



IBM Software Group

Effective Software Testing – tools and strategies for project success

Rational software



ON DEMAND BUSINESS™

Agenda

- Business Driven Development
- Test Management
- Code and Unit Testing
- Manual Functional Testing
- Automated Functional Testing
- Break
- Performance Testing
- Wrap Up & Resources



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- **Business Driven Development**
- Test Management
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- Manual Functional Testing
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Software delivery challenges for On Demand Business



On Demand Business focus

- **Responsiveness**
as a key competency
- **Effectiveness** of people
as a critical success factor
- **Revenue growth**
with cost containment



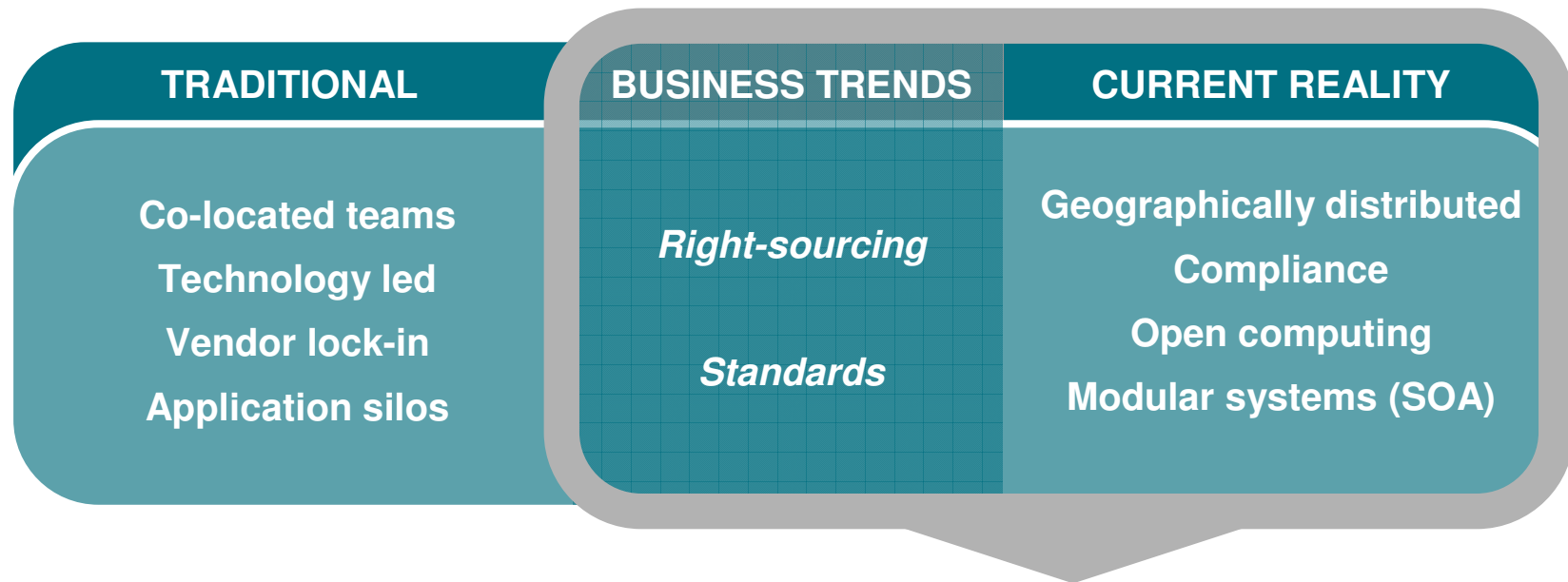
Software delivery challenges¹

- Keeping software projects **aligned**
with changing business priorities
- Delivering better **business results**
within the constraints of current
investments and skill sets
- **Effectively managing** business
and technical **risk**

¹ IBM Rational research, November 2005



Evolving software and systems delivery

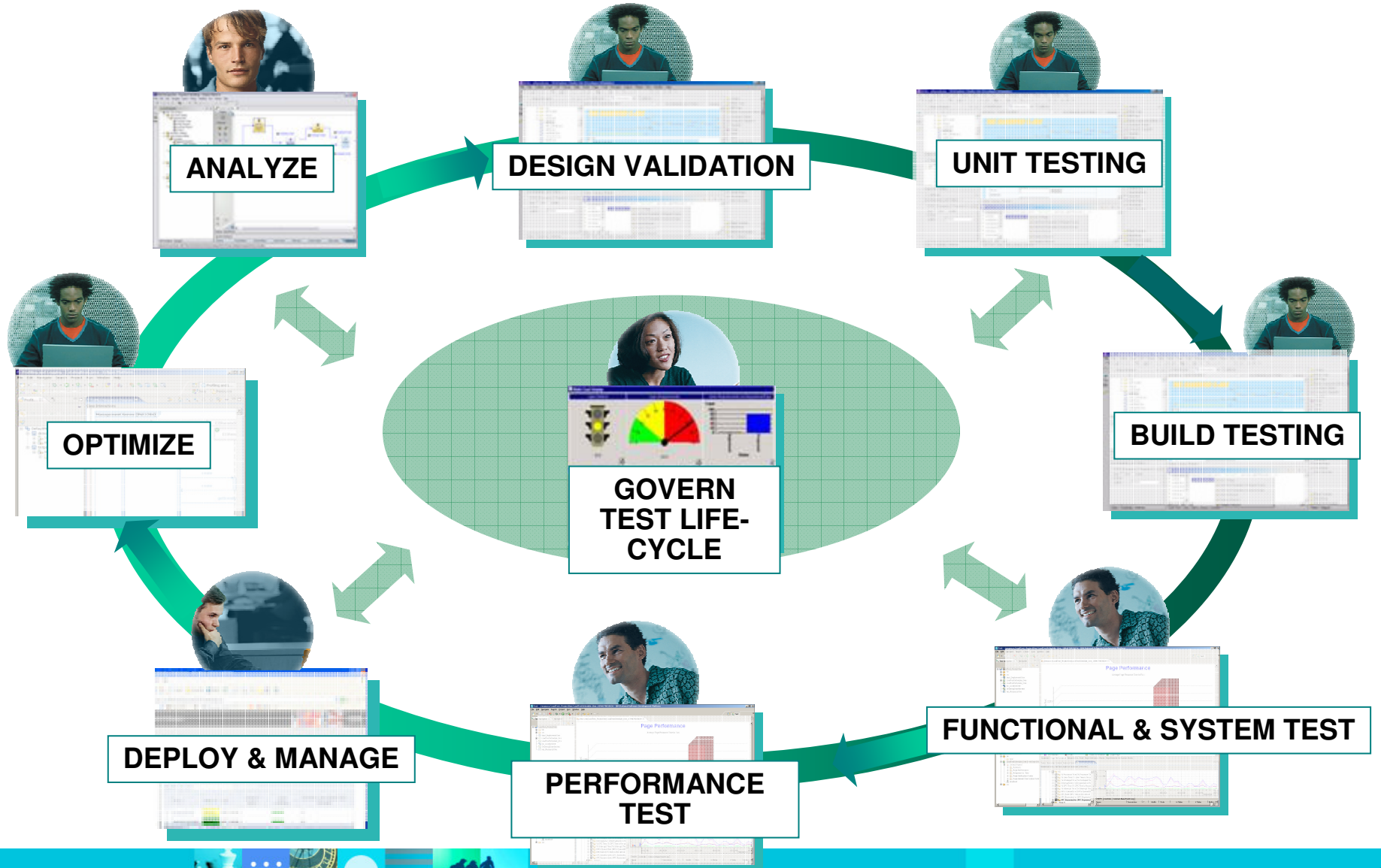


Business Driven Development

Enabling organizations to *govern* the business process of software and systems development



Integrated quality capabilities



Rational Software Development Platform

GOVERNANCE DASHBOARD

Solutions for geographically distributed development, compliance, SOA

Process & portfolio management

- IBM Rational® Portfolio Manager
- IBM Rational Method Composer
- Best practices content (IBM Rational Unified Process® IBM Tivoli Unified Process®, Portfolio Management)

Requirements & analysis

- IBM WebSphere® Business Modeler
- IBM Rational RequisitePro®
- IBM Rational Software Architect
- IBM Rational Software Modeler
- IBM Rational Rose® Data Modeler

Design & construction

- IBM Rational Software Architect
- IBM Rational Software Modeler
- IBM Rational Data Architect
- IBM Rational Application Developer
- IBM Rational Web Developer

Software quality

- IBM Rational Performance Tester
- IBM Rational Functional Tester
- IBM Rational Manual Tester
- IBM Rational PurifyPlus
- IBM Rational Robot
- IBM Test RealTime

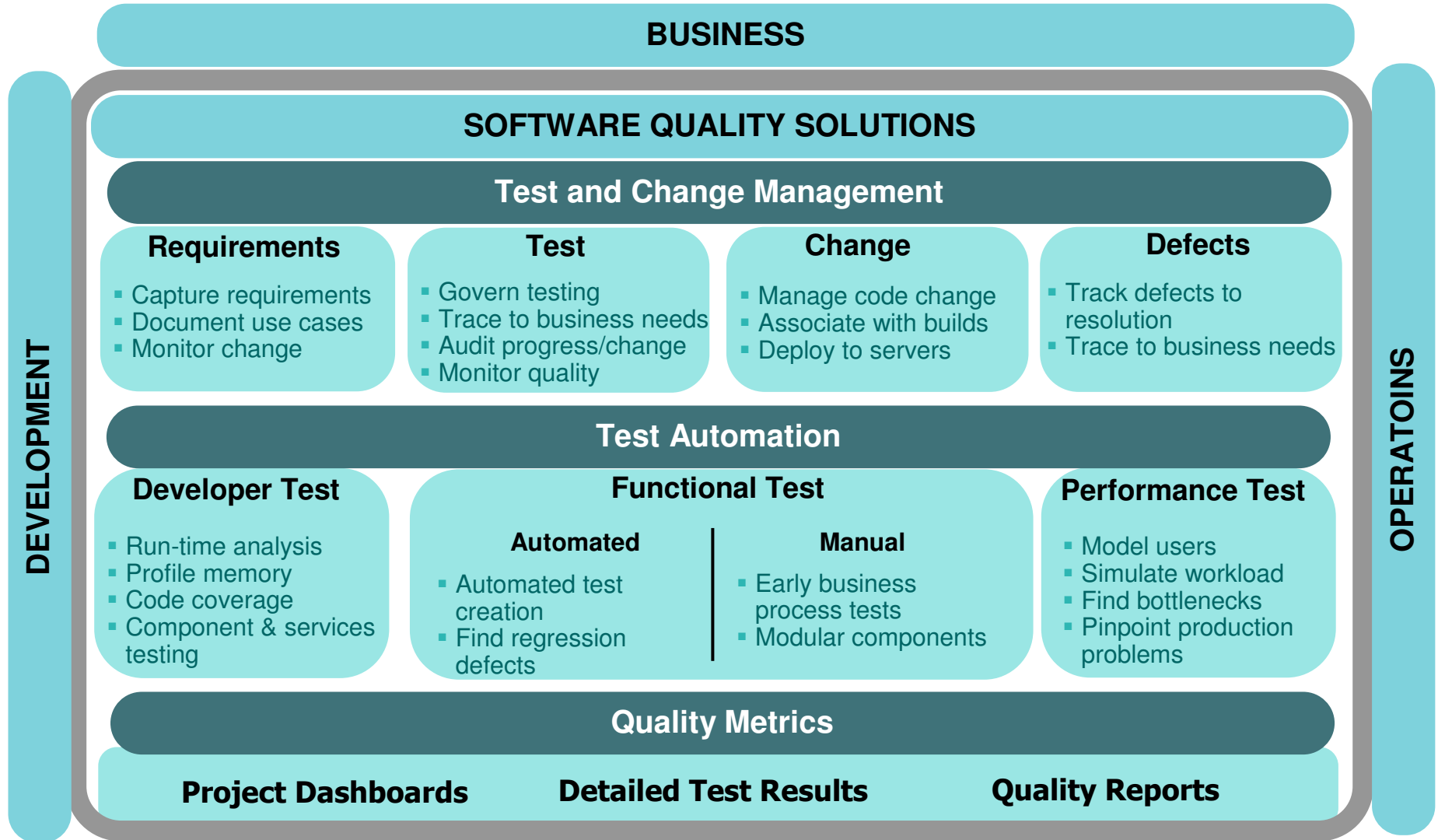
Change & configuration management

- IBM Rational ClearCase®
- IBM Rational ClearQuest®
- IBM Rational Team Unifying Platform™
- IBM Tivoli Provisioning Manager
- IBM Tivoli Configuration Manager
- IBM Tivoli Intelligent Orchestrator

Partner ecosystem & open computing: Eclipse, Linux®, Microsoft® Windows®, UNIX®, IBM z/OS®



Rational Software Quality Solutions

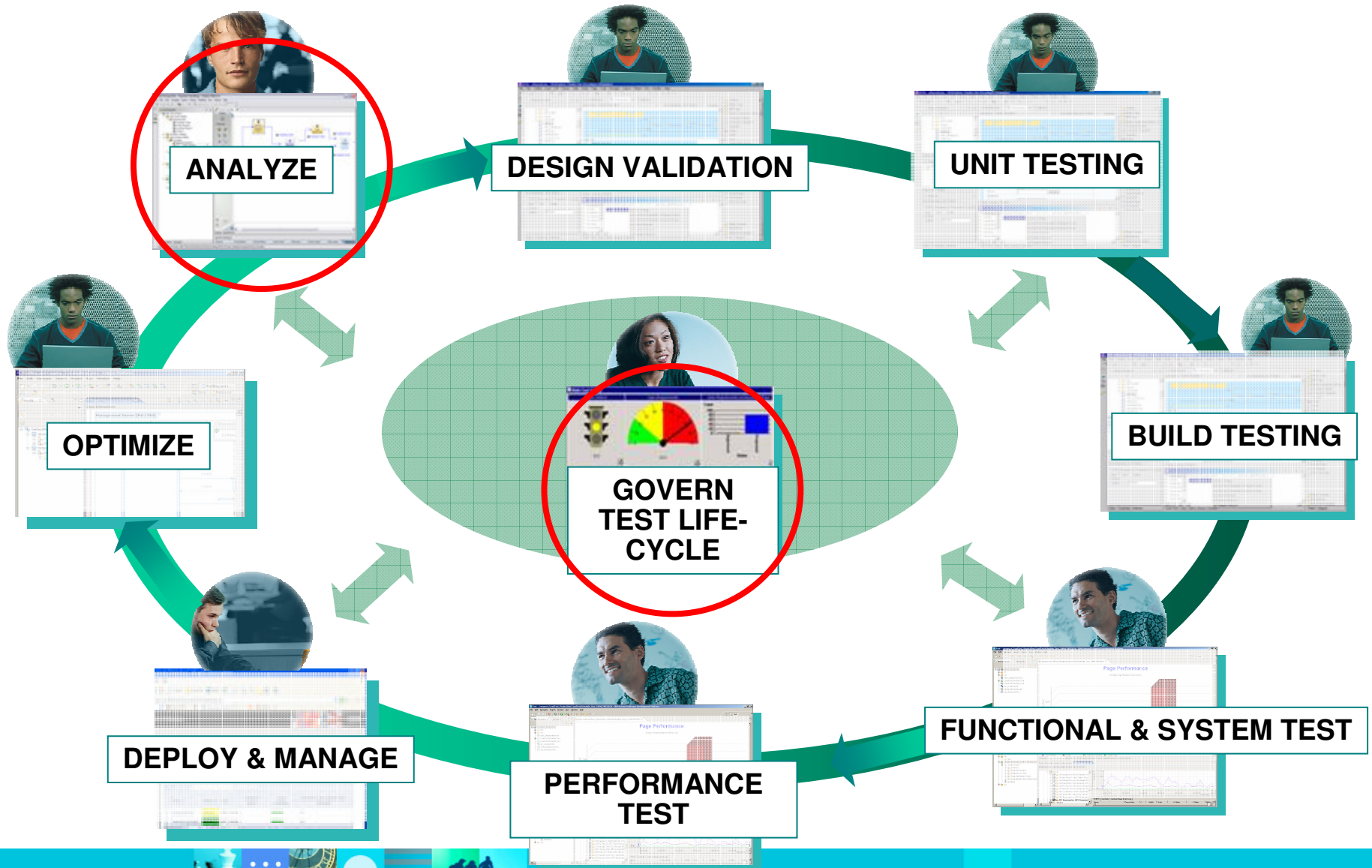


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Integrated quality capabilities



What is Test Management?



Plan

Create

Execute

Analyze

- **Plan Objective:**
 - ▶ Organize and maintain an inventory of items to test
- **Create Objective:**
 - ▶ Capturing the steps required to complete a given test
- **Execute Objective:**
 - ▶ Assembling scripts in sequence to perform a suite of tests
- **Analyze Objective:**
 - ▶ Determine current status of testing project



Challenges of Test Management

■ Comprehensive

- ▶ Keep track of test assets including requirements, test scripts, logs, results and reports
- ▶ Ensure testing addresses the requirements and business use cases

■ Distributed

- ▶ Accommodate the requirements of both dedicated, independent QA teams as well as integrated project teams and distributed teams to ensure high operational integrity.

■ Extensible

- ▶ Lower the cost of test lab management
- ▶ Simplify the management of tools from multiple vendors

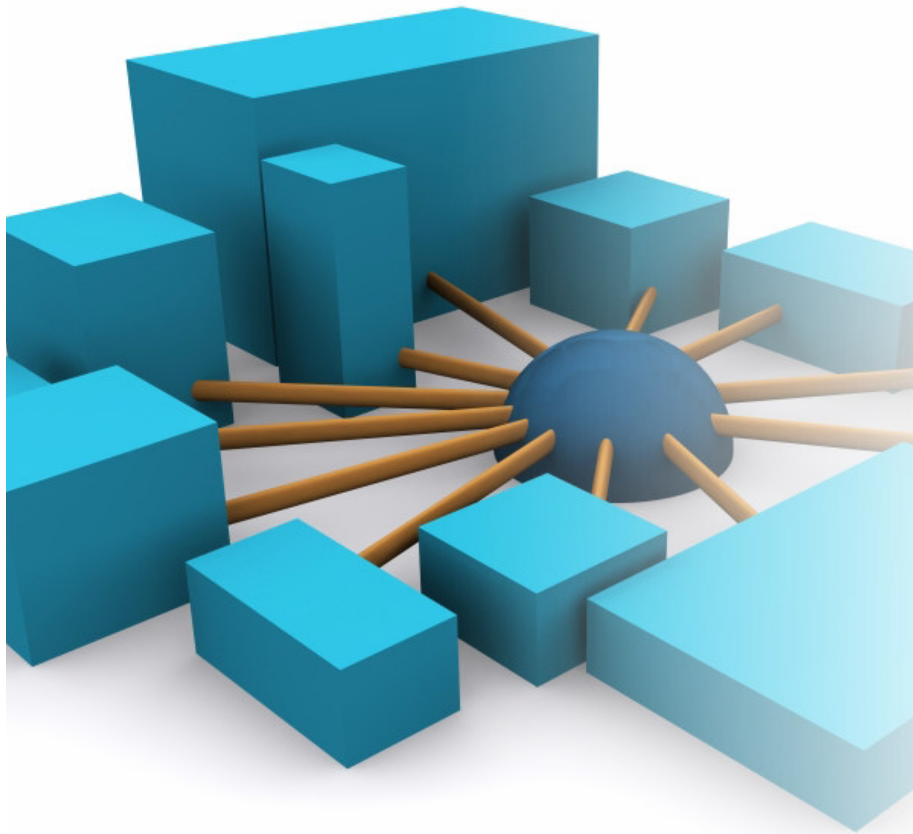
■ Configurable

- ▶ Ensure compliance and enforcement of project and company policies
- ▶ Project-specific needs and workflow automation



ClearQuest: The hub for life-cycle management

Govern the test and development process



IBM Rational ClearQuest

Test Change Defects

- Single project view
- Global test project coordination
- Configurable, enforceable processes
- Extensible test ecosystem

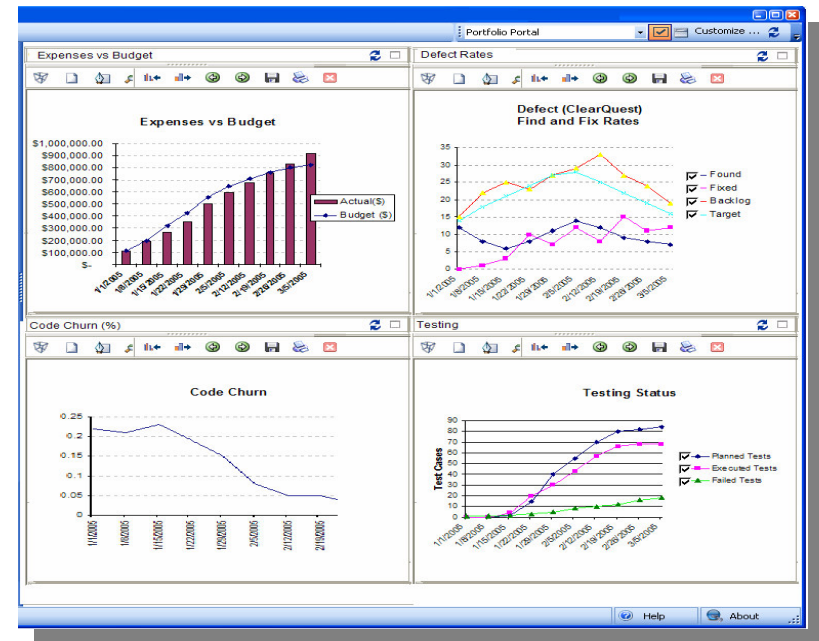


Single project view

Single solution to manage tests, defects and project change

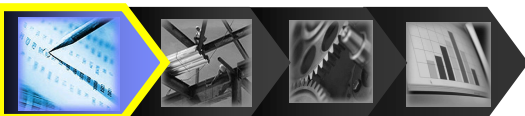
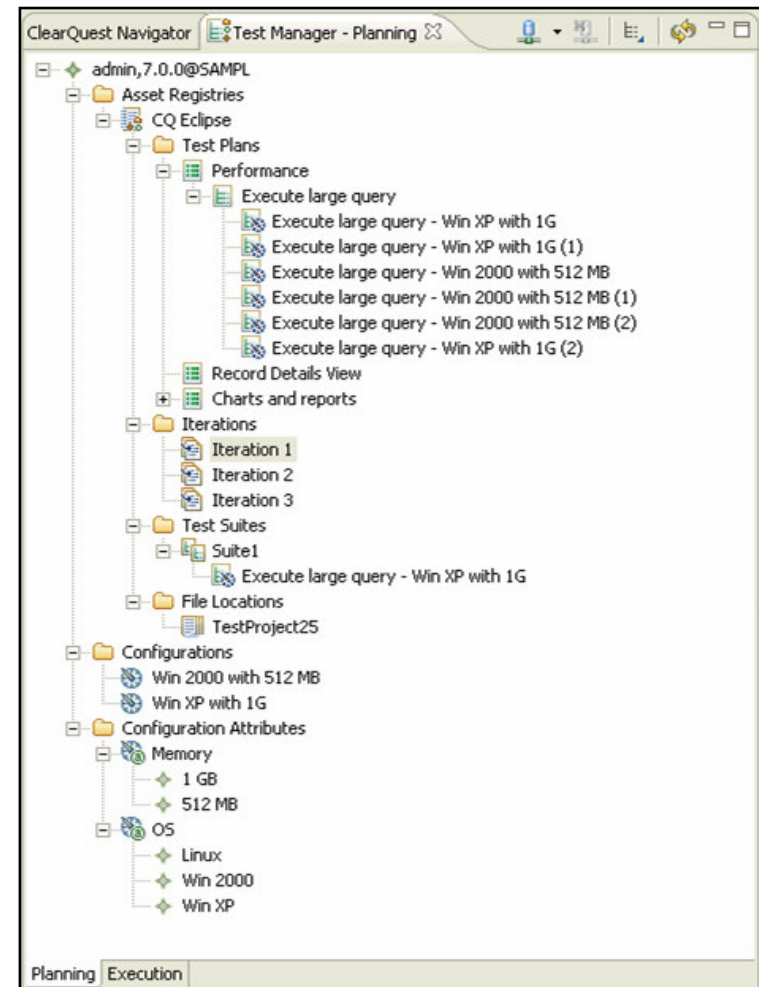
Benefits:

- Consolidated, real-time view of the entire project status
- Traceable, auditable relationships between development, test and project artifacts
 - ▶ Manages test planning, test results, quality metrics, and defects
 - ▶ Central repository with integrated version control
 - ▶ Comprehensive quality metrics in project dashboards and reports
 - ▶ Centralized user management



Plan: Enterprise test management & planning

- Manages test planning, test results, quality metrics, and defects
- Link requirements to tests
- Automates sharing and reuse of distributed assets
- Extensible customization of forms and workflows
- Auditable test change history
- e-Signature support
- Supports enterprise-level databases (Oracle, DB2, SQL Server, etc)



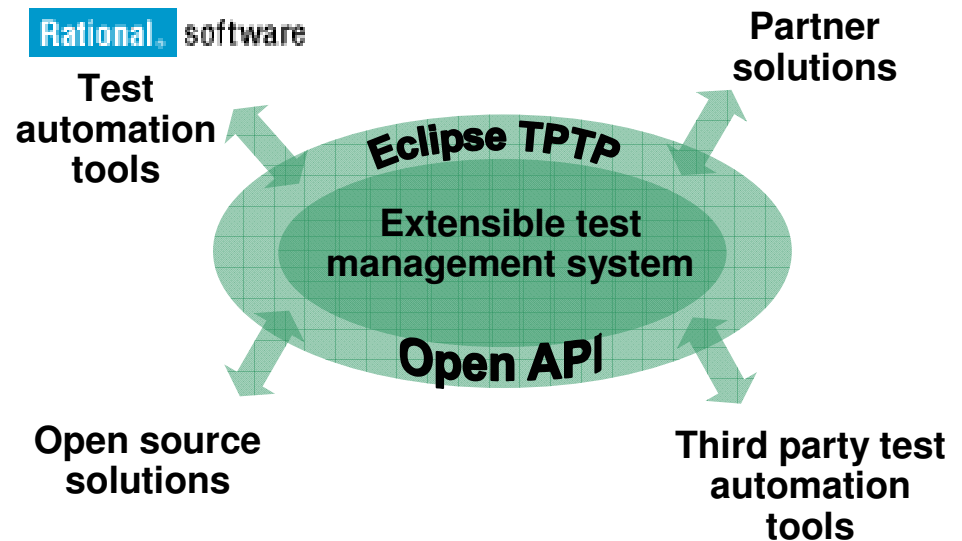
Create and Execute: Extensible test ecosystem

Integrated with Rational, open source and 3rd party test automation tools for Test Execution and Analysis

Benefits:

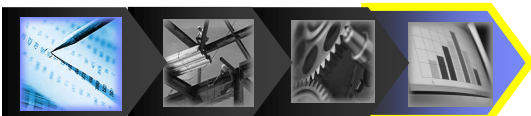
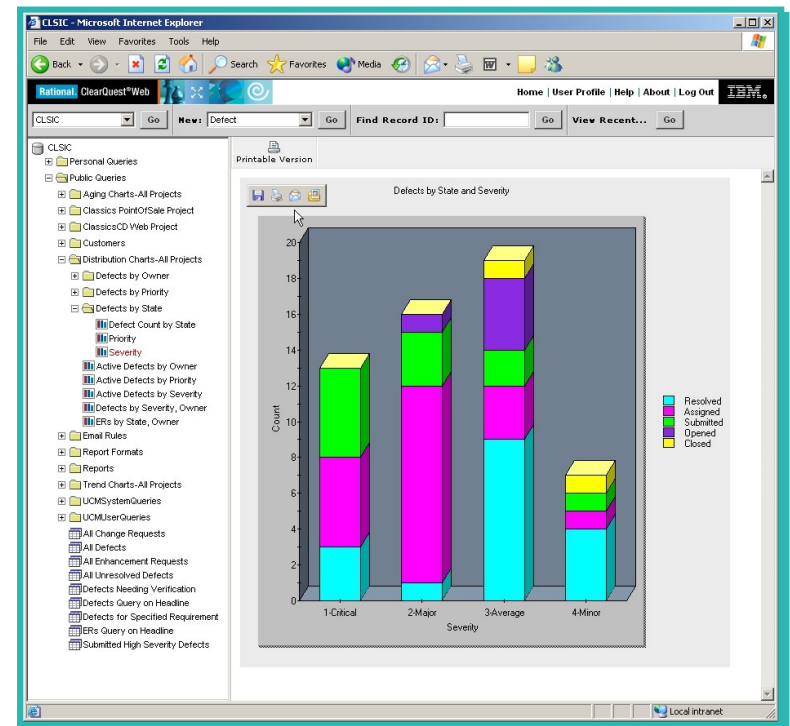
- Lowers the cost of test lab management
- Simplifies the management of tools from multiple vendors

- ▶ Integrated with Rational Functional Tester, Rational Manual Tester and Rational Performance Tester
- ▶ Integrates with SPI Dynamics QAInspect for security testing
- ▶ Partner and customer extensibility
- ▶ Open source plug-ins



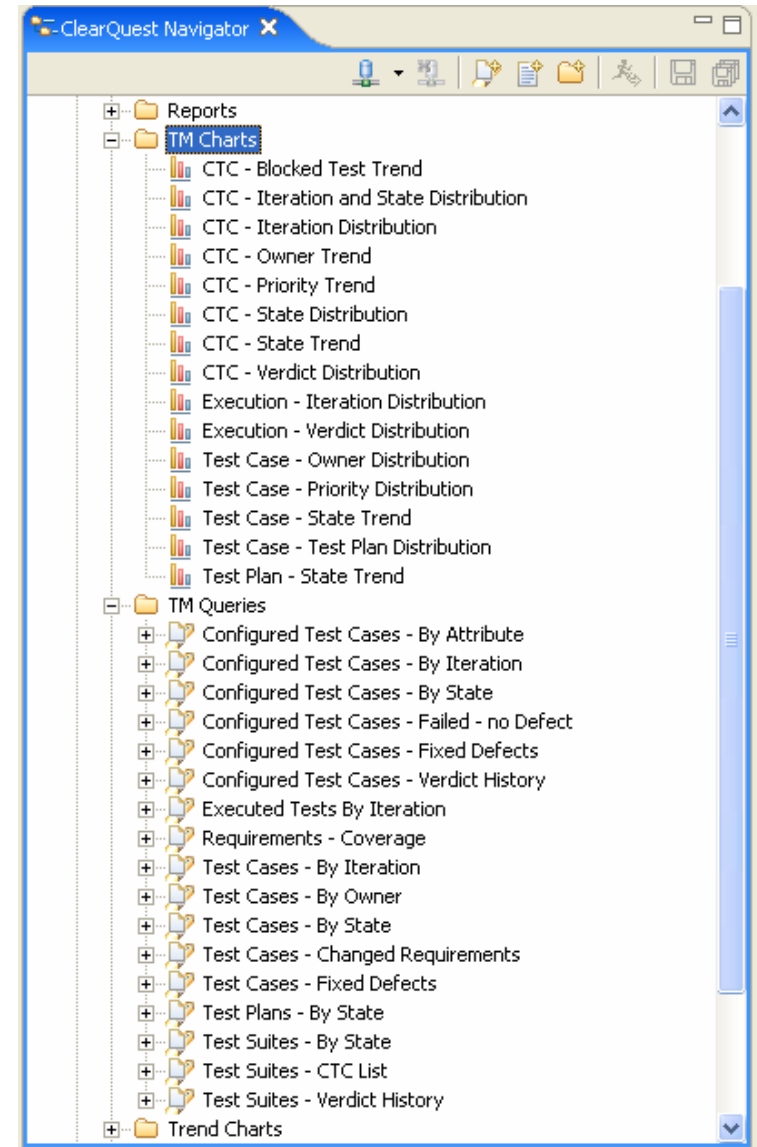
Analyze: Comprehensive quality metrics

- Generate reports to monitor test progress
 - ▶ Run reports to summarize test case results
 - ▶ Run reports to measure requirements coverage
- Key considerations when creating schedules
 - ▶ Ability to report against test motivators
 - ▶ Ability to monitor current project status



Analyze: Test Reporting and Metrics

- **Built-in queries, charts, and reports:**
 - ▶ **Coverage/Suspicion**
 - Impact of requirement change on Test Cases
 - Impact of defects change on Test Cases
 - ▶ **Status**
 - Planned tests vs. implemented
 - Passed vs. failed in this iteration
 - Failed test cases without attached defect
 - Requirements without any test case defined
 - ▶ **Trend over time**
 - # of Test Cases
 - # of Passed vs. Failed Test Cases
- **Link test results to defects and requirements**
- **Web publishing of quality metrics**
- **Build or Customize your own!**



Global project coordination

Distributed and co-located testing and development support

Benefits:

- Ability to leverage globally distributed talent
- Simplifies the complexities of geographically distributed test coordination
 - ▶ High scalability for large enterprise projects
 - ▶ Web-based test planning and quality metrics reporting
 - ▶ Automates sharing and reuse of distributed test assets



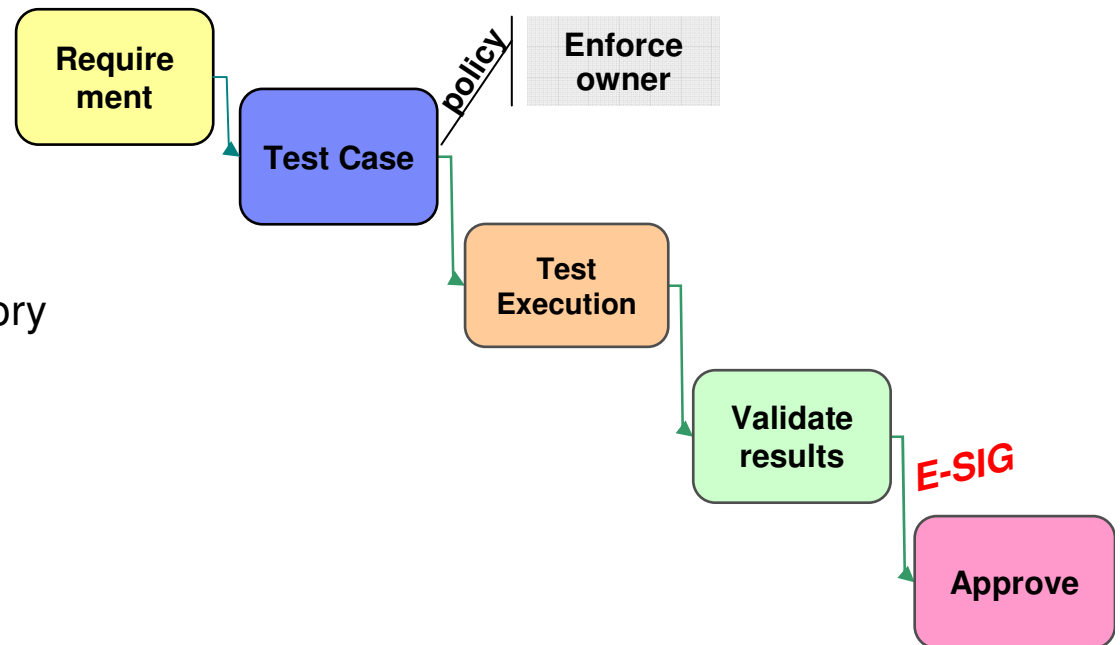
Configurable, enforceable process

Customize and enforce your test processes and workflows

Benefits:

- Ensure compliance and enforcement of project and company policies
- Configurable for project-specific needs and workflow automation

- ▶ Data collection and process customization & enforcement
- ▶ Auditable test change history
- ▶ e-Signature support for regulatory compliance
- ▶ Project security



DEMO

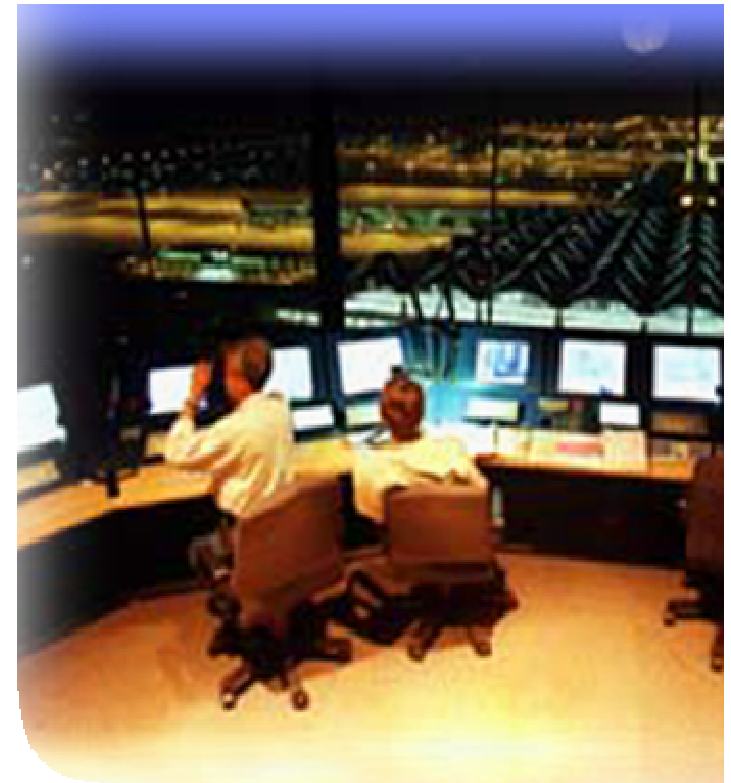
What You'll See:

- Test Planning with IBM Rational ClearQuest
- Test plan creation and analysis
- Test Reporting and Analysis



Summarizing Key Features in ClearQuest

- **Comprehensive**
 - ▶ Increase productivity with a single, comprehensive solution for test and defect management.
 - ▶ Manage test planning, test results, test analysis, reports and defects
 - ▶ Common repository and integrated version control
 - ▶ Integrated quality metrics in project dashboards and reports
- **Support for distributed teams**
 - ▶ Scalable for enterprise wide projects with co-located, distributed, or outsourced test teams
 - ▶ Web UI
 - ▶ Replication
- **Extensible**
 - ▶ Integration with 3rd Party test tools through adapters
- **Configurable**
 - ▶ Ensure compliance , both internally and externally, through tighter process control and project customization.
 - ▶ Improved delivery mechanism, audibility and controls
 - ▶ Customize workflows and enforce processes to ensure compliance with your project's standards
 - ▶ User management & security

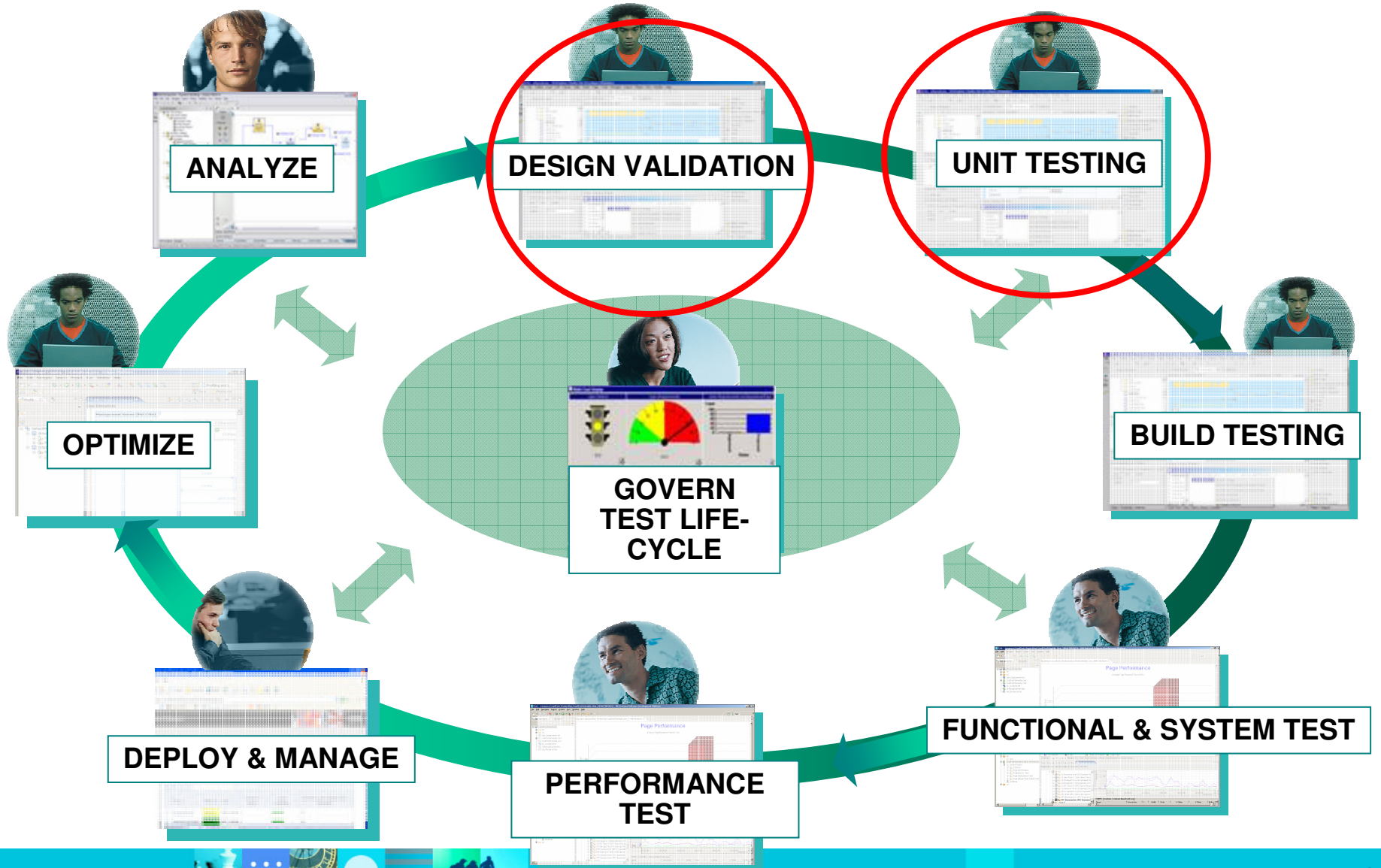


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Integrated quality capabilities



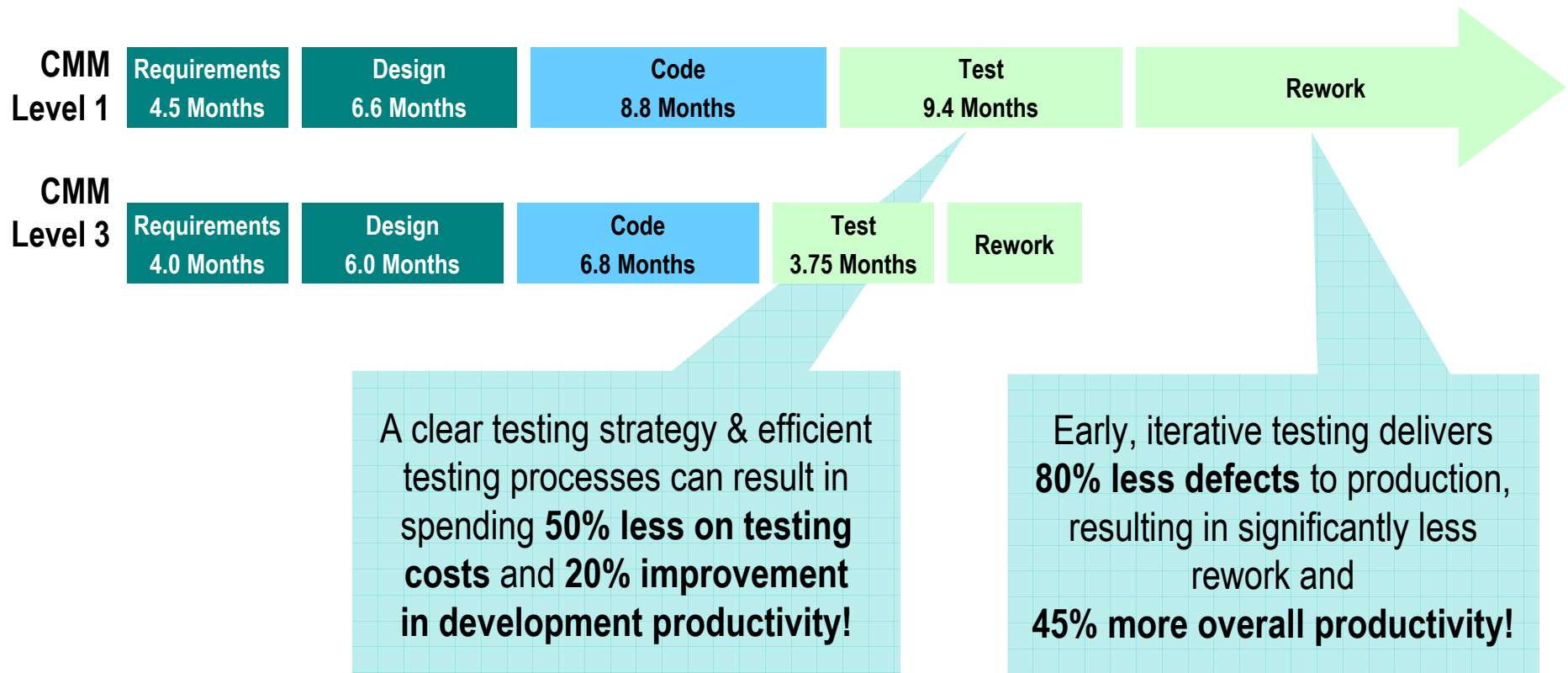
Challenge: Reliable Software Is Critical To Success

Challenges:

- Customers expect delivery of reliable applications
 - ▶ Application quality can be a key differentiator
- Building reliable applications is hard!
 - ▶ Difficult to validate component and code quality
 - ▶ Too much time do you spent tracking down memory corruption problems
 - ▶ Integration always takes longer than planned
 - ▶ Developers spend too much time tracking down “irreproducible” errors?
- Tracking down just one problem can take a developer days or even weeks!
- Late Discovery of Defects increases rework



Challenge: Reduce Rework Costs



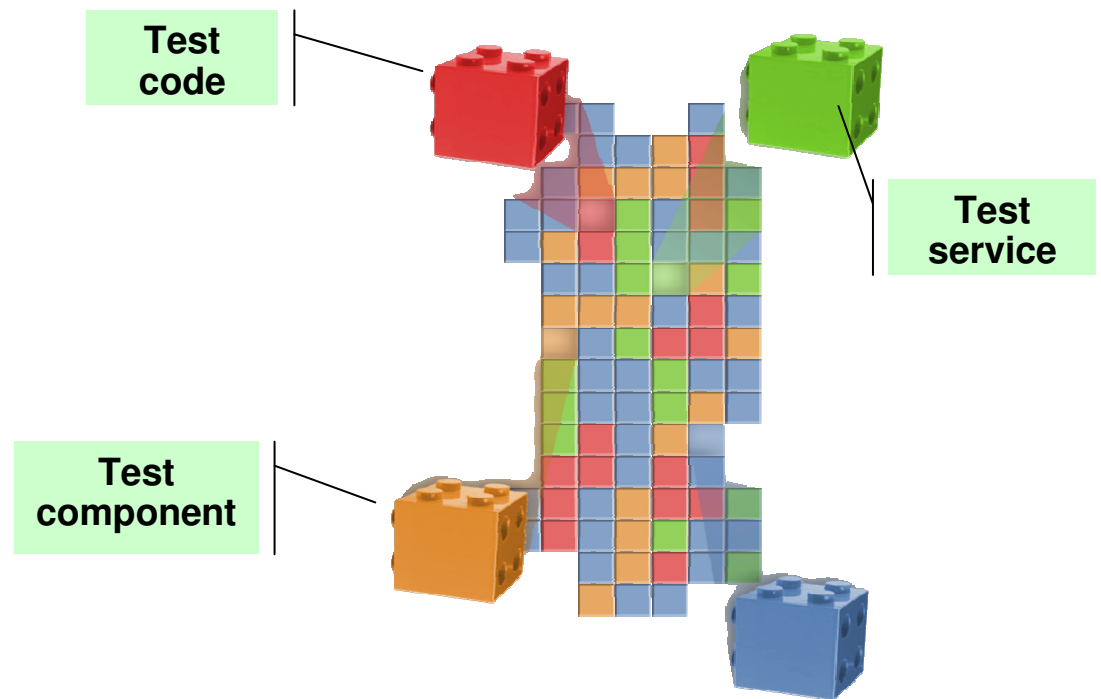
Note: CMM Level 1 organizations spend 30%+ of project dollars on testing.
 CMM Level 3 organizations spend 15%.



Services, Business Processes & Component Tests

Benefits:

- Reduces risk of late defect discovery
- Validate component and code quality
 - ▶ Create test scenarios from WSDL files
 - ▶ Support data-driven testing and stubbing
 - ▶ WS-I conformance of WSDL files
 - ▶ Validate SOAP message
 - ▶ Automated code review
 - ▶ Run-time analysis
 - ▶ Embedded systems testing



Develop fast, reliable code

IBM Rational PurifyPlus

- Developer test solution to ensure creation of fast, reliable code
- Memory corruption and leaks – even in third party code
- Graphical view of performance data to identify bottlenecks
- Identify untested and dead code
- Multi-platform and multi-language support for Unix, Windows, Linux, Java, .NET, VB6, C/C++, and more

The screenshot displays the IBM Rational PurifyPlus interface within the Microsoft Development Environment. The main window shows the 'Function Detail' for 'VSLDemo.exe (Snapshot)'. The 'Method' being analyzed is 'WordCount.Scan'. The interface includes several panels:

- Method Summary:**
 - Method: WordCount.Scan
 - Calls: 45,482
 - Current method bytes allocated: 75,732 (16.28% of Focus)
 - Total method bytes allocated: 990,282
 - Number of Objects: 5,130
 - M+D bytes: 183,490 (39.44% of Focus)
 - Avn M bytes: 71
- Object Table:**

| Object Name | Size | O+R | GCs | Line | References |
|-----------------------|------|-----|-----|------|------------|
| System.String 1C7C290 | 12 | N/A | 16 | 211 | 0 |
| System.String 1C7C2F0 | 12 | N/A | 16 | 211 | 0 |
| System.String 1C7C318 | 12 | N/A | 16 | 211 | 0 |
| System.String 1C7C378 | 12 | N/A | 16 | 211 | 0 |
| System.String 1C7C3AC | 12 | N/A | 16 | 211 | 0 |
| IntBox 1C7C3F4 | 16 | N/A | 16 | 237 | 0 |
| IntBox 1C7C41C | 16 | N/A | 16 | 237 | 0 |
| System.String 1C7C480 | 12 | N/A | 16 | 211 | 0 |
- Callers Table:**

| Caller | Calls | Current method bytes allocated |
|-----------------|--------|--------------------------------|
| WordCount.Parse | 45,482 | 183,490 |
- Descendants Table:**

| Descendant | Calls | Current method bytes allocated |
|----------------------|--------|--------------------------------|
| String Concat | 21,878 | 103,518 |
| FileStream.ReadByte | 69,637 | 4,240 |
| Garbage Collector | 5 | 0 |
| JIT Compiler | 5 | 0 |
| StringBuilder.Length | 48,407 | 0 |

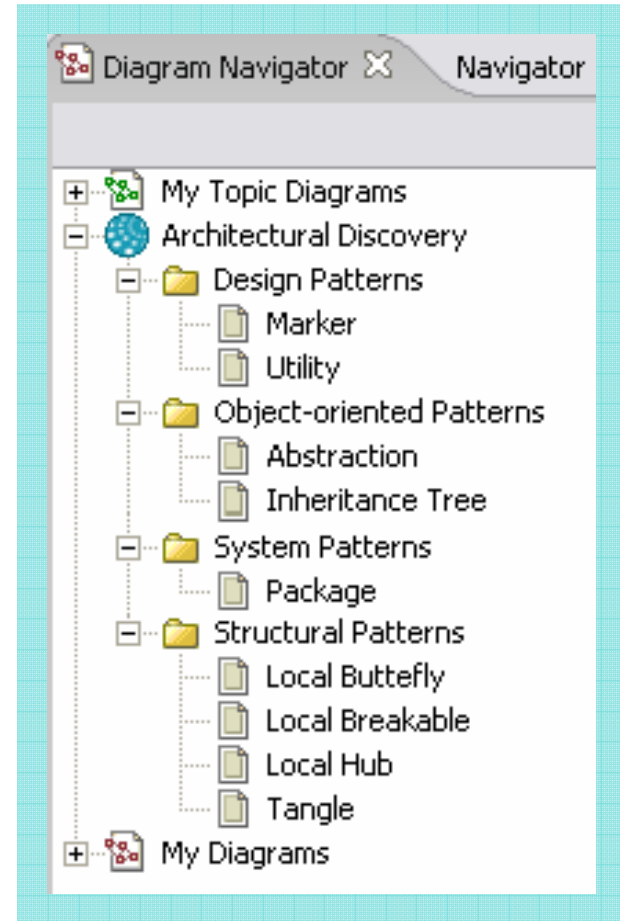
The interface also features a 'PurifyPlus Navigator' on the right, a 'Model Explorer' showing the project structure, and a 'Debug' window at the bottom with the output: 'VSLDemo.exe': Loaded 'c:\demo\vs12002\vsldemo\vsldemoform\bin\pureapi.dll', No symbols loaded.



Architecture review and rules-based analysis

IBM Rational Software Architect

- Automatic detection of design patterns and important Object Oriented structures
- Structural anti-pattern detection of tangles, hubs, butterflies
- Automated refactoring of tangles through QuickFixes
- Verification of architectural integrity
 - ▶ The architect defines architectural constraints for the packages, classes, interfaces or their relationships
 - ▶ These architectural constraints are recorded as rules based on pre-defined templates
 - ▶ The rules verify the integrity of the architecture and report all violations of the architectural constraints

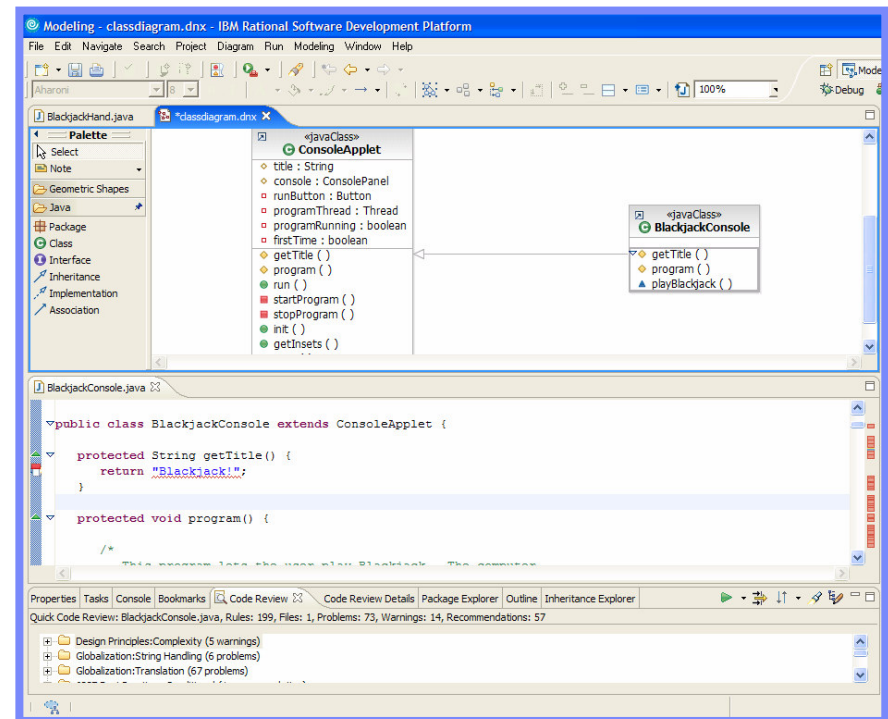


Test web services, Java, J2EE, and Portal applications

IBM Rational Application Developer

■ Code Analysis Tools

- ▶ Both static code analysis and dynamic runtime analysis
- ▶ Sequence diagram runtime trace with performance, thread and code coverage
- ▶ Advanced memory leak detection
- ▶ Remote data collection across multiple servers
- ▶ User-defined run-time probes
- ▶ Interactive reports and metrics

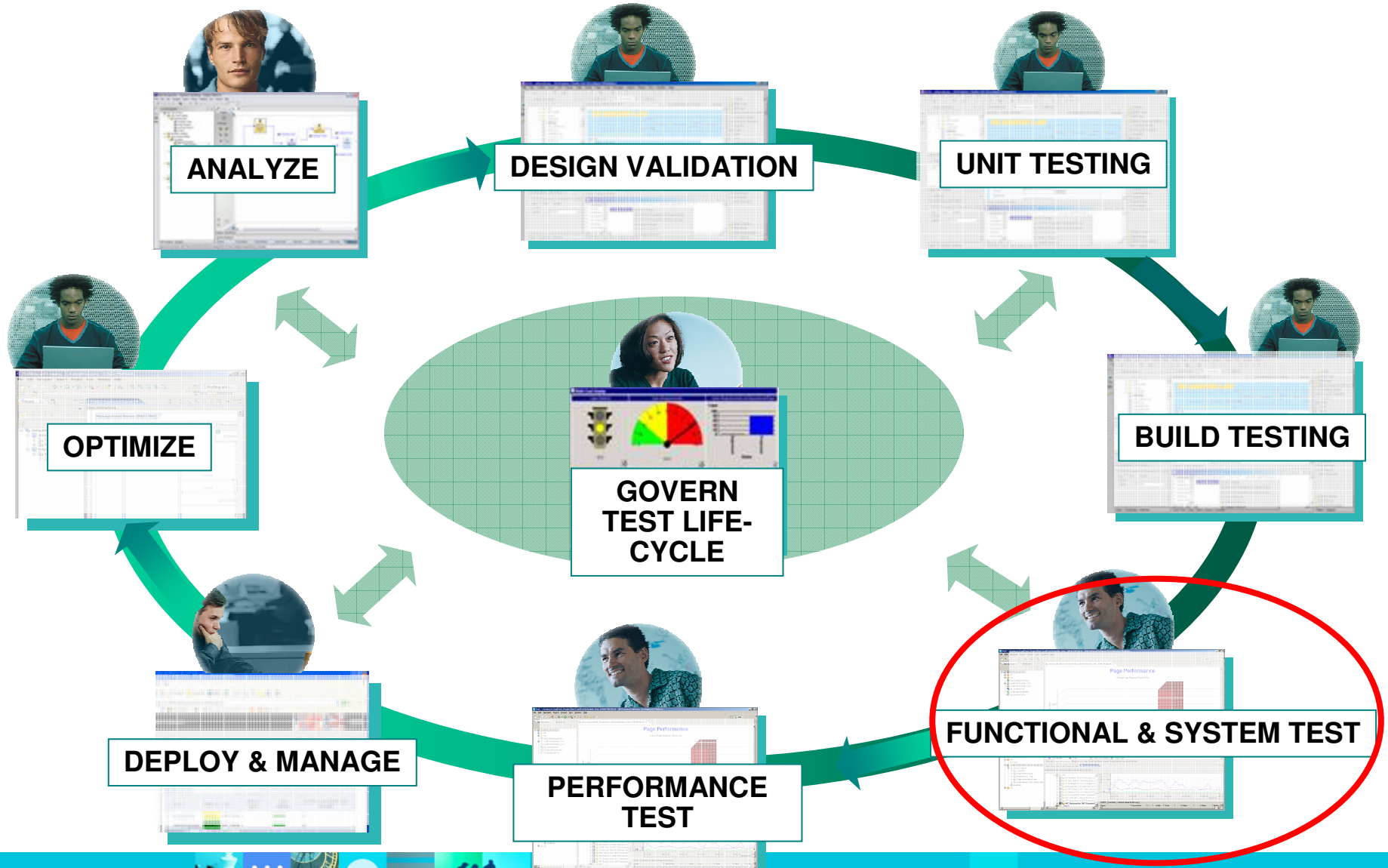


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Integrated quality capabilities



What is Manual Functional Testing?

The manual process of ensuring fitness for use

- ▶ Using human labor to validate the business use cases and fitness for use of an application, system or device
- ▶ Includes labor to plan, design, execute and evaluate the status of the application or device under test
- ▶ Experience indicates over 75% of the testing done today is performed manually



Challenges of Manual Functional Testing

Three things that complicate the life of a manual tester

- **Labor Intensive**

- ▶ Too much time is spent maintaining manual test documentation for application changes

- **Resistant to Change**

- ▶ Each project has diverse processes, tester skill sets and types of applications and devices under test

- **Unreliable**

- ▶ Accidental human-error with data entry and validation often skews test results



Transform Manual Testing with IBM Rational Manual Tester

From ad-hoc testing to controlled and efficient testing

■ Labor Intensive

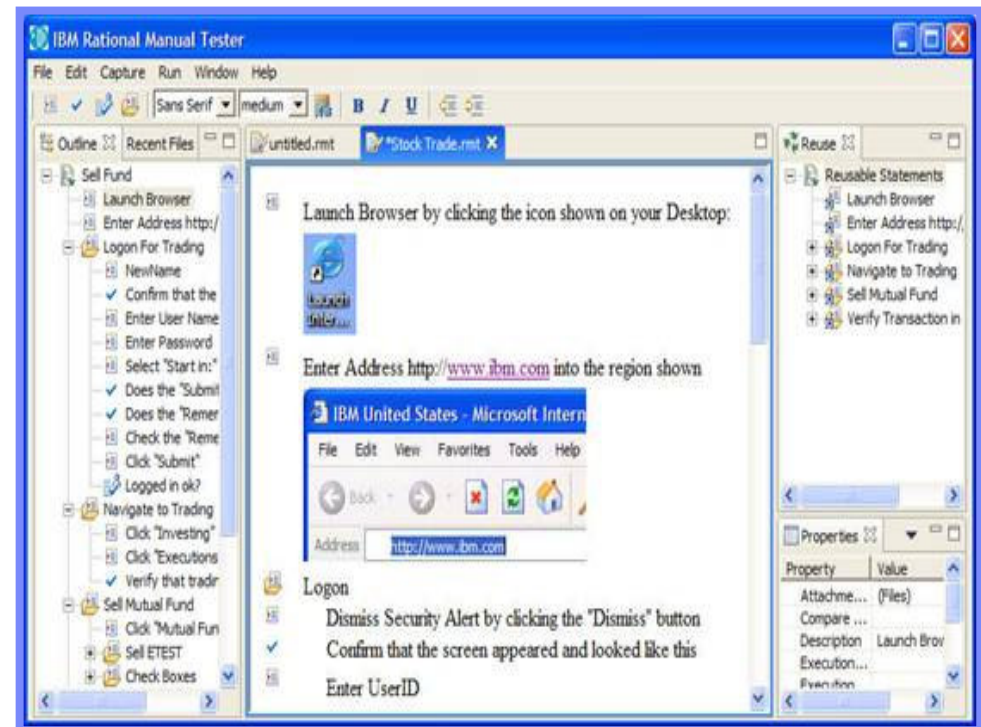
- ▶ Minimizes test maintenance with linked content. Make changes in only one location to update all tests.

■ Resistant to Change

- ▶ Provide a consistent interface that can be used to document tests for any device from can opener to computer

■ Unreliable

- ▶ Automate data entry and data validation during test execution to minimize human error



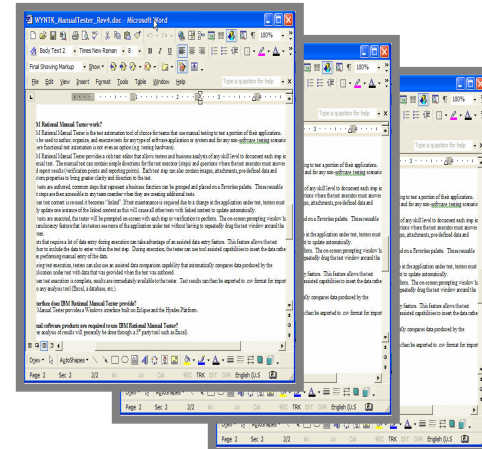
Consolidate Test Creation and Maintenance

Benefits:

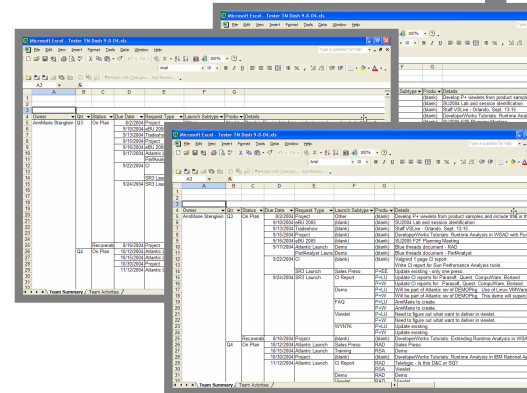
- ▶ Leverage Existing Test Documents
- ▶ Rich Editing Environment

- ▶ Jump-start adoption of Rational Manual Tester by leveraging existing assets
- ▶ Bulk import manual tests documented in Word or Excel
- ▶ Provides a rich text editing environment to document clear, easy to understand tests
- ▶ Allows embedding of images or attach files to add clarity and detail
- ▶ Provide a consistent Test Interface

Microsoft Word documents



Microsoft Excel spreadsheets



Rational Manual Tester test

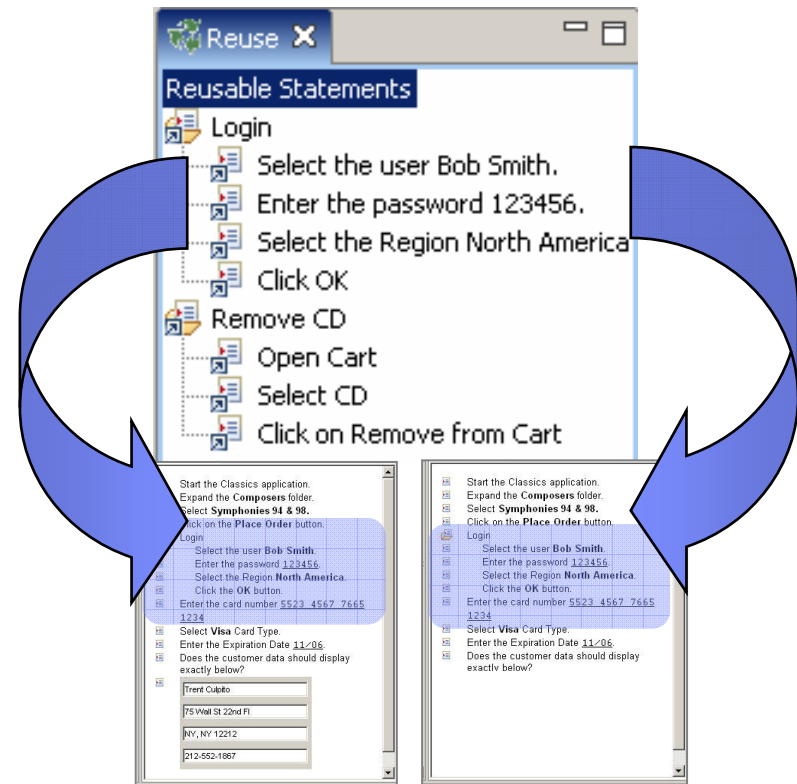
Start the Classics application.
 Expand the **Composers** folder.
 Select **Symphonies 94 & 98**.
 Click on the **Place Order** button.
 Login
 Select the user **Bob Smith**.
 Enter the password **123456**.
 Select the Region **North America**.
 Click the **OK** button.
 Enter the card number **5523 4567 7665 1234**.
 Select **Visa** Card Type.
 Enter the Expiration Date **11/06**.
 Does the customer data should display exactly below?

| |
|--------------------|
| Trent Culpito |
| 75 Wall St 22nd Fl |
| NY, NY 12212 |
| 212-552-1867 |

Reduce test maintenance and ensure consistency

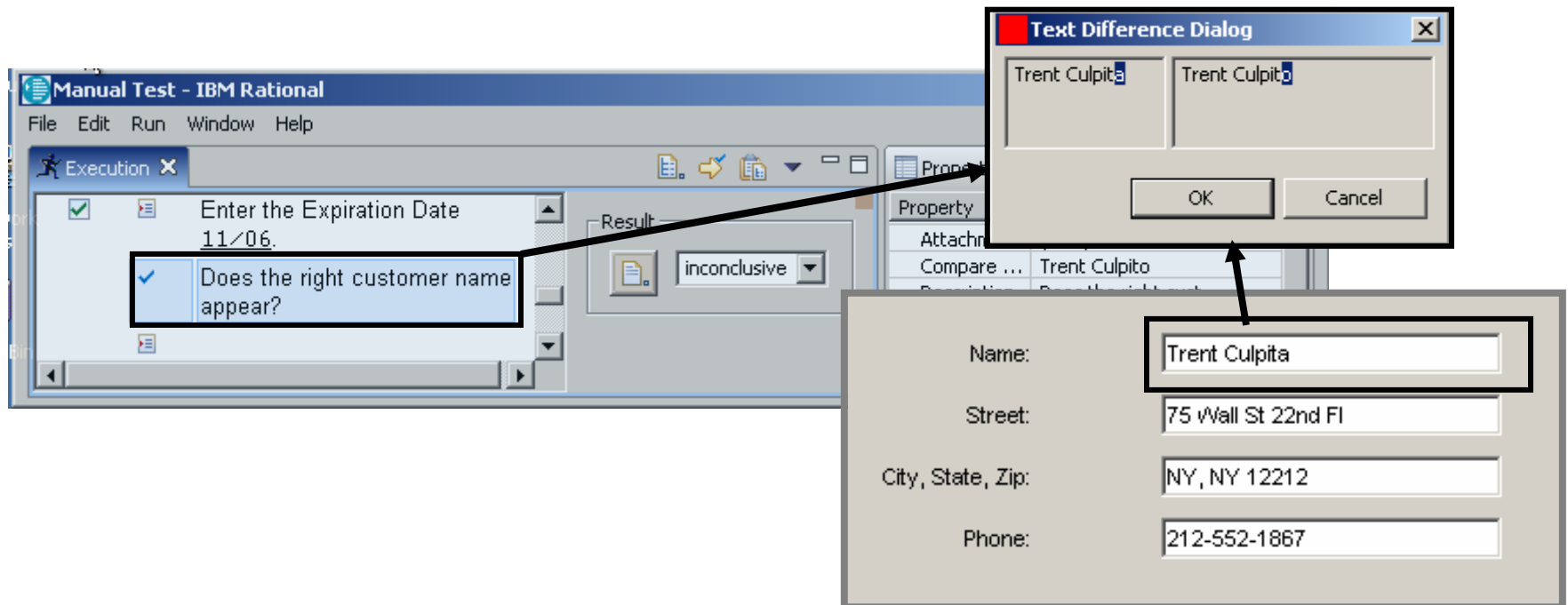
Benefit:

- ▶ Enable Shared Content Across Multiple Tests
- ▶ Create commonly used test statements once
- ▶ Reuse statements across multiple tests through simple drag and drop
- ▶ Maintenance of shared content is efficient with single-point updating of shared content
- ▶ Ensures consistency and reduces test maintenance



Assisted Data Entry and Data Verification

- **Benefit:**
 - ▶ Reduce human error
 - ▶ Store critical data used during the test as part of the test instructions
 - ▶ Automate data entry during test execution to speed entry and reduce errors
 - ▶ Automate data validation during test execution to ensure accurate results



DEMO

What You'll See:

- Manual testing with IBM Rational Manual Tester v6.1
- Test creation, reuse and execution



Summarizing Key Features in Manual Tester

- **Advances manual testing**
 - ▶ Rich text editor for test authoring
 - ▶ Test step reuse palette
 - ▶ Test script import from Microsoft Word or Excel

- **Satisfies diverse needs**
 - ▶ Supports usage by distributed teams
 - ▶ Generates spreadsheet-ready results data
 - ▶ Multiple validation points
 - ▶ Custom data fields

- **Minimizes Test Maintenance**
 - ▶ Assisted data entry and data verification during test execution



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BREAK

What we've seen so far:

- Test Planning challenges, tools and demo
- Code and Unit testing challenges and tools
- Manual Functional Testing challenges, tools and demo

What's coming up next:

- Automated Functional Testing challenges and tools
- Performance Testing challenges, tools and demo

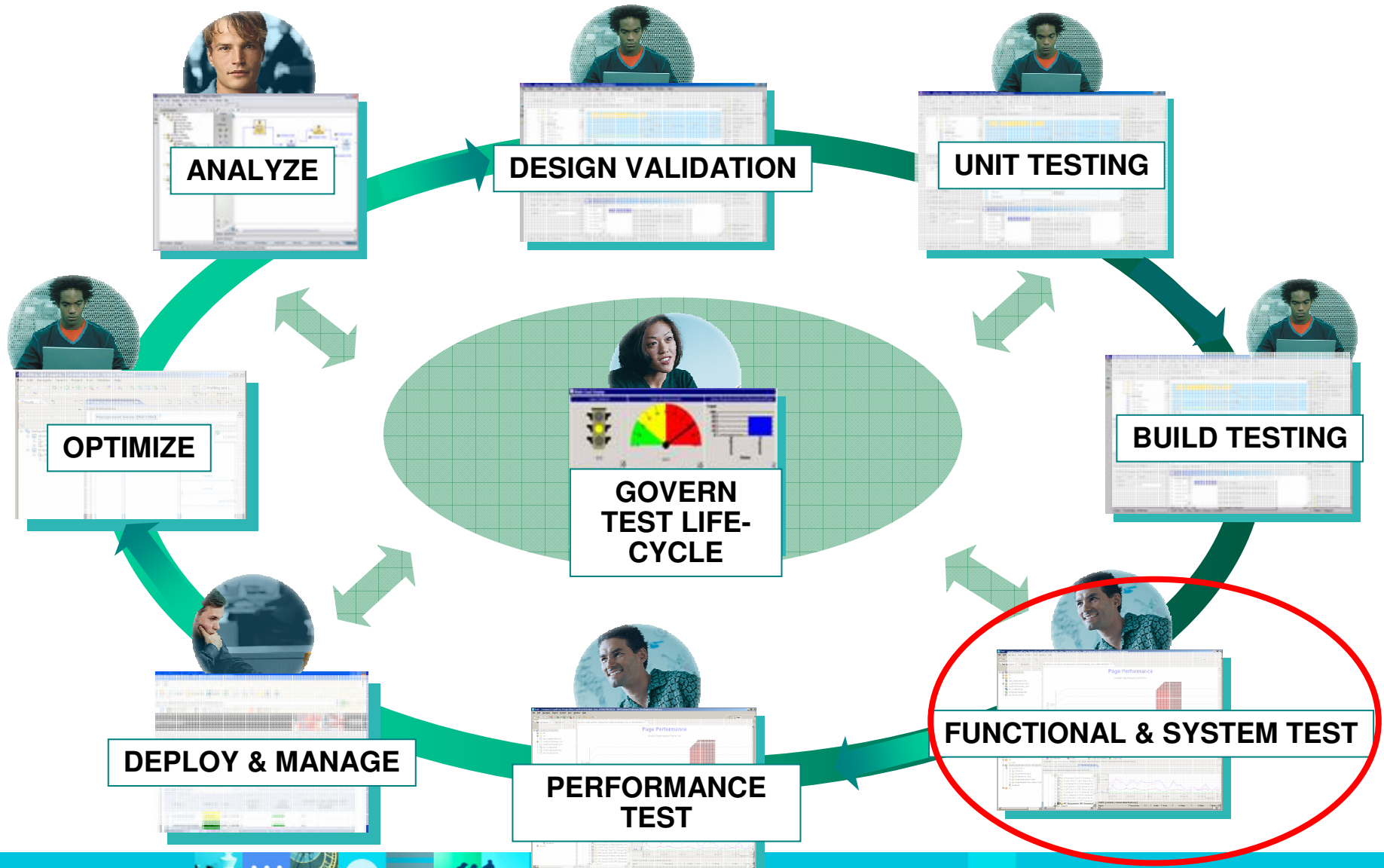


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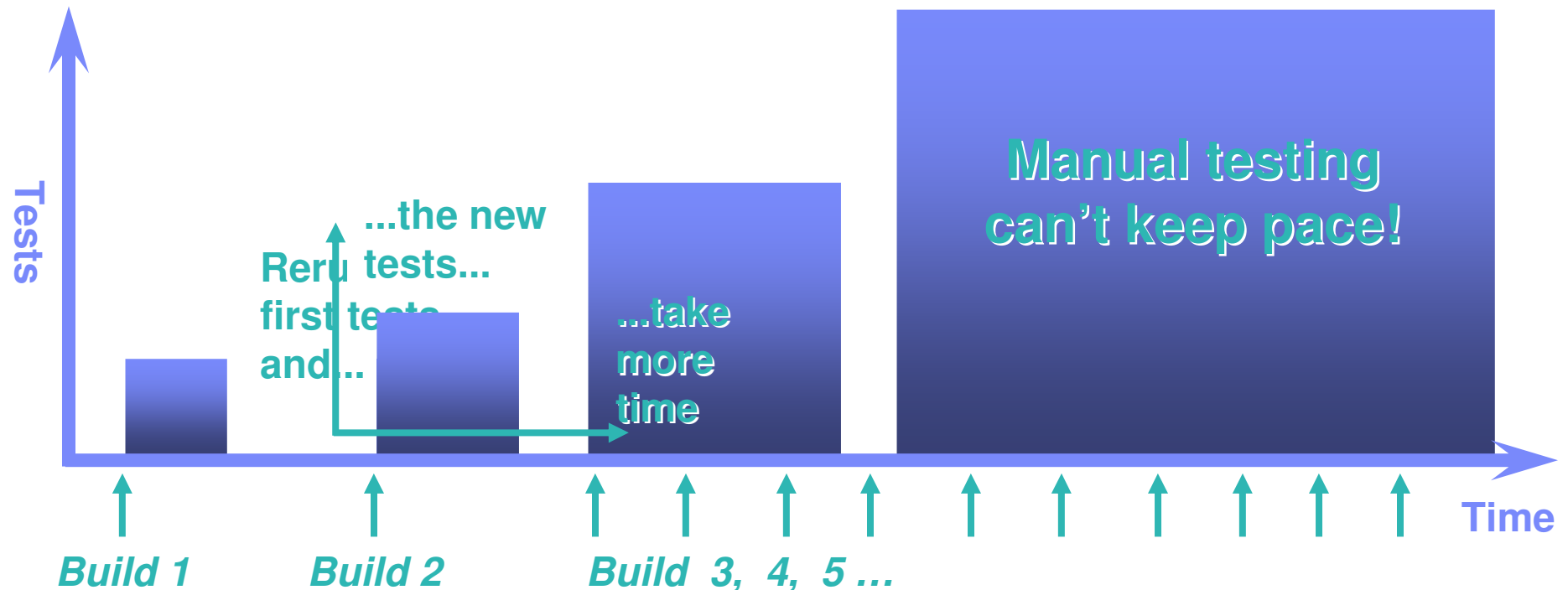
What is Automated Functional Testing?

The automated process of ensuring fitness for use

- Using automation tools to capture actions taken against an application in script format.
- Three Step Process
 - ▶ Record actions into a script format – either VB.NET or Java
 - ▶ Optionally enhance scripts with custom coding
 - ▶ Execute scripts – ideally overnight to increase test productivity to 24/7



Challenge of Manual Functional Testing with Short Test Cycles



- Manual testing alone can't keep pace with the rapid development of applications.....
 - Quality will be sacrificed to keep on schedule



Challenges of Automated Functional Testing

Three things that complicate the life of an automated functional tester

- Control cost of test automation
 - ▶ Inexperienced testers face steep learning curve for tools
 - ▶ Test maintenance grows with project

- Testing Tools Lack Flexibility
 - ▶ Power users hands are tied by tool limitations

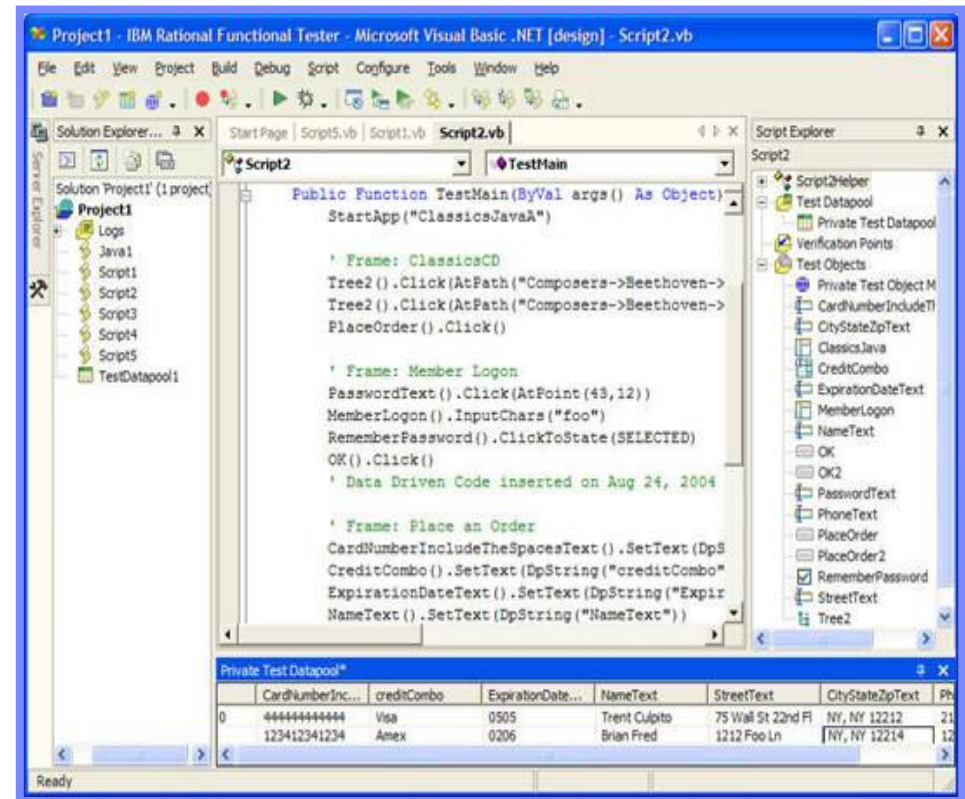
- Test Team Integration
 - ▶ Managing script changes with parallel development
 - ▶ Sharing test assets with the larger software team



Functional Testing with IBM Rational Functional Tester Plus

Test automation for the novice and the professional

- Control cost of test automation
 - ▶ ScriptAssure technology ensures test script playback even with changes in application geography
 - ▶ Wizard assistance for common tasks such as data driven tests
- Testing Tools Lack Flexibility
 - ▶ Full flexibility of Java or VB.net to address all application testing challenges
- Test Team Integration
 - ▶ ClearCase LT included to incorporate support for parallel development and geographically distributed teams

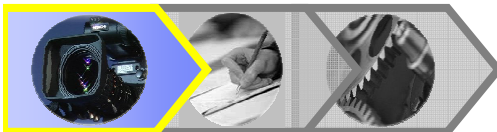


Control of Test Automation

Recording Scripts

Benefits:

- Lowers cost of application testing
 - Improves test productivity and accuracy
-
- ▶ Creates a Test Script that captures all system-user interaction
 - ▶ Test scripts are recorded on the fly, as user navigates application
 - ▶ Verification points are inserted to validate system response
 - ▶ Formalize end-to-end tests that exercise business processes
 - ▶ Automate functional testing of composite applications
 - ▶ Broad support for modern and legacy application environments
 - ▶ Minimize test maintenance with tests resilient to frequent changes



Flexibility: Recording Scripts

Environment Support

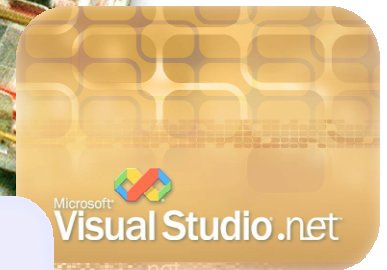
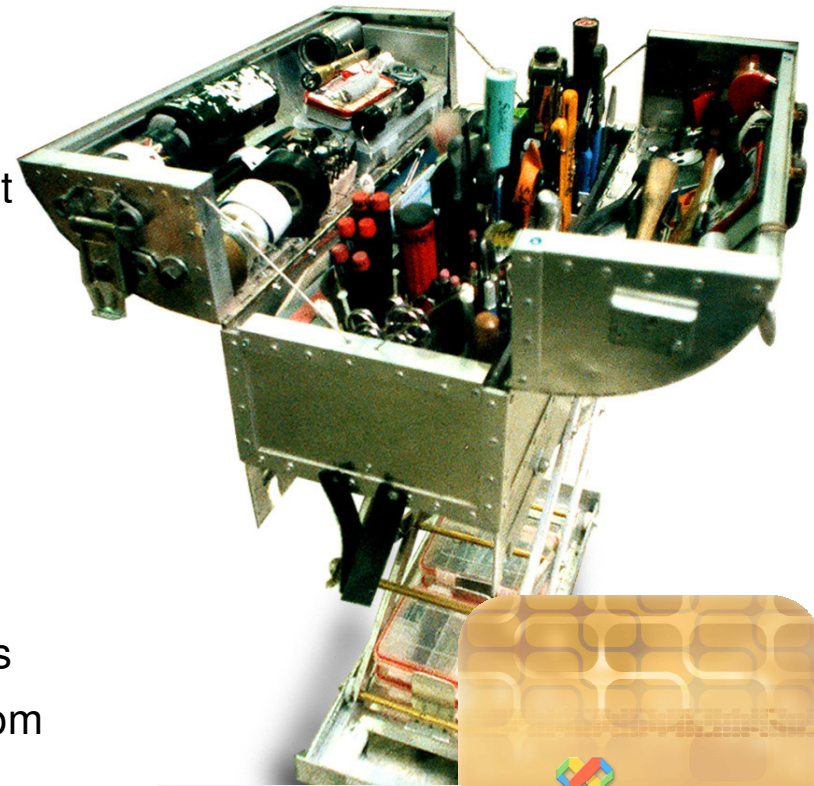
- IBM Rational Functional Tester Plus supports the following environments:
 - Web
 - Java
 - Any VS.NET application running under the .NET Framework
 - Terminal Emulation
 - ▶ Add-on support for 3270/5250/VT100 terminal-based applications
 - Commercial Packages
 - ▶ Support for Siebel 7.7 Implementations
- Legacy Applications:
 - ▶ Visual Basic
 - ▶ C/C++
 - ▶ PowerBuilder
 - ▶ Delphi
 - ▶ Win32



Flexibility: Enhancing Scripts

Flexible Coding Language

- IBM Rational Functional Tester uses Java or VB.net for scripting
 - ▶ Standard language syntax
 - Not a custom version of Java or VB.net
 - ▶ Augments language commands with test specific functions
 - Click, Verify, Select, etc...
- Flexible power to enhance scripts
 - ▶ Programmatic access to all GUI objects
 - ▶ Datapool facility enables data driven tests
 - ▶ Leverage existing code and resources from a variety of sources
 - Books, Internet, developerWorks, etc...



Control Cost of Test Automation

Reliable Playback with Script Assure

Version 1.0

Account # / Log In ID

Log In

Click here to save your s

| Property | Value |
|-------------|-----------|
| .class | Html |
| .classIndex | 0 |
| .id | button1 |
| .name | userLogin |
| .type | submit |
| .value | Log In |

Version 2.0

Customer Log On

Log On

| Property | Value |
|-------------|------------|
| .class | Html.INPUT |
| .classIndex | 0 |
| .id | button1 |
| .name | userLogin |
| .type | submit |
| .value | Log On |

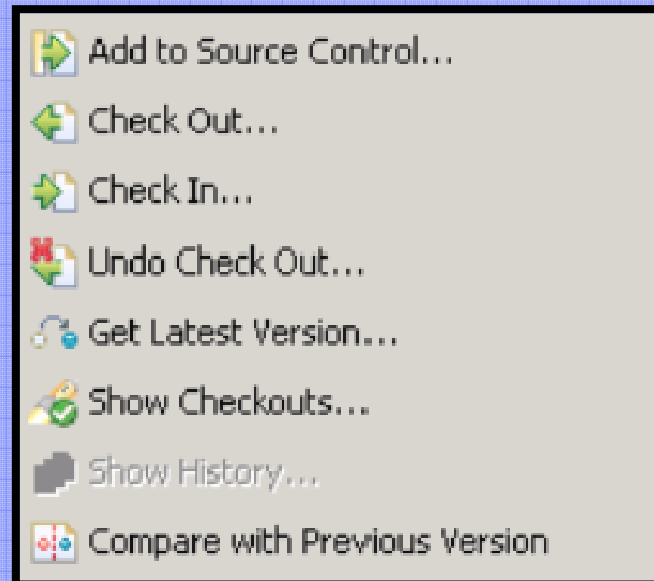
No User Intervention Required With ScriptAssure™



Test Team Integration

Version Control of Scripts

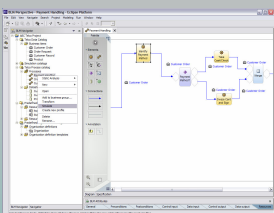
- Functional Tester includes ClearCase LT for test script version control
- ClearCase LT enables parallel script development
 - ▶ Work simultaneously on multiple releases
 - ▶ Coordinated workflows across the team
 - ▶ Secure, versioned software test assets



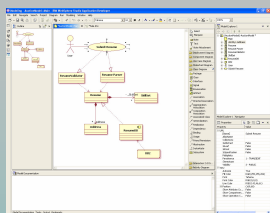
Test Team Integration: Leverage open standards

Expand test ecosystem and practitioner productivity

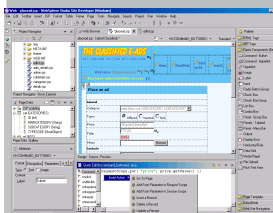
Analyst



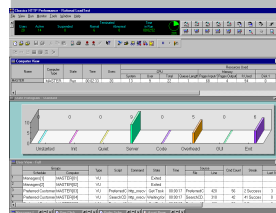
Architect



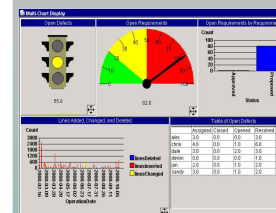
Developer



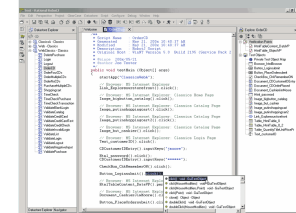
Tester



Project
Manager



Deployment
Manager



**IBM Rational Functional Tester built on Eclipse
Eclipse Test and Performance Tools Platform (TTP)
Support for open source SAFS keyword driven testing framework
Ability to leverage community created add-ons
Custom code for advanced testing extensions
Shared environment with development teams for improved team asset sharing**



DEMO

What You'll See:

- Functional Testing with IBM Rational Functional Tester v6.1
- Test creation, modification and execution



Summarizing Key Features in IBM Rational Functional Tester Plus



- **Control Cost of Test Automation**
 - ▶ Create data driven tests without coding
 - ▶ Static data and properties verification
 - ▶ Dynamic data validation without coding
 - ▶ Reliable playback with ScriptAssure
 - ▶ Remote and local playback on various platforms

- **Flexibility**
 - ▶ Flexible coding language
 - ▶ Broad Environment Support:
 - Web, Java, .net
 - ▶ Powerful, professional debugger
 - ▶ Object map editing flexibility

- **Test Team Integration**
 - ▶ Version control of scripts

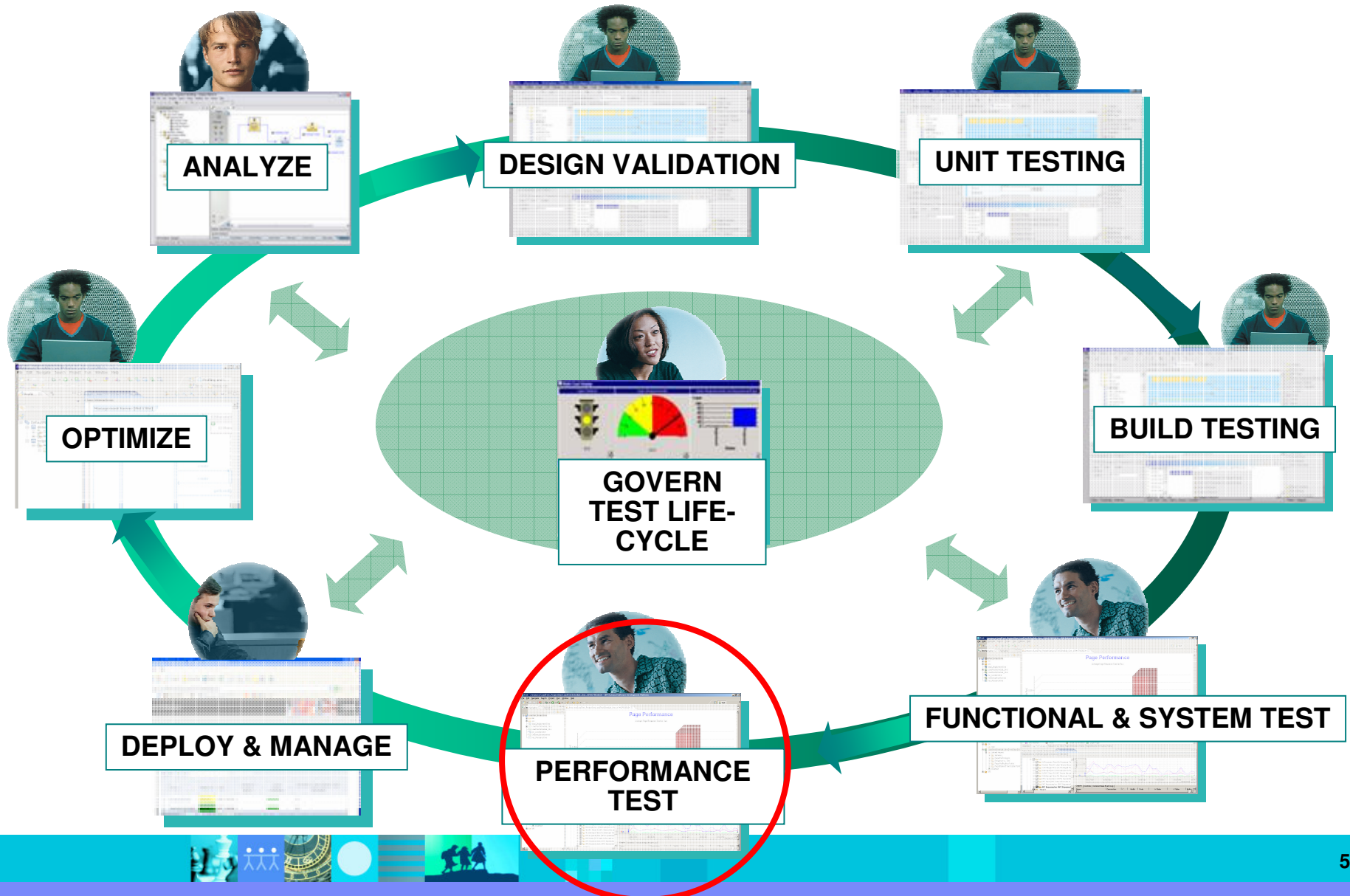


Agenda

- Business Driven Development
- Test Management
- Code and Unit Testing
- Manual Functional Testing
- Automated Functional Testing
- Break
- **Performance Testing**
- Wrap Up & Resources

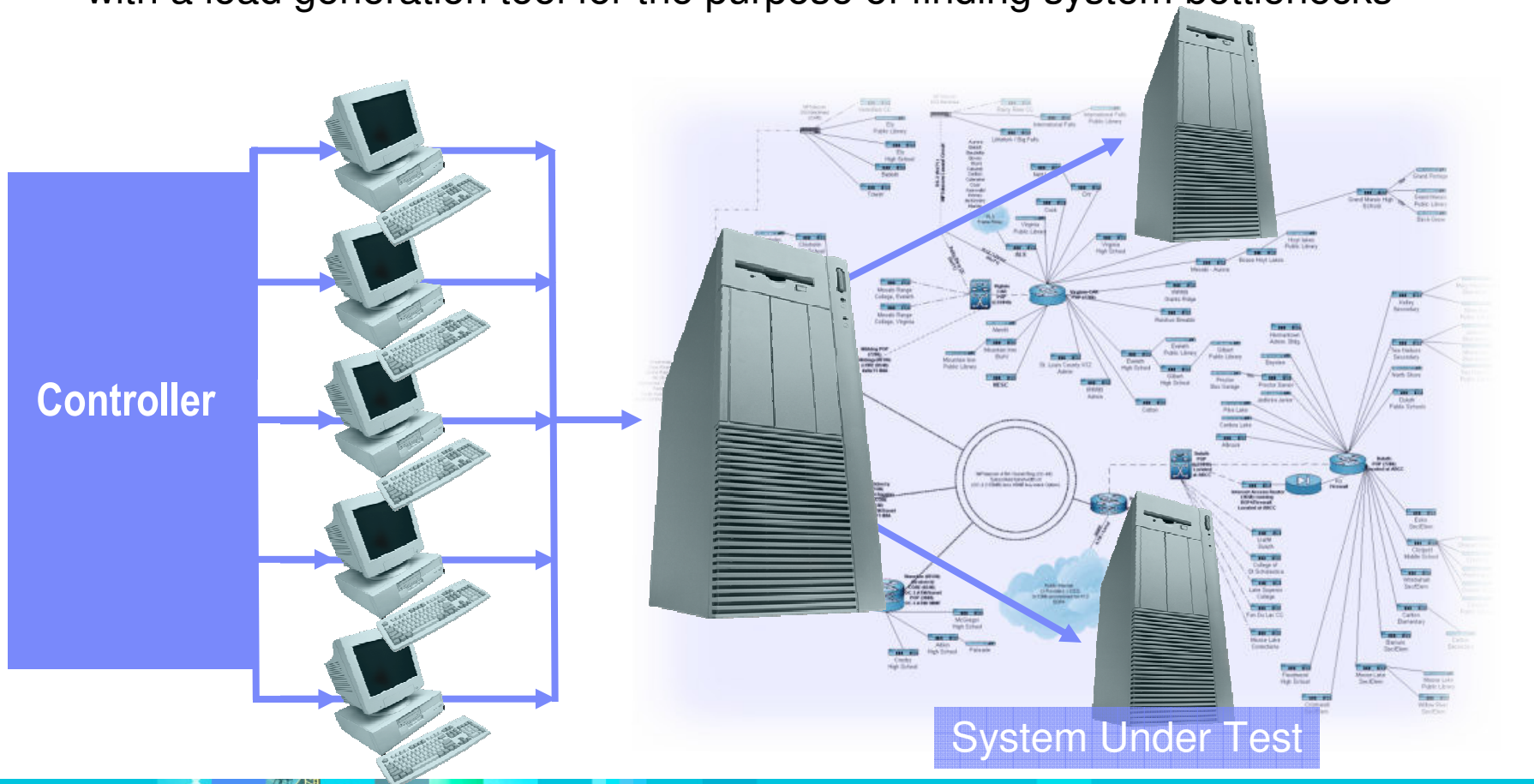


Integrated quality capabilities



What Is Performance Testing?

- The process of exercising an application by emulating actual users with a load generation tool for the purpose of finding system bottlenecks



Why do Performance Testing?

- Because a break at any point in your system means your customers are not getting the service you think they are

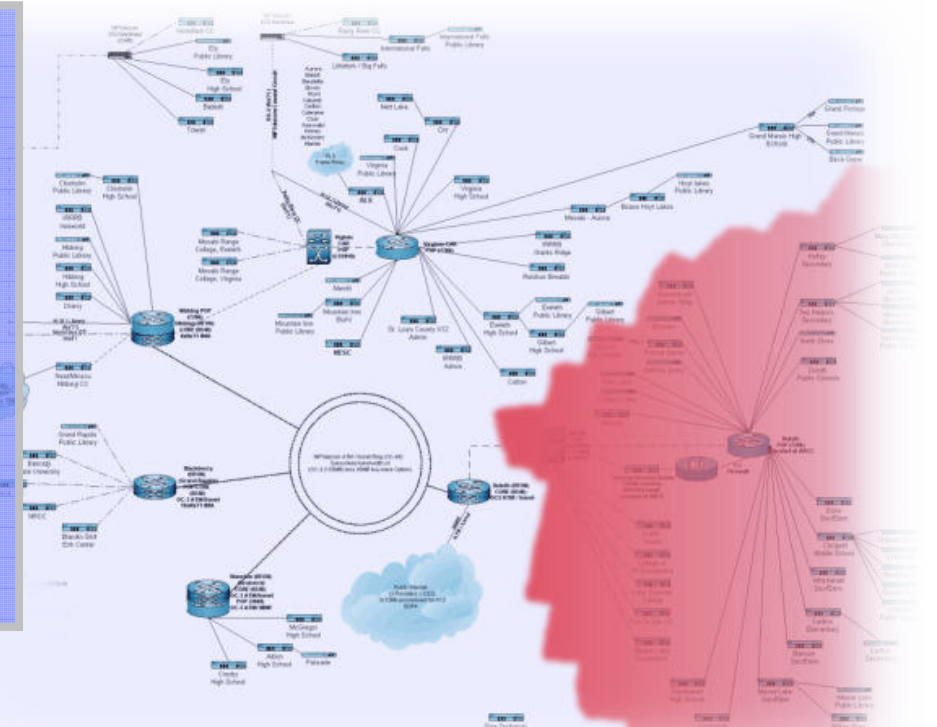
The page cannot be displayed

There is a problem with the page you are trying to reach and it cannot be displayed.

Please try the following:

- Click the **Refresh** button, or try again later.
- Open the home page, and then look for links to the information you want.

HTTP 500.13 - Server too busy.



System Under Test

Creating a Performance Test

Creating a performance test is a three step process



Build Scripts

Schedule Workload

Execute & Analyze

- **Script Creation Considerations**

- ▶ Visual test editor, varying input data & correlating server responses

- **Scheduling Considerations**

- ▶ Accurately representing a true user workload

- **Execute and Analyze Considerations**

- ▶ Validating responses & finding the bottleneck



Challenges of Performance Testing

Three things that complicate the life of a performance tester

- Complex Tools & Complex Task
 - ▶ Tool complexity and lack of experience intimidates many first time users

- Testing Tools Lack Flexibility
 - ▶ Power users hands are tied by tool limitations

- Problem Discovery and Diagnosis
 - ▶ Pinpointing the problem is only the first step
 - ▶ The real challenge is determining the cause



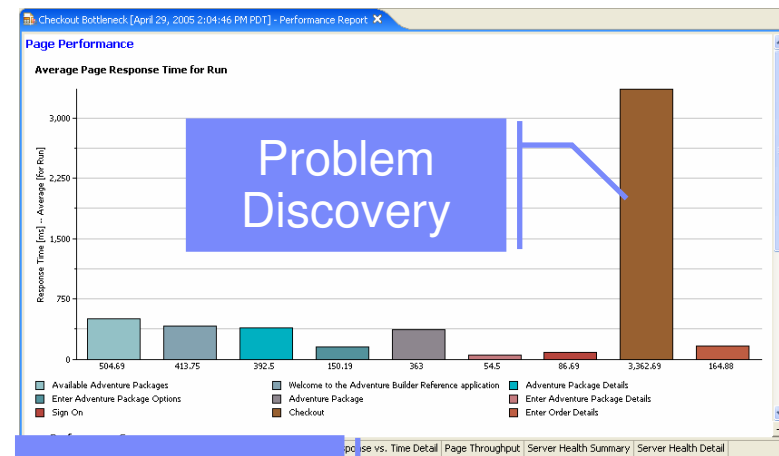
Performance Testing with IBM Rational Performance Tester

Problem discovery and diagnosis with Day 1 Productivity

- **Complex Tools & Complex Task**
 - ▶ Performance Tester masks complexity of scripts and automates task of ensuring data consistency

- **Testing Tools Lack Flexibility**
 - ▶ Performance Tester tests use Java to enable custom coding solutions to application specific challenges

- **Problem Discovery and Diagnosis**
 - ▶ Pinpoint cause of application slow downs for J2EE applications
 - ▶ Interface with Tivoli products for complete environment analysis



Problem Diagnosis

| Package | <Base Time (se... | Average Base T... | Cumulative Tim... | Calls |
|--|-------------------|-------------------|-------------------|---------|
| com.sun.j2ee.blueprints.opc.powebservice | 11.07% | 5.54% | 11.07% | 3.64% |
| PoEndpointBean | 11.07% | 5.54% | 11.07% | 3.64% |
| submitPurchaseOrder(com.sun.j2ee.b... | 11.07% | 11.07% | 11.07% | 1.82% |
| ejbCreate() | 0.00% | 0.00% | 0.00% | 1.82% |
| com.sun.j2ee.blueprints.waf.controller.web | 5.09% | 5.09% | 23.15% | 1.82% |
| (default package) | 3.27% | 0.82% | 73.64% | 7.27% |
| com.ibm._jsp | 2.33% | 0.33% | 3.40% | 12.7... |
| com.ibm.ws.rsadapter.jdbc | 1.77% | 0.15% | 2.67% | 21.8... |
| db2j.ai.c | 0.85% | 0.11% | 0.85% | 14.5... |
| db2j.bk.b | 0.59% | 0.12% | 1.01% | 9.09% |
| db2j.bk.c | 0.58% | 0.10% | 0.89% | 10.9... |
| com.sun.j2ee.blueprints.waf.view.template | 0.34% | 0.34% | 3.74% | 1.82% |



Reduce Complexity with Performance Tester: *Create Performance Tests without Coding*

- Create simple, tree-based tests
 - ▶ Remove the need for programming
 - ▶ Tests are represented in a tree view as a sequential flow of web pages
- Flexible modeling and emulation of diverse user populations
- User interface enables:
 - ▶ Data pooling
 - ▶ Automated identification and variation of dynamic data
 - ▶ Looping
 - ▶ Conditional events

The screenshot displays the Performance Tester interface with three callout boxes highlighting key features:

- Visual test editor:** Points to the 'Performance Test - OrderingStrawberries' tree view on the left, which shows a sequential flow of web pages like 'Home Page', 'Fruits', 'Strawberries', etc.
- Real-time reporting:** Points to the 'Page Performance' 3D bar chart showing 'Average Page Response Time for Run' for various pages. The chart data is as follows:

| Page | Response Time (ms) |
|--------------------|--------------------|
| Shipping Address | 254 |
| Home Page | 685 |
| Submit Order | 96 |
| Customer Info | 78 |
| Shopping Cart | 547 |
| Strawberries | 412 |
| Order Confirmation | 2,901 |
| Login Page | 1,195 |
| Fruits | 35 |
- Flexible test design and scheduling:** Points to the 'Test Contents' section of the tree view.
- Server resource data collection:** Points to the 'Statistical Data' window at the bottom, which shows a line graph of system metrics like '% Processor Time' and 'Cache' over time.



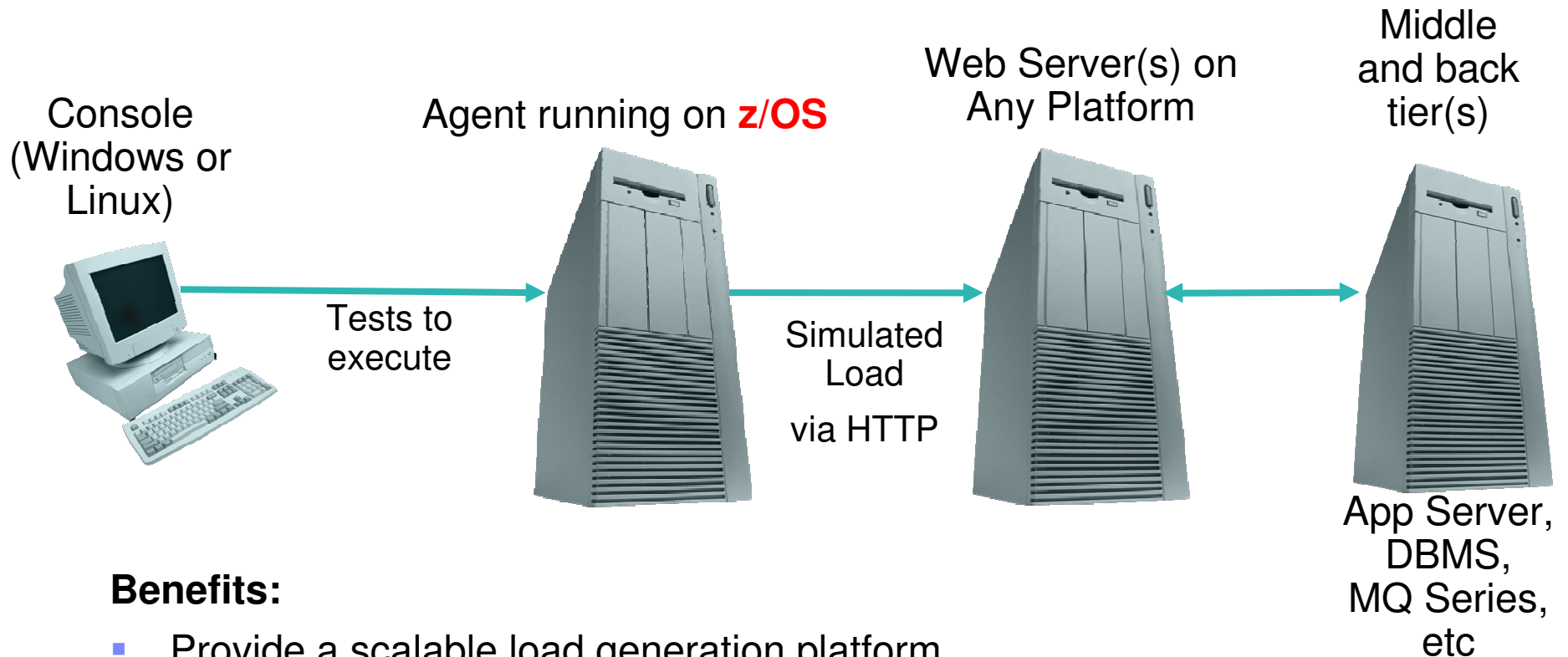
Testing Flexibility with Performance Tester

- Performance Tester provides support for the following Environments:
 - ▶ Web
 - ▶ Siebel
 - Siebel 7.7, 7.8
 - ▶ SAP
 - SAP 4.6C & R/3 Enterprise (4.7)
 - SAPGUI for Windows 6.20 & 6.40
 - ▶ Citrix Presentation Server
- Validate scalability under variable multi-user loads prior to deployment
- Provides cross-tier transaction breakdown and resource monitoring to pinpoint bottlenecks
- Optional insertion of Java code for advanced customization
- Use Windows, Linux, and UNIX servers or z/OS hardware to generate load



Testing Flexibility with Performance Tester

Deployment of Rational Performance Tester for z/OS



Benefits:

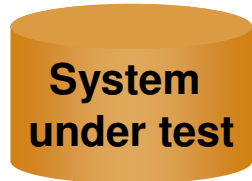
- Provide a scalable load generation platform
- Leverage customer investment in z/OS



Problem Discovery and Diagnosis: *Leverage production data for root cause analysis*



Tester (Test Lab)



System under test

User Load

Analyze Resource Load Across Tiers (Memory, Message Queue, etc.)

Analyze Web Page Performance

Analyze Transaction Performance

Root Cause Analysis

Tivoli software

**Self-managing
autonomic
capabilities**

**Rational ClearQuest /
Rational ClearCase**

**Submit actionable data to
the development team**

Development



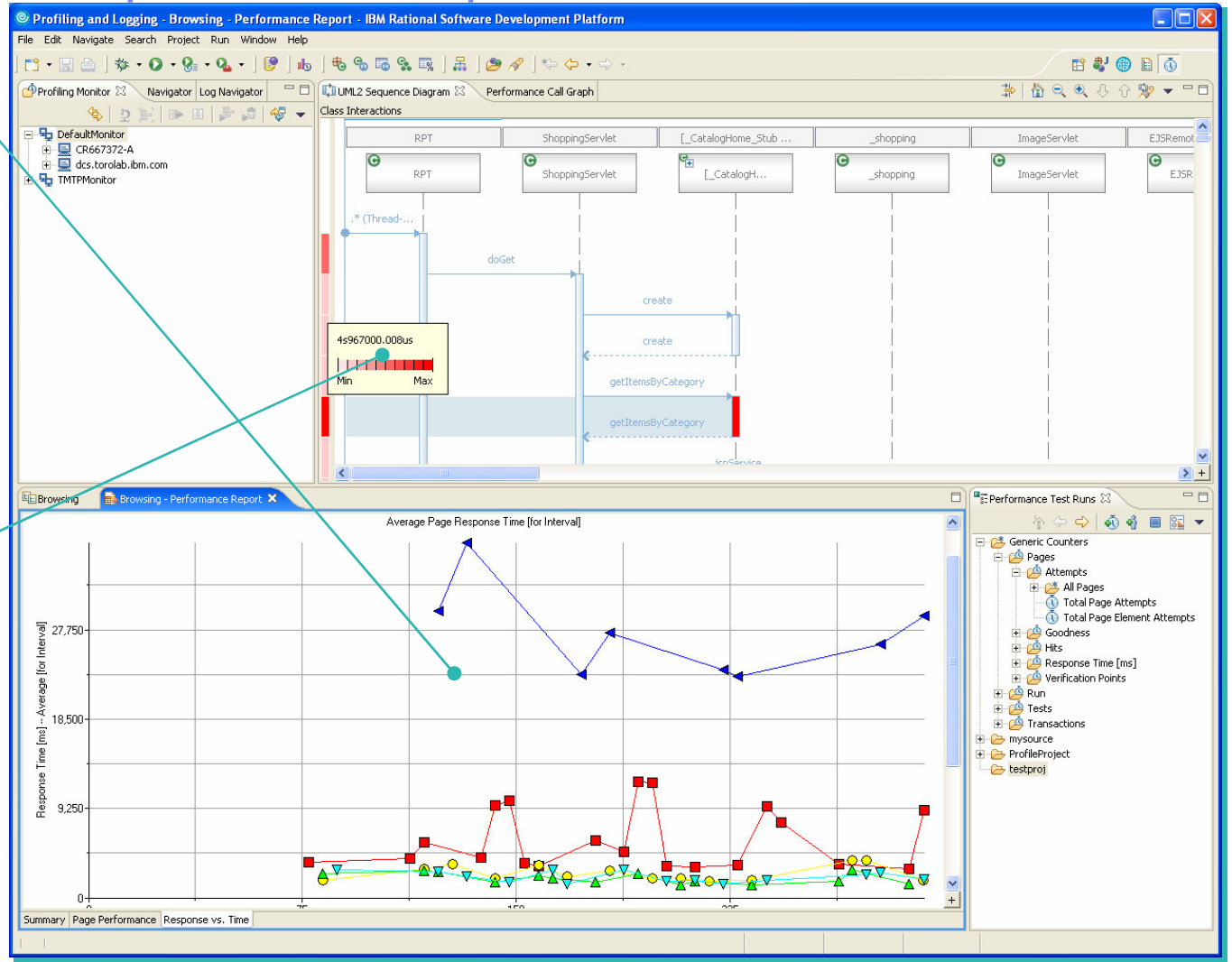
**Rational Application
Developer**



Problem Discovery and Diagnosis: *Identify root cause of performance problems*

IBM Rational Performance Tester decomposes poor response times identified during a performance test...

...into the amount of time spent within each application component.



DEMO

What You'll See:

- Performance Testing with IBM Rational Performance Tester v6.1
- Test creation, modification and execution
- Response and Resource Utilization Analysis

What You Won't See:

- Programming or Code



Summarizing Key Features in Performance Tester

- **Built for Day 1 Productivity**
 - ▶ Create code free tests
 - ▶ Mask complexity to get the job done
- **Advanced Data Access & Manipulation**
 - ▶ Create code free schedules
 - ▶ Automated data variation and synchronization
- **Lower Cost of Performance Testing**
 - ▶ Low resource requirements
 - ▶ Desktop IDE integration



Agenda

- Business Driven Development
- Test Management
- Code and Unit Testing
- Manual Functional Testing
- Automated Functional Testing
- Break
- Performance Testing
- **Wrap Up & Resources**



Benefits from standardization on Rational

| | |
|--|---|
| CGE&Y Accelerated Delivery Centre - Finland | <ul style="list-style-type: none"> Full lifecycle software development centre delivers improved productivity (6 concurrent projects by 55 developers, 5 testers and 10 business analysts), reduced costs and enhanced quality to their customers |
| TTI Telecom | <ul style="list-style-type: none"> Improved time-to-market by 50% Estimated savings of \$2 million per year |
| Unisys | <ul style="list-style-type: none"> Accelerated client success: 25-40% improvement in cycle time 75-100% improvement in productivity 25-60% cost savings |
| Ericsson | <ul style="list-style-type: none"> 80% fewer bugs; 100% productivity increase |
| Lockheed Martin Canada | <ul style="list-style-type: none"> \$409K Net Quantifiable Benefit; 222% ROI |
| Credence Systems Corporation | <ul style="list-style-type: none"> 1200% increase in developer productivity 90% reduction in bug backlog |
| Information Builders (ISV) | <ul style="list-style-type: none"> 96% increase in productivity through improved regression testing |

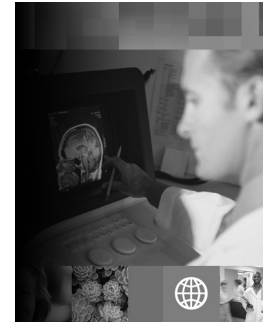


IBM Rational quality solutions helping industries

Health care

"By automating our tests with Rational tools we are able to increase our test coverage and repeat the full regression test daily without adding additional resources to our project teams. The pay back time of test automation has proven to be well within the scope of one release project."

Theo Engelen, Product Development Director at Philips Medical Systems



Financial

By employing Rational's Quality by Design approach, ProCard has been able to reduce the regression suite testing time, execution time, down to approximately six hours unattended. "

Scott McHugh, Senior Quality Assurance Engineer, ProCard, Inc



Comp. Services

Using Rational [tools], we've reduced regression testing times on projects from 220 hours to 80 hours. That's a significant reduction... We've also reduced overall testing time from 920 hours to 780 hours per project. This makes a significant difference in development time."

James Toon, QA Projects Manager, Crown Management Systems, Ltd.



Summary

- Lifecycle Approach to Software Quality Supports
 - ▶ Quality focus early in lifecycle
 - ▶ Quality integrated into the software development lifecycle
 - ▶ Govern and controlled testing to manage risk and compliance
 - ▶ Support for testing service oriented architectures
 - ▶ Support open standards
- IBM Software Quality Solutions Provide
 - ▶ Faster time-to-value
 - ▶ Consistent, reliable application delivery
- IBM leads in hosting design, construction & testing in Eclipse



“IBM, of course, is extremely well positioned to help companies tackle the whole [ITLM] problem, given its comprehensive product portfolio, extensive partner programs, and worldwide Global Services organization.”

Melissa Webster, IDC, May 2005 - “IT Life-Cycle Management: Will a Platform Emerge?”



Next Steps...

The screenshot shows the IBM Rational software website. At the top, there is a navigation bar with the IBM logo, a search bar, and links for 'Country/region [select]' and 'Terms of use'. Below the navigation bar, there are tabs for 'Home', 'Products', 'Services & solutions', 'Support & downloads', and 'My account'. The main content area is titled 'Software quality' and features a sidebar with links to 'Software', 'Trials and betas', 'Support', 'Training and certification', 'Library', 'Events', and 'News'. The main text discusses the importance of software quality and the challenges of building it into an application. It mentions that IBM Rational addresses these challenges with a complete and modular platform for teams who develop embedded systems, and software products. The page also includes a call to action to contact an IBM representative and a list of product information links.

Contacting your IBM representative

- ▶ <http://www.ibm.com/contact/us>
- ▶ Call 1 800 728 1212

Product Information on IBM.com

- ▶ www.ibm.com/software/rational
- ▶ Success Stories
- ▶ PowerPack Evaluation: Trials, Demos, Betas
- ▶ Events: Webinars, Seminars, Conferences
- ▶ Literature, Technical Resources & Support



For More Information...

The screenshot shows the IBM developerWorks website interface. At the top, there is a navigation bar with links for Home, Products, Services & solutions, Support & downloads, and My account. A search bar and a dropdown menu for 'Country/region' are also visible. The main content area features a sidebar with various technology categories like DB2, eServer, Lotus, Rational, Tivoli, and WebSphere. The main article title is 'Analyze system performance: Validate system scalability with IBM Rational Performance Tester V6.1'. Below the title, it indicates the level is 'Introductory', the author is 'Brian Bryson, IBM Rational', and the date is '26 May 2005'. The article description mentions learning to analyze system performance with IBM Rational Performance Tester v6.1. A call to action says 'Register now or sign in using your IBM ID and password.' Below this, there are sections for 'Prerequisites' (None), 'System requirements' (To complete the steps in this tutorial, you'll need to install IBM sample application...), 'Duration' (Under one hour), and 'Formats' (HTML).

■ Technical Resources on IBM developerWorks

- ▶ www.ibm.com/developerworks/rational
- ▶ Manual, Functional & Performance Tester Tutorials
- ▶ Discussion forums
- ▶ Technical articles and whitepapers





IBM Software Group

Effective Software Testing – tools and strategies for project success

Rational software



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