



IBM zEnterprise Unified Resource Manager: What's in it for z/VM?

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Agenda

- Brief overview of the IBM zEnterprise Unified Resource Manager
- How to use it to configure some features of interest even to well-established z/VM environments
 - Selecting existing z/VM virtual servers for management
 - Connecting z/VM virtual servers to the new intra-ensemble data network and its associated virtual networks
 - Configuring zManager for goal-oriented performance management of selected z/VM virtual servers
 - Basic monitoring for achievement of performance objectives
 - Active processor performance management
 - Different levels of granularity and instrumentation
 - *NEW*: Automation via RESTful APIs
- Note: we won't cover configuring z/VM itself to participate in the ensemble.

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**

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

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

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



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)

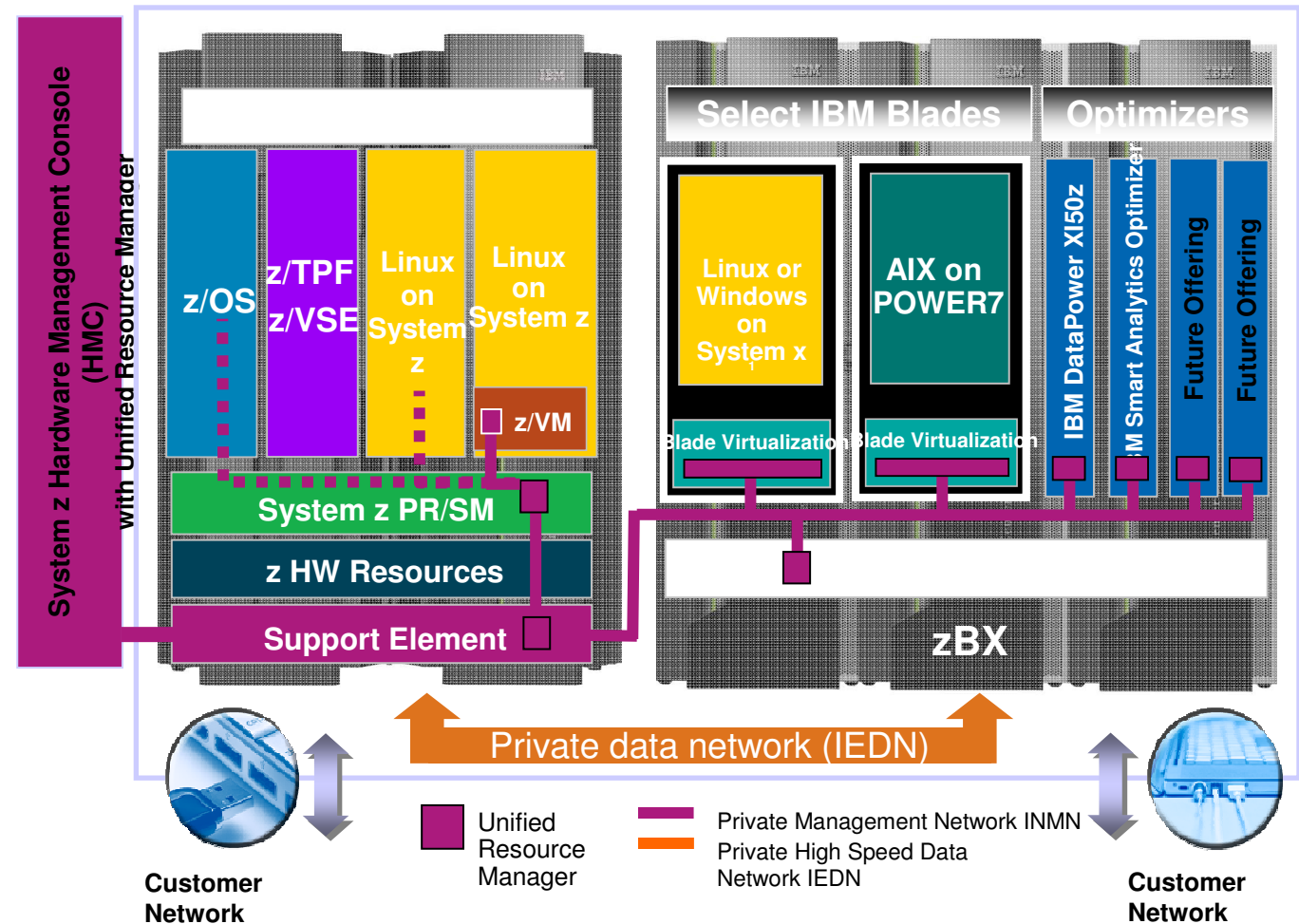
zEnterprise Unified Resource Manager and Ensembles

Ensemble:

- A zEnterprise Ensemble is a collection of zEnterprise nodes managed as a single virtualized pool of server resources
 - Native LPAR and z/VM Virtual Images
 - PowerVM virtual images
 - IBM DataPower Appliance
- A zEnterprise node can be a member of at most one Ensemble
- New, private networks

zEnterprise Unified Resource Manager (zManager)

- HMC is management console
 - One primary/alternate pair per ensemble
- Ensemble-Wide scope of responsibility
- Hardware configuration and operational control
- Virtual server life cycle management
- Virtual network and storage provisioning
- Energy Management
- Goal-oriented performance management



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Synergy with z/VM and Linux on System z



- **What does zEnterprise and Unified Resource Manager offer to z/VM users?**
- **Server and application consolidation on System z using Linux and z/VM is the industry leader in large-scale, cost-efficient virtual server hosting**
- **Create and perform lifecycle management on z/VM virtual machines**
 - Wizard-driven creation of new virtual machines
 - Management of existing virtual machines, selected on an individual basis
 - Consistent interface across technologies
 - Reduces skill-level requirements
- **Leverage the secure physical network connections between z/VM, zBX, and/or other System z servers in the ensemble for data and management**
 - Fast 10 Gb Ethernet connection to the data
 - Less latency – fewer 'hops' to get to the data and no need for encryption / firewall
 - Traffic on user networks not affected
 - Secure, isolated management network: no interference with/from data traffic
- **Perform virtual network management**
 - Define and manage virtual networks on the IEDN, including access control
 - Manage and control communication between virtual server operating systems and the hypervisor
- **Workload awareness and platform performance management**
 - Wizard-driven management of resource in accordance with specified business service level objectives
 - Monitor resource use within the context of a business workload
 - Define workloads and associated business policies
 - Plus integrated blades on zBX offer added dimension for workload optimization



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Some zManager Use Cases for Existing z/VM Environments

- **Select existing z/VM virtual servers to manage**
- **Connect a z/VM virtual server to the IEDN for interoperation with zBX (and/or with other System z Servers in the ensemble)**
 - Define a virtual network on the IEDN
 - Create a new IEDN VSWITCH
 - Connect the virtual server to the virtual network via the IEDN VSWITCH
- **Perform Goal-oriented performance management**
 - Define a workload resource group and associated performance policy and service classes. Monitor and get reporting data.
 - Enable dynamic, hypervisor-based processor management for selected virtual servers. Monitor and get reporting data
 - Install and enable the Guest Platform Management Provider (GPMP) in select virtual servers for more granular management and reporting
 - Enable ARM instrumentation in middleware for even more granular reporting, including transaction hops between virtual servers
- **NEW: Automation via RESTful APIs**

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- Automation via RESTful APIs

Selecting Existing z/VM Virtual Servers to Manage

- Click on the “+” next to VML1 to see all of its managed VS’s
 - Use an HMC userid with authority to the Virtual Server Administrator role and the z/VM Virtual Machine Objects role. We’ll use ENSADMIN (a new default userid)

Hardware Management Console

Ensemble Management > hydra > Members > R93

Virtual Servers | **Hypervisors** | Blades | Topology

Filter: [] Tasks: [] Views: []

Select	Name	Status	Processors	Memory (MB)	Type	Auto Start
<input checked="" type="checkbox"/>	VML1	Operating			z/VM	—
<input type="checkbox"/>	C.1.01	Operating		8	65,536 PowerVM	—
<input type="checkbox"/>	C.1.02	Operating		8	65,536 PowerVM	—
<input type="checkbox"/>	C.1.03	Operating		8	32,768 PowerVM	—
<input type="checkbox"/>	C.1.04	Operating		8	32,768 PowerVM	—

Max Page Size: 500 Total: 15 Filtered: 15 Selected: 1

Tasks: VML1

- Image Details
- Toggle Lock
- Daily
- Recovery
- Service
- Operational Customization
- Configuration

Selecting Existing z/VM Virtual Servers to Manage

- I have a virtual server called GSSP26 running under z/VM VML1
- Notice it is not shown as being ensemble-managed on the HMC

```

q names
Ready; T=0.01/0.01 17:05:13
GSSP26 - DSC , GSSP08 - DSC , VSMREQIN - DSC , VSMPROXY - DSC
VSMREQIU - DSC , VSMWORK3 - DSC , VSMWORK2 - DSC , VSMWORK1 - DSC
GSSFHUB - DSC , LITDNSF - DSC , ROUTER2F - DSC , ROUTER1F - DSC
ZVMLXAPP - DSC
DIRMSAT - DSC
PERFSVM - DSC
PORTMAP - DSC
ISPVM - DSC
VMSERVS - DSC
DTCVSW1 - DSC
OPMGRS1 - DSC
OPERATOR - SYSC
VSM - TCPIP
Ready; T=0.01/0
  
```

Hardware Management Console

Choose z/VM Virtual Servers to Manage

Ensemble Management > hydra > Members > R93

Virtual Servers | Hypervisors | Blades | Topology

Select	Name	Status
<input type="checkbox"/>	GSSP18	Not Activated
<input type="checkbox"/>	GSSP19	Not Activated
<input type="checkbox"/>	GSSP20	Not Activated
<input type="checkbox"/>	HIPER2	Not Activated
<input type="checkbox"/>	IPLTEST	Not Activated

Selecting Existing z/VM Virtual Servers to Manage

- For VML1, we click on “Choose z/VM Virtual Servers to Manage”
- Then find GSSP26 in the list, check it, and click OK...

Hardware Management Console

Ensemble Management > hydra > Members > R93

Virtual Servers | Hypervisors | Blades | Topology

Select ^ Name ^ Status ^ Processors ^

Select	Name	Status	Processors
<input checked="" type="checkbox"/>	VML1	ating	
<input type="checkbox"/>	C.1.01	ating	8
<input type="checkbox"/>	C.1.02	ating	8
<input type="checkbox"/>	C.1.03		
<input type="checkbox"/>	C.1.04		

Context menu for VML1:

- Image Details
- Toggle Lock
- Daily
- Recovery
- Service
- Operational Customization
- Configuration
- Choose z/VM Virtual Servers to Manage
- Manage Storage Resources
- Manage Virtual Switches
- New Virtual Server

Tasks: VML1

- Image Details
- Toggle Lock
- Daily
- Recovery
- Service

Retrieve list of existing virtual servers from z/VM

R93HMC1: Choose z/VM Virtual Servers to Manage - Mozilla Firefox: IBM Edi...

9.12.16.234 https://9.12.16.234/hmc/content?taskId=141&refresh=334

Choose z/VM Virtual Machines to Manage - R93:VML1

Select or deselect the z/VM virtual machines that are to be managed by this console.

Filter: gssp

Select	Virtual Machine Name
<input type="checkbox"/>	GSSP03
<input type="checkbox"/>	GSSP04
<input type="checkbox"/>	GSSP05
<input type="checkbox"/>	GSSP06
<input checked="" type="checkbox"/>	GSSP07
<input checked="" type="checkbox"/>	GSSP08
<input checked="" type="checkbox"/>	GSSP09
<input type="checkbox"/>	GSSP10
<input type="checkbox"/>	GSSP11
<input checked="" type="checkbox"/>	GSSP12
<input type="checkbox"/>	GSSP13
<input type="checkbox"/>	GSSP14
<input type="checkbox"/>	GSSP15
<input type="checkbox"/>	GSSP16
<input checked="" type="checkbox"/>	GSSP17
<input checked="" type="checkbox"/>	GSSP18
<input checked="" type="checkbox"/>	GSSP19
<input checked="" type="checkbox"/>	GSSP20
<input checked="" type="checkbox"/>	GSSP26
<input type="checkbox"/>	GSSPHUB

Page 1 of 1 Total: 12727 Filtered: 22 Displayed: 22 Selected: 77

OK Cancel Help

Filter on virtual servers named GSSP*

Include GSSP26 in list of managed virtual servers

R93HMC1: Choose z/VM Virtual Servers to Manage - Mozilla Firefox: I...

9.12.16.234 https://9.12.16.234/hmc/content?taskId=138&refresh=326

Please wait while the Choose z/VM Virtual Machines to Manage task gathers the list of virtual machines from the selected target images...

Done

Selecting Existing z/VM Virtual Servers to Manage

- Now GSSP26 shows up as being managed by zManager...

Hardware Management Console

Ensemble Management > hydra > Members > R93

Virtual Servers | Hypervisors | Blades | Topology

Select	Name	Status
<input type="checkbox"/>	GSSP18	Not Activated
<input type="checkbox"/>	GSSP19	Not Activated
<input type="checkbox"/>	GSSP20	Not Activated
<input type="checkbox"/>	GSSP26	Operating
<input type="checkbox"/>	HIPER2	Not Activated
<input type="checkbox"/>	IPLTEST	Not Activated

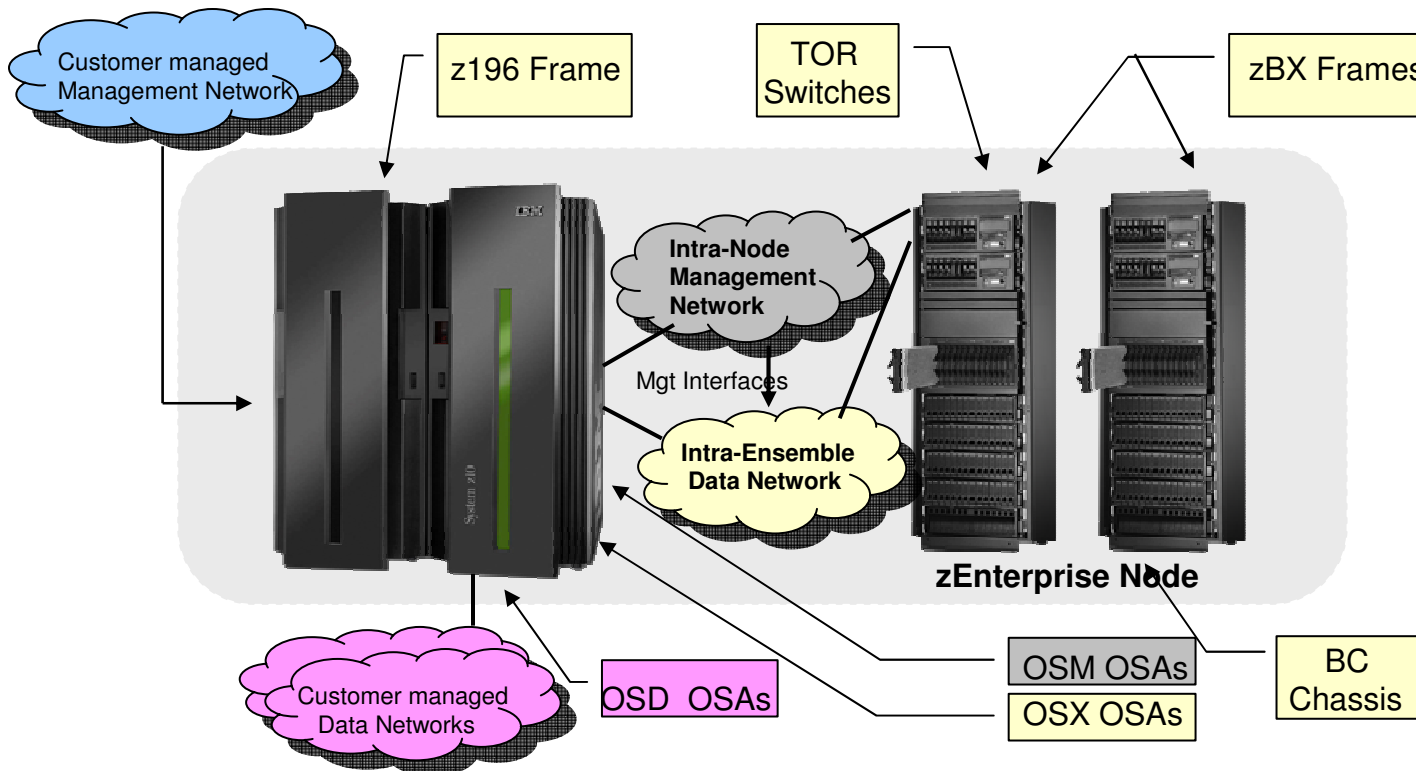
The screenshot shows the Hardware Management Console interface. The left sidebar contains navigation options: Welcome, Systems Management, Ensemble Management (with sub-items hydra, Members, R91, R93, Workloads), HMC Management, and Service Management. The main area displays a list of virtual servers under the path Ensemble Management > hydra > Members > R93. The list includes GSSP18, GSSP19, GSSP20, GSSP26, HIPER2, and IPLTEST. GSSP26 is highlighted with a red circle and is shown as 'Operating', while all other servers are 'Not Activated'.

Some zManager Use Cases for Existing z/VM Environments

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- **Automation via RESTful APIs**

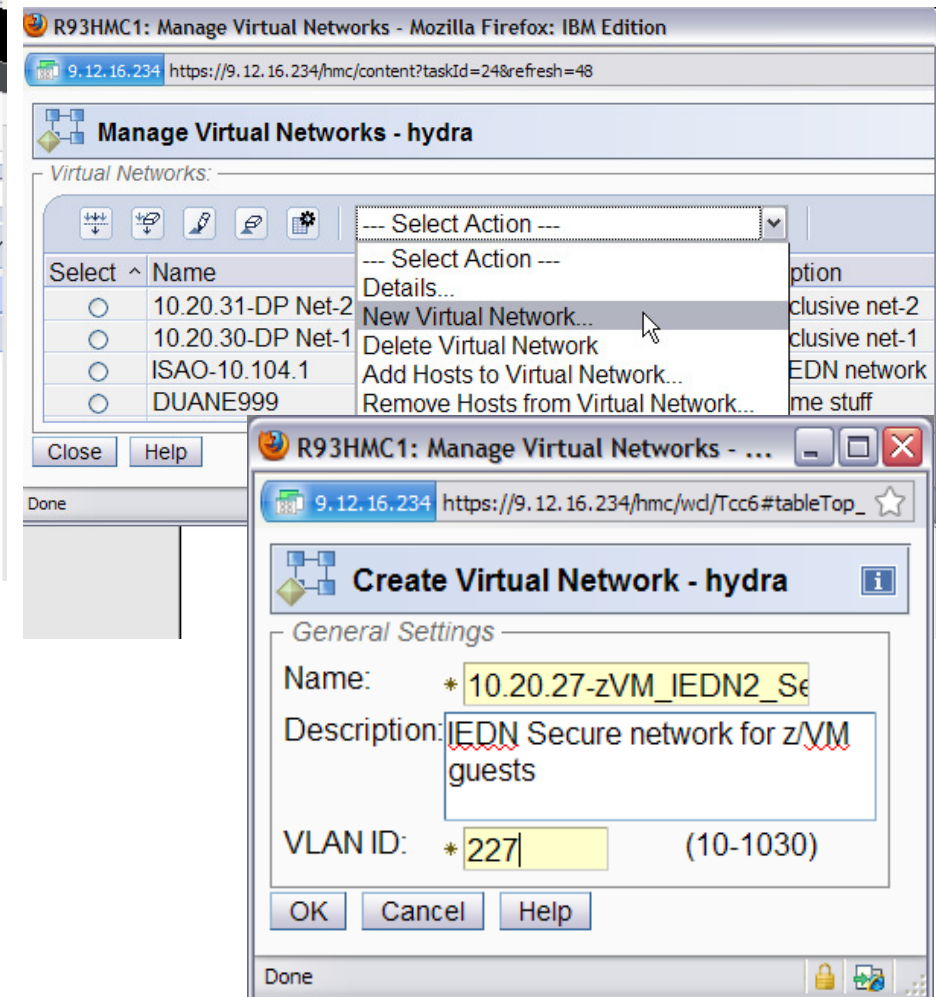
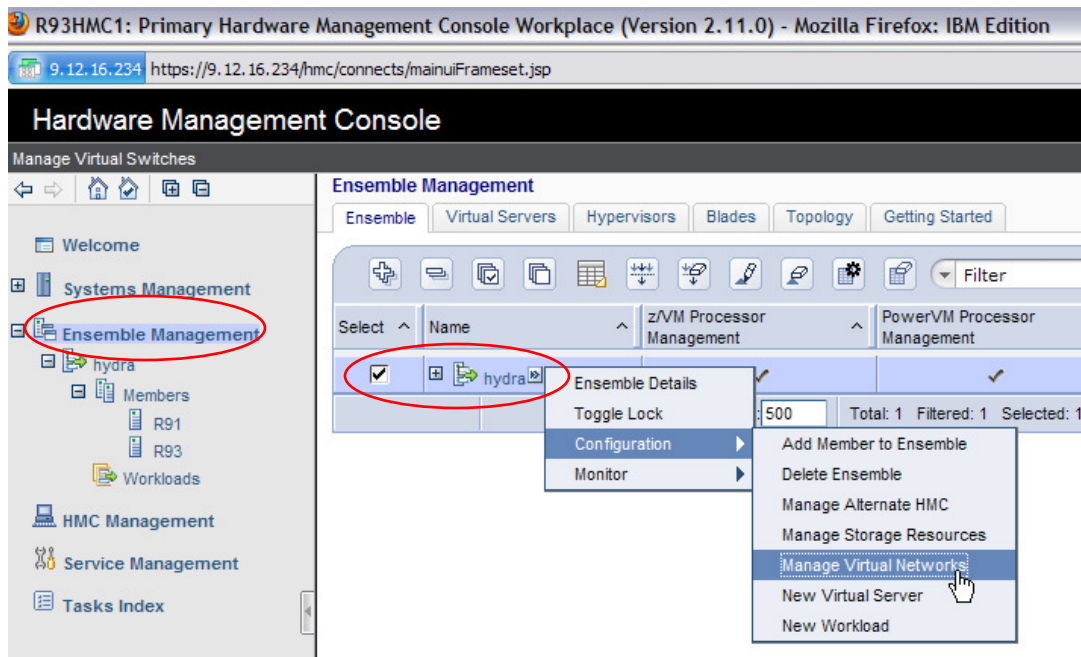
Connecting a z/VM Virtual Server to the IEDN

- **The Intra-Ensemble Data Network (IEDN) is a 10Gb, private, secure network over which all ensemble-managed virtual servers can communicate**
 - Single physical network, one or more virtual networks
- **z/VM virtual servers connect to the IEDN through new OSX OSA CHPIDs**
 - OSX is a standard OSA-Express3 10GbE adapter configured as CHPID type OSX
 - Virtual servers can connect directly to an OSX, or through the new TYPE IEDN VSWITCH
- **An updated qeth driver provides Linux support for OSX**
 - Connect to IEDN VSWITCH with TYPE IEDN NIC
- **For older Linux distributions, z/VM provides OSD to OSX simulation vNICs (OSDSIM on SET VSWITCH) that allows them to connect to an IEDN VSWITCH with a TYPE QDIO NIC**



Connecting a z/VM Virtual Server to the IEDN

- Let's connect GSSP26 to the IEDN
- We'll assume we first want to define a new virtual network on the IEDN for it to connect to



Connecting a z/VM Virtual Server to the IEDN

- Next, create an IEDN VSWITCH via zManager

- This can only be done from zManager (it writes out configuration data to the OSX)
- Also can only directly attach a Linux or z/OS guest to a real OSX using zManager

The screenshot shows the Hardware Management Console (HMC) interface. The main window displays a list of virtual servers under the 'Members' tab for R93. The 'VML1' virtual server is selected, and a context menu is open over it. The 'Manage Virtual Switches' option is highlighted. A secondary window titled 'Manage Virtual Switches - R93:VML1' is open, showing a table of virtual switches and a 'Table Actions' menu with 'Create IEDN vSwitch' selected.

Select	Name	Port Type	GVRP	Layer Mode		
<input type="radio"/>	IE	ACCESS		ETH		
<input type="radio"/>	IE	ACCESS		ETH		
<input checked="" type="radio"/>	IE	ACCESS		ETH		
<input type="radio"/>	IE	ACCESS		ETH		
Table Actions						
<input type="radio"/>	IE	ACCESS		ETH		
<input type="radio"/>	DT70TAG	QDIO	UNAWARE	false	ETH	
<input type="radio"/>	QDIO120	QDIO	AWARE	ACCESS	false	ETH
<input type="radio"/>	TEN208	QDIO	AWARE	ACCESS	true	ETH
				Total: 8		

Connecting a z/VM Virtual Server to the IEDN

- Fill in VSWITCH name, layer mode, and OSX information. Click OK...

R93HMC1: Manage Virtual Switches - Mozilla Firefox: IBM Edition

9.12.16.234 https://9.12.16.234/hmc/wd/T897#tableTop_2f0d2f0d

Create Virtual Switch - R93:VML1

Name: * IEDN27

Layer Mode: * ETH

Router: NONROUTER

Queue size (Mbytes): * 8

IP timeout: * 5

Connect uplinks:

Uplink type: Real

	OSX CHPID	Device Number	Port Name
Uplink 1:	OSX 1.27	270	
Uplink 2:	OSX 1.26	264	
Uplink 3:	OSX 1.2A		

Virtual

Uplink Id:

vNic:

Controller: Use any available controller.

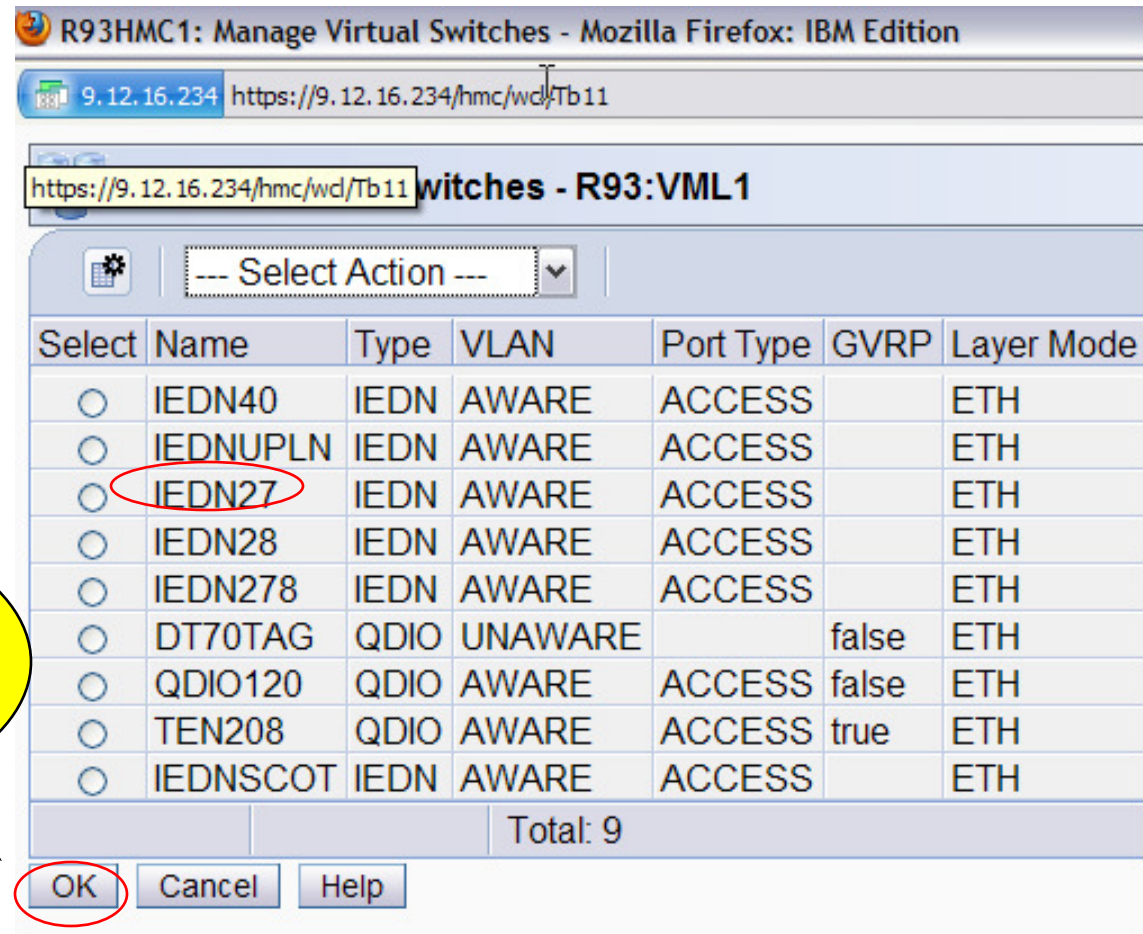
Select	Name	Available	VDEV Range	IP	ETHERNET	VLAN_ARP	GVRP	LINKAGG	ISOLATION
<input type="checkbox"/>	DTCENS1	true	*	true	true	true	true	true	true
<input type="checkbox"/>	DTCENS2	true	*	true	true	true	true	true	true
									Total: 2

OK Cancel Help

Done

Connecting a z/VM Virtual Server to the IEDN

- This creates the VSWITCH definition in zManager



VSWITCH not actually defined in z/VM until OK is clicked

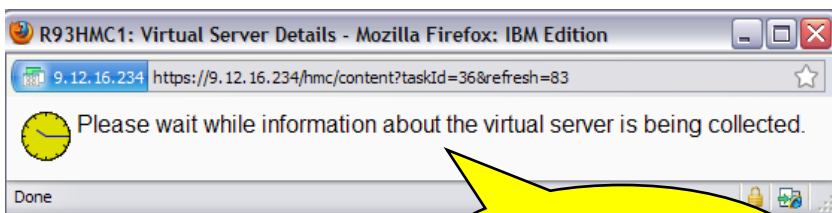
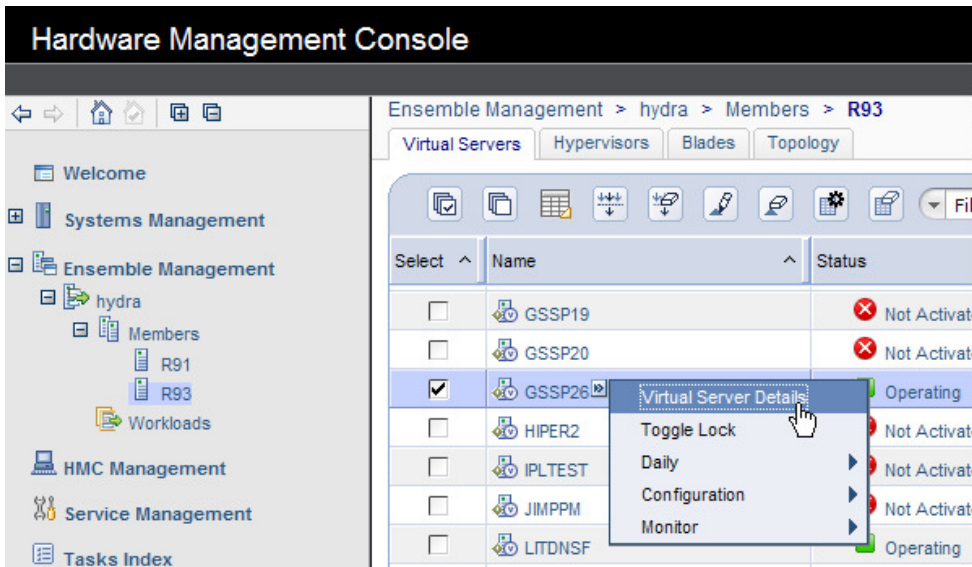
Connecting a z/VM Virtual Server to the IEDN

- Here's the resulting IEDN VSWITCH from zVM's point of view
- Note the new controller machines for ensemble use.

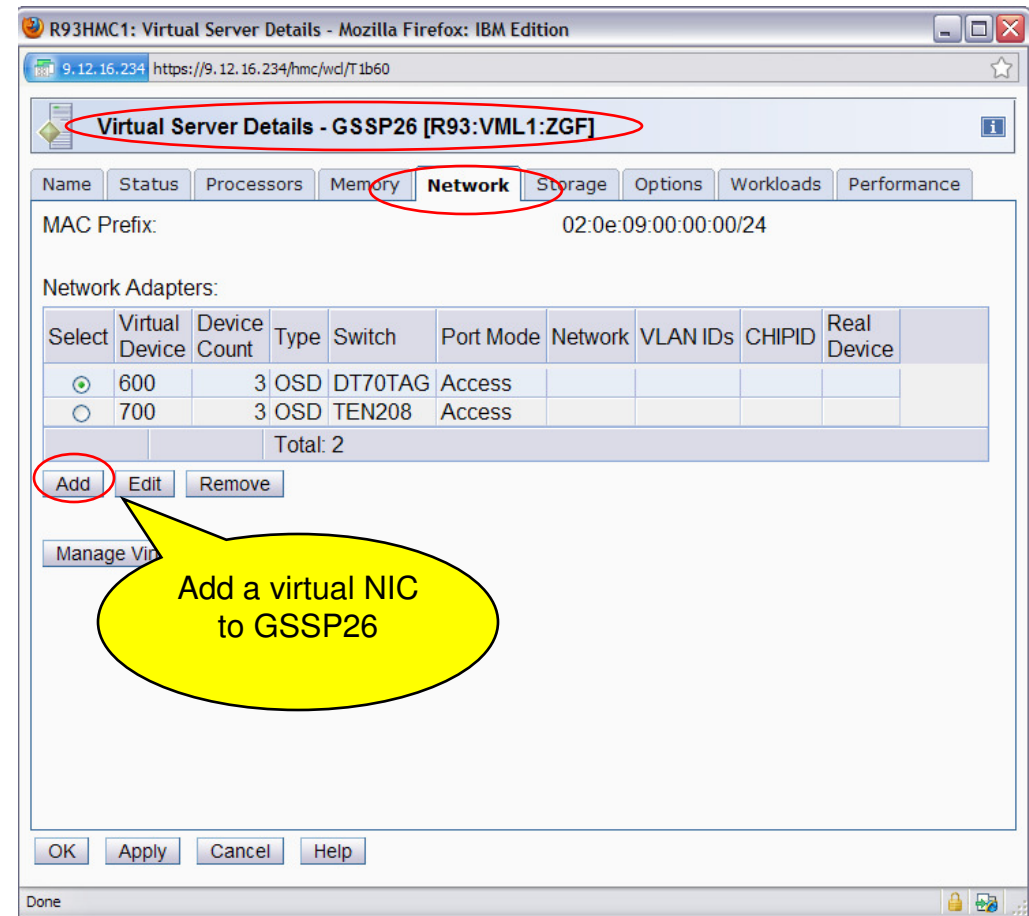
```
q vswitch iedn27
VSWITCH SYSTEM IEDN27 Type: IEDN Connected: 14 Maxconn:
INFINITE
  PERSISTENT RESTRICTED ETHERNET
Accounting: OFF
  VLAN Aware Default VLAN: NONE Default Porttype: Access
GVRP: Enabled
  Native VLAN: NONE VLAN Counters: OFF
MAC address: 02-0E-09-00-00-07 MAC Protection: ON
State: Ready
IPTimeout: 5 QueueStorage: 8
Isolation Status: OFF
Uplink Port:
  RDEV: 0270.P00 VDEV: 0270 Controller: DTCENS2
  RDEV: 0264.P00 VDEV: 0264 Controller: DTCENS1 BACKUP
Ready; T=0.01/0.01 09:33:33
```

Connecting a z/VM Virtual Server to the IEDN

- Now connect GSSP26 to the virtual network via the IEDN VSWITCH
 - Going to use an OSDSIM connection in this example
- Select virtual server details for GSSP26 and select the Network tab
 - zManager works with z/VM to gather the current state of GSSP26
- Click on "Add" to add a network adapter to this virtual server



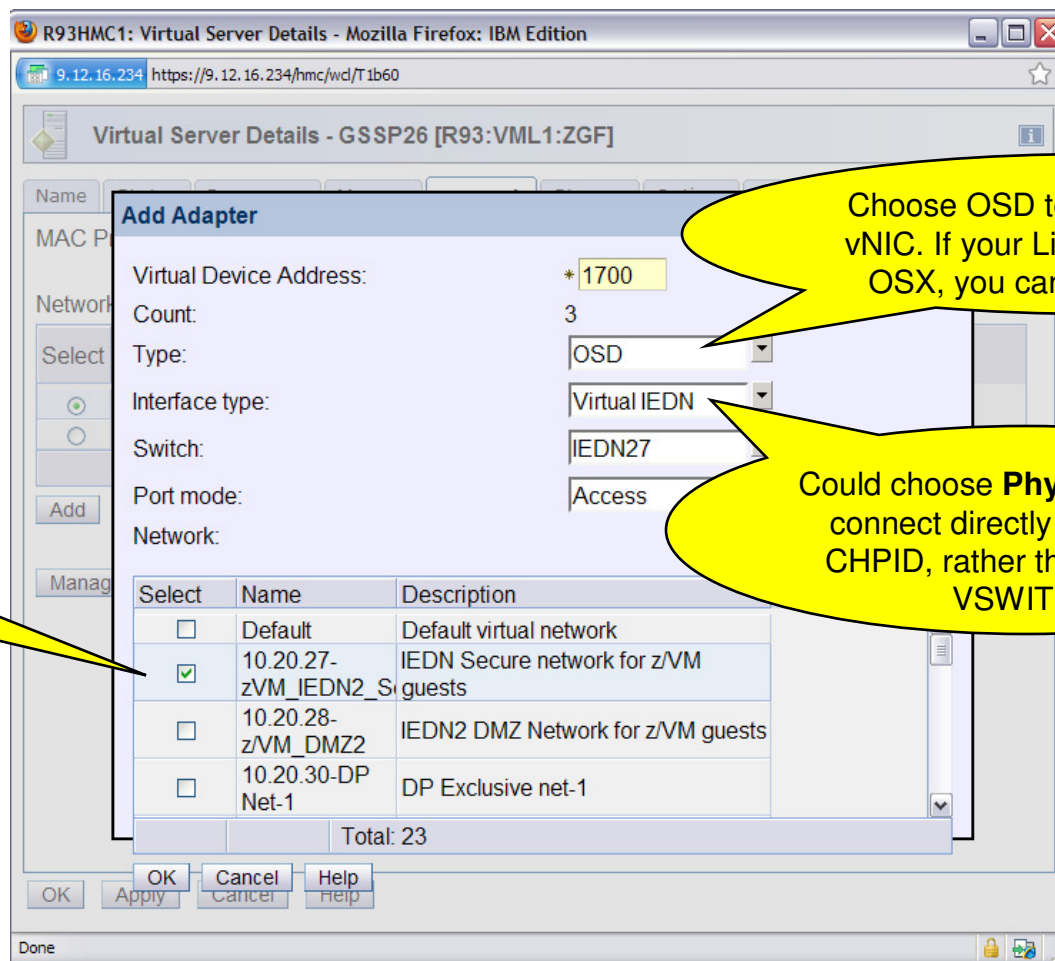
Ask z/VM for the current state of GSSP26



Add a virtual NIC to GSSP26

Connecting a z/VM Virtual Server to the IEDN

- Fill in the Add Adapter panel. Enter a virtual NIC address and select our virtual network.
- For an OSDSIM connection, select Type “OSD” and Interface type “Virtual IEDN.”
 - Interface type is a zManager construct, it doesn’t translate to any particular definition in the z/VM directory.
 - We need to select Virtual IEDN for it to bring up a list of IEDN VSWITCHes to choose from.
- Click OK...



Connecting a zVM Virtual Server to the IEDN

- Note the 1700 NIC has been added. Click Apply to actually make the change to z/VM
- Then if we click Edit to view it...

Virtual Server Details - GSSP26 [R93:VML1:ZGF]

MAC Prefix: 02:0e:09:00:00:24

Select	Virtual Device	Device Count	Type	Switch	Port Mode	Network	VLAN IDs	CHIP
<input type="radio"/>	600	3	OSD	DT70TAG	Access			
<input type="radio"/>	700	3	OSD	TEN208	Access			
<input checked="" type="radio"/>	1700	3	OSD	IEDN27	Access	10.20.27-zVM_IEDN2_Secure		

Total: 3

Buttons: Add, Edit, Remove

Buttons: OK, Apply, Cancel, Help

- ... we see the Type is still OSD, but the Interface Type is now Virtual QDIO. This is what an OSDSIM connection looks like
- If we had created a type OSX vNIC, the Interface type here would show as Virtual IEDN

Edit Adapter

Virtual Device Address: * 1700

Count: 3

Type: OSD

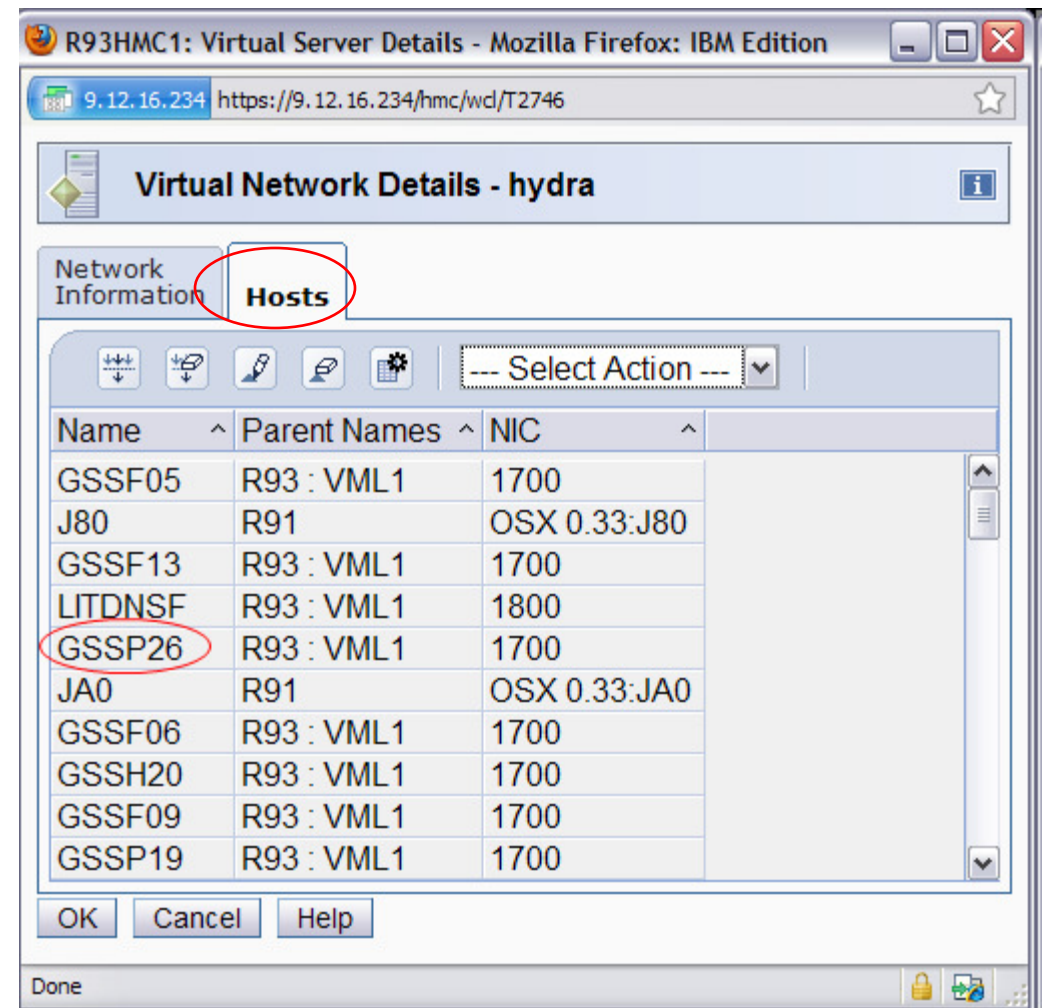
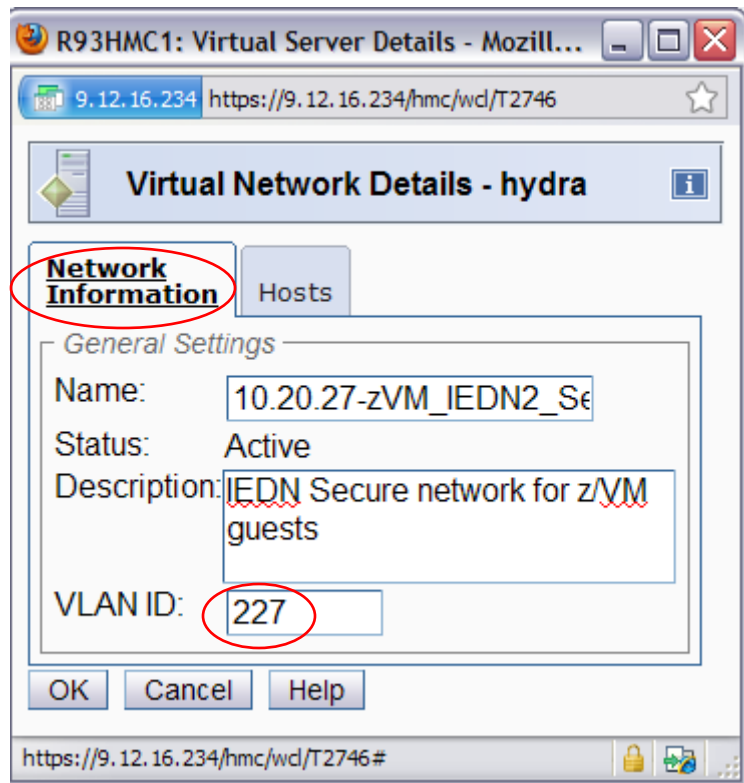
Interface type: Virtual QDIO

Switch:

Buttons: OK, Cancel, Help

Connecting a z/VM Virtual Server to the IEDN

- Checking virtual networks, we see GSSP26 is now listed on our virtual network!



Connecting a z/VM Virtual Server to the IEDN

- Here's what the directory entry looks like

```
USER GSSP26 XXXXXXXX 4096M 6144M GZ 0
  CPU 0 BASE
  CRYPTO      APVIRT
  IPL CMS PARM AUTOOCR
  IUCV ALLOW
  OPTION APPLMON
  CONSOLE 0009 3215 T OPMGRM
  NICDEF 0600 TYPE QDIO LAN SYSTEM DT70TAG
  NICDEF 0700 TYPE QDIO LAN SYSTEM TEN208
  NICDEF 1700 TYPE QDIO LAN SYSTEM IEDN27 DEVICES 3
  SPOOL 000C 2540 READER
  SPOOL 000D 2540 PUNCH
```

- GRANTs to the VSWITCH are persisted internally by z/VM and will be reapplied when z/VM is re-IPLed.
 - Backup your z/VM Shared File System!

```
SET VSWITCH IEDN27 GRANT GSSP26 OSDSIM ON
SET VSWITCH IEDN27 GRANT GSSP26 VLAN 227
```

Connecting a z/VM Virtual Server to the IEDN

■ Notes:

■ **OSX support available with:**

- SLES 10 SP4, SLES 11 SP1 and up
- RHEL 5.6, RHEL 6.1 and up

■ **If you try to connect a Linux guest directly to an OSX chpid (or to a TYPE IEDN vNIC) and don't have the updated qeth driver, Linux will not allow the device to come online.**

- Prevents you from getting the wrong device by mistake

■ **z/OS guest connection to the IEDN is only supported via a direct OSX attachment, not via VSWITCH**

Some zManager Use Cases for Existing z/VM Environments

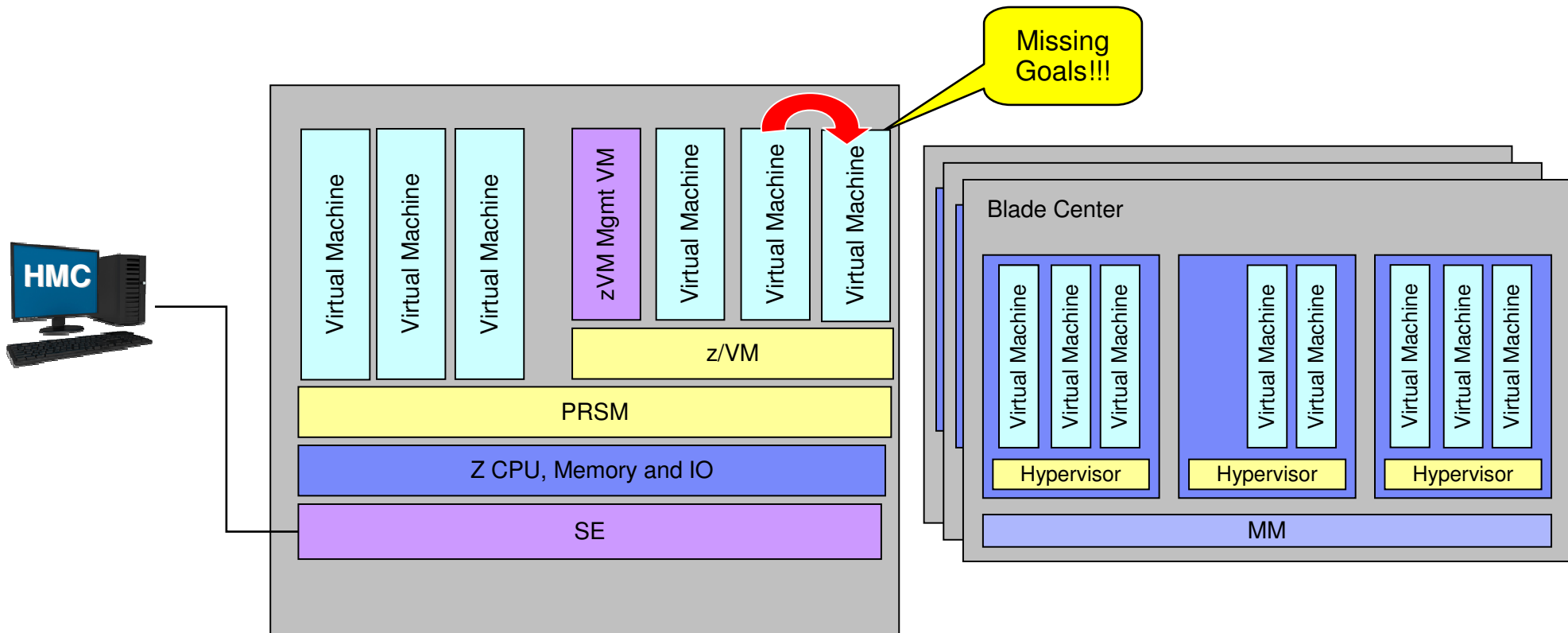
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 - Enable ARM instrumentation in middleware for even more granular reporting, including transaction hops between virtual servers
- Automation via RESTful APIs

Goal-oriented Performance Management

- Allow critical workloads to receive resources and priority based on goal-oriented policies established by business requirements
- Smart business adjustments based on workload insight
- Wizard-driven management of resources in accordance with specified business service level objectives
- Monitor resource use within the context of a business workload
- HMC provides a single consolidated and consistent view of resources
 - Define workloads and associated performance policies



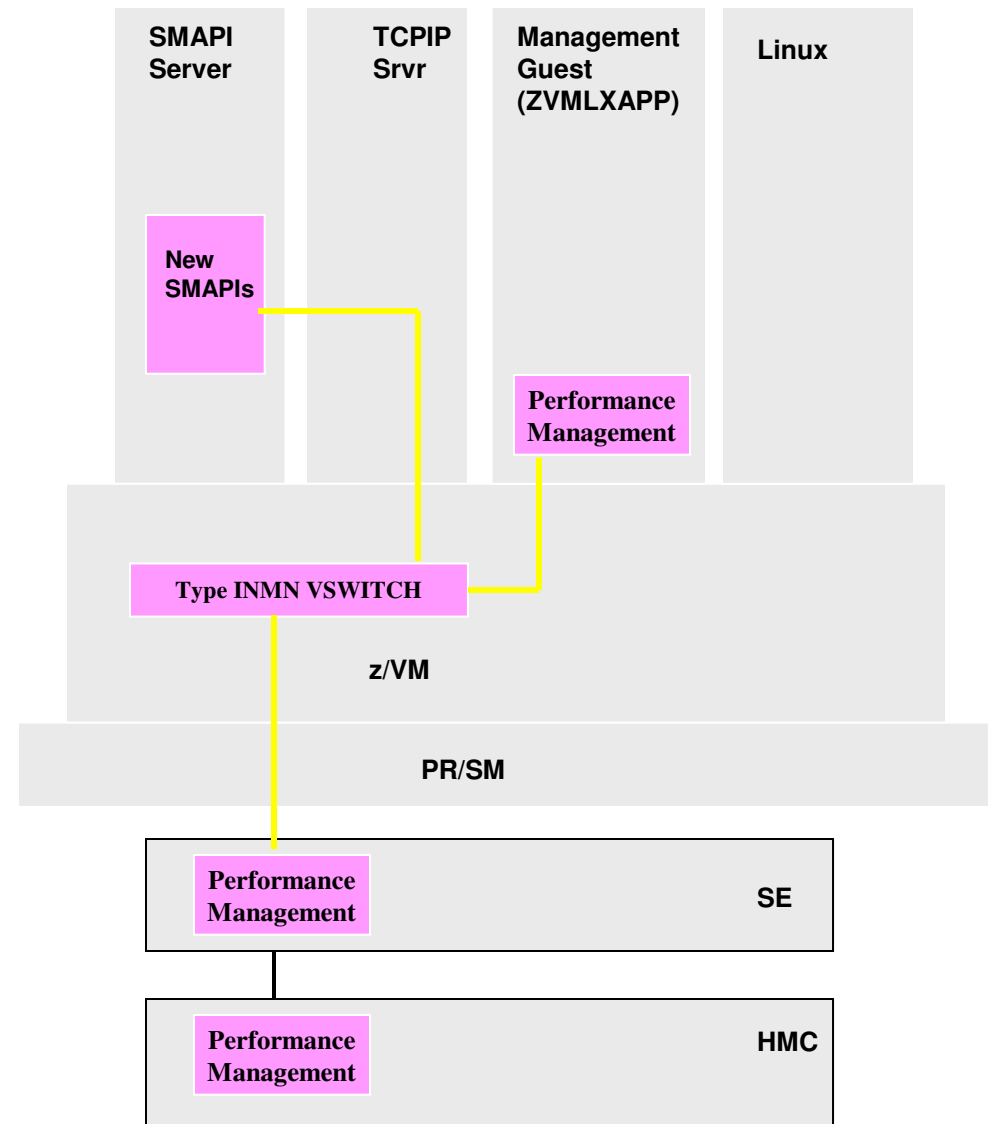
Managing Resources across z/VM Virtual Machines



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

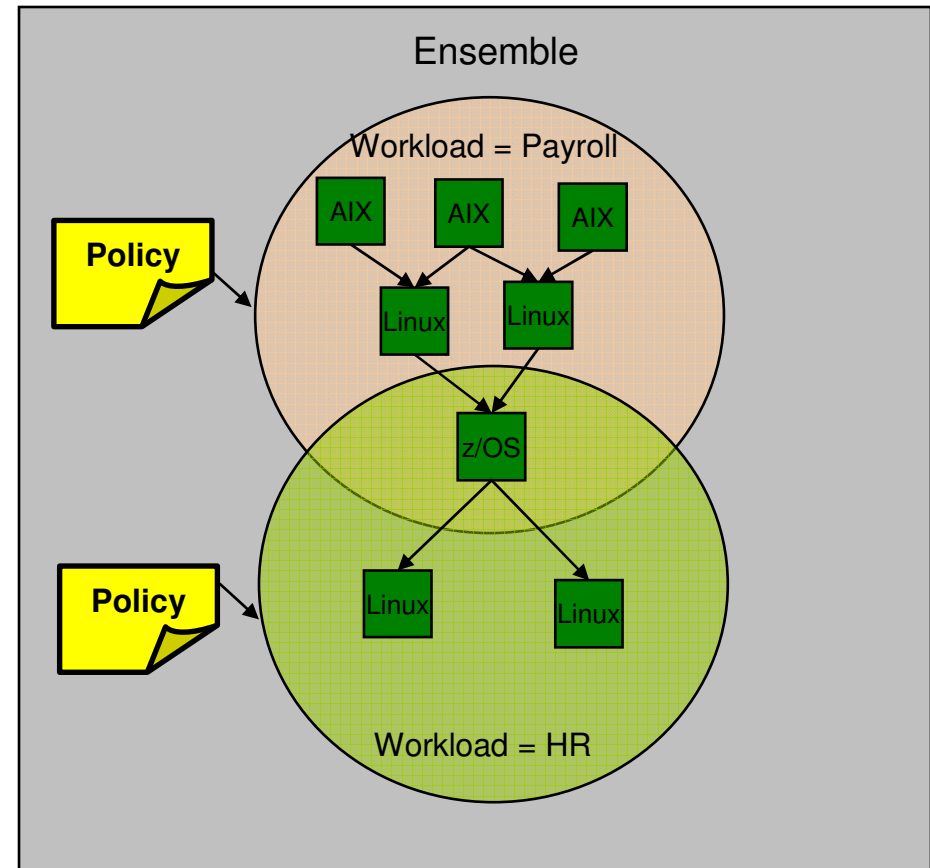
Goal-oriented Performance Management for z/VM

- **zManager works with z/VM to adjust the relative processor SHARE of virtual servers in order to meet goals**
 - Multiple layers of performance management support
 - Ensemble, node, hypervisor
 - Does not require agents running within the virtual servers
 - Will optionally leverage the Guest Platform Management Provider (GPMP), if installed and operating. We'll look at that later.
 - Does leverage CP Monitor sampling
 - Only for guests using relative share, not absolute share
 - and not maximum share option
LIMITHARD – LIMITSOFT is okay
 - Distinct from VMRM. Should not be used in conjunction with VMRM (choose one or the other)



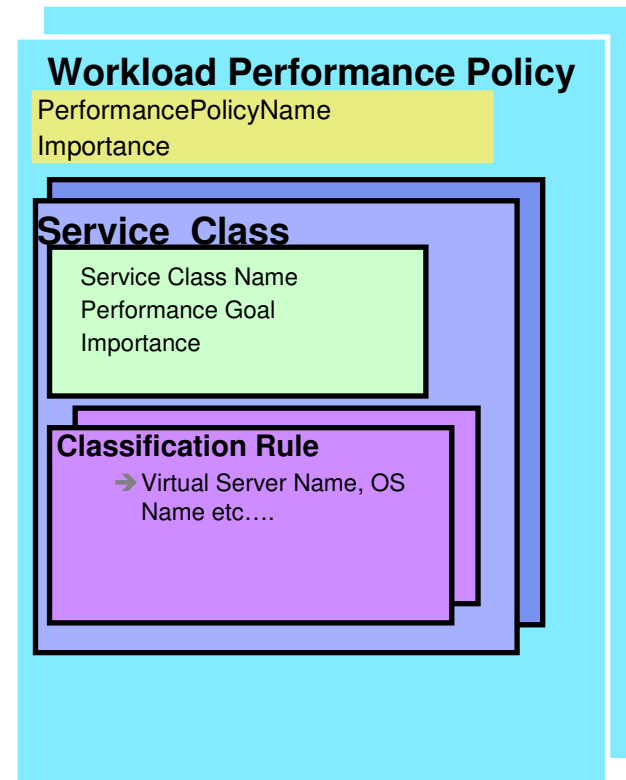
Workload Resource Group

- **A “workload” is a grouping of virtual servers**
 - Conceptually, a collection of virtual servers contributing to the end-to-end execution of a particular business function
- **Provides a “management view” and context for workload management**
 - Performance policies are associated to a workload
- **Can contain *any* type of ensemble-managed virtual server**
 - A virtual server can be in multiple workloads
 - zManager can also perform processor performance management for PowerVM virtual servers
 - zManager only monitors z/OS and provides reports. It defers to z/OS WLM for resource balancing.
- **Can be defined by an administrator**
 - Requires the “Automate” suite
 - New HMC roles for controlling access to performance management tasks



Performance Policies and Service Classes

- **Policy: describes workload performance objectives**
 - Conceptually similar to a z/OS WLM policy
 - Has an overall business importance level for the workload
 - Can define multiple per workload, but one active at a time per workload
 - Can dynamically change policies (via UI or scheduled)
- **Service classes: set priority for and classify resources within a policy**
 - A service class assigns a performance goal and an importance
 - Multiple per policy. Some virtual servers in a workload may have higher priority and/or need a higher velocity than others, this is how you specify that
 - Have classification rules that map virtual servers in the workload to a given service class



Goal-oriented Performance Management

- **First let's just put GSSP26 in a "workload," configure a performance policy for it, and monitor to see if it's achieving the goals we define.**
- **We won't do any active management of GSSP26 yet**
 - 1. Define virtual server(s) to a workload or workloads**
 - 2. Create performance policy and service classes that include the workload, and specifically include GSSP26. Activate the performance policy.**
 - 3. Monitor and get reporting data**

Goal-oriented Performance Management

- First, define a workload (“Scott workload”) and add GSSP26 to it
 - We’ll also add z/VM virtual servers SCOTT50 and SCOTT60 (not shown)

The screenshot shows the Hardware Management Console (HMC) interface. On the left is a navigation pane with sections like Welcome, Systems Management, Ensemble Management (containing hydra, Members, R91, R93, Workloads), HMC Management, Service Management, and Tasks Index. The main area is titled 'Ensemble Management' and has tabs for Ensemble, Virtual Servers, Hypervisors, Blades, Topology, and Getting Started. A table lists virtual servers, with 'hydra' selected. A context menu is open over 'hydra', showing options like Ensemble Details, Toggle Lock, Configuration, Monitor, and 'New Workload' (which is highlighted by the mouse cursor). Other options include Add Member to Ensemble, Delete Ensemble, Manage Alternate HMC, Manage Storage Resources, Manage Virtual Networks, and New Virtual Server.


The screenshot shows the 'New Workload - hydra' configuration dialog. On the left is a navigation pane with options like Welcome, Workload Name (selected), Select Virtual Servers, Create Performance Policy, Create Service Class, Service Class Goal, Classification Rule, Manage Service Classes, Manage Performance Policies, Activate Policy, and Summary. The main area is divided into sections:

- Workload Name:** Name: * Scott workload, Description: Scott's simple workload, Category: Scott.
- Select Virtual Servers:** Shows a table of available virtual servers. GSSP26 is selected.

Select	Name	Hypervisor	Workloads
<input type="checkbox"/>	GSSP19	VML1	
<input type="checkbox"/>	GSSP20	VML1	
<input checked="" type="checkbox"/>	GSSP26	VML1	
<input type="checkbox"/>	HIPER2	VML1	
<input type="checkbox"/>	IOCP	R91	
<input type="checkbox"/>	IPLTEST	VML1	
<input type="checkbox"/>	J80	R91	GSSP17-J80
<input type="checkbox"/>	JA0	R91	
<input type="checkbox"/>	JE0	R91	
<input type="checkbox"/>	JIMPPM	VML1	

Goal-oriented Performance Management

- Define a performance policy (“Scott policy”) for Scott Workload with an associated business importance

 New Workload - hydra

Create Performance Policy

You may create a performance policy for the workload now or use the default performance policy and create later.

***Create Option**

Default

New

New based on:

Policy Details

Workload: Scott workload

Name: * Scott policy

Description: Scott's simple policy

Business importance: * High

Highest

High

Medium

Low

Lowest

What is the relative Importance of this business function To other business functions?

Goal-oriented Performance Management

- Then define a service class (“Scott service class”) with an associated performance goal and business importance

New Workload - hydra

Welcome
 Workload Name
 Select Virtual Servers
 Create Performance Policy
 Create Service Class
 Service Class Goal
 Classification Rule
 Manage Service Classes
 Manage Performance Policies
 Activate Policy
 Summary

Create Service Class - Scott policy

You may create a service class for the performance policy now or use the default service

***Create Option**

Default
 New
 New based on:

Service Class Details

Workload: Scott workload
 Performance policy: Scott policy
 Name: * Scott service class
 Description: Scott's simple service class

New Workload - hydra

Welcome
 Workload Name
 Select Virtual Servers
 Create Performance Policy
 Create Service Class
 Service Class Goal
 Classification Rule
 Manage Service Classes
 Manage Performance Policies
 Activate Policy
 Summary

Service Class Goal - Scott po

Select the performance goal and

Performance Goal

Velocity: * Fast
 Discretionary

Business importance: * High

Highest
 High
 Medium
 Low
 Lowest

What is the relative importance of this specific task to other tasks of this business function?

Goal-oriented Performance Management

- **Create a classification rule in Scott service class that associates GSSP26 to it**
 - Let's also add a classification rule for SCOTT.* virtual servers in the workload

The image displays two screenshots of the IBM zEnterprise Unified Resource Manager interface, illustrating the steps to create a classification rule for the Scott service class.

Left Screenshot: Shows the "New Workload - hydra" window. The left sidebar lists navigation options, with "Classification Rule" selected. The main area is titled "Classification Rule - Scott policy: Scott service class" and contains a "Rule Builder: Filter Type" dialog box. The dialog box explains that the rule builder allows creating a classification rule by constructing clauses that are ANDed or ORed together. A dropdown menu is open, showing options: Hostname, OS Level, OS Name, OS Type, and Virtual Server Name (which is selected).

Right Screenshot: Shows the same "New Workload - hydra" window. The left sidebar is updated, with "Classification Rule" selected. The main area is titled "Classification Rule - Scott policy: Scott service class" and contains a "Classification rule:" section. This section shows a "Logical Operators" box with "AND" and "OR" buttons. Below this, two clauses are defined: "Virtual Server Name == GSSP26" and "Virtual Server Name == SCOTT.*". These two clauses are connected by an "OR" operator, indicating that the rule will be satisfied if either condition is met.

Goal-oriented Performance Management

- **Activate “Scott policy” for workload “Scott workload”**

New Workload - hydra

Activate Policy

Select the performance policy to activate when the workload is created.

--- Select Action ---

Select	Performance Policy	Business Importance	Description
<input checked="" type="checkbox"/>	Scott policy	High	Scott's simple policy
<input type="checkbox"/>	Default	Medium	The default workload performance policy
Total: 2			

Launch Customize Scheduled Operations to schedule future performance policy activations. The task will be launched after the workload has been created.

Summary

Hardware Management Console

ensadmin

Filter

Tasks Views

Select	Name	Virtual Servers	Performance Policy	Performance Policy Status	Performance Policy Business Importance	Category
<input type="checkbox"/>	MIXOSWkldR91R93	10	MIXOSPolicy	Active	High	
<input type="checkbox"/>	PET Bookstore Workload	18	PET Bookstore Policy	Active	Highest	PET
<input type="checkbox"/>	PPMPO003	0	Peak	Active	Highest	Linux
<input type="checkbox"/>	PPMPO13_Default	0	Default	Active	Medium	Linux
<input type="checkbox"/>	PPMPO13_ServiceClass	0	Gold	Active	High	Linux
<input type="checkbox"/>	PPMZVCM07	1	Gold	Active	Highest	Linux
<input type="checkbox"/>	R90ToR93	0	R93DDF	Active	High	
<input type="checkbox"/>	Scott workload	1	Scott policy	In Progress	High	Scott
<input type="checkbox"/>	ssw-wkload	6	ssw-default	Active	Medium	test

Goal-oriented Performance Management

- First let's just put GSSP26 in a "workload," configure a performance policy for it, and monitor to see if it's achieving the goals we define.
- We won't do any active management of GSSP26 yet
 1. Define virtual server(s) to a workload or workloads
 2. Create performance policy and service classes that include the workload, and specifically include GSSP26. Activate the performance policy.
 3. **Monitor and get reporting data**

Goal-oriented Performance Management

Workload report

- Display high level view of “performance health” of each Workload
 - Indication if a workload contains service class missing goals
- Graphs available for visual view, including workload’s overall load and service class goal achievement
- Can drill down to workload’s service class report

Workloads Report - hydra

Report Interval: Last 1 minute (6/28/11 11:55:24 AM - 6/28/11 11:56:24 AM) [Modify](#)

Last: 1 minute

Starting from: Date: 6/28/11 Time: 11:40:02 AM Duration: 1 minute

OK Apply Cancel

--- Select Action --- Filter

Select ^	Workload ^	Service Class With Largest PI (PI)	Performance Policy ^
<input type="radio"/>	PPMSNIF03 - Blade 4	Gold SC (1.00)	Policy 1
<input type="radio"/>	PPMZVCM07		Gold
<input type="radio"/>	R90ToR93		93DDF
<input type="radio"/>	r93c1b14workload		ssw-default
<input checked="" type="radio"/>	Scott workload	Scott service class (0.60)	Scott policy
<input type="radio"/>	SimpleWorkload	Default (0.41)	Default
<input type="radio"/>	ssw-wkload	Default (0.40)	ssw-default
<input type="radio"/>	stutzie workload	Jims Test (0.42)	Jims_policy

Total: 50 Filtered: 50 Selected: 1

Workload Charts

Click to expand for graphical chart

Workload health overview

The active performance policy

Goal-oriented Performance Management

Service class report

- High-level view of each service class in Workload's performance policy
 - Goal and importance
 - Actual performance
 - Indication if monitoring event is established for service class and event is triggered (not shown)
 - Graph available of service class performance index
 - Can drill down to virtual server report for the workload

Service Classes Report - Scott workload

Report Interval: Starting 6/28/11 11:44:02 AM for 15 minutes (6/28/11 11:59:02 AM) [Modify](#)

Select	Service Class	Performance Policy	Current Performance	PI	Goal	Business importance
<input type="radio"/>	Default	Scott policy			Velocity - Moderate	Medium
<input checked="" type="radio"/>	Scott service class	Scott policy	Fastest	0.60	Velocity - Fast	High

Total: 2 Filtered: 2 Selected: 1

[Service Class Charts](#)

[Close](#) [Help](#)

Click to expand for graphical chart

Performance Index
 PI < 1.0 : velocity goal being overachieved
 PI = 1.0: velocity goal achieved
 PI > 1.0: velocity goal not being achieved

Goal-oriented Performance Management

Virtual servers report

- List of virtual servers associated with the workload
 - Virtual server Service class PI
 - Resource usage
 - Hypervisor CPU delay percentage
- Graph of CPU Utilization trend for the selected interval
- We'll look at this one again a bit later, and see more data

Virtual Servers Report - Scott workload

Report Interval: Starting 6/28/11 2:55:59 PM for 15 minutes (6/28/11 3:10:59 PM) [Modify](#)

--- Select Action --- Filter

Select	Virtual Server	OS Name	OS Type	OS Level	Virtual Processors	Allocated Memory (MB)	Physical CPU Utilization (%)	Hypervisor CPU Delay (%)	Idle Time (%)	Other Time (%)	Service Class (PI)	OS Processes Total CPU Using Samples (%)	OS Processes Total CPU Delay Samples (%)	OS Processes Total I/O Delay Samples (%)	OS Processes Total Page Delay Samples (%)
<input checked="" type="radio"/>	GSSP26				1	472	0.0	0.0	100.0	0.0	Scott service class (60.00)				
<input type="radio"/>	SCOTT50				1	346	0.0	0.0	100.0	0.0	Scott service class (60.00)				
<input type="radio"/>	SCOTT60				1	288	0.0	0.0	100.0	0.0	Scott service class (60.00)				

Page 1 of 1 Total: 3 Filtered: 3 Displayed: 3 Selected: 1

Virtual Server Charts

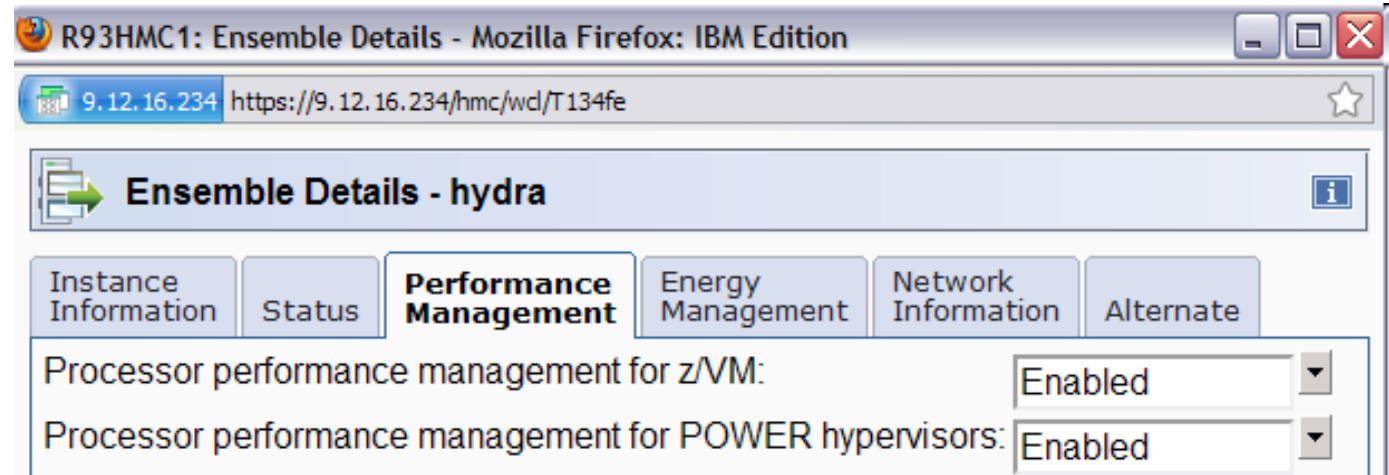
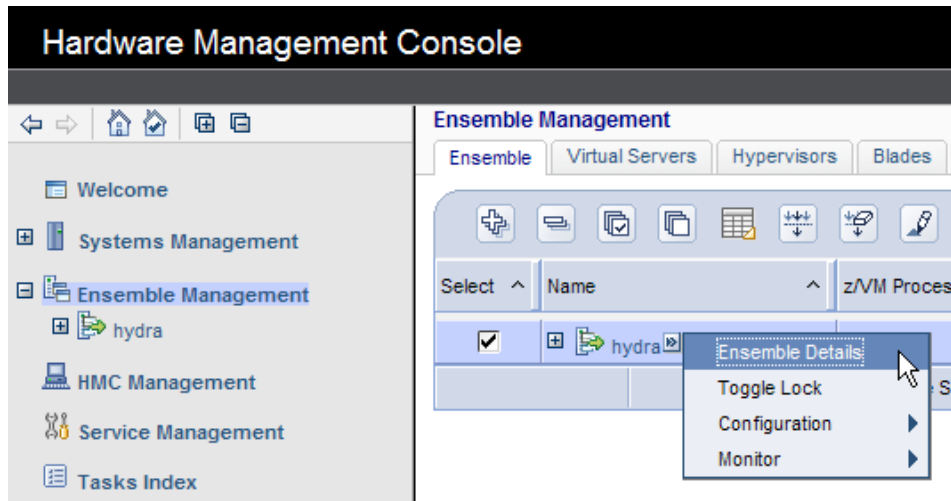
Click to expand for graphical chart

Goal-oriented Performance Management

- **Now let's enable processor performance management for GSSP26**
 1. Define virtual server(s) to a workload or workloads
 2. Create performance policy and service classes that include the workload, and specifically include GSSP26. Activate the performance policy.
 3. Monitor and get reporting data
 4. **Enable processor management for z/VM**
 5. **Enable processor management for GSSP26**
 6. **Look at some more reports**

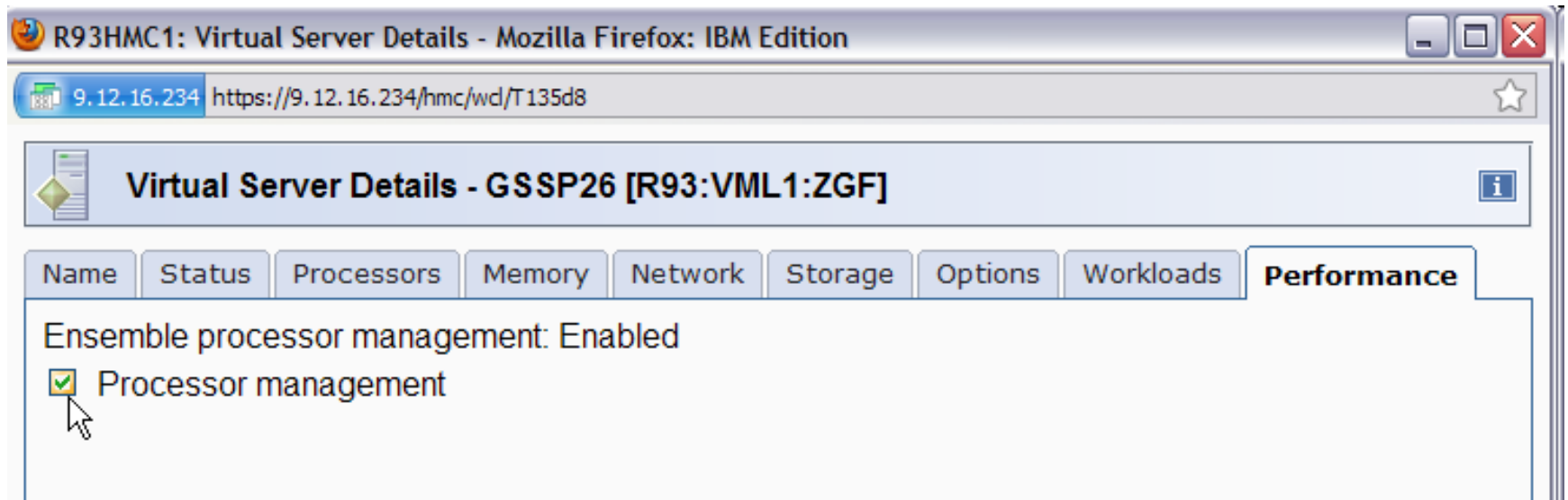
Goal-oriented Performance Management

- First we ensure z/VM is enabled for processor performance management at the ensemble level



Goal-oriented Performance Management

- Then we enable it for our GSSP26 virtual server



- For new virtual servers created by Unified Resource Manager, processor management is enabled by default. For existing virtual servers that have selected for management, it must be explicitly enabled like this
- **That's it! We have now enabled processor performance management for GSSP26**
 - No GPMP running yet in GSSP26. It is optional

Goal-oriented Performance Management

■ Hypervisor Report


- Shows that processor management for our GSSP26 virtual server is now Active
- If it wasn't, the reason field would show why

Hypervisor Report - GSSP26											
Report Interval: Starting 6/28/11 2:55:59 PM for 15 minutes (6/28/11 3:10:59 PM) Modify											
Hypervisor Details:											
Hypervisor: VML1		Processor count: 4		Total allocated memory: 32,768 MB							
Hypervisor type: z/VM		Total CPU consumption: 53.0%									
Virtual Servers:											
<div style="display: flex; justify-content: space-between; align-items: center;"> --- Select Action --- <input type="text" value="Filter"/> </div>											
Virtual Server	Processor Management Status	Processor Management Reason	Virtual Processors	Consumed Processors	Hypervisor Processing Unit Delay (%)	Share Mode	Share Limit	Shares	Min Shares	Max Shares	
GSSP26	Active	None	1	0.00	0.0	Relative	None	86	1	10,000	
LITDNSF	Not Active	Virtual server processor management disabled	1	0.00	0.0	Relative	None	100	1	10,000	
ROUTER1F	Not Active	Virtual server processor management disabled	1	0.00	0.3	Relative	None	100	1	10,000	
ROUTER2F	Not Active	Virtual server processor management disabled	1	0.00	0.0	Relative	None	100	1	10,000	
SCOTT50	Active	None	1	0.00	0.0	Relative	None	100	1	10,000	
SCOTT60	Active	None	1	0.00	0.0	Relative	None	100	1	10,000	
<input type="checkbox"/> ACNT1	Not Active	Virtual server was not active									

Goal-oriented Performance Management






Resource adjustment report

- Lists successful and failed resource adjustments for a workload or service class over a given interval

 **Service Class Resource Adjustments Report - Scott service class**

Report Interval: Starting 5/14/11 5:10:23 PM for 15 minutes (5/14/11 5:25:23 PM) [Modify](#)

Successful Adjustments:












--- Select Action ---

Filter

Receiver Virtual Servers	Receiver Workload	Receiver Service Class	Receiver Processing Units After (Before)	Donor Virtual Servers	Donor Workload	Donor Processing Units After (Before)
Total: 0 Filtered: 0 Displayed: 0						

Failed Adjustments:

--- Select Action ---

Filter

Receiver Virtual Servers	Receiver Workload	Receiver Service Class	Failure Reason	Time
Total: 0 Filtered: 0 Displayed: 0				

Close
Help

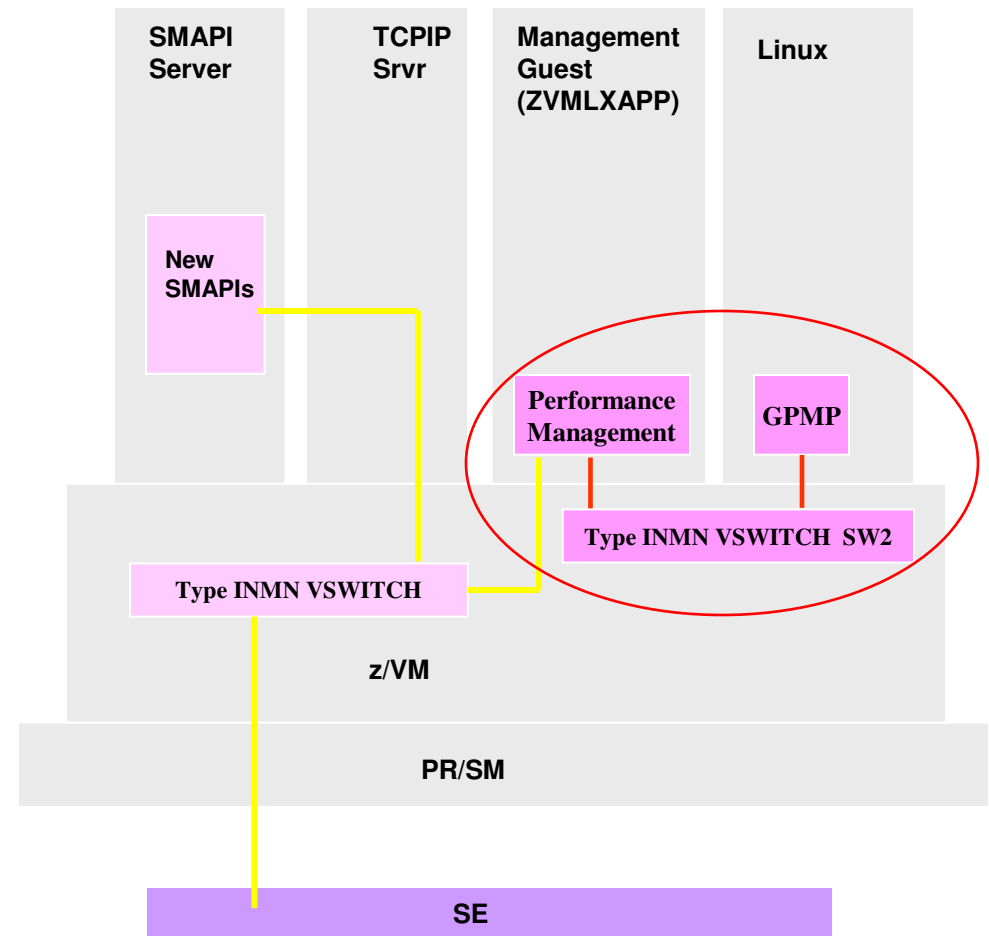
Goal-oriented Performance Management

- **Now let's start a GPMP in GSSP26**

1. Define virtual server(s) to a workload or workloads
2. Create performance policy and service classes that include the workload, and specifically include GSSP26. Activate the performance policy.
3. Monitor and get reporting data
4. Enable zManager processor management for z/VM
5. Enable processor management for GSSP26 (default after creation of new VS is "enabled" – but not for "imported" vs?)
6. Look at some more reports
7. **Enable for GPMP**
8. **Install GPMP in GSSP26 and start it**
9. **See new info in virtual server report**

Goal-oriented Performance Management for z/VM

- **Guest Platform Management Provider (GPMP) collects OS-level performance data and feeds it to zManager**
 - It is optional
- **Supported with Linux for System z, z/OS, AIX, Microsoft Windows, and Linux for System x virtual servers**
- **For z/VM virtual servers, the GPMP feeds data to the z/VM Management guest through a TYPE INMN VSWITCH named SW2**
 - Private, point-to-point IPv6 connection



Goal-oriented Performance Management

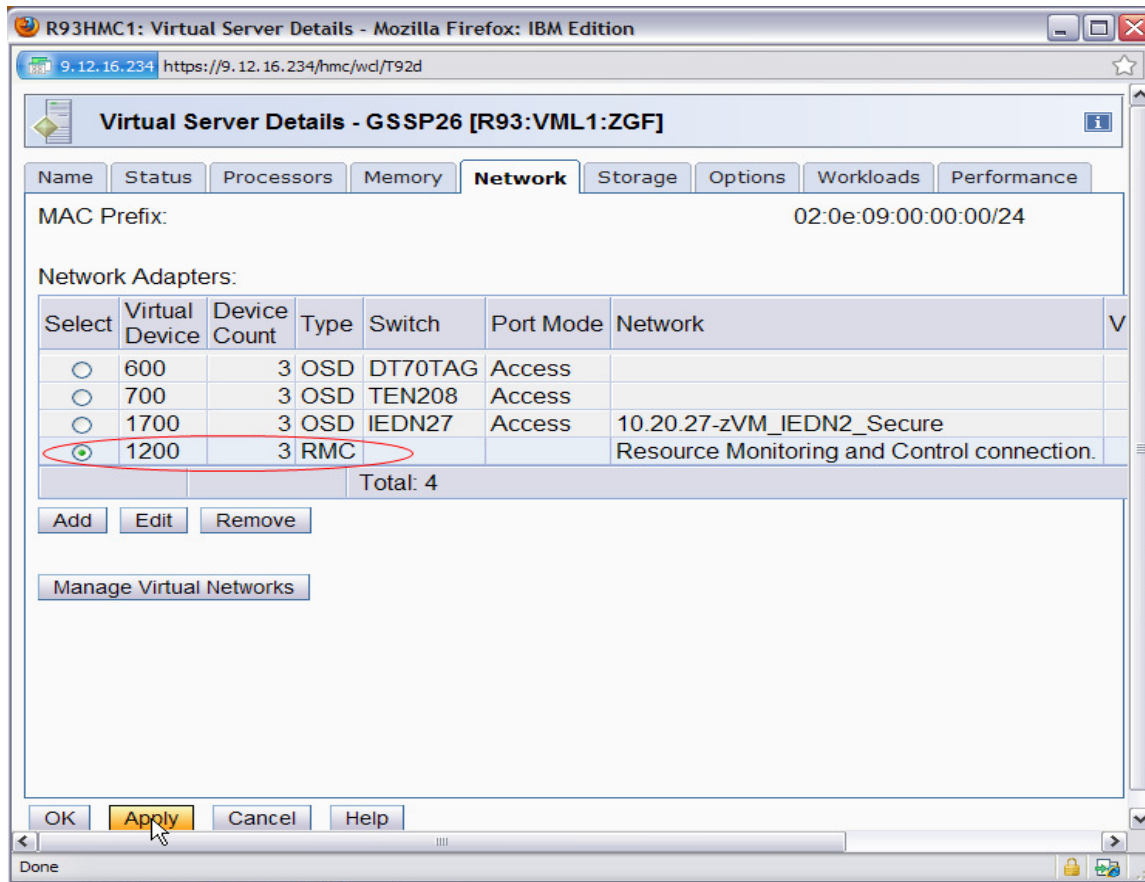
- **From virtual server details, click on box indicating you want to enable this virtual server for GPMP**
 - This then pops up a window asking the vNIC address for the VSWITCH network connection from the virtual server to the management guest...

The screenshot displays the 'Virtual Server Details' page for GSSP26 [R93:VML1:ZGF] in Mozilla Firefox. The 'Options' tab is active, showing fields for Password (XX123XXX), Privilege classes (*GZ), IPL device (*CMS), IPL load parameters, IPL parameters (AUTOOCR), and GPMP version (Unavailable). The 'Enable GPMP support' checkbox is circled in red. An 'Add RMC Device' dialog box is open, displaying the following configuration:

Add RMC Device	
In order to support the Guest Platform Management Provider, a resource monitoring and control network device will be added to this virtual server.	
Device	* 1200
Count	3
Type	RMC
OK Cancel	

Goal-oriented Performance Management

- And here we see the RMC device
- The change won't be made to z/VM until you click Apply. Then you'll also see the message on z/VM for the added vNIC



HCPSWS2858I GSSP26 connection to SYSTEM SW2 has been updated by VSMWORK1.

Goal-oriented Performance Management

- **And here is the resulting vNIC definition on z/VM (in this example, an OSDSIM connection)**

NICDEF 1200 TYPE QDIO DEV 3 LAN SYSTEM SW2

Q OSA

```
OSA 1200 ON NIC 1200 UNIT 000 SUBCHANNEL = 000A
      1200 DEVTYPE OSA          CHPID 0D OSD
      1200 MAC 02-0E-09-00-00-69 CURRENT
      1200 QDIO-ELIGIBLE        QIOASSIST-ELIGIBLE
OSA 1201 ON NIC 1200 UNIT 001 SUBCHANNEL = 000B
      1201 DEVTYPE OSA          CHPID 0D OSD
      1201 QDIO-ELIGIBLE        QIOASSIST-ELIGIBLE
OSA 1202 ON NIC 1200 UNIT 002 SUBCHANNEL = 000C
      1202 DEVTYPE OSA          CHPID 0D OSD
      1202 QDIO ACTIVE          QIOASSIST-ELIGIBLE
```

Goal-oriented Performance Management

- Now configure that RMC vNIC from the Linux virtual server (IPv6). Here's what it looks like...

ifconfig

```
eth0      Link encap:Ethernet  HWaddr 02:00:00:00:00:FE
          inet addr:10.20.8.236  Bcast:10.20.8.255  Mask:255.255.255.0
          inet6 addr: fd55:faaf:e1ab:a08:0:ff:fe00:fe/64  Scope:Global
          inet6 addr: fe80::ff:fe00:fe/64  Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1492  Metric:1
          RX packets:108 errors:0 dropped:0 overruns:0 frame:0
          TX packets:42 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:10256 (10.0 KiB)  TX bytes:6230 (6.0 KiB)

eth1      Link encap:Ethernet  HWaddr 02:0E:09:00:00:69
          inet6 addr: fe80::e:9ff:fe00:69/64  Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1492  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:16 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 b)  TX bytes:3310 (3.2 KiB)
```

Goal-oriented Performance Management

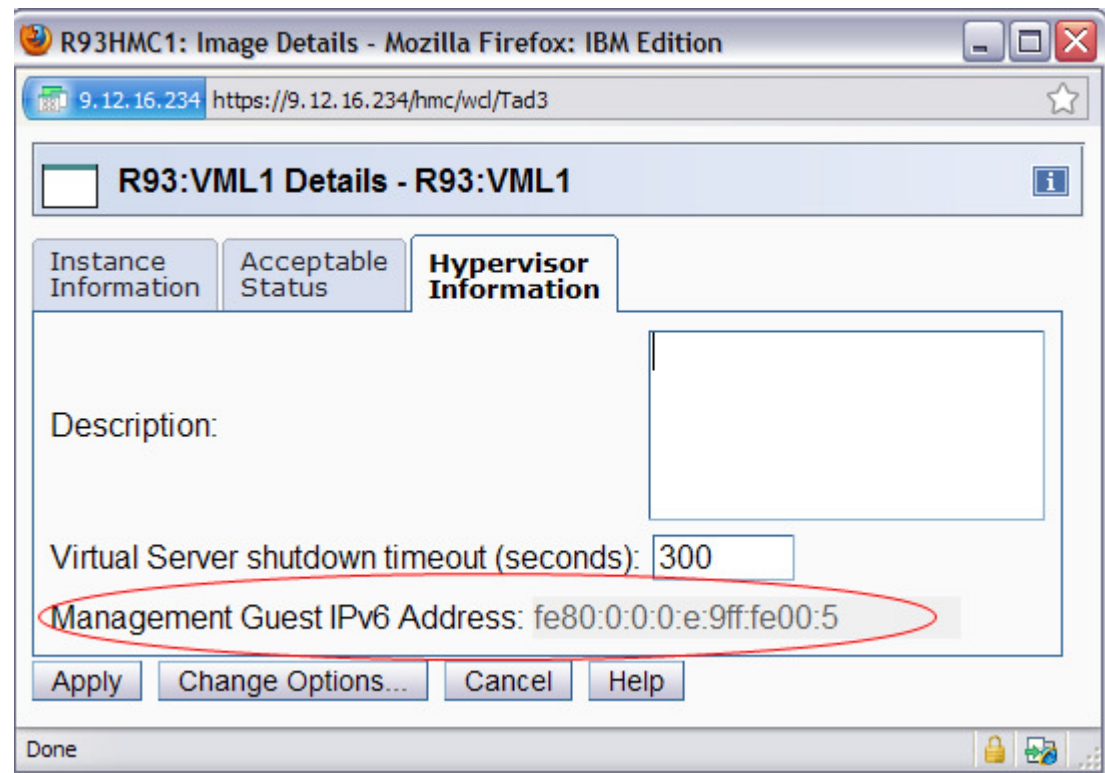
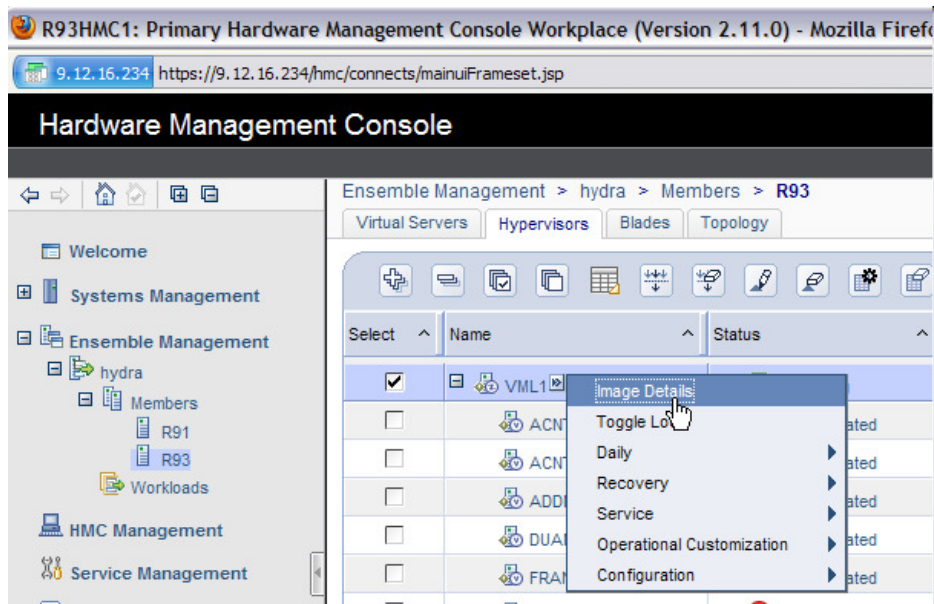
- ...and the Linux `lsqeth` view

```
lsqeth
```

```
Device name                : eth1
-----
card_type                  : GuestLAN QDIO
cdev0                      : 0.0.1200
cdev1                      : 0.0.1201
cdev2                      : 0.0.1202
chpid                      : 0D
online                     : 1
portname                   : AGN_NW
portno                     : 0
checksumming               : sw checksumming
state                      : UP (LAN ONLINE)
priority_queueing         : always queue 2
buffer_count               : 16
add_hhlen                  : 0
layer2                     : 1
large_send                 : no
```

Goal-oriented Performance Management

- Now that GSSP26 is *enabled* for GPMP, let's install the actual GPMP on Linux.
 - The rpm is shipped as firmware and loaded into the z/VM management guest
- First, find the IPv6 address of the z/VM mgmt guest...



Goal-oriented Performance Management

- Make sure we can ping the management guest from GSSP26...

```
ping6 -I eth1 fe80:0:0:0:e:9ff:fe00:5
PING fe80:0:0:0:e:9ff:fe00:5 (fe80::e:9ff:fe00:5) from fe80::e:9ff:fe00:69 eth1:
56 data bytes
64 bytes from fe80::e:9ff:fe00:5: icmp_seq=0 ttl=64 time=0.112 ms
64 bytes from fe80::e:9ff:fe00:5: icmp_seq=1 ttl=64 time=0.066 ms
64 bytes from fe80::e:9ff:fe00:5: icmp_seq=2 ttl=64 time=0.072 ms
```

- Then, install the GPMP rpm from the management guest onto GSSP26 (command shown is for a RHEL 5.5 system)

```
[root@GSSP26 ~]# rpm -ivh http://[fe80:0:0:0:e:9ff:fe00:5%eth1]:80/gpmp.s390x.rpm
```

```
Retrieving http://[fe80:0:0:0:e:9ff:fe00:5%eth1]:80/gpmp.s390x.rpm
Preparing... ##### [100%]
   1:gpmp      ##### [100%]
Making group ibmlarm
Creating user ibmlarm with default group ibmlarm and home directory /var/opt/ibm/arm/
Making group ibmgpmp
Creating user ibmgpmp with default group ibmgpmp and home directory /var/opt/ibm/gpmp
Adding user ibmgpmp to group ibmlarm
Running ldconfig to set up ARM libraries... Done with ldconfig.
Fixing permissions
```

...

```
Adding the gpmpcheck process to crontab for user ibmgpmp.
```

```
Note: Run /opt/ibm/gpmp/post-install-config to grant permissions
to other users to access GPMP and ARM components. Currently, only the
ibmgpmp user has all the necessary access permissions.
```


Goal-oriented Performance Management

- **Now, start the GPMP ...**

```
[root@GSSP26 ~]# cd /opt/ibm/gpmp
[root@GSSP26 gpmp]# su ibmgpmp
bash-3.2$
bash-3.2$ ./gpmp start
FEW6101I The guest platform management provider is starting.
bash-3.2$
```

- **z/OS Notes:**
 - **z/OS guests must use a NICDEF TYPE INMN for the RMC device**
 - **For GPMP on a z/OS guest under z/VM to connect to the z/VM management guest over the INMN, need fix for z/OS CommServer APAR PM38225**

Goal-oriented Performance Management

- Here's what the virtual servers report now shows
- Notice GSSP26 is now showing the Linux distribution and level, along with various OS-level performance data

Virtual Servers Report - Scott workload

Report Interval: Starting 6/28/11 4:00:12 PM for 15 minutes (6/28/11 4:15:12 PM) [Modify](#)

Select	Virtual Server	OS Name	OS Type	OS Level	Virtual Processors	Allocated Memory (MB)	Physical CPU Utilization (%)	Hypervisor CPU Delay (%)	Idle Time (%)	Other Time (%)	Service Class (PI)	OS Processes Total CPU Using Samples (%)	OS Processes Total CPU Delay Samples (%)	OS Processes Total I/O Delay Samples (%)	OS Processes Total Page Delay Samples (%)
<input checked="" type="radio"/>	GSSP26	Red Hat Enterprise Linux Server	Linux	5.5	1	429	1.0	0.3	98.7	0.0	Scott service class (0.75)	0.4	98.1	1.5	0.0
<input type="radio"/>	SCOTT50				1	280	0.0	0.0	100.0	0.0	Scott service class (0.75)				
<input type="radio"/>	SCOTT60				1	289	0.0	0.0	100.0	0.0	Scott service class (0.75)				

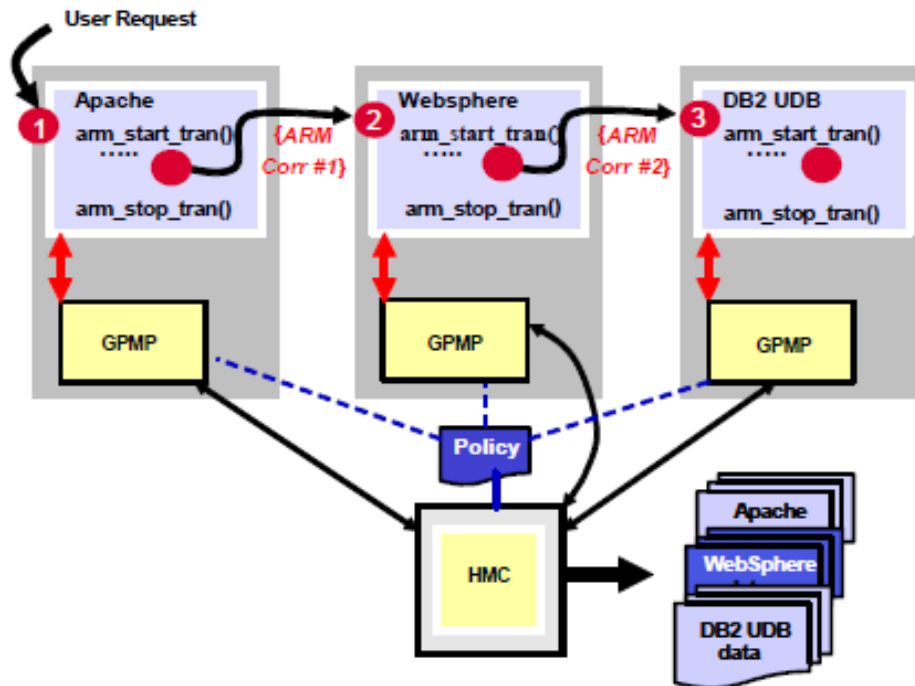
Page 1 of 1 Total: 3 Filtered: 3 Displayed: 3 Selected: 1

[Virtual Server Charts](#)

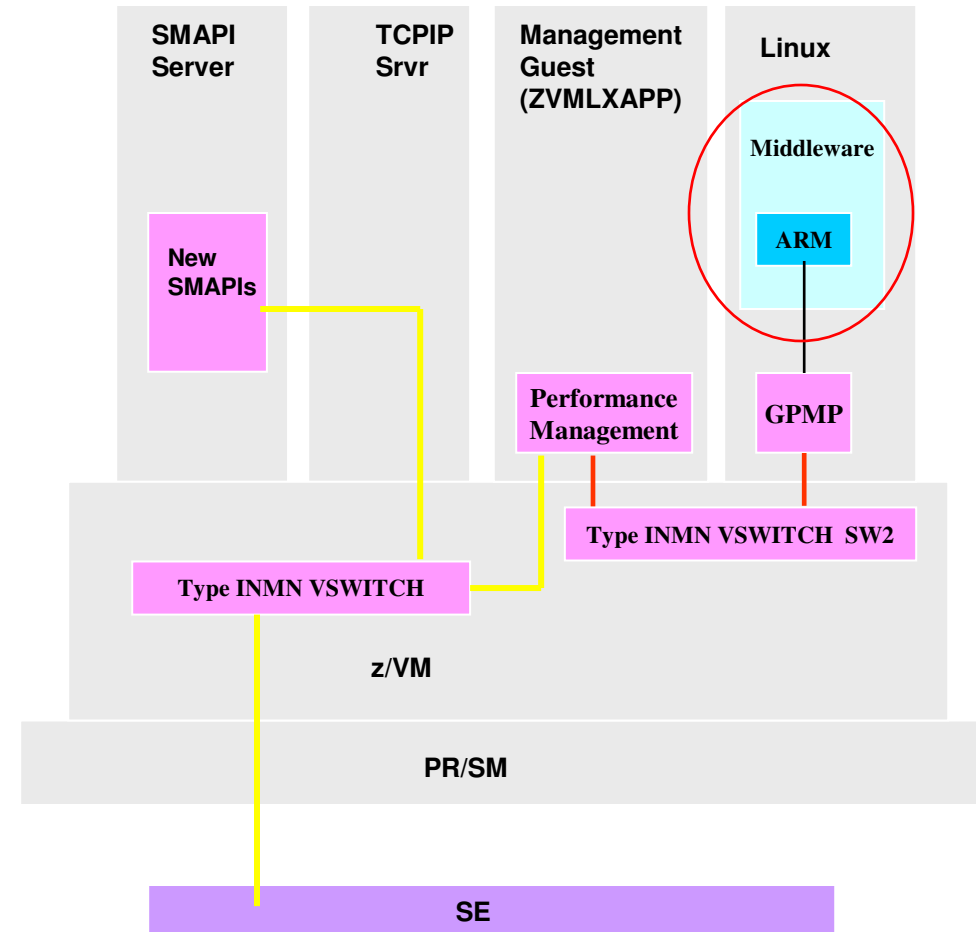
Goal-oriented Performance Management

- **Finally, let's enable ARM in middleware running on the Linux virtual server and see the additional information we get**
 1. Define virtual server(s) to a workload or workloads
 2. Create performance policy and service classes that include the workload, and specifically include GSSP26. Activate the performance policy.
 3. Monitor and get reporting data
 4. Enable zManager processor management for z/VM
 5. Enable processor management for GSSP26 (default after creation of new VS is "enabled" – but not for "imported" vs?)
 6. See new reports
 7. Enable GSSP26 for GPMP. Define INMN VSWITCH and vNIC.
 8. Enable for GPMP (which defines vNIC and does the GRANT to vswitch SW2)
 9. Install GPMP in GSSP26 and start it
 10. See new info in virtual server report
 11. **Activate ARM (Application Response Measurement) in Apache, WebSphere Application Server and DB2.**
 12. **See Hops report and virtual server topology report and view statistics report**

Application Response Measurement (ARM)



- Enables tracking a transaction as it flows between virtual servers
- Provides detailed view of resources consumed by instrumented applications
- Based on Open Group ARM standard instrumentation



- Middleware instrumented to ARM APIs
 - Must be explicitly enabled for each
- GPMP collects the statistics

Goal-oriented Performance Management

- **HOPs report shows the transactional flow of work**
 - Provides info for each hop involved in handling a specific service class within a specific workload
 - Requires operating GPMP and ARM-instrumented middleware

Hops Report - GSSF18Cluster-ServiceClass in Workload GSSF18Cluster

Report Interval: Starting 6/28/11 4:18:31 PM for 15 minutes (6/28/11 4:33:31 PM) [Modify](#)

Details for GSSF18Cluster-ServiceClass:
 Workload: GSSF18Cluster Performance goal: Velocity - Fastest PI: 1.53
 Performance policy: GSSF18Cluster-Policy Business importance: High Performance: Fast

--- Select Action --- Filter

Name	Hop Number	Group Name	Successful Transactions	Failed Transactions	Stopped Transactions	Inflight Transactions	Queue Time (s)	Execution Time (s)	Successful Average Response Time (s)	Inflight Average Response Time (s)
[-] Hop 0	0		23,949	0	0	2	0.000000	0.001216	0.001216	10.000223
[-] IBM DB2 Universal Database	0	db2inst1	110	0	0	0	0.000000	0.000256	0.000256	0.000000
[-] IBM Webserving Plugin	0	Apache/2.2.3 (Red Hat)	23,839	0	0	0	0.000000	0.001220	0.001220	0.000000
GSSF18	0		23,839	0	0	0	0.000000	0.001220	0.001220	0.000000
[-] WebSphere:APPLICATION_SERVER	0	g3sr013	0	0	0	2	0.000000	0.000000	0.000000	10.000223
[-] Hop 1	1		30,016	0	0	0	0.000000	0.011102	0.011102	0.000000
[-] WebSphere:APPLICATION_SERVER	1	GSSF20trade	14,959	0	0	0	0.000000	0.010989	0.010989	0.000000
GSSF20	1		14,959	0	0	0	0.000000	0.010989	0.010989	0.000000
[-] WebSphere:APPLICATION_SERVER	1	GSSF21trade	15,057	0	0	0	0.000000	0.011213	0.011213	0.000000
GSSF21	1		15,057	0	0	0	0.000000	0.011213	0.011213	0.000000
[-] Hop 2	2		250,644	0	0	0	0.000000	0.000392	0.000392	0.000000
[-] IBM DB2 Universal Database	2	db2inst1	250,644	0	0	0	0.000000	0.000392	0.000392	0.000000
GSSF22	2		250,644	0	0	0	0.000000	0.000392	0.000392	0.000000

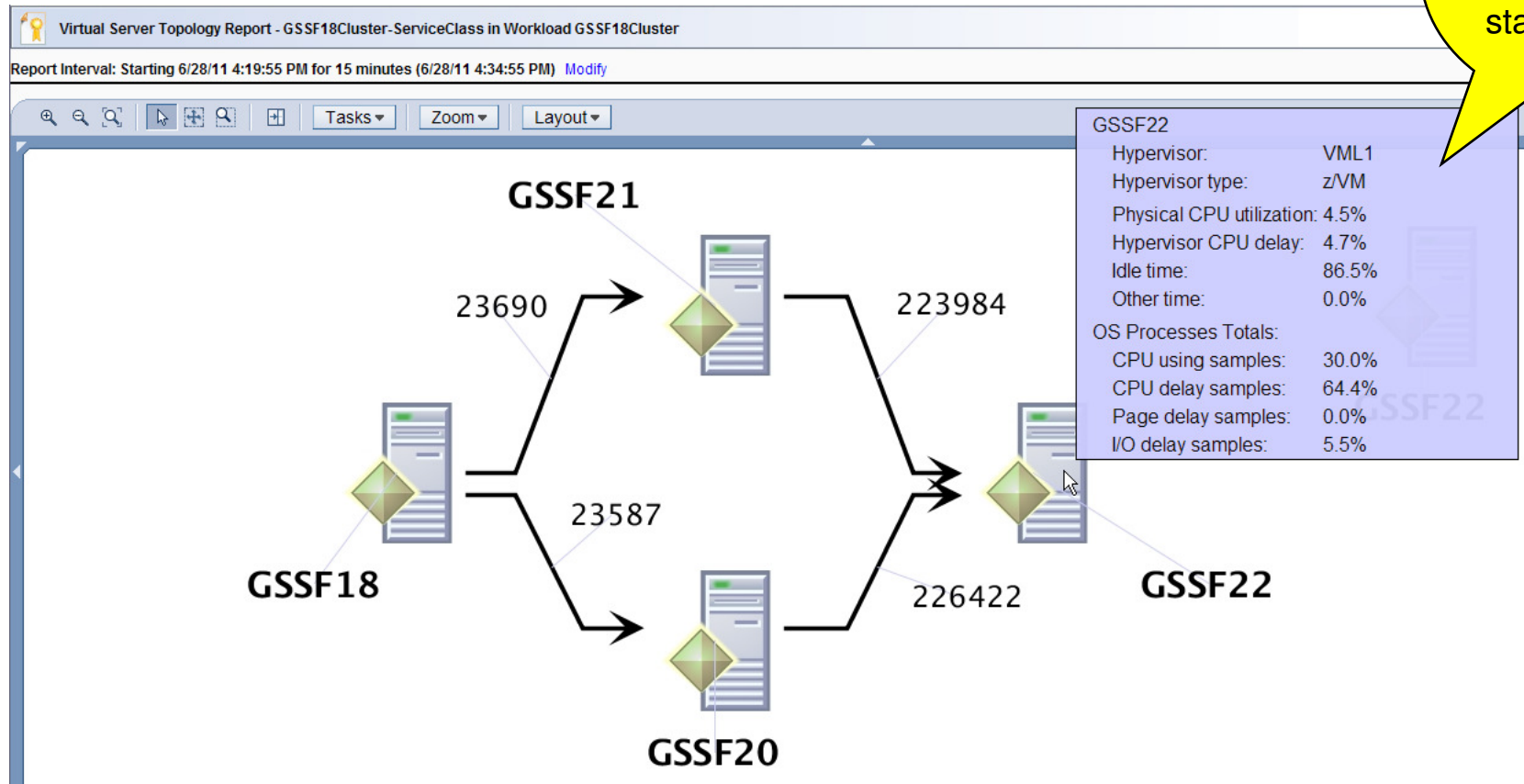
Page 1 of 1 Total: 13 Filtered: 13 Displayed: 13

Goal-oriented Performance Management

Virtual server topology report

- Provides graphical view of relationships between running virtual servers in a workload
- Requires operating GPMP and ARM-instrumented middleware

Drag mouse over a server to get usage statistics for it

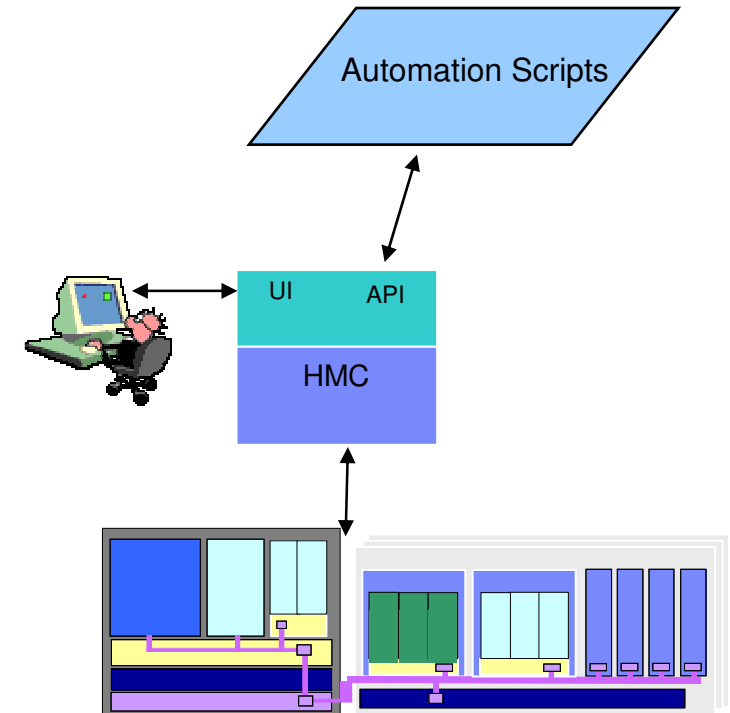


Some zManager Use Cases for Existing z/VM Environments

- **Select existing z/VM virtual servers to manage**
- **Connect a z/VM virtual server to the IEDN for interoperation with zBX (and/or with other System z Servers in the ensemble)**
 - Define a virtual network on the IEDN
 - Create a new IEDN VSWITCH
 - Connect the virtual server to the virtual network via the IEDN VSWITCH
- **Perform goal-oriented performance management**
 - Define a workload resource group and associated performance policy and service classes. Monitor and get reporting data.
 - Enable dynamic, hypervisor-based processor management for selected virtual servers. Monitor and get reporting data
 - Install and enable Guest Platform Management Provider (GPMP) in select virtual servers for more granular management and reporting
 - Enable ARM instrumentation in middleware for even more granular reporting, including transaction hops between virtual servers
- **Automation via RESTful APIs**

Automation via RESTful APIs

- **New API allows programmatic access to the same underlying zManager function as is accessed via the HMC UI**
 - Same resource types, instances and policy
 - API functions corresponding to views and tasks in the UI
 - Listing resource instances
 - Creating, changing, deleting resource instances
 - Operational control of resource instances
 - Etc.
- **Architecture / design based on current industry design practices**
 - Requests and responses structured as RESTful Web services
 - Data is represented in Javascript Object Notation (JSON)
 - Status and property change notifications delivered via JMS
 - HMC provides an embedded JMS broker configured to support API specific use only
- **TCP/IP Sockets / HTTP is underlying network transport, SSL for connection security**
- **HTTP Web services orientation facilitates access from scripting environments**
 - Modern scripting languages (Perl, Python, etc.) have HTTP support libraries
- **Fully documented and supported for customer and third party use**
 - **Also, see charts from Tuesday SHARE session 10847**



Summary

- IBM zEnterprise Unified Resource Manager offers a variety of capabilities for z/VM administrators
 - Create and perform lifecycle management on z/VM virtual machines
 - Leverage secure physical network connections between z/VM, zBX, and/or other System z servers in the ensemble for data and management
 - Perform virtual network management
 - Workload awareness and goal-oriented platform performance management
 - Allow critical workloads to receive resources and priority
 - Monitor for goal achievement via variety of reports
 - Automation via RESTful APIs
- Granular selection of z/VM virtual servers for management
- Can start simple and expand usage as desired



For Hands-on experiences....

- **Wednesday afternoon -- Sessions 10631 and 10632**
 - **IBM zEnterprise Unified Resource Manager Hands-on Lab**
 - **Parts 1 and 2**

Backup

For more information...

- zEnterprise System Introduction to Ensembles, GS27-2609
- zEnterprise System Ensemble Planning and Configuration Guide, GC27-2608
- zEnterprise System Ensemble Performance Management Guide, GC27-2607
- IBM zEnterprise Unified Resource Manager Redbook, SG24-7921
- IBM System z Hardware Management Console Web Services API, SC27-2616

Summary of Available Performance Reports

- **Workloads report**
 - High level performance status and goal achievement for all workloads defined for the ensemble
 - From here you can select the hypervisor, virtual server, or service class reports
- **Service classes report**
 - List of all service classes defined for a workload and for each it shows details and performance data. If there are problems, from here can drill down to individual virtual server reports for more details
- **Virtual servers report**
 - Performance data for virtual servers associated with a workload or a service class
- **Hypervisor report**
 - Details about virtual servers running in a hypervisor and how they are competing for shared resources. Includes any adjustments made for the virtual servers running in the hypervisor
- **Resource adjustments report**
 - Lists successful and failed resource adjustments for a workload or service class over a given interval
- **Virtual server topology report**
 - Graphical view of relationships between running virtual servers in a workload (requires GPMP and ARM-instrumented applications)
- **View statistics**
 - OS processes and statistics for a virtual server topology report node (requires GPMP and ARM-instrumented applications)
- **Hops report**
 - Info for each hop involved in handling a specific service class within a specific workload. Requires GPMP and ARM-instrumented applications