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IBM Software Group | Tivoli Software

Top 10 Problem Solving Scenarios Using IBM OMEGAMON and the Tivoli Enterprise Portal

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Questions

- Are you getting the most from your investment in System z hardware and z/OS software?
- Are you able to recognize and resolve issues efficiently?
- Are you able to maximize the performance and availability of your critical business applications?
- What are the most common issues and how can OMEGAMON address them?

Common Resources To Consider

- **Operating System**
 - LPARs, CPU, Memory, Address Spaces, DASD, Enqueues
- **Transactions**
 - Subsystems, Regions, Tasks, Transactions, Programs, Messages, Queues, Files, Pools, Buffers, Logging
- **Databases**
 - Subsystems, Files, Database Objects, Calls, Threads, Connections, Virtual Pools, Logging, Locking
- **Network**
 - Network Address Space, Applications, Connections, Interfaces

Scenario #1 - z/OS Operating System Analyzing z/OS High CPU Usage Issues – Real Time

System CPU utilization

Product provided OMEGAMON z/OS workspaces show overall system CPU utilization, and CPU utilization by address space.

Address space utilization

System CPU Utilization

Average CPU Percent	RMF MVS CPU Percent	RMF LPAR CPU Percent	Total TCB%	Total SRB%	Average IFA Percent
19	4.9	4.9	20	1	0

Address Space Counts

Address Space Count	Started Task Count	Batch Job Count	TSO User Count	APPC Count	Total Enclave Count	Active Enclave Count	Inactive Enclave Count
338	302	9	17	10	9	3	6

Address Space CPU Utilization Summary

Job Name	Step Name	Proc Step	Type	SvcClass	SvcClass Period	ASID	JESJOBID	CPU Percent	TCB Percent	SRB Percent	IFA Percent	IFA on C Percent
CXEGRH	CXEGRH	AGENT	STC	OPSDEF	1	0X0154	STC15630	9.1	9.1	0.0	0.0	0

Scenario #1 - Analyzing z/OS High CPU A Custom Workspace For CPU Analysis

Tivoli Enterprise Portal Welcome Ed Woods Log out IBM

File Edit View Help

Plot System CPU over time

Create a custom workspace that shows both overall system and address space utilization

System CPU Utilization

Average CPU Percent	RMF MVS CPU Percent	RMF LPAR CPU Percent	Total TCB%	Total SRB%
7	5.1	5.1	34	2

System CPU Plot Chart

Address Spaces Using CPU

Job Name	CPU Percent	Type	SvcClass	SvcClass Period	ASID	JESJOBID	TCB Percent	SRB Percent	IFA Percent	IFA on CP Percent	zIIP Percent	zIIP on CP Percent	Indepe Enclave
WLM	1.3	STC	SYSTEM	1	0X000C		1.3	0.0	0.0	0.0	0.0	0.0	
GRS	0.4	STC	SYSTEM	1	0X0007		0.4	0.0	0.0	0.0	0.0	0.0	
ADHADB1S	0.4	STC	OPSDEF	1	0X00D1	STC15485	0.4	0.0	0.0	0.0	0.0	0.0	
NETVIEW	0.4	STC	OPSDEF	1	0X0135	STC16169	0.4	0.0	0.0	0.0	0.0	0.0	
CXEG02	0.4	STC	OPSDEF	1	0X0138	STC16603	0.4	0.0	0.0	0.0	0.0	0.0	
RMFGAT	0	STC	SYSTEM	1	0X0000		0.0	0.0	0.0	0.0	0.0	0.0	

CPU Usage

Show address spaces using CPU (versus all tasks)

Consider a custom query

Where usage greater than 0%

Take Advantage Of Custom Queries To Optimize The Display Of Information

Exploit queries to optimize workspace performance
Use "Create Another" to make copies of product provided queries

Right click "Properties"

Click "Query"

Select query from list

Custom query requests address spaces using CPU

Job Name	CPU Percent	Type	SvcClass	SvcClass Period	ASID	JESJOBID	TCB Percent	SRB Percent	IFA Percent	IFA on Perc
WLM	1.3	STC	SYSTEM	1	0X000C		1.3	0.0	0.0	
GRS	0.4	STC	SYSTEM	1	0X0007		0.4	0.0	0.0	

	Managed System	CPU Percent	Job Name	Step Name	Proc Step	Tyt
1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	== \$NODE\$	0.0				

Identify Looping Tasks - Address Space CPU Loop Index

Address Space Bottlenecks Summary - IBM-E9503533F87 - SYSADMIN *ADMIN MODE*
Page: 1 of 2

Navigator

View: Physical

- MVS Operating System
 - LPAR400J:SP22:MVSSYS
 - Address Space Overview**
 - Channel Path Activity
 - Common Storage
 - Cryptographic Coprocessors
 - DASD MVS
 - DASD MVS Devices
 - Enclave Information
 - Enqueue, Reserve, and Lock Summary
 - LPAR Clusters
 - Operator Alerts
 - Page Dataset Activity
 - Real Storage
 - System CPU Utilization
 - System Paging Activity
 - Tape Drives
 - User Response Time
 - WLM Service Class Resources
 - z/OS UNIX System Services Overview

Selected Execution States

- Using CPU
- Using IFA
- Using zIIP
- CPU Wait
- IFA Wait
- zIIP Wait
- Active I/O
- Queued I/O
- CPU Loop Index

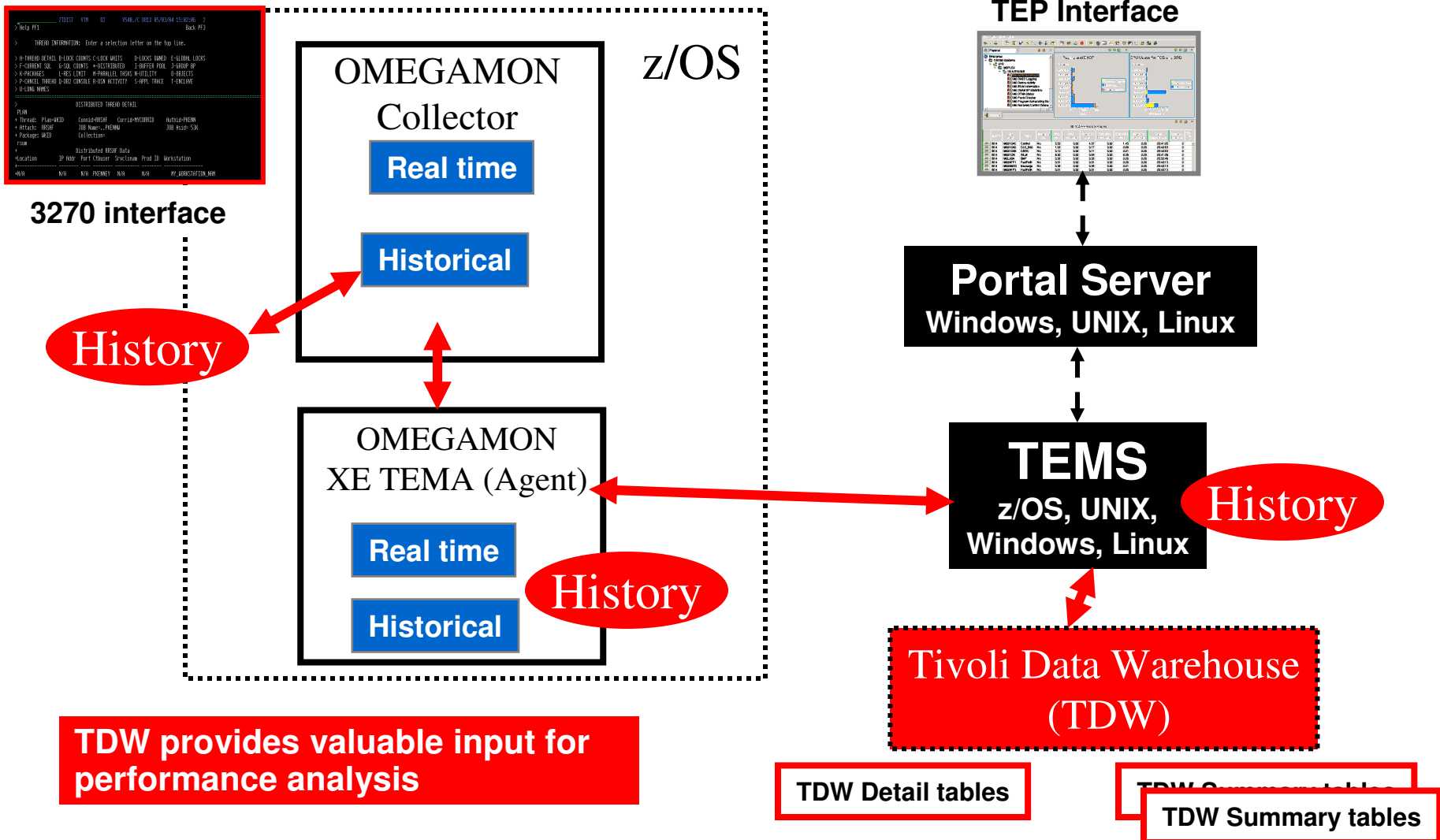
OMEGAMON XE For z/OS 4.20 added a "looping task" indicator. This attribute can be used to aid in identifying tasks that may be looping, and wasting CPU resources.

Address Space Bottlenecks Summary - Contention (%) by Resource

ASID	Job Name	Step Name	Proc Step	Type	Service Class	Period	Using CPU	Using IFA	Using zIIP	CPU Wait	IFA Wait	zIIP Wait	CPU Loop Index	Active I/O	Queued I/O	Enqueue Wait	Tape Mount	Resource Group Capping	Paging Wait	Serv Wai	
0X001D	SSANTCP1	RUMMIGS		Batch	BATCH	2	86.1	0.0	0.0	13.8	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0	
0X0028	VTAM36	VTAM	VTAM36	STC	SYSSTC	1	4.0	0.0	0.0	0.4	0.0	0.0	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0	
0X00E6	FX4SDSST	FX4SDSST	TEMS	STC	STCPROD	1	3.6	0.0	0.0	0.8	0.0	0.0	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0	
0X0006	XCFAS	XCFAS	IEFPROC	STC	SYSTEM	1	3.2	0.0	0.0	0.4	0.0	0.0	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0	
0X0007	GRS	GRS		STC	SYSTEM	1	2.4	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0	
0X00D4	M5GBHUB1	M5GBHUB1	TEMS	STC	STC	2	1.6	0.0	0.0	0.4	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0	
0X00E3	FBWBSRVR	FBWBSRVR	SCLMDTW	STC	STCPROD	1	1.2	0.0	0.0	0.4	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0	
0X000B	WLM	WLM	I																	0.0	0
0X00D2	MQRGMSTR	MQRGMSTR	P																	0.0	0
0X00DE	L3IAMQW9	L3IAMQW9	AGENT	STC	STC	2	0.8	0.0	0.0	0.4	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0

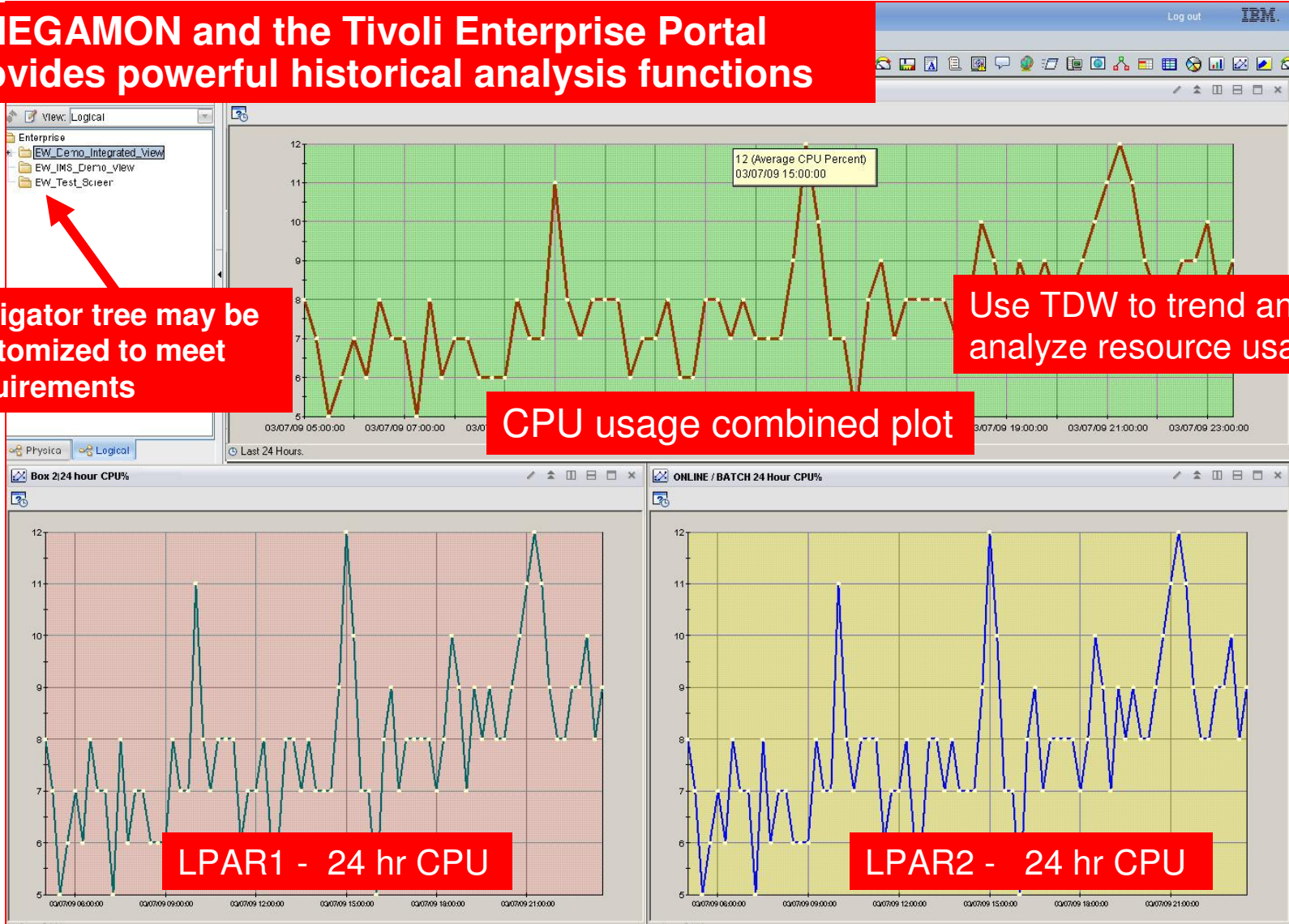
Situation alerts with "Take Action" may be created using this function.

Scenario #2 – Analyzing CPU Usage Using Tivoli Data Warehouse To Isolate Problems



Scenario 2 – Analyzing CPU Usage - Historical

OMEGAMON and the Tivoli Enterprise Portal provides powerful historical analysis functions



Scenario #3 – Isolating DB2 Performance Bottlenecks

DB2 Threads Analysis

DB2 threads are a common starting place for DB2 performance analysis. Common things to look for include:
 Threads with high “In-DB2” time
 Threads with high Getpage counts
 Threads with high wait times (lock/latch, I/O, other)

Navigation push-buttons

Product provided DB2 Thread workspace provides an easy to sort and view overview of threads. Move columns, click on column header to sort.

	Elapsed Time	Plan	Package DBRM (Unicode)	CP CPU Rate	Thread Status	In DB2 CP CPU Time	In DB2 Time	Wait Time	Get Page	Updates	Commits	Authorization ID (Unicode)	Job Name
	23 Days	ADHPLAN3	ADHASSCS	0.0	NOT-IN-DB2	00:00:20.258	00:00:51.908	00:00:30.701	646776	2289	11266	AEAGENT	ADHADB1S
	23 Days	ADHPLAN3	ADHAAAIS	0.0	NOT-IN-DB2	00:00:19.813	00:01:26.904	00:01:06.813	53748	21848	12222	AEAGENT	ADHADB1S
	23 Days	ADHPLAN3	ADHMSUMT	0.0	NOT-IN-DB2	00:00:13.792	04:04:47.208	01:34:53.823	74581	11651	2245	KLAYLO	ADHSRV2
	23 Days	ADHPLAN3	ADHAAFLR	0.0	NOT-IN-DB2								ADHADB1S
	23 Days	ADHPLAN1		0.0	NOT-IN-DB2								ADHADB1S
	00:37:47.1	DB2PM	DGO@PC1	0.0	NOT-IN-DB2								CXEGO2

DB2 Thread Analysis

Creating A Custom Thread Analysis Workspace

Create a custom DB2 thread workspace to speed thread analysis. View threads by various categories on the same screen.

Distributed

MVS ID	DB2 Subsystem	Plan	Correlation ID	Package DBRM
MVSA	DB1S	DISTSERV	db2jcc_appli	
MVSA	DB1S	DISTSERV	db2jcc_appli	

CICS/IMS online

MVS ID	DB2 Subsystem	Plan	Correlation ID	Package DBRM	Aut

Batch

MVS ID	DB2 Subsystem	Plan	Correlation ID
MVSA	DB1S	KO2PLAN	OMEGAMON
MVSA	DB1S		ADH ID 1
MVSA	DB1S		
MVSA	DB1S		

High Getpage

DB2 Subsystem	Plan	Package DBRM	Get Page
DB1S	DB2PM	DGO@PC1	7948555
DB1S	ADHPLAN3	ADHAAFLR	90996
DB1S			49393
DB1S			7887

All Threads

MVS ID	DB2 Subsystem	Plan	Correlation ID	Package DBRM
MVSA	DB1S	ADHPLAN1	ADH ID 1	
MVSA	DB1S	KO2PLAN	OMEGAMON	
MVSA	DB1S	DISTSERV	db2jcc_appli	
MVSA	DB1S	DISTSERV	db2jcc_appli	
MVSA	DB1S	ADHPLAN3		ADHM
MVSA	DB1S			ADHM
MVSA	DB1S		DE1PROC	ABPR

High "In-DB2"

High Getpage

Use a custom query or workspace options to filter and sort

Creating A Custom Thread Analysis Workspace - Continued

Start with the product provided workspace, and customize to the needs of the environment workload. Do "Save As" to save the workspace to the portal server.

Right click "Properties"

Click column headers to control content

Properties - EW_Thread_Display

Preview

MVS ID	DB2 Subsystem	Plan	Correlation ID	Package DBRM	Authorization ID	Connection Type	CP CP Rate
MVSA	DB1S	DISTSERV	db2jcc_appli		DDS1621	DBAccess	0
MVSA	DB1S	DISTSERV	db2jcc_appli		DDS1621	DBAccess	0

Filters

	MVS ID	DB2 Subsystem	Plan	Correlation ID	Package DBRM	Authorizat
1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2			= DISTSERV			
3						

Scenario #4 – Isolating CICS Performance Issues

CICS Task Analysis

Tasks running within a given CICS region are a common starting point for CICS performance analysis

Drill downs for additional detail. Dynamic links to navigate to other tools within the TEP.

System ID	CICS Region Name	CICS SYSIDNT	Transaction ID	Task State	Task Number	CPU Time	Elapsed Time	Resource Type	Resource Name	Wait Type	User ID	Terminal ID	Program ID	E
SP22	CICSSPG1	SPG1	CSOL	Suspend	00003	00:00:00.01	00:02:48.52	SODOMAIN	SO_NOWOR	Socket	n/a	n/a	DFHSOL	Ni
SP22	CICSSPG1	SPG1	CSSY	Suspend	00005	00:00:00	00:02:48.5	ICMIDNTE	DFHAPTIM	Interval	n/a	n/a	DFHAPATT	Ni
SP22	CICSSPG1	SPG1	CSSY	Suspend	00006	00:00:00.01	00:02:48.5	ICEXPIRY	DFHAPTIX	Interval	n/a	n/a	DFHAPATT	Ni
SP22	CICSSPG1	SPG1	CSTP	Suspend	00008	00:00:00.3	00:02:48.5	TCP_NORM	DFHZDSP	Terminal	n/a	n/a	DFHZCSTP	Ni
SP22	CICSSPG1	SPG1	CSNC	Suspend	00019	00:00:00	00:02:48.45	CSNC	MROQUEUE	MRO	n/a	n/a	DFHCRNP	Ni

“Transaction Analysis” workspace will show task info, task state, elapsed time, CPU time, resource being accessed, and current wait reason for the task. Use to determine if the task is processing or waiting, and if waiting what is the reason.

Isolating CICS Performance Issues

CICS Task Analysis And Region Analysis With A Custom Workspace

CICS region overview (use a custom query) to be able to see CICS activity cross region.

System ID	CICS Region Name	CICS SYSIDNT	CPU Utilization	Transaction Rate	I/O Rate	Page Rate	Maximum Tasks Percent	VTAM ACB Open	SOS	Region Status	Storage Vi in Last
MVSA	CICSAOR1	C22A	0.0	0	0.0	0.0	3	Yes	No	N/S	
MVSA	CICSAOR2	C22B	0.0	0	0.0	0.0	2	Yes	No	N/S	
MVSA	CICSAOR3	C22C	0.0	0	0.0	0.0	1	Yes	No	N/S	
MVSA	CICSAOR4	C22D	0.0	0	0.0	0.0	2	Yes	No	N/S	

Add a link to navigate cross-region.

Transaction Processor Utilization

Create a custom CICS workspace to view CICS region and CICS task activity from a consolidated view.

Transaction Analysis

System ID	CICS Region Name	CICS SYSIDNT	Transaction ID	User ID	Terminal ID	Task Number	Resource Type	Resource Name	Task State	Elapsed Time	CPU Time	Program ID	Exceeds MAXR Threshold	DB2 Correlation Identifier
MVSA	CICSAOR1	C22A	OSEC	SYSSTC	n/a	00070	USERWAIT	SR2WORK	Suspend	17:51:29.69	00:00:00	KOCSR2ZZ	No	n/a
MVSA	CICSAOR1	C22A	OSRV	SYSSTC	n/a	00069	USERWAIT	SRWORK	Suspend	17:51:29.88	00:00:00.18	KOCSRVZZ	No	n/a
MVSA	CICSAOR1	C22A								1.19	00:00:39.32	EYU9XLOP	No	
MVSA	CICSAOR1	C22A								3.68	00:00:00.01	FYU9XI OP	No	n/a

Transaction overview for a given CICS region.

Scenario #5 – Isolate IMS Bottlenecks Analyze IMS Queues And Processing

Product Provided IMS Health workspace focuses on many key rate metrics

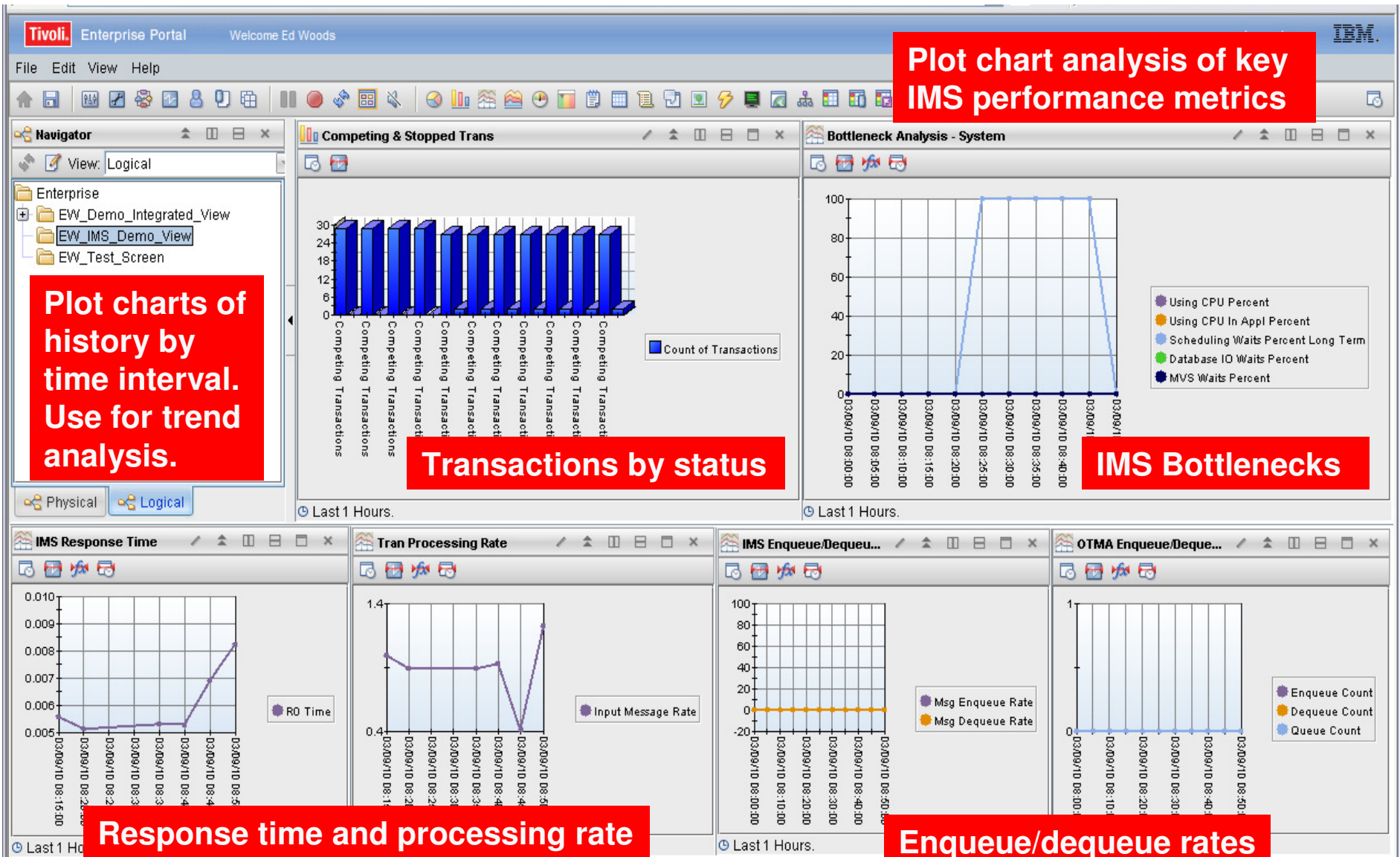
The screenshot displays the Tivoli Enterprise Portal interface for IMS Health. The left sidebar shows a tree view with 'IMS Health' selected. The main workspace contains several gauge charts for key metrics:

- Total Message ENQ/DEQ Rates:** Two gauges for Total ENQ Rate and Total DEQ Rate, both showing 0.0.
- CPU Percent for Control and Dependent Regions:** Two gauges for Control CPU Percent and Dependent CPU Percent, both showing 0.0.
- Paging and I/O Rates for all IMS address spaces:** Two gauges for Total I/O Rate and Total Paging Rate, both showing 0.0.
- Total Transaction queue depth and rate:** Two gauges for Total Transaction Queue and Total Transaction Rate, both showing 0.0.

Red callout boxes highlight these metrics: 'Enqueue/dequeue rates', 'CPU rates', and 'Tran queue & tran rate'. A red arrow points to the 'IMS Health' folder in the sidebar. A red text box on the left states: 'Understanding and analyzing IMS processing rates and queue activity is key to managing IMS performance.'

IMS ID	FF ENQ Rate	BALG ENQ Rate	Total ENQ Rate	FF DEQ Rate	BALG DEQ Rate	Total DEQ Rate	Control CPU Percent	Dependent CPU Percent	Total CPU Percent	Control I/O Rate	Dependent I/O Rate	Total I/O Rate	Control Paging Rate	Dependent Paging Rate	Total Paging Rate	FF Transaction Queue	BALG Message Queue	Total Transaction Queue	FF Transaction Rate	BALG Message Rate

IMS Historical Performance Analysis Custom Workspace



The TEP Provides Powerful Chart Functions And Statistical Analysis Features

Baseline analysis and arithmetic functions

Add Statistical Baseline

Name	Argument	Result
<input type="checkbox"/> RANGE - MIN/MAX		
<input checked="" type="checkbox"/> AVG	+/- 0 standard deviation	
<input type="checkbox"/> MIN	+/- 0 percent	
<input type="checkbox"/> MAX	+/- 0 percent	
<input type="checkbox"/> PERCENTILE	50	
<input type="checkbox"/> MODE		

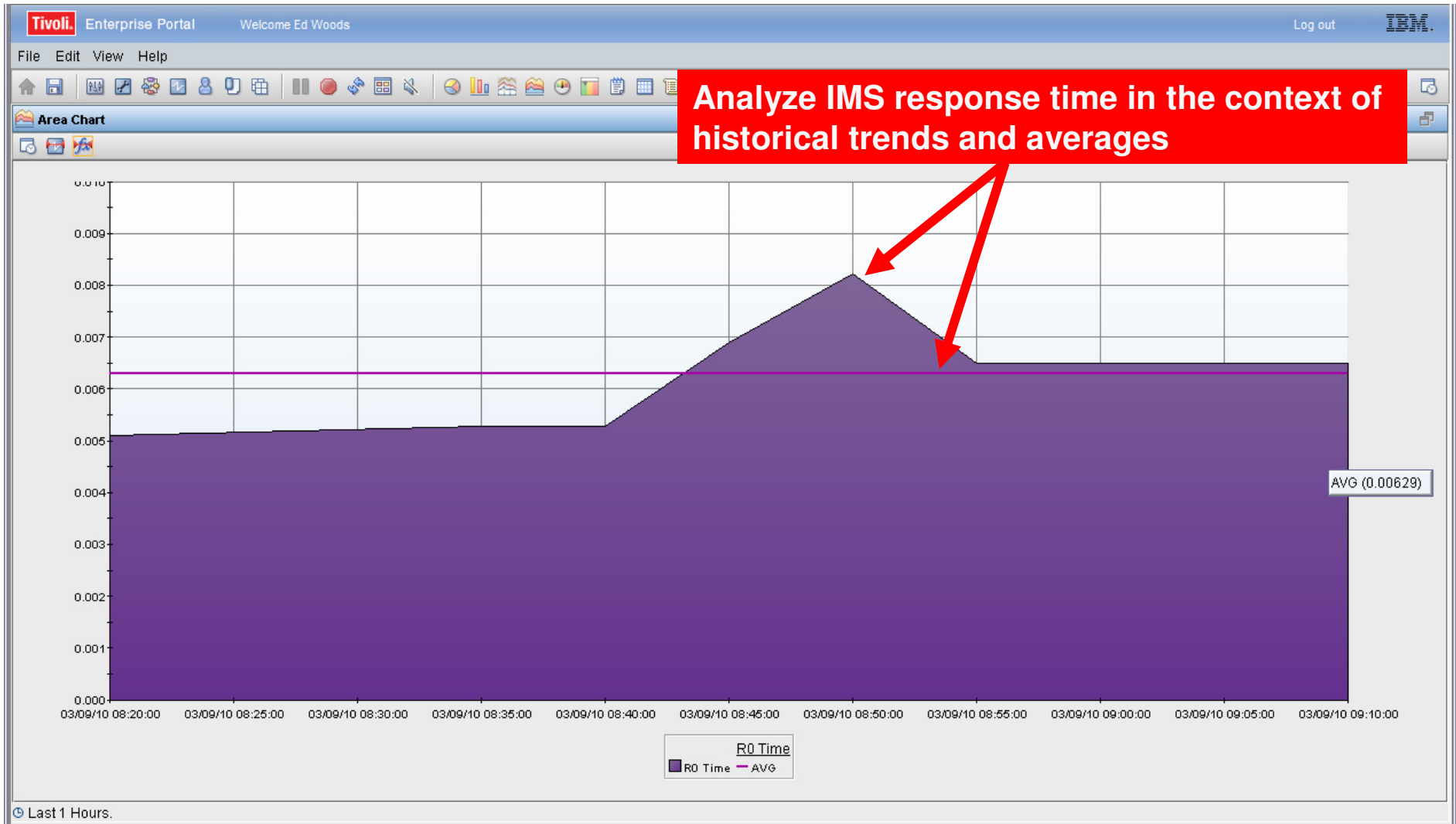
Attribute: Input Message Rate

Time Span: Last 24 Hours

Select one or more statistical values to add to the view.

Area plot charts provide a different perspective of history

Example – Area Plot Chart Of IMS Response Time With Statistical Baseline



Scenario #6 – WebSphere MQ Isolate MQ Performance Issues

When looking at WebSphere MQ issues typical starting points are Queue Statistics (Queue status and queue depth), and Channel Performance (Channel status and activity).

The screenshot shows the Tivoli Enterprise Portal interface. On the left is a Navigator pane with a tree view of system components. The 'Queue Statistics' component is selected. The main area displays two charts: 'Queue Statistics Summary' and 'Queue Utilization for Monitored Queues with Messages'. Below the charts is a table titled 'Queue Statistics for Monitored Queues with Messages'. A red box highlights the 'Current Depth', 'Msgs Put per Sec', and 'Msgs Read per Sec' columns. A red arrow points to the 'Current Depth' column header with the text 'Click on column header to sort by queue depth'. Another red box highlights the 'Current Depth' and 'Msgs Put per Sec' columns with the text 'Look at queue depth and Msg put and read rate'.

Queue Name	Queue Usage	Definition Type	Total Opens	Input Opens	Output Opens	Current Depth	Msgs Put per Sec	Msgs Read per Sec	High Depth Threshold	Highest Depth	% Full	Ret Intvl Exceeded	Get Status	Put Status	Cur Opened Exclusive	C D
WSQM	XmitQ	Predefined	0	0	0	448650	0.0	0.0	80	0	0.0	No	Disa...	Ena...	n/a	Yi
DEMO00.QREP.DATAQ	Normal	Predefined	0	0	0	154343	0.0	0.0	80	0	0.0	No	Ena...	Ena...	n/a	Yi
TGT_QM_ZL	XmitQ	Predefined	0	0	0	75578	0.0	0.0	80	0	0.0	No	Ena...	Ena...	n/a	Yi

Use Situations To Alert On MQ Queue Depth

The screenshot displays the Tivoli Enterprise Portal interface. The top navigation bar includes the Tivoli logo, 'Enterprise Portal', a user welcome message 'Welcome Ed Woods', and a 'Log out' button. Below the navigation bar is a menu with 'File', 'Edit', 'View', and 'Help'. A toolbar with various icons is positioned below the menu. On the left, a 'Navigator' pane shows a tree view of system components, with 'Queue Statistics' selected. The main area is divided into two panes. The top pane, titled 'Queue Statistics Summary', contains a 3D bar chart showing the 'Number of Queues' for different categories: Monitored Queues (yellow, ~750), Open Queues (blue, ~100), # Qs With High Depth (red, ~50), # of Qs Get-Inhib (green, ~100), and # of Qs Put-Inhib (cyan, ~100). A legend on the right identifies these categories. The bottom pane shows a list of situations, with one highlighted: 'Critical' with a pencil icon, 'EW_Q_Depth_High', 'WMQA:MVSA:MQESA', and timestamp '07/07/10 18:29:07'. A red arrow points from a text box to this situation. Below the situation list is a table of queue statistics.

Monitor and alert on MQ queue depth to indicate potential bottlenecks

Click to get details on the situation alert

Queue Name	Queue Usage	Definition Type	Total Opens	Input Opens	Output Opens	Cur Opened Exclusive	Current Depth	Highest Depth	High Depth Threshold	% Full	Ret Intvl Exceeded	Get Status	Put Status	Cur Defn	Trigger Control	Trigger Type
WSQM	XmitQ	Predefined	0	0	0	n/a	448650	0	80	0.0	No	Disa...	Ena...	Yes	No	First
DEMO00.OPER.DATAC	Normal	Predefined	0	0	0	n/a	154343	0	80	0.0	No	Ena...	Ena...	Yes	No	First

A Situation To Monitor MQ Queue Depth

The various tabs control where the situation logic runs, and if the situation takes an action, or sends an alert via the EIF interface

Right click and select "Situations"

Boolean logic can be used to monitor for multiple scenarios within a single situation

	Current Depth	Queue Name	Msgs Put per Sec
1	> 100	== WSQM	
2	> 500	== WSQA	
3	== 1000		> 10.0

Scenario #7 – Network Performance And Availability Understanding The Impact Of The Network On z/OS

Tivoli Enterprise Portal Welcome Ed Woods Log out

File Edit View Help

By integrating information from OMEGAMON Mainframe Networks with information from the other OMEGAMONs, you can get a better understanding of the network impact on the workload

Alert graphic view

Originating System ID	Correlation ID	MVS ID	D
DB1S:MVSA:DB2	db2jcc_appli	MVSA	D

DB2 Distributed threads

System ID	CICS Region Name	Group Number	Group Type	G
CICS Response time				

Application Name	Origin Node	Response Time	Resp Tin Vari
DSNADIST	TCPIP:MVSA	0.00	
DSNADIST	TCPIP:MVSA	0.00	

DB2 network

Origin Node	Application Name	Response Time
TCPIP:MVSA	CICSAOR3	0.00
TCPIP:MVSA	CICSWUI	0.00

CICS network

IMSID	RTA Group Name	RTA Group Number	Input Queue Time	Proce Tir
IMSB	SYSTEM	0	0.000171	0.00
IMSB	SYSTEM	0	0.000171	0.00
IMSB	SYSTEM	0	0.000171	0.00
IMSB	CLASS 1	1	0.000171	0.00
IMSP	CLASS 1	1	0.000171	0.00
IMSI			0.000171	0.00

IMS Response time

Origin Node	Foreign IP Address	Foreign Port	Byte Rate
TCPIP:MVSA		0	0
TCPIP:MVSA		0	0
TCPIP:MVSA		0	0
TCPIP:MVSA		0	0
TCPIP:MVSA		0	0
TCPIP:MVSA		0	0

IMS network

Situation Event Console

(Active) Total Events: 1

Severity	Status	Owner	Situation Name	Display Item	Source	Impact	Opened
Alerts							

Take Action

Action Name: **Actions**

Exploit Queries To Optimize The Display

The screenshot shows the Tivoli Enterprise Portal interface. The main window displays a 'Graphic View' with a network diagram containing nodes for z/OS, CICS, IMS, Network, and DB2. A 'Properties - EW_Network_View' window is open, showing a table of 'DB2 Dist Network' data. A red arrow points from the 'Query' button in the Properties window to the 'Query Editor' dialog. In the Query Editor, a new query is being configured with the name 'All Connections no Filter' and a description 'This query returns all attributes for all connections'. The 'Specification' tab is active, showing a table of attributes with 'Application Name' selected and filtered to 'DSNADIST'.

Application Name	Origin Node	Response Time	Response Time Variance	Byte Rate	IP	Port	Status	Other
DSNADIST	TCPIP:MVSA	0.00	0.00	0				
DSNADIST	TCPIP:MVSA	0.00	0.00	0				

“Created another” query and filtered for DB2 distributed (DSNADIST)

Scenario #8 - Storage

Storage – Understanding I/O bottlenecks

- I/O potentially impacts many types of workload on z/OS
 - DB2, IMS, CICS, MQ, WebSphere and much more.....
 - CPUs are **FAST**, I/O is **SSLLOOWW**.....
- OMEGAMON provides I/O information in several areas
 - OMEGAMON XE For z/OS – I/O by Volser, I/O for tasks, Paging I/O
 - OMEGAMON XE For DB2 – I/O by DB2 object and volser, Logging I/O
 - OMEGAMON XE For CICS – VSAM I/O (LSR stats), task and region delays
 - OMEGAMON XE For IMS – IMS DB I/O, IMS MSG Q data set I/O, IMS log I/O
 - OMEGAMON XE For Mainframe Networks – FTP activity
 - OMEGAMON XE For Messaging – Queues, buffers, logging
- OMEGAMON XE For Storage provides the most robust analysis of storage and I/O on z/OS
 - LCU, Control Unit, Volser, dataset level
 - Virtual tape, Cache control unit (including control unit internal info)
 - SMS and HSM monitoring analysis
 - User defined I/O and space groups, Application I/O and space groups

Storage – Understanding I/O Bottlenecks

OMEGAMON Storage provides detailed I/O bottleneck analysis via drill down capability

The screenshot shows the 'Average Delay Queue' graph for LCU 00A. The y-axis is labeled 'Queue' and ranges from 0 to 1. The x-axis is labeled 'LCU Number' and shows values 00A, 00B, 00C, 00D, 016, 017, 018. The graph shows a single bar at 00A with a value of 1.0.

Use the capabilities of the TEP to sort and filter the display

The screenshot shows the 'Logical Control Unit Report' table with columns: LCU Number, Average Delay Queue, Contention Rate, Director Port Busy Percent, Control Unit Busy Percent, and Channel I/O. The table contains data for LCUs 00A, 016, 00D, 018, and 017.

Below the table is a dropdown menu for 'LCU Volume Performance' with options: LCU Channel Detail, LCU Volume Cache, Logical Control Unit Trend, Highest Volume Response Time, Highest Volume MPL, Highest Volume I/O Rate, Highest Volume Busy Percent, Lowest Volume Connect Percent, Link Wizard..., and Link Anchor.

The screenshot also shows the 'Volume Performance Report' table with columns: Volume, Device Address, Busy Percent, I/O Per Second, IOSQ Delay, Pend Time, Connect Time, Disconnect Time, Response Time, MSR Connect Time Percent, I/O Count, Device MPL, DCBs Open, Reserved Percent, Average HyperPAV Alias Count, and Average Command Response Delay. The table contains data for volumes DMPU35, DMP48, DMPU51, and DMPU129.

Storage – Understanding I/O Bottlenecks From The Application Perspective

It's important to understand the impact of I/O on the application. OMEGAMON Storage provides powerful application level I/O and space monitoring capabilities.

“Application Summary” allows the user to target specific workloads for I/O and space monitoring

Application	ASID	I/O Second	Dataset Count	High Dataset MSR	Dataset with High MSR	Volume with High MSR Dataset	Volume Count	Link Volume	Volume with High MSR Dataset
DB1SMSTR	131	19	19	0.0					
DB1SIRLM	135	0	1	0.0					
DB1SDBM	144	2927	4	0.0					
DB1SDIST	146	0	3	0.0					
CICSAOR6	154	2	85	0.0					
DB1SWLM	18	2	7	0.0					
CICSAOR1	293	2	97	0.0					
CICSAOR2	401								

- Application Dataset Performance
- Application Volume Performance
- Application Volume Cache
- Application Dataset Space Usage
- Application Volume Space Usage
- Address Space CPU Usage Details
- Address Space CPU Usage Enclaves
- Address Space Bottleneck Details
- Address Space Impact Analysis
- Address Space Storage for Job
- Owned Enclaves
- Link Wizard...
- Link Anchor...

Monitor the application, then drill down for additional detail. Go from Volser down to dataset level detail.

Volume	Device Address	Busy Percent	I/O Per Second	IOSQ Delay	Pend Time	Connect Time	Disconnect Time	Response Time	MSR Connect Time Percent	I/O Count	Device MPL	DCBs Open	Reserved Percent	Average HyperPAV Alias Count	Average Command Response Delay
DMPP30	10A1	0.0	0.4	0.0	0.1	0.1	0.0	0.2	50.0	1119	0	60	0.0	n/a	0.0
DMPP31	1074	0.0	0.0	0.0	0.1	0.1	0.0	0.2	50.0	146	0	47	0.0	n/a	0.0
DMPP08	1071	0.7	11.4	0.0	0.1	0.6	0.0	0.7	85.7	194...	8	85	0.0	n/a	0.0
DMPD02	1300	0.0	0.5	0.0	0.1	0.1	0.0	0.3	33.4	645	0	0	0.0	n/a	0.0
DMPD04	1302	0.0	0.2	0.0	0.1	0.1	0.0	0.2	50.0	687	0	0	0.0	n/a	0.0

Scenario #9 – Situation Alert Notification Versus Highlighting Thresholds To Identify Issues

Situations versus highlighting thresholds
 Use situations to indicate/notify important events/issues
 Use highlighting in the TEP for informational purposes

A situation requires coding and distribution, and will typically be more overhead than threshold highlighting.

Highlighting thresholds is fine for informational, but will not drive an action or notification (beyond what is on the screen).

Warning
 DNET535_MQ_Depth WMQB:MVSA:MQESA 06/18/10 16:45:07

KFWITM102I Select workspace link button to view situation event results for: DNET535_MQ_Depth

Situations may be used to indicate events and notify about problems. Situations may be used to indicate performance, resource, or availability issues.

Queue Name	Queue Usage	Predefined	0	0	0	n/a	151	0	80	0.0	No	Ena...	Ena...	Yes	No	First
DEMO.XML1	Normal	Predefined	0	0	0	n/a	151	0	80	0.0	No	Ena...	Ena...	Yes	No	First
SYSTEM.HIERARCHY...	Normal	Predefined	0	0	0	n/a	3	0	80	0.0	No	Ena...	Ena...	Yes	No	First

Using The Threshold Function For Informational Highlighting

The Threshold function works well to highlight information for easy to see eyecatchers

Highlight BP hit ratio for informational purposes

From "Properties" select the "Threshold" tab.

Specify thresholds and highlighting level (Critical, Warning, etc).

**Take Action...
Link To...
Launch...
Export...
Split vertically
Split horizontally
Remove
Print Preview...
Print...
Find...
Properties...**

Virtual Buffer Pool Size	VPOOL Buffers Allocated	VPOOL Buffers In Use	VPOOL Buffers to be Deleted	Use Count	Hiperpool Size	HPOOL Buffers Allocated	HPOOL Buffers Backed	HPOOL Buffers to be Deleted	Castout Attribute
3000	3000	0	0	3	0	0	0	0	YES

Pool ID	VP Sequential Thresh	Deferred Write Thresh
BP8K0	80	30

GetPages Per Synchronous I/O	Prefetch Per I/O	Sequential Prefetch Per I/O	Buffer Pool Hit Percent Random	Buffer Pool Hit Percent Sequential	Page Write
3.55	1.00	0.00	71.8	0.0	

Use Icons	Maximum Concurrent Prefetch	Buffer Pool Hit Percent Random	Buffer Pool Hit Percent Sequential	Page Write
1		< 75.0		Wr
2		< 90.0		
3			< 90.0	

Using Situations To Drive Event Notification

Situation editor to specify situation logic.

	Current Depth	Queue Name	Storage Class
1	> 4500	'ASN.QSNW.ADMINQ'	DEFA
2			
3			

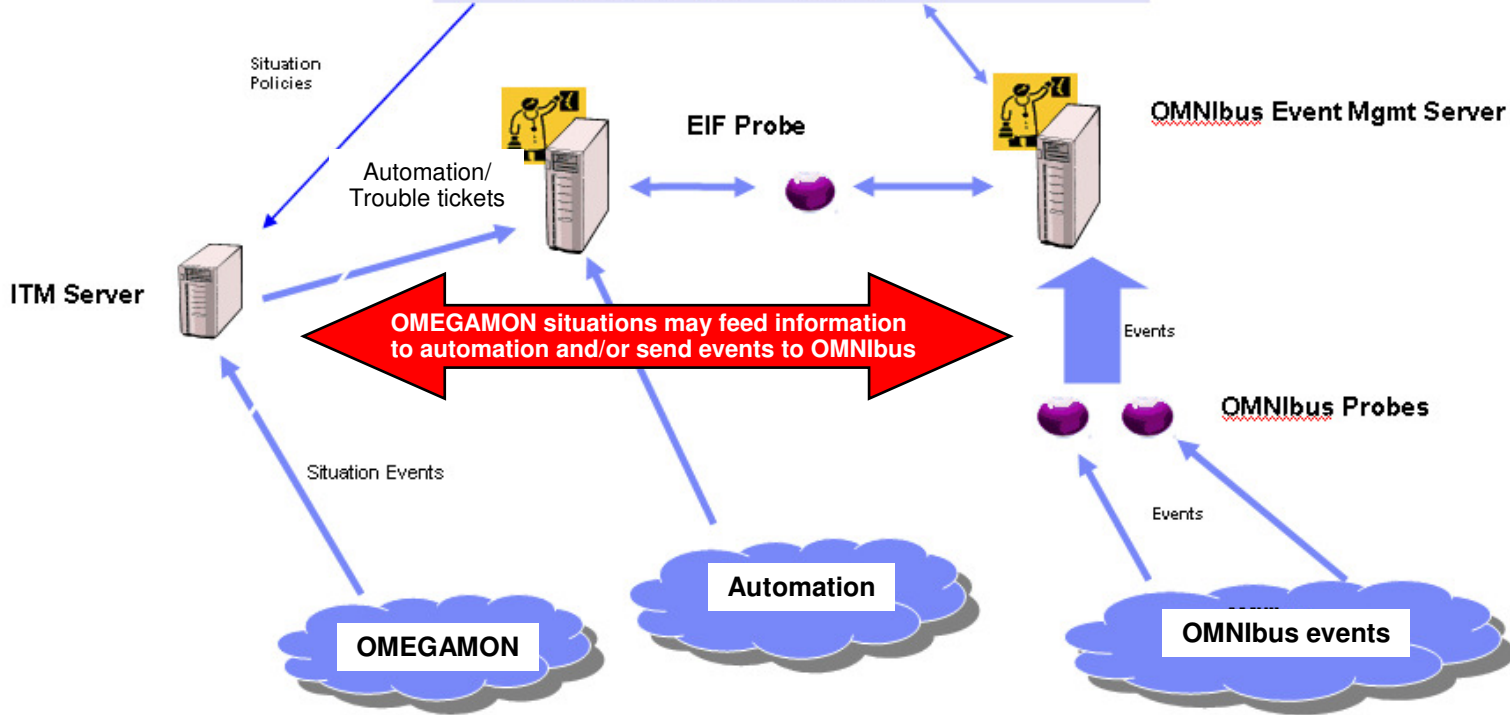
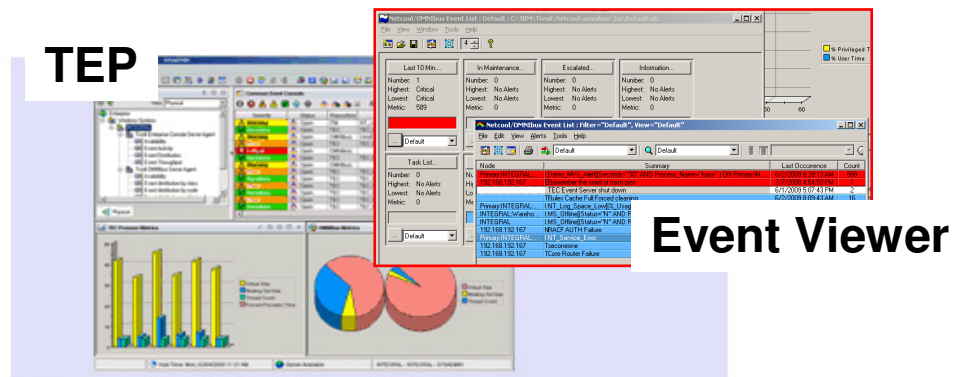
Use "Action" to have the situation issue a corrective command.

Use "EIF" to have the situation send the event to OMNIBus.

Using the EIF interface may be more efficient than using the "Action" tab on the situation editor.

Use The EIF Interface To Send Events To OMNIBus

OMNIBus Integration enables customer to forward events reported by OMEGAMON XE monitoring agents . The interface is bi-directional.



Situations And Alerts Versus Threshold Highlighting

- Not all information requires an alert
 - In general alerts imply some type of event that requires an action to address
- Some information needs to be highlighted for informational purposes, but does not require an action
 - Nice to know, but does not require immediate intervention
- Use situation alerts for events or information that
 - Requires additional analysis or immediate action
 - Requires some form of corrective action
 - Has an “owner” responsible for addressing an issue
- Consider threshold highlighting for
 - Information that is of diagnostic interest
 - Information that is useful for analysis and may indicate a potential issue, but does not require immediate action
- For informational purposes threshold highlighting will be more efficient than coding, creating, distributing, and executing a situation

Scenario #10 – A Dashboard To Provide An Integrated Problem Management Paradigm

The screenshot displays the Tivoli Enterprise Portal interface. On the left is a 'Custom navigation' tree with categories like CICS Performance, DB2 Performance, IMS Performance, and z/OS Performance. The main area is a 'Graphic alert view' showing various performance indicators with colored circles: Windows Performance (green), UNIX (green), CICS Performance (blue), Network (red), z/OS Performance (green), DB2 Connect Server (green), and Sysplex Performance (red). A 'Situation alerts' console is open, showing a 'CRITICAL' alert for 'EW_Demo_Thread_Alert' with details 'D81L:SYSL:DB2 06/13/08 10:42:11'. Below this is a 'Situation alerts' table with columns for Severity, Status, Owner, and Situation Name. A 'Browser interface' is visible at the bottom, and a 'Take action' window is open on the right.

Severity	Status	Owner	Situation Name
Critical	Open		EW_Demo_Thre
Critical	Open		Dist_DB2_Net_A
			EW_Demo_CF_7

- Use the graphics and integration capabilities of the Tivoli Enterprise Portal to provide custom dashboard views targeted for specific audiences
 - Technical views, Operational views, Alert management views, SME views, End to end business application views, Management by exception views

Integrated Technical View Using The TEP

An integrated view of some of the most commonly referenced performance information

Custom navigation allows you to target the most important information

z/OS system and address space CPU

Managed System	Average CPU Percent	RMF MVS CPU Percent	RMF CP CPU Percent
DEMOPLX:MVSA:MVSSYS	4	6.2	6.3

DB2 Threads

MVS ID	DB2 Subsystem	In DB2 CP CPU Time	In DB2 Time	Plan	A
MVSA	DSNC	00:00:00.009	00:00:00.014	PSADPLAN	D
MVSA	DSNC	00:00:00.302	00:00:04.662	KO2PLAN	D
MVSA	DSNC		2.592	KO2PLAN	D
MVSA	DSNC		2.611	KO2PLAN	D

CICS Tasks

System ID	CICS Region Name	CICS SYSIDNT	Transaction ID	User ID	Terminal ID	Ta Nur
MVSA	CICSAOR1	C22A	OSEC	SYSSTC	n/a	000
MVSA	CICSAOR1			3STC	n/a	000
MVSA	CICSAOR1			3STC	n/a	000

Network

Origin Node	Application Name	Connections in Backlog	Total Segments Retransmitted
TCPIP:MVSA	ADHSRVS		

DASD I/O bottlenecks

Managed System	Address	Volume	Response	Storage Group	I/O Rate	Cache Status	Percent Reserve
----------------	---------	--------	----------	---------------	----------	--------------	-----------------

Alerts

Situation Event Console: (Active) Total Events: []

Hub Time: Thu, 07/01/2010 11:33 PM | Server Available | EW_Demo_Integrated_View - dem17lnx.democentral.ibm.com - Ed Woods

Dashboard Alternatives – TEP Versus TBSM

- Use Tivoli Enterprise Portal to establish the premise of a Management Dashboard
 - Powerful and flexible graphics and integration capabilities of the Tivoli Enterprise Portal enable the creation of targeted dashboards
 - Use the TEP to establish the concept of an integrated management dashboard in your shop

- Look at TBSM to grow and expand the notion of dashboards and business application management
 - Components like TADDM can analyze application dependencies
 - TBSM shows SLAs
 - Event correlation via OMNIBus
 - Expandable and scalable for large enterprises

OMEGAMON DE, OMEGAMON XE, & ITCAM

The screenshot displays a complex dashboard with a central flow diagram titled "End To End Manage" showing components like App Server, DB2 Connect, Network, DB2, and Storage. Below the diagram are several data tables:

CICS Response Time			IMS Response Time			DB2 Distributed Performance		
CICS Region	Group Name	Response Time	MSID	Item Name	Program	Origname	SOL Calls Sent	Data Rows Sent
CICS.L153	TRAN.GRP.C*	00:00:00						
CICS.L153	TRAN.GRP.E*	00:00:00						
CICS.L153	TRAN.GRP.E*	00:00:00						

Tivoli Business Service Manager (TBSM)

The screenshot shows a dashboard for "Online Banking Status" with a tree diagram of services and various performance metrics. A table at the bottom provides summary statistics:

ServiceName	DB2 Case %	QueueTimeLat	TWIn	Priority
...

Summary

- The Tivoli Enterprise Portal provides a powerful and flexible integrated capability to identify and manage common performance and availability challenges
- The Tivoli Enterprise Portal enables you able to recognize and resolve issues efficiently
- The Tivoli Enterprise Portal allows you to target the most common issues and ensure that you are getting the most from your investment in System z hardware and z/OS software
- By building dashboards you can use the Tivoli Enterprise Portal as a way to begin the process end to end business application management

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Tivoli With Az

This is a blog to discuss what is happening in the area of IBM z/Series, Tivoli, OMEGAMON monitoring, System Automation, and other relevant IBM Tivoli technology for z/OS performance and availability management.

Ed Woods
IBM Corporation

Friday, February 5, 2010

OMEGAMON DB2 Near Term History

OMEGAMON DB2 has a very useful Near Term History (NTH) function. NTH provides an easy way to be able to retrieve and review DB2 Accounting and Statistics records from the past few hours of DB2 processing. The data is stored in a set of VSAM files allocated to the OMEGAMON collection task. How far back the history goes depends upon the size of the files and the amount of data being written to these files. Now some of the data volume is driven by the DB2 workload activity. Accounting records are typically written when a DB2 thread terminates processing, and it is the Accounting data that is often looked at by the analyst when studying what DB2 applications have been doing. Statistics records are created on a time interval basis. Usually, you will have much more accounting data than statistics data. Also, OMEGAMON has the ability to pull in additional trace IFCIDs to get information on things such as dynamic SQL activity.

are displays that show the number of records written to the NTH files, by type. In the example I show, you see an example of common NTH settings/options, and then you see the record count in the NTH record information display. If you look carefully you see that 'Perf-Dyn SQL' has a lot of records written relative to the other record types. This is a good way to understand the impact of enabling certain collection options, such as dynamic SQL collection, and see how many trace records are being gathered, as a result.

Posted by Ed Woods at 3:13 PM 0 comments

ED WOODS

I'm an IT Specialist with IBM Corporation supporting Tivoli Performance solutions on z/OS. Please note that comments made on this blog are my own, and do not necessarily reflect the position of IBM Corporation.

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Useful Links

- [Link to IBM Tivoli product information](#)
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Thank You!