



z/VM and Linux Performance Management

New Product Overview



Agenda

- Opportunity
 - New work loads
 - New monitoring needs
- Current products
 - OMEGAMON for z/VM
 - z/VM Performance Toolkit
- Future product
 - A monitoring infrastructure - TMS
 - Solution architecture – big animal pictures
 - Scenarios
- Workspaces

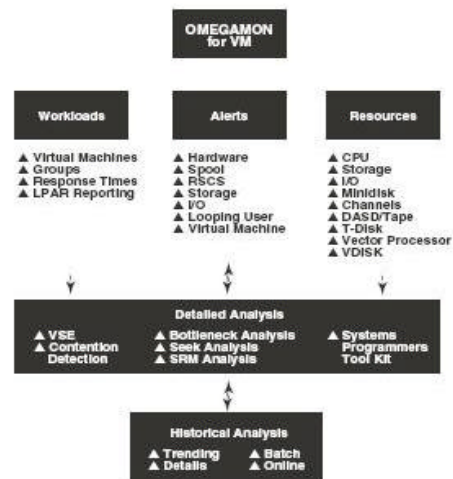
Opportunity

- New workload
 - ▶ Linux on zSeries/System z
 - ▶ WAS, DB2, Java
 - ▶ Migration
- Performance
 - ▶ Real and Virtual resources
 - ▶ Monitoring needs
 - ▶ Managing needs

OMEGAMON for z/VM

What is OMEGAMON Classic?

- ? A software performance monitor for the z/VM operating system.
- ? Contains both a Real-Time and Historical collection component.
- ? Used to analyze system health and diagnose problems.
- ? Used to monitor system resource/workloads and pro-actively report potential problems.
- ? Used to perform trend analysis and capacity planning.
- ? "Green-screen" product, menu or command line driven.
- ? Each instance a data collector, plus VCOLLECT for historical data.
- ? Not used by OMEGAMON XE on z/VM Linux.



z/VM Performance Toolkit Overview

- Full-Screen operator console (FCON)
- Real Time performance monitor capability for z/VM.
 - CPU Performance
 - Storage Utilization
 - Channel, I/O Device Performance
 - Detailed I/O Analysis
 - Detailed User Performance data
 - TCP/IP Server Performance
 - Linux Performance data
- 3270 interface, with ability to exploit GDDM graphics.
- Some web server capability.
- Some ability to customize screens.
- Some integration with other platform monitors (Linux).

z/VM Performance Toolkit Sample

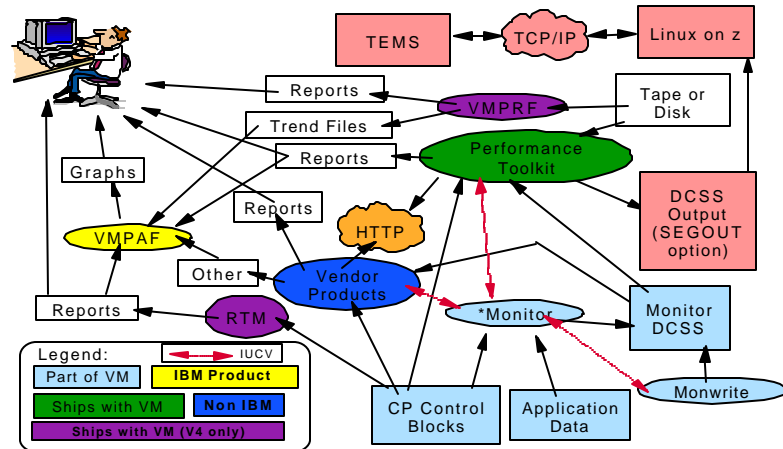
FCX100 CPU 2096 SER 1A26B Interval 19:34:57 - 19:39:57 Perf. Monitor

CPU Load									Vector Facility			Status or
PROC	%CPU	%CP	%EMU	%WT	%SYS	%SP	%SIC	%LOGLD	%VTOT	%VEMU	REST	ded. User
P00	7	2	5	93	1	0	95	7	Master
P01	7	2	5	93	0	0	93	7	Alternate

Total SSCH/RSCH	9/s	Page rate	.0/s	Priv. instruct.	309/s
Virtual I/O rate	0/s	XSTORE paging	.8/s	Diagnose instr.	25/s
Total rel. SHARE	8201	Tot. abs SHARE	0%		

Queue Statistics:					User Status:	
	Q0	Q1	Q2	Q3		
VMDBKs in queue	2	0	0	10	# of logged on users	0
VMDBKs loading	0	0	0	0	# of dialed users	0
Eligible VMDBKs		0	0	0	# of active users	0
El. VMDBKs loading		0	0	0	# of in-queue users	12
Tot. WS (pages)	65054	0	0	407066	% in-Q users in PGWAIT	...
Expansion factor		2	2	2	% in-Q users in IOWAIT	...
85% elapsed time	.400	.050	.400	2.400	% elig. (resource wait)	...

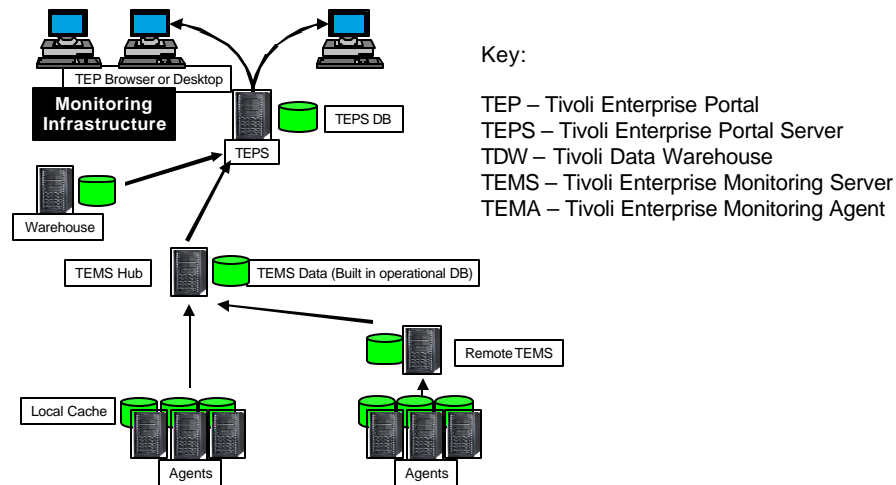
VM Performance Data Food Chain



TMS Overview

An Integrated Monitoring Approach

TMS/OMEGAMON XE Architecture Overview

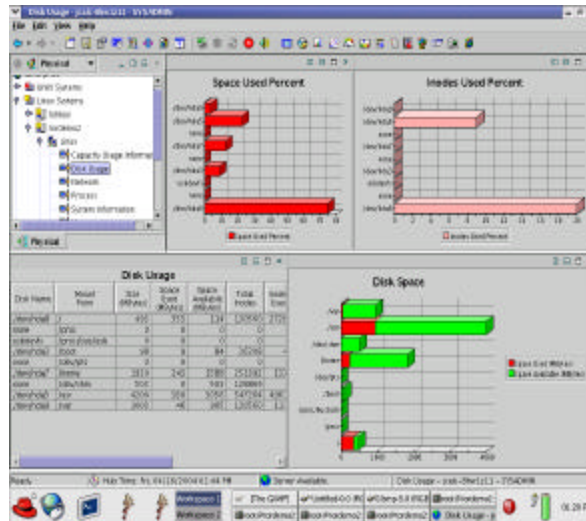


TEMS Function

- Data gathering from a variety of sources
 - TEMA – Tivoli Enterprise Monitoring Agents
 - Diverse list of supported platforms (AIX to z/OS).
 - SNMP
 - ODBC
 - WBEM
 - HTTP
 - Text Files
 - Universal Agent capability: write your own custom agent.
- Data storage and retrieval
- Historical Data Collection for later reporting
 - Includes aggregation and pruning

TEPS/TEMS Function

- Principal User Interface
 - End users
 - Administrators
- Browser-based or desktop application
- Flexible formatting
 - Multiple Views per Workspace
 - Discrete Queries to populate each View
 - Many ways to represent data
 - Many navigation options



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TEP/TEPS Function

- Graphical system monitor/manager
- Reusable objects for leveraging best practices
- Integrated events, real time & historical reporting, and simple automation (Reflex Automation)
- Set of workspaces included
 - Can personalize workspaces according to preference
- Personalize Workspace navigation (i.e. Link)
- Simple integration with other tools
 - 3270 HOD, Browser Interface, App Launch
- Authentication
- Navigator view
- Situations with expert advice

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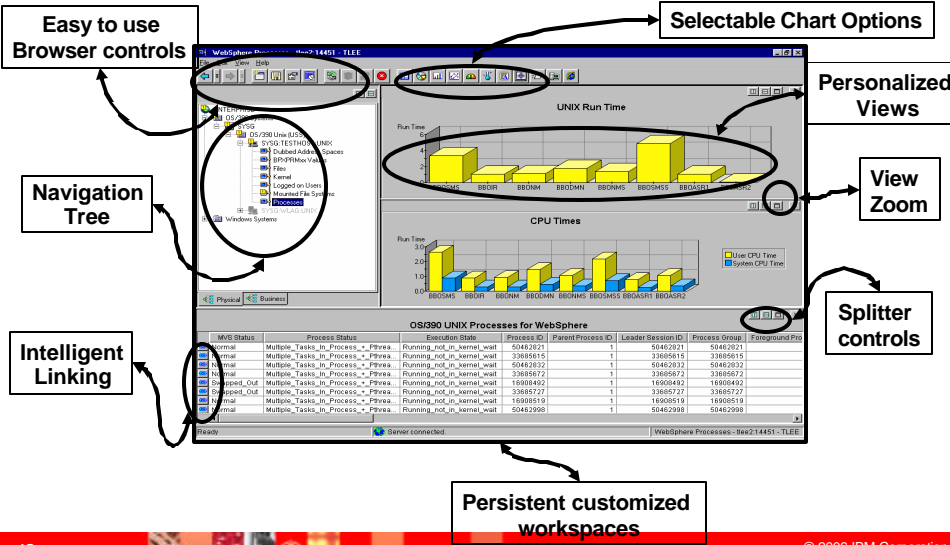
- **Tivoli Enterprise Portal provides the user interface for ITM & OMEGAMON monitors, and integrating applications**
- **The TEP Application Window has a number of components:**
 - ▶ Navigator
 - Tree like view of monitored environment
 - Shows alert icons when problems arise
 - You can create custom navigator views
 - ▶ Workspaces
 - Presents information to the user
 - Displayed as one or more Views
 - Pre-defined workspaces provided
 - Workspaces can be created and customized
 - ▶ Views
 - Displays data from agents
 - Based on queries and filters from agent data
 - You can define links to go directly to specific views

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Tivoli Enterprise Portal

Improve your ability to Diagnose and Resolve Problems



Easy to use Browser controls

Selectable Chart Options

Personalized Views

View Zoom

Splitter controls


Persistent customized workspaces


Intelligent Linking

Navigation Tree

OS/390 UNIX Processes for WebSphere


MVS Status	Process Status	Execution State	Process ID	Parent Process ID	Leader Session ID	Process Group	Terminated PID
Normal	Multiple_Tasks_in_Process...	Running_not_in_kernel_wait	50462921	1	50462921	50462921	
Normal	Multiple_Tasks_in_Process...	Running_not_in_kernel_wait	33895615	1	33895615	33895615	
Normal	Multiple_Tasks_in_Process...	Running_not_in_kernel_wait	50462932	1	50462932	50462932	
Normal	Multiple_Tasks_in_Process...	Running_not_in_kernel_wait	33895672	1	33895672	33895672	
Exceptional_Out	Multiple_Tasks_in_Process...	Running_not_in_kernel_wait	16004492	1	16004492	16004492	
Exceptional_Out	Multiple_Tasks_in_Process...	Running_not_in_kernel_wait	33895727	1	33895727	33895727	
Normal	Multiple_Tasks_in_Process...	Running_not_in_kernel_wait	1600519	1	1600519	1600519	
Normal	Multiple_Tasks_in_Process...	Running_not_in_kernel_wait	50462998	1	50462998	50462998	

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Logical Views

- Logical views allow disparate resources to be grouped together
- Useful for creating collections of resources into Geographic, functional, or relationship-based groups.
- Can be used with scalable background images/bitmaps

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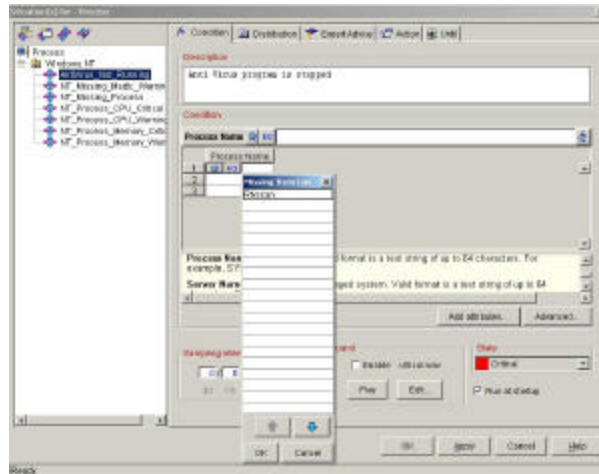
Monitoring Capabilities Overview

- Agents provide data to the Management Server
 - Filter options available
- Situations test for conditions indicating a problem
 - For example, threshold values exceeded
 - Set sampling interval to request agent data for evaluation
- Notifications can be set for a situation event
 - Appear as overlay icon on the Navigator view
 - Different severities can be used
- Responses can be initiated from a situation event
 - Message to console
 - TEC event
- Policies provide advanced automation processes
- Historical data option to show previous information

Automation using “Situations”

- A situation describes one or more conditions that you want to test
 - Each condition compares a user-specified value against attribute data collected from managed systems
- If all conditions are met, the situation evaluates to true and an alert indicator icon appears on the TEP to let you know that a problem exists
- When you create a situation, you can also specify automated responses to take place when the situation becomes true (Take Action)
- Each management agent comes with a set of pre-defined situations that start running as soon as the management agent is connected
- Each situation may examine the values of one or more attributes

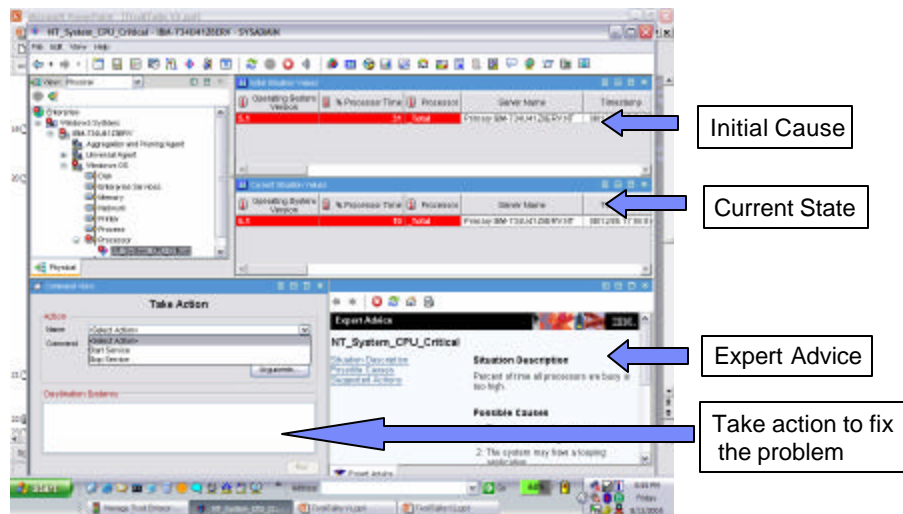
Situation Editor



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Situation Analysis



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Provided Sample Situations

Workspace	Situation Name	Warning	Critical
LPAR	ZVM_LPAR_Busy_Critical **		> 90 %
	ZVM_Physical_CPU_Critical **		> 90 %
	ZVM_LPAR_OVHD_Critical **		> 40 %
System	ZVM_CP_CPU_Critical **		> 30 %
	ZVM_Total_CPU_Critical **		> 90 %
	ZVM_Total_to_Virtual_High	> 40 %	
Workload	ZVM_User_CPU_Critical **		> 90 %
	ZVM_Virtual_CPU_Critical **		> 90 %
Real Storage	ZVM_Avail_Mean_Low	<= Avail Mean Low Thresh	
	ZVM_Avail_Mean2G_Low	<= Avail Mean Low Thresh 2G	
	ZVM_Page_Used_Critical **		> 95 %
	ZVM_Spool_Used_Critical **		> 95 %
DASD	ZVM_DASD_Queue_Critical **		> 25 %
z/VM Linux	ZVM_PerfKit_Collector_Inactive PerfKitCollector/INACTIVE		INACTIVE

** Warning Situation shipped, but not run at startup

Tivoli OMEGAMON XE on z/VM and Linux

Release Timeline

- OMEGAMON for VM v630 released 1Q04
- Next major release in 2006

Platform Support

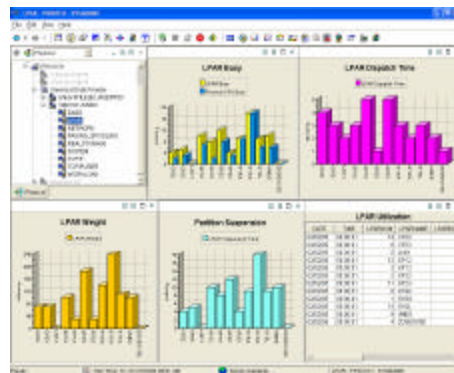
- Current product: z/VM Versions 3.1.0, 4.3.0, 4.4.0 (in either 31-bit or 64-bit images), 5.1.0 or 5.2.0
- Next release: z/VM v5.2, SLES 9 for S/390 and zSeries initially. Others as function is available.

New Features in Last Major Release

- Scan key metrics and compare results with baseline thresholds
- View workloads for virtual machines, groups, response times and LPAR reporting
- Historical reporting and trending analysis
- Bottleneck Analysis

Key Features in Next Major Release

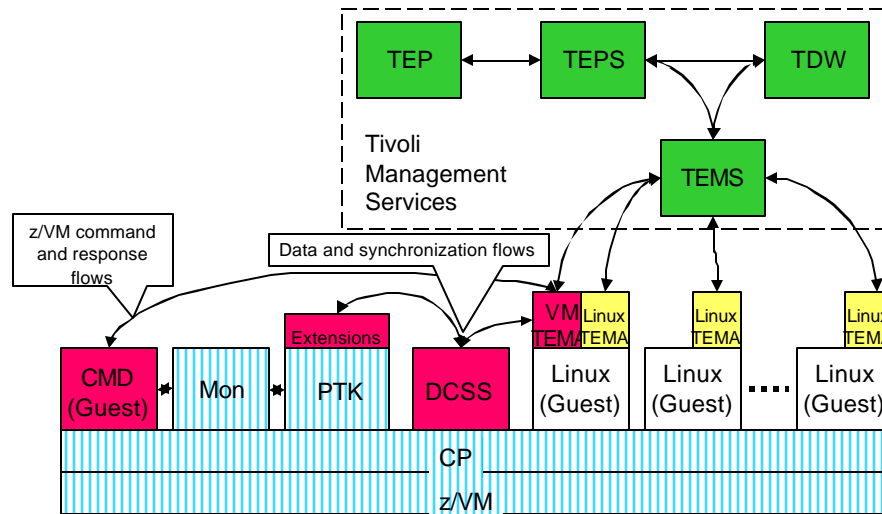
- Single product offering for Linux on zSeries and z/VM
- Integrated OMEGAMON XE operations console for z/VM



Software Pre-requisites

- z/VM 5.2
- Performance Toolkit 5.2
- SLES 9 with DCSS support

Basic Architecture



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Tivoli OMEGAMON XE on z/VM and Linux a Scenario

Problem

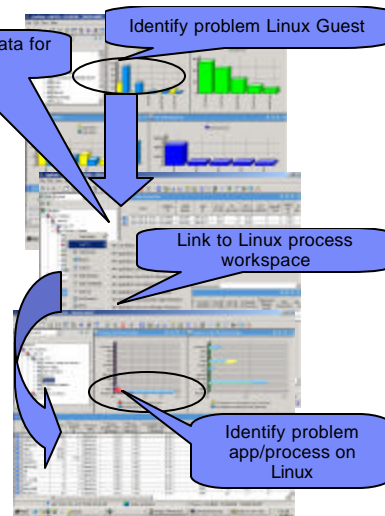
- Uneven Linux Guest CPU consumption

Solution

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

Potential Benefits

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



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Tivoli OMEGAMON XE on z/VM and Linux a Scenario

Problem

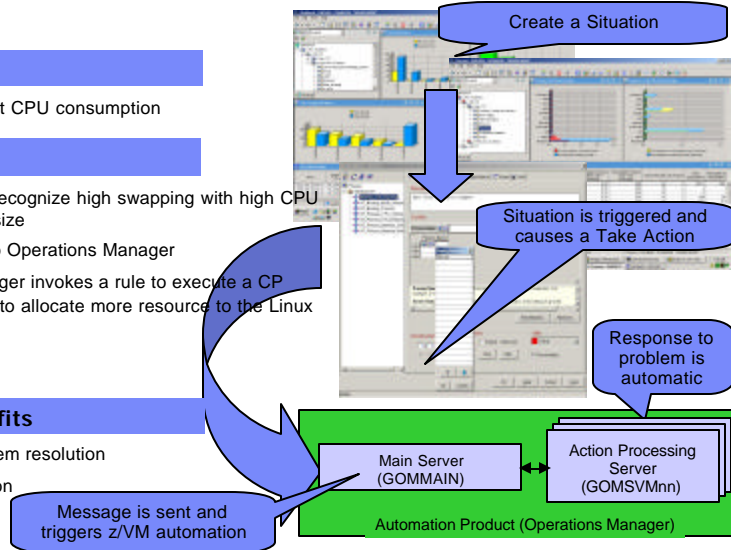
- High Linux Guest CPU consumption

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



Tivoli OMEGAMON XE on z/VM and Linux an integrated approach

Environment

- A SOA application running on WAS
- WAS running on Linux
- Linux running on z/VM

Symptom

- Slow application GUI response

Needs

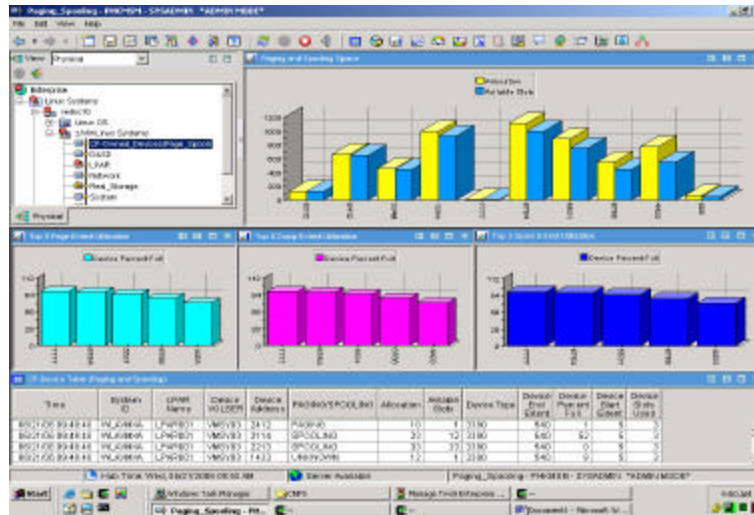
- End to end information
 - SOA
 - WAS
 - Linux
 - z/VM
- Easy way to hand off information across team/specialty boundaries

An Infrastructure

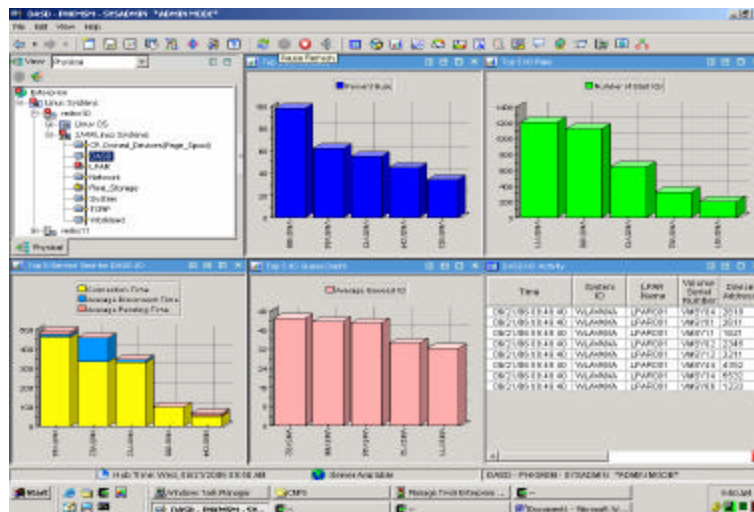
- This product is part of a larger suite
- Linkages, situations and policies can be developed across apps and teams to address common problems/scenarios
- Common look and feel and data handling enables problem sharing
- Generates common events/alerts
- Uses common db interface
- Toolkit available for integrating other apps or tools

- **z/VM Linux Default Workspace**
- **PAGING and SPOOLING Utilization**
- **DASD**
- **LPAR Utilization**
- **NETWORK Utilization (Hiper Socket and Virtual Switch)**
- **REAL STORAGE Utilization**
- **TCPIP Utilization – Server**
- **TCPIP Utilization - Users**
- **SYSTEM Utilization**
- **System Terminal Workspace**
- **Workload (z/VM User ID) Activity**
- **Linux Workload Workspace**
- **ApplData Workspace**

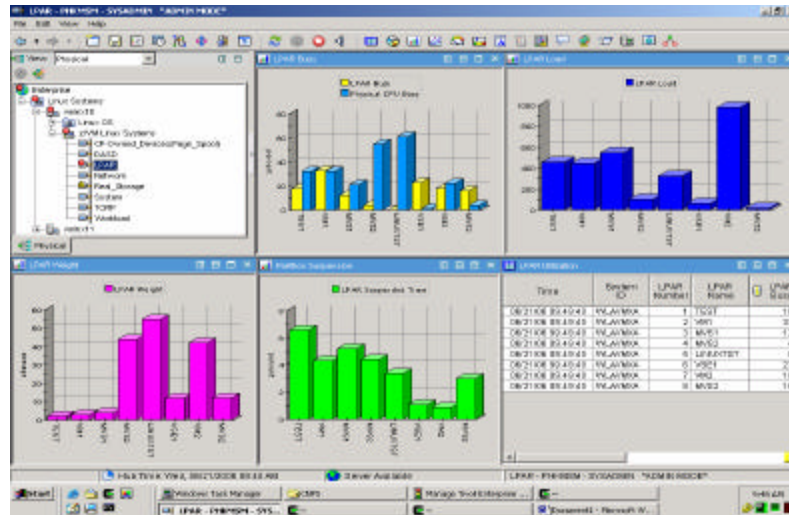
PAGING and SPOOLING Utilization



DASD



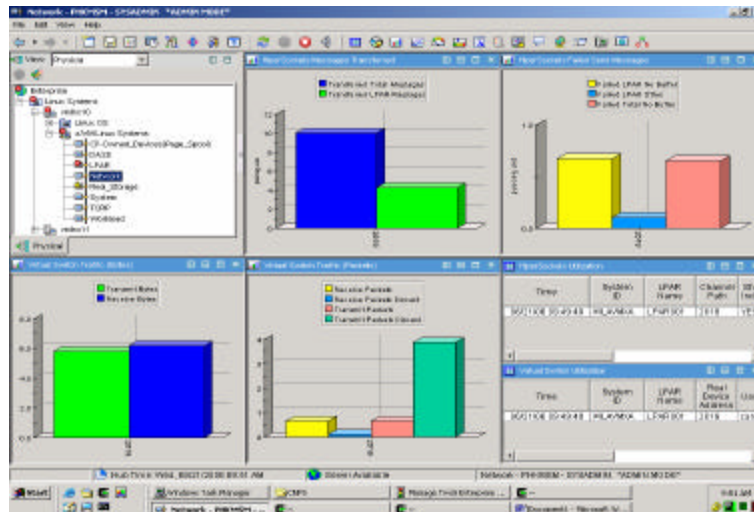
LPAR Utilization



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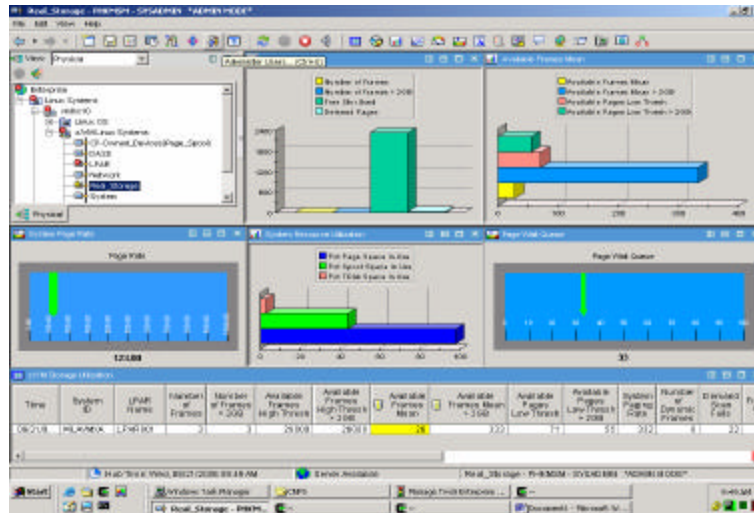
NETWORK Utilization (Hipersockets and Virtual Switch)



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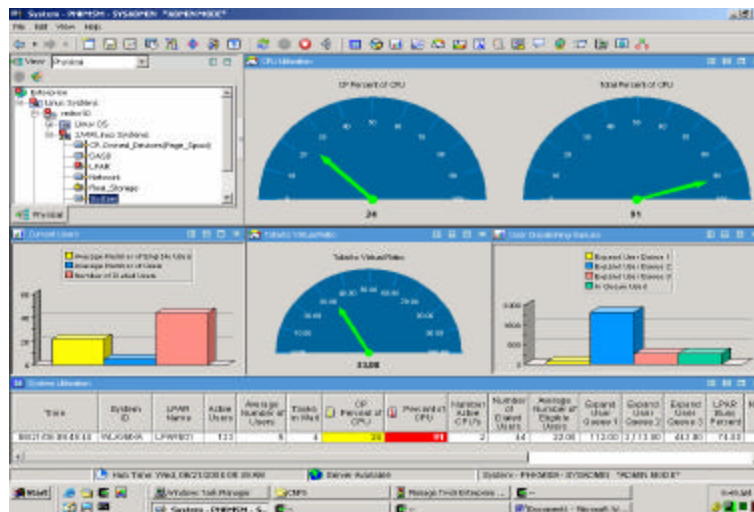
REAL STORAGE Utilization



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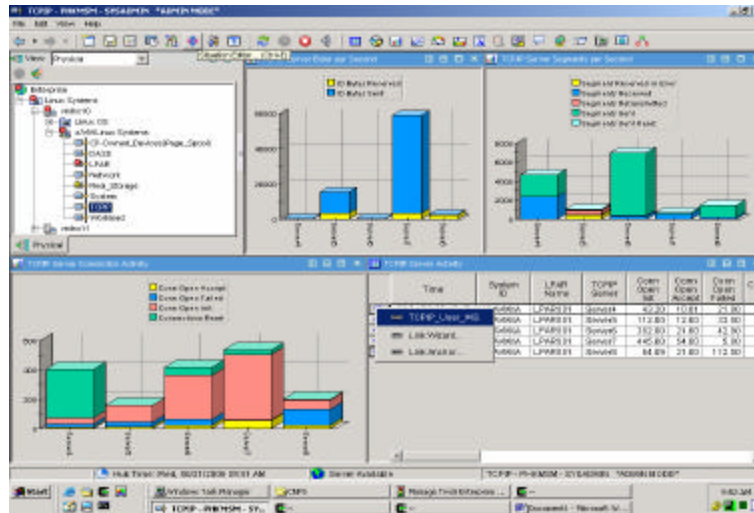
SYSTEM Utilization



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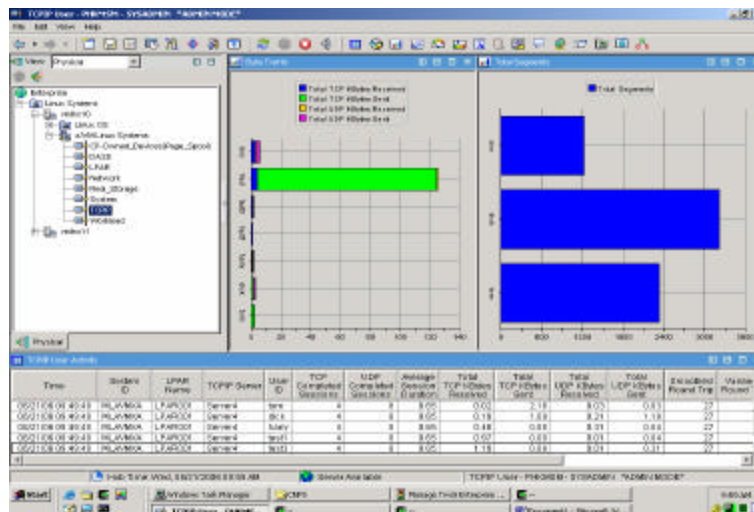
TCPIP Utilization - Server



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TCPIP Utilization - Users



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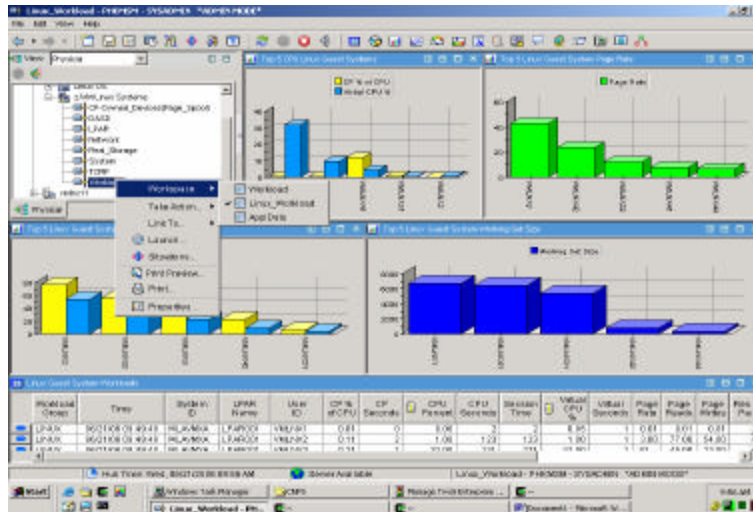
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The screenshot shows a Windows XP desktop environment. The active window is titled "System, Terminal - PHOCC11 - SYSA0001". It contains three main components:

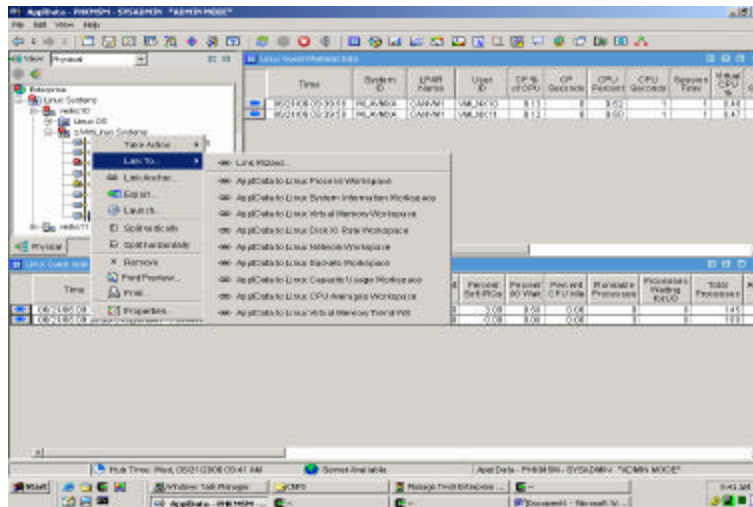
- Left Panel (Tree View):** Displays the "Windows System" tree. The "PHOCC11" folder is selected under the "Data" node.
- Right Panel (Command Prompt):** Displays the output of the "System Information" command. It shows system details such as "System Name: PHOCC11", "System Version: 6.0.6002.18000", and "System Architecture: x64".
- Bottom Panel (Take Action Dialog):** A dialog box titled "Take Action" with a "Name" field containing "PHOCC11" and a "Cancel" button.

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Linux Workload Workspace



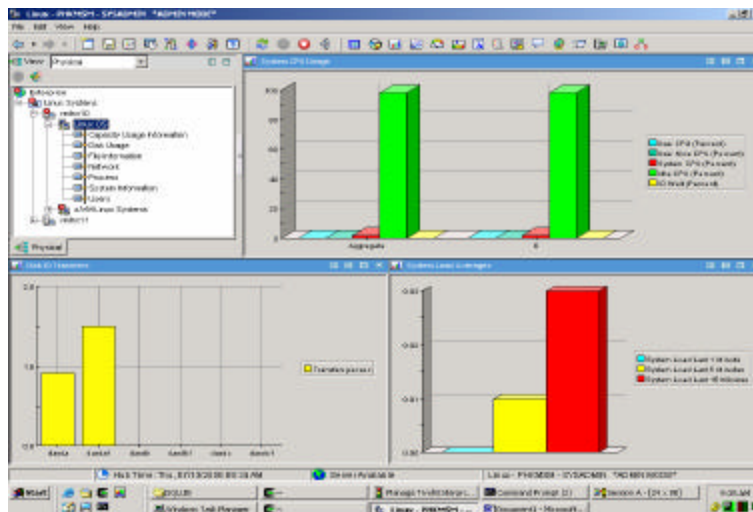
AppIData Workspace



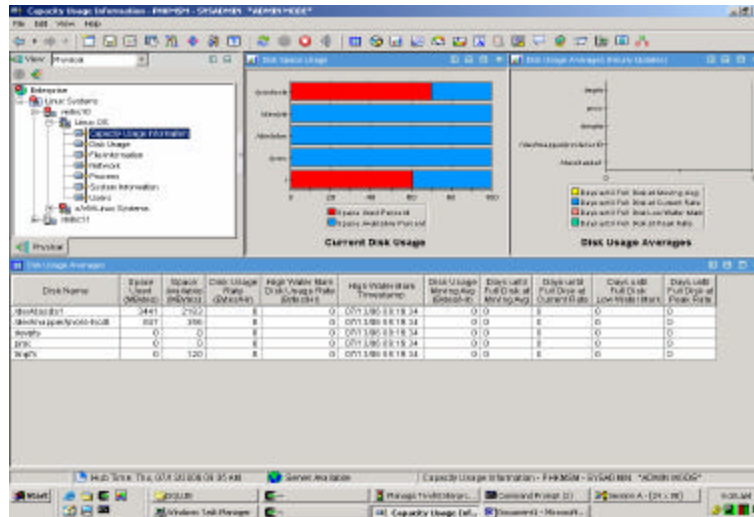
Linux on zSeries Primary Workspaces

- Linux OS
- Capacity Usage
- Disk Usage
- File Information
- Network
- Process
- System Information
- Users

Linux OS



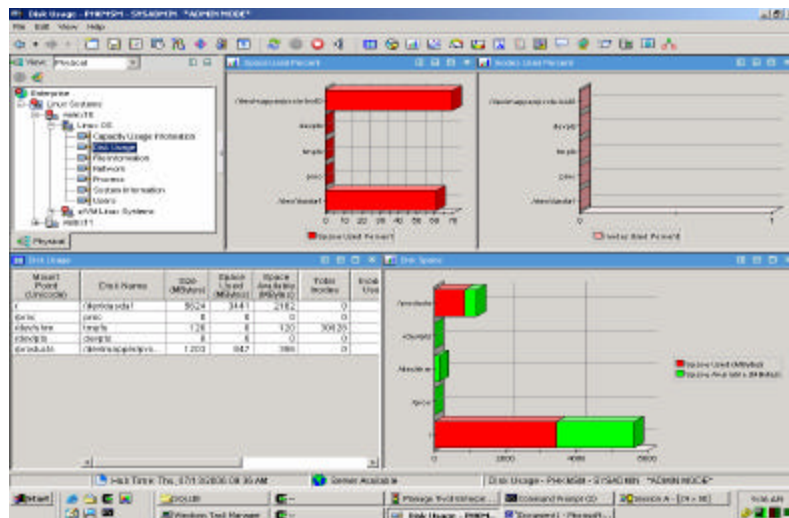
Capacity Usage



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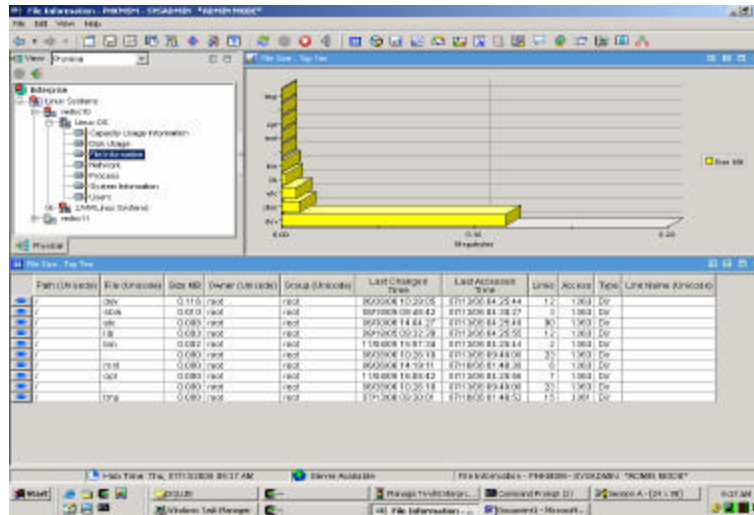
Disk Usage



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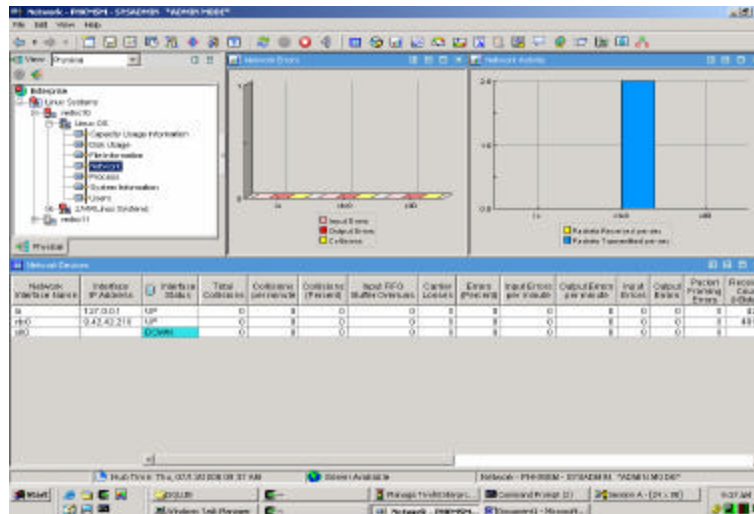
File Information



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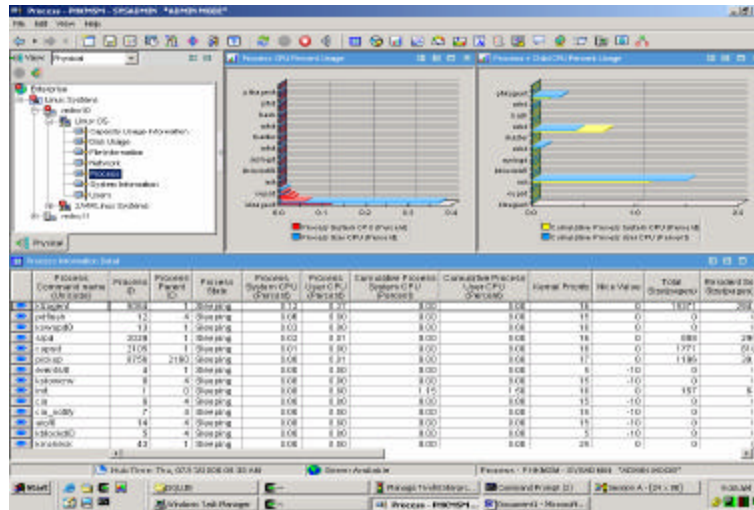
Network



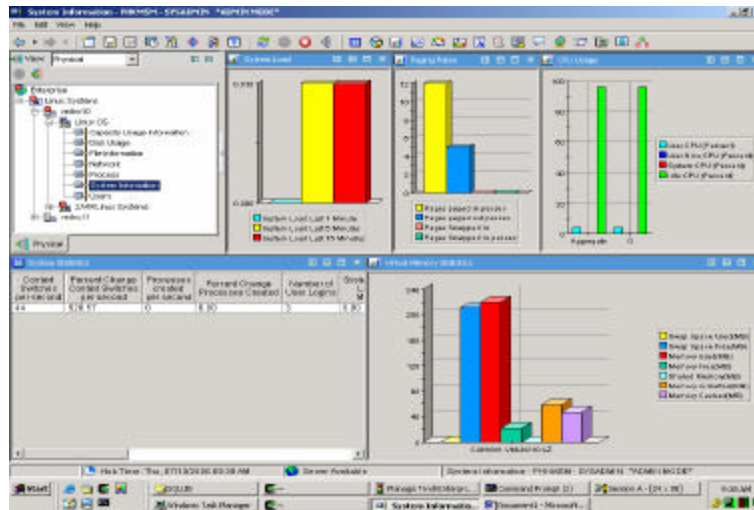
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Process



System Information



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