



ITSO Poughkeepsie IBM @server z/OS & zSeries 2003 Technical Update



Redbooks

Tools for the AD Life Cycle

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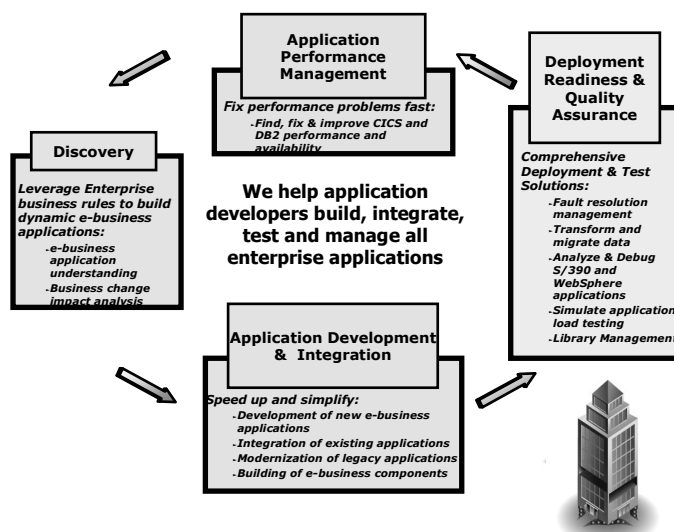
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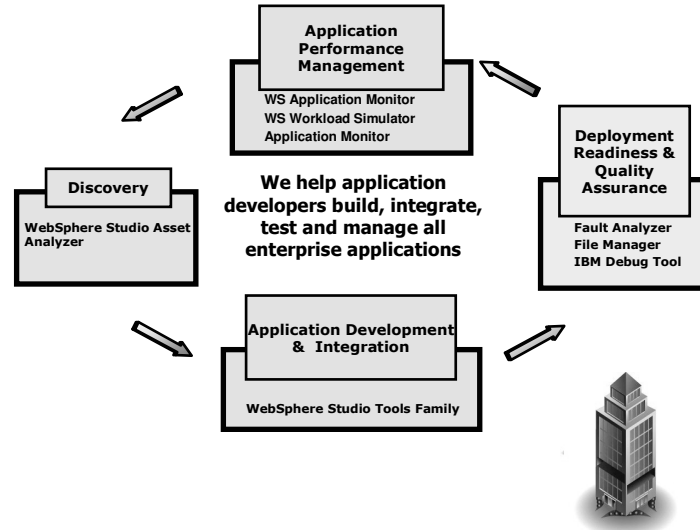


IBM Modernization Strategy





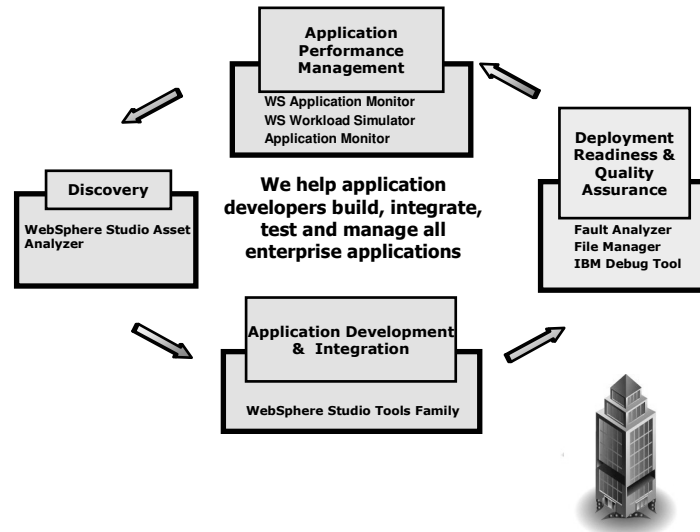
IBM's Modernization Solution



Redbooks

WebSphere Studio Asset Analyser

IBM's Modernization Solution

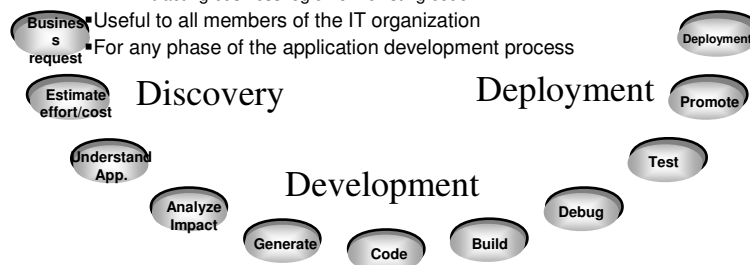


WebSphere Studio Asset Analyzer

■ Aids in:

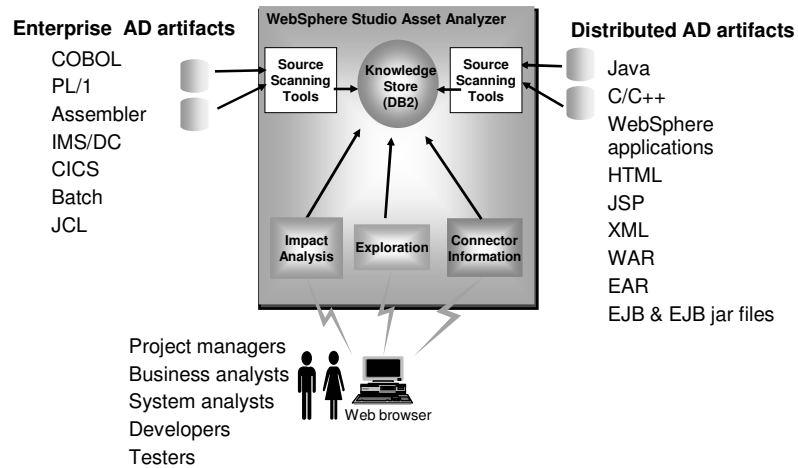
- ▶ Understanding components and their relationships
- ▶ Analyzing the impact of a proposed change
- ▶ Scoping and developing project plans
- ▶ Gathering connector information for an MVS programs
- ▶ Extracting business logic from existing code

- Useful to all members of the IT organization
- For any phase of the application development process



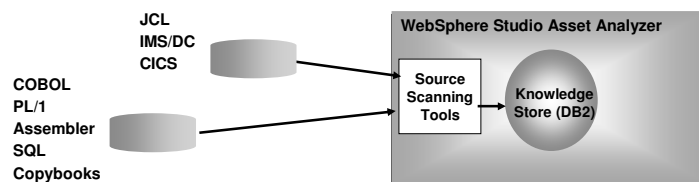
Benefit: Spend less time searching for asset information

WebSphere Studio Asset Analyzer Overview



Inventory Collection

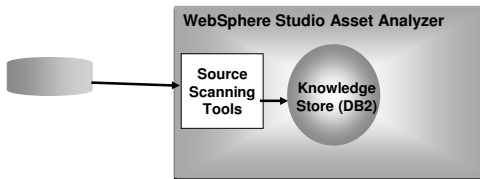
- Scans the resources that you specify, and then stores information about them in a DB2 database
- Inventory information is collected for:
 - Source code
 - CICS and IMS online regions / transactions / subsystems
- z/OS assets can be scanned from:
 - PDS / PDSE
 - SCLM (IBM Source Control Library Manager)
 - Changeman



Inventory Collection (*continued*)

- Distributed assets can be scanned from:
 - File systems
 - including the hierarchical file system (HFS) of UNIX System Services
 - An accessible WebDAV server
 - Rational ClearCase

Java source / bytecode
C / C++
JavaServer Pages
HTML
JAR and EAR files



Overview - Explore

- Used to view application components and their relationships
- View (and select components from) lists of components, or...
- Search for components by:
 - name
 - application name
 - project name
 - site
- Follow links to navigate through an application, to discover (for example):
 - what program is invoked by a batch job, or CICS transaction?
 - what subroutines are called?
 - what files are used?



Using Explore to find components

Home | **Explore** | Connect | Inventory | Database status | Help

MVS assets | Distributed assets

Explore MVS assets

Use one or more asterisks (*) to locate all assets that match the pattern of your search argument (such as *CUST*).

Search: [Advanced search](#)
☐ Type mixed case

Enter one or more search strings.
A wildcard * character can be used.

Inventory	Total	Run time	Total	Program	Total	Data	Total
Application	17	Batch job	63	Analysis concatenation set	21	Data element	29603
Library	46	CICS group	101			Data set	426
Member	2176	CICS online region	2	BMS map definition	98	Data store	216
Project	68			BMS map set definition	56	DD name	1521
Site	1	CICS transaction	523	Entry point	222	I/O record description	473
		IMS subsystem	1	Literal	3744	SQL column reference	38
		IMS transaction	22	Program	284	SQL table reference	6
		Run unit	399				

Or just click on any counter to view the full list.



Using Explore to understand components

Home | **Explore** | Connect | Inventory | Database status | Help

MVS assets | Distributed assets

Program details

Member: MYTRADS
 Program: MYTRADS
 Language/type: COB / Program source
 Analysis status: Completed
 Member record count: 992
 Blank lines: 1
 Comment lines: 145
 Noncomment lines: 846
 Program record count: 1038
 Scanning option: CICS
 Splitting nodes: 161
 Site: STLADS28
 Library: PARTITIONED DATA SET DAVIN10.PDPAK.SG
 Data base updated: 10/2/02 8:39 AM by DAVIN10
 Analysis concatenation set used: DMH19

Actions

- Code extraction
- Identify analysis concatenation set
- Identify analysis options
- Queue for analysis
- View source
- View program data elements
- View e-business program information
- Show control flow diagram
- Show structure diagram

In this example we are looking at details for a program

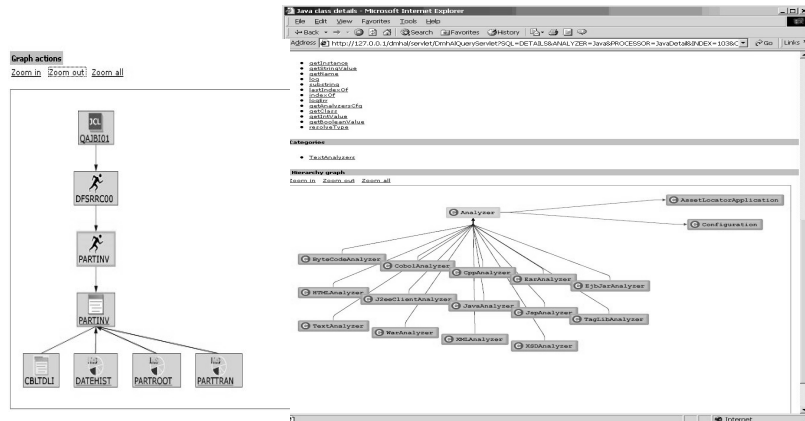
From here, click to see more information about this program, to display diagrams, or to see a related component

The following tables list the components related to the Program, MYTRADS .

Member (2)	Language	Type	Analysis status	Member record count	Source location
AESCCE	COB	Included source	Completed		PKGD.STUDIO.SDMHDATA(AESCCE)
CUSTFILE	COB	Included source	Completed	15	DAVIN10.PDPAK.COPYLIB(CUSTFILE)

... and their relationships

- Visualization support for zOS and distributed Assets



e-business rating

Program	Language	Number of lines	Source code	Internal control	Data code	e-business transformation index
APBBLRAL	COB	1897	19	10	0	78
APBBLR01	COB	2715	0	2	0	10
AS11ALAL	PLI	456	0	12	2	64
CHAPBAC	COB	224	0	1	8	22
CHAPBAC	COB	442	0	3	12	40
CHAPBAC	COB	213	6	1	10	32
COBEE	COB	701	0	1	0	5
COBEE	COB	27	0	0	0	5

Benefit: Quickly understand the reusability of code

Code extraction

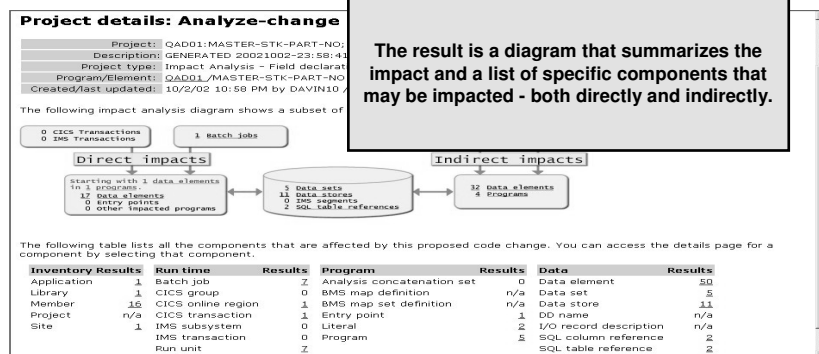
- Analyze, isolate, and reuse existing business logic
 - to support services oriented architecture
- Selected code is stored with generated data areas



Benefit: Spend less time harvesting from existing code

Overview - Change Impact Analysis

- Determine what components are affected based on:
 - changes to field declarations
 - changes to a section of program source code
 - changes to an entry point signature (name, parms)



Overview - Connector Information

- Use WSAA to
 - ▶ quickly gather input and output data structures of transactions
 - ▶ put this information in a form that you can import into a connector-building tool such as WebSphere Studio Application Developer IE or VisualAge Java
- For each transaction, WSAA generates
 - ▶ a summary report
 - ▶ a COBOL copybook containing the input/output data structures

Summary - WebSphere Studio Asset Analyzer

- Aids in:
 - ▶ Understanding components and their relationships
 - ▶ Scoping and developing project plans
 - ▶ Gathering connector information for an MVS programs
 - ▶ Extracting business logic from existing code
 - ▶ Analyzing the impact of a proposed change
- Useful to all members of the IT organization
 - ▶ Project Managers
 - ▶ Analysts
 - ▶ Developers
 - ▶ Testers
- For any phase of the application development process
 - ▶ Requirements
 - ▶ Development
 - ▶ Test
 - ▶ Deployment



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Redbooks

WebSphere Studio Application Developer

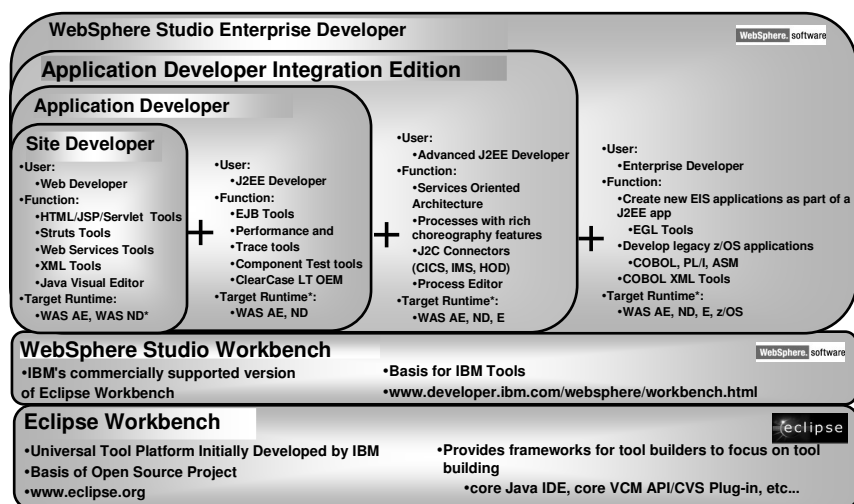
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WebSphere Studio Tools Family



*Other IBM/non-IBM Runtimes could be used



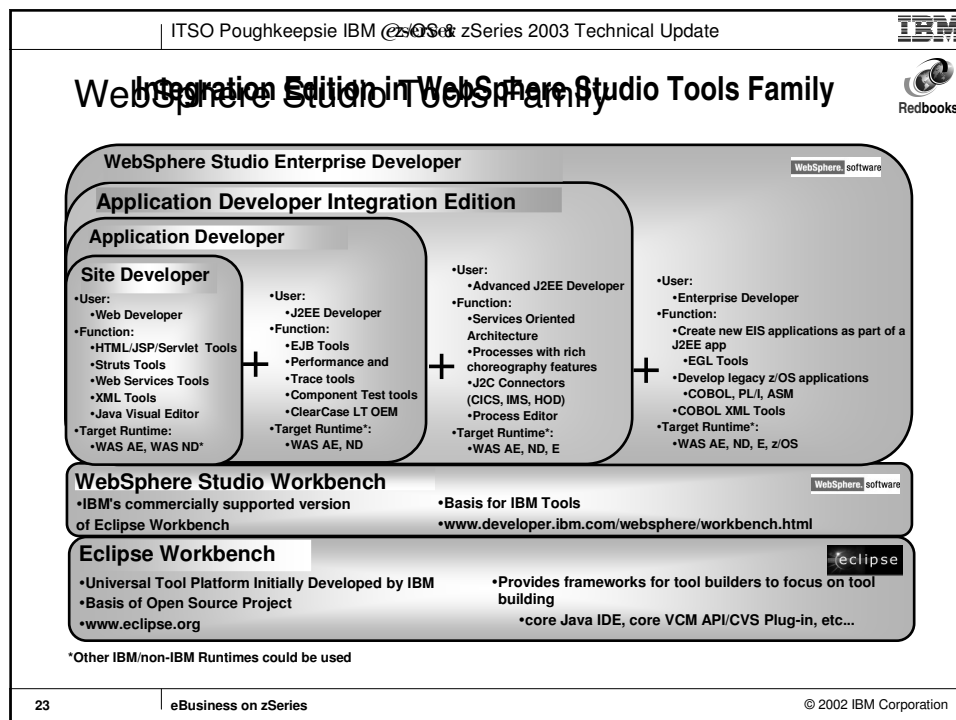
Key Benefits of Integration Edition

- J2C tooling allow J2C Adapters to be imported and exposed as a service
 - ▶ Integration Edition ship CICS, IMS and HOD Adapters
 - ▶ Others adapters can be imported as Resource Archives (RAR)*
 - J2EE 1.3 Specification
- Powerful tooling for data structure transformation into XML datatypes
 - ▶ e.g. COBOL COMMAREAs, 3270 Screens, C data structures, etc.
 - ▶ Makes it easy to deal with various EIS data structures from Java or other languages
 - ▶ Developers don't need to deal with low level datatype conversions (e.g. COBOL to Java)



More about J2C Resource Adapters

- J2EE Connector Architecture 1.0 defines how J2C resource adapters plug into application servers
 - ▶ Does not define how a resource adapters might plug into tooling
- IBM is defining the specification of tooling plugins
 - ▶ Target is J2EE Connector Architecture 2.0
 - ▶ We are releasing an early implementation of this specification in Integration Edition 4.1
- How does a tool acquire metadata about the data structures for an EIS system?
 - ▶ Currently, this varies significantly based on the EIS system
 - ▶ The implementation we are proposing uses WSDL to describe the data structures
 - ▶ We are working with these ISVs (tooling support): Dassault, iSphere, Siebel, SAP, Gemstone, CrossWorlds, Peregrine and Intenia



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Agenda

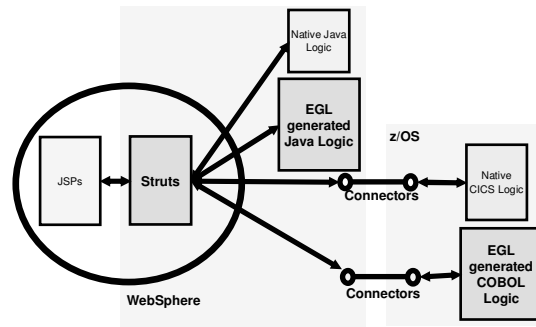
<ul style="list-style-type: none"> ▪Struts Tools ▪Business Integration Tools ▪z/OS Application Development Tools ▪XML Enablement Tool for z/OS Cobol applications ▪Enterprise Generation Language (EGL)
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24

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Struts Tools



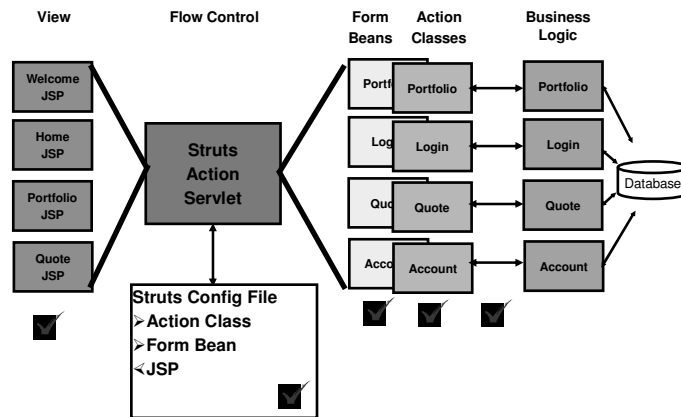
Struts Tools

- Rapid design and construction of J2EE web apps
 - Promotes well-structured web applications
 - Enables development in less time with fewer errors
 - Connects to business logic of choice
 - EJBs, Java, COBOL, PL/I, EGL, etc.
- Wizards and editors
 - Setup J2EE web project with Struts support
 - Create and update Struts components
 - Visual design and assembly
- Build Support
 - Validates changes against existing resources

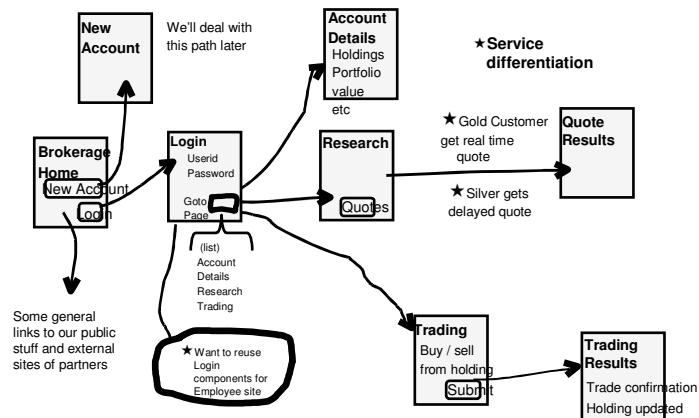
Create Struts Components

☑ = Struts Tool support

Struts: 100% 50%
Struts Tools: 50% 25%



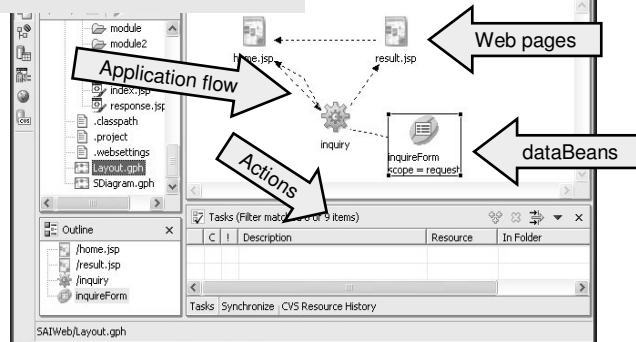
Visual design using yellow sticky notes



Web Diagram Editor - Design

Visual Design

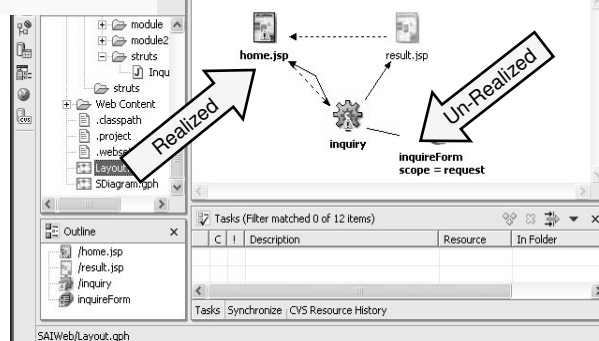
- Layout web pages, actions, dataBeans
- Show application flow



Web Diagram Editor - Definition

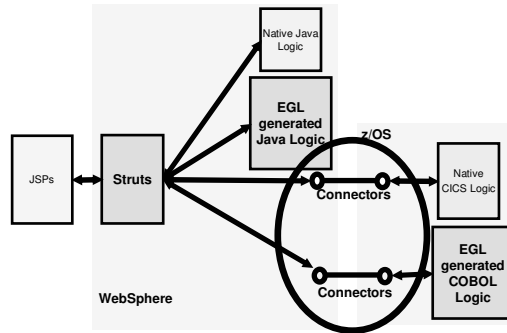
Wizards to create

- Web pages: JSP, HTML
- Actions: Java, COBOL, EGL
- ActionForms: dataBeans









Benefit: Faster construction of web applications

Business Integration Tools



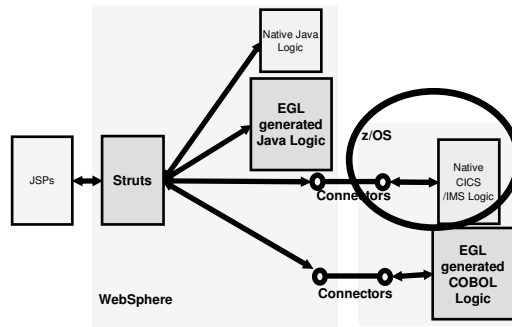
New and Improved JCA Adapters

New and Improved JCA Adapters

Adapter		Details
SAP		<ul style="list-style-type: none"> •New •Available from IBM
IMS		<ul style="list-style-type: none"> •Improved •Support 2PC when communicating via TCP/IP with IMS Connect •Support for MFS •Developer license included in Integration Edition
Siebel		<ul style="list-style-type: none"> •New •Available with Siebel CRM offering
Tuxedo		<ul style="list-style-type: none"> •New •Built by Prolifics (www.prolifics.com)
CrossWorlds		<ul style="list-style-type: none"> •New •JMS to invoke WICS (WebSphere InterChange Server formerly Crossworlds) Collaboration (runtime engine ICS) •Access to WBI Adapters via JCA in the near future •WBI Adapters Cover all major EIS vendors and a wide range of ISV Application Vendors
J.D. Edwards		<ul style="list-style-type: none"> •New •Will become available starting in mid-2003 •Available with J.D. Edwards back-end systems software

IBM JCA included in Integration Edition: CICS ECI, CICS EPI, IMS, 3270 HOD.

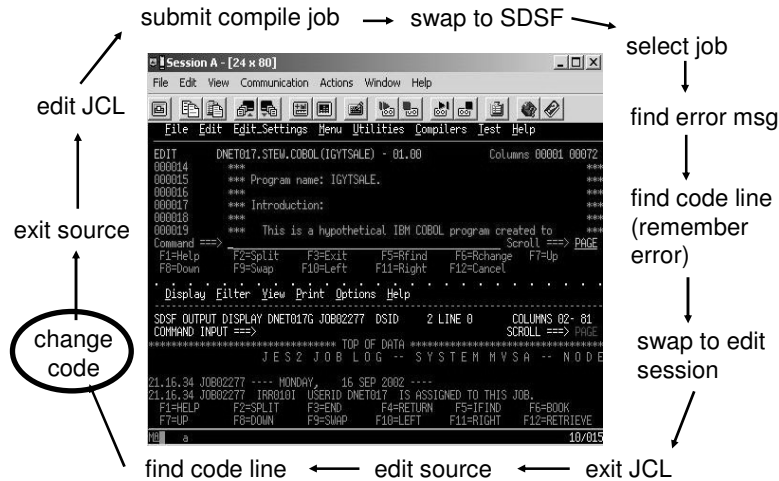
z/OS Application Development Tools



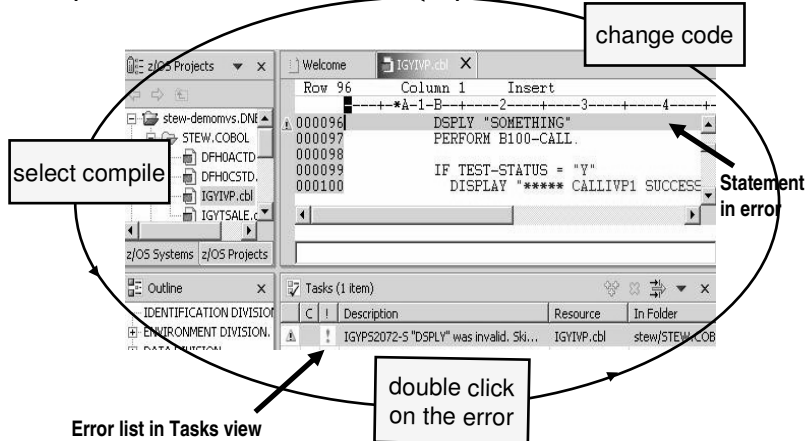
z/OS Application Development

- Interactive, workstation-based environment
 - Faster development with less errors
 - Host offload of development CPU cycles
- Edit/compile/debug on the workstation
 - Remote or Local
 - Language sensitive editors for COBOL, PL/I, ASM, JCL
- Interactive access to the mainframe
 - Job generation, submission, and monitoring
 - TSO command execution
- SCLM support

ISPF based development



WebSphere Studio based development



Benefit: Simplified Development for COBOL and PL/I on z/OS

Interactive Access to z/OS

The screenshot displays the IBM WebSphere Studio Enterprise Developer interface with several views open:

- MVS Project:** Points to the 'z/OS Projects' pane on the left, which lists various projects like 'denomvs.f1' and 'denomvs.f2'.
- MVS Directory:** Points to the 'MVS Directory' pane, showing a hierarchical view of the MVS file system.
- Outline view:** Points to the 'Outline' view, which shows the structure of the selected project, including 'Identification division', 'Data Division', 'Working-storage section', 'Procedure division', 'mainline section', and 'xml-handler section'.
- TSO Commands view:** Points to the 'TSO Commands' view, which displays a list of commands and their execution status.
- Job Monitor view:** Points to the 'Job Monitor' view, which shows a table of jobs with columns for Job ID, Job Name, Owner, Hold Status, and Exec Node.
- ISPF like editor:** Points to the main editor window, which displays an XML document with a table of data.

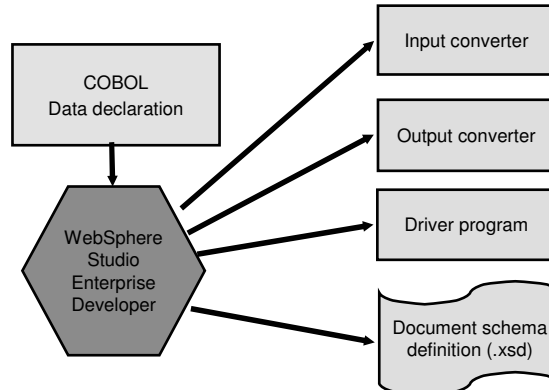
SCLM Support

- Access to SCLM on z/OS
 - Connect to SCLM repository
 - View a list of projects
 - List project members
 - Execute SCLM actions
- Check-in/check-out support
 - TEMP WORK AREA

The screenshot shows the SCLM Repository interface with a tree view of projects and a list of project members. A context menu is open over the 'FLM0' member, showing various actions such as 'SCLM Promote Function', 'SCLM Build Function', 'FFS Save', 'FFS Edit', 'SCLM Delete Local File From Workspace', 'SCLM Promote Function', 'SCLM Build Function', 'Cancel Edit And Unlock File From Repository', 'Member(File) Status Information', 'Delete File from Repository', 'Save File back to Repository', 'Edit File from Repository', 'Browse File from Repository', 'Compare With', and 'Replace With'.

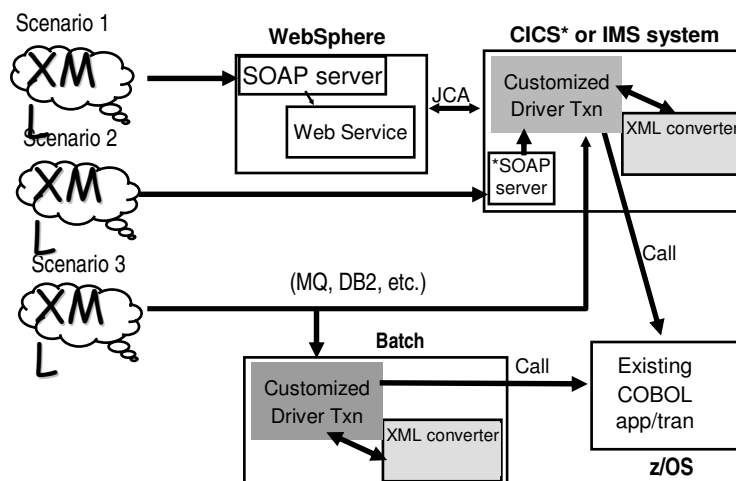
XML Enablement Enhancements for z/OS

- Creates COBOL programs to handle XML messages
- Original COBOL program unchanged



Benefit: Speeds development of XML-enabled COBOL applications

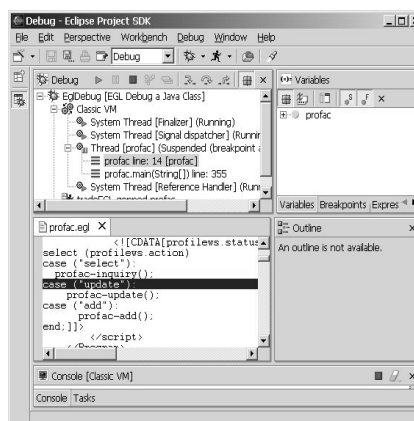
z/OS XML Implementation Scenarios



Additional Features

Testing and Debugging

- End-to-end Debugging
 - ▶ Java and JSP debugger
 - ▶ COBOL, PL/I debugger
 - ▶ EGL debugger
- Verifying application Flow
 - ▶ breakpoints
 - ▶ changing variable values
- WebSphere Test Environment
 - ▶ integrated in Workbench
 - ▶ choice of versions



Benefit: End-to-end test and debug from the Workbench

Cheat Sheets

- Help the novice Integration Edition user to learn key programming tasks faster.
- Provide active guidance when creating a specific type of Service.
- Actual wizard that you need for each stage of development is launched.
- Once a step is completed, the cheat sheet adds a check mark to the list of steps and you progress to the next step.



Summary

- Comprehensive end-to-end development environment
 - Single development environment
 - provides integration of process, tools, infrastructure and assets
- Supports more runtimes, developers, and tooling
 - WebSphere Application Server, CICS, IMS, z/OS batch
 - Web, Java, and Enterprise Developers
 - Java, J2EE, Web, XML, COBOL, EGL, and Web services
- Higher-quality applications in a fraction of the time
 - Web Diagram editor
 - Language sensitive editors
 - Integrated WebSphere Server test environment
 - Integrated deployment automation tools
- How will Integration Edition reduce development time?
 - Supports J2C Resource Adapters (Avoid low level coding to access a J2C enabled backend)
 - Business Process editor allows service flows to be created visually (instead of writing code)
 - Isolates developers from other low-level coding:
 - COBOL/Java conversions
 - SOAP invocations
 - Defining WSDL operations/messages



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WebSphere Studio Application Monitor V2.1

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WebSphere Studio Application Monitor

- Strategy
- Overview
- Architecture
- Product Demonstration

46

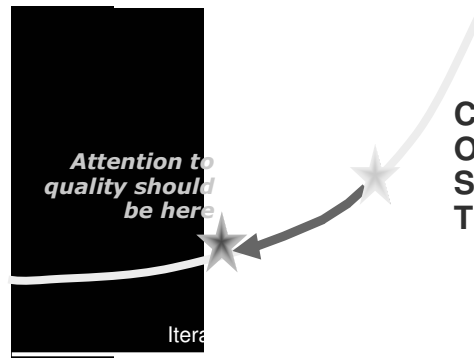
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Strategy:

To prevent, detect, diagnose and remove defects throughout the software development and deployment lifecycle

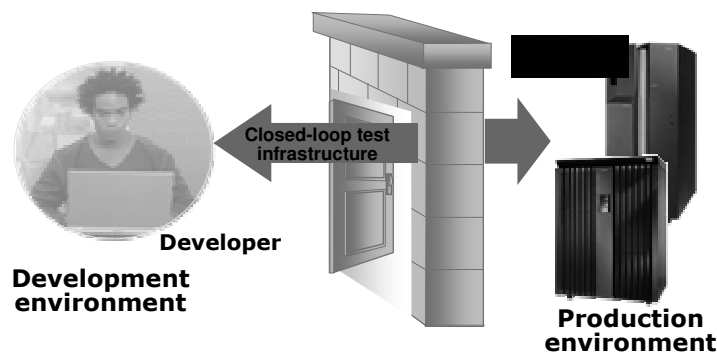
- **Improve application quality**
- **Provide early warnings of activities susceptible to failure**
- **Analyze across disciplines to understand root causes**
- **Establish a test foundation for downstream test activities**



Strategy:

*Provide development and deployment tools integration
Reduce business downtime by automating system diagnosis, repair,
& rebuild*

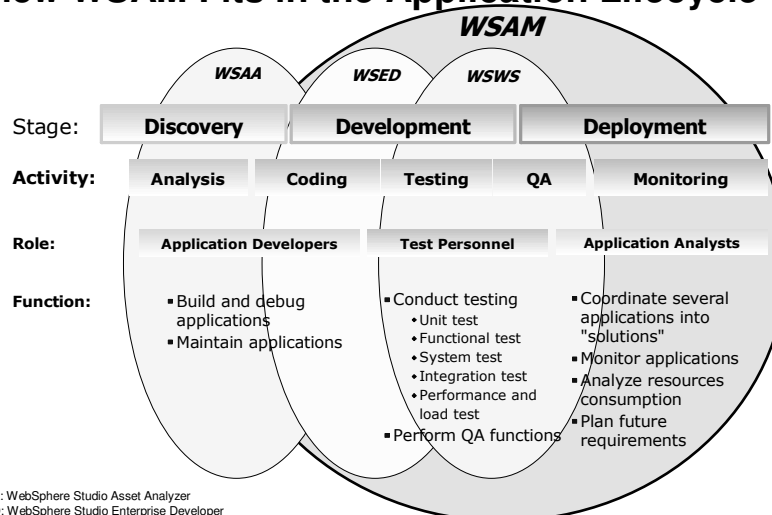
- **Find and fix errors post-deployment quickly**
- **Speed up application rebuild and redeploy**
- **Bridge development teams and operation teams**



The AD Lifecycle: Discover - Develop - Deploy

Stage:	Discovery	Development	Deployment
Activity:	Analysis	Coding	Testing QA Monitoring
Role:	Application Developers	Test Personnel	Application Analysts
Function:	<ul style="list-style-type: none"> ▪ Build and debug applications ▪ Maintain applications 	<ul style="list-style-type: none"> ▪ Conduct testing <ul style="list-style-type: none"> • Unit test • Functional test • System test • Integration test • Performance and load test ▪ Perform QA functions 	<ul style="list-style-type: none"> ▪ Coordinate several applications into "solutions" ▪ Monitor applications ▪ Analyze resources consumption ▪ Plan future requirements

How WSAM Fits in the Application Lifecycle

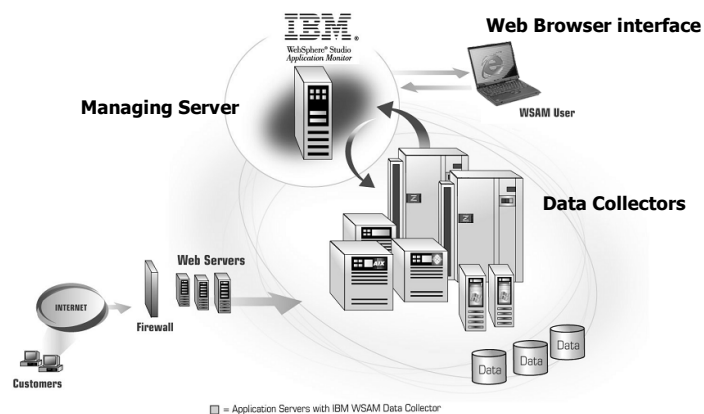


WSAA: WebSphere Studio Asset Analyzer
 WSED: WebSphere Studio Enterprise Developer
 WSWS: WebSphere Studio Workload Simulator
 WSAM: WebSphere Studio Application Monitor

What Does WSAM Provide?

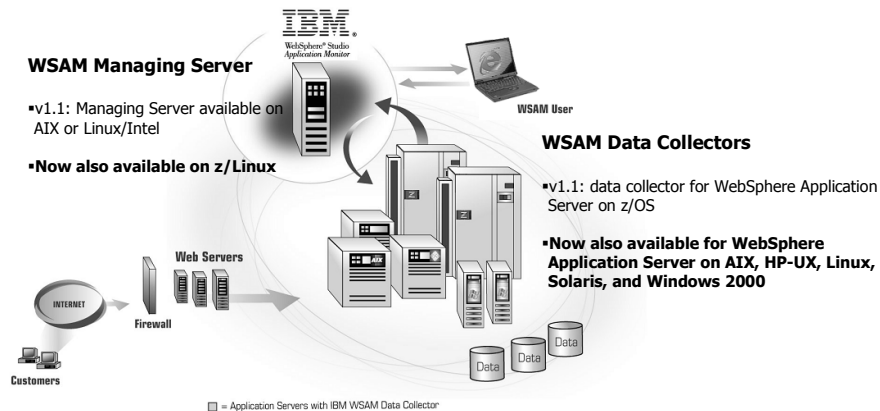
- Real-time **problem determination** for J2EE applications
- **Performance management** through a rich set of historical analysis functions
- Non-intrusive, **production-safe** architecture
- **Application independence** brings total manageability without the need to modify or access application code
- A **lifecycle** tool for Development, Test and Deployment

Conceptual Overview of WSAM

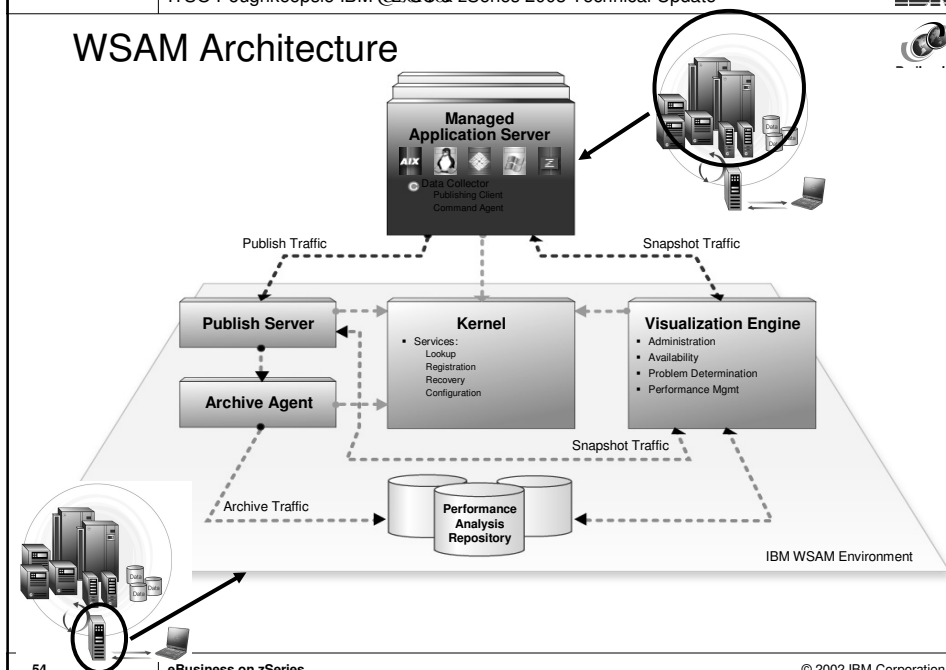


WSAM - Environments Supported

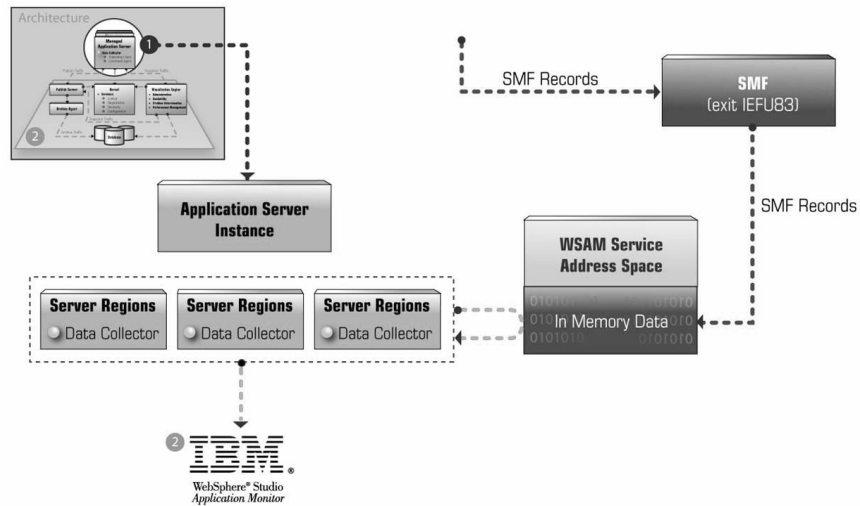
- **Distributed Data Collectors** - A comprehensive solution for customers with mixed WebSphere platforms (z/OS and Distributed)
- **Managing Server on z/Linux**
- **Support for WebSphere Application Server v5**



WSAM Architecture

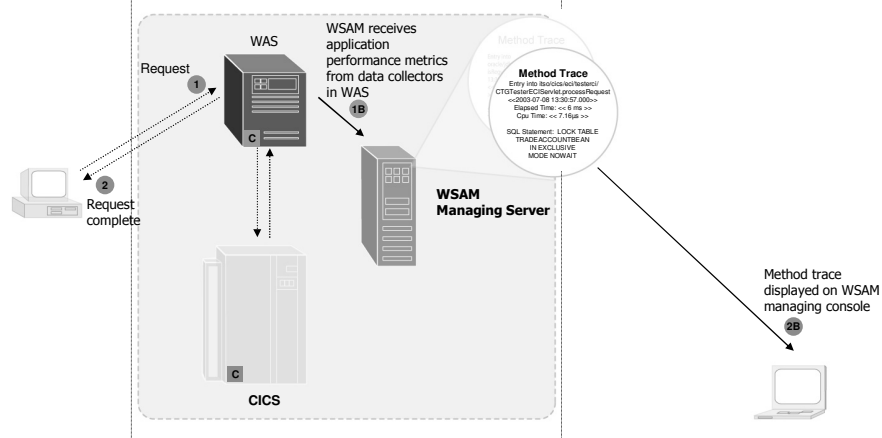


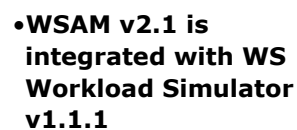
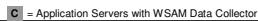
WSAM Architecture: z/OS



J2EE Transaction

Client Request





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Other Features

- **System Resources**

Displays summary information for the system resources on the selected application server
JVM CPU Usage, JVM Memory Usage, EJB Coverage, EJB Activity, Transactions Initiated and JSP/Servlet Activity and Coverage

- **Trap and Alert Management**

A trap can be set with a threshold on an event or behavior
When the system meets the criteria of the trap, the action (alert) occurs
Integration via SNMP to Tivoli, Openview, BMC, etc.
New trap types, e.g. "application hung" traps in WSAM 2.1
Stack trace and method trace information now included in trap data
Multiple UI enhancements to facilitate creation and administration of traps

- **Software Consistency Check**

Detects software mismatches in "cloned" runtime environments



Other Features

- **Account and Server Group Management**



A "server group" consists of a user-defined collection of servers
Accounts may be associated with specific groups
Access to data and operations of the group can be restricted



- **Dynamic Monitoring**

Monitoring Scope and granularity of information returned may be changed without restarting either the applications or the application servers
No need to pinpoint specific classes or methods in advance (i.e., no need to designate what needs to be monitored)

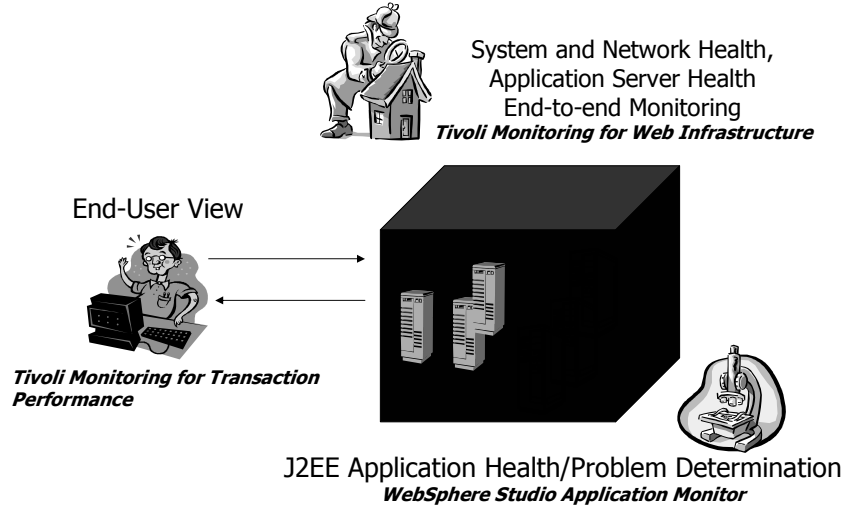
- **Memory Analysis**

In-depth analysis of JVM memory utilization, GC frequency and heap contents
Memory leak detection and analysis

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<h2>Other Features</h2> <ul style="list-style-type: none"> Problem Determination <ul style="list-style-type: none"> Monitoring support for additional J2EE API's within nested request events, including JMS, JCA, JNDI, JavaMail, and improved JDBC request capture <ul style="list-style-type: none"> New L2 monitoring level captures these events Full JVM active thread display with complete thread dump options <ul style="list-style-type: none"> Includes non-J2EE threads Recent history is captured <ul style="list-style-type: none"> Recent requests per JVM Enhanced method trace with pagination and new method flow views, and abstracted event statistics views that make it easy to quickly identify and drill-down to specific problematic methods Reduced L3 monitoring overhead on distributed platforms 		
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<h2>Other Features</h2> <ul style="list-style-type: none"> Other <ul style="list-style-type: none"> Ability to set sampling rate by app server and by monitoring level (formerly single global setting) Full Web/HTTP Server information view - important HTTP server statistics are now available for concurrent web server monitoring Multiple UI enhancements - unified overview page, new server, overview metrics, customizable landing page, new graphical displays WLM monitoring (z/OS only) 		
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WSAM and Tivoli Products



How a Customer Used WSAM

- A European financial services firm deployed a new version of a third-party back-office "Black Box" application, and experienced performance degradation as a result
- Application slowdowns caused a 60% drop in overall response time, resulting in lower employee productivity
- WebSphere Resource Analyzer was able to identify high CPU utilization and other system-level information.
- IBM WSAM was deployed to isolate the specific cause of the problems at an application level.



How WSAM Helped

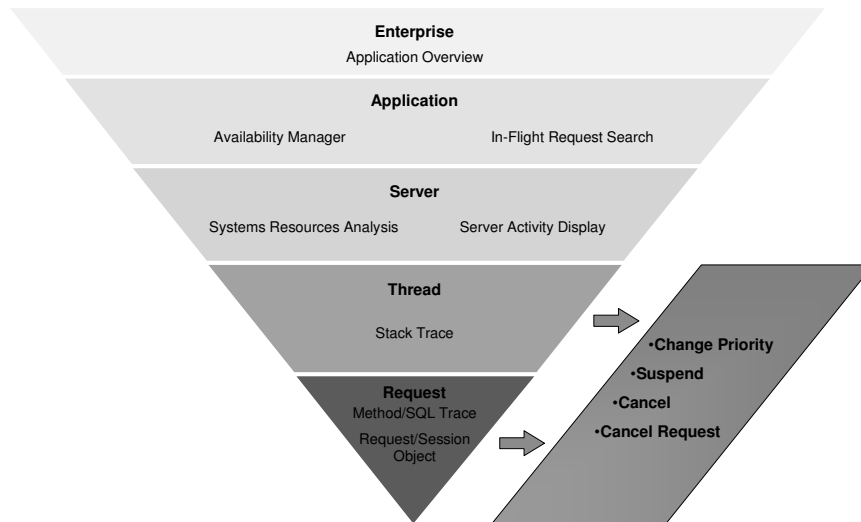
- Rapid implementation in one day allowed for immediate analysis and data capture against the application
- Ability to see all applications within the JVM without byte code modification to quickly find problematic application code
no access to development resources required (valuable feature, as this was a third-party app)
- WSAM provided the necessary "Method trace" information, which showed exactly which methods were consuming excessive CPU cycles
- Data Center management presented the WSAM findings report to the app vendor, which resulted in the vendor rewriting the problematic portions of the application to resolve the issues
End result was a dramatic reduction in CPU consumption, and end-user response times decreasing by over 50%



Product Demonstration

- Problem Determination
- Performance Analysis
- Memory Analysis

Drill-Down Problem Determination



Scenario: Trades Are Not Executing

- Large online brokerage requires sub-five (<5) second trading response time to meet SLA with internal business units.
- Customers begin calling in to complain that trades are not executing.
- Call center manager notices an significant increase in trading-related calls.
- Data center is notified that trades are not executing properly.

Problem Determination Drill Down with WSAM

In-Flight Request Search

Server Name	Client Request	Thread ID	Total Resident Time (ms)
demo-win-s01:trade01.2152	/WebSphereSamples/TradeSample/servlet/PingJDBCRead	212429224	275796
1 demo-win-s01:trade02.3044	/WebSphereSamples/TradeSample/servlet/PingJDBCRead	212428088	275796
demo-win-s01:trade01.2152	/WebSphereSamples/TradeSample/servlet/PingJDBCRead	168228272	6407

Server Activity Display

Thread ID	Client Request	Idle Time (ms)	Last Known Class Name	Last Known Class Name
212428088	/WebSphereSamples/TradeSample/servlet/PingJDBCRead	125400	trade_client/TradeConfig	rndSymbol

Request Detail

Detail

Thread ID: 212428088
Client Request: /WebSphereSamples/TradeSample/servlet/PingJDBCRead
Accum. CPU: 17 (µs)
Idle Time: 125400 (ms)
Thread Type: HttpServlet
Resident Time: 275796 (ms)
Last SQL: LOCK TABLE TRADEHOLDINGBEAN IN EXCLUSIVE MODE

Method Trace

Method

oracle.jdbc.driver/OracleStatement.isRegularResultSet <2002-11-11 13:30:57.000>> Elapsed Time: <<275796 ms >> CPU Time: <<17 µs >>
SQL Statement: LOCK TABLE TRADEACCOUNTBEAN IN EXCLUSIVE MODE

Cancel Request

Cancel

Change Priority
Change Thread Status
5 **Cancel Request**

Overall View – Application Groups

WebSphere® Studio Application Monitor

APPLICATION OVERVIEW
View availability for all applications running in assigned server groups, and a baseline response time indicator relating current and historical response time. Configure the baseline by going to the Administration tab and clicking Group Management. To view additional information for the applications in a server group, select from the drop-down menu.

ADMINISTRATION AVAILABILITY PROBLEM DETERMINATION PERFORMANCE MANAGEMENT LOGOUT HELP

Quotes

2 of 2 Servers Available

Select Detail View

Volume Throughput

Total Volume (last hour): 379

Trading

2 of 2 Servers Available

Select Detail View

Volume Throughput

Total Volume (last hour): 285

Click "In-Flight Request Search"

Volume Throughput

Response Time Indicator

% Server Availability

→ This page shows a bird's-eye view of the applications that are available in the server groups

→ Drill-down options are available from this page

→ For example, we want to see all of the active requests on the Trading Group

Application View – All Currently Running Requests



IBM WebSphere® Studio Application Monitor

ADMINISTRATION AVAILABILITY PROBLEM DETERMINATION PERFORMANCE MANAGEMENT LOGOUT HELP

IN-FLIGHT REQUEST SEARCH
In the Search Request box, type the name of the request for which you are searching. If you leave this box empty, all active requests will display.

Search for a specific request

SEARCH CRITERIA

Group: Trading
Server: All Servers
Search Request: OK

SEARCH RESULTS

Timestamp: Oct 4, 2002 6:51:37 AM

Click "Application Activity Display"

Select Request with Longest Resident Time

Server Name	Client Request	Start Date/Time	Thread ID	Resident Time (ms)
demo-win-s02.Trade02.2428	/WebSphereSamples/TradeSample/servlet/PingJDBCRead?ttl=3600&lock=true	Oct 4, 2002 6:52:39 AM	654560132	78442
demo-win-s02.Trade02.2428	/WebSphereSamples/TradeSample/servlet/GetQuote?ttl=30	Oct 4, 2002 6:50:59 AM	653860168	38927
demo-win-s02.Trade02.2428	/WebSphereSamples/TradeSample/servlet/GetQuote?ttl=30	Oct 4, 2002 6:50:59 AM	653536272	38927
demo-win-s02.Trade02.2428	/WebSphereSamples/TradeSample/servlet/GetQuote?ttl=30	Oct 4, 2002 6:50:59 AM	653933288	38927
demo-win-s02.Trade02.2428	/WebSphereSamples/TradeSample/servlet/GetQuote?ttl=30	Oct 4, 2002 6:51:15 AM	647304776	22927
demo-win-s02.Trade02.2428	/WebSphereSamples/TradeSample/servlet/GetQuote?ttl=30	Oct 4, 2002 6:51:15 AM	653859584	22927

→ "In-Flight Request Search" can be narrowed down with user-defined criteria
→ This display is sorted by resident time, longest first
→ Drill down further by clicking the AAD button ("Application Activity Display")

71

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Server View – Thread Data in an App Server



IBM WebSphere® Studio Application Monitor

ADMINISTRATION AVAILABILITY PROBLEM DETERMINATION PERFORMANCE MANAGEMENT LOGOUT HELP

APPLICATION ACTIVITY DISPLAY
The Application Activity Display provides thread data for an application server. click the thread's ID to review more request detail.

→ "Application Activity Display" shows thread data for an application server at a specific point in time
→ The first thread above shows a high idle time
→ Drill-down down further by clicking on the thread ID

SERVER SELECTION

Group: Trading Server: demo-win-s02.Trade02.2428

SERVER INFO

Snapshot Date: Oct 4, 2002 Application Server Name: Trade02
Snapshot Time: 6:57:25 AM Application Server IP Address: 192.168.3.45
Platform CPU % Utilization: 0.78% Total Thread Count: 1

THREADS

Filter By: Thread Type: Any Thread Status: Any Refresh

Click "Thread ID" to drill down

High Idle Time

Thread ID	Priority	Client Request	Client Request Start	Resident Time (ms)	Accumulated CPU (ms)	Idle Time (ms)	Thread Status	Last Known
654560132	5	/WebSphereSamples/TradeSample/servlet/PingJDBCRead?ttl=3600&lock=true	Oct 4, 2002 6:52:39 AM	78442	0	78440	Waiting Condition	com.ibm.bm.jsr.com.jsr
653536272	5	/WebSphereSamples/TradeSample/servlet/GetQuote?ttl=30	Oct 4, 2002 6:56:54 AM	32959	0	32959	Waiting Condition	com.ibm.bm.jsr.com.jsr
653923824	5	/WebSphereSamples/TradeSample/servlet/GetQuote?ttl=30	Oct 4, 2002 6:56:55 AM	31959	0	31959	Waiting Condition	com.ibm.bm.jsr.com.jsr
651328872	5	/WebSphereSamples/TradeSample/servlet/GetQuote?ttl=30	Oct 4, 2002 6:56:55 AM	31959	0	31959	Waiting Condition	com.ibm.bm.jsr.com.jsr

72

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Thread View – Detail on a Selected Thread

Click "Stack Trace"

Last SQL Call

Details for the chosen thread are displayed

Execute a Stack Trace or Method Trace on the Left Nav to determine next course of action

Stack Trace

Click "Method Trace"

Last Method Invoked

Stack Trace shows all the methods that have not completed execution

Method Trace

IBM WebSphere Studio Application Monitor

METHOD TRACE PROPERTIES

Snapshot Date	Oct 4, 2002
Snapshot Time	6:52:39 AM
Platform CPU % Utilization	0.00%
Current Total Elapsed Time	78442 ms
Current Total CPU Time	0 ms

METHOD TRACE

Entry	Exit	Date/Time
web_pmtv/PingJDBCRead.doGet		Oct 5, 2002 6:51:29 PM
trade_client/TradeConfig.mdsymbol		Oct 5, 2002 6:51:29 PM
trade_client/TradeConfig.mdint		Oct 5, 2002 6:51:29 PM
trade_client/TradeConfig.random		Oct 5, 2002 6:51:29 PM
trade_client/TradeConfig.random		Oct 5, 2002 6:51:29 PM
trade_client/TradeConfig.mdint		Oct 5, 2002 6:51:29 PM
trade_client/TradeConfig.mdsymbol		Oct 5, 2002 6:51:29 PM
com.ibm.ejs.cm.proxy.StatementProxy		Oct 5, 2002 6:51:29 PM
SQL Statement: LOCK TABLE TRADEHOLDINGBEAN IN EXCLUSIVE MODE NOWAIT		
com.ibm.ejs.cm.proxy.StatementProxy.executeCommon		Oct 5, 2002 6:51:29 PM
SQL Statement: LOCK TABLE TradeQuoteBean IN EXCLUSIVE MODE NOWAIT		

Note: Table Lock

→ "Method Trace" lists the method information for uncompleted requests

→ Return to "Request Details" to take action against the request

Cancel Request – Take Action on a request

IBM WebSphere Studio Application Monitor

REQUEST PROPERTIES

Snapshot Date	Oct 4, 2002	Application Server Name	Trade02
Snapshot Time	6:52:39 AM	Application Server IP Address	192.168.3.45
Platform CPU % Utilization	0.00%	Total Thread Count	1

REQUEST DETAIL

Thread ID	654560132	Accumulated CPU	0 ms
Client Request	WebSphereSamples/TradeSampleServlet/PingJDBCRead?B=360&locale=true	Idle Time	78440 ms
Client Request Start Date	Oct 4, 2002	Thread Type	HttpServlet
Client Request Start Time	6:52:39 AM	Last Known Class Name	com.ibm.ejs.cm.proxy.StatementProxy
Resident Time	78442 ms	Last Known Method	getStatement
Priority	5	Thread Status	Waiting Condition
Change Priority	No Change	Change Thread Status	No Change
Last SQL	LOCK TABLE TRADEHOLDINGBEAN IN EXCLUSIVE MODE NOWAIT		

→ The request is cancelled

→ Thread Status and Priority may also be changed from this screen

Click "Cancel Request"

Normal Processing Resumes

IBM WebSphere Studio Application Monitor

ADMINISTRATION AVAILABILITY PROBLEM DETERMINATION PERFORMANCE MANAGEMENT LOGOUT HELP

APPLICATION ACTIVITY DISPLAY
The Application Activity Display provides thread data for an application server at a specific point in time. After pinpointing a hung thread, click the thread's ID to review more request detail.

SERVER SELECTION

Group: Trading Server: demo-win-402.Trade02.2428 (L3)

SERVER INFO

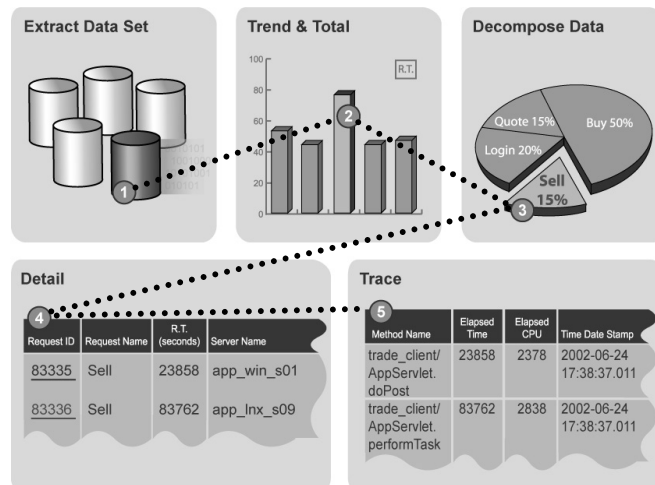
Snapshot Date	Oct 4, 2002	Application Server Name	Trade02
Snapshot Time	6:57:25 AM	Application Server IP Address	192.168.3.45
Platform CPU % Utilization	0.78%	Total Thread Count	0

THREADS

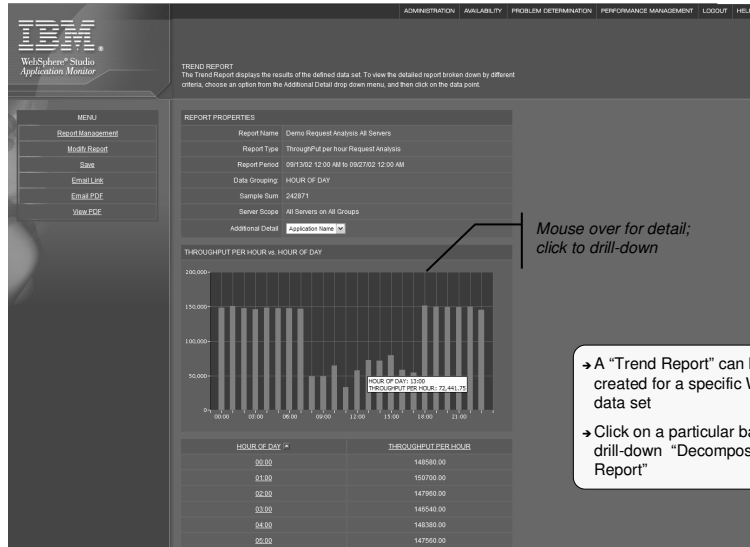
Filter By: Thread Type: Any Thread Status: Any Refresh

Thread ID	Priority	Client Request	Client Request Start	Resident Time (ms)	Accumulated CPU (ms)	Idle Time (ms)	Thread Status	Last Known Class Name	Last Known Method
The problematic request has been cleared; all subsequent requests finished processing									

Performance Analysis Drill Down



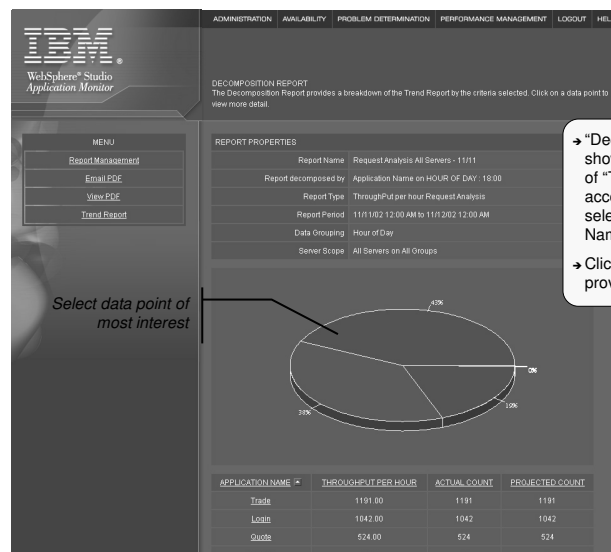
Trend Report



→ A "Trend Report" can be created for a specific WAS data set

→ Click on a particular bar to drill-down "Decomposition Report"

Decompose



→ "Decomposition Report" shows a further breakdown of "Trend Report", according to the criteria selected ("Application Name", in this case)

→ Clicking on a data point provides more details

Select data point of most interest

Detail

REQUEST REPORT DETAIL
The Request Report Detail displays a breakdown of the data for the portion of the Decomposition Report.

REPORT PROPERTIES

Report Name	RequestAnalysis All Servers - 11/11
Report detail on	HOUR OF DAY : 18:00
Report decomposed by	Application Name on HOUR OF DAY : 18:00
Report Type	ThroughPut per hour Request Analysis
Report Period	11/11/02 12:00 AM to 11/11/02 12:00 AM
Server Scope	All Servers on All Groups

→ The "Request Report Detail" opens
→ Drilling-down is available through the "Trace Report"

REQUEST NAME	REQUEST TYPE	RESPONSE TIME (ms)	CPU TIME (ms)	SERVER	TIME-STAMP
Trade	Servlet	42045	15.625	demo-win-s02.Quote01	2002-11-11 17:59:19.0
Trade	Servlet	42045	0.000	demo-win-s02.Quote01	2002-11-11 17:59:18.0
Trade	Servlet	41967	0.000	demo-win-s02.Quote01	2002-11-11 17:59:18.0
Trade	Servlet	38109	0.000	demo-win-s02.Quote01	2002-11-11 17:59:29.0
Trade	Servlet	39014	0.000	demo-win-s02.Quote01	2002-11-11 17:59:30.0
Trade	Servlet	39014	0.000	demo-win-s02.Quote01	2002-11-11 17:59:30.0

Trace Report

TRACE REPORT
The Trace Report provides details on any one record selected from the Request Report Detail.

REPORT PROPERTIES

Report Name	RequestAnalysis All Servers - 11/11
Request Trace on	Trade
Report detail on	HOUR OF DAY : 18:00
Report decomposed by	Application Name on HOUR OF DAY : 18:00
Report Period	11/11/02 12:00 AM to 11/11/02 12:00 AM
Server Scope	All Servers on All Groups

→ The "Trace Report" provides details on any one record selected

SQL Statement

```
SELECT symbol,price,details FROM TradeQuoteBean WHERE symbol
```

Entry Point

```
Entry into trade_clientTradeConfig.indSymbol <<2002-11-11 17:59:19.367>> Elapsed Time: <<0 ms>> Cpu Time: <<0.000 ms>>
```

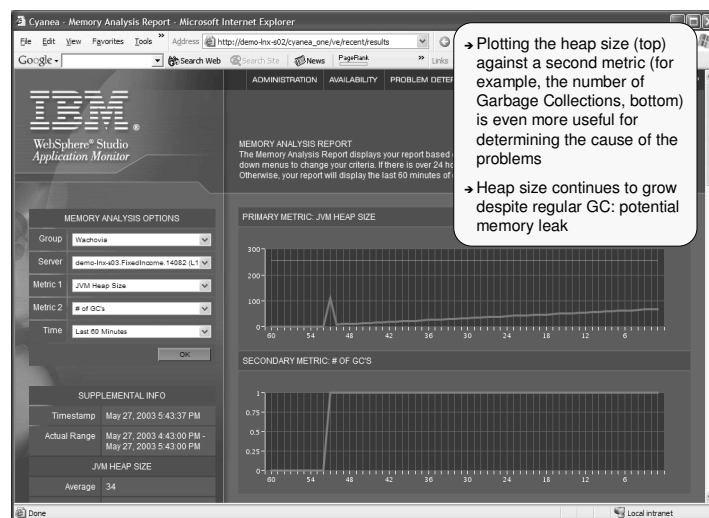
Exit Point

```
Exit from trade_clientTradeConfig.random <<2002-11-11 17:59:19.367>> Elapsed Time: <<0 ms>> Cpu Time: <<0.000 ms>>
```

Memory Analysis (available with v1.1.2)

- Memory leaks in Java are hard to pinpoint
 - Memory handling is done by the JVM
 - Pro: This frees up the developers to focus on building the applications
 - Con: But it makes memory issues hard to trace back to a specific component
- WSAM has a "Memory Analysis" feature to track down memory leaks

Heap Size Can Be Plotted Against A Second Metric



Heap Analysis

→ "Heap Analysis" shows the detailed heap content

→ Quickly identify classes that contribute the most to heap utilization

Class name	Total size (kb)	Percent of total size	# of instances	Percent of total #
com.trading.Bond	25	0%	2188	0%
com.trading.BondFactory	0	0%	1	0%
com.trading.BondServlet	0	0%	1	0%
com.trading.Node	477	0%	61180	27%
com.trading.Trie	0	0%	1	0%
object[]	61474	93%	66763	29%
primitive[]	2663	4%	25777	11%

Memory Leak Analysis

→ "Memory Leak Analysis" shows a snapshot of the heap at two different times

→ Comparing the results shows significant growth in two classes: those are the likeliest sources of leaks

Class name	Original # of instances	Original total size (kb)	Δ # of instances	Δ Total size (kb)
com.trading.BondServlet	1	0	0	0
com.trading.Trie	1	0	0	0
com.trading.BondFactory	1	0	0	0
com.trading.Bond	1859	21	1255	14
com.trading.Node	51860	405	34375	14

Summary: A Robust Platform for Application Management



WSAM: an integral part of a **24/7 enterprise** IT infrastructure

- Advanced **Problem Determination** for real-time problem resolution
- Detailed historical analysis with **Performance Management** functionality
- True **Application Independence** allows views of applications without requiring access or modification to application code

Rapid Implementation enables fast ROI



WebSphere Studio Workload Simulator for z/OS and OS/390

ITSO Poughkeepsie IBM @OS4 zSeries 2003 Technical Update		 
<h2 style="text-align: center;">Agenda</h2> <ol style="list-style-type: none">1. Do We Need Load-Testing?2. WebSphere Studio Workload Simulator for z/OS3. Scenario4. Q&A		
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ITSO Poughkeepsie IBM @OS4 zSeries 2003 Technical Update		 
<h2 style="text-align: center;">Agenda</h2> <ol style="list-style-type: none">1. Do We Need Load-Testing?2. WebSphere Studio Workload Simulator for z/OS3. Scenario4. Q&A		
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Do We Need Load-Testing?



When Load-Testing Was Not Done...

1996 chess match between Kasparov and IBM's computer

"Thousands of users per second were turned away from IBM's website..." [USA Today 2/14/96]

1999 Christmas shopping at KBKids.com

- KBKids.com launched its website in July 1999 for the Christmas shopping season
- Seriously underestimated response of children and parents (Pokemon toys): sharp increase in traffic caught company offguard
- Entire website taken offline to add more servers during critical shopping season
- Loss of customer good will

[Source: abcnews.com, 1999]

Right after the 9-11 event

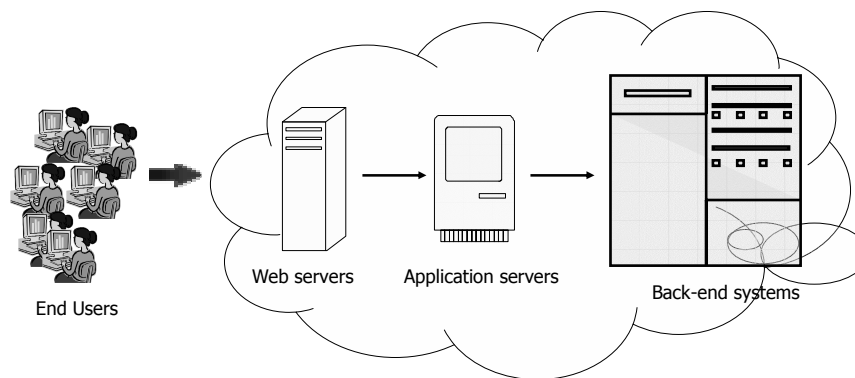
- USAToday.com website - 18% availability
- FBI.gov website - usually 2-3 secs response time; went to 40 secs response time
- ABCnews.com website - 5% availability

[Source: NetworkWorldFusion, 2001]

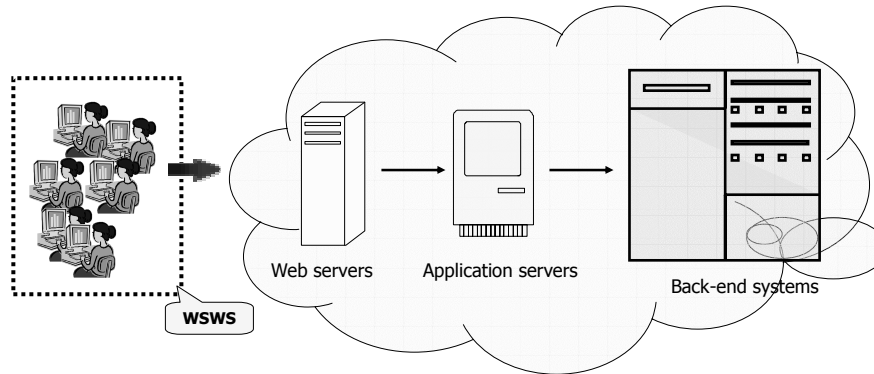
Agenda

1. Do We Need Load-Testing?
2. WebSphere Studio Workload Simulator for z/OS
3. Scenario
4. Q&A

A Typical Set-up

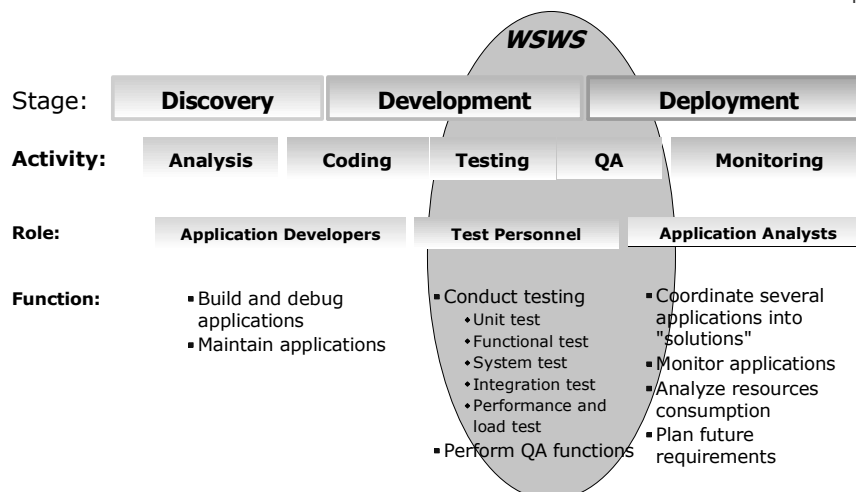


What WWS Does



- WWS simulates a large number of web browsers (or "virtual users"), and is used to test web applications and web servers
- WWS does not pre-req the WebSphere Application Server

Where WWS Fits



WSWS - Architecture



Windows

Windows-based "Controller"

Test Case Capture
Test Case Scripting
Test Execution and Monitoring
Test Analysis



zSeries

z/Series-based "Engine"

Load generation

All test functions are accessible through the Windows-based controller

WSWS Can Test Any Web-Serving Environment



Windows

Windows-based Controller

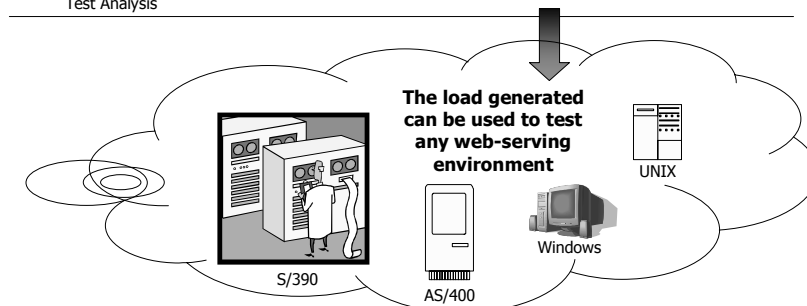
Test Case Capture
Test Case Scripting
Test Execution and Monitoring
Test Analysis







zSeries

z/Series-based Engine

Load generation



	ITSO Poughkeepsie IBM eBusiness on zSeries 2003 Technical Update	
	<p>WSWS – Value Proposition</p> <p>WSWS is scalable WSWs is the only 390-based solution on the market currently The load is generated from a zSeries server It can be used to test any web-serving environment A “server farm” is not required</p> <p>WSWS is priced on machine capacity, not “per-virtual user” Other load-testing tools are priced by per-virtual-user They can be very costly if the customer needs to run large simulations WSWs is OTC/IPLA</p> <p>WSWS has a user-friendly interface All test functions are accessible from a Windows interface</p>	
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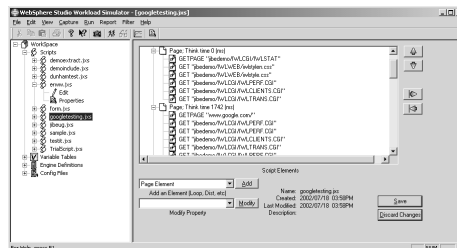
	ITSO Poughkeepsie IBM eBusiness on zSeries 2003 Technical Update	
	<p>WSWS Usage Scenarios</p> <p>What can WSWs be used for?</p> <ul style="list-style-type: none"> •Verify web-serving performance <ul style="list-style-type: none"> - Stress/Load a web server Simulate large numbers of users executing a distribution of functions - Benchmark web applications Execute industry web benchmarks (e.g., Trade 2) to estimate response time under production conditions - Verify load-distribution functions •Quality Assurance on web applications <ul style="list-style-type: none"> - Simulate large numbers of users on web applications - Perform regression test prior to web deployment •Functional test of server-side functions Drive web-server functions and validate the functionality 	
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1-2-3 Testing...

- 1 - Create test scripts
- 2 - Execute and monitor test
- 3 - Analyze results

1. Create Test Scripts

- Capture/automatic script generation
 - User's actions can be captured to automatically build a test script
- Test scripts are managed through a Windows GUI
- Variable content is supported
 - Ex: multiple users with different log-on IDs and passwords
- Programming functions (e.g., distribute, looping)
 - Add flexibility to test scripts
 - Response validation
 - String manipulation
- Full Cookies support
- Socks support



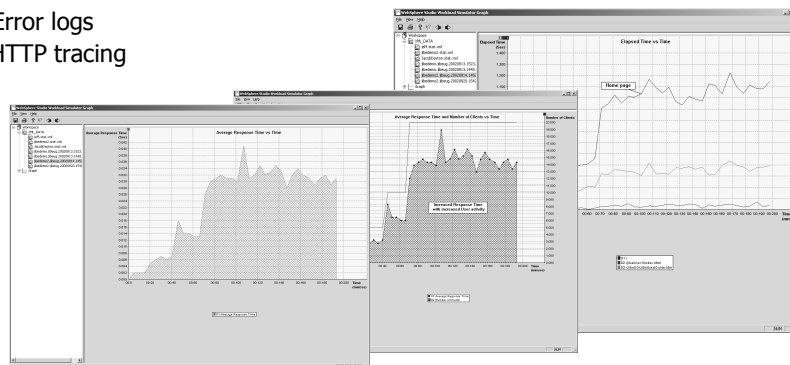
2. Execute and Monitor Test



- Various run-time parameters can be set:
 - Number of clients, delay controls
 - Number of times the script is to repeat, or a time limit for the test
 - Various log/trace options
 - Socks support
- The test engines can be monitored in real-time through a Windows GUI or a browser interface
 - Tests can be started/stopped remotely through the browser
- Support for multiple engines
- SSL support



3. Analyze Results

- Graphing of performance measurements:
 - Response time
 - Data read or written transfer (throughput)
 - Throughput of Page elements, Pages, and Transactions
 - CPU or Memory Utilization
 - The above items can be plotted against time or the number of virtual users
- Error logs
- HTTP tracing





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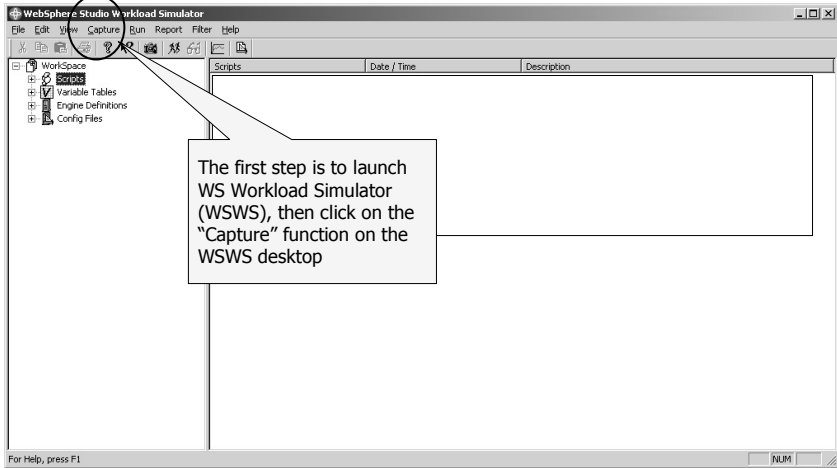
Agenda

1. Do We Need Load-Testing?
2. WebSphere Studio Workload Simulator for z/OS
3. Scenario: an airline needs to load-test its flight-inquiry system
4. Q&A

105
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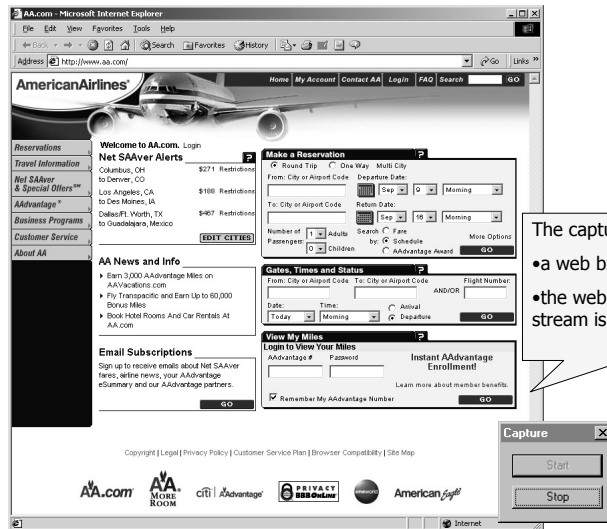
- 1 - Create test scripts
- 2 - Execute and monitor test
- 3 - Analyze results



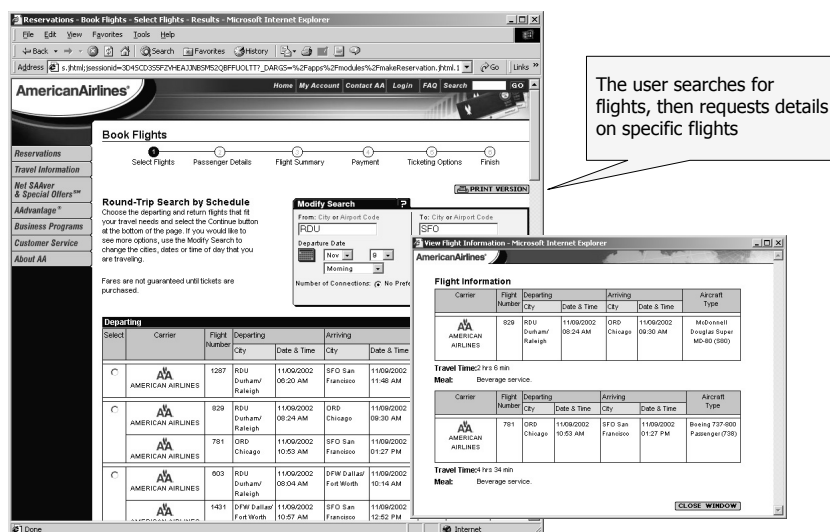
The first step is to launch WS Workload Simulator (WSWS), then click on the "Capture" function on the WSWS desktop


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- 1 - Create test scripts
- 2 - Execute and monitor test
- 3 - Analyze results

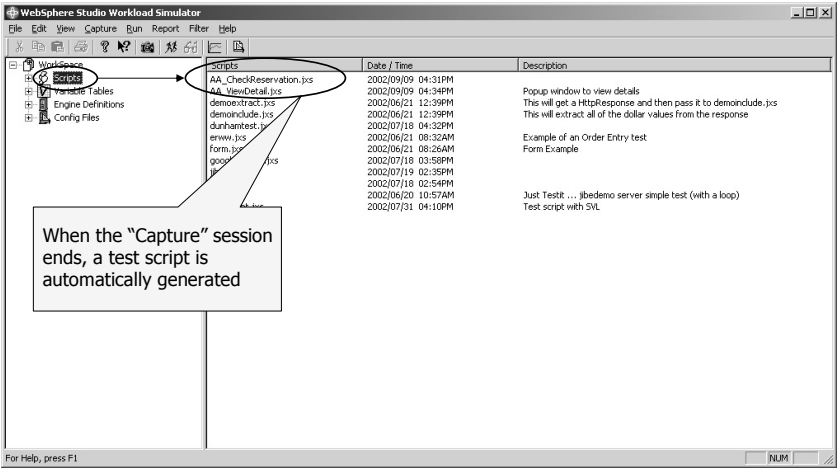


- 1 - Create test scripts
- 2 - Execute and monitor test
- 3 - Analyze results




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- 1 - Create test scripts
- 2 - Execute and monitor test
- 3 - Analyze results

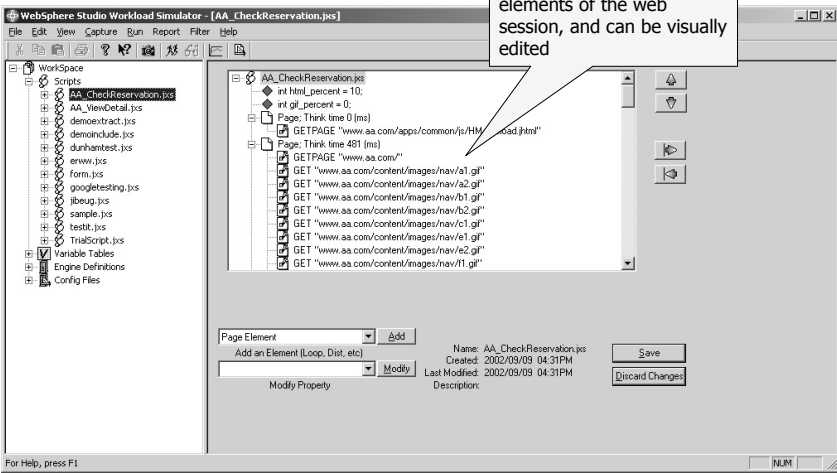


When the "Capture" session ends, a test script is automatically generated

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- 1 - Create test scripts
- 2 - Execute and monitor test
- 3 - Analyze results



The test script shows all elements of the web session, and can be visually edited

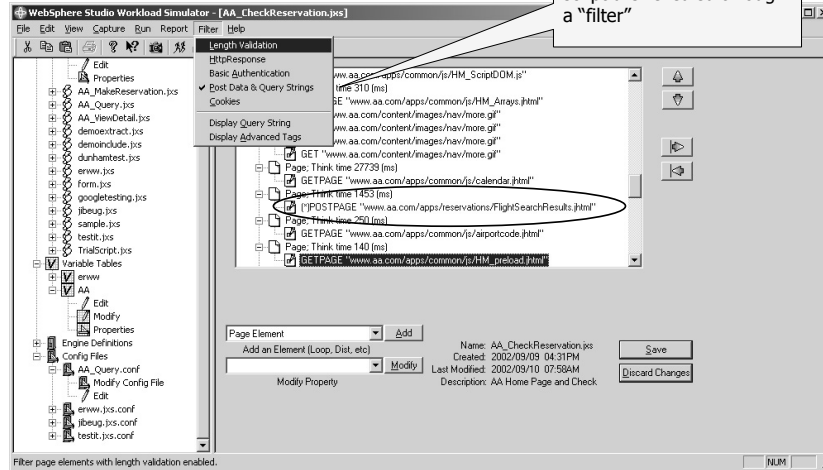
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1 - Create test scripts

2 - Execute and monitor test

3 - Analyze results

Variable elements in the test script are revealed through a "filter"

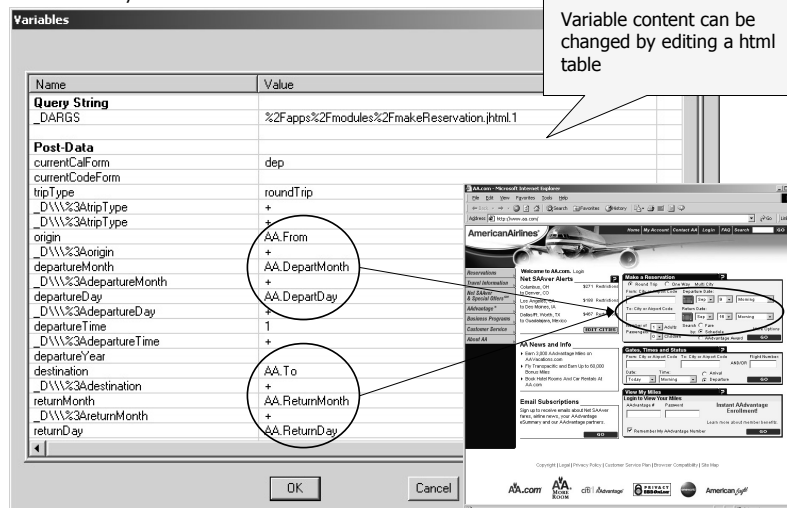


1 - Create test scripts

2 - Execute and monitor test

3 - Analyze results

Variable content can be changed by editing a html table



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1 - Create test scripts

2 - Execute and monitor test

3 - Analyze results

113

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1 - Create test scripts

2 - Execute and monitor test

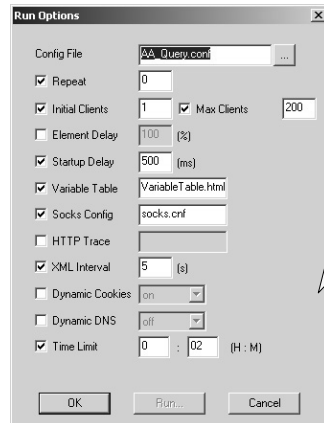
3 - Analyze results

114

eBusiness on zSeries

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- 1 - Create test scripts
- 2 - **Execute and monitor test**
- 3 - Analyze results

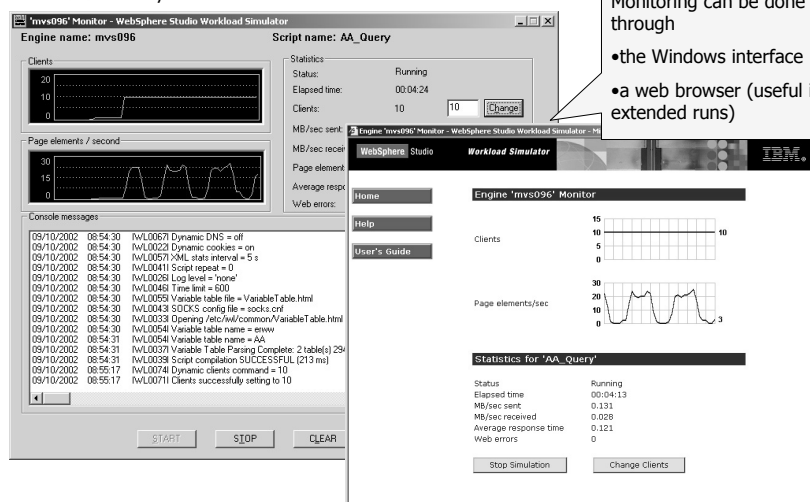


Prior to executing the test script, runtime options can be set, e.g.:

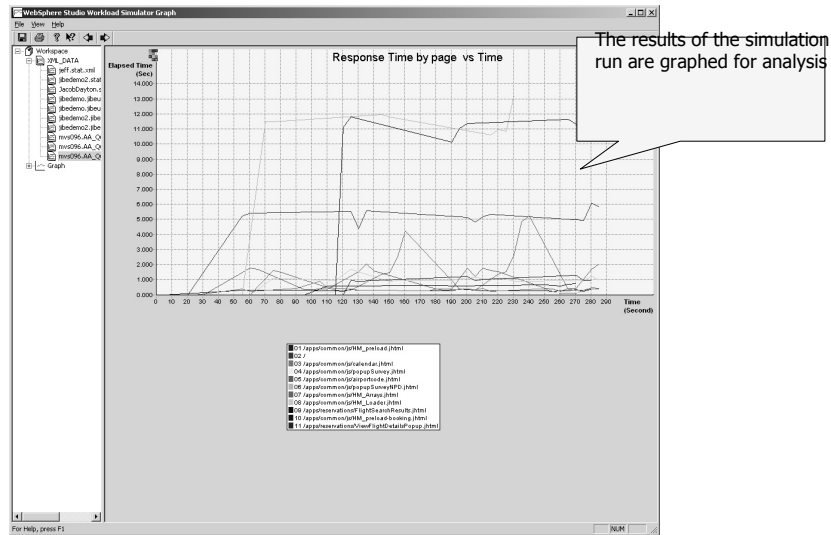
- **Repeat**: number of times the test is to be repeated
- **Initial/Max Clients**: number of virtual users to be simulated
- **Start-up delay**: to simulate the delay between users coming on-line (not all users go on-line at exactly the same moment)
- **Variable Table**: specifies where the variable content should be drawn from

The runtime parameters are saved in a configuration file that can be re-used

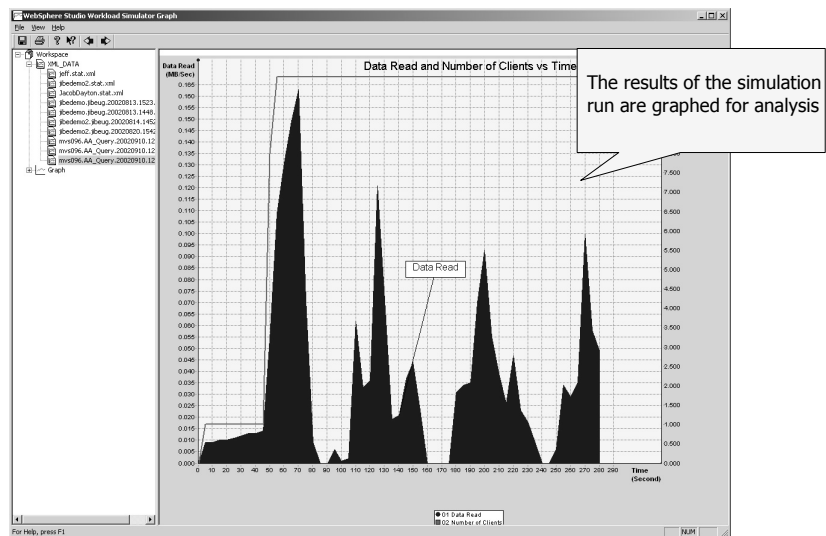
- 1 - Create test scripts
- 2 - **Execute and monitor test**
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- 1 - Create test scripts
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- 1 - Create test scripts
- 2 - Execute and monitor test
- 3 - **Analyze results**



Agenda

- 1. Do We Need Load-Testing?**
- 2. WebSphere Studio Workload Simulator for z/OS**
- 3. Scenario**
- 4. Q&A**