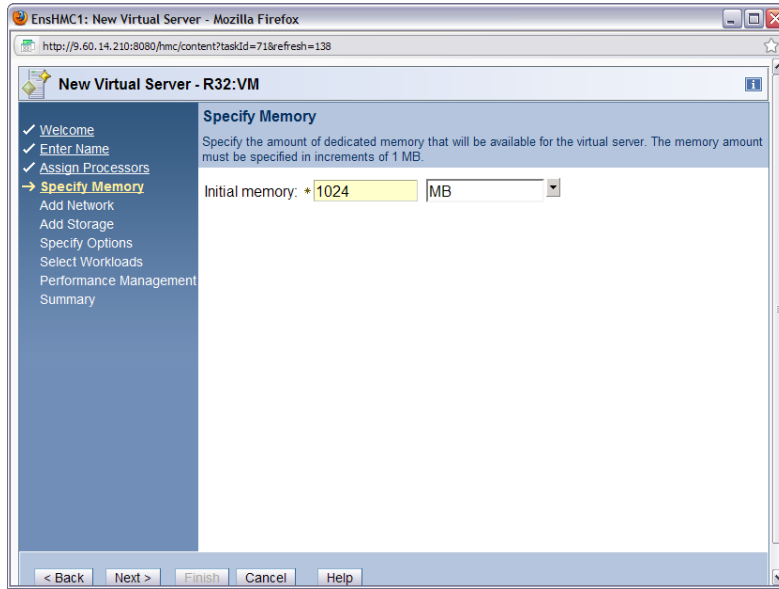


Use Cases

- New virtual server
- Virtual server details
- Create virtual network
- Associate virtual server with virtual network







EnshMC1: New Virtual Server - Mozilla Firefox
 http://9.60.14.210:8080/hmc/content?taskId=73&refresh=139

New Virtual Server - R32:VM

- ✓ Welcome
- ✓ Enter Name
- ✓ Assign Processors
- ✓ Specify Memory
- ✓ Add Network
- **Add Storage**
- Specify Options
- Select Workloads
- Performance Management
- Summary

Add Storage

Add the storage drives that the virtual server will use to access the storage resources.

Select	Device	Name	Description	Resource Name	Mode	Size
Total: 0						

EnshMC1: New Virtual Server - Mozilla Firefox
 http://9.60.14.210:8080/hmc/content?taskId=73&refresh=139

New Virtual Server - R32:VM

- ✓ Welcome
- ✓ Enter Name
- ✓ Assign Processors
- ✓ Specify Memory
- ✓ Add Network
- ✓ Add Storage
- **Specify Options**
- Select Workloads
- Performance Management
- Summary

Specify Options

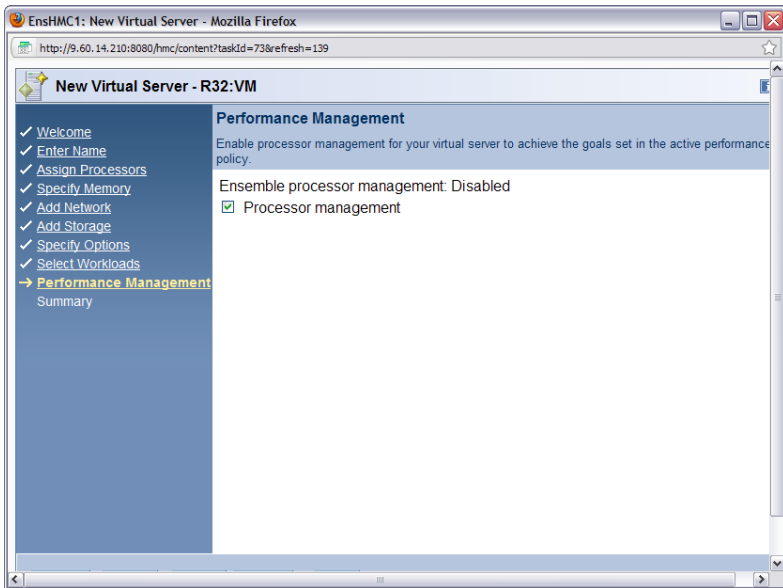
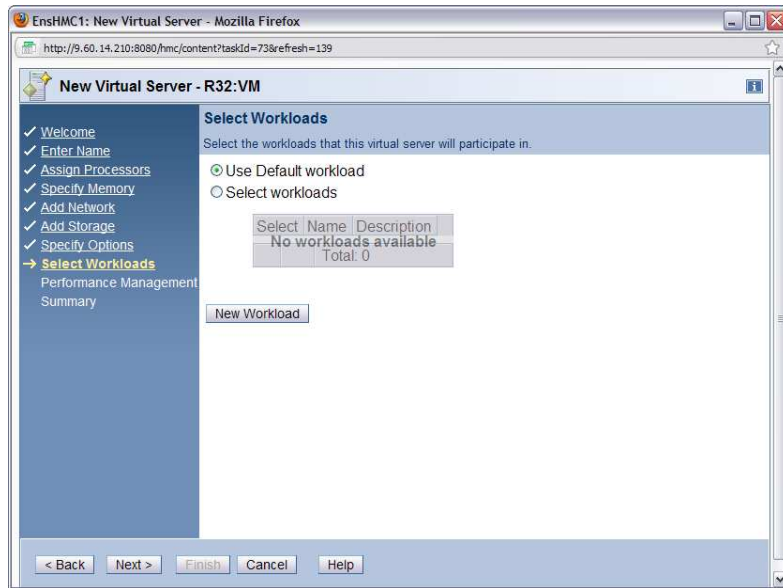
Choose the boot source for your virtual server.

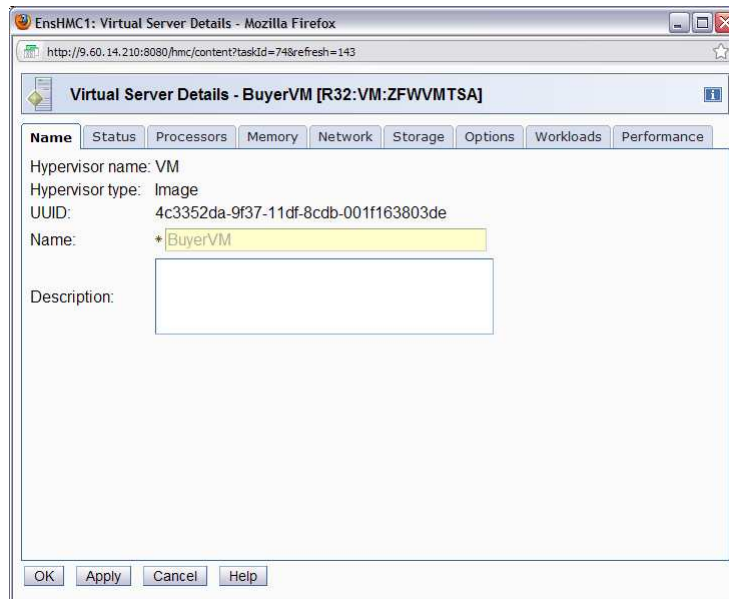
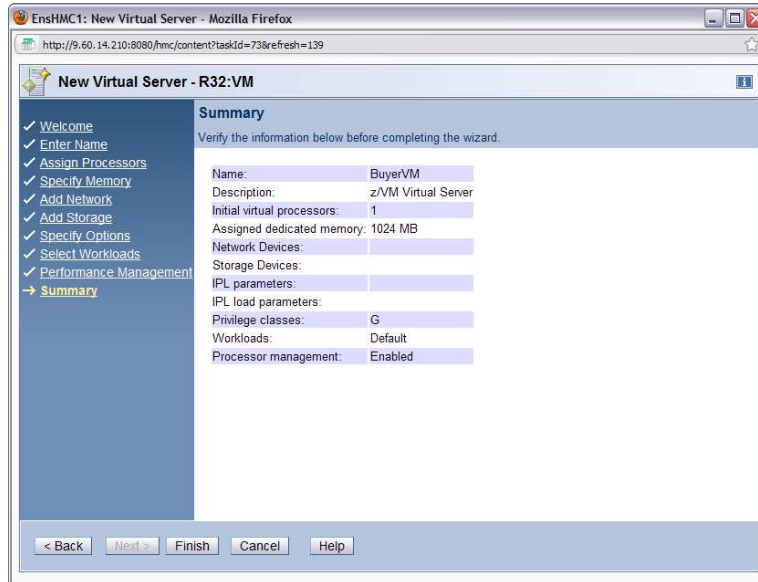
Privilege classes:

IPL boot device:

IPL parameters:

IPL load parameters:





EnSHMC1: Virtual Server Details - Mozilla Firefox
http://9.60.14.210:8080/hmc/wd/T14a1

Virtual Server Details - BuyerVM [R32:VM:ZFWMTSA]

Name **Status** Processors Memory Network Storage Options Workloads Performance

Status: Not Activated
Guest Platform Management Provider Status: Not Operating

Acceptable Status:

<input checked="" type="checkbox"/> Operating	<input type="checkbox"/> Not Operating
<input type="checkbox"/> Communications not active	<input type="checkbox"/> Exceptions
<input type="checkbox"/> Status Check	<input type="checkbox"/> Migrating
<input type="checkbox"/> Starting	<input type="checkbox"/> Stopping

OK Apply Cancel Help

EnSHMC1: Virtual Server Details - Mozilla Firefox
http://9.60.14.210:8080/hmc/wd/T14a1

Virtual Server Details - BuyerVM [R32:VM:ZFWMTSA]

Name Status **Processors** Memory Network Storage Options Workloads Performance

Processor type: Central Processor

Initial virtual processors: +1

Maximum virtual processors: +1

Share mode: Relative

Share limit: None

Initial relative shares: +0

OK Apply Cancel Help

EnsHMC1: Virtual Server Details - Mozilla Firefox
http://9.60.14.210:8080/hmc/wd/T14a1

Virtual Server Details - BuyerVM [R32:VM:ZFWMTSA]

Name Status Processors **Memory** Network Storage Options Workloads Performance

Initial memory: +1 MB

Maximum memory: +1 MB

OK Apply Cancel Help

EnsHMC1: Virtual Server Details - Mozilla Firefox
http://9.60.14.210:8080/hmc/wd/T14a1

Virtual Server Details - BuyerVM [R32:VM:ZFWMTSA]

Name Status Processors Memory **Network** Storage Options Workloads Performance

MAC Prefix:

Network Adapters:

Select	ID	Network Name	Network Description	MAC Address
Total: 0				

Add Edit Remove

Manage Virtual Networks

OK Apply Cancel Help

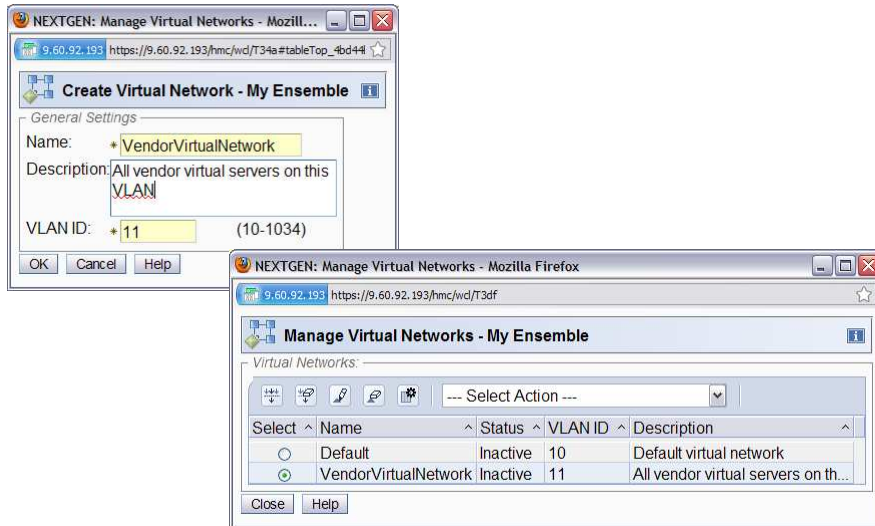
The screenshot shows the 'Storage' tab of the 'Virtual Server Details - BuyerVM [R32:VM:ZFWMTSA]' interface. The 'Storage Drives' section contains a table with columns: Select, Device, Name, Description, Resource Name, Mode, and Size. Below the table, it indicates 'Total: 0' and provides 'Add', 'Edit', and 'Remove' buttons. A 'Manage Storage Resources' button is also present. At the bottom of the window are 'OK', 'Apply', 'Cancel', and 'Help' buttons.

The screenshot shows the 'Options' tab of the 'Virtual Server Details - BuyerVM [R32:VM:ZFWMTSA]' interface. The 'Privilege classes' field is set to '*G'. Below this are input fields for 'IPL boot device:', 'IPL parameters:', and 'IPL load parameters:'. There is also a checkbox for 'Enable Guest Platform Management Provider Support'. At the bottom of the window are 'OK', 'Apply', 'Cancel', and 'Help' buttons.

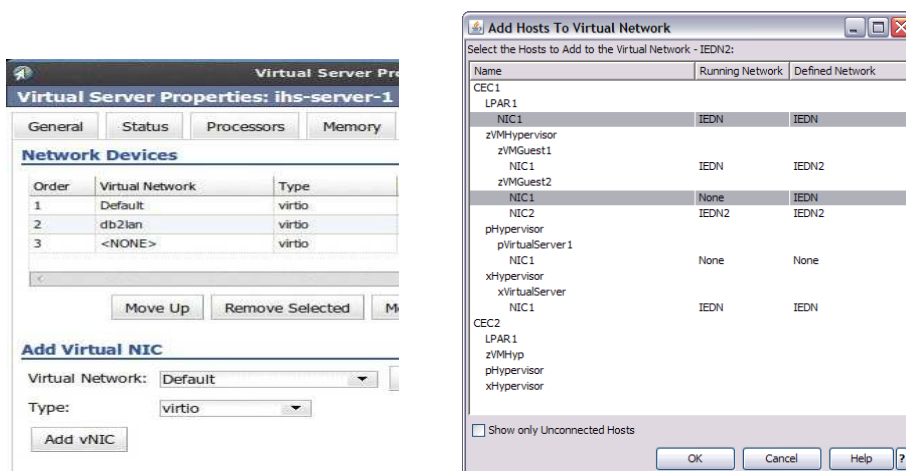
The screenshot shows a web browser window titled "EnsHMC1: Virtual Server Details - Mozilla Firefox" with the URL "http://9.60.14.210:8080/hmc/jwd/T14a1". The page title is "Virtual Server Details - BuyerVM [R32:VM:ZFWVMTSA]". A navigation bar contains tabs for Name, Status, Processors, Memory, Network, Storage, Options, **Workloads**, and Performance. The Workloads tab is active, showing two radio buttons: "Use Default workload" (selected) and "Select workloads". Below the radio buttons is a table with columns "Name" and "Description". The table content is "No workloads available" and "Total: 0". A "New Workload" button is located below the table. At the bottom of the window are buttons for "OK", "Apply", "Cancel", and "Help".

The screenshot shows the same web browser window as above, but with the "Performance" tab selected. The page title remains "Virtual Server Details - BuyerVM [R32:VM:ZFWVMTSA]". The navigation bar now highlights the "Performance" tab. The main content area displays "Ensemble processor management: Disabled" and a checkbox for "Processor management" which is currently unchecked. At the bottom of the window are buttons for "OK", "Apply", "Cancel", and "Help".

Create Virtual Network

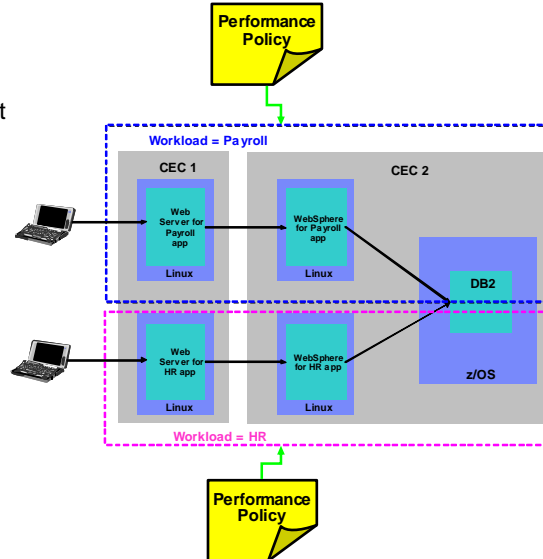


Associate Virtual Server With Virtual Network



Workload

- A Workload is a grouping mechanism and “management view” of virtual servers supporting a business application
- Provides the context within which associated platform resources are presented, monitored, reported, and managed
- Performance policy is associated with Workload

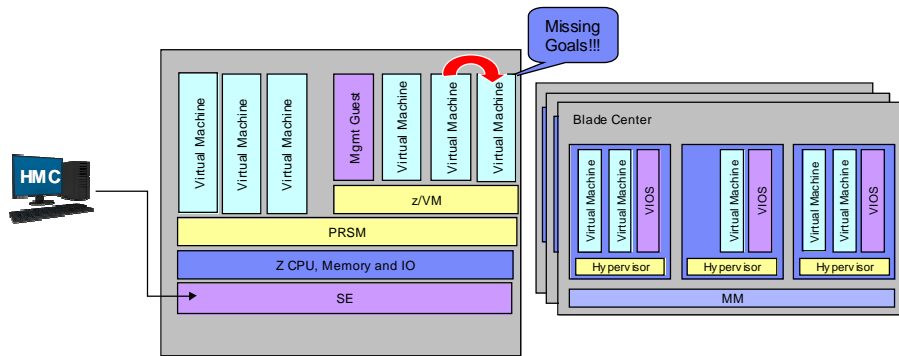


Workload Performance Policy

- Defines performance goals for virtual servers in a workload
 - Conceptually similar to simplified z/OS WLM Policy
- Provides basis for monitoring and management of platform resources used by virtual servers in a Workload
- Workload to performance policy relationship:
 - Multiple performance policies associated with a workload
 - A single policy is active at a given time
 - Can dynamically change the policy that is active
 - Through the UI
 - Through a time-based schedule
 - Example: Day shift / night shift policy



Managing Resources across z/VM Virtual Machines



- Manage CPU resources across z/VM virtual machines
 - Detect that a virtual machine is part of a workload not achieving its goals
 - Determine that virtual machine performance can be improved with additional resources
 - Project effect on all relevant Workloads of moving resources to virtual machine
 - If good trade-off based on policy, redistribute resources



IBM zEnterprise System:

A revolutionary change has come to IT bringing a new dimension in computing

- Redefining IT frameworks to bring change to operational silos and extend System z governance to z/VM virtual machines and zBX blades
- Driving business decisions based on insight rather than hindsight
- Improving agility to compete with consolidation and simplification
- Delivering consistent business controls across applications and platforms
- Focused on integration and collaboration to fuel business growth



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