Using ITCAM for Transactions to Manage Composite Z applications

BSM and Netcool Team

Graham Davis (Perth – Australia - AP)

Master Certified IT Specialist (Systems Management)
Mainframe Systems Mgt (20yrs) Distributed Systems Mgt (7yrs)
Ex-TBSM Z Developer / Systems Programmer
Tivoli SWAT AP Lead

Workflow for Resolving Composite Application Problems

Sense

Detect that a threshold has been breached and that a problem occurred, or is about to happen

Isolate

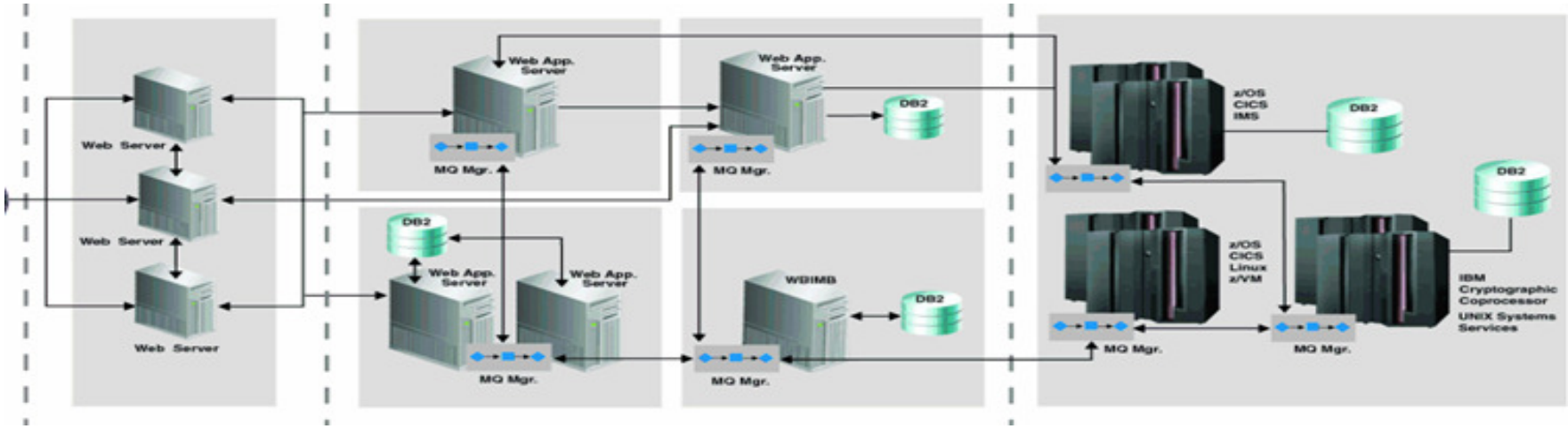
Pinpoint the problem to a specific part of the environment and hand-off to the appropriate specialist

Diagnose

Drill down into the details and get to the root cause of the problem

Repair

Fix the faulty component, validate the fix and roll back into production



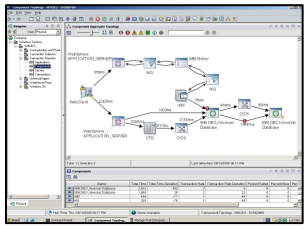
ITCAM for Transactions

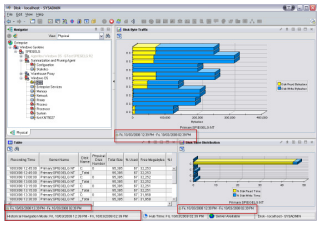
Deep-dive tools

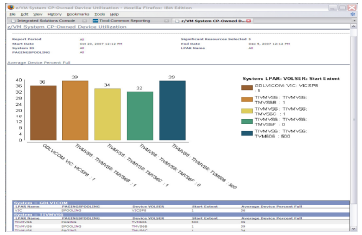
- ITM
- ITCAM for Applications
- ITCAM for SOA
- OMEGAMON

Composite Application Management and Resource Monitoring

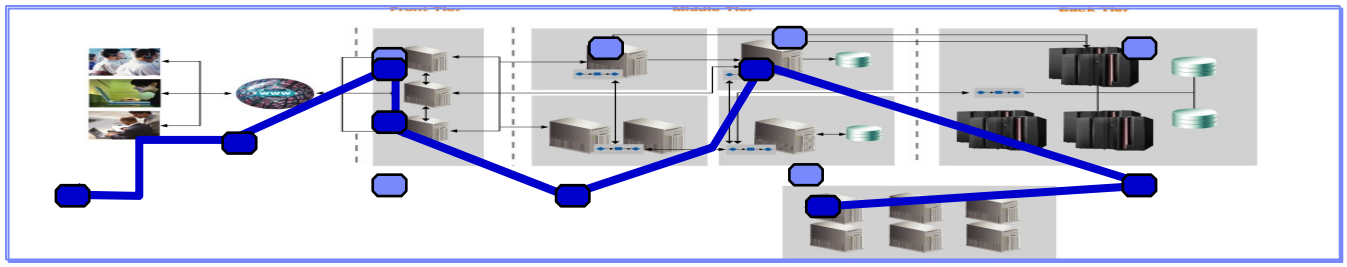
- Monitor application response to ensure business expectations are met
- Understand transaction flows over complex topologies
- Monitor infrastructure performance and availability
- Diagnose application performance issues
- Increase application availability and customer satisfaction
- Improve MTTR and MTBF







Transactions | **Applications** | **Servers**



Customer Pain – Sensing and Isolating a Problem Today

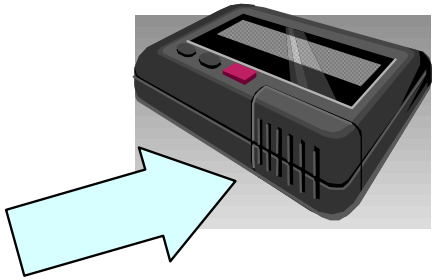
Response time is terrible; more than one minute.

Check all resources

- System Alerts
- Health Monitors
- OS Statistics
- Network traffic
- Application log files
- Database metrics

Everything looks normal … but performance is still bad

Bridge Call with Tiger Team



Locate Source of Problem … maybe …

- Finger-pointing: "It's the network guy's fault"
- Recreating the problem is difficult
- Isolating the cause can take hours or days
- Solutions by chance

Customer Value – Demonstrating ROI

Money wasted isolating problems

Sev 1 outages/slowdowns per year	12
Average time to isolate (hrs)	8
SME's involved in isolation	15
Avg. loaded hourly rate (/hr)	$75
Total direct costs	$108,000

Revenue lost during outages

Lost revenue / hr	$10,000
SLA penalties / hr	$5,000
Hours downtime / yr	96
Total indirect costs	$1,440,000

Total costs of poor problem isolation capability

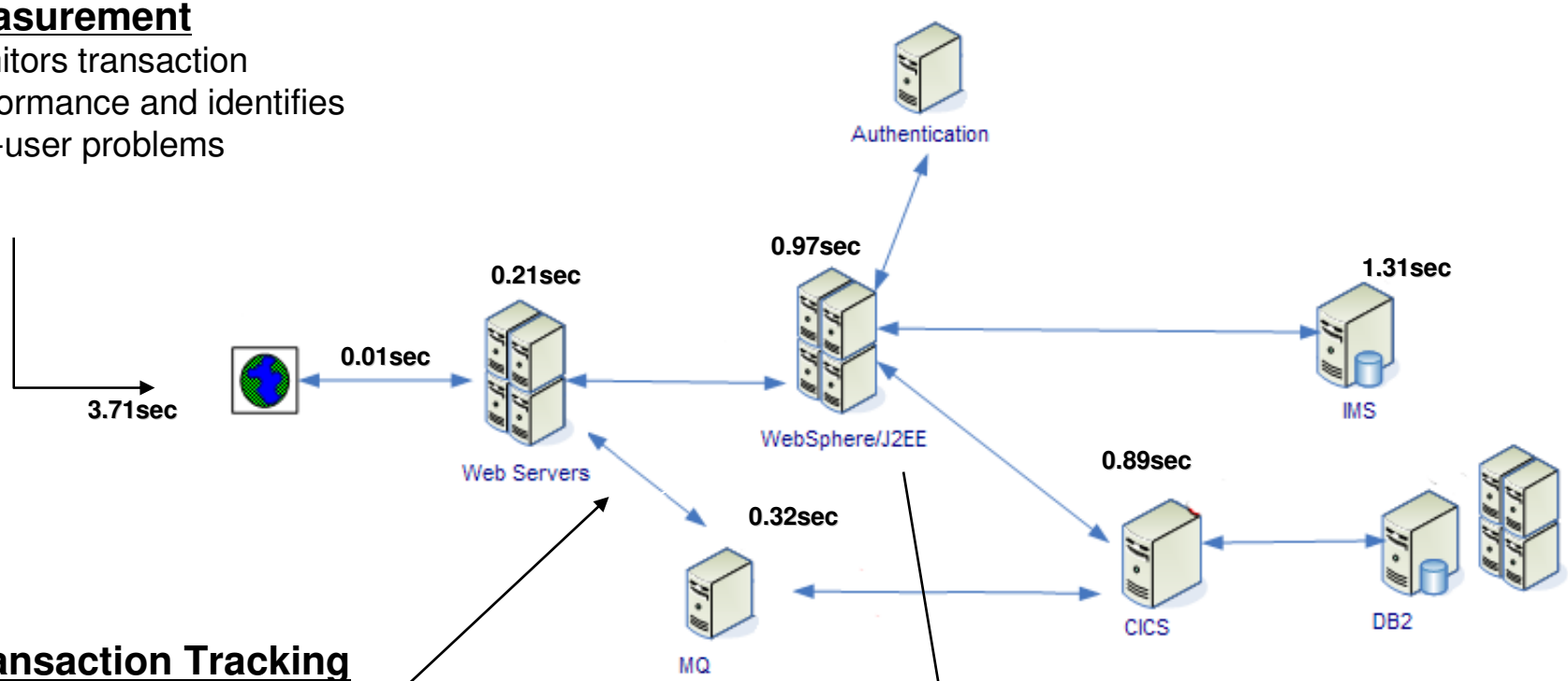
Total lost / yr	**$1,548,000**

Every customer case will be different …

*…what do **you** lose each year due to poor performance?*

End-to-End Monitoring, Tracking and Diagnosis

Response Time Measurement
Monitors transaction performance and identifies end-user problems

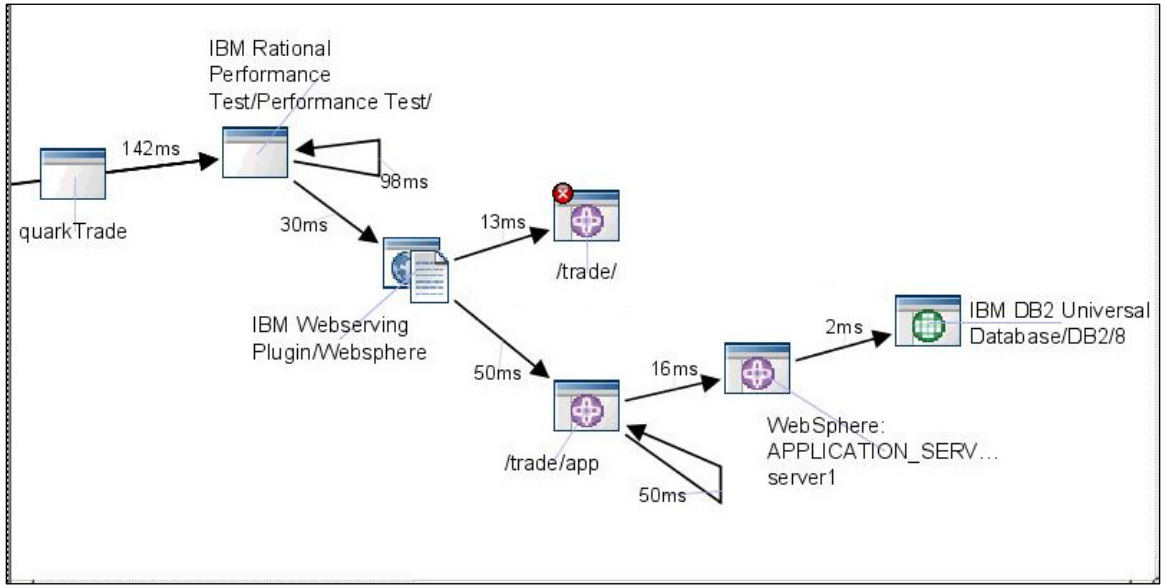


Transaction Tracking
Correlate data from app server, MQ, CICS, IMS and custom instrumentation to show topology and isolate problems

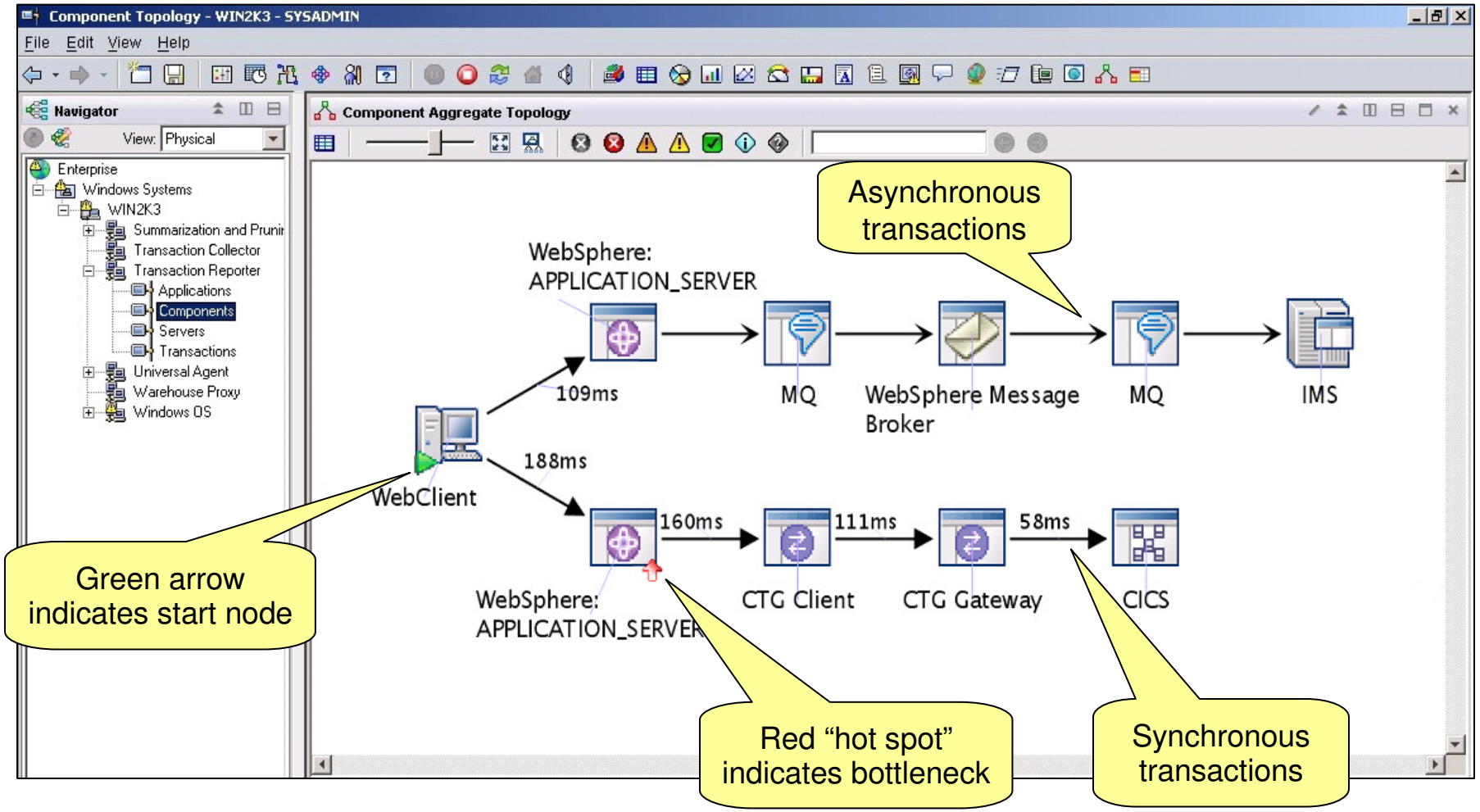
Deep Dive diagnostics
Launch in context to SME capabilities including SME level tracking within specific domain

Transaction Tracking Overview

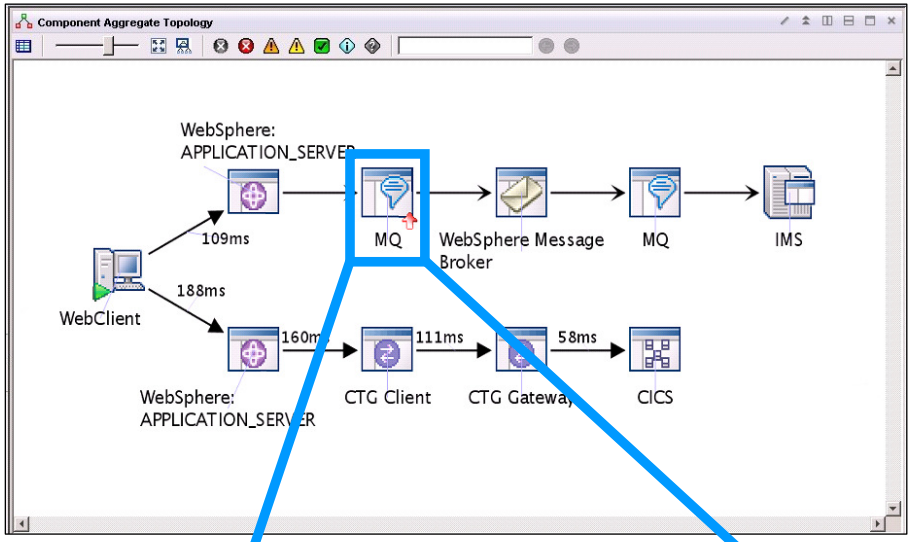
- Unified, end-to-end transaction tracking across heterogeneous environments - fully integrated across distributed and zSeries
- Domain-thru-domain tracking capability via dynamic correlation – token passing not required
- Support for existing ARM instrumentation, plus introduction of a much more flexible transaction tracking API (the TTAPI).
- Makes token-based based tracking more consumable, less dependent on how systems are connected
- Support for asynchronous transactions
- Extensible, modular framework
- Integrated response time and transaction tracking



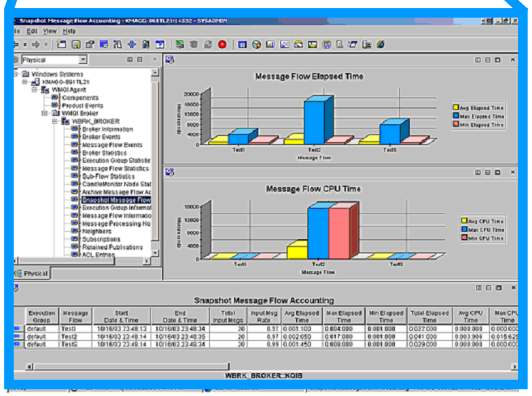
Transaction Tracking Topology



Deep-dive drill down



ITCAM for Transactions

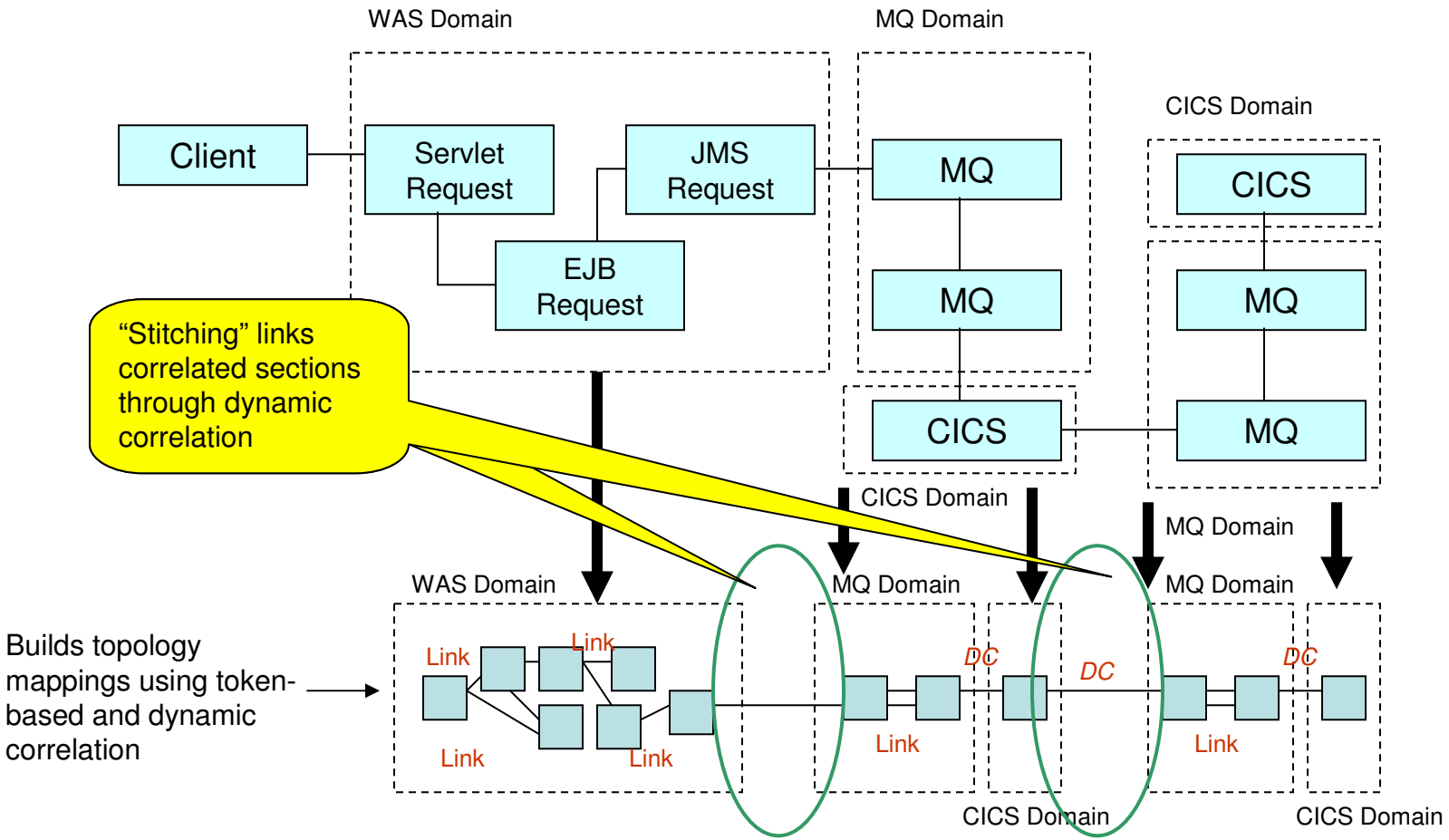


OMEGAMON XE for Messaging

- Uses Dynamic Workspace Links to launch in context into appropriate SME tool.
- Launch destinations depend on type on data source. E.g:
  - MQ -> OMEGAMON XE for MSG
  - WAS -> ITCAM for WebSphere
  - CICS -> OMEGAMON for CICS
  - IMS -> OMEGAMON for IMS
- Where appropriate, will drill down to specific workspace (ie. In MQ, Queue Manager drilldown links to the Queue Manager Status Workspace for the specific Queue Manager).

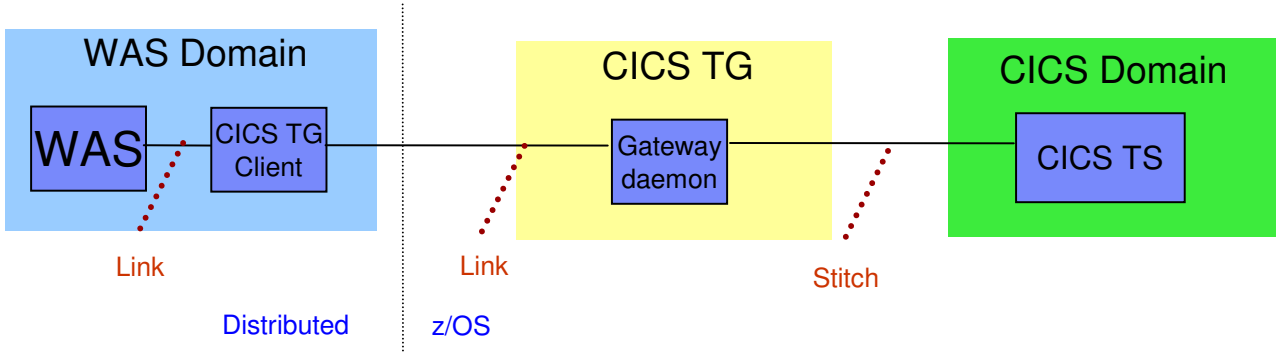
Enterprise-Wide Tracking

- Track inside domains with correlated techniques
- Track between domains through stitching



Dynamic Correlation – WAS to CICS via CICS TG

- Linking and stitching is also used in the correlation of transactions flowing between WAS and CICS via CICS TG



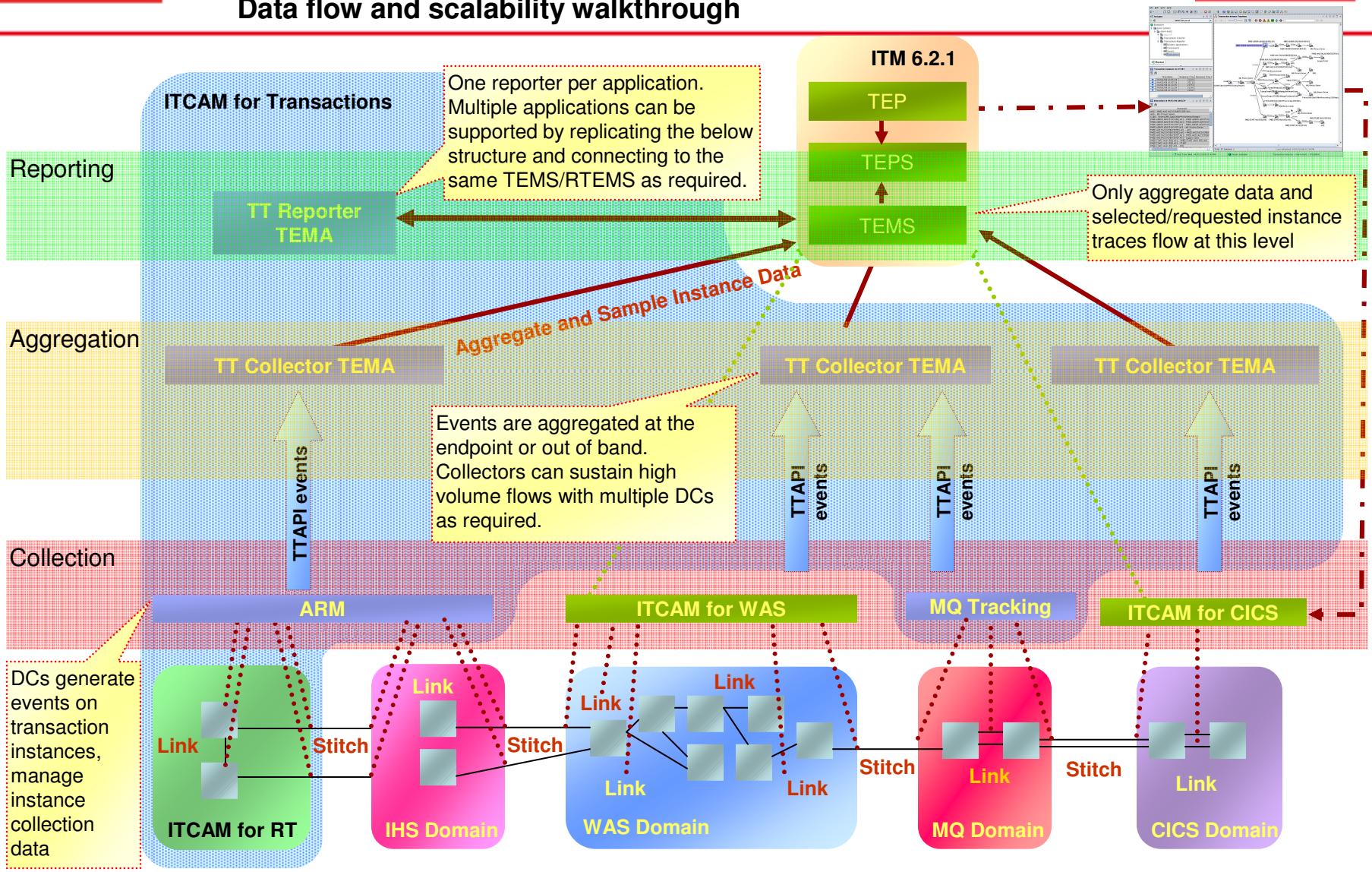
- The CICS TG client application (EJB, JSP etc) is deployed into WAS. Events generated by ITCAM for WebSphere can be linked to by the client application.
- A link is constructed between the CICS TG gateway daemon and the client application
- Finally details of the connection between the CICS TG and CICS is stitched together by connecting attributes acquired by the CICS TG data collector and ITCAM CICS data collector.
- This allows a tokenless correlation to be recorded from WAS through to CICS

CICS TG attribute	CICS stitching attributes
Derived Network UOWID	Network UOWID
CICS TG Jobname	Exci caller Jobname
CICS TG Stepname	Exci caller Stepname
CICS TG SMFID	Exci caller SMFID

An example of CICS TG to CICS stitching via an EciSynconreturn transaction over EXCI

Scalable Tracking Architecture

Data flow and scalability walkthrough



Current Domain Coverage

- IBM WAS
  - WebSphere 5/6/7 tracking supported through BCI technology embedded in ITCAM for WAS – distributed and z/OS
- MQ 5/6/7
  - MQ 5.3 and up tracked by ITCAM for Transactions natively – distributed and z/OS
- CICS
  - CICS 2.3+ transactions and services, including any CICS hosted applications (C++, COBOL, Natural, etc.)
- ARM
  - ARM 2.0/4.0 instrumentation supported via native library linkages (libarm)
- TTAPI
  - Customer instrumentation possible through our published Transaction Tracking API (TTAPI), available for a range of languages on both distributed and z/OS systems. Current language bindings include:
    - C, C++, Java (distributed)
    - C, C++, Java, COBOL, PL/I, Assembler (z/OS, including CICS)
- CTG
  - CICS Transactions Gateway (CTG) 7.1+
- IMS
  - IMS
- WMB
  - WebSphere Message Broker v6.0 (distributed)
- JDBC
  - JDBC tracking through WAS (supports all databases)

Current Domain Coverage (cont.)

IBM WAS
- Non-BCI WAS tracking (ARM based)

MQ
- Generic MQI Client

.NET
- .NET TTAPI bindings

Tuxedo
- Tuxedo Server (FML32 over ATMI) v9/10

CICS
IMS
- DB2 tracking from ITCAMfCICS and ITCAMfIMS

SOA
- Service Tracking support through ITCAM for SOA – ESB support including:

  WebSpere ESB – WebSphere Process Server – WebSphere CE – WebSphere Datapower – Weblogic – AXIS – CICS Web Services – SAP Netweaver

Composite Application Management and Resource Monitoring

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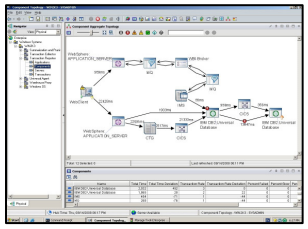

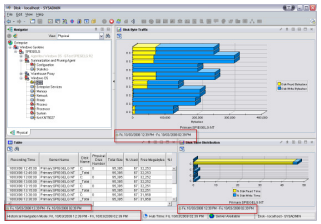

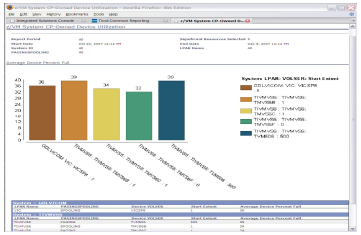

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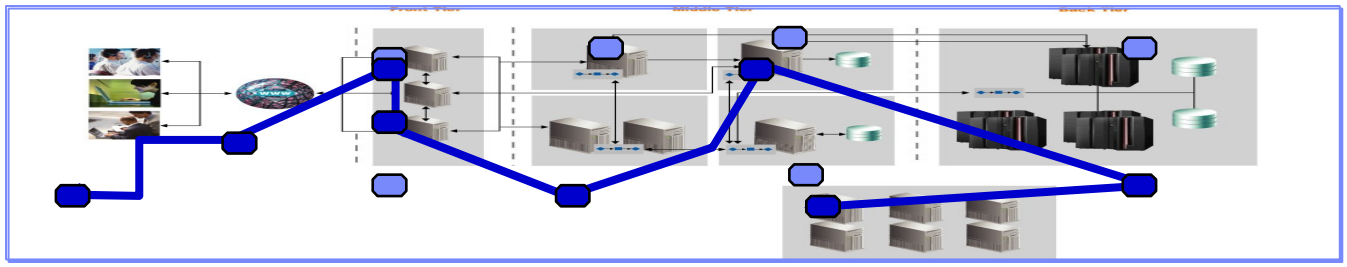
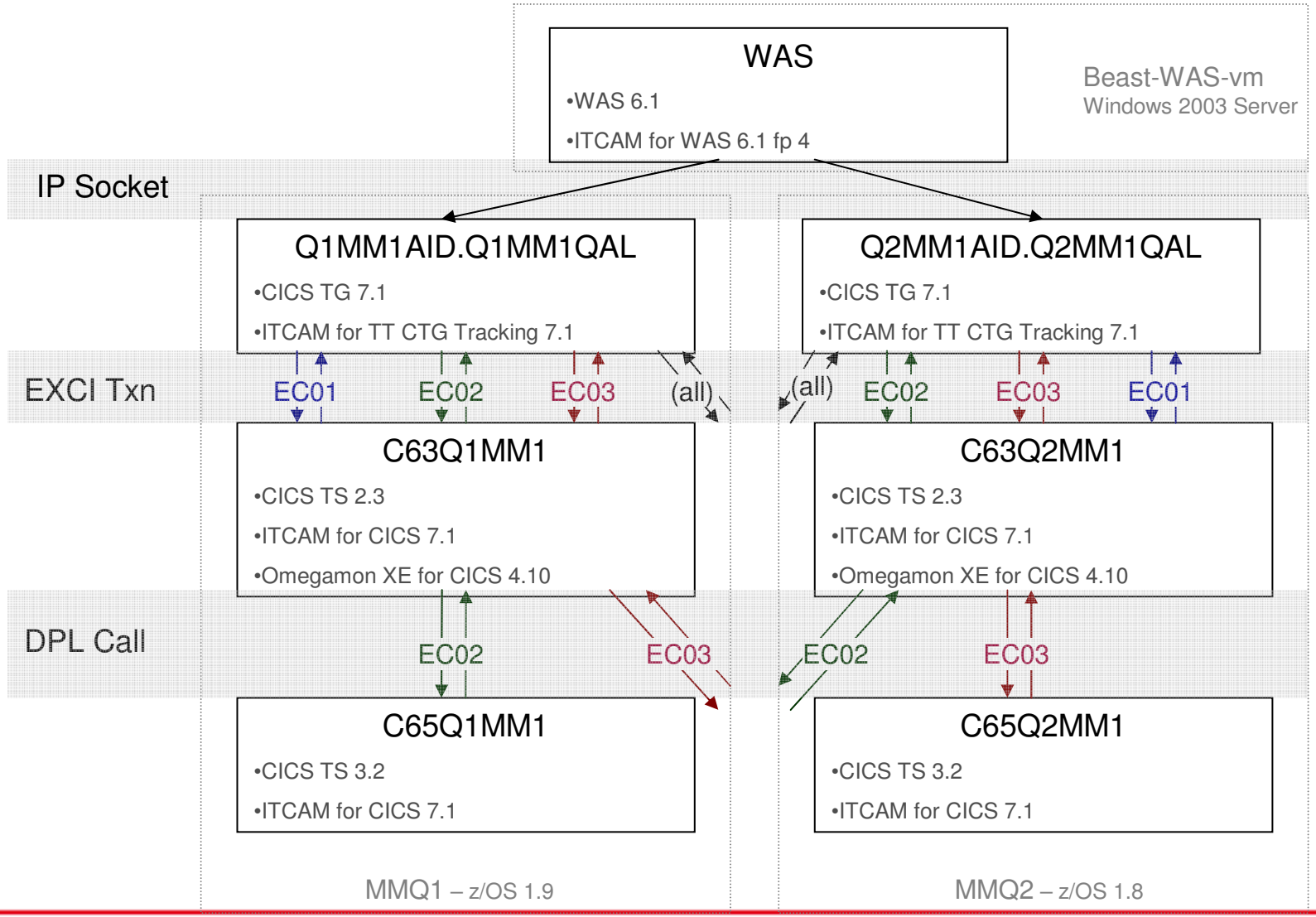


IT Customer

CTG Test Environment



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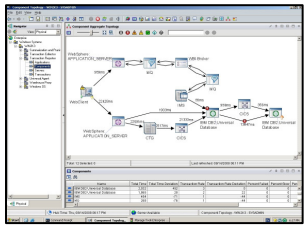
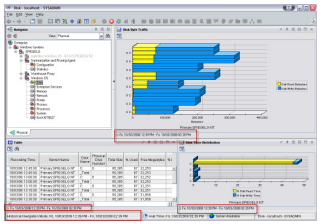
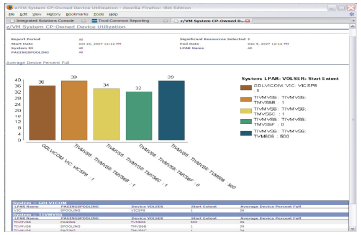
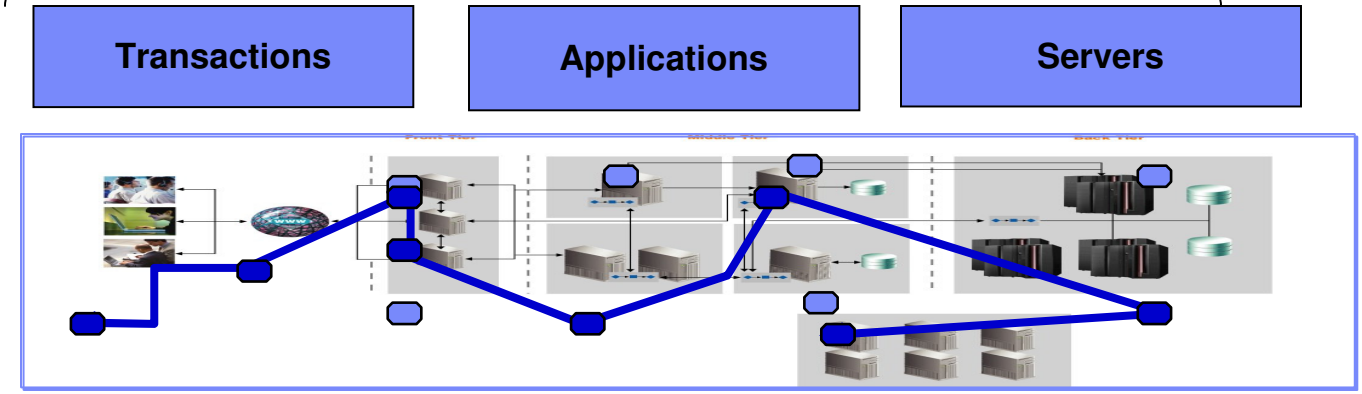
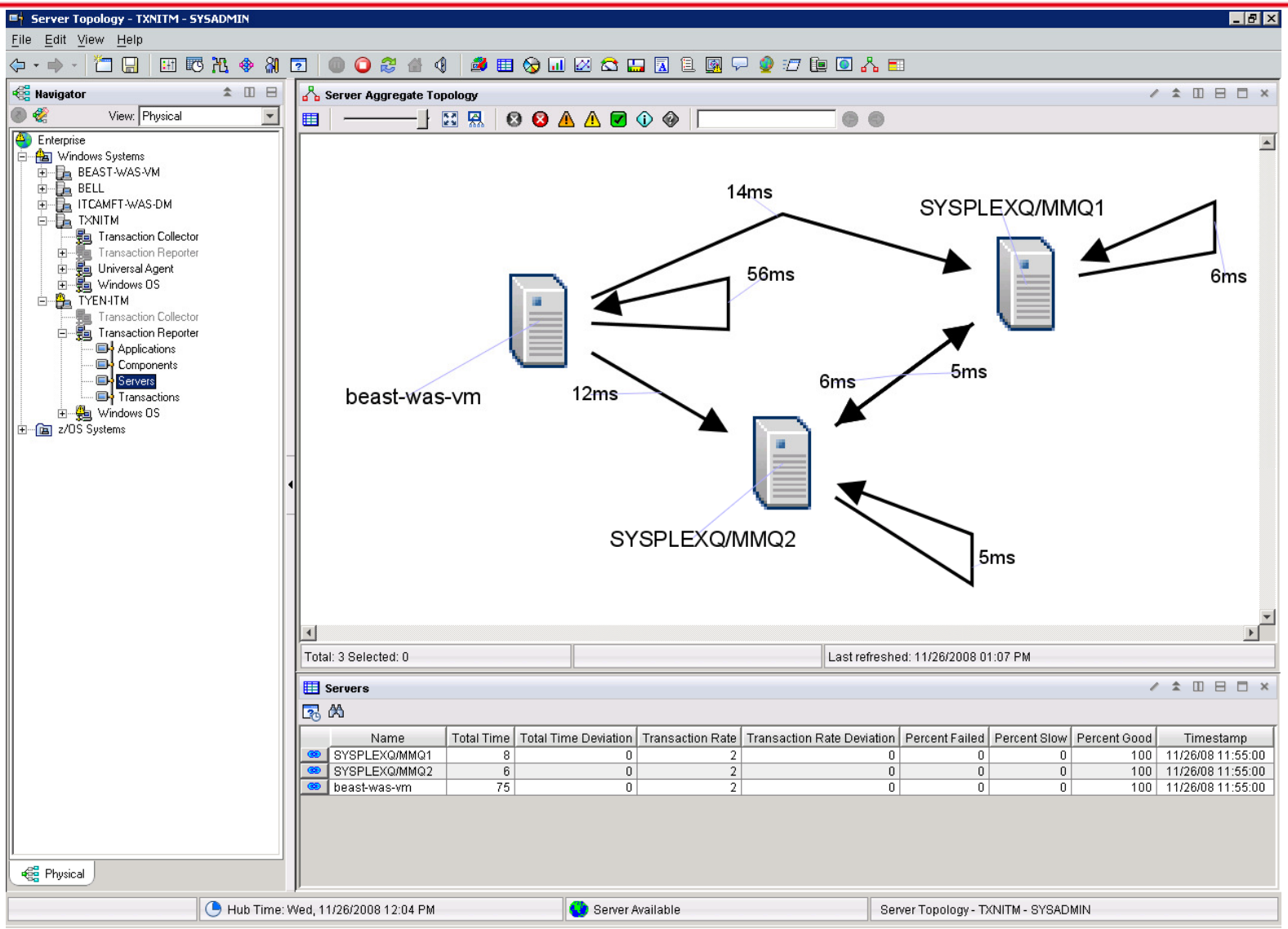








Server Topology



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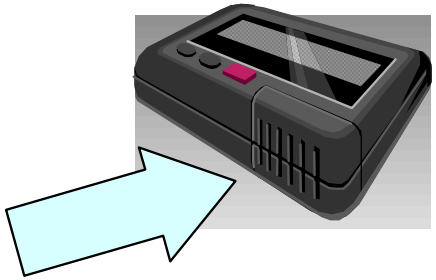

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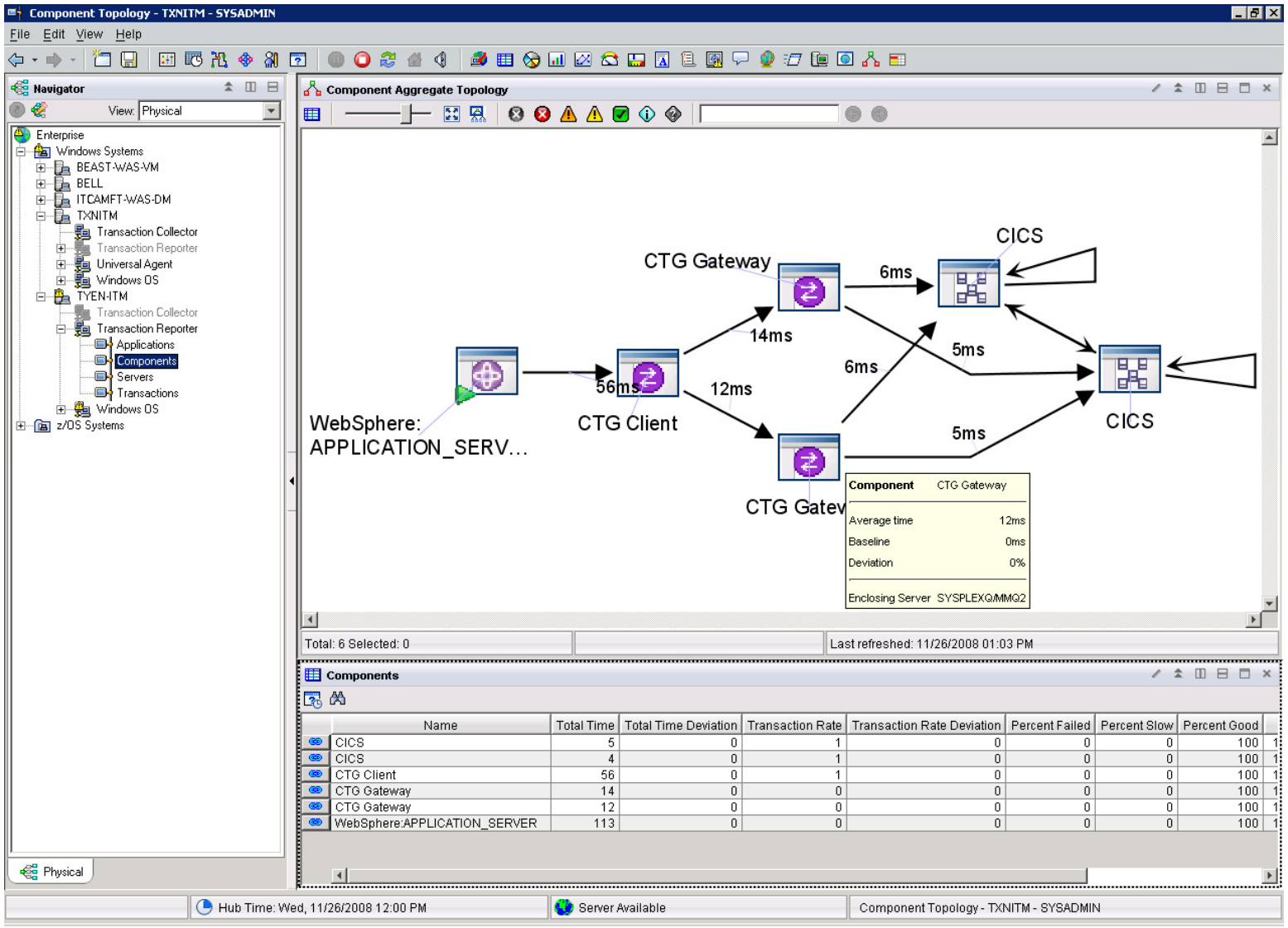
Component Topology
CTG Gateway Mouseover



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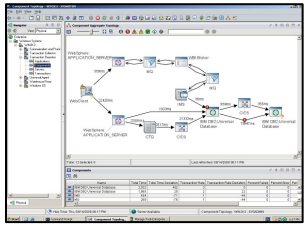
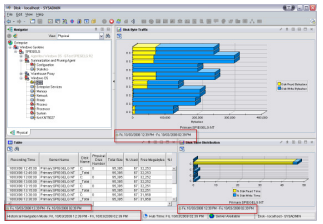
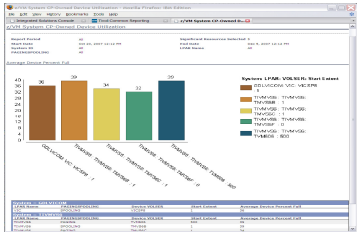
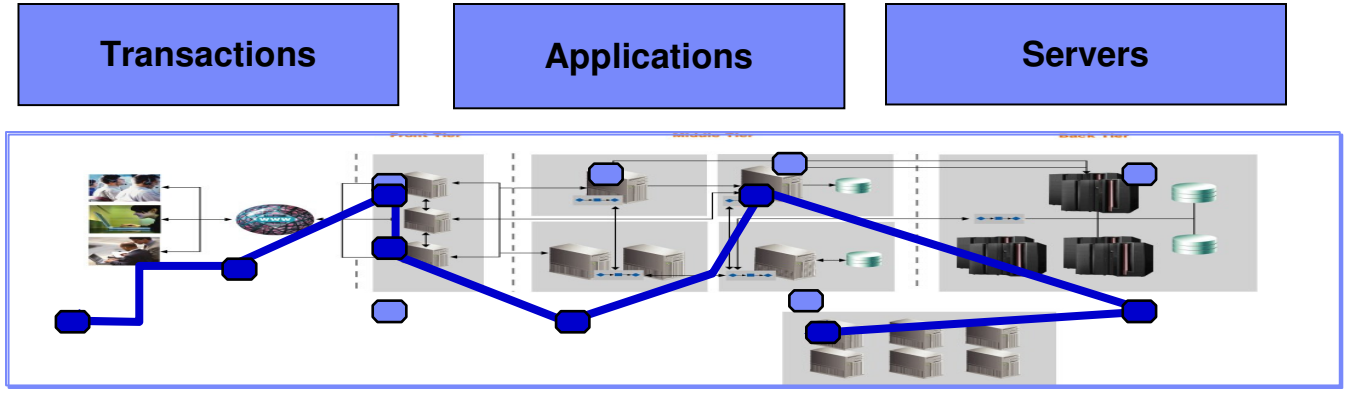
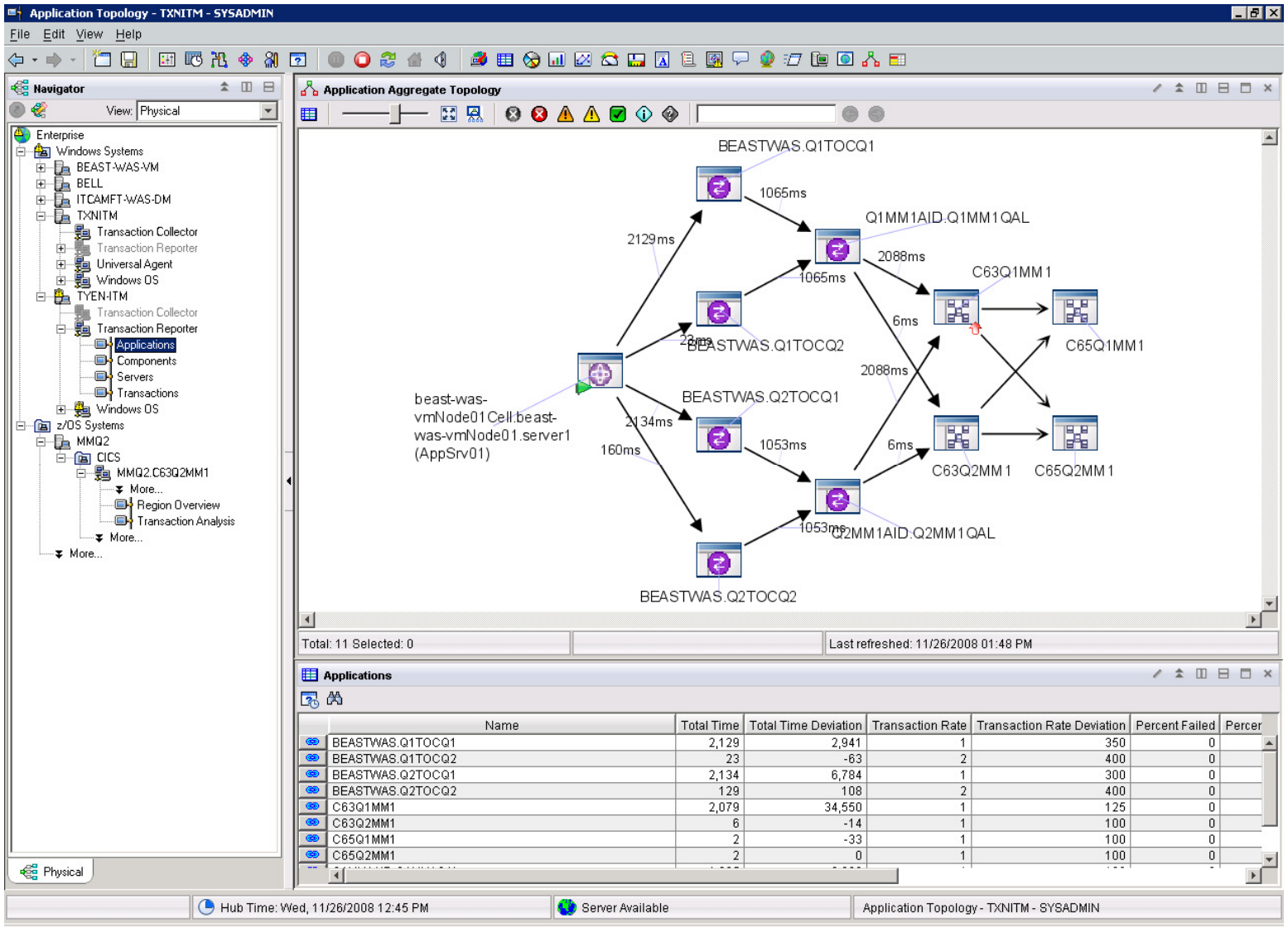








Application Topology
Slowdown in CICS C63Q1MM1



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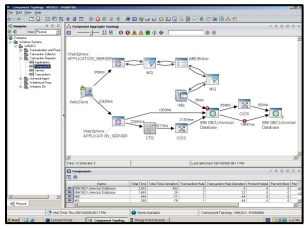

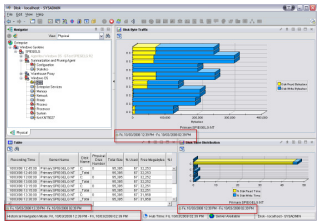

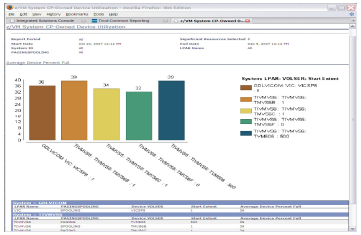

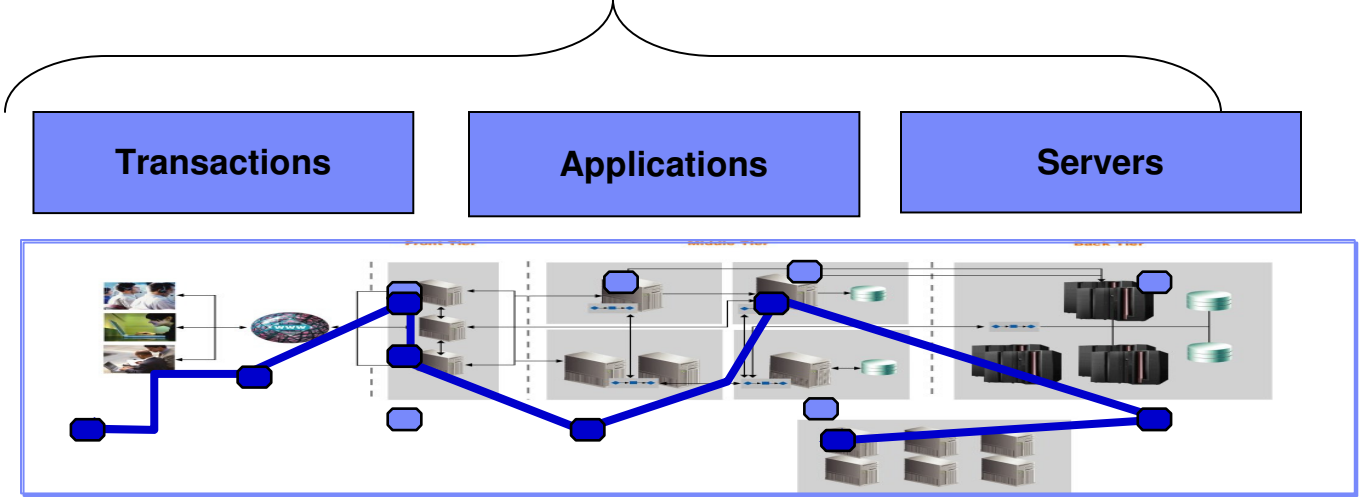

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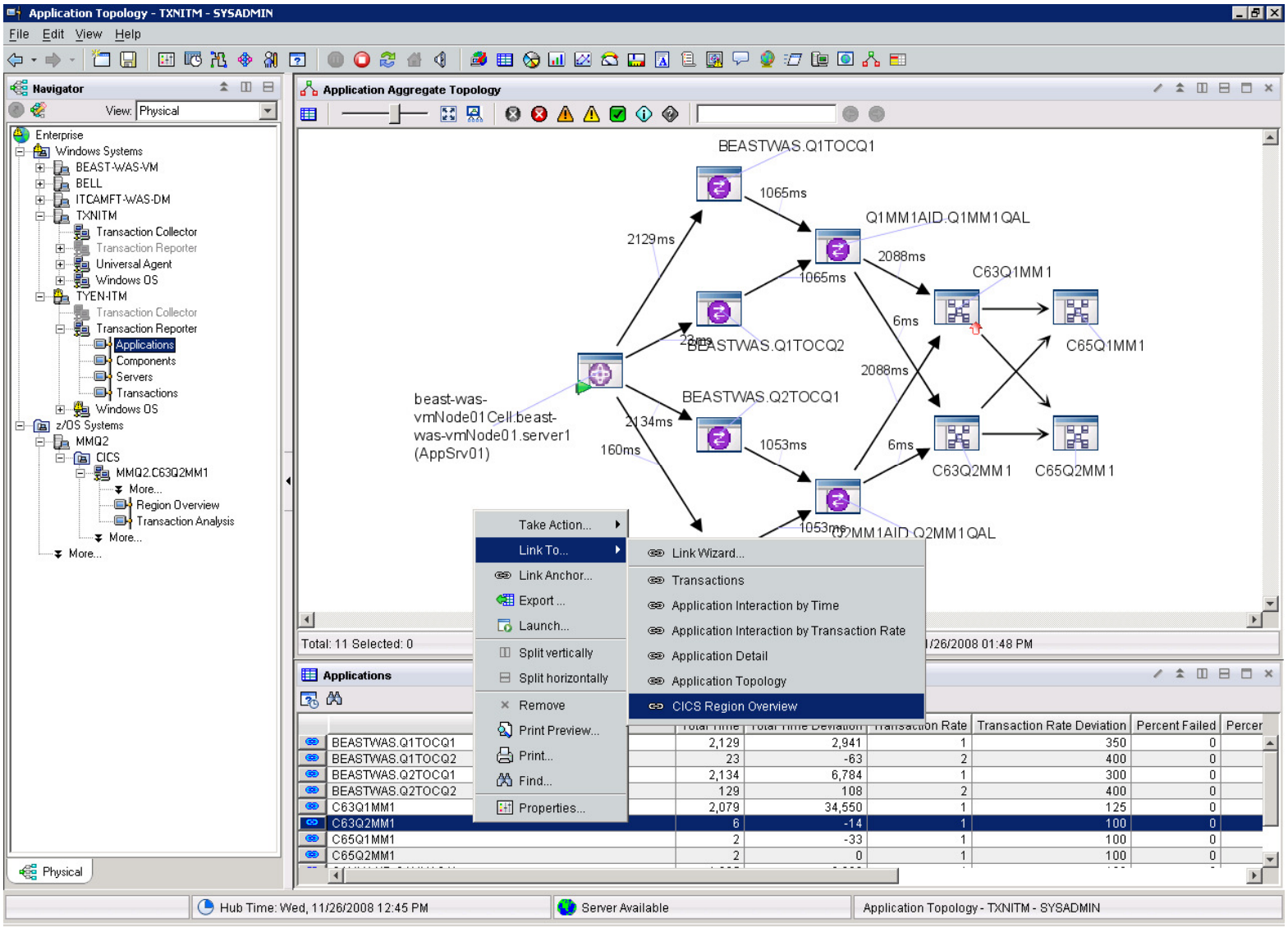
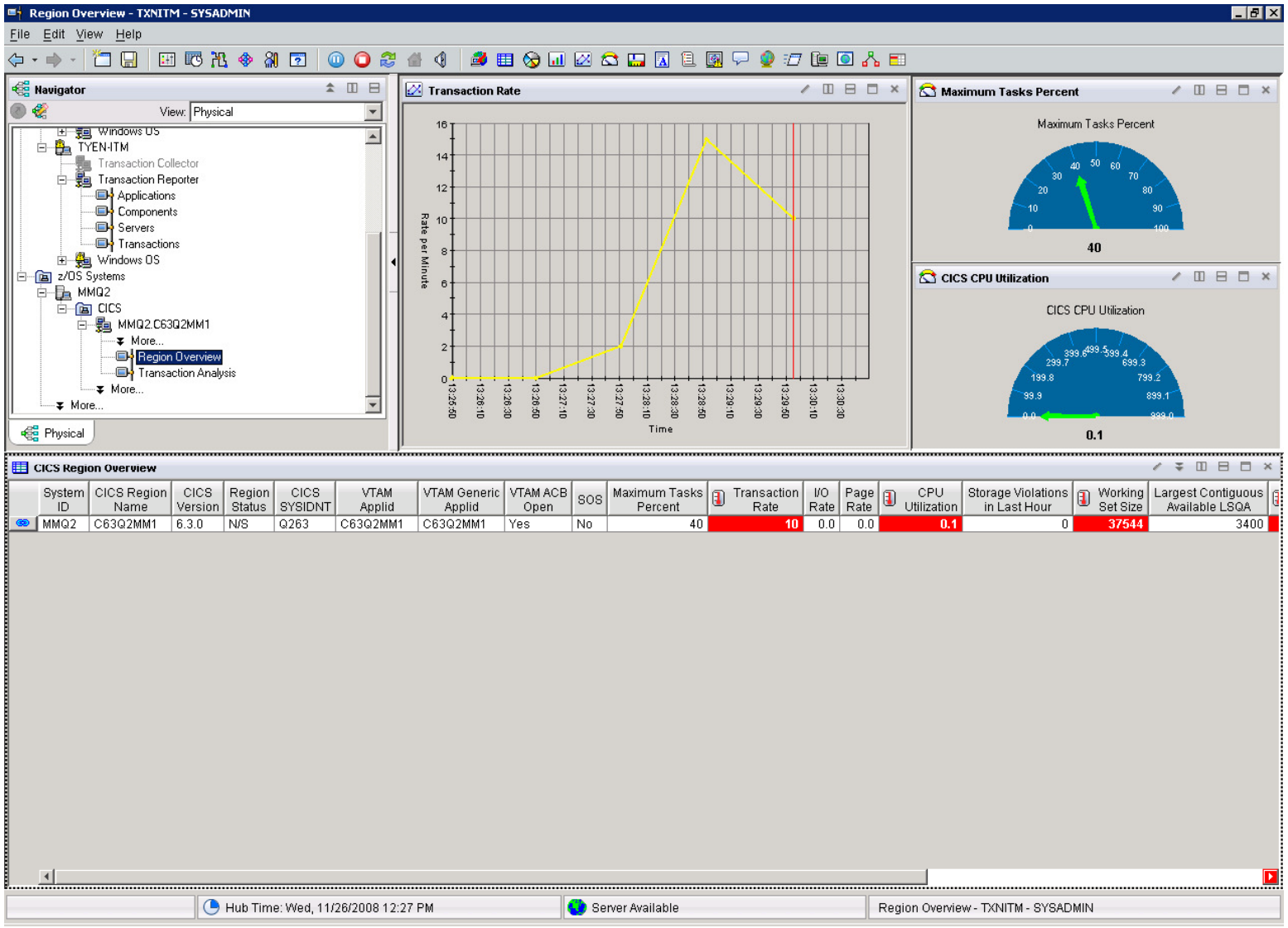
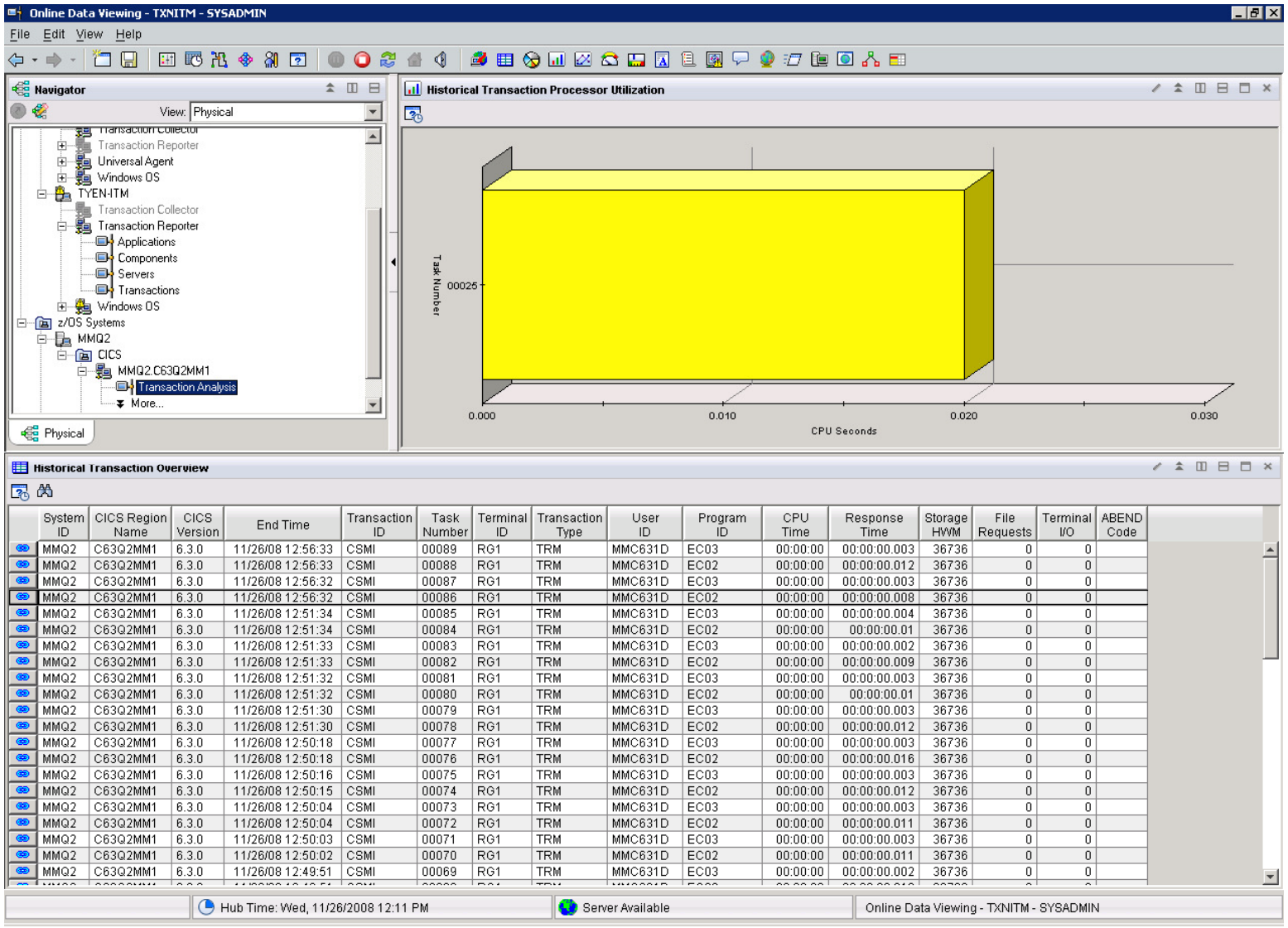


Omegamon XE for CICS
CICS Region Overview



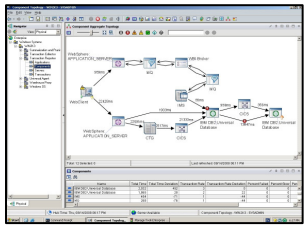
Omegamon XE for CICS
CICS Transaction Analysis

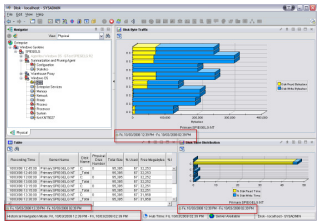


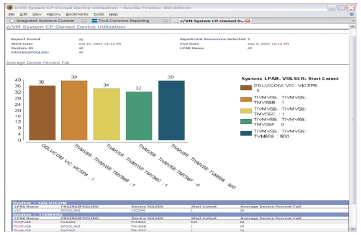
System ID	CICS Region Name	CICS Version	End Time	Transaction ID	Task Number	Terminal ID	Transaction Type	User ID	Program ID	CPU Time	Response Time	Storage HWM	File Requests	Terminal I/O	ABEND Code
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:56:33	CSMI	00089	RG1	TRM	MMC631D	EC03	00:00:00	00:00:00.003	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:56:33	CSMI	00088	RG1	TRM	MMC631D	EC02	00:00:00	00:00:00.012	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:56:32	CSMI	00087	RG1	TRM	MMC631D	EC03	00:00:00	00:00:00.003	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:56:32	CSMI	00086	RG1	TRM	MMC631D	EC02	00:00:00	00:00:00.008	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:51:34	CSMI	00085	RG1	TRM	MMC631D	EC03	00:00:00	00:00:00.004	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:51:34	CSMI	00084	RG1	TRM	MMC631D	EC02	00:00:00	00:00:00.01	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:51:33	CSMI	00083	RG1	TRM	MMC631D	EC03	00:00:00	00:00:00.002	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:51:33	CSMI	00082	RG1	TRM	MMC631D	EC02	00:00:00	00:00:00.009	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:51:32	CSMI	00081	RG1	TRM	MMC631D	EC03	00:00:00	00:00:00.003	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:51:32	CSMI	00080	RG1	TRM	MMC631D	EC02	00:00:00	00:00:00.01	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:51:30	CSMI	00079	RG1	TRM	MMC631D	EC03	00:00:00	00:00:00.003	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:51:30	CSMI	00078	RG1	TRM	MMC631D	EC02	00:00:00	00:00:00.012	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:50:18	CSMI	00077	RG1	TRM	MMC631D	EC03	00:00:00	00:00:00.003	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:50:18	CSMI	00076	RG1	TRM	MMC631D	EC02	00:00:00	00:00:00.016	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:50:16	CSMI	00075	RG1	TRM	MMC631D	EC03	00:00:00	00:00:00.003	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:50:15	CSMI	00074	RG1	TRM	MMC631D	EC02	00:00:00	00:00:00.012	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:50:04	CSMI	00073	RG1	TRM	MMC631D	EC03	00:00:00	00:00:00.003	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:50:04	CSMI	00072	RG1	TRM	MMC631D	EC02	00:00:00	00:00:00.011	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:50:03	CSMI	00071	RG1	TRM	MMC631D	EC03	00:00:00	00:00:00.003	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:50:02	CSMI	00070	RG1	TRM	MMC631D	EC02	00:00:00	00:00:00.011	36736	0	0	
MMQ2	C63Q2MM1	6.3.0	11/26/08 12:49:51	CSMI	00069	RG1	TRM	MMC631D	EC03	00:00:00	00:00:00.002	36736	0	0	

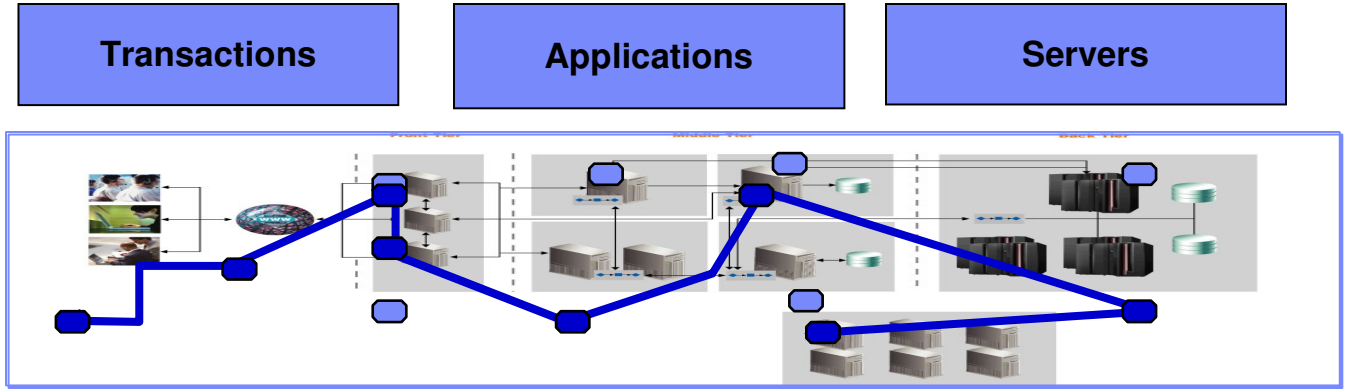
Composite Application Management and Resource Monitoring

- Monitor infrastructure performance and availability
- Increase application availability and customer satisfaction
- Improve MTTR and MTBF
- Diagnose application performance issues
- **Understand transaction flows over complex topologies**
- Monitor application response to ensure business expectations are met

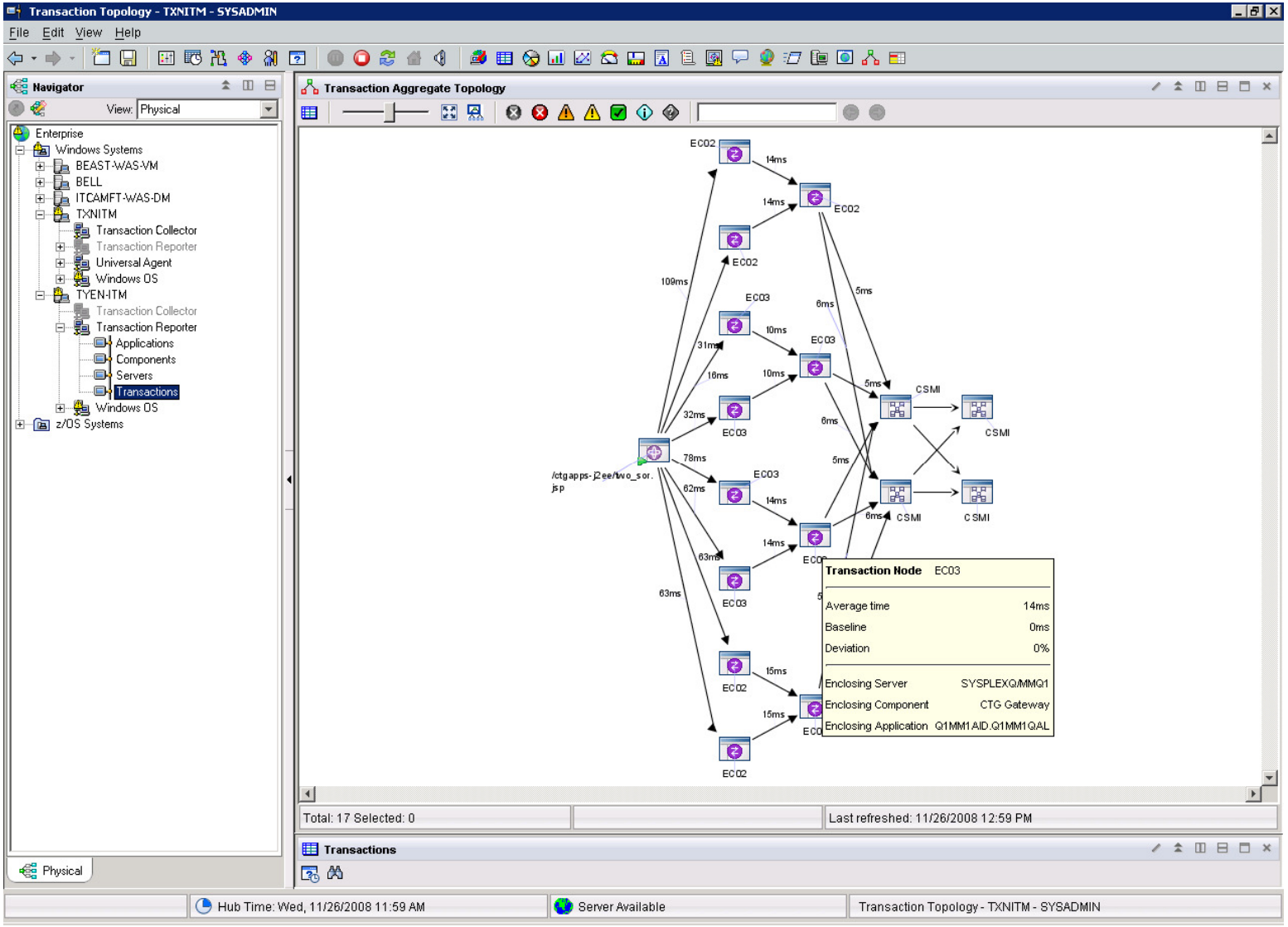






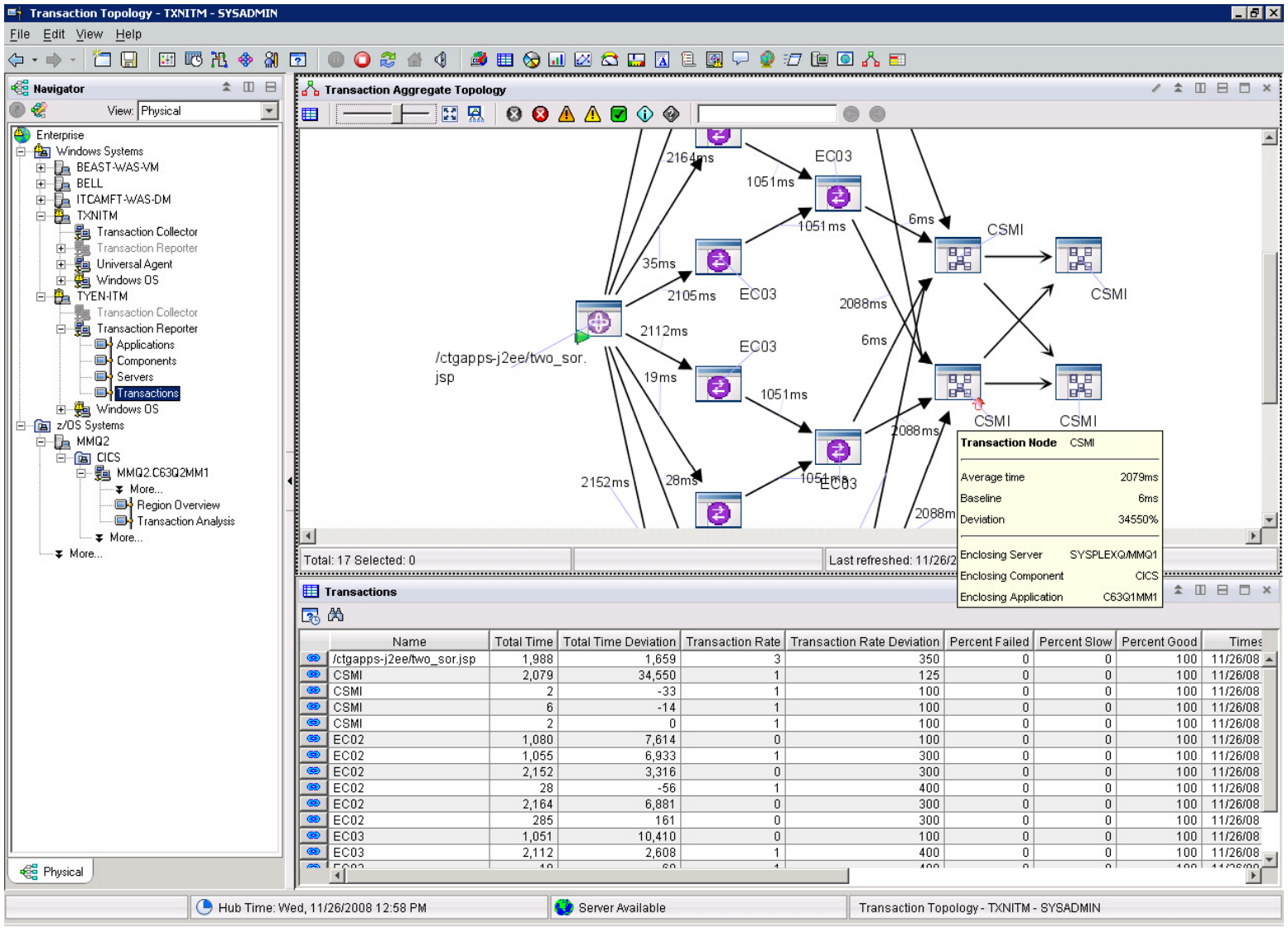


Transaction Topology
CTG Gateway Mouseover

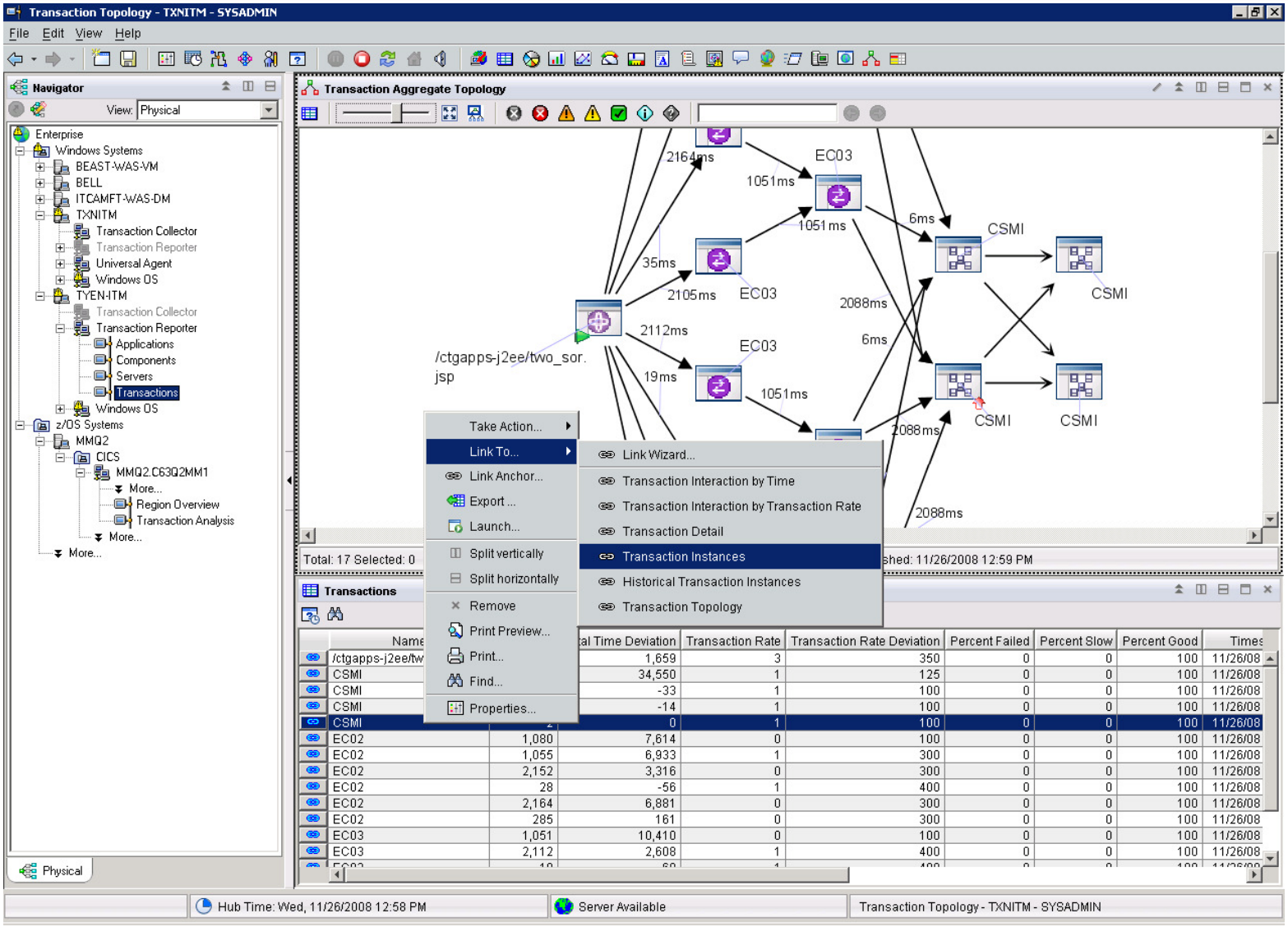


Transaction Topology

Slowdown in CICS Transaction – Transaction Mouseover

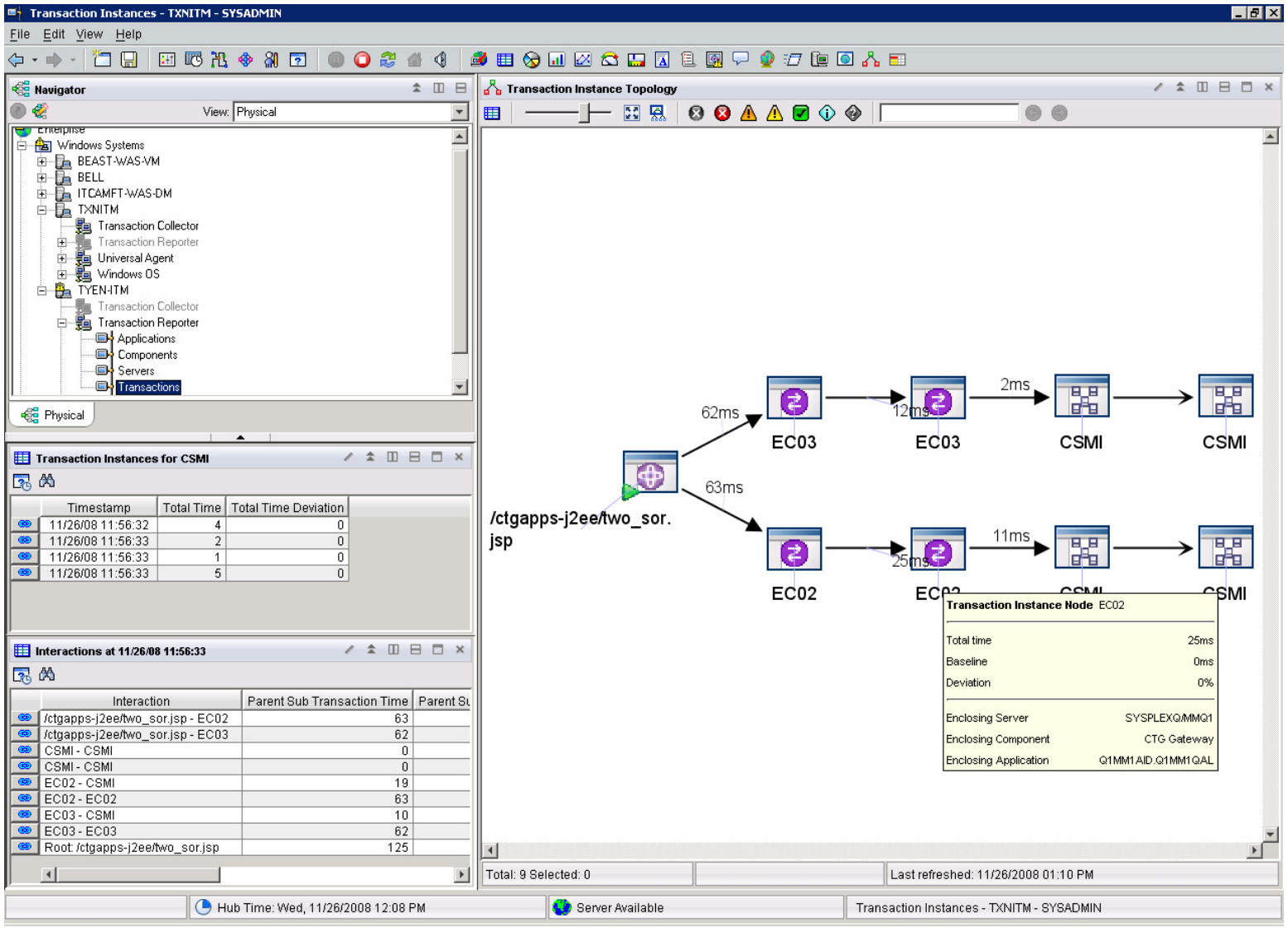


Transaction View
Link to Transaction Instance



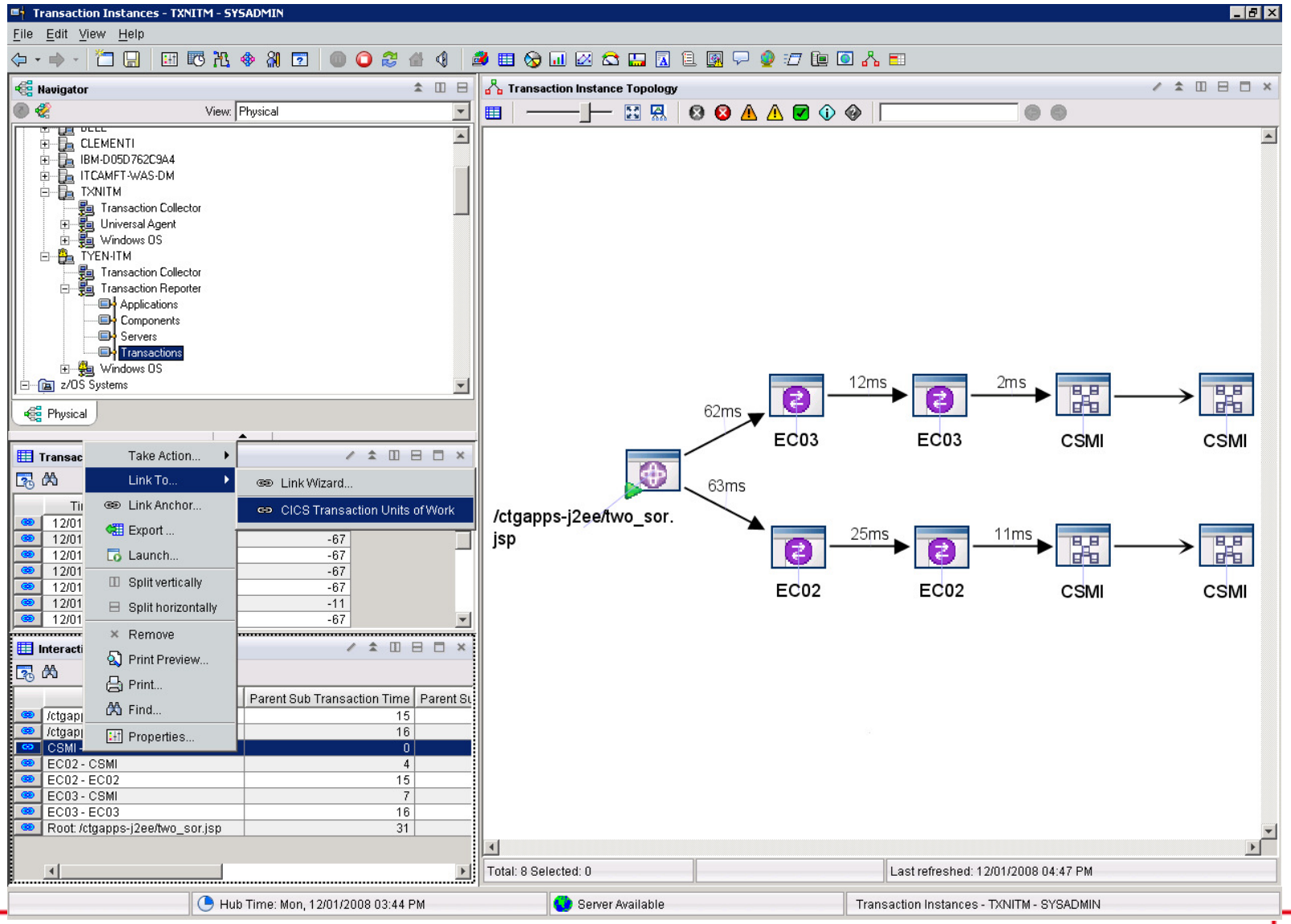
Transaction Topology

Transaction Instance View – CTG Gateway Mouseover



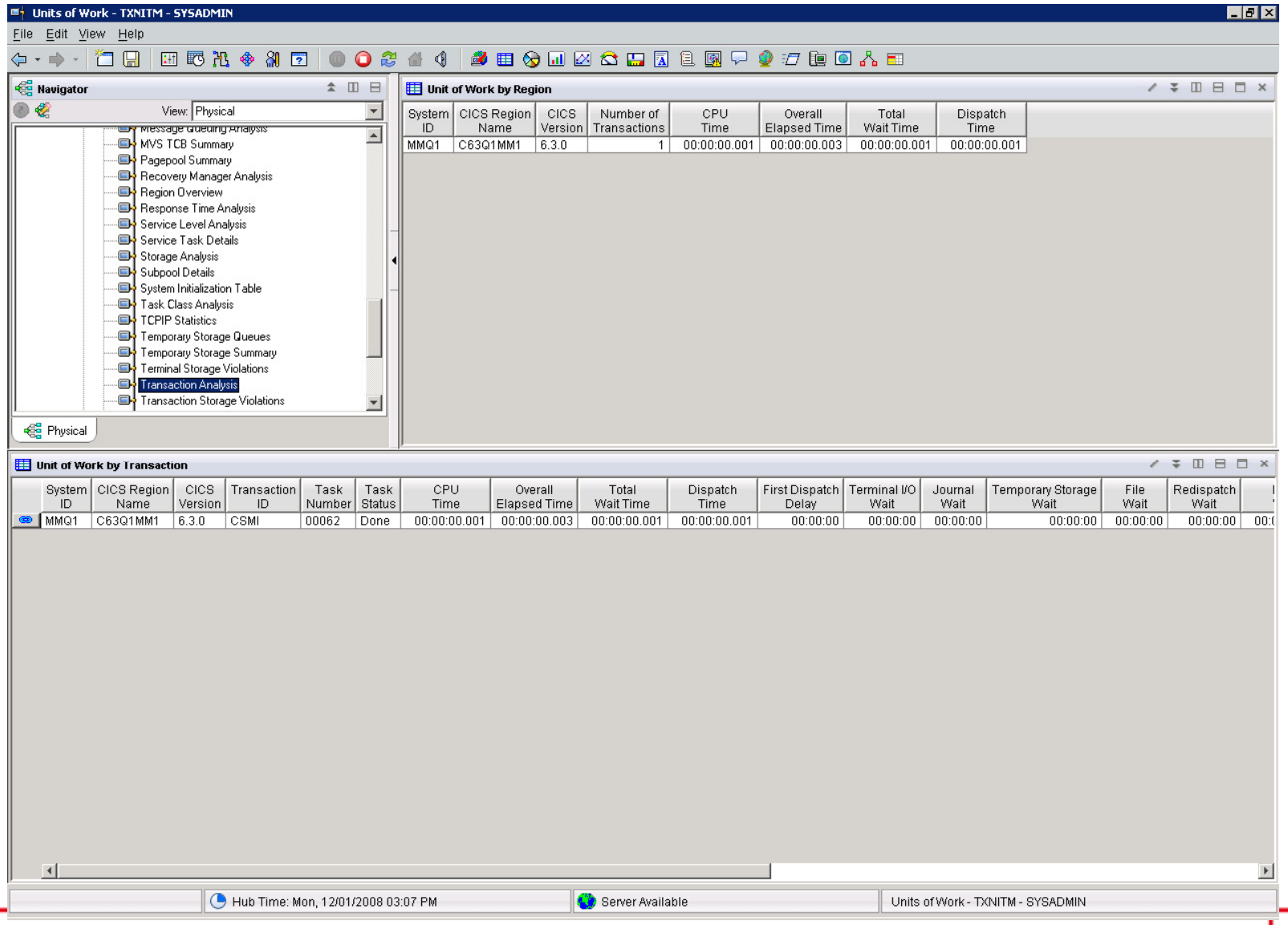
Transaction Topology

Link to Omegamon XE for CICS Transaction Units of Work



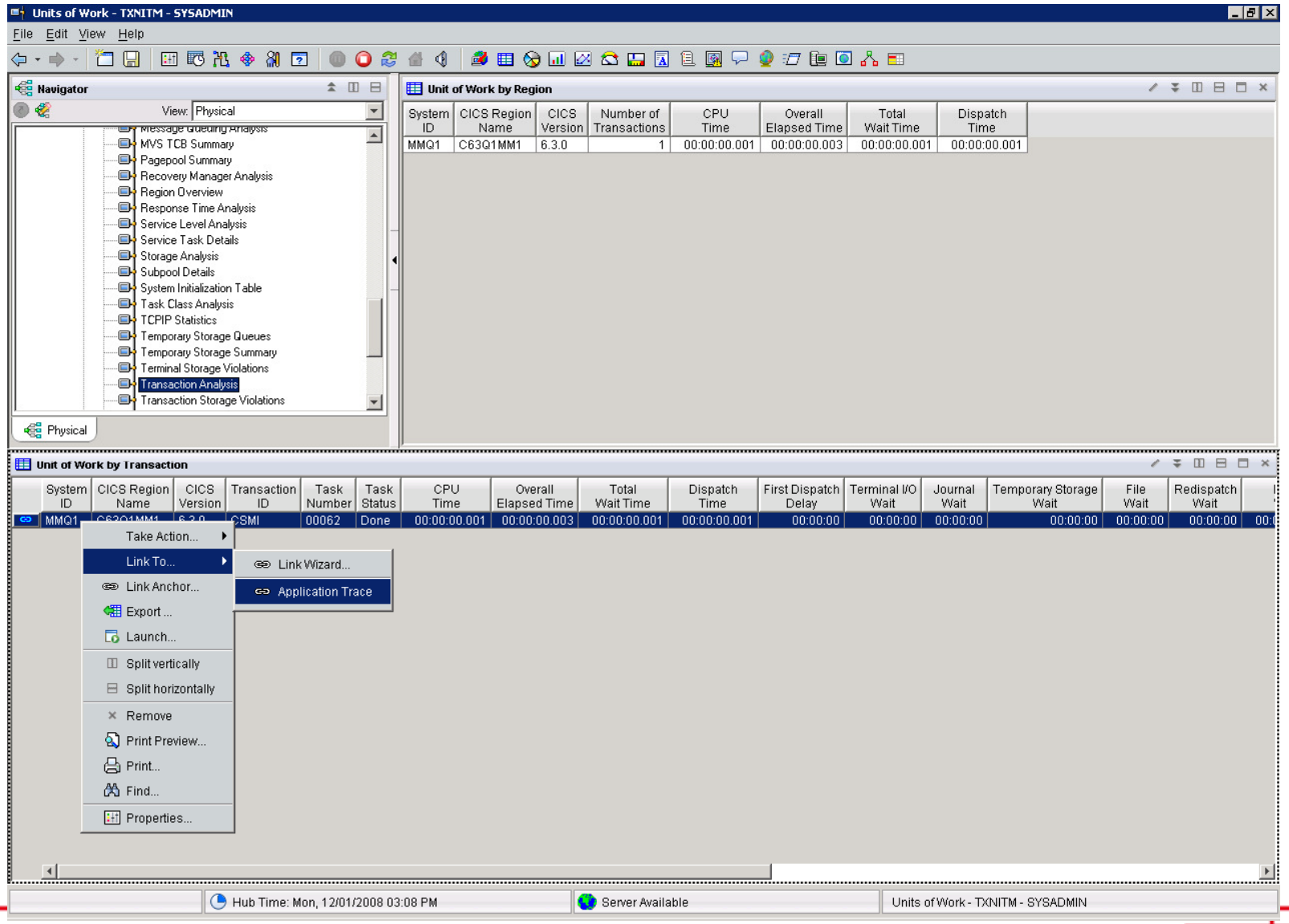
Transaction Topology

Transaction Analysis by Unit of Work

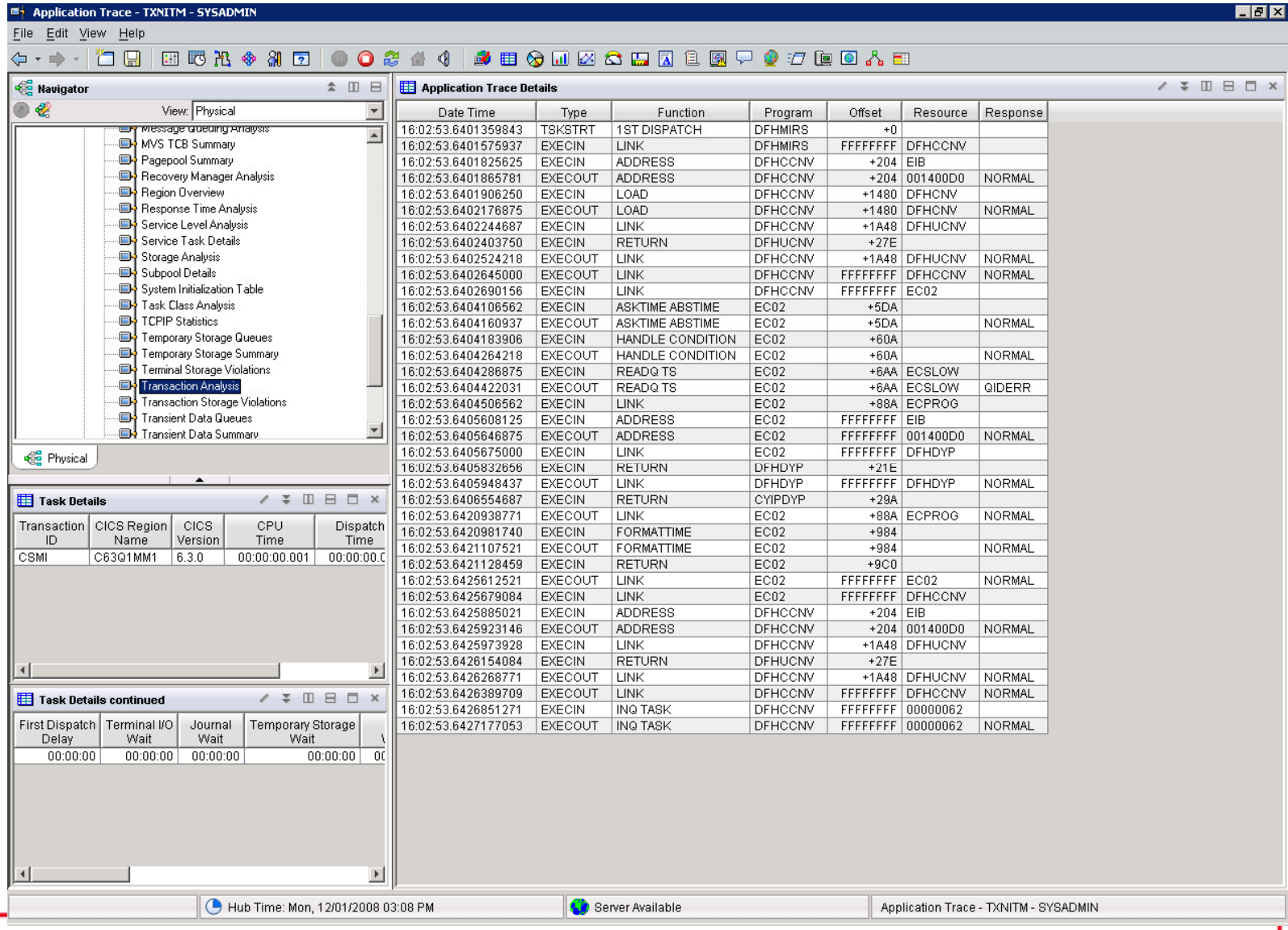


Transaction Topology

Link to Omegamon XE for CICS Application Trace



Transaction Topology
Application Trace



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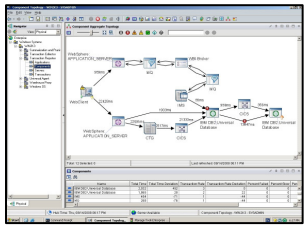
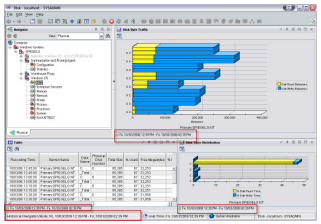
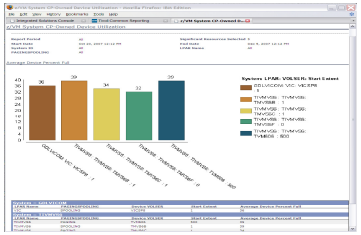
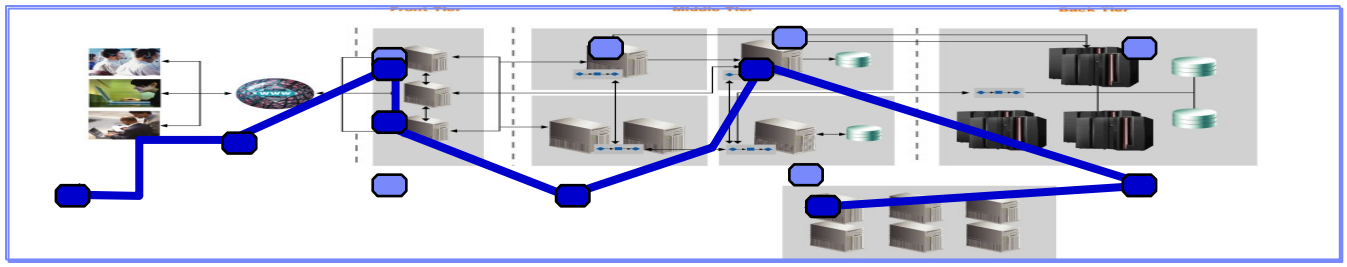






Transactions | **Applications** | **Servers**



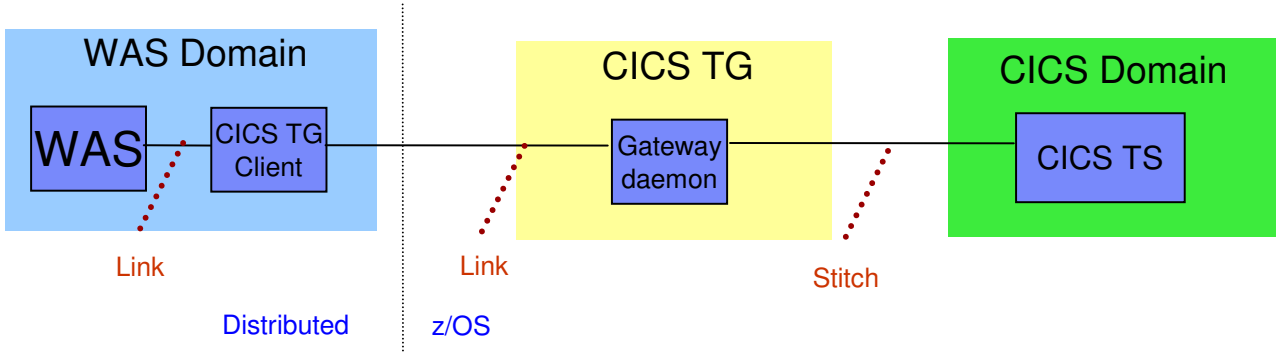
Detailed Application Response Metrics

Questions?

Backup

Dynamic Correlation – WAS to CICS via CICS TG

- Linking and stitching is also used in the correlation of transactions flowing between WAS and CICS via CICS TG



- The CICS TG client application (EJB, JSP etc) is deployed into WAS. Events generated by ITCAM for WAS can be linked to by the client application.
- A link is constructed between the CICS TG gateway daemon and the client application
- Finally details of the connection between the CICS TG and CICS is stitched together by connecting attributes acquired by the CICS TG data collector and ITCAM CICS data collector.
- This allows a tokenless correlation to be recorded from WAS through to CICS

CICS TG attribute	CICS stitching attributes
Derived Network UOWID	Network UOWID
CICS TG Jobname	Exci caller Jobname
CICS TG Stepname	Exci caller Stepname
CICS TG SMFID	Exci caller SMFID

An example of CICS TG to CICS stitching via an EciSynconreturn transaction over EXCI

Introduction to IBM Tivoli Resource Monitoring
A Common Portal, Information and Automation Infrastructure

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Tivoli Enterprise Portal (TEP)

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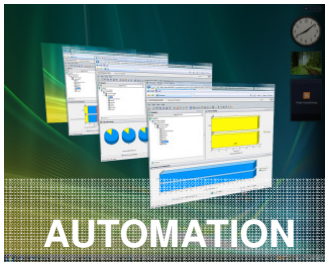
Tivoli Data Warehouse (TDW) and Situations



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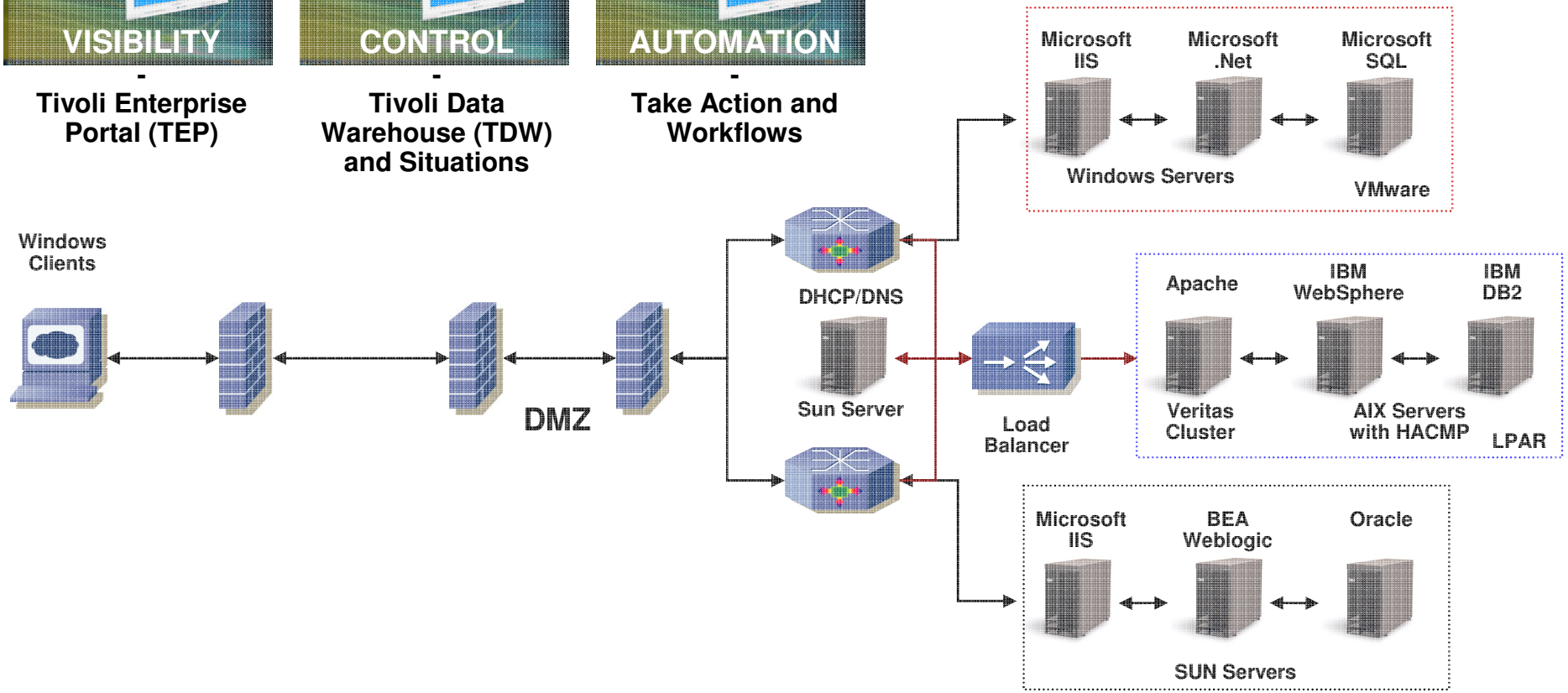
Take Action and Workflows

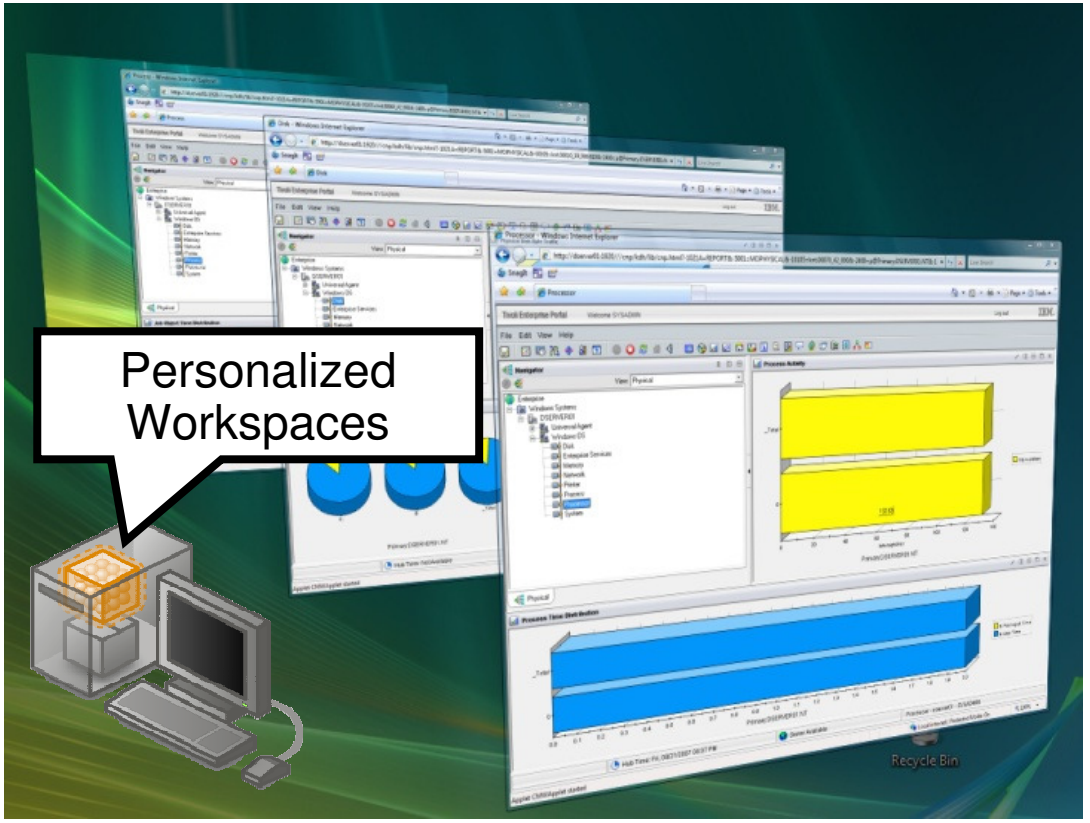


IBM Tivoli Monitoring - Visibility
IBM Tivoli Enterprise Portal (TEP)

Tivoli Enterprise Portal (TEP)

The Tivoli Enterprise Portal (TEP) is the central location to view and act on contextualized information provided by the system monitors

- **Consolidated** view and **contextual** information can significantly reduce mean time to recovery by aiding in **"root cause"** analysis
- **Centralized** visualization of real-time and historical data can help with "intermittent" problems
- **Personalized** views based on the user roles and scope
- **Visualization of resource utilization** can highlight areas to reduce costs
- Anything visualized in the TEP is available **in the Data Warehouse**

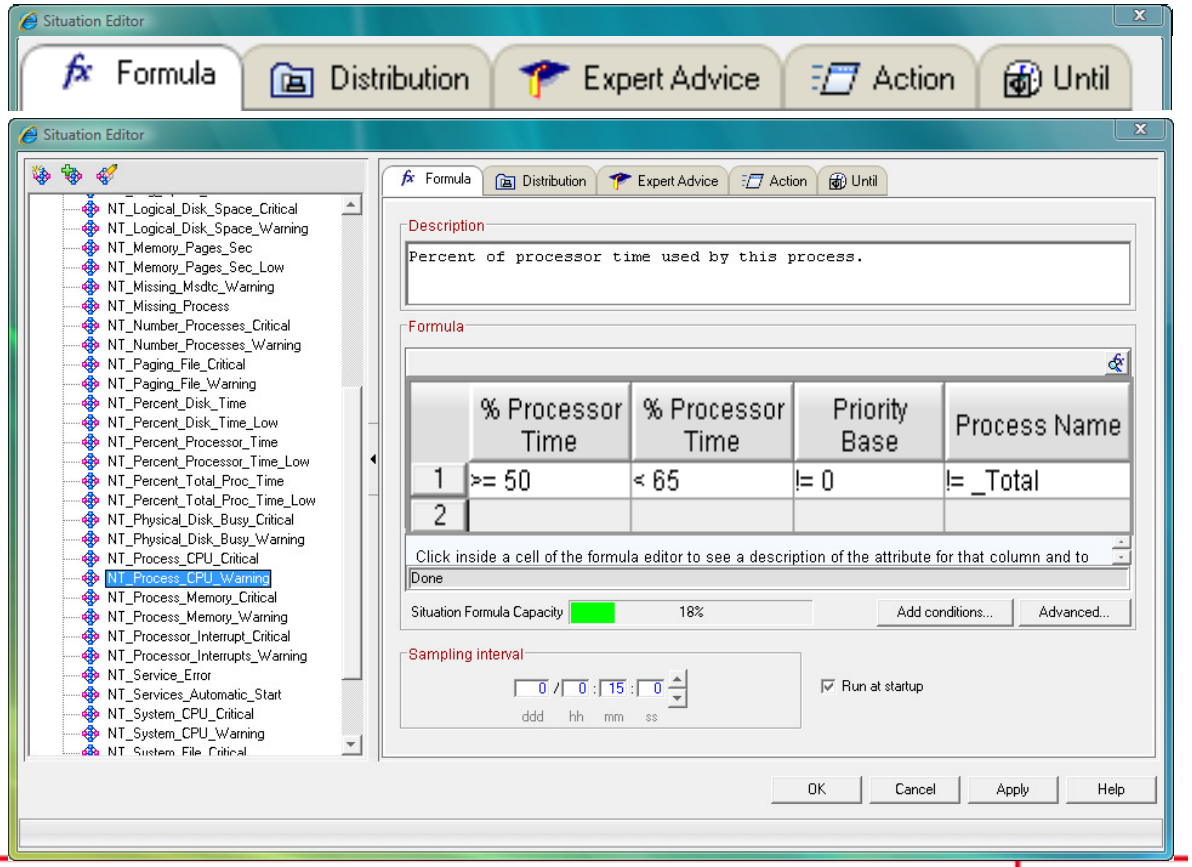


IBM Tivoli Monitoring - Control
Alerting through Situations

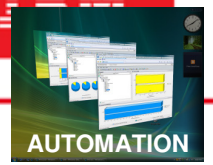
CONTROL
-
Tivoli Data Warehouse and Situations

Situations allow operators to quickly define, distribute and take a reflex action to a set of defined conditions in any monitored resource

- Pre-defined **out-of-the-box** situations provide immediate return on investment and fast time to value
  - **Extended** situations reduce false alerts and raise confidence of operators that alerts are real
- Easy **distribution** to a set of targets
- **Expert Advice** imbeds run book automation
- **Tight integration** into root cause analysis and correlation tools improve mean time to recovery



IBM Tivoli Monitoring - Automation
Capture and Replay Best Practices by Take Action



Take Action and Workflows

Take Action allows for entry of individual commands and either manual or automated processes to be executed in response to an individual situation

- **Out-of-the-box** take actions provide immediate return on investment and fast time to value
- **Reflex Action** allows the return of a server to a specified state even though disconnected
- **Personalized** take actions can capture a local best practice for unique situations and execute it preemptively
- **User-defined** text can also imbed knowledge that may be unique to a particular situation