Monitoring IMS and CICS Using OMEGAMON and Tivoli Enterprise Portal

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Tivoli software

Agenda

- OMEGAMON And The Tivoli Enterprise Portal (the TEP)

- About CICS And IMS Subsystems

- Typical Performance And Availability Challenges

- Monitoring CICS And IMS With OMEGAMON

- Defining An Integrated Management Strategy

- What's coming with OMEGAMON CICS and IMS

OMEGAMON XE for CICS V4.1

Provides Alerts and Information in the Following Areas

- **Service Level Analysis**
- **Transaction Analysis**
- **Bottleneck Analysis**
- **Journal Analysis**
- **CICS System Initialization Table**
- **Storage Analysis**
- **UOW Analysis**
- **VSAM File and Lock Analysis**
- **Connections Analysis**
- **Logstream Analysis**
- **Temporary Storage Usage**
- **CICS Region Overview**
- **DB2 Summary and Task data**
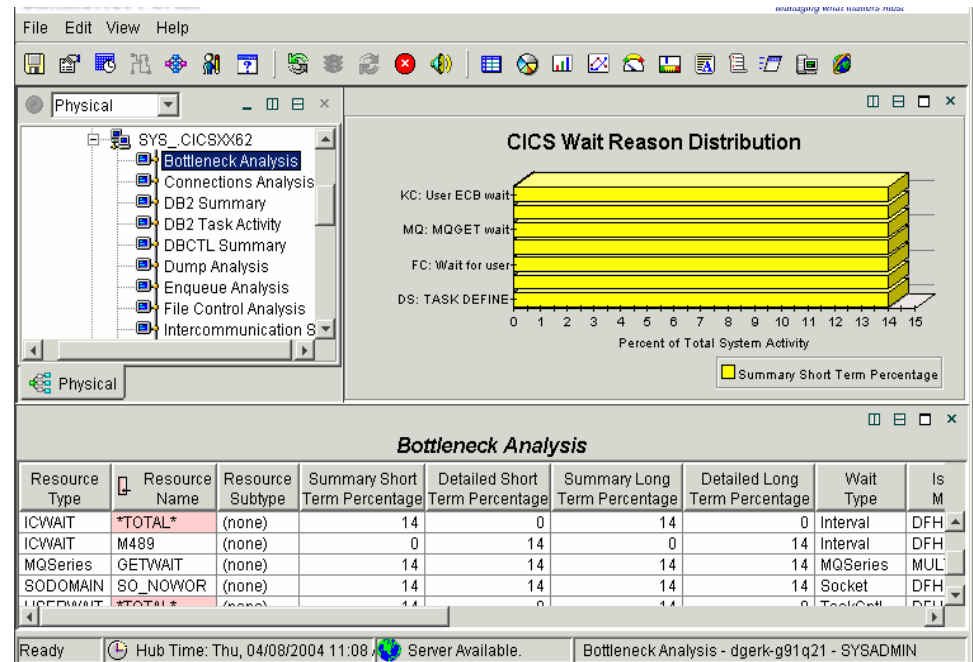
OMEGAMON XE For IMS on z/OS V4.1 Components And Facilities – Real Time And Historical

- **Real Time Monitor**
  - ▸ *Subsystems, regions, resources, pools, DBs, Fast path*
  - ▸ *IMS Connect, OTMA*

- **Response Time Analysis (RTA)**
  - ▸ *Transaction Response time by user defined groups*

- **Bottleneck Analysis**
  - ▸ *Workload performance and task analysis*

- **Operator Assist & Integrated Console Facility**
  - ▸ *IMS resource commands*

- **Online Transaction Reporting Facility (Online TRF)**
  - ▸ *View TRF information in the TEP*

- **Trace Facilities**
  - ▸ *Application Trace & TRF trace*

- **Exceptions & Alerts**
  - ▸ *Integrated alert/automation in the TEP*

- **Plex level information**
  - ▸ *N-way data sharing, MSC, shared queues (in the TEP)*

- **EPILOG Historical**
  - ▸ *Historical analysis of transaction response, bottlenecks and IMS resources*
  - ▸ *Stored in VSAM Epilog Data Store (EDS) by group and time interval*

- **Transaction Reporting Facility (TRF)**
  - ▸ *Detailed transaction & database data – individual transactions*
  - ▸ *Suitable for performance analysis & chargeback*
  - ▸ *Data retrieved from IMS log*

- **XE Snapshot Historical**
  - ▸ *Snapshot historical stored in the Tivoli Data Warehouse*
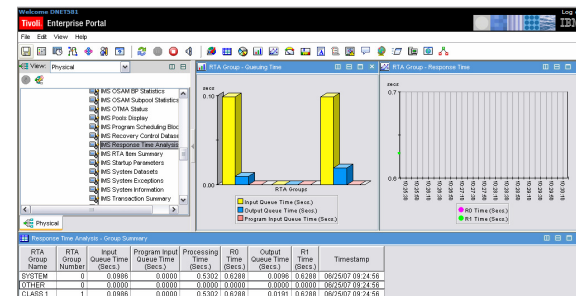
IBM And The Tivoli Enterprise Portal
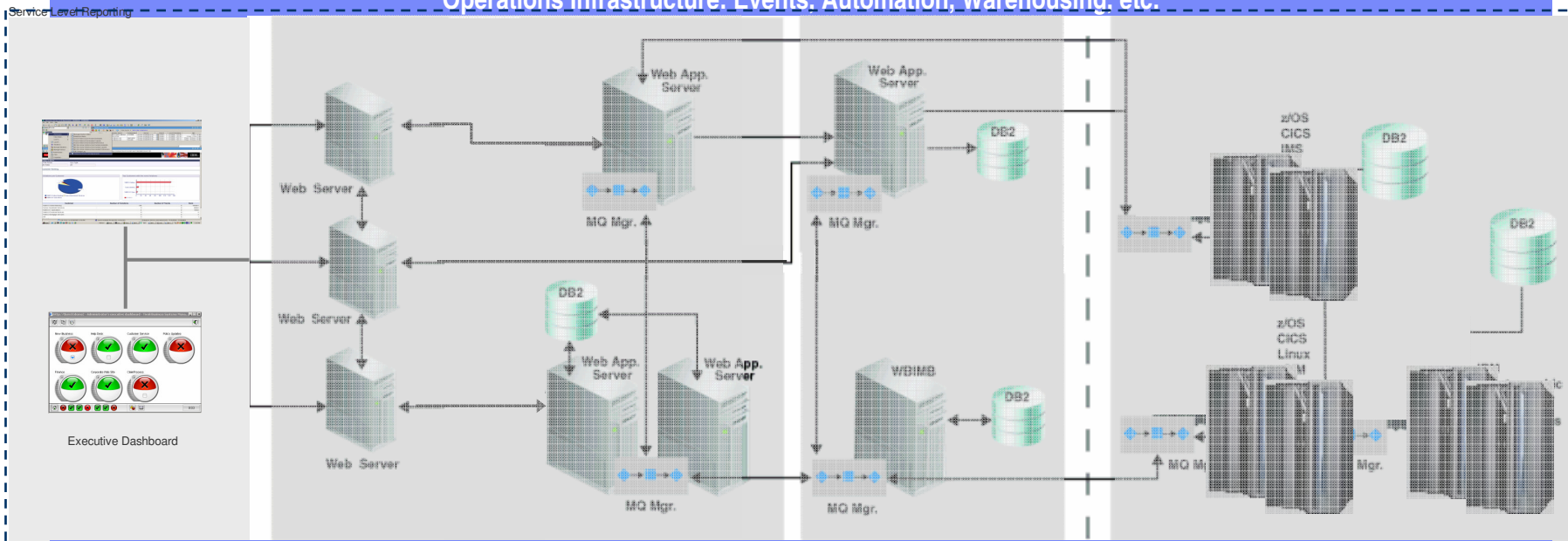## End to End Performance And Availability Management
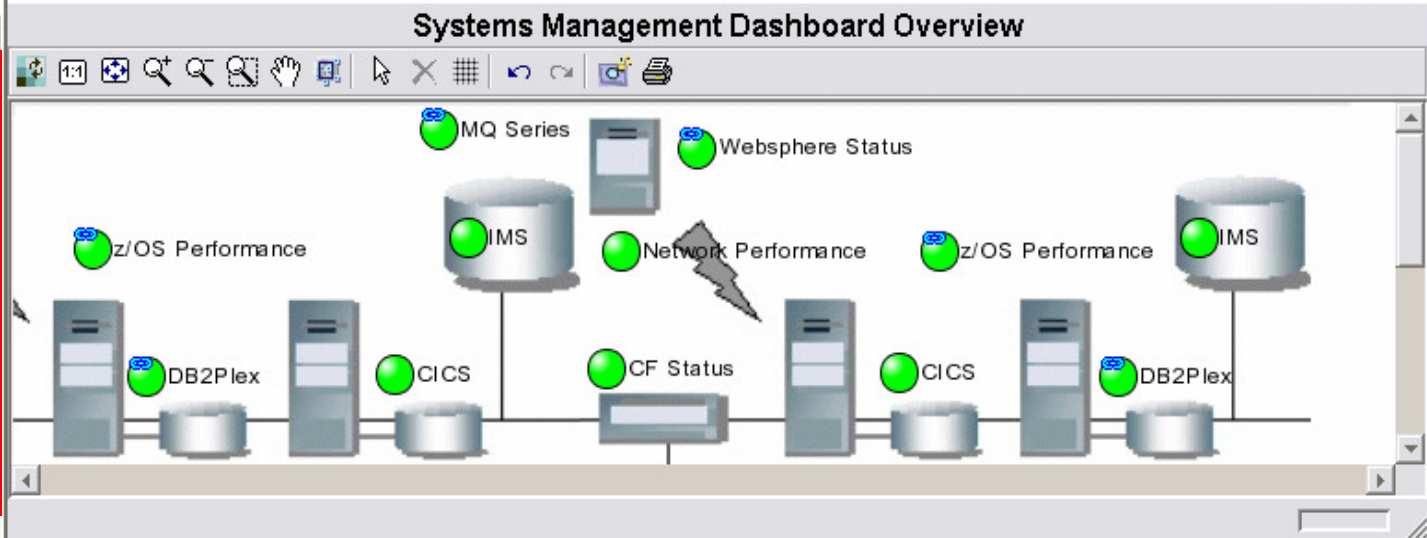
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Use TEP To Build A Consolidated Management View Consistent Methodology And Interface

IMS & CICS as part of bigger picture

A dashboard allows for key technology elements to be combined into a single view.

Integrate information from a variety of components and subsystems.

Systems Management Dashboard Overview

MQ Series — Websphere Status — z/OS Performance — IMS — Network Performance — z/OS Performance — IMS — DB2Plex — CICS — CF Status — CICS — DB2Plex

z/OS Performance

Service Class	Period	Goal Type	G Perc
BATCH	1	Velocio	
BATCH			
BATHI			

CICS Region Overview

System ID	CICS Region Name	CICS Version	R S
SP12	CCCDS18	6.2.0	N/
SP12	CCCDS19	6.2.0	N/
SP12	CCCDS20	6.2.0	N/

IMS Address Spaces

Originating System Identifier	MVS System	IM
XEIMS:SP12:MVS	SP12	I71
XEIMS:SP12:MVS	SP12	I71

DB2 Threads

Originnode	
D71G:SP12:DB2	02/08

MQ Series

Origin Node	P
MQ12:SP12:MQESA	04
MQ12:SP12:MQESA	03

z/OS Service class details

CICS See multiple regions

IMS Manage key regions

DB2 Track key threads

MQ Queues and channels

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The TEP Is The Focus Of An Integrated Performance, Availability And Systems Management Approach
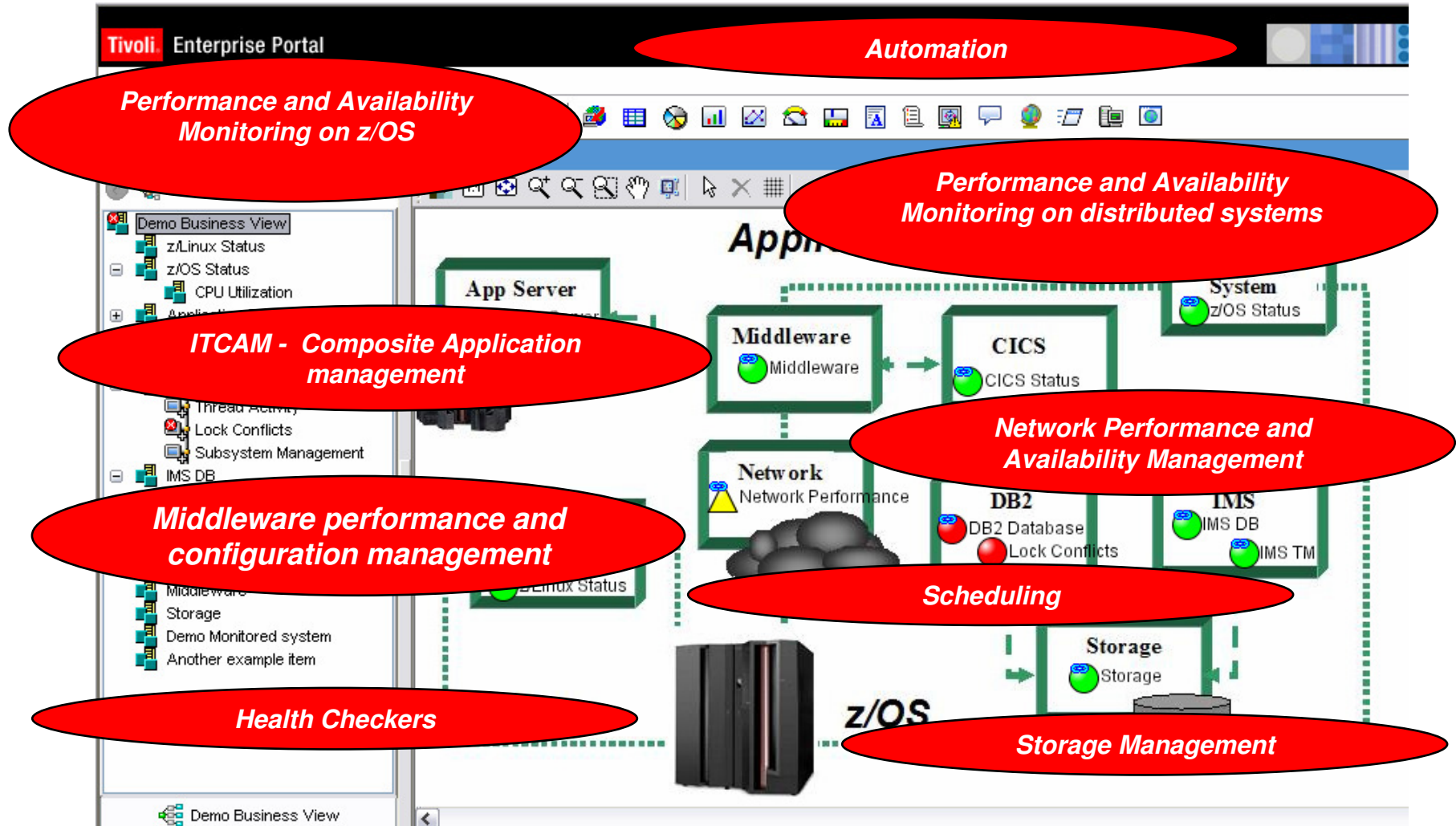
DL/I Request Handling With CICS And IMS DBCTL

CICSA

DBCTLA

DL/I request #1

IMS DB

Request #2A

Request #2B

CICSB

DBCTLB

DL/I request #2
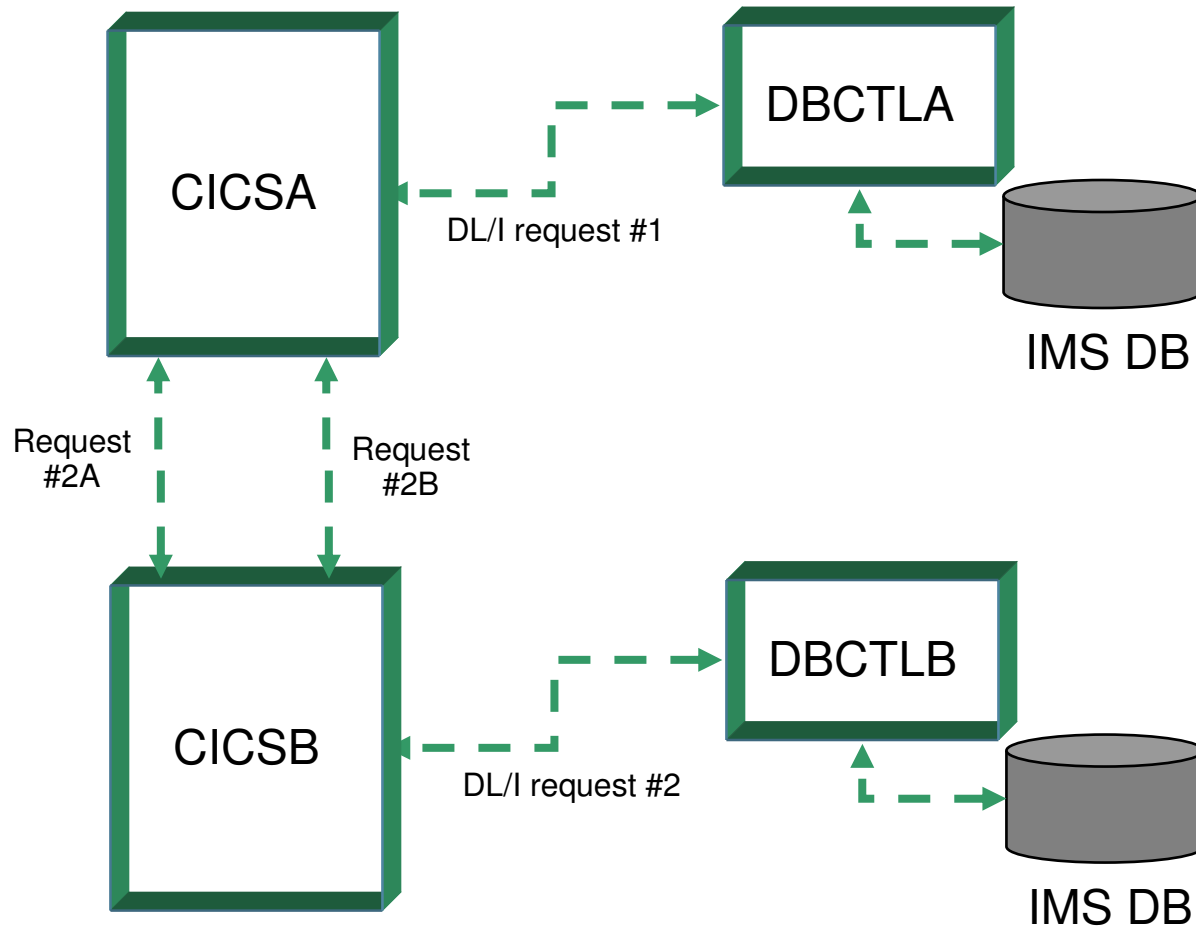
IMS DB

CICSA may access IMS data via a request to DBCTLA
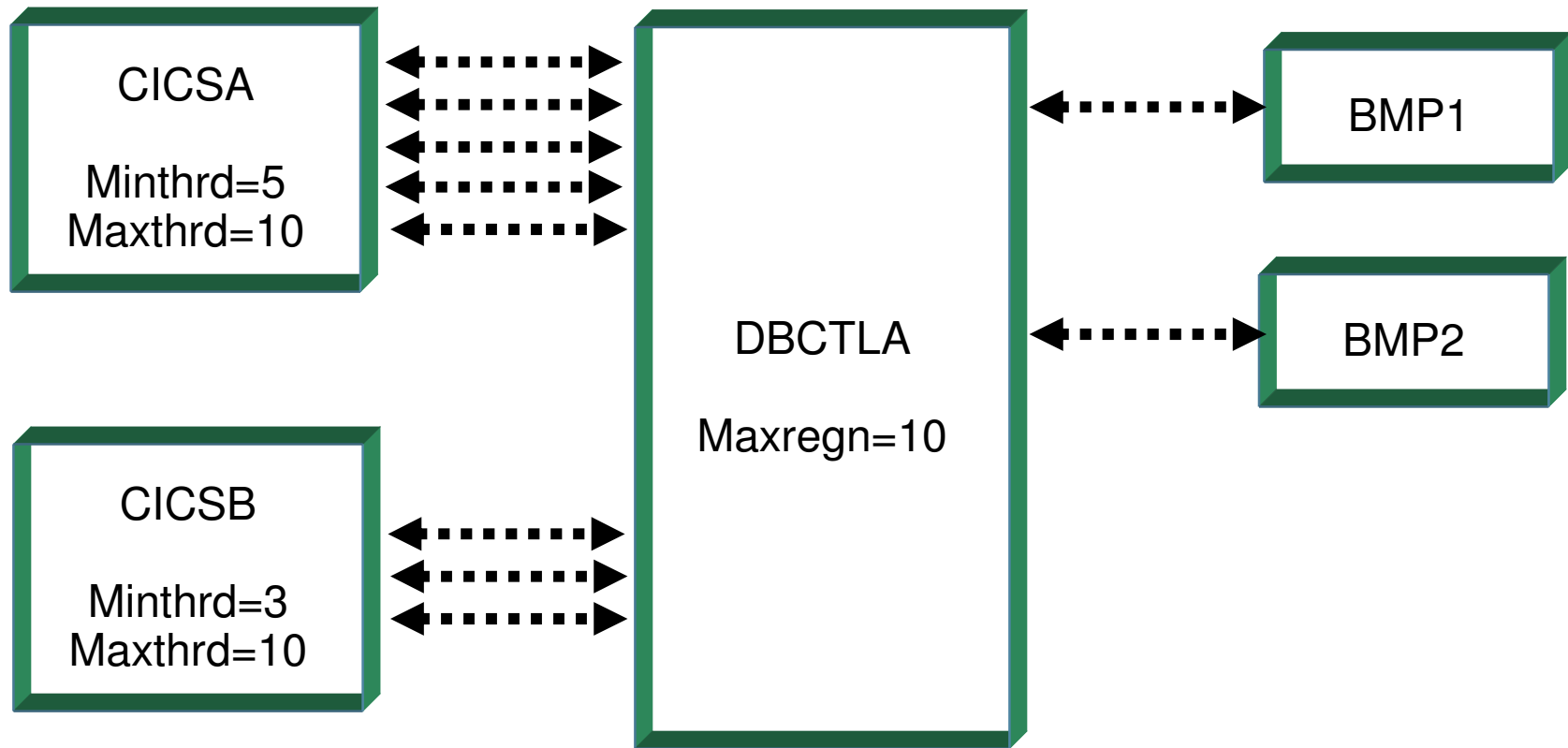CICSA may access data via function shipping to CICSB and CICSB accesses DBCTLB

CICS And IMS DBCTL
Subsystems And Address Spaces
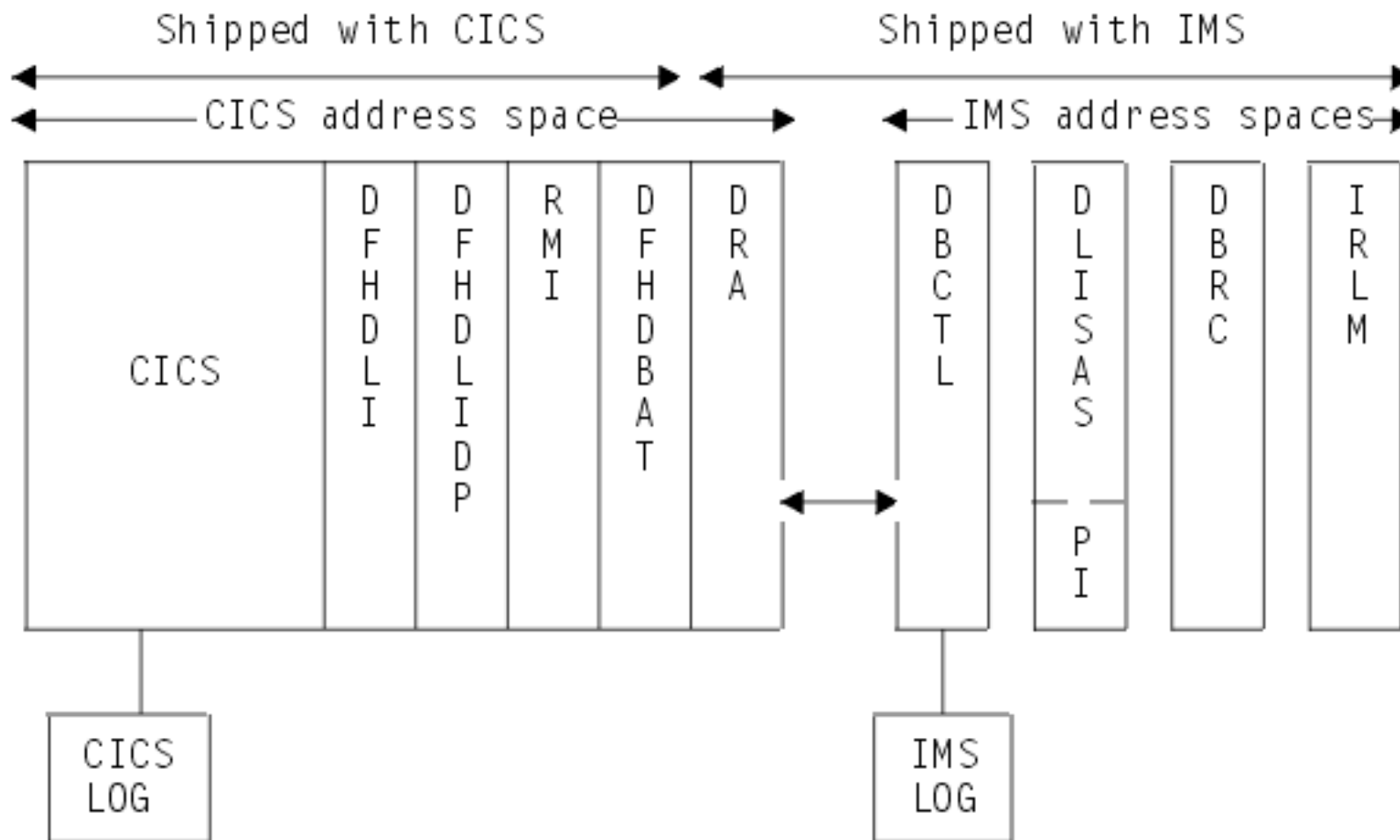
Threads, Address Spaces And Subsystems

CICSA		BMP1
Minthrd=5 Maxthrd=10	DBCTLA Maxregn=10	BMP2
CICSB Minthrd=3 Maxthrd=10		

➢ Number of threads specified will impact performance
➢ Maximum number of threads in DBCTL is 255
➢ One thread equates to one TCB

Typical Performance, Availability And Resource Challenges

- **Performance**
  - ‣ Transaction rate, transaction response time, CICS and IMS internal processing bottlenecks

- **Resource**
  - ‣ CICS – CPU, storage, tasks, critical file I/O
  - ‣ IMS – CPU, storage, threads, IMS pools, IMS databases, PSBs, IMS database buffer pools, logging, IMS database locking

- **Availability**
  - ‣ IMS and CICS subsystem availability
  - ‣ IMS to CICS connection availability
  - ‣ IMS database status and availability

Components Of An Integrated Solution

- What OMEGAMON XE For CICS provides
  - ▶ In depth real time and historical analysis of CICS performance including CICS response time and CICS region resource usage
  - ▶ Both 3270 and Tivoli Enterprise Portal interfaces

- What OMEGAMON XE For IMS provides
  - ▶ In depth real time and historical analysis of IMS and IMS/DBCTL performance including IMS database and DL/I call level detail
  - ▶ Both 3270 and Tivoli Enterprise Portal interfaces

- OMEGAMON Dashboard Edition
  - ▶ Required to create integrated multi-component views in the Tivoli Enterprise Portal

- Additional useful information
  - ▶ Add OMEGAMON XE For z/OS to monitor the operating system
  - ▶ Add OMEGAMON XE For Mainframe Networks to add network performance information

OMEGAMON XE For CICS V4.1
CICS Region Overview Workspace

Drill down for storage usage detail

The Region overview workspace provides a summary view of transaction rate, CPU usage, I/O and other performance information

Performance
Monitoring CICS Transaction Response Time

OMEGAMON XE For CICS monitors transaction response time (RTA)

Recommendation – customize RTA transaction groups for critical transaction

To see bottleneck data for the RTA group

CICS Bottleneck Analysis
Is The Issue In CICS Or IMS?
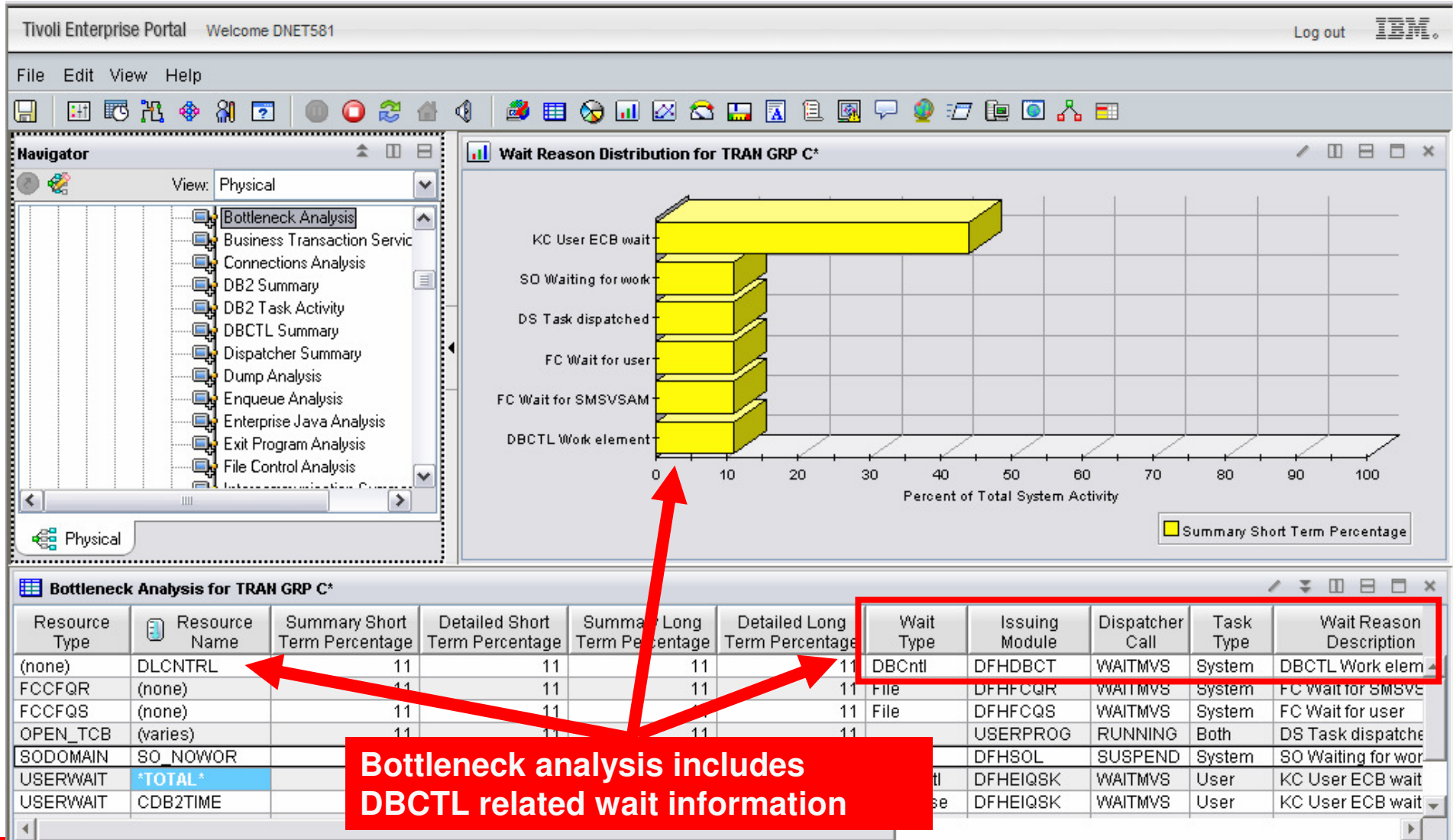
Bottleneck analysis includes DBCTL related wait information

Transaction Response Time Situation Alert

For proactive response time alerts create RTA situations based upon RTA groups

Add additional attributes to make situations more robust and meaningful

Add actions to automate corrections

Monitor CICS And IMS DBCTL Availability

Monitor DBCTL status

Use a situation for an availability alert

OMEGAMON XE For IMS V4.1
DBCTL Monitoring With Drill Down For Detail

DBCTL Thread Detail

Thread DBCTL Thread With Call Level Detail

PSB information

Call counts

Thread status

Call detail

Understanding IMS Database Locking
Who Are The Owners And Waiters?

Lock owner/waiters

Drill into thread detail

Monitor IMS Database And PSB Status

Monitor Critical IMS Pools

OSAM and VSAM DB pool performance details

IMS subsystem pools including PSB pools

OMEGAMON IMS Bottleneck Analysis Information May Be Integrated Into The TEP

Analyze where IMS workload is spending its time. Provide analysis of where to tune.

Tivoli Enterprise Portal   Welcome DNET581

File   Edit   View   Help

Navigator

View: Physical

- DFSMShsm Reporting
- IMS
  - IMSA:MVSA:IMS
    - IMS Address Spaces
    - IMS Coupling Facility Data S
    - IMS DASD Logging
    - IMS DBCTL Thread Summa
    - IMS Dependent Regions
    - IMS Device Activity
    - IMS Extended Recovery Fa
    - IMS External Subsystems
    - IMS Fast Path Balancing Gr

Physical

```
----------------------------------------------------------------
: Elapsed time . . . : 17:24 MN     Samples taken (short) . : 281    :
: Suppress states . . <  0 %        Samples taken (long)  . : 2026   :
: Display COMPETING TRANSACTIONS +  Sampling interval . . . : 5 tenths-sec :
----------------------------------------------------------------

                                            Lines 15 to 28 of 29
----------------------------------------------------------------
     Wait Reason      :      Short Term %     :      Long Term %       :
                      : %  0------- 50-------100 :  %  0------- 50-------100 :
----------------------------------------------------------------
Database I/O Waits    :   .3:>   .    .    .    :   .2:>   .    .    . :
 HISTDB               : 20.0:----->  .    .    . :20.0:----->
 D1B80002             :  .30:----->  .    .    . :.30
MVS Waits:            :  3.2:>   .    .    .    : 2.0:   .    .    . :
 CPU Wait (DEP)       : 3.20:>   .    .    .    : 2.00:----->  .   :
 Program Fetch I/O    :   0:   .    .    .    :   0:   .    .    . :
: Commit (Phase 2)    : 2.80:>   .    .    .    : 2.30:>   .    .    . :
: Prepare to Commit   : 4.70:>   .    .    .    : 5.60:>   .    .    . :
: User Sign on DB2    :  .10:>   .    .    .    : .30:>   .    .    . :
: Terminate Thread    :   0:   .    .    .    :   0:   .    .    . :
: SQL Call            :58.80:--> .    .    .    :15.30:--> .    .    . :
```

IMS Address Spaces

	IMS ID	Job Name	Type	Swapped Out	CPU Time	CPU Percentage	TCB CPU Time	TCB CPU Percentage	SRB CPU Time	SRB CPU Percentage	Task Elapsed Time	Common Page-Ins	Common Page-In Rate	Private Page-Ins	Pr Pa R
	IMSA	IMSAMAST	Control	No	41.43									1	
	IMSA	IMSADLI	DL/I SAS	No	0.08										
	IMSA	IMSADBRC	DBRC	No	0.08										
	IMSA	IMSAIRLM	IRLM	No	42.80										
	IMSA	CICSAOR1	DBCTL	No	34,603.80										

DEXAN data based on groups defined in KOIGBLxx macro

Recommendation - For DBCTL workload create program based groups in KOIGBLxx

Situation Example – Monitor Thread Usage

This product provided situation may be customized to monitor thread usage and to monitor it by CICS jobname

The Value Of Using The Tivoli Enterprise Portal To Manage This Environment

- **Provides an integrated overview of CICS and IMS processing and activity**
  - ▶ See the 'BIG PICTURE' from a single screen
    - Integrated graphical overview with alerts
    - Integrated technical view with detailed information
  - ▶ Speed problem notification
  - ▶ Improve problem isolation
    - Is the problem in CICS or IMS or somewhere else?
  - ▶ Automate notification and problem correction
- **Dynamic navigation and ease of use**
- **Historical and real time analysis**

V4.1 Added Dynamic Workspace Linking Functionality To The z/OS Monitoring Solutions

Problem: How do I quickly find a potential problem
that requires multiple monitoring products?

Scenario: Dynamically link **IN CONTEXT** between
various monitoring technologies

Solution: Dynamic Workspace Linking
Product provided links & user customized links

OMEGAMON XE for
DB2 PE/PM z/OS 4.1.0

OMEGAMON XE
for CICS on z/OS 4.1.0

OMEGAMON XE
for IMS on z/OS 4.1.0

OMEGAMON XE
for z/OS 4.1.0

OMEGAMON XE
for Storage 4.1.0

OMEGAMON z/OS
Management Console 4.1.0

OMEGAMON XE for
Mainframe Networks 4.1.0
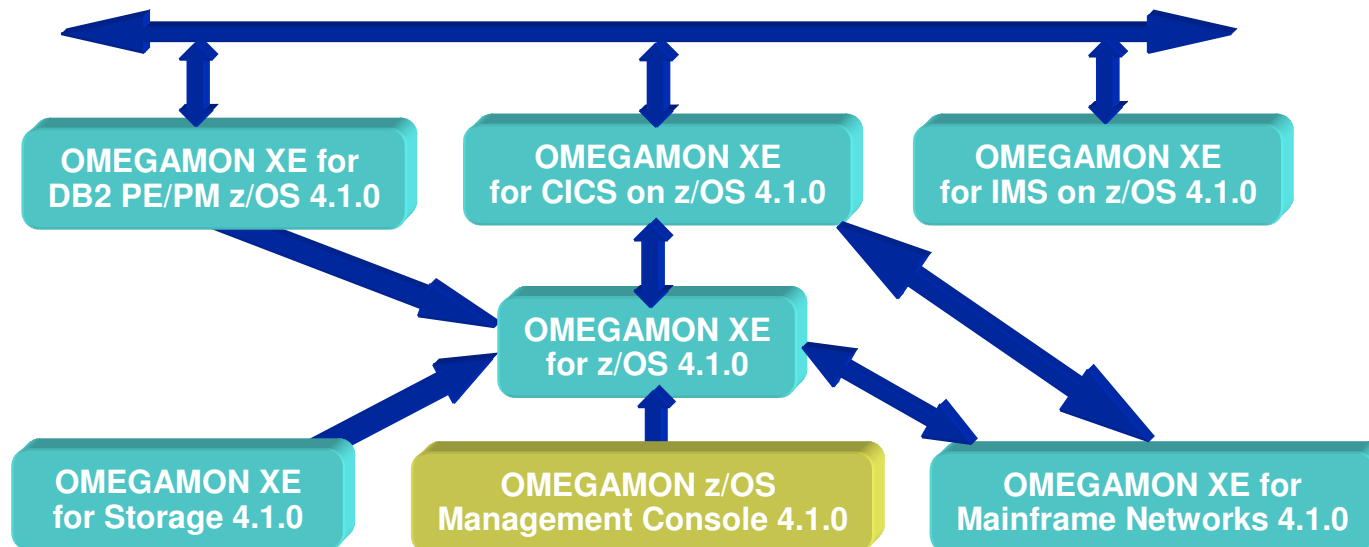
Examples
Product Provided Dynamic Workspace Links With V4.1

- **OMEGAMON XE On z/OS**
  - TN3270 Server Sessions, Applications, TCP Listeners, TCP Listeners, Applications

- **OMEGAMON XE For CICS**
  - Temporary Storage Queues, Log Stream Analysis, Transaction Analysis, Transaction Analysis, DB2 Summary, DBCTL Summary, TCPIP Statistics, Message Queuing Analysis

- **OMEGAMON XE For IMS**
  - IMS Dependent Regions, IMS Dependent Regions, IMS DBCTL Thread Details, Global Lock Conflicts

- **OMEGAMON XE For DB2 PM/PE**
  - Enclave Thread Summary, Thread Enclave, IMS Thread Summary, Thread Detail, Detailed Thread Exception, CICS Thread Summary, Thread Detail, Detailed Thread Exception

- **OMEGAMON XE For z/VM and Linux**
  - Linux Workload and ApplData

Dynamic Workspace Links Between IMS And CICS

OMEGAMON XE For IMS DBCTL thread detail

Bi-directional dynamic workspace link

OMEGAMON XE For CICS CICS transaction detail
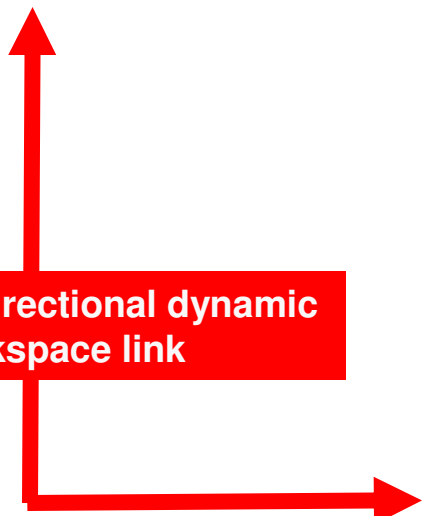
Dynamic Workspace Link From IMS Lock Conflict To CICS Transaction Detail
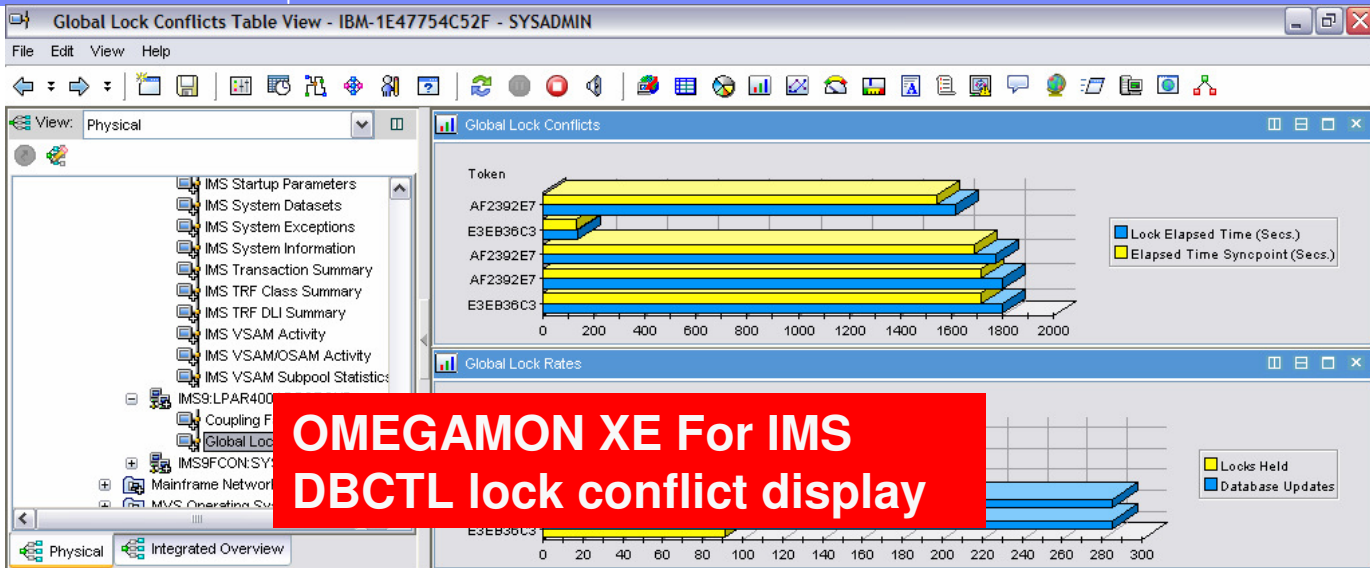
OMEGAMON XE For IMS DBCTL lock conflict display

OMEGAMON XE For CICS CICS transaction detail

Create An Integrated Graphic Overview Of CICS And IMS Activity

Note – Creating a custom graphic overview requires that OMEGAMON DE be enabled in the TEP

Custom navigation tree

Custom graphic overview with icons for alerts

CICS RTA

IMS Threads

Create An Integrated Technical CICS And IMS Workspace

IMS region activity

IMS DB status

IMS lock conflicts

CICS response time

CICS tasks

DBCTL threads

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Use The Portal To See IMS Historical Performance Data

Click to select desired time intervals

History data showing recording time. Data is viewable and sortable.

What's Coming – OMEGAMON V4.2.0 Launch in Context

Coming in 4.2.0

OM XE for z/OS, CICS, IMS, DB2

From Tivoli Enterprise Portal

To 3270
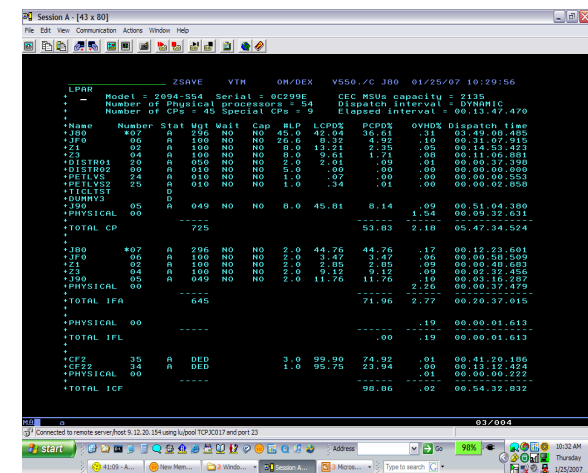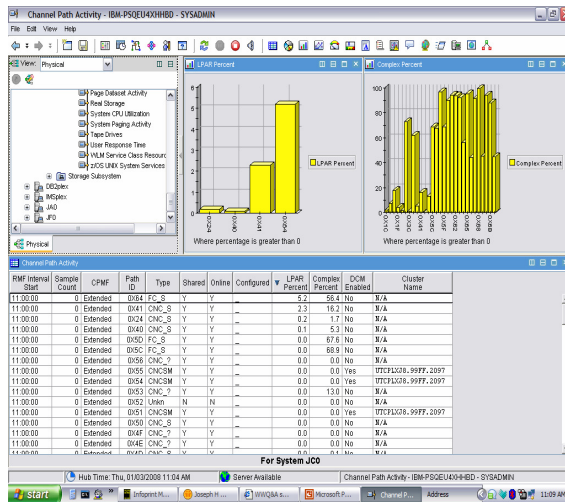
OMEGAMON XE for CICS on z/OS V4.1.0 Interim Features And V4.2.0

- **V4.1.0 Interim Features**
  - ▶ **08 Summer**
    - ▪ **Enhancements to OMEGAMON XE for CICS on z/OS v4.1.0**
      - – **TEP reports to take advantage of TEP "1 minute history"**
      - – **Dynamic Workspace Links from TEP reports to 3270**
      - – **Initially TRANSACTION ANALYSIS and ONDV**
  - ▶ **08 Year end**
    - ▪ **Integration of OMEGAMONs using ITCAM for Transactions**
- **V4.2.0**
  - ▶ **Historical linking between products**
  - ▶ **Restructuring of product workspaces**
  - ▶ **Active Transactions SNAPSHOT capability**
  - ▶ **Service Level Analysis enhancements**
  - ▶ **Resource Limiting enhancements**
  - ▶ **New CICS TS release support**

ITCAM For Transactions

An 'integrated' view of an application – transaction tracking

WAS	CICS TG	CICS	DB2
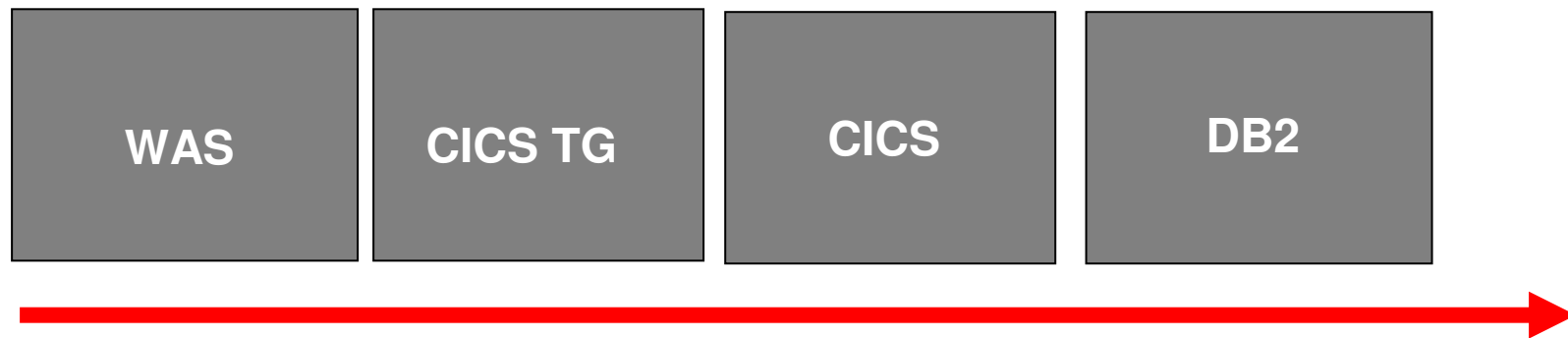
Using the ITCAM for Transaction Trace we start to build a picture of the application's 'flow'.

Using ITCAM as a starting point gives us WAS, J2EE etc.

OMEGAMON XE for IMS on z/OS
V4.2.0

- **Product Simplification**
  - ▶ **Enable Classic/CUA only data within XE TEP**
- **Transaction History**
  - ▶ **Improve collection performance and collect additional application information**
- **Integrated zApplication Trace with ITCAM for IMS key technology**
- **Improved performance by streamlining data collection**
- **Improved ICAT configuration**
- **Bottleneck Analysis in Tivoli Enterprise Portal**
  - ▶ **Competing, Non-Competing, Executing (default)**
  - ▶ **Display short and long term collection buckets**
- **Full RTA Support in Tivoli Enterprise Portal**
  - ▶ **Response Time Monitor**
  - ▶ **Display 10 worst performing transactions**
  - ▶ **Interval Response Time**

Summary

- **OMEGAMON And The Tivoli Enterprise Portal (the TEP) provide an integrated management capability**

- **When defining a performance and availability management strategy consider an integrated approach**

- **OMEGAMON and the TEP continue to be enhanced and expanded**

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