



IBM Software Group

z/VM®



IBM Tivoli OMEGAMON XE for zVM & Linux

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Wilfried Jurkowski (Technical Sales for zSeries – OMEGAMON, ITM & System Automation)

wilfried_jurkowski@de.ibm.com



Agenda

- System Requirements & Architecture
- Installation Process
- Graphical Userinterface (**T**ivoli **E**nterprise **P**ortal)
 - Workspaces
 - Event Management (Situations & Automation)
 - History Data and Reporting
- Scenarios for Problem Analysis and Problem Solution
- Appendix A: Workspace Screenshots (not Part of the Presentation)
- Appendix B: Configuration Parameters (not Part of the Presentation)

System Requirements & Architecture

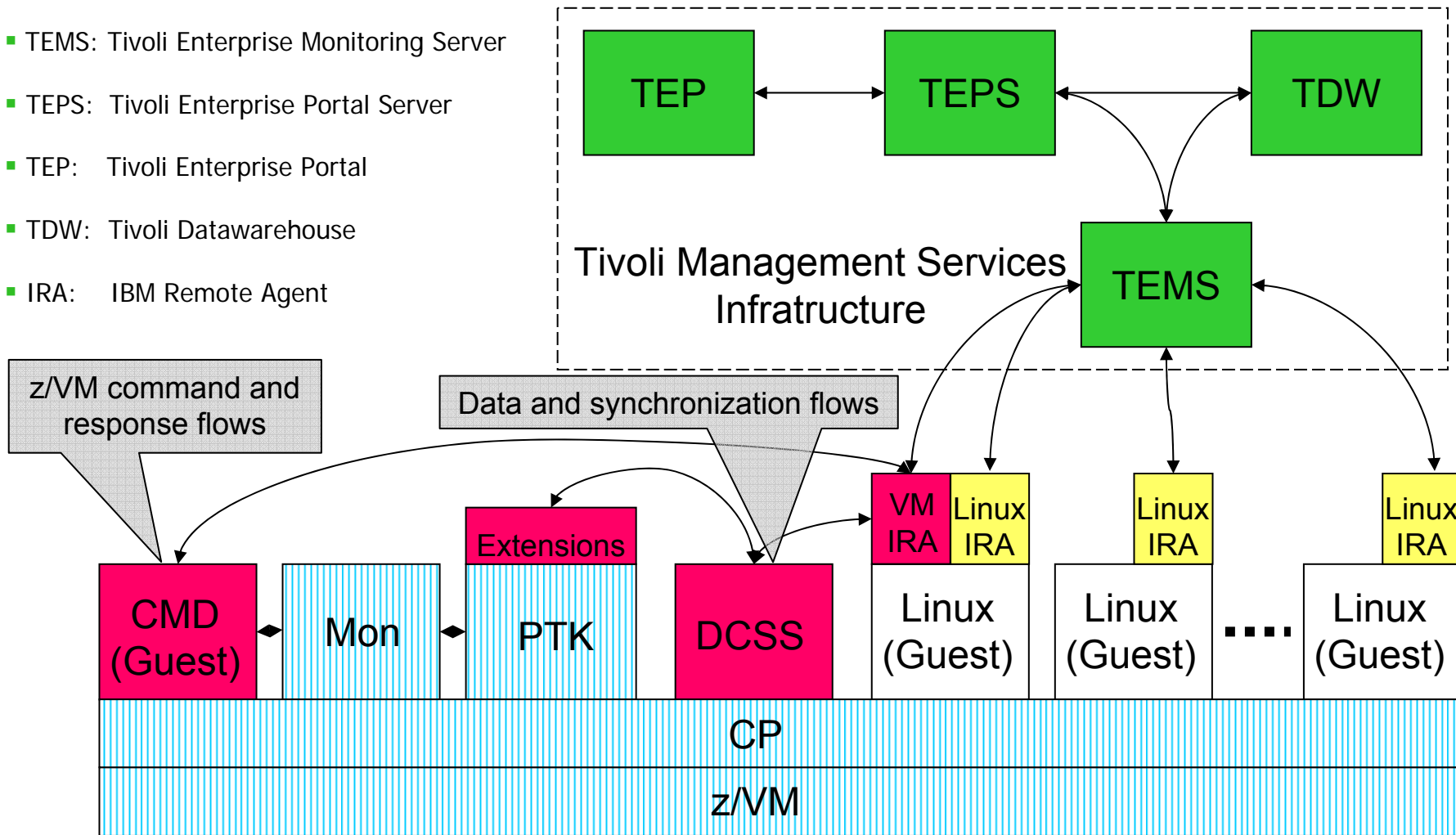
System Requirements and Software Package

- **Installation is done on z/VM and on each Linux guest you wish to monitor**
 - ▶ Software Requirements
 - z/VM
 - z/VM 5.2 Performance Toolkit, or higher, with appropriate service
 - For OMEGAMON XE for zVM and Linux V4.2.0 you need to be on z/VM 5.3 or higher
 - Linux on z
 - Only one Linux on z guest required per LPAR
 - SLES 9 Service Pack 3 or higher
 - RHEL 4 Update level 5 or higher
 - These have the following support
 - Ability to attach a z/VM DCSS
 - vmcp interface to allow Take Action commands and Reflex Automation
 - ▶ Software Package (download from ShopZ or shipped on CD)
 - ITM 6.2.2 FP2 (including TEMS/TEPS/TEP/TDW & DB2 V9.5)
 - OMEGAMON XE for zVM and Linux Agents V4.2.0
 - Application Support for the Linux Agent
 - IBM Product Documentation



Basic Architecture for z/VM and Linux Monitoring

- TEMS: Tivoli Enterprise Monitoring Server
- TEPS: Tivoli Enterprise Portal Server
- TEP: Tivoli Enterprise Portal
- TDW: Tivoli Datawarehouse
- IRA: IBM Remote Agent

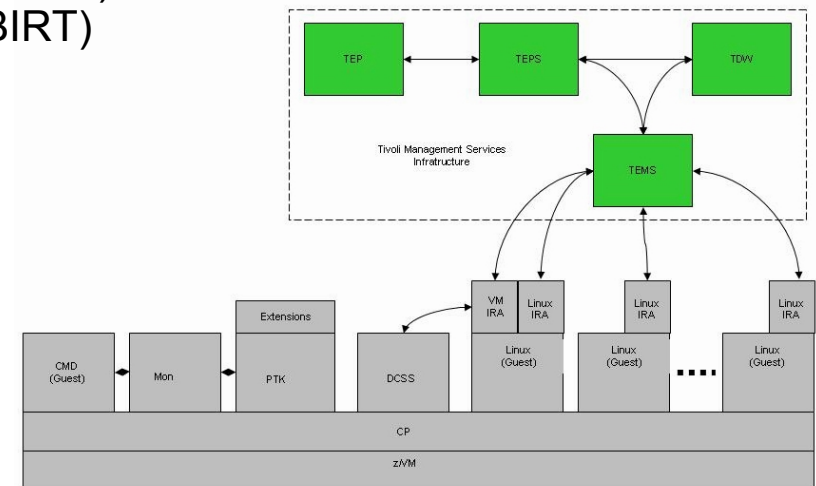


Installation Process

Installing OMEGAMON XE for z/VM and Linux (1)

▪ First Step: Installation of the ITM infrastructure

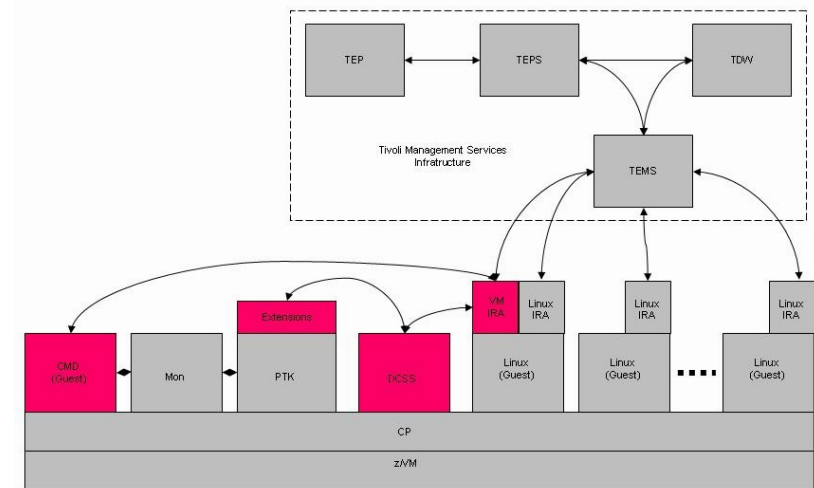
- TEMS “HUB”: zLinux - Linux/Unix - AIX - Windows - zOS
- TEMS “remote”: not necessary (zLinux - Linux/Unix - AIX - Windows – zOS)
- TEPS: zLinux - Linux/Unix - AIX - Windows
- TEP: Full Client - Browser (Firefox / Internet Explorer) - Java Web Start
- Datawarehouse: necessary, if history data (>24 hours)
also base for reporting (TDS / BIRT)
- Application Support Files
 - Tivoli OMEGAMON XE for zLinux
 - Tivoli OMEGAMON XE for zVM (part of the product)



Installing OMEGAMON XE for z/VM and Linux (2)

■ Second Step: Installation of the “zVM” Monitoring Agent

- PERFKIT Module is a prerequisite
 - obtain latest service (z/VM 5.4 has 4.2.0 support)
- Command processor installed with VM/SES
- zVM Monitoring Agent (need to install only on one zVM)
 - required Steps
 - System changes
 - Create and configure the PERFOUT DCSS
 - Update the FCONX \$PROFILE
 - Install the agent on one Linux guest
 - optional Steps for Command Processor
 - Edit KVLCFG file
 - Start KVLCMD EXEC



Installing OMEGAMON XE for z/VM and Linux (3)

Third Step: Installation of the “Linux” Monitoring Agents

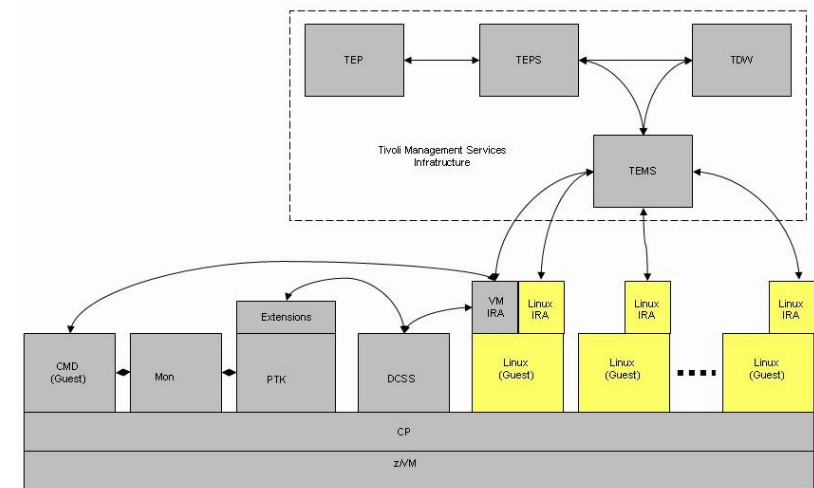
– zLinux Monitoring Agent (need to install on every Linux guest wish to monitor)

▪ required Steps

- Accessing the DCSS
- Enabling Appldata collecting
- Enabling Dynamic Workspace Linking
- Install the agent(s) on every Linux guest

▪ optional Steps

- Enabling the Take Action Command (Command Processor)



Installing OMEGAMON XE for z/VM and Linux (4)

- **Fourth Step: You have “a lot more” Linux guests**

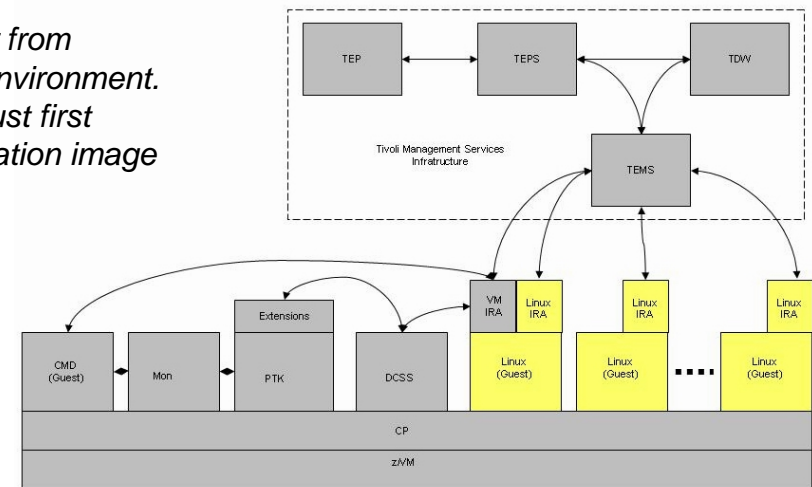
- Deploying Monitoring Agents across your Environment

IBM Tivoli Monitoring provides the ability to deploy monitoring agents from a central location, the Tivoli Enterprise Monitoring Server (TEMS-HUB).

- required Steps

- Create and populate the agent deploy depot with installable agent images
- View and change the contents of the agent depot
- Use one agent depot for all the monitoring servers in your monitoring environment
- Deploy an OS agent
- Deploy a non-OS agent

The agent depot is an installation directory on the monitoring server from which you deploy agents and maintenance packages across your environment. Before you can deploy any agents from a monitoring server, you must first populate the agent depot with bundles. A bundle is the agent installation image and any prerequisites.



Checklist for the Installation (1)

▪ On the ITM Infrastructure

- ▶ Installing application support files (this is the most commonly overlooked step)
 - ... for zVM part of the product tape
 - ... for zLinux on the CD or download from ShopZ
- ▶ Be sure to install the application support files at:
 - TEMS
 - TEPS
 - Each instance of the Desktop Client if you are using it
- ▶ Check the “LOGON” with the “SYSADMIN” User from your TEP or Browser
 - Link Example: <http://dem17lnx.democentral.ibm.com:1920///cnp/client>

Checklist for the Installation (2)

▪ On z/VM

- ▶ Install the correct level of Performance Toolkit
- ▶ Build and save the DCSS
- ▶ Add OPTION APPLMON to all Linux guests and TCPIP servers
- ▶ Update the PROFILE TCPIP
 - *Add "OPTION APPLMON" statements to the Directory entry for your TCPIP server(s)*
 - *Add "MONITORRECORDS MOSTRECORDS" to the PROFILE TCPIP file*
- ▶ Update the FCONX \$PROFILE to collect OMEGAMON data
 - *FC MONCOLL SEGOUT ON PERFOUT*
- ▶ Enable the Monitor Domains for the data you wish to collect
 - *Must have Class E privilege*
- ▶ Configure the command processor for the Take Action command (optional)
 - *Edit the "KVL CONFIG" file ...*

Checklist for the Installation (3)

- **On “every monitoring” Linux guest**
 - ▶ Ensure you have installed the required packages
 - ▶ Configure Linux storage to access the DCSS
 - *Either with a mem= parameter in zipl.conf*
 - *Or “DEF STOR CONFIG” and leaving a memory hole for the DCSS*
 - ▶ Do a “modprobe dcssblk” to load DCSS support
 - ▶ Do an “echo perfout > /sys/devices/dcssbld/add to link to the DCSS
 - ▶ Do modprobe’s for the 3 Linux apldata modules and then enable them
 - *Load the collecting drivers with “modprobe apldata_...”*
 - *Enable collecting with “echo 1 > /proc/sys/apldata/...”*
 - ▶ Set the timer interval and enable it by updating the ...
 - */sys/proc/apldata/interval*
 - */sys/proc/apldata/timer files*
 - ▶ Enable Dynamic Workspace Linking (DWL)
 - *Modify “<ITM_Home>/config directory/lz.ini file”*
 - ▶ Enable “sudo” for the Command Processor and Take Action (optional)



Why “OMEGAMON XE for zVM and Linux”

- The PERFKIT Module is a prerequisite but a “single” Monitor
- zVM & Linux data integration with predefined “Workspaces” and “Links”
 - ▶ “Real Time” monitoring (predefined Workspaces) on the TEP GUI Userinterface
 - ▶ “Event Management” (predefined Situations) & Automation Integration
 - *Event Management Integration with “Tivoli Netcool/ OMNibus”*
 - ▶ “History Data” on the TEP and the “Tivoli Datawarehouse” for Reporting
 - ▶ Possibility of own- and individual customized Workspaces
- Integration of several zVM and a lot of Linux guests on the same Userinterface
- The ITM Architecture is the “Base” for both agents with the benefit of ...
 - ▶ Integration of the zOS monitoring agents
 - ▶ Integration of the distributed monitoring agents
 - ▶ Same look-and-feel – same administration – same funktionalität
- „Day-One-Support“ of the OMEGAMON XE Agents (OS & Subsystems)

Additional Informations

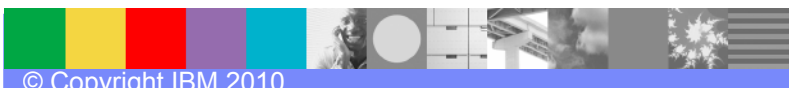
- **Installing OMEGAMON XE on z/VM and Linux Video**
 - ▶ <http://w3-03.ibm.com/support/techdocs/atmastr.nsf/WebIndex/PRS2753>

- **Installation of OMEGAMON XE on z/VM and Linux PowerPoint Presentation**
 - ▶ <http://w3-03.ibm.com/support/techdocs/atmastr.nsf/WebIndex/PRS3050>

- **OMEGAMON XE on z/VM and Linux Installation Checklist**
 - ▶ <http://www-01.ibm.com/support/docview.wss?uid=swg21326187>

- **Tivoli OMEGAMON XE on z/VM and Linux „Homepage“**
 - ▶ <http://www-01.ibm.com/software/tivoli/products/omegamon-xe-zvm-linux/>

- **Deploying Monitoring Agents across your Environment**
 - ▶ http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/index.jsp?topic=/com.ibm.itm.doc/itm_install137.htm

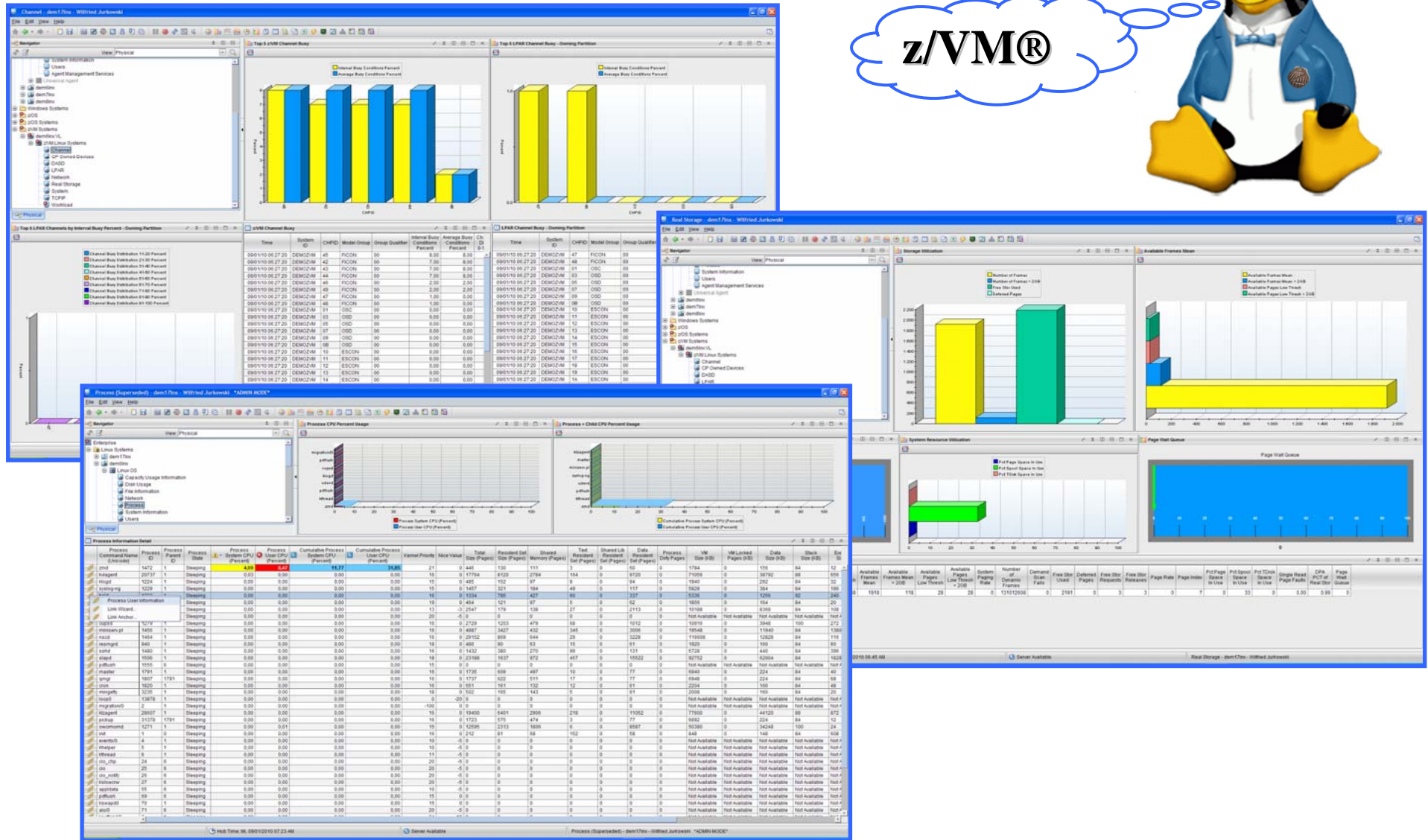


Tivoli Enterprise Portal

the

Graphical Userinterface

IBM Tivoli OMEGAMON XE on z/VM and Linux



IBM Tivoli OMEGAMON XE on z/VM and Linux

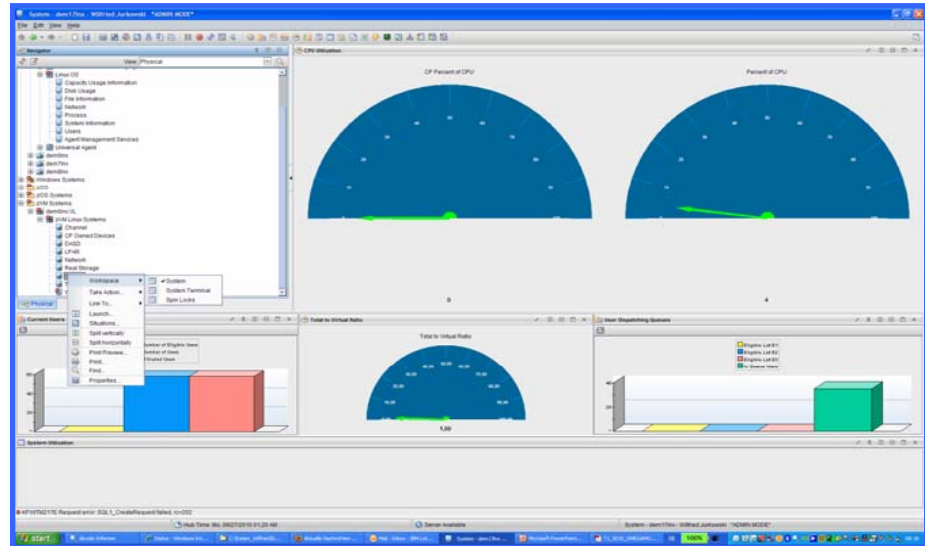
Product at a Glance

- Combined Offering
- Monitors zVM and Linux on System z
- Provides workspaces that display
 - Overall System Health
 - Workload metrics for logged-in users
 - Individual device metrics
 - LPAR Data & Response Times
- Composite views of zLinux running on VM
- Leverages the VM Performance Toolkit
- Bottleneck Analysis
- Historical Reporting and Trending Analysis

Event Monitoring

Pre-defined Situations with

- Thresholds
- Intervall Definitions
- ACTION (Automation) & EXPERT ADVICE and ...

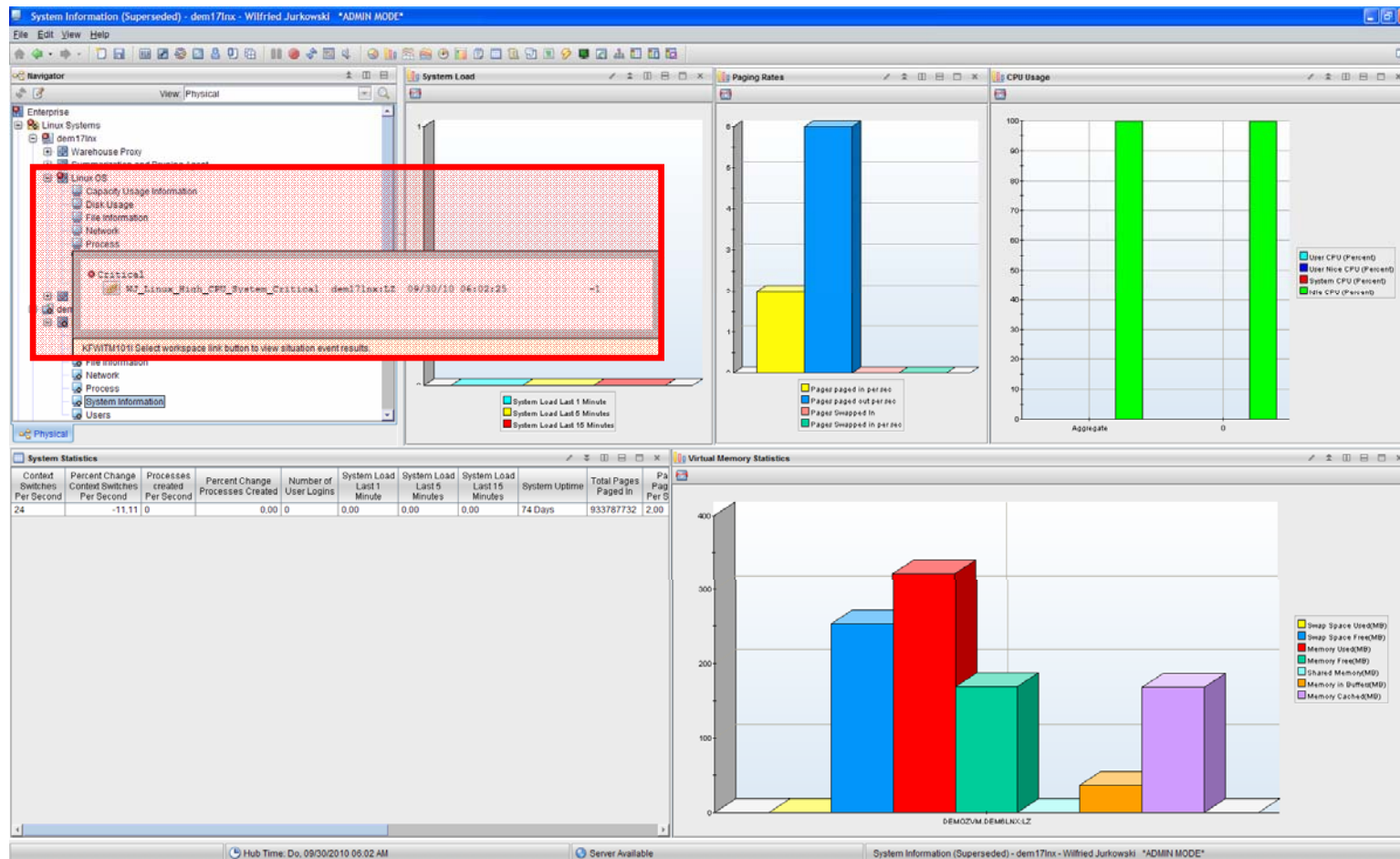


- **Linux CPU monitoring from within Linux guest**
 - Measurements are accurate from the perspective of the guest
- **OMEGAMON XE on z/VM and Linux**
 - Requires VM Performance Toolkit same relationship as OMEGAMON XE for z/OS has with RMF
- **Linux guest required for OMEGAMON XE on z/VM and Linux**
 - Data collection from VM Performance Toolkit is passed through DCSS (SLES 9, SLES 10, and RHEL 5) to OMEGAMON agent running on Linux



“Situation” Event Management (1)

- **Situation Event is “TRUE”**
 - ▶ Yellow Light -> WARNING
 - ▶ Red Light -> CRITICAL (more colors available)



“Situation” Event Management (2)

1. Situation Analysis
2. Situation Editor

The screenshot displays the IBM Tivoli Monitoring interface. The main window shows the 'Situations for - System Information' dialog box, which is used to edit a situation named 'WJ_Linux_High_CPU_System_Critical'. The dialog includes a 'Formula' tab with a text area containing the situation's description: 'percentage of processor time is used for system calls. This'. Below this, there are fields for 'CPU ID' and 'System CPU (Percent)', with a value of 'Aggregate > 1.00' shown. The 'Situation formula editor' section features a 'Situation Formula Capacity' slider set to 8%, a 'Sampling interval' field, a 'Sound' section with an 'Enable critical wav' checkbox, and a 'State' dropdown menu set to 'Critical'. The 'Run at startup' checkbox is also checked. Buttons for 'OK', 'Cancel', 'Apply', 'Group', and 'Help' are visible at the bottom.

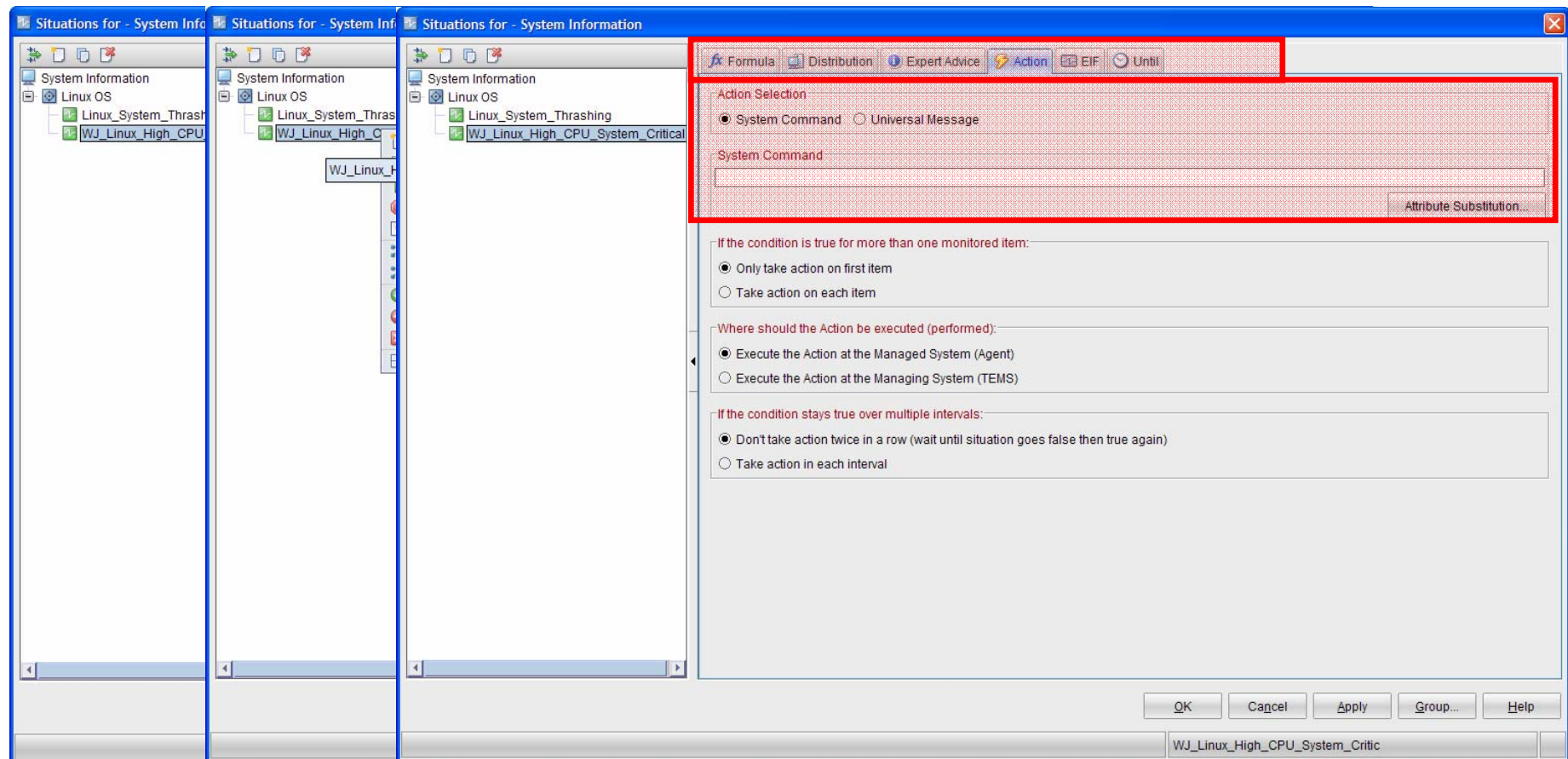
In the background, the main application window shows a table of 'Initial Situation Values' and 'Current Situation Values'. The 'Current Situation Values' table is highlighted with a red box and contains the following data:

CPU ID	System CPU (Percent)	System Name	Time Stamp	User CPU (Percent)	User Nice CPU (Percent)	Idle CPU (Percent)	Busy CPU (Percent)	IO Wait (Percent)	User to System CPU (Percent)
Aggregate	5.60	dem17inxLZ	09/30/10 08:03:53	5.07	0.00	89.00	11.00	0.03	6.87

The 'Initial Situation Values' table shows a similar row with a value of 1.63 for System CPU (Percent) at a time stamp of 09/30/10 06:02:25.

Situation Editor – Main Steps

1. Situation “Formula” Definition
2. Situation “Distribution” Definition
3. Situation “Action” Definition



History Data – Definitions and Workspace (1)

1. History “New Collection” Definition
2. History “Base” Definition
3. History “Datawarehouse” Definition

The screenshot displays the 'History Collection Configuration' window with three panes. The left pane shows a tree view of monitored applications, with 'OMEGAMON XE on z/VM and Linux' selected. The middle pane shows the selected application's details. The right pane shows a table of attribute groups with columns for Prune and Summarize options. A red box highlights the 'KVLSystem' attribute group, which is set to 'On' for pruning and '3 Months' for summarization. Below the table, the 'Configuration Controls' section shows the 'Weekly' summarization option selected.

Group	Prune Detailed	Summarize Hourly	Prune Hourly	Summarize Daily	Prune Daily	Summarize Weekly	Prune Weekly	Summarize Monthly	Prune Monthly	Summarize Quarterly	Prune Quarterly	Summarize Yearly	Prune Yearly
KVLCSP Device													
KVLChannel Data													
KVLControlUnit													
KVLDASDCache													
KVLDevice													
KVLFChannel Data													
KVLHyperSocket													
KVLLChannel Data													
KVLLPAR Info													
KVLMinidisk Cache													
KVLPKStat													
KVLProcessor Data													
KVLSpinLock													
KVLSystem							On		3 Months				
KVLSystem2													
KVLTCP/IP Srvr Data													
KVLTCP/IP Usr Data													
KVLUser App/Data													
KVLUser Wait													
KVLUser Workload													
KVLdisk													
KVLVirtualSwitch													

History Data – Definitions and Workspace (2)

The screenshot displays the IBM Tivoli Monitoring console interface. The main workspace contains several panels:

- Navigator:** A tree view on the left showing the system hierarchy, including z/VM Systems, z/VM Linux Systems, Channel, CP Owned Devices, DASD, LPAR, Network, Real Storage, System, TCP/IP, and Workload.
- CPU Utilization:** Two gauge charts. The left one is labeled 'CP Percent of CPU' and the right one is 'Percent of CPU'. Both show a needle pointing to 0.
- Current Users:** A 3D bar chart showing 'Average Number of Eligible Users' (yellow), 'Average Number of Users' (blue), and 'Number of Dialed Users' (red).
- Total to Virtual Ratio:** A gauge chart showing a ratio of approximately 50.00.
- User Dispatching Queues:** A 3D bar chart showing 'Eligible List E1' (yellow), 'Eligible List E2' (blue), 'Eligible List E3' (red), and 'In Queue Users' (green).
- Current User History:** A line chart showing historical data for the three user categories over time.
- System Information History:** A line chart showing historical data for 'CP Percent of CPU', 'Percent of CPU', 'Number Active CPUs', 'LPAR Busy Percent', and 'System Transaction Rate'.

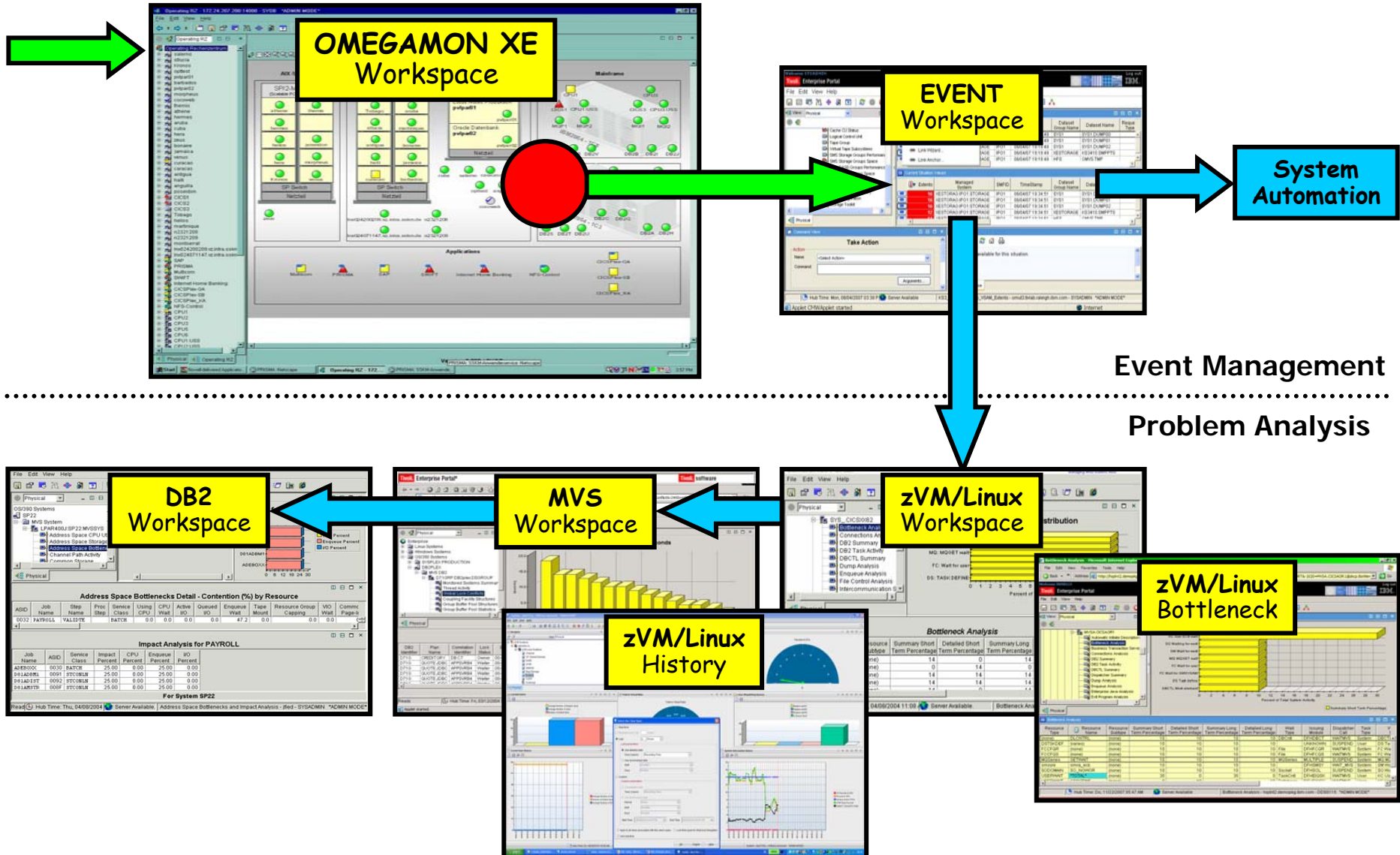
A dialog box titled 'Select the Time Span' is overlaid on the center. It has the following options:

- Real time
- Realtime plus Last Hours
- Last Hours

Below these options are sections for 'Use detailed data' and 'Custom' parameters, both with dropdown menus for 'Time Column', 'Shift', and 'Days'. The 'Custom' section also includes 'Interval', 'Start Time', and 'End Time' fields. At the bottom of the dialog are 'Apply to all views associated with this view's query', 'Lock time span for Historical Navigation', 'Use Hub time', 'OK', 'Cancel', and 'Help' buttons.

Problem Analysis & Problem Solution

Monitoring Scenario - Example



IBM Tivoli OMEGAMON 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

Identify problem Linux Guest

Look at additional data for Linux Guest

Link to Linux process workspace

Identify problem app/process on Linux

System ID	LPAR Name	User ID	CP % of CPU	CP Seconds	CPU Percent	CPU Seconds	Session Time	Virtual CPU %	Vs Det
082108	VLANKA	CAVMI	0.13	0	0.02	1	1	0.48	
082108	082108	VLANKA	0.12	0	0.00	1	1	0.47	

IBM Tivoli OMEGAMON on z/VM and Linux – a Scenario

Problem

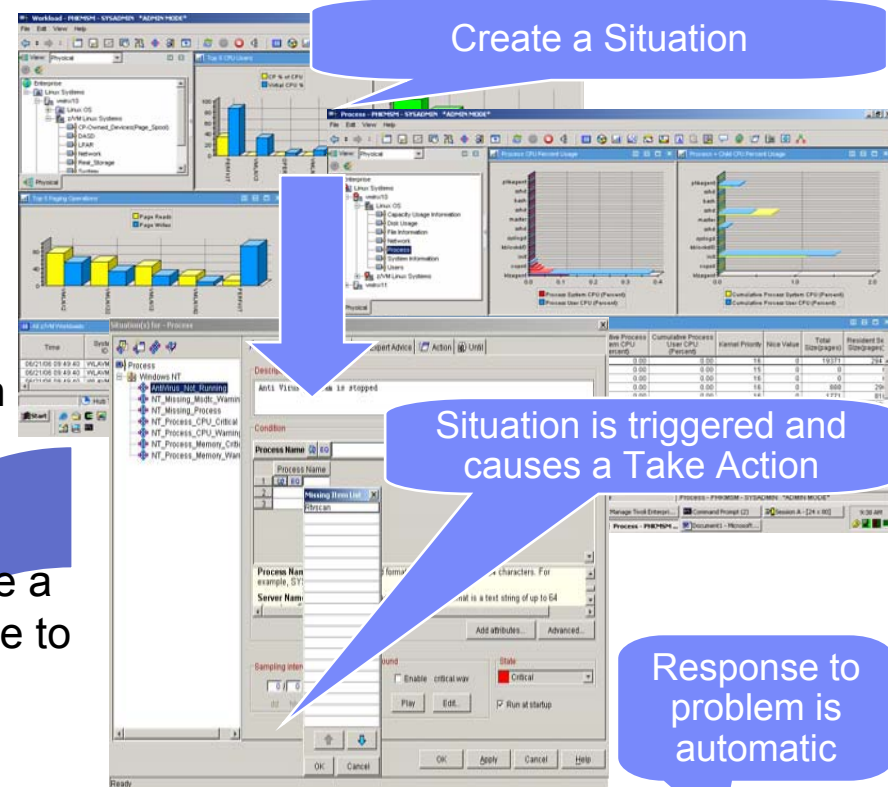
- High Linux Guest CPU consumption

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

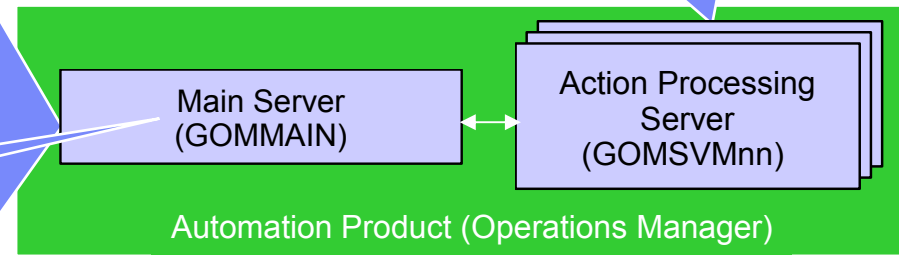


Create a Situation

Situation is triggered and causes a Take Action

Response to problem is automatic

Message is sent and triggers z/VM automation



Questions?



Thank You
DANKU

z/VM®



Appendix A:

OMEGAMON XE for zVM & Linux

Workspace Screenshots

Workspace: zVM Topic View

Tivoli Enterprise Portal | Welcome SYSADMIN | Log out

File Edit View Help

Navigator View: Physical

- Enterprise
 - Windows Systems
 - zVM Systems**
 - VM30021.VL
 - vm30022.VL
 - zVM Linux Systems

System Health: CPU Utiliz...

System ID	Virtual CPU Busy Percent	CP Percent of CPU
RALVM30	~0.9	~0.2
1 (RALVM30)	~0.9	~0.2

System Health: Real Memory Overc...

System ID	Storage Overcommit Ratio
RALVM30	~0.05

System Health: DASD Pa...

System ID	Pot Page Space In Use
RALVM30	~80%
RALVM30	~80%

System Health: Main Storag...

System ID	Page Rate
RALVM30	~0.1
RALVM30	~0.1

System Health: Highest Workload ...

System ID	Highest Individual Wait State Percent
RALVM30-HSSUTIL	~35%

z/VM Health: All Systems

Hub Time: Tue, 09/07/2010 03:00 PM | Server Available | System Health - zvmcvt06.tivlab.raleigh.ibm.com - SYSADMIN

Workspace: zVM “zVM Linux Systems”

zVM PTK Collector Status

Time	Collector Name	Collector Status	zVM Collection Interval	Number of rows this interval
09/01/10 06:23:20	System Health	ACTIVE	0	1
09/01/10 06:23:20	Resource Constraint	ACTIVE	0	61
09/01/10 06:23:20	Spin Lock	ACTIVE	0	26
09/01/10 06:23:20	DASD Cache	ACTIVE	0	1416
09/01/10 06:23:20	Virtual Disk	ACTIVE	0	28
09/01/10 06:23:20	Control Unit	ACTIVE	0	7
09/01/10 06:23:20	FICON Channel	ACTIVE	0	30
09/01/10 06:23:20	LPAR Channel	ACTIVE	0	48
09/01/10 06:23:20	Channel	ACTIVE	0	48
09/01/10 06:23:20	Minidisk Cache	ACTIVE	0	1
09/01/10 06:23:20	Processor	ACTIVE	0	79
09/01/10 06:23:20	Linux Application	ACTIVE	0	2
09/01/10 06:23:20	Virtual Switch	ACTIVE	0	1
09/01/10 06:23:20	Hipersocket	ACTIVE	0	4
09/01/10 06:23:20	Workload	ACTIVE	0	60
09/01/10 06:23:20	DASD	ACTIVE	0	1416
09/01/10 06:23:20	CP Owned	ACTIVE	0	9
09/01/10 06:23:20	Storage	ACTIVE	0	1
09/01/10 06:23:20	System	ACTIVE	0	1
09/01/10 06:23:20	LPAR	ACTIVE	0	36
09/01/10 06:23:20	Performance Toolkit Collector	ACTIVE	60	0
09/01/10 06:23:20	TCPIP User	INACTIVE	0	0
09/01/10 06:23:20	TCPIP	INACTIVE	0	0

Top 5 Busy DASD Devices

Device	Busy Percent
DMS1P1	~100
DMS1P2	~100
DMS1P3	~100
DMS1P4	~100
DMS1P5	~100

Top 5 Workloads by CPU Utilization

Workload	CP % of CPU	CPU Percent	Virtual CPU %
DEM2LIX	~7.5	~7.5	~7.5
DEM7LIX	~6.5	~6.5	~6.5
DEM3LIX	~5.5	~5.5	~5.5
DEM4LIX	~4.5	~4.5	~4.5
DEM5LIX	~3.5	~3.5	~3.5

Top 5 Workloads by Working Set

Workload	Resident Pages	Resident Pages > 2GB	Working Set Size
DEM2LIX	~1,800,000	~1,800,000	~1,800,000
DEM7LIX	~1,600,000	~1,600,000	~1,600,000
DEM3LIX	~1,400,000	~1,400,000	~1,400,000
DEM4LIX	~1,200,000	~1,200,000	~1,200,000
DEM5LIX	~1,000,000	~1,000,000	~1,000,000

Workspace: zVM "Channel"

Channel - dem17lnx - Wilfried Jurkowski

File Edit View Help

Navigator View: Physical

- System Information
- Users
- Agent Management Services
- Universal Agent
- dem6lnx
- dem7lnx
- dem8lnx
- Windows Systems
- zOS
- z/OS Systems
- zVM Systems
 - dem6lnx.VL
 - zVM Linux Systems
 - Channel
 - CP Owned Devices
 - DASD
 - LPAR
 - Network
 - Real Storage
 - System
 - TCPIP
 - Workload

Physical

Top 5 z/VM Channel Busy

Top 5 LPAR Channel Busy - Owning Partition

Top 5 LPAR Channels by Interval Busy Percent - Owning Partition

z/VM Channel Busy

Time	System ID	CHPID	Model Group	Group Qualifier	Interval Busy Conditions Percent	Average Busy Conditions Percent	Ch. Di 0-1
09/01/10 06:27:20	DEMOZVM	45	FICON	00	8.00	8.00	
09/01/10 06:27:20	DEMOZVM	42	FICON	00	7.00	8.00	
09/01/10 06:27:20	DEMOZVM	43	FICON	00	7.00	8.00	
09/01/10 06:27:20	DEMOZVM	44	FICON	00	7.00	8.00	
09/01/10 06:27:20	DEMOZVM	46	FICON	00	2.00	2.00	
09/01/10 06:27:20	DEMOZVM	49	FICON	00	2.00	2.00	
09/01/10 06:27:20	DEMOZVM	47	FICON	00	1.00	0.00	
09/01/10 06:27:20	DEMOZVM	48	FICON	00	1.00	0.00	
09/01/10 06:27:20	DEMOZVM	01	OSC	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	03	OSD	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	05	OSD	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	07	OSD	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	09	OSD	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	09	OSD	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	0B	OSD	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	10	ESCON	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	11	ESCON	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	12	ESCON	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	13	ESCON	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	14	ESCON	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	15	ESCON	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	16	ESCON	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	17	ESCON	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	18	ESCON	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	19	ESCON	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	1A	ESCON	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	1B	ESCON	00	0.00	0.00	
09/01/10 06:27:20	DEMOZVM	1C	ESCON	00	0.00	0.00	

LPAR Channel Busy - Owning Partition

Time	System ID	CHPID	Model Group	Group Qualifier	Channel Shared Indicator	Interval Busy Conditions Percent	Average Busy Conditions Percent	Channel Distribu 0-10 Per
09/01/10 06:27:20	DEMOZVM	47	FICON	00	Yes	1.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	48	FICON	00	Yes	1.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	01	OSC	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	03	OSD	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	05	OSD	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	07	OSD	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	09	OSD	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	0B	OSD	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	10	ESCON	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	11	ESCON	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	12	ESCON	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	13	ESCON	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	14	ESCON	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	15	ESCON	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	16	ESCON	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	17	ESCON	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	18	ESCON	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	19	ESCON	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	1A	ESCON	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	1B	ESCON	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	1C	ESCON	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	1D	ESCON	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	40	FICON	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	41	FICON	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	42	FICON	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	43	FICON	00	Yes	0.00	0.00	1C
09/01/10 06:27:20	DEMOZVM	44	FICON	00	Yes	0.00	0.00	1C

Hub Time: MI, 09/01/2010 06:27 AM

Server Available

Channel - dem17lnx - Wilfried Jurkowski

Workspace: zVM “CP Owned Devices”

CP Owned Devices - dem17lnx - Wilfried Jurkowski

File Edit View Help

Navigator View: Physical

- Agent Management Services
 - Universal Agent
 - dem6lnx
 - dem7lnx
 - dem8lnx
- Windows Systems
- z/OS
- z/OS Systems
- z/VM Systems
 - dem6lnx:VL
 - z/VM Linux Systems
 - Channel
 - CP Owned Devices**
 - DASD
 - LPAR
 - Network
 - Real Storage
 - System
 - TCPIP
 - Workload

Paging and Spooling Space

Top 5 Page Extent Utilization

Top 5 Dump Extent Utilization

Top 5 Spool Extent Utilization

CP Device Table (Paging and Spooling)

Time	System ID	LPAR Name	Device VOLSER	Device Address	PAGING SPOOLING	Allocation	Available Slots	Device Type	Device End Extent	Device Percent Full	Device Start Extent	Device Slots Used
09/01/10 06:27:20	DEMOZVM	DEMOZVM	DVMPG3	E014	PAGING	10017	1803060	3390	10016	0	0	0
09/01/10 06:27:20	DEMOZVM	DEMOZVM	DVMPG1	E025	PAGING	10017	1803060	3390	10016	0	0	0
09/01/10 06:27:20	DEMOZVM	DEMOZVM	DVMPG2	E026	PAGING	10017	1803060	3390	10016	0	0	0
09/01/10 06:27:20	DEMOZVM	DEMOZVM	DVMPG4	E04F	PAGING	10017	1803060	3390	10016	0	0	0
09/01/10 06:27:20	DEMOZVM	DEMOZVM	DVMPG6	E07E	PAGING	10017	1803060	3390	10016	0	0	0
09/01/10 06:27:20	DEMOZVM	DEMOZVM	DVMPG5	E07F	PAGING	10017	1803060	3390	10016	0	0	0
09/01/10 06:27:20	DEMOZVM	DEMOZVM	DVMR...	F010	DIRECT	20	3420	3390	20	5	1	180
09/01/10 06:27:20	DEMOZVM	DEMOZVM	DVMSPL	F011	SPOOLING	10016	1207980	3390	10016	33	1	594900
09/01/10 06:27:20	DEMOZVM	DEMOZVM	DVMPAG	F012	PAGING	10016	1802880	3390	10016	0	1	0

Hub Time: MI, 09/01/2010 06:28 AM

Server Available

CP Owned Devices - dem17lnx - Wilfried Jurkowski

Workspace: zVM “DASD” & “Detailed Links”

The screenshot displays the TSM console interface for a zVM system. The left pane shows a tree view of the system hierarchy, with the 'zVM Systems' folder expanded to show 'zVM Linux Systems' and 'Channel'. A context menu is open over the 'Channel' folder, highlighting the 'Workspace' option, which is set to 'DASD'. Other menu items include 'Take Action...', 'Link To...', 'Launch...', 'Situations...', 'Split vertically', 'Split horizontally', and 'Print...'. The main area contains several performance charts and a data table:

- Top 5 Device Busy:** A bar chart showing the percentage of busy time for five devices: DMTRES, DMTCAT, DMTOS1, SC1003, and DMTSP1. All bars are at 0%.
- Top 5 I/O Rate:** A bar chart showing the number of I/O operations per second for the same five devices. DMTRES has the highest rate at approximately 3.0, followed by DMTCAT at 2.0, and the others at 1.0.
- Top 5 Service Time:** A stacked bar chart showing average service times for five devices. The bars are colored yellow, red, and blue. DMTRES has the highest service time at approximately 2.0.
- Top 5 I/O Queue Depth:** A bar chart showing the average number of I/O operations queued for five devices. All bars are at 0.
- DASD I/O Activity:** A table listing I/O activity for various devices over time. The table has columns for Time, System ID, LPAR Name, Volume Serial Number, Device Address, Device Type, Connection Time, Percent Busy, Average Queued IO, and Number IO per Second.

Workspace: zVM “LPAR” & “Detailed Links”

The screenshot displays the IBM Tivoli Enterprise Console interface for a zVM LPAR workspace. The main window is titled "LPAR - dem17lnx - Wilfried Jurkowski *ADMIN MODE*".

Navigator: Shows a tree view of system components. The "zVM Systems" folder is expanded, and the "LPAR" sub-folder is selected, highlighted with a red box. A context menu is open over the "LPAR" folder, showing options: "Workspace", "Take Action...", "Link To...", "LPAR", "Processor by LPAR Name", and "Processor".

LPAR Busy: A bar chart showing the percentage of LPAR Busy (yellow) and Physical CPU Busy (blue) for various LPARs. The Y-axis ranges from 0 to 24 percent. ZTEECZM shows the highest LPAR Busy value at approximately 24%.

LPAR Load: A bar chart showing the percentage of LPAR Load (blue) for various LPARs. The Y-axis ranges from 0 to 6 percent. ZTEECZM shows the highest LPAR Load value at approximately 5.5%.

LPAR Weight: A bar chart showing the percentage of LPAR Weight (purple) for various LPARs. The Y-axis ranges from 0 to 12 percent. All LPARs show a weight of approximately 10%.

Partition Suspension: A bar chart showing the percentage of LPAR Suspended Time (green) for various LPARs. The Y-axis ranges from 0.0 to 2.0 percent. DEMONM3 shows the highest suspended time at approximately 1.4%.

LPAR Utilization: A chart showing LPAR Utilization, currently empty.

Status Bar: Displays "Hub Time: Mo, 09/27/2010 01:18 AM", "Server Available", and "LPAR - dem17lnx - Wilfried Jurkowski *ADMIN MODE*".

Workspace: zVM "Network"

Network - dem17lnx - Wilfried Jurkowski

File Edit View Help

Navigator View: Physical

- System Information
- Users
- Agent Management Services
- Universal Agent
- dem6lnx
- dem7lnx
- dem8lnx
- Windows Systems
- zOS
- zOS Systems
 - zVM Systems
 - dem6lnx.VL
 - zVM Linux Systems
 - Channel
 - CP Owned Devices
 - DASD
 - LPAR
 - Network**
 - Real Storage
 - System
 - TCP/IP
 - Workload

Top 5 HiperSockets Message Rate per Second

Top 5 HiperSockets Message Failure Rate per Second

Top 5 Virtual Switch Devices Receive Packets Rate per Second

HiperSockets Activity

Time	System ID	LPAR Name	Channel Path	Sharing Indicator	Transferred Total Messages	Transferred Total Data Units	Failed Total No Buffer	Transferred LPAR Messages	Transferred LPAR Data Units	Failed LPAR No Buffer	Failed LPAR Other
09/01/10 06:30:20	DEMOZVM	DEMOZVM	F4	YES	0,00	0,00	0,00	0,00	0,00	0,00	0,00
09/01/10 06:30:20	DEMOZVM	DEMOZVM	F5	YES	0,00	0,00	0,00	0,00	0,00	0,00	0,00
09/01/10 06:30:20	DEMOZVM	DEMOZVM	F6	YES	0,00	0,00	0,00	0,00	0,00	0,00	0,00
09/01/10 06:30:20	DEMOZVM	DEMOZVM	F7	YES	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Virtual Switch Activity

Time	System ID	LPAR Name	Real Device Address	User ID	VSWITCH Timeout	Transmit Bytes	Transmit Packets Rate per Second	Transmit Packets Discarded Rate per Second	Receive Bytes	Receive Packets Rate per Second	Receive Packets Discarded Rate per Second	QSV	VSWITCH Name	Write Signals per Second	Read Signals per Second	Sync Signals per Second
09/01/10 06:30:20	DEMOZVM	DEMOZVM	F5C3	DTCVSW1	300	27.360,00	35,00	0,00	5.318,00	27,00	0,00	8	VSWITCH1	16,3	0,0	0

Hub Time: Mi, 09/01/2010 06:44 AM

Server Available

Network - dem17lnx - Wilfried Jurkowski

Workspace: zVM “Real Storage”

The screenshot displays the IBM Real Storage management console interface. The top-left pane shows a tree view of system components, with 'z/VM Systems' and 'Real Storage' highlighted. The main area contains several monitoring panels:

- Storage Utilization:** A 3D bar chart showing 'Number of Frames' (yellow), 'Number of Frames > 2GB' (blue), 'Free Stor Used' (green), and 'Deferred Pages' (cyan).
- Available Frames Mean:** A 3D bar chart showing 'Available Frames Mean' (yellow), 'Available Frames Mean > 2GB' (blue), 'Available Pages Low Thresh' (red), and 'Available Pages Low Thresh > 2GB' (green).
- System Page Rate:** A line graph showing page rate over time.
- System Resource Utilization:** A 3D bar chart showing 'Pct Page Space In Use' (blue), 'Pct Spool Space In Use' (green), and 'Pct TDisk Space In Use' (red).
- Page Wait Queue:** A line graph showing the page wait queue over time.

At the bottom, a table provides detailed metrics for the system:

Time	System ID	LPAR Name	Number of Frames	Number of Frames > 2GB	Available Frames High Thresh	Available Frames High Thresh > 2GB	Available Frames Mean	Available Frames Mean > 2GB	Available Pages Low Thresh	Available Pages Low Thresh > 2GB	System Paging Rate	Number of Dynamic Frames	Demand Scan Fails	Free Stor Used	Deferred Pages	Free Stor Requests	Free Stor Releases	Page Rate	Page Index	Pct Page Space In Use	Pct Spool Space In Use	Pct TDisk Space In Use	Single Read Page Faults	DPA PCT of Real Stor	Page Wait Queue
09/01/1...	DEMOZVM	DEMOZVM	1918	118	48	48	1918	118	28	28	0	131012608	0	2191	0	3	3	0	7	0	33	0	0.00	0.99	0

Workspace: zVM “System” & “Detailed Links”

The screenshot displays the IBM Tivoli Monitoring console interface. On the left, the Navigator pane shows a tree view of system components, with the 'z/OS Systems' folder expanded to show 'z/OS Linux Systems'. A red box highlights the 'System' workspace, and a context menu is open over it, showing options like 'Launch...', 'Situations...', and 'Properties...'. The main area contains several charts:

- CPU Utilization:** Two semi-circular gauges. The left gauge, labeled 'CP Percent of CPU', shows a value of 0. The right gauge, labeled 'Percent of CPU', shows a value of 4. A green arrow points to the needle in the right gauge.
- Total to Virtual Ratio:** A semi-circular gauge showing a value of 1.00, with a green arrow pointing to the needle.
- User Dispatching Queues:** A 3D bar chart showing four categories: Eligible List E1 (yellow), Eligible List E2 (blue), Eligible List E3 (red), and In Queue Users (green). The 'In Queue Users' bar is the tallest, reaching approximately 40 on the y-axis.
- Current Users:** A 3D bar chart showing three categories with values around 60, 40, and 20. A context menu is open over this chart.
- System Utilization:** A large empty area at the bottom of the main display.

The bottom status bar shows system information: 'Hub Time: Mo, 09/27/2010 01:20 AM', 'Server Available', and 'System - dem17inx - Wilfried Jurkowski *ADMIN MODE*'. The Windows taskbar at the very bottom shows the Start button, several open applications, and the system tray with the time '08:16'.

Workspace: zVM “Workload” & “Detailed Links”

The screenshot displays the IBM Tivoli Workload Scheduler (WLS) interface in ADMIN MODE. The main window shows a 'Physical' view of zVM systems. A context menu is open over the 'Physical' view, highlighting the 'Workspace' option, which is expanded to show 'Workload', 'Linux Workload', 'AppData', and 'Resource Constraint'. Other menu items include 'Take Action...', 'Link To...', 'Situations...', 'Split vertically', 'Split horizontally', 'Print Preview...', 'Print...', 'Find...', and 'Properties...'. The interface also features several performance charts: 'Top 5 CPU Users' (showing CPU % and Virtual CPU %), 'Top 5 Page Rate' (showing Page Rate), and 'Top 5 Working Set Size' (showing Working Set Size). The Navigator tree on the left shows a hierarchy of Linux OS, z/OS Systems, and z/VM Systems, with 'z/VM Linux Systems' expanded to show 'Channel', 'CP-Owned Devices', 'DASD', 'LPAR', 'Network', 'Real Storage', 'System', and 'TCP/IP'. The status bar at the bottom shows 'Hub Time: Mo, 09/27/2010 01:04 AM', 'Server Available', and 'Workload - dem17lnx - Wilfried Jurkowski *ADMIN MODE*'. The Windows taskbar at the very bottom shows the start button, several open applications, and the system tray with the time 08:00.

Workspace: zVM “Workload” -> “AppData” & “Details”

The screenshot displays the IBM AppData software interface. The top window, titled "AppData - dem17lnx - Wilfried Jurkowski *ADMIN MODE*", shows a "Linux Guest Workload Data" table with columns for Time, System ID, LPAR Name, User ID, Total CP % of CPU, CP Seconds, Total CPU Percent, CPU Seconds, Session Time, Total Virtual CPU%, Virtual Seconds, Page Rate per Seconds, Page Reads per Second, Page Writes per Second, Resident Pages, Resident Pages > 2GB, Average Storage Size in Kbytes, Expanded Storage Size in Pages, and Expanded Storage Moved In. The table contains two rows of data for the date 09/27/10.

The left-hand "Navigator" pane shows a tree view of system components. The "z/OS Systems" folder is expanded to show "z/VM Systems", which is further expanded to show "dem6lnx:VL". Under "z/VM Linux Systems", the "Workload" folder is highlighted with a red box.

The bottom window, titled "Linux Guest AppData", displays a detailed table of system metrics. The table includes columns for Time, System ID, LPAR Name, User ID, Virtual CPUs, Total CPU, User CPU, Kernel CPU, Nice CPU, Percent IRQ, Percent Soft IRQs, Percent I/O Wait, Percent CPU Idle, Runnable Processes, Processes Waiting for I/O, Total Processes, Avg Processes Last Minute, Avg Processes Last 5 Minutes, Avg Processes Last 15 Minutes, Total Main Memory, Percent Main Memory Utilization, Total High Memory, Percent High Memory Utilization, Shared Memory, Buffers and Free Cache, Buffer Cache Used, Total Swap Space, and System Space. The table shows data for the time 09/27/10 01:04:46.

A context menu is open over the "Workload" folder in the Navigator, listing various workspace links such as "Link to AppData to Linux Process Workspace", "AppData to Linux Virtual Memory Workspace", "AppData to Linux Disk IO Rate Workspace", "AppData to Linux Network Workspace", "AppData to Linux Sockets Workspace", "AppData to Linux Capacity Usage Workspace", "AppData to Linux CPU Averages Workspace", "AppData to Linux Virtual Memory Trend WS", "Link Wizard...", and "Link Anchor...". This menu is also highlighted with a red box.

The bottom status bar shows the Hub Time as "Mo, 09/27/2010 01:06 AM", the server status as "Server Available", and the current user and mode as "AppData - dem17lnx - Wilfried Jurkowski *ADMIN MODE*". The Windows taskbar at the very bottom shows the start button, several open applications, and the system tray with the time "08:03".

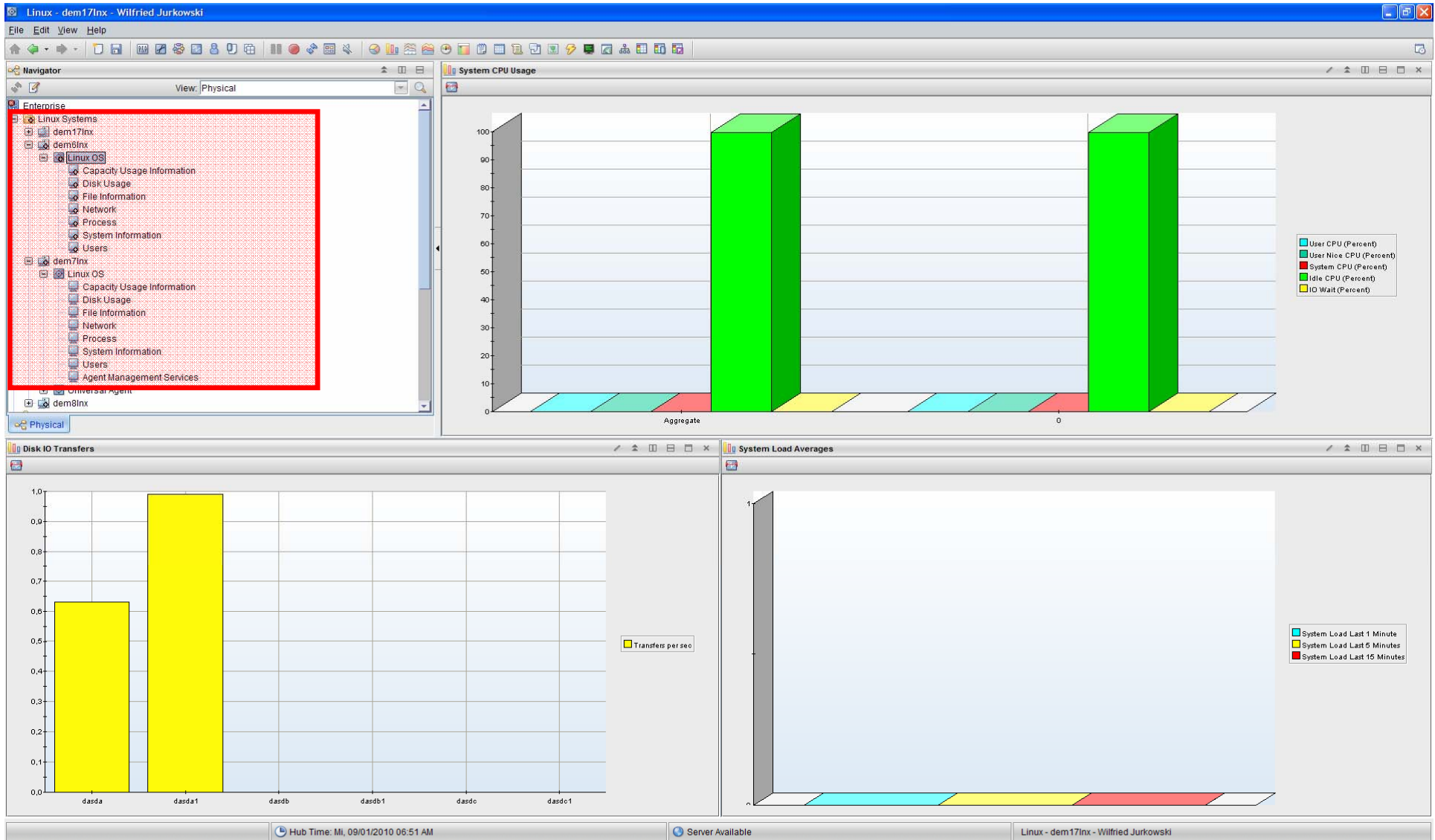
Workspace: zLinux “Systems Overview” & “History Links”

The screenshot displays the 'Linux Systems Overview' application. The Navigator pane on the left shows a tree view with a context menu open over the 'Linux OS' folder. The main area contains three charts and a table:

- Linux Systems Busy CPU:** A 3D bar chart showing CPU usage for three systems: DEMOZVM.DEM6LNXLZ, DEMOZVM.DEM8LNXLZ, and dem17InxLZ.
- Linux Systems 15 Minute Average Workload:** A 3D bar chart showing system load for the same three systems.
- Linux Systems User Logins:** A horizontal 3D bar chart showing the number of user logins for the same three systems.
- Linux Systems Statistics Table:** A table with columns for System Name, Context Switches Per Second, Percent Change Context Switches Per Second, Processes created Per Second, Percent Change Processes Created, Number of User Logins, System Load Last 1 Minute, System Load Last 5 Minutes, and System Load Last 15 Minutes.

System Name	Context Switches Per Second	Percent Change Context Switches Per Second	Processes created Per Second	Percent Change Processes Created	Number of User Logins	System Load Last 1 Minute	System Load Last 5 Minutes	System Load Last 15 Minutes
DEMOZVM.DEM6LNXLZ	24	-14.28	0	0.00	0	0.00	0.00	0.00
DEMOZVM.DEM8LNXLZ	87	-2.24	0	0.00	1	0.00	0.00	0.00
dem17InxLZ	197	-22.74	22	0.00	1	0.23	0.10	0.09

Workspace: zLinux "Linux OS"



Workspace: zLinux “Capacity Usage Information”

Capacity Usage Information (Superseded) - dem17lnx - Wilfried Jurkowski

File Edit View Help

Navigator View: Physical

- Enterprise
 - Linux Systems
 - dem17lnx
 - dem6lnx
 - Linux OS
 - Capacity Usage Information
 - Disk Usage
 - File Information
 - Network
 - Process
 - System Information
 - Users
 - dem7lnx
 - Linux OS
 - Capacity Usage Information
 - Disk Usage
 - File Information
 - Network
 - Process
 - System Information
 - Users
 - Agent Management Services

Physical

Disk Space Usage

Disk Usage Averages (Hourly Updates)

Disk Usage Averages

Disk Name	Space Used (MB)	Space Available (MB)	Disk Usage Rate (Bytes/Hr)	High Water Mark Disk Usage Rate (Bytes/Hr)	High Water Mark Time Stamp	Disk Usage Moving Avg (Bytes/Hr)	Days Until Full Disk Moving Avg	Days Until Full Disk Current Rate	Days Until Full Disk Low Water Mark	Days Until Full Disk Peak Rate
/dev/dasda1	3546	3496	0	46137344	07/26/10 08:44:50	0	0	0	0	3
/dev/dasdc1	1165	5876	0	0	09/01/10 06:44:59	0	0	0	0	0
/tmp/kv/LCD7-0982-06.iso	312	0	0	0	09/01/10 06:44:59	0	0	0	0	0
debugfs	0	0	0	0	09/01/10 06:44:59	0	0	0	0	0
devpts	0	0	0	0	09/01/10 06:44:59	0	0	0	0	0
proc	0	0	0	0	09/01/10 06:44:59	0	0	0	0	0
securityfs	0	0	0	0	09/01/10 06:44:59	0	0	0	0	0
sysfs	0	0	0	0	09/01/10 06:44:59	0	0	0	0	0
udev	0	245	0	0	09/01/10 06:44:59	0	0	0	0	0

Hub Time: Mi, 09/01/2010 06:52 AM

Server Available

Capacity Usage Information (Superseded) - dem17lnx - Wilfried Jurkowski

Workspace: zLinux "Disk Usage"

Disk Usage (Superseded) - dem17lnx - Wilfried Jurkowski

File Edit View Help

Navigator View: Physical

- Enterprise
 - Linux Systems
 - dem17lnx
 - dem6lnx
 - Linux OS
 - Capacity Usage Information
 - Disk Usage**
 - File Information
 - Network
 - Process
 - System Information
 - Users
 - dem7lnx
 - Linux OS
 - Capacity Usage Information
 - Disk Usage
 - File Information
 - Network
 - Process
 - System Information
 - Users
 - Agent Management Services

Physical

Space Used Percent

Inodes Used Percent

Disk Usage

Mount Point (Unicode)	Disk Name	Size (MB)	Space Used (MB)	Space Available (MB)	Total Inodes	Inodes Used	Inodes Free	Space Used Percent	Inodes Used Percent	File System Type	Space Available Percent
/media	/tmp/kv/LCD7-0...	312	312	0	0	0	0	100	0	iso9660	0
/	/dev/dasda1	7042	3546	3496	0	0	0	50	0	reiserfs	50
/opt	/dev/dasdc1	7042	1165	5876	0	0	0	16	0	reiserfs	84
/proc	proc	0	0	0	0	0	0	0	0	proc	100
/sys	sysfs	0	0	0	0	0	0	0	0	sysfs	100
/sys/kernel/d...	debugfs	0	0	0	0	0	0	0	0	debugfs	100
/dev	udev	245	0	245	62866	161	62705	0	0	tmpfs	100
/devpts	devpts	0	0	0	0	0	0	0	0	devpts	100
/sys/kernel/s...	securityfs	0	0	0	0	0	0	0	0	security	100

Disk Space

Space Used (MBytes)

Space Available (MBytes)

Hub Time: MI, 09/01/2010 06:53 AM

Server Available

Disk Usage (Superseded) - dem17lnx - Wilfried Jurkowski

Workspace: zLinux “File Information” & “Detailed Links”

The screenshot displays the IBM File Information application interface. The top-left pane shows a hierarchical tree view of the file system, with 'File Information' selected under the 'dem6lnx' directory. The top-right pane is a 3D horizontal bar chart titled 'File Size - Top Ten', showing the sizes of the top 10 directories in MB. The bottom pane is a table titled 'File Size - Top Ten' providing detailed information for each directory.

Path	File	Size (MB)	Owner	Group	Last Changed Time	Last Accessed Time	Links	Access	Type	Link Name
/	sbin	0.009	root	root	11/10 9 12:27:09	07/26/10 08:01:58	3	755	Directory	
/	etc	0.006	root	root	07/23 0 08:37:27	07/26/10 08:01:16	81	755	Directory	
/	lib64	0.004	root	root	9 12:26:56	07/26/10 08:01:58	5	755	Directory	
/	lib	0.003	root	root	11/10 9 11:43:03	07/26/10 08:01:17	10	755	Directory	
/	dev	0.002	root	root	08/29 0 10:45:02	07/26/10 08:01:16	8	755	Directory	
/	bin	0.002	root	root	11/10 9 11:52:20	07/26/10 08:01:16	2	755	Directory	
/	media	0.001	root	root	03/23 0 18:33:24	03/23/10 18:33:24	5	555	Directory	
/	usr	0.000	root	root	11/10 9 11:48:20	07/26/10 08:01:35	14	755	Directory	
/	home	0.000	root	root	09/05 9 06:07:49	07/26/10 08:01:57	3	755	Directory	
/	usr	0.000	root	root	10/19 9 09:50:22	07/26/10 08:01:58	2	755	Directory	
	Specific File Information									
	Link Wizard									
	Link Anchor									

Workspace: zLinux "Networks"

Sockets Information (Superseded) - dem17lnx - Wilfried Jurkowski *ADMIN MODE*

File Edit View Help

Navigator View: Physical

- Enterprise
 - Linux Systems
 - dem17lnx
 - dem6lnx
 - Linux OS
 - Capacity Usage Information
 - Disk Usage
 - File Information
 - Network
 - Process
 - System Information
 - Users
 - dem7lnx
 - Linux OS
 - Capacity Usage Information
 - Disk Usage
 - File Information
 - Network
 - Process
 - System Information
 - Users
 - Agent Management Services

Sockets Used by Protocol

Network Activity

Sockets Services Information

Socket Owner Name (Unicode)	Local Port	Socket Protocol	Receive Queue (Bytes)	Send Queue (Bytes)	Local Address	Local Service Name	Foreign Address	Socket State	Socket UID	Socket Inode	Foreign Port
root	10000	UDP	0	0	*	*	*	CLOSED	0	4431	0
root	427	UDP	0	0	255.255.255.255	*	*	CLOSED	0	3452	0
root	427	UDP	0	0	9.39.68.133	*	*	CLOSED	0	3451	0
root	427	UDP	0	0	224.0.1.22	*	*	CLOSED	0	3450	0
root	427	UDP	0	0	239.255.255.253	*	*	CLOSED	0	3449	0
root	111	UDP	0	0	*	*	*	CLOSED	0	3575	0
root	631	UDP	0	0	*	*	*	CLOSED	0	8066	0
root	55112	TCP	1	0	127.0.0.1	*	127.0.0.1	CLOSED WAIT	0	4445	427
root	8418	TCP	0	0	127.0.0.2	*	127.0.0.2	ESTABLISHED	0	222129	13588
root	13588	TCP	0	0	127.0.0.2	*	127.0.0.2	ESTABLISHED	0	222130	8418
root	38343	TCP	0	0	127.0.0.1	*	127.0.0.1	ESTABLISHED	0	5455	389
ldap	389	TCP	0	0	127.0.0.1	*	127.0.0.1	ESTABLISHED	76	5456	38343
root	7478	TCP	0	0	127.0.0.1	*	127.0.0.1	ESTABLISHED	0	308221	3661
root	3661	TCP	0	0	127.0.0.1	*	127.0.0.1	ESTABLISHED	0	308222	7478
root	14161	TCP	0	0	127.0.0.2	*	127.0.0.2	ESTABLISHED	0	308226	12502
root	12502	TCP	0	0	127.0.0.2	*	127.0.0.2	ESTABLISHED	0	308225	14161
root	12325	TCP	0	0	127.0.0.2	*	127.0.0.2	ESTABLISHED	0	222104	13588
root	13588	TCP	0	0	127.0.0.2	*	127.0.0.2	ESTABLISHED	0	222126	5595
root	5595	TCP	0	0	127.0.0.2	*	127.0.0.2	ESTABLISHED	0	222125	13588
root	2686	TCP	0	100	9.39.68.133	*	9.39.68.147	ESTABLISHED	0	1177169	9002
root	12502	TCP	0	0	127.0.0.2	*	127.0.0.2	ESTABLISHED	0	308249	1762
root	1762	TCP	0	0	127.0.0.2	*	127.0.0.2	ESTABLISHED	0	308250	12502
root	25505	TCP	0	0	9.39.68.133	*	9.39.68.147	ESTABLISHED	0	1177204	9002
root	1920	TCP	0	0	127.0.0.1	*	127.0.0.1	ESTABLISHED	0	308214	23123
root	23123	TCP	0	0	127.0.0.1	*	127.0.0.1	ESTABLISHED	0	308213	1920

Hub Time: MI, 09/01/2010 07:17 AM

Server Available

Sockets Information (Superseded) - dem17lnx - Wilfried Jurkowski *ADMIN MODE*

Workspace: zLinux "Process" & "Detailed Links"

Process (Superseded) - dem17lnx - Wilfried Jurkowski *ADMIN MODE*

File Edit View Help

Navigator View: Physical

- Enterprise
 - Linux Systems
 - dem17lnx
 - dem6lnx
 - Linux OS
 - Capacity Usage Information
 - Disk Usage
 - File Information
 - Network
 - Process**
 - System Information
 - Users

Physical

Process CPU Percent Usage

Process + Child CPU Percent Usage

Process Information Detail

Process Command Name (Unicode)	Process ID	Process Parent ID	Process State	Process System CPU (Percent)	Process User CPU (Percent)	Cumulative Process System CPU (Percent)	Cumulative Process User CPU (Percent)	Kernel Priority	Nice Value	Total Size (Pages)	Resident Set Size (Pages)	Shared Memory (Pages)	Text Resident Set (Pages)	Shared Lib Resident Set (Pages)	Data Resident Set (Pages)	Process Dirty Pages	VM Size (KB)	VM Locked Pages (KB)	Data Size (KB)	Stack Size (KB)	Exe SI
zmd	1472	1	Sleeping	4.09	8.47	11.77	31.85	21	0	446	130	111	3	0	60	0	1784	0	156	84	12
kviagent	20737	1	Sleeping	0.03	0.00	0.00	0.00	16	0	17764	8120	2784	164	0	9720	0	71056	0	38792	88	656
klogd	1224	1	Sleeping	0.00	0.00	0.00	0.00	15	0	485	152	97	8	0	94	0	1940	0	292	84	32
syslog-ng	1229	1	Sleeping	0.00	0.00	0.00	0.00	15	0	1457	321	184	49	0	117	0	5828	0	384	84	196
Process User Information			Sleeping	0.00	0.00	0.00	0.00	16	0	1334	785	427	60	0	337	0	5336	0	1256	92	240
Link Wizard...			Sleeping	0.00	0.00	0.00	0.00	19	0	464	121	97	5	0	62	0	1856	0	164	84	20
Link Anchor...			Sleeping	0.00	0.00	0.00	0.00	13	-3	2547	179	138	27	0	2113	0	10188	0	8368	84	108
cupsd	1273	1	Sleeping	0.00	0.00	0.00	0.00	20	-5	0	0	0	0	0	0	0	Not Available	Not Available	Not Available	Not Available	Not A
miniserv.pl	1456	1	Sleeping	0.00	0.00	0.00	0.00	16	0	2729	1203	479	68	0	1012	0	10916	0	3948	100	272
nscd	1464	1	Sleeping	0.00	0.00	0.00	0.00	16	0	4887	3427	432	345	0	3006	0	19548	0	11940	84	1380
resmgrd	940	1	Sleeping	0.00	0.00	0.00	0.00	18	0	29152	869	644	29	0	3228	0	116608	0	12828	84	116
sshd	1480	1	Sleeping	0.00	0.00	0.00	0.00	16	0	480	90	63	15	0	61	0	1920	0	160	84	60
slapd	1506	1	Sleeping	0.00	0.00	0.00	0.00	16	0	1432	380	270	99	0	131	0	5728	0	440	84	396
pdflush	1556	6	Sleeping	0.00	0.00	0.00	0.00	18	0	23188	1637	972	457	0	15522	0	92752	0	62004	84	1828
master	1791	1	Sleeping	0.00	0.00	0.00	0.00	15	0	0	0	0	0	0	0	0	Not Available	Not Available	Not Available	Not Available	Not A
qmgr	1807	1791	Sleeping	0.00	0.00	0.00	0.00	16	0	1735	609	497	10	0	77	0	6940	0	224	84	40
cron	1820	1	Sleeping	0.00	0.00	0.00	0.00	16	0	1737	622	511	17	0	77	0	6948	0	224	84	68
mingetty	3235	1	Sleeping	0.00	0.00	0.00	0.00	16	0	651	161	132	12	0	61	0	2204	0	160	84	48
loop0	13878	1	Sleeping	0.00	0.00	0.00	0.00	18	0	502	165	143	5	0	61	0	2008	0	160	84	20
migration/0	2	1	Sleeping	0.00	0.00	0.00	0.00	0	-20	0	0	0	0	0	0	0	Not Available	Not Available	Not Available	Not Available	Not A
kizagent	28607	1	Sleeping	0.00	0.00	0.00	0.00	16	0	0	0	0	0	0	0	0	Not Available	Not Available	Not Available	Not Available	Not A
pickup	31378	1791	Sleeping	0.00	0.00	0.00	0.00	16	0	19400	6401	2906	218	0	11052	0	77600	0	44120	88	872
owcimomd	1271	1	Sleeping	0.00	0.01	0.00	0.00	16	0	1723	575	474	3	0	77	0	6892	0	224	84	12
init	1	0	Sleeping	0.00	0.00	0.00	0.00	15	0	12595	2313	1806	6	0	8587	0	50380	0	34248	100	24
events/0	4	1	Sleeping	0.00	0.00	0.00	0.00	16	0	212	81	68	152	0	58	0	848	0	148	84	608
khelper	5	1	Sleeping	0.00	0.00	0.00	0.00	10	-5	0	0	0	0	0	0	0	Not Available	Not Available	Not Available	Not Available	Not A
kthread	6	1	Sleeping	0.00	0.00	0.00	0.00	10	-5	0	0	0	0	0	0	0	Not Available	Not Available	Not Available	Not Available	Not A
cio_chp	24	6	Sleeping	0.00	0.00	0.00	0.00	11	-5	0	0	0	0	0	0	0	Not Available	Not Available	Not Available	Not Available	Not A
cio	25	6	Sleeping	0.00	0.00	0.00	0.00	20	-5	0	0	0	0	0	0	0	Not Available	Not Available	Not Available	Not Available	Not A
cio_notify	26	6	Sleeping	0.00	0.00	0.00	0.00	20	-5	0	0	0	0	0	0	0	Not Available	Not Available	Not Available	Not Available	Not A
kslowcrw	27	6	Sleeping	0.00	0.00	0.00	0.00	20	-5	0	0	0	0	0	0	0	Not Available	Not Available	Not Available	Not Available	Not A
apldata	55	6	Sleeping	0.00	0.00	0.00	0.00	20	-5	0	0	0	0	0	0	0	Not Available	Not Available	Not Available	Not Available	Not A
pdflush	69	6	Sleeping	0.00	0.00	0.00	0.00	15	0	0	0	0	0	0	0	0	Not Available	Not Available	Not Available	Not Available	Not A
kswapd0	70	1	Sleeping	0.00	0.00	0.00	0.00	15	0	0	0	0	0	0	0	0	Not Available	Not Available	Not Available	Not Available	Not A
aio/0	71	6	Sleeping	0.00	0.00	0.00	0.00	20	-5	0	0	0	0	0	0	0	Not Available	Not Available	Not Available	Not Available	Not A

Hub Time: MI, 09/01/2010 07:23 AM Server Available Process (Superseded) - dem17lnx - Wilfried Jurkowski *ADMIN MODE*

Workspace: zLinux "System Information"

System Information (Superseded) - dem17lnx - Wilfried Jurkowski *ADMIN MODE*

File Edit View Help

Navigator View: Physical

- Enterprise
 - Linux Systems
 - dem17lnx
 - dem6lnx
 - Linux OS
 - Capacity Usage Information
 - Disk Usage
 - File Information
 - Network
 - Process
 - System Information
 - Users
 - dem7lnx
 - Linux OS
 - Capacity Usage Information
 - Disk Usage
 - File Information
 - Network
 - Process
 - System Information
 - Users
 - Agent Management Services

System Load

Paging Rates

CPU Usage

System Statistics

Context Switches Per Second	Percent Change Context Switches Per Second	Processes created Per Second	Percent Change Processes Created	Number of User Logins	System Load Last 1 Minute	System Load Last 5 Minutes	System Load Last 15 Minutes	System Uptime	Total Pages Paged In
24		0.00	0	0.00	0	0.00	0.00	45 Days	573244380

Virtual Memory Statistics

Hub Time: MI, 09/01/2010 07:25 AM

Server Available

System Information (Superseded) - dem17lnx - Wilfried Jurkowski *ADMIN MODE*

Workspace: zLinux "Users" & "Detailed Links"

The screenshot displays the IBM Tivoli Monitoring workspace for a zLinux system. The main window is titled "Users (Superseded) - dem17lnx - Wilfried Jurkowski *ADMIN MODE*".

Process User Information Table:

Process ID	Effective User ID	Saved User ID	File System User ID	Real Group ID	Effective Group ID	Saved Group ID	File System Group ID	Real User Name (Unicode)	Effective User Name (Unicode)	Saved User Name (Unicode)	File System User Name (Unicode)	Real Group Name (Unicode)	Effective Group Name (Unicode)	Saved Group Name (Unicode)	File System Group Name (Unicode)
1	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
2	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
3	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
4	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
5	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
6	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
8	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
24	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
25	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
26	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
27	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
55	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
69	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
70	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
71	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
75	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
93	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
248	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
293	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
940	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root
1139	100	100	100	101	101	101	101	messagebus	messagebus	messagebus	messagebus	messagebus	messagebus	messagebus	messagebus
1236	2	2	2	2	2	2	2	daemon	daemon	daemon	daemon	daemon	daemon	daemon	daemon
1221	0	0	0	0	0	0	0	root	root	root	root	root	root	root	root

Total User Logins Chart:

The chart shows login activity over time. The x-axis represents time in minutes (0 to 90). The y-axis represents the number of logins. A vertical green line indicates a specific time point. The area under the curve is colored blue, and a portion of the area between 45 and 90 minutes is highlighted in yellow.

Predefined zLinux & zVM Situations

The screenshot displays two windows from the Tivoli Enterprise Monitoring Server interface. The left window, titled 'Situations for - Linux OS', shows a tree view of predefined situations under 'Linux OS'. The selected situation is 'WJ_Linux_High_CPU_System_Critical'. The right window, titled 'Situations for - z/VM Linux Systems', shows a tree view of predefined situations under 'z/VM Linux Systems'. The selected situation is 'ZVM_CP_CPU_Critical'.

Both windows show a 'Situation formula editor' with a table for defining conditions. The 'WJ_Linux_High_CPU_System_Critical' situation has a formula table with the following content:

	CPU ID	System CPU (Percent)
1	=..Aggregate	> 1,00
2		
3		

The 'ZVM_CP_CPU_Critical' situation has a formula table with the following content:

	CP Percent of CPU
1	>= 30
2	
3	

Both windows also show configuration options for the situation, including 'Sampling interval', 'Sound', and 'State'. The 'WJ_Linux_High_CPU_System_Critical' situation has a sampling interval of 0:0:1:0, is enabled with sound 'critical.wav', and is in a 'Critical' state. The 'ZVM_CP_CPU_Critical' situation has a sampling interval of 0:0:5:0, is not enabled with sound, and is in a 'Critical' state.

Appendix B:

OMEGAMON XE for zVM & Linux

Configuration Parameters

Configuration of OMEGAMON XE for z/VM (1)

➤ System Changes

- Add "OPTION APPLMON" statements to the Directory entry for all Linux guests where you will collect appldata
- Add "OPTION APPLMON" statements to the Directory entry for your TCPIP server(s)
- Add "MONITORRECORDS MOSTRECORDS" to the PROFILE TCPIP file
- Enable the Monitor Domains for the data you wish to collect
 - ▶ Must have Class E privilege
 - ▶ Chart on next page shows what domains to enable for the data you wish to collect

➤ Enabling Monitoring Domains

Data record type	Associated CP Monitor domain
LPAR Processors Channels Real Storage Hipersockets Spin Locks Minidisk Cache CCW Translations	SAMPLE: SYSTEM
DASD DASD cache Virtual switches Control Unit cache	SAMPLE: I/O
CP-owned minidisks Virtual disks	SAMPLE: STORAGE
Users	SAMPLE: USER
Network server virtual machines Network users Linux virtual machines	SAMPLE: APPLDATA EVENT: APPLDATA

Configuration of OMEGAMON XE for z/VM (2)

➤ Creating / Configuring the PERFOUT DCSS

- **Estimating the size**
 - ▶ Can use the exec that comes with z/VM
 - *FCXSEGSZ EXEC*
 - *Gives bare minimum size*
 - ▶ Better to make it larger than you need. 16M is a good safe starting size
 - *If you have 1000's of users or DASD, you may want to increase this*
- **Find a location**
 - ▶ Must not conflict with the MONDCSS segment
 - ▶ Best location is just above the size of your Linux virtual machine
 - *If your Linux guest is 512M, put segment from 514-530M*
- **Define the DCSS**
 - ▶ DEFSEG PERFOUT 20200-211FF SN (Example)
 - *This is 514M-530M in 4K pages*
- **Save the DCSS**
 - ▶ SAVESEG PERFOUT
 - *You must do this from a virtual machine that can contain the DCSS. In this case it must have a minimum of 530M of virtual storage*
- **Potential problems**
 - ▶ Overlap with MONDCSS - Use Q NSS MAP to check
 - ▶ The DCSS is within the virtual storage of the machine that will be running the Performance Toolkit. This will prevent Performance Toolkit from loading the DCSS



Configuration of OMEGAMON XE for z/VM (3)

➤ Updating the FCONX \$PROFILE

- **Add the** following statement to the FCONX \$PROFILE. This will tell the Performance Toolkit to output data to the DCSS
 - ▶ FC MONCOLL SEGOUT ON PERFOUT

➤ Configuring the Command Processor (optional)

- **Edit the KVL CONFIG file**
 - ▶ Add the z/VM userid of your Linux guest to the AGENT_ID= line
 - *AGENTID=Inxuserid*
 - ▶ Add any commands that are not to be issued from a Take Action
 - *CMDS=IPL*
 - *CMDS=LOGOFF*
 - *CMDS=DEFINE STORAGE*
 - *CMDS=YOUR COMMAND HERE*
 - ▶ Depending on how much logging you wish to have on your command processor you may adjust the Logging parameters
 - *LOG_SIZE=100* (size of each log)
 - *LOG_COUNT=3* (number of log files to keep)
 - *LOG_RESP=N* (Do/don't log the output of commands that are run)

➤ Start the KLVCMG EXEC

- **Enter KVL CMD on the command line to start the command processor**
 - ▶ Uses the **WAKEUP** command to wait for input from the TEPS via SMSG
 - ▶ Any console input will also cause it to wakeup
 - ▶ You can use “#CP DISC” to disconnect the userid and avoid unintentional interrupts
- **Although this exec works, it is meant as an example. You may modify it to fit your needs**



Configuration of OMEGAMON XE for Linux (1)

➤ Accessing the DCSS

▪ Ensure storage is available for the DCSS

- ▶ Linux uses all storage that CP provides to it. Need to ensure that the storage location of the DCSS is not used by Linux
- ▶ Two options:
 - *Place DCSS above the Linux guest*
 - Linux guest is 512M
 - Define DCSS to be from 514M-530M
 - Extend the Linux address range
 - Add the following to the [ipl] section of the parameters line in the /etc/zipl.conf file: **mem=530M**
 - Issue the command **zipl**
 - Re-ipl your linux guest
 - **NOTE:** Be VERY careful when editing the zipl.conf file

Leave a "hole" for the storage with the DEF STOR command. If DCSS is defined from 48-64M you could use the following "DEF STOR CONFIG 0.48M 64M.448M" - you MUST do this if your Linux guest is 2G or larger

▪ Load the DCSS device driver

- ▶ Issue the command **modprobe dcssblk**

▪ Add the PERFOUT DCSS to the Linux guest (from root)

- ▶ Issue **echo perfout > /sys/devices/dcssblk/add**

▪ To make permanent when you re-ipl, add the above two lines to your

- ▶ **/etc/rc.d/boot.local** file on SLES
- ▶ **/etc/rc.d/rc.local** file on RHEL



Configuration of OMEGAMON XE for Linux (2)

➤ Enabling Appldata Collecting

- **Load the collecting drivers**
 - ▶ modprobe appldata_os
 - ▶ modprobe appldata_mem
 - ▶ modprobe appldata_net_sum
- **Enable collecting**
 - ▶ echo 1 > /proc/sys/appldata/os
 - ▶ echo 1 > /proc/sys/appldata/mem
 - ▶ echo 1 > /proc/sys/appldata/net_sum
- **Set the interval timer**
 - ▶ echo 10000 > /proc/sys/appldata/interval (time is in ms)
- **Enable the timer**
 - ▶ echo 1 > /proc/sys/appldata/timer
- **Add above statements to /etc/rc.d/boot.local or /etc/rc.d/rc.local to automatically enable collection at startup**

➤ Enabling Dynamic Workspace Linking

- **The following must be done for each Linux guest you wish to link to**
 - ▶ Stop the Linux agent
 - ▶ Modify the lz.ini file. This is the Linux agent initialization file. It can be found in the <ITM_Home>/config directory
 - Add **KLZ_SETLPARVMID=Y**
 - *If you are running ITM 6.2.0 or higher, you must comment out the **CTIRA_HOSTNAME** variable.*
 - ▶ Restart the Linux agent
- **Allows you to link directly from a workspace in the Linux agent to a workspace in the z/VM agent**



Configuration of OMEGAMON XE for Linux (3)

➤ Enabling the Take Action Command (optional)

- **Allows you to enable reflex automation to handle situations without manual intervention**
 - ▶ Load the vmcp driver to allow you to issue VM commands from Linux
 - ***modprobe vmcp***
 - ▶ Verify that sudo is available
 - ***sudo vmcp q userid***
 - ▶ If installing from a userid other than root you will need to do the following
 - *Add **:/sbin** the **PATH** statement in **vi.ini** file*
 - *Use visudo to update the **/etc/sudoers** file with the command*
 - **userid ALL=NOPASSWD:/sbin/vmcp** userid is the non-root id
 - This allows 'userid' to run as root
- **Test to ensure that it is working**
 - ▶ `sudo vmcp msg <userID> <TEP userID> cmd=<name of the command>`
 - *userID is where the command processor is running*
 - *TEP userID is the authorized userID used to log onto the portal*
 - ▶ Use a simple command like "QUERY USERS" and then look on the console of the VM userid running the Command Processor to see if the command was issued.
- **Allows you to issue commands on your z/VM system directly from the TEP**

Tivoli® OMEGAMON XE on z/VM and Linux Version 4.2.0

Planung und Konfiguration - **SC12-4417-00** or Planning and Configuration Guide - **SC27-2837-00**

Last Page

