Best practices for System z composite application management

Agenda

- ✓ Composite application challenges
- What to Expect from an Application Management Solution to Achieve Best Practices
- SOA and Federated Identity Management for z/OS
- Julie Craig, Senior Analyst, Enterprise Management Associates
- Summary

Composite Applications

CIO's top priorities are to deliver business agility / innovation while retaining a resilient business
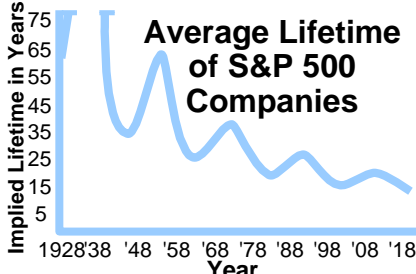
Complexity

Increased complexity makes change much harder

Compliance

The changing global regulatory and business environment requires security, privacy and ongoing audit capabilities
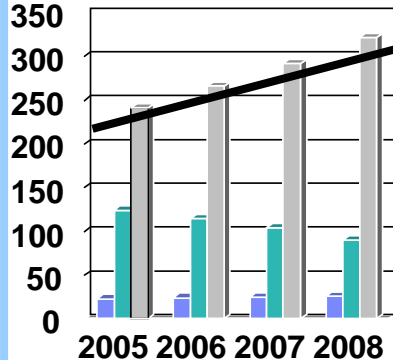
Change

Average Lifetime of S&P 500 Companies

Implied Lifetime in Years: 75 65 55 45 35 25 15 5

Year: 1928 '38 '48 '58 '68 '78 '88 '98 '08 '18

Increased competitive pressure to change and adapt while IT has an increasing role in every business process

Rising Cost of Operations

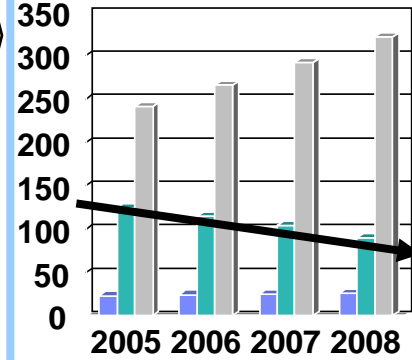350 300 250 200 150 100 50 0

2005 2006 2007 2008

The cost of operations continues to increase at 10% CAGR … twice the rate of the IT budget
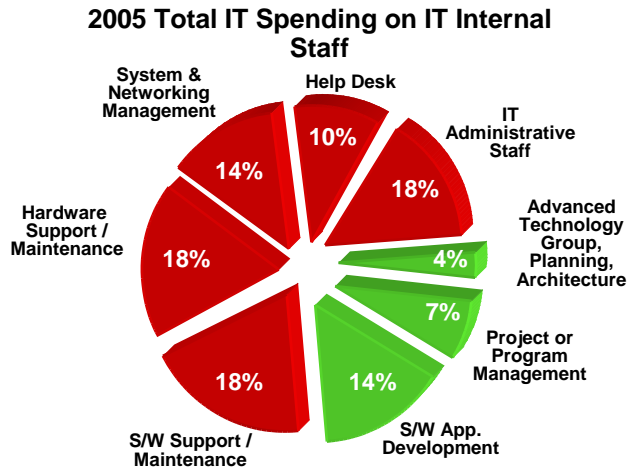
Inability to Innovate

350 300 250 200 150 100 50 0

2005 2006 2007 2008

The percentage of application development budget is shrinking at -10% CAGR … which can reduce business agility, increase business risk, and increase frustration with IT

Challenges with IT Effectiveness and Efficiency

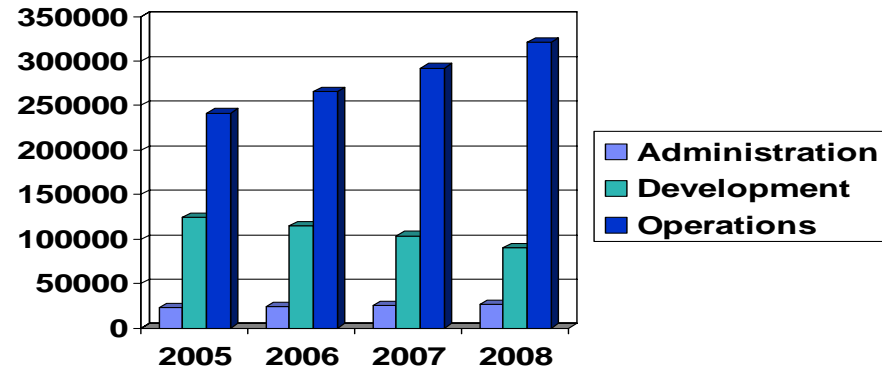Labor continues to comprise over 70% of IT Operations spending:

2005 Total IT Spending on IT Internal Staff

- System & Networking Management 14%
- Help Desk 10%
- IT Administrative Staff 18%
- Advanced Technology Group, Planning, Architecture 4%
- Project or Program Management 7%
- S/W App. Development 14%
- S/W Support / Maintenance 18%
- Hardware Support / Maintenance 18%

IT Operations spending not aligned with Business Objectives:

- **Overall IT budgets grew smaller than corporate revenues in 2006 – requiring improved IT efficiency to meet demand – Gartner**
- **77% of firms rated improving IT efficiency as the most important operational priority in 2006**
- **IT Operational Labor spend will be $260B in 2007**

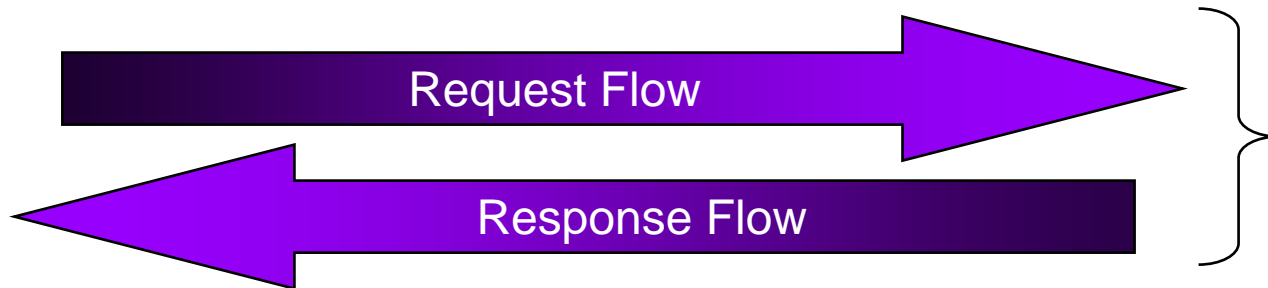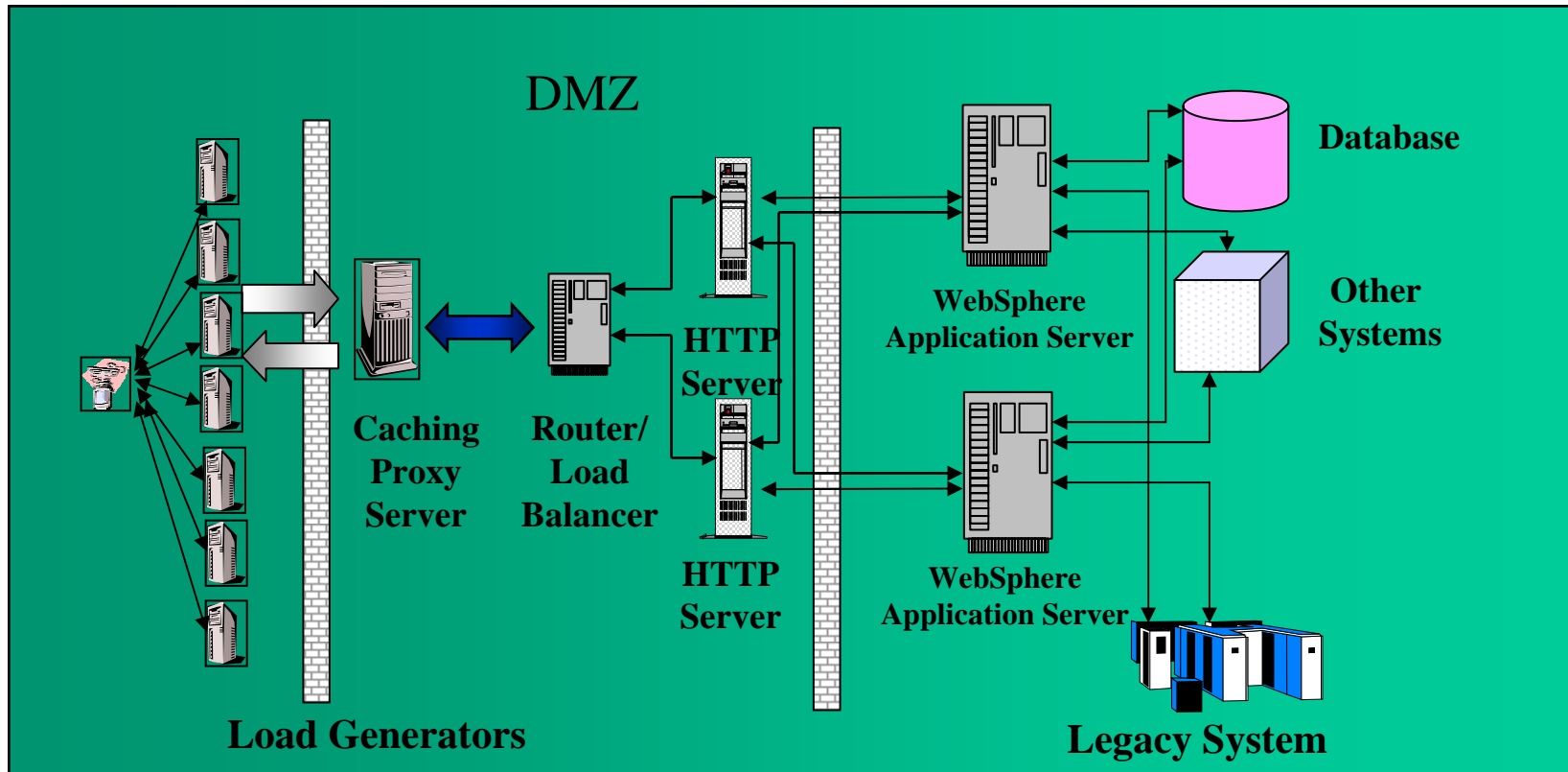IT Organizations cannot keep pace with change and complexity

- **85% of problems are caused by IT making changes to the environment**
- **SOA, Virtualization and composite applications increase complexity**
- **Customers become the IT Systems Test Team**
- **Complexity exposes lack of integration across IT organizations**

Increases in operations expenses take away from new innovation

Legend:
- Administration
- Development
- Operations

(Bar chart, years 2005, 2006, 2007, 2008; y-axis 0 to 350000)

Source: Gartner Group, IT Spending & Staffing surveys

Composite Applications

Composite Application Management Makes Problem Determination Challenging – Typical Complex Environment

DMZ

Database

WebSphere
Application Server

Other
Systems

HTTP
Server

Caching
Proxy
Server

Router/
Load
Balancer

HTTP
Server

WebSphere
Application Server

Load Generators

Legacy System

Request Flow

Response Flow

Request flow traverses
• OS platforms
• Physical machines
• Multiple networks
• Network hardware

Problem Domain:
When a problem occurs, where is it?

Time to play the "Blame Game…"

Enterprise Users

Database

Internal Web Server

Edge Server

Middleware

External Web Servers

Web Application Servers

Legacy Systems

Internet Users
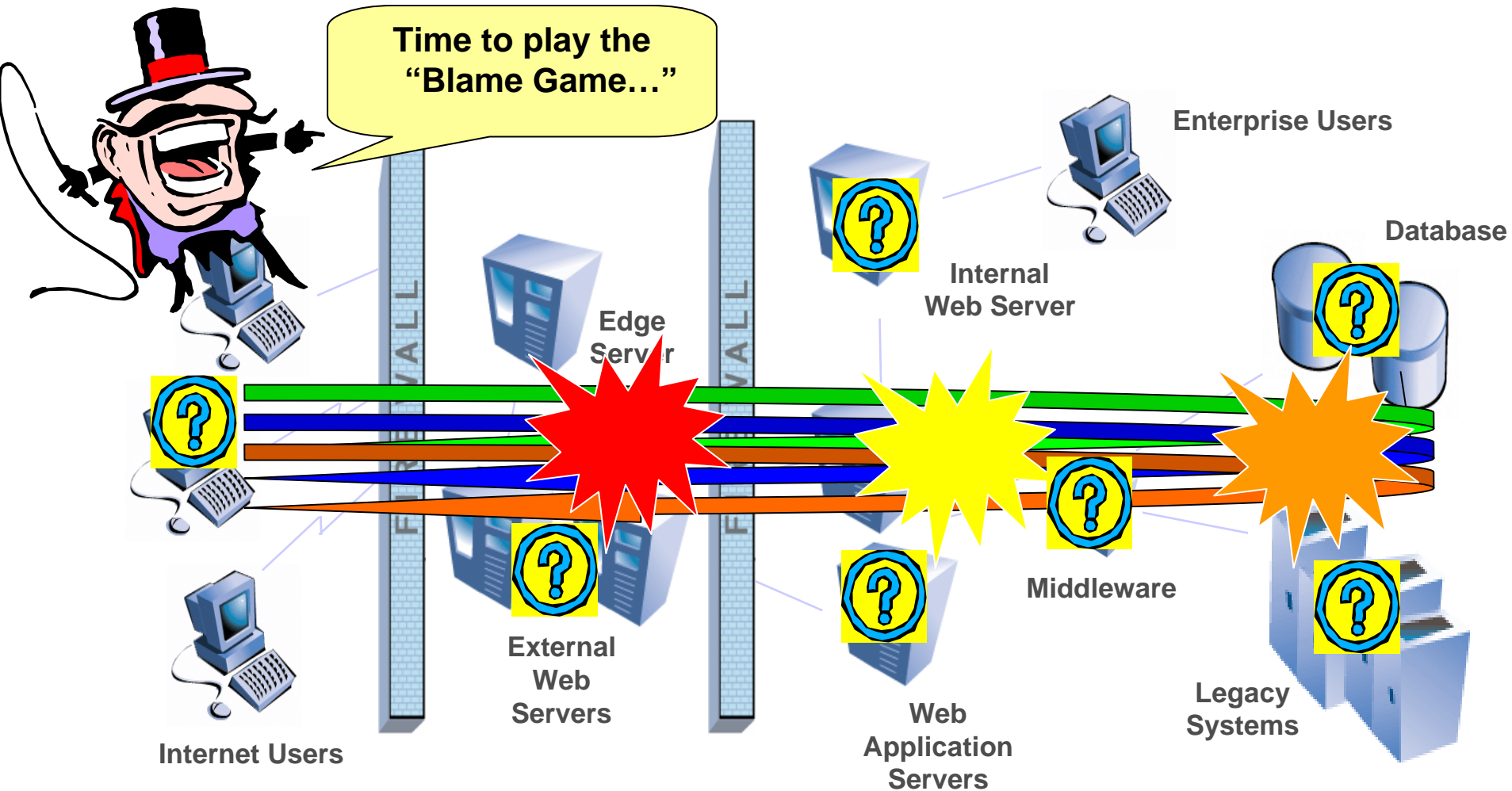
Often secondary errors in other applications

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Investigate the crime

- Understand that a crime has been committed

- Collect the Evidence

- Identify and prosecute the Guilty!

End User Response Measurement
Quickly identifies whether a crime has been committed

ITCAM for Response Time Tracking

- Awareness of customers response time experience

- See transaction paths to speed problem isolation

- Automated learning of response times

- Validation of end user service level delivery

See transaction paths to speed problem isolation

- **Track requests / transactions as they travel through different kinds of application servers / regions.**

Examples of scenarios with z/OS backend:

WAS -> MQ -> WAS	**WAS -> SOAP/HTTP -> WAS**
WAS -> CICS Transaction Gateway -> CICS	**WAS -> MQ -> CICS**
WAS -> SOAP/HTTP -> CICS	**WAS -> RMI/IIOP -> WAS**
CICS -> MQ -> WAS	**CICS -> SOAP/HTTP -> WAS**
CICS -> SOAP/HTTP -> CICS	**CICS -> DPL -> CICS**
WAS -> IMSConnect -> IMS	**WAS -> MQ -> IMS**

- **Trace transactions inside application servers / regions**

Composite Applications

Benefits of transaction tracking and tracing

- **Transaction tracking example**

Determine the exact path of a transaction from a CICS TOR to many symmetric CICS AOR's:

- Validate load balancing algorithm

- Accurately contribute to Impact Analysis

- **Transaction tracing example**

Determine the impact of ASCII/EBCDIC COMMAREA conversion in a CICS region when accessed by a WAS application via the CTG

- CPU utilization by the DFHCCNV program

Complete Transaction Trace (Servlet)

Complete Transaction Trace (IMS transaction)

Complete Transaction Trace (Detailed trace)

Composite Applications

In-Flight Request Search Page

Blocked Transaction Trace (Servlet)

No arrow coming back !

Composite Method Trace - Microsoft Internet Explorer

File   Edit   View   Favorites   Tools   Help

Back   Search   Favorites   Links

Address http://dev-lnx-w15.usca.ibm.com:9080/am/ve/sad/samTrace?thread=730159728&clone=101.149   Go

Request. The Flow View presents all requests in their order of execution, and identifies slow or expensive requests using the Threshold Highlighter. The Flow View also lets you export to a file or email pdf. The Search tab allows for search using specific characteristics.

MENU

Select New Thread

Composite Stack Trace

Composite Method Trace

⊞ TRANSACTION OVERVIEW

Nesting Summary   Drilldown View   **Flow View**   Search

📝 Threshold Highlighter

Δ Elapsed Time >= `5` (ms)   Δ CPU Time >= `5.0` (ms)   Apply   Reset

COMPLETE FLOW VIEW (TVT6006.TVT6006.cb61001.95 (L3))   1000 per Page

🟧 Queue Names Match   ⬜ Queue Names Don't Match   ** indicates values that cross thresholds

1 - 2 of 2 Results   1

Depth	Event Type	Event Data	Elapsed Time (ms)	CPU Time (ms)	Δ Elapsed Time (ms)	Δ CPU Time (ms)
0	Servlet Entry	/cyanea_one/testware/samimsIVTNOCM0	0	0	0	0
		To: DEMO.PLEX1..TVT6006.I91A.73 (L3) Platform: ZOS App Server: IMS Event: Invoke				

🟧 Queue Names Match   ⬜ Queue Names Don't Match   ** indicates values that cross thresholds

1 - 2 of 2 Results   1

🟢 Internet

start   5:50:59 - A...   Jean-Jacqu...   Composite ...   Microsoft Po...   Vista Session A   http://9.42....   99%   7:46 PM Thursday 2/15/2007

Blocked Transaction Trace (IMS Transaction)

What to monitor in an application environment

- **Response Times**
  - End user and transaction times
  - Service response in an SOA

- **Resources** that affect performance
  - System resources
  - Application environment resources
  - Application resources

- On demand collection of **diagnostic data** when required

- **Historical** monitoring of data collection for trend analysis and reporting

- **Actionable** metrics for creating performance and availability management automation

WebSphere Resource Views in ITM / TEP

- J2EE resource pools are critical in terms of providing availability to commonly accessed services such as database access and other container pool types. This workspace enhances PMI data with configuration data to provide a comprehensive overview of requests flowing through WebSphere "funnel".
- Use resource monitoring automation to watch for critical resource and take action automatically
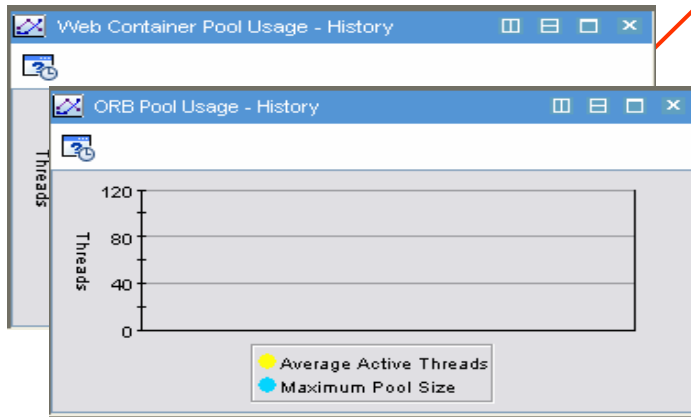
Comparison of recent active threads in ORB pool

Visual correlation of CPU utilization vs. pool consumption
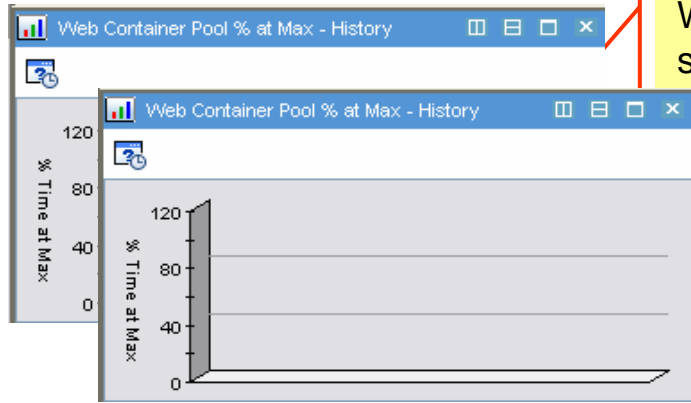
Web container pool statistics showing # times at maximum capacity

DB2 and J2C connection pools at full saturation
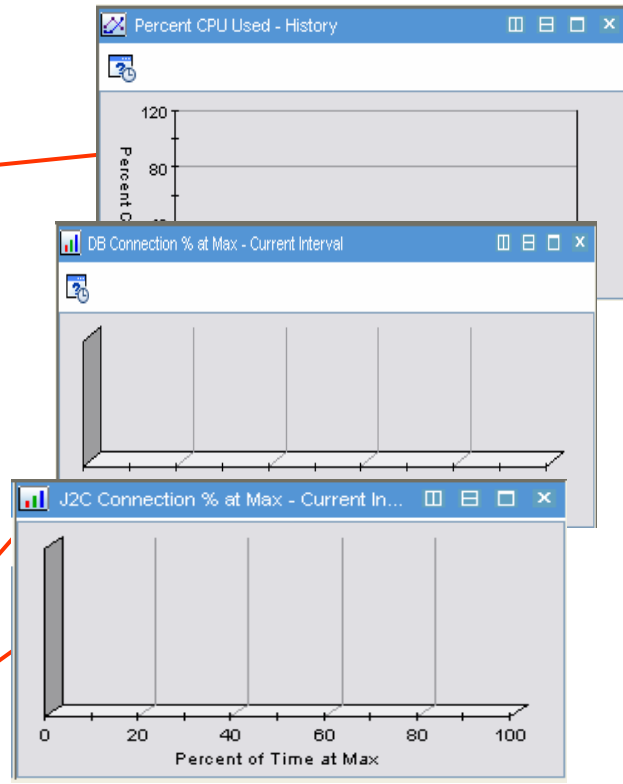
System Resources Overview – z/OS

Composite Applications © 2006 IBM Corporation
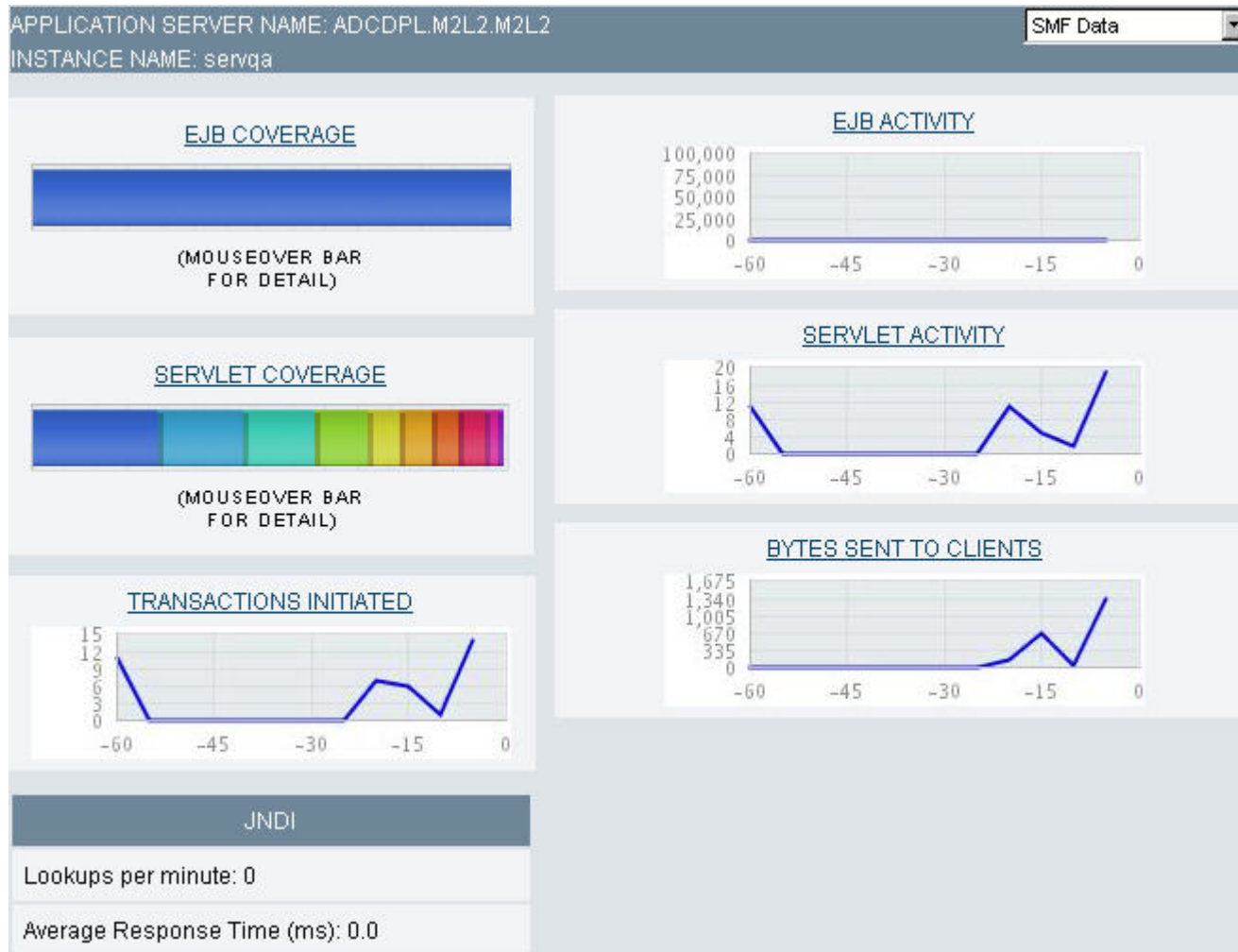
ITCAM for WebSphere - WLM Associated Service Class Summary page

View Service Class and Enclave

Service Class | Enclave

ADDRESS SPACE PROPERTIES

Server Name (Region)	ADCDPL.M2L2.M2L2.servqa.bdf (L3)	Associated Report Class		Associated Resource Group	
Associated Workload	STC	Server Space	Yes	Associated Service Class Goals	Applied

ASSOCIATED SERVICE CLASS PROPERTIES

Name	STCMED	Description	ExVel(60) Imp(2)	Associated Workload	STC
Associated Resource Group		# of Service Class Periods	2	WLM Mode	Goal Mode
Last Initialized Time	Sep 15, 2004 5:31:24 AM	Data Collected Time	Sep 28, 2004 10:37:41 AM	Policy Name	BASE
Policy Activated Time	Apr 2, 2004 1:56:46 PM	Policy Activator User ID	CSFFF	Policy Activated System	M2L2
Current Delay Sample Intervals (ms)	250	Total # WLM Sample Code	4,565,527		

ASSOCIATED SERVICE CLASS PERIOD

Period	Goal Type	Response Time Units (msec., sec., min., hr.)	Goal % Value	Importance Level (1-5)	Response Time/Velocity (Goal Value)	Period Duration
Period 1	Velocity Goal	Unknown	0	2	60	200
Period 2	Percentile Goal	ms	50	2	2000	0

WLM Associated Service Class Period Detail page

Service Class	Enclave

ASSOCIATED SERVICE CLASS PERIOD PROPERTIES

Name	STCMED	Response Time Units (msec., sec., min., hr.)	ms	Goal % Value	50	Importance Level (1-5)	2
Period	2	Response Time/Velocity (Goal Value)	2000	Period Duration	0	Data Collected Time	Sep 28, 2004 10:42:40 AM

RESPONSE TIME DISTRIBUTION DETAIL

Total Transactions	230

Buckets	Transactions	Buckets	Transactions	Buckets	Transactions
< 50%	0	90 - 100%	0	130 - 140%	0
50 - 60%	0	100 - 110%	1	140 - 150%	0
60 - 70%	0	110 - 120%	1	150 - 200%	0
70 - 80%	1	120 - 130%	1	200 - 400%	1
80 - 90%	0			> 400%	225

DELAY DETAIL -- CB

Begin-to-End Phase	Active	Ready	Waiting	Local	Sysplex	Network
	0	0	0	0	0	0

Execution Phase	Active	Ready	Waiting	Local	Sysplex	Network
	0	0	0	0	0	0

< Back

ITCAM – Reducing the cost of IT

Forrester Consulting Study:
"The Total Economic Impact of CAM for WebSphere"

Risk-Adjusted ROI for the *Organization*

- **Return on Investment: 699%**
- **3 Year Total Net Savings: >$2M**
- **Payback Period: 12 month period**

"According to the *Organization* a typical problem that once took 20 to 30 hours to isolate and identify, now takes 1 hour with ITCAM for WebSphere"

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Composite Applications

Monitor Application Usage By Service Requestor

Identity Challenges in SOA and Web Services

Expect SOA usage to change in next 12-24 months?

Decrease overall 1%
Don't know 2%
Remain the same 29%
Increase overall 69%
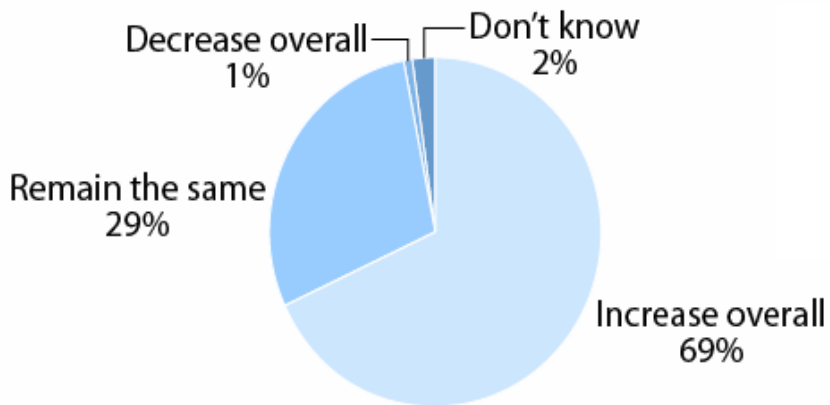
N= 252

Source: Forrester Trends "Time for SOA is Now", April 2006

- Increasing number of heterogeneous users
  - Adding business partners, customers, contractors
  - Concerns with consistent access control
- Multiple, diverse enforcement points
  - Gateways, application servers, service bus and mainframe
  - Requires application coding – expensive to maintain and support
- Compliance concerns
  - Maintain clean user directories in mainframe and lines of businesses
  - Still need to flow identities from gateway to mainframe

Real Life Identity Solution
Example: Getting a Visa to Work Abroad
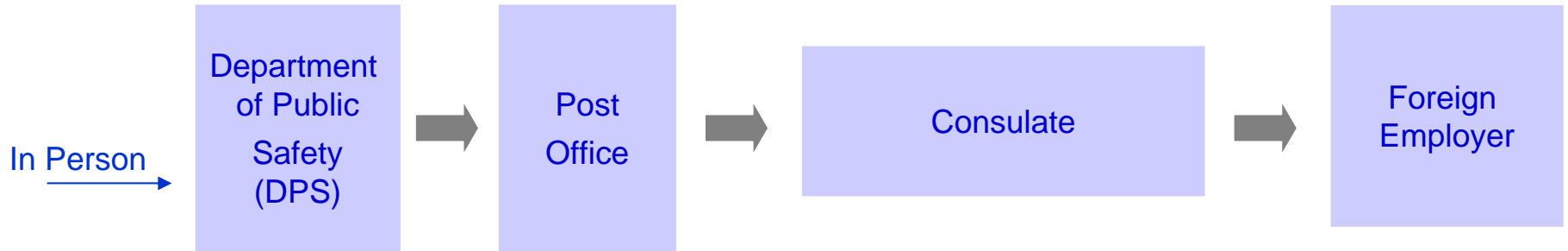
In Person →

| Department of Public Safety (DPS) | → | Post Office | → | Consulate | → | Foreign Employer |

1. Show In Person
2. Validate
3. Get DL

4. Show DL
5. Validate
6. Get Passport

7. Show Passport
8. Validate
9. Get Visa

10. Show Visa
11. Validate
12. Work Permit

Identity & Trust Validation Happened Throughout! →

Composite Applications

SOA Identity Challenges

Services →

Users
Partners →

| Point of Contact (Proxy & Gateway) | → | Application Server | → | Enterprise Service Bus | → | CICS/IMS RACF |

Write 100 lines

Write 3000 lines

Write 5000 lines

Write 2000 lines

Access and Identity Management Infrastructure
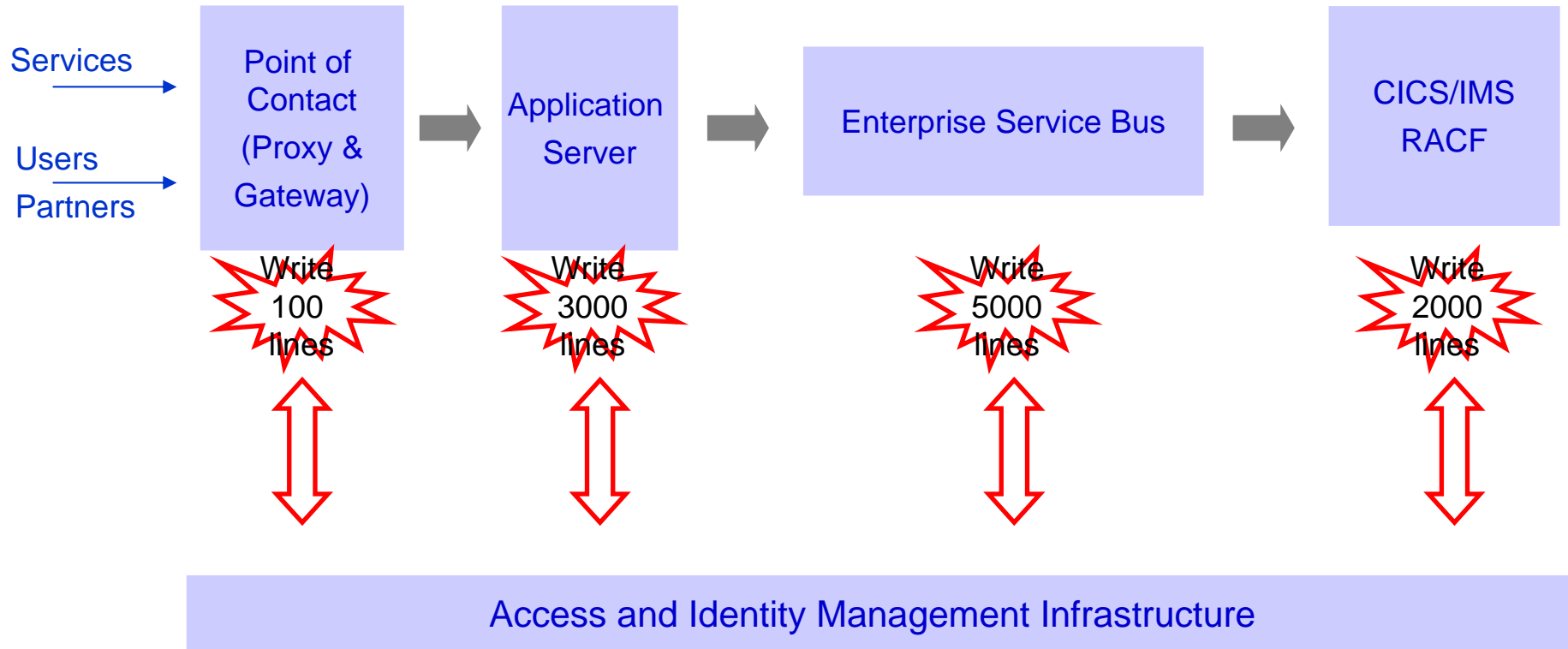
Congratulations! You're now in the Software Development Business

SOA Identity Solution

Services →

Users →
Partners

| Point of Contact (Proxy & Gateway) | → | Application Server | → | Enterprise Service Bus | → | CICS/IMS RACF |

SAML

LTPA

PassTicket

Authentication

WS-TRUST   **WS-TRUST**   **WS-TRUST**   **WS-TRUST**

SOA Identity Offering (powered by TFIM)

Access and Identity Management Infrastructure
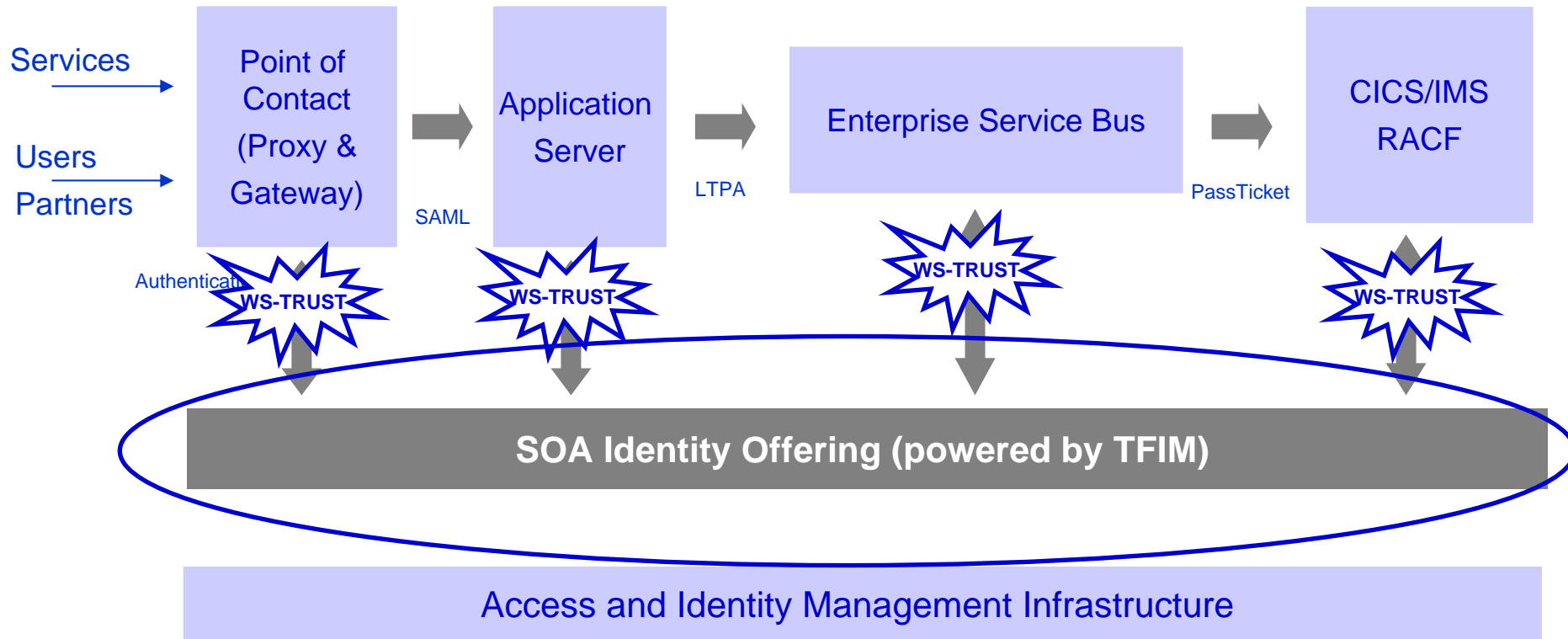
Validate Identities by exchanging standards-based credentials in a centralized, consistent manner!

Broad Integration for SOA Management

Monitoring for Performance & Quality with ITCAM

Services

Users

Partners

| Point of Contact (Proxy & Gateway) | Application Server | Enterprise Service Bus | CICS/IMS RACF |

SAML

LTPA

PassTicket

Authentication

WS-TRUST

WS-TRUST

WS-TRUST

WS-TRUST

End-to-End Identity Propagation with TFIM

Access and Identity Management Infrastructure
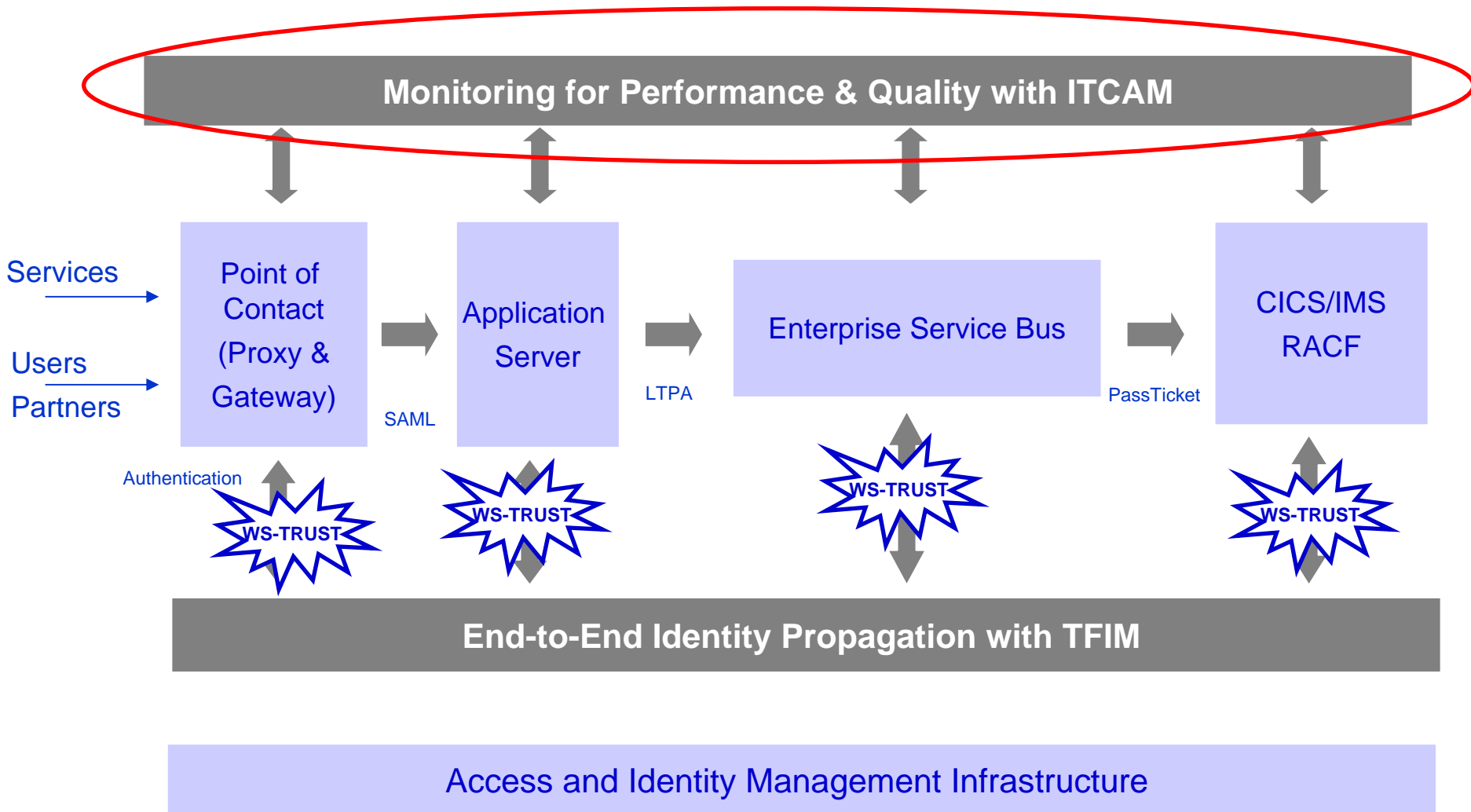
SOA Identity Offering
Powered by Tivoli Federated Identity Manager

- Integrate identities for SOA environments and web services that use z/OS CICS, IMS, or other z/OS subsystems
- Implement centralized identity mediation & token mapping across multiple, diverse enforcement points
- Preserve identity of the requesting user for access control and audits
- Protect z/OS-hosted web services using z/OS security services
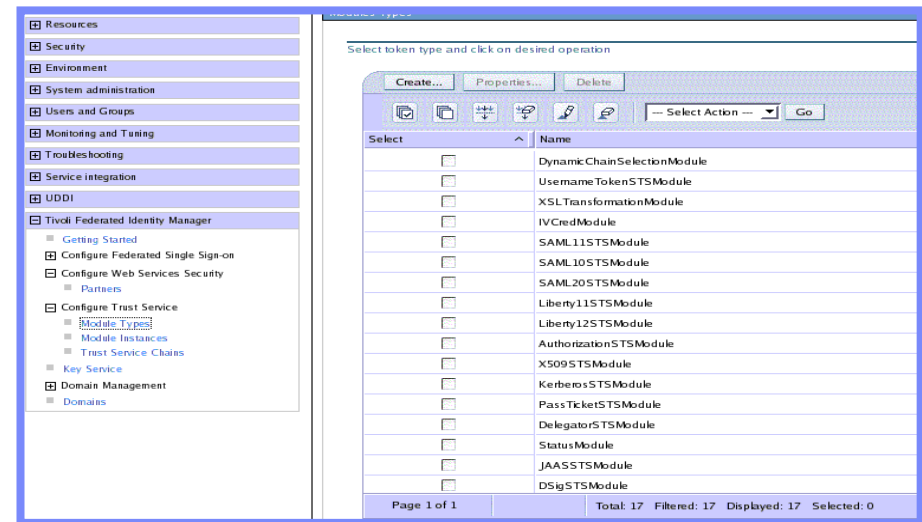
Secure Token Service in

Tivoli Federated Identity Manager

Delivering End-to-End Identity Propagation in a SOA environment

Best Practice: SOA and System z RACF Passtickets

Plan ahead of time for System z access by ESB and Distributed Applications

▪ Are you planning on hard coding and re-using the same Application or RACF ID's?

▪ Do you need to synchronize those passwords and manage them?

▪ Do you plan on Auditing each transaction through the SAF interface? What about uniqueness in the Audit Report to distinguish one transaction from another?

▪ Are you considering putting all of your end-users and business partners ID's in RACF?

TFIM Leadership Functions

▪ TFIM will provide a manageable Identity Propagation service via WS-TRUST

▪ TFIM provides consistent model for generating RACF/ACF2 PassTickets to be called by any application supporting the WS-TRUST standard

▪ TFIM will manage all of your business partner connections, end-user's and cross domain Identity challenges as a Service for your SOA environment

▪ PassTickets provide the correct information for SAF Auditing for compliance and reporting capabilities for the System z

PassTickets are the IBM RECOMMENDED approach for connecting SOA Applications to System z

Application and Identity Management Integration

Challenge

- ITCAM for SOA shows that Web service response times occasionally exceed thresholds and some messages are exceptionally long

- Further analysis with Web Services Navigator indicates one external user is sending over-length messages

Solution

- ITCAM for SOA automation can be configured to reject messages from the responsible user

- In concert with TFIM, ITCAM for SOA can audit the user or place enhanced security restrictions on the user to prevent Denial of Service attacks

Value

- ITCAM for SOA and FIM together enable providers to protect their publicly accessible Web services from accidental or malicious misuse.

IBM Security Solutions
Continue to be Recognized for Leadership

- **Gartner Leadership Quadrant, Web Access Management (September 2006)**
- **Gartner Leadership Quadrant, User Provisioning (April 2006)**
- **Gartner Leadership Quadrant, Web Services (2005)**
- **#1 Provisioning and Web SSO Vendor, IDC (August 2005)**
- **Information Security Names IBM Tivoli to The Influence List for 2003-2008**
- **2005 #1 Provisioning Vendor, Gartner Vendor Selection Tool**
- **2005 Frost & Sullivan Global Market Leadership Award for Identity Management**
- **2004 SYS-CON Best Web Services Security Solution Award**
- **2004 Information Security Product-of-the-Year Bronze Award for Authentication and Authorization**
- **2003 Frost & Sullivan Market Engineering Leadership Award**
- **2003 Crossroads A-List Award for Integrated Identity Management Solution**
- **2003 Network Computing Well-Connected Award Finalist**
- **2003 SC Magazine Reader Trust Awards – Best General Security Finalist**
- **2003 LinuxWorld Product Excellence Award – Best Security Solution Finalist**
- **2003 Top WLAN Companies of the Year for Leadership in Wireless Security**
- **IBM Tivoli Access Manager Sets New Performance Records – Mindcraft Benchmark**
- **IBM Tivoli Wins Information Security Excellence Award for Second Year in a Row**
- **2002 Information World Editor's Choice Award for Security Software**

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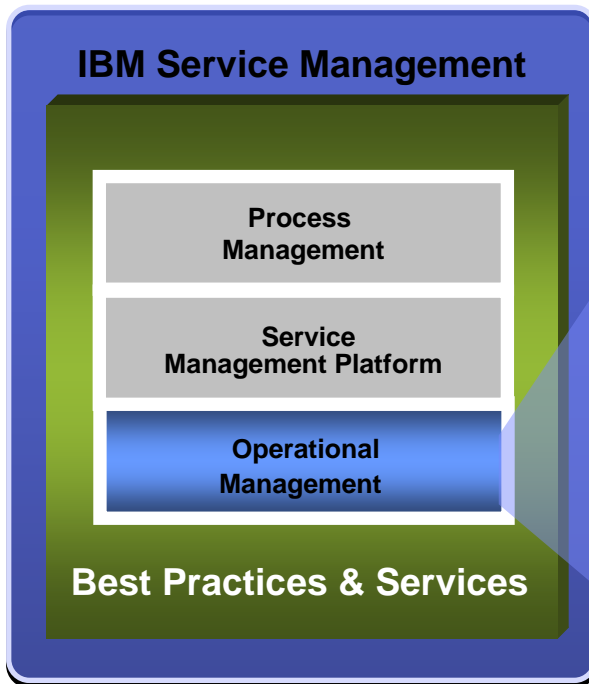
Enterprise Management Associates

Julie Craig, Senior Analyst shares her perspective on the announcements

> ➢ *Delivering on the ITCAM roadmap*

> ➢ *TEP integration*

> ➢ *Builds on Tivoli governance story*

> ➢ *Brings additional SOA management products to a ripe market*

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IBM is the Leader in System Z Management and Monitoring

- **#1 in Performance & Availability Management - IDC, August 06**

- **#1 in IT Operations Management Gartner 2006 - 5th year in a row**

IBM Service Management

- Process Management
- Service Management Platform
- **Operational Management**

Best Practices & Services

Improved Service Delivery
- Optimize availability & performance of System z resources
- Quickly isolate & resolve problems
- Automation integration to dynamically resolve issues
- Reduce costs
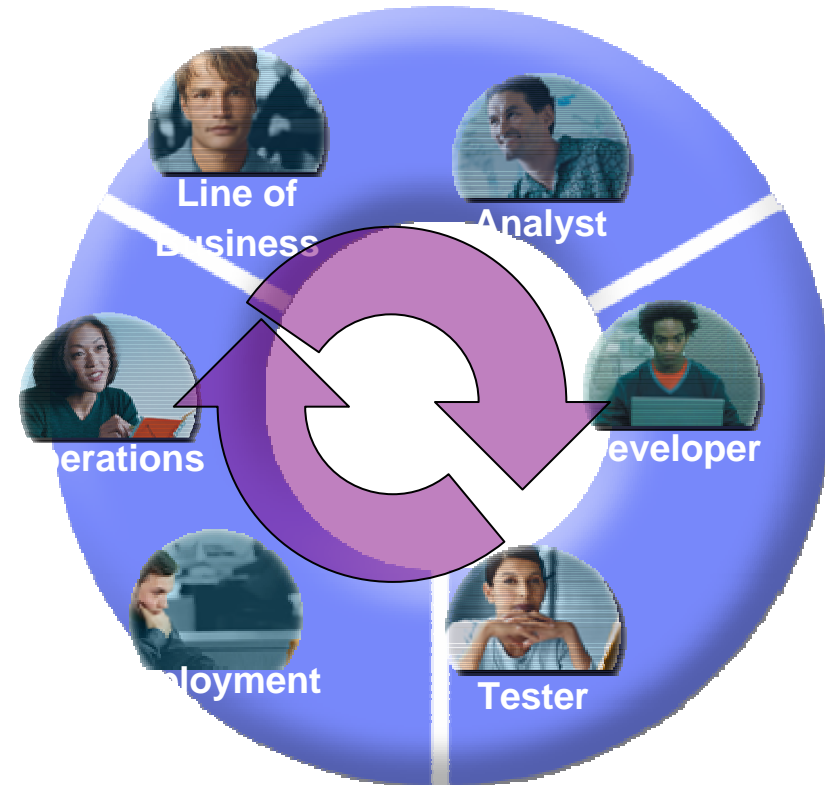
End-to-End management
- Complete portfolio to manage all System z resources
- Common Tivoli Enterprise Portal (TEP) for end-to-end enterprise management (ITM, ITCAM, TSA, TWS, …)
- Real-time & historical reporting
- Situations, thresholds, take action, workflow automation, TSA integration, expert advice, personalized workspaces

Summary

- **Tivoli helps maintain high performance and availability in a volatile business climate**

- **End to End Solutions**

- **CAM for monitoring, and FIM for identity mgmt in the SOA environment**

- **Integrated tools are the key to providing a comprehensive management solution to the On Demand business climate…**

For More Information:

IBM Composite Application Management
http://www.ibm.com/software/tivoli/solutions/application-management/
IBM IT Service Management
http://www.ibm.com/software/tivoli/solutions/it-service-management/
IBM Tivoli Security
http://www.ibm.com/software/tivoli/solutions/security/
IBM Tivoli Software
http://www.ibm.com/developerworks/tivoli/
IBM Build to Manage Toolkits
http://www.ibm.com/developerworks/eclipse/btm/

Line of Business

Analyst

Operations

Developer

Deployment

Tester

References

- Composite Application Management - ITCAM
  - http://www-128.ibm.com/developerworks/tivoli/application-mgmt/
- ITCAM for WebSphere and ITCAM for J2EE Product Info
  - http://www-306.ibm.com/software/tivoli/products/composite-application-mgr-websphere/
  - http://www-306.ibm.com/software/tivoli/products/composite-application-mgr-j2ee/
- Tivoli Info Center for ITCAM for WebSphere 6.1
  - http://publib.boulder.ibm.com/infocenter/tivihelp/v3r1/index.jsp?topic=/com.ibm.itcamwas.doc_6.1/welcome.htm
- WebSphere Application Server Info Center
  - http://www-306.ibm.com/software/webservers/appserv/was/library/
- IBM Tivoli InfoCenter – Reference for most Tivoli products including ITCAM products
  - http://publib.boulder.ibm.com/infocenter/tivihelp/v3r1/index.jsp
- Built to Manage Toolkit
  - http://www-128.ibm.com/developerworks/eclipse/btm/
- ITCAM GPS Tech Note
  - http://www-128.ibm.com/developerworks/forums/servlet/JiveServlet/download/873-159895-13949076-215527/ITCAM%20GPS%20Correlation%20Restrictions%20and%20Limitations.pdf
- ITCAM Usage Redbook
  - http://www.redbooks.ibm.com/redpieces/abstracts/sg247151.html?Open
- Implementing OMEGAMON XE for Messaging 6.0
  - http://www.redbooks.ibm.com/redpieces/abstracts/sg247357.html
- Performance Monitoring and Best Practices for WebSphere on z/OS
  - http://www.redbooks.ibm.com/abstracts/sg247269.html
- z/OS Basic Skills Info Center
  - http://publib.boulder.ibm.com/infocenter/zoslnctr/v1r7/index.jsp
- z/OS Concepts for Java Developers
  - http://www-128.ibm.com/developerworks/eserver/library/es-zos/index.html
- Understand WAS on z/OS – Intro
  - http://www-128.ibm.com/developerworks/eserver/library/es-zos/index.html

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