


## Rational 動能開發：提升 SOA 開發品質測試工具

*IBM Rational Testing Solution*



IBM軟體產品處  
技術顧問 林裕隆(Jason Lin)

# Agenda

- IBM Rational Software Delivery Platform 簡介
- 測試管理 - CQTM
- 手動測試 - RMT
- 自動化功能測試 - RFT
- 壓力測試 - RPT
- SOA測試 - Tester for SOA Quality



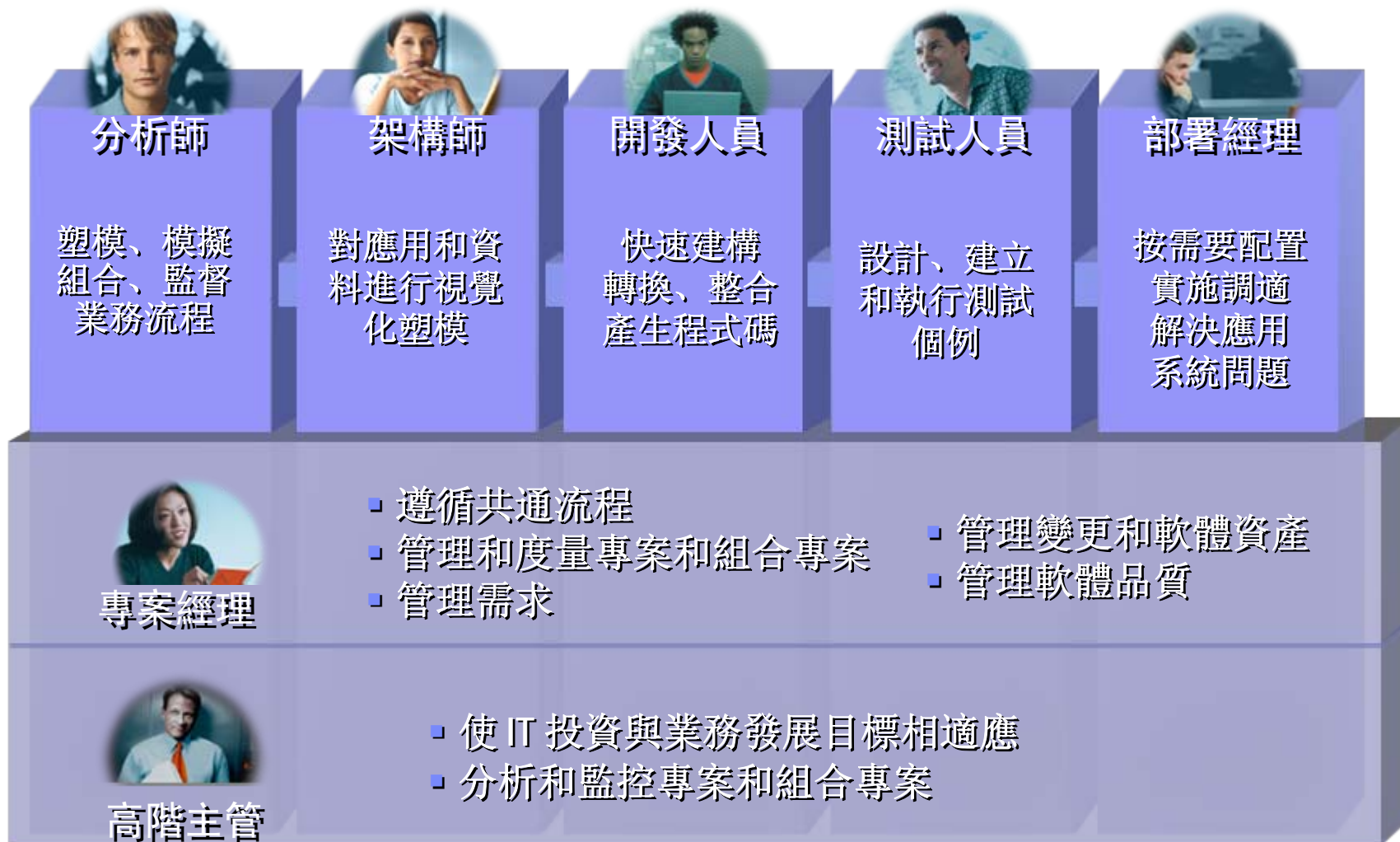
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- **IBM Rational Software Delivery Platform 簡介**
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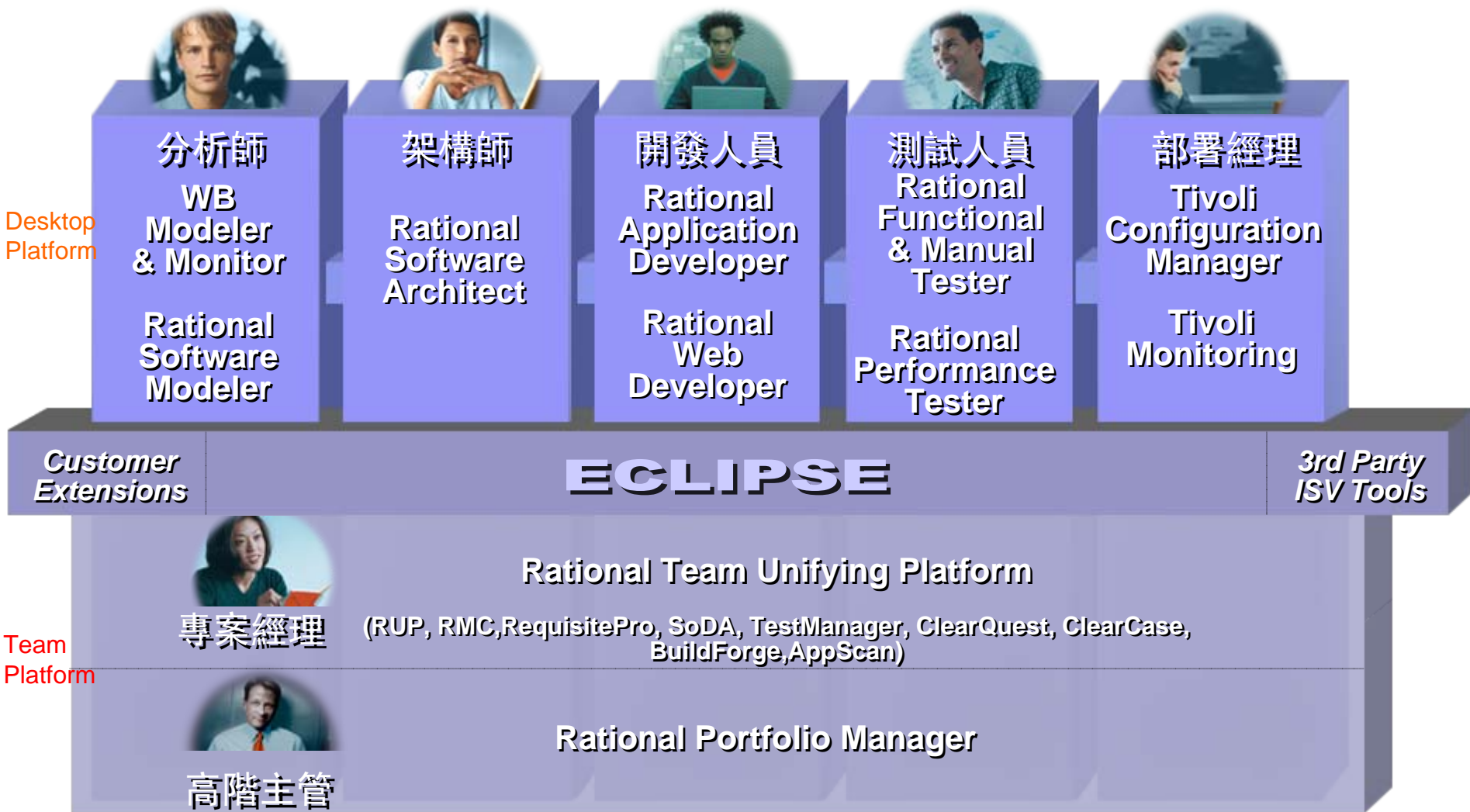
# The IBM Software Development Platform (SDP)

## A team-based approach (角色分工)



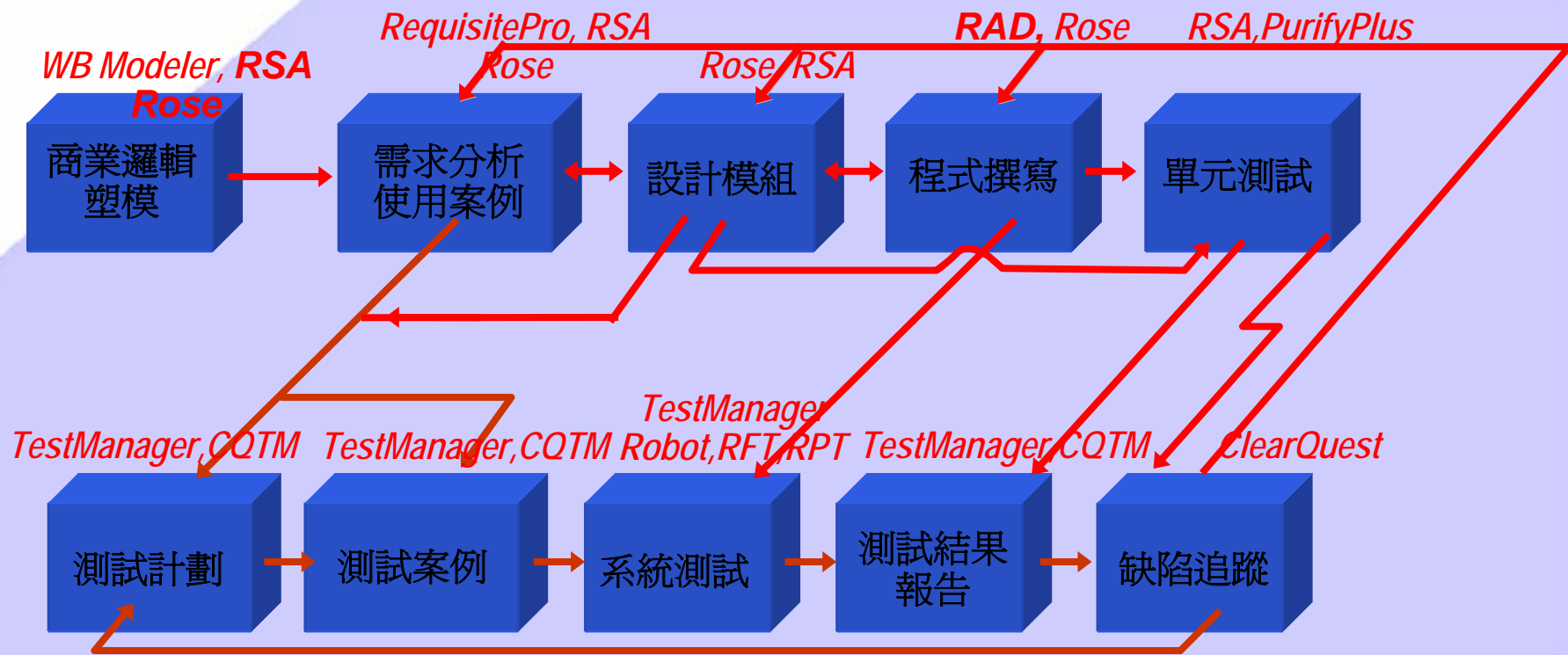
# The IBM Software Development Platform (SDP)

*A complete, open, modular, and proven solution*



# 整合性的軟體協同開發平台, 真正提昇生產力

## IBM SDP



統一並具整合性的流程指導 - *Rational Unified Process(RUP), Rational Method Composer(RMC)*

專案執行過程紀錄, 分析及報告 - *SoDA, Rational Portfolio Manager(RPM)*

軟體建構及異動管理 - *ClearCase, ClearQuest, BuildForge*



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# 測試管理： What is Test Management?



## Plan

- **Plan Objective:**

- ▶ Organize and maintain an inventory of items to test



## Create

- **Create Objective:**

- ▶ Capturing the steps required to complete a given test



## Execute

- **Execute Objective:**

- ▶ Assembling scripts in sequence to perform a suite of tests



## Analyze

- **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

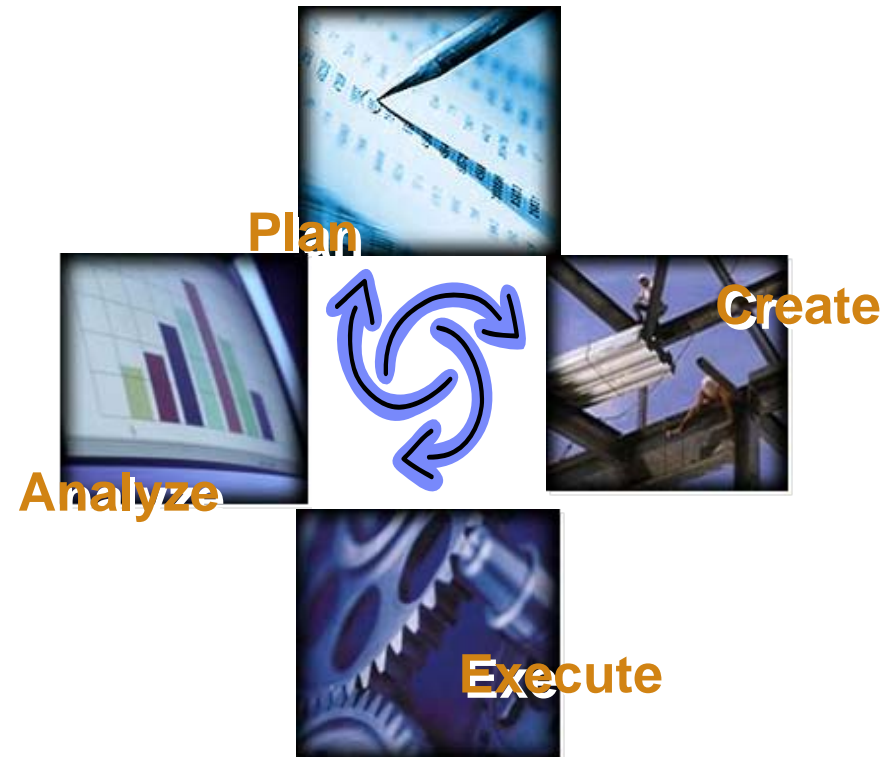
- ▶ Accommodate the requirements of both dedicated, independent QA teams as well as integrated project teams and distributed teams to ensure high operational integrity.

## ■ Extensible

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

## ■ Configurable

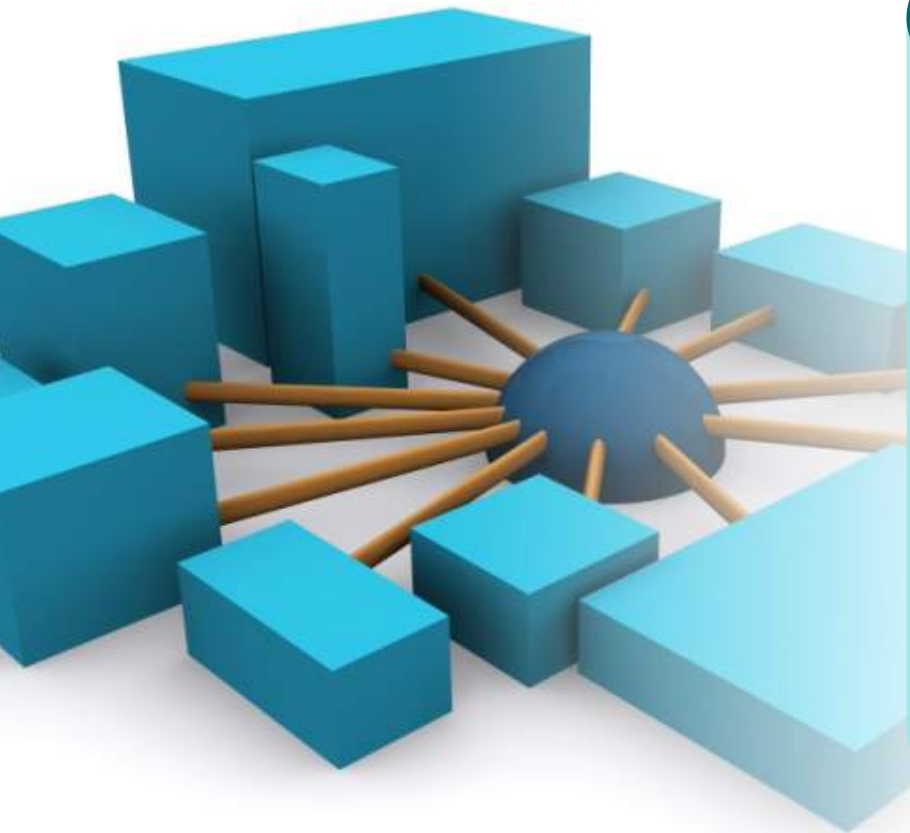
- ▶ Ensure compliance and enforcement of project and company policies
- ▶ Project-specific needs and workflow automation



# ClearQuest: The hub for life-cycle management

## *Govern the test and development process*

Solution : CQTM(ClearQuest Test Manager)



### IBM Rational ClearQuest

Test Change Defects

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

# ClearQuest Test Manager(CQTM)

*Single solution to manage tests, defects and project change*

## Benefits:

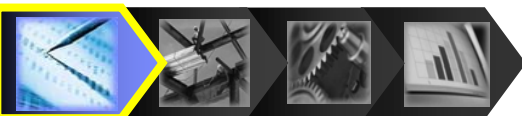
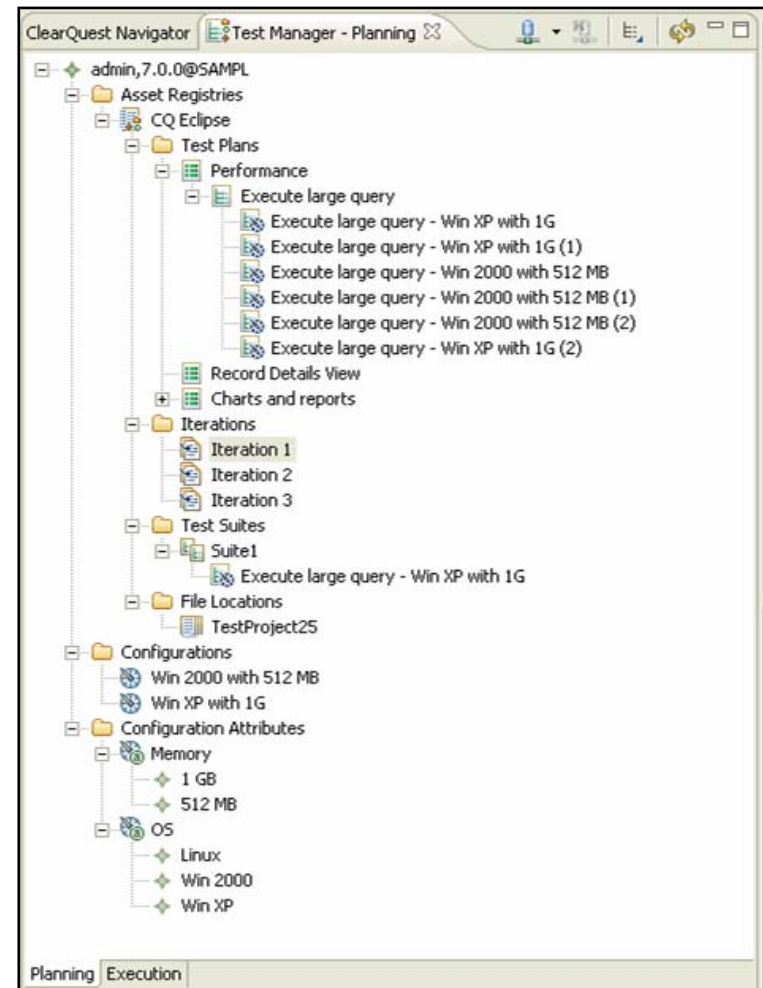
- Consolidated, real-time view of the entire project status
- Traceable, auditable relationships between development, test and project artifacts
  - ▶ Manages test planning, test results, quality metrics, and defects
  - ▶ Central repository with integrated version control
  - ▶ Comprehensive quality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



# ClearQuest Test Manager(CQTM)

## Plan: Enterprise test management & planning

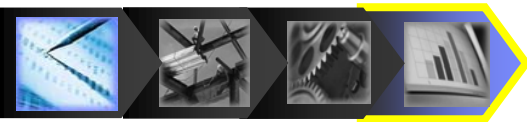
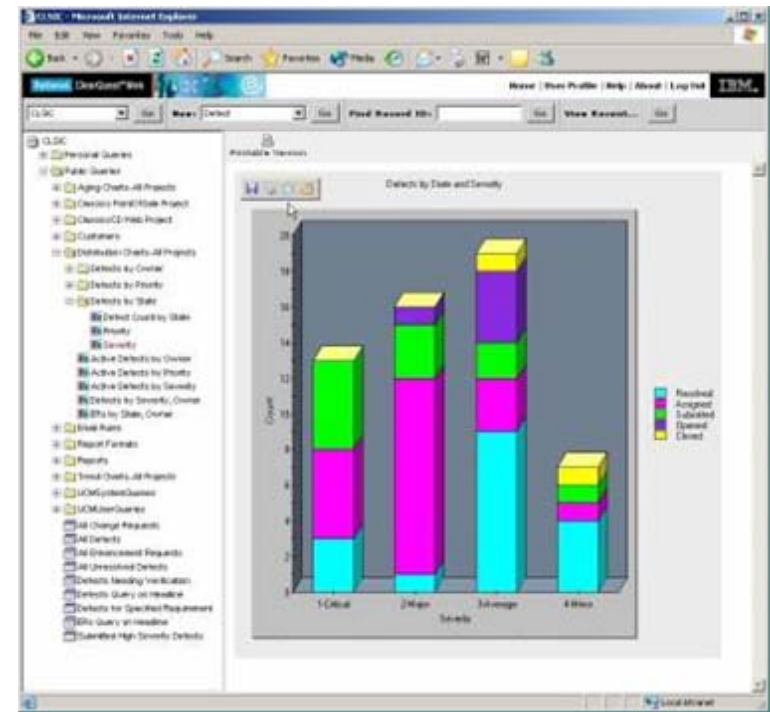
- Manages test planning, test results, quality metrics, and defects
- Link requirements to tests
- Automates sharing and reuse of distributed assets
- Extensible customization of forms and workflows
- Auditable test change history
- e-Signature support
- Supports enterprise-level databases (Oracle, DB2,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



# ClearQuest Test Manager(CQTM)

## Analyze: Comprehensive quality metrics

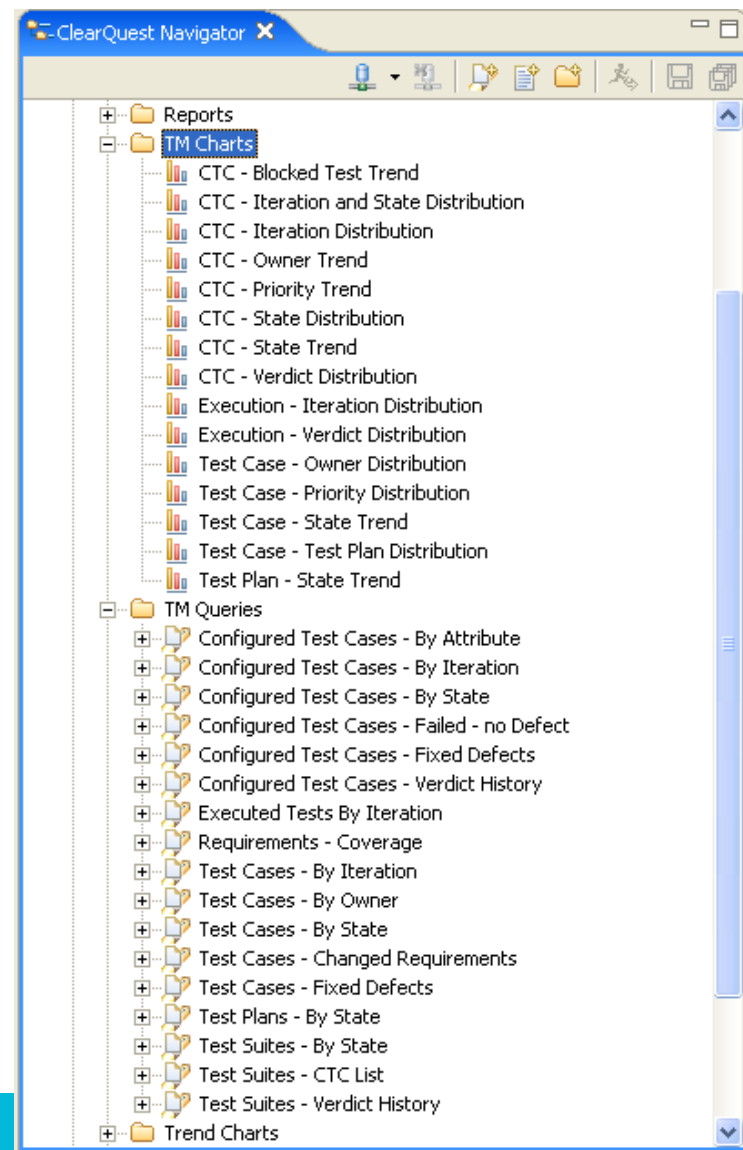
- Generate reports to monitor test progress
  - ▶ Run reports to summarize test case results
  - ▶ Run reports to measure requirements coverage
- Key considerations when creating schedules
  - ▶ Ability to report against test motivators
  - ▶ Ability to monitor current project status



# ClearQuest Test Manager(CQTM)

## 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!**



# ClearQuest Test Manager(CQTM)

## -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



# ClearQuest Test Manager(CQTM)

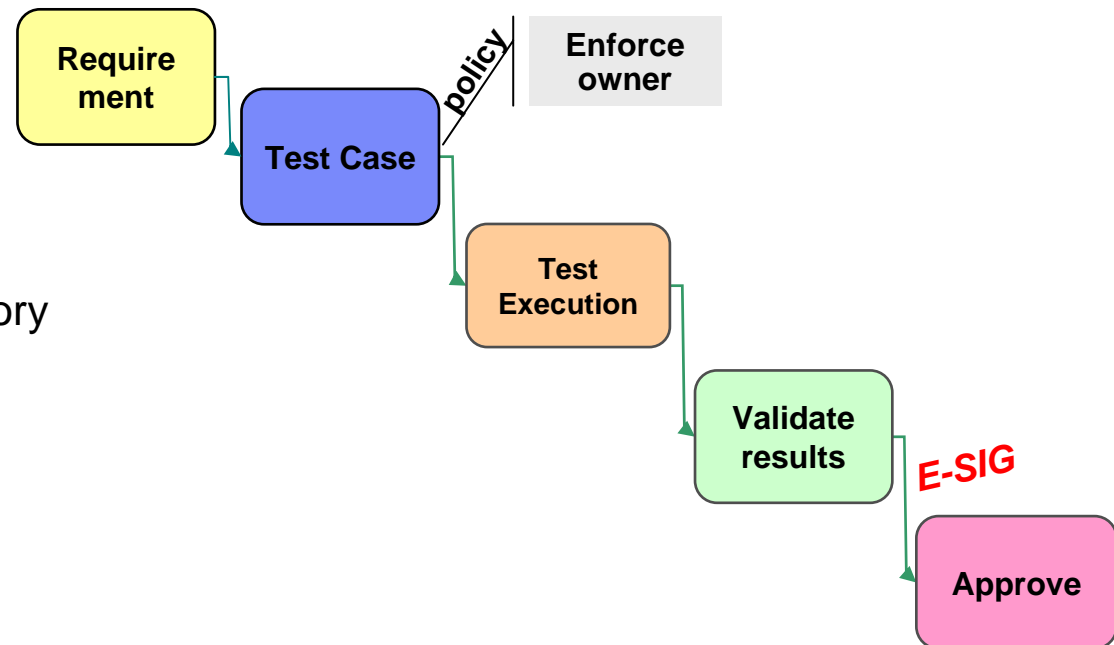
-Configurable, enforceable process

*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





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# 手動測試 : What is Manual Functional Testing (RFT)?

*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

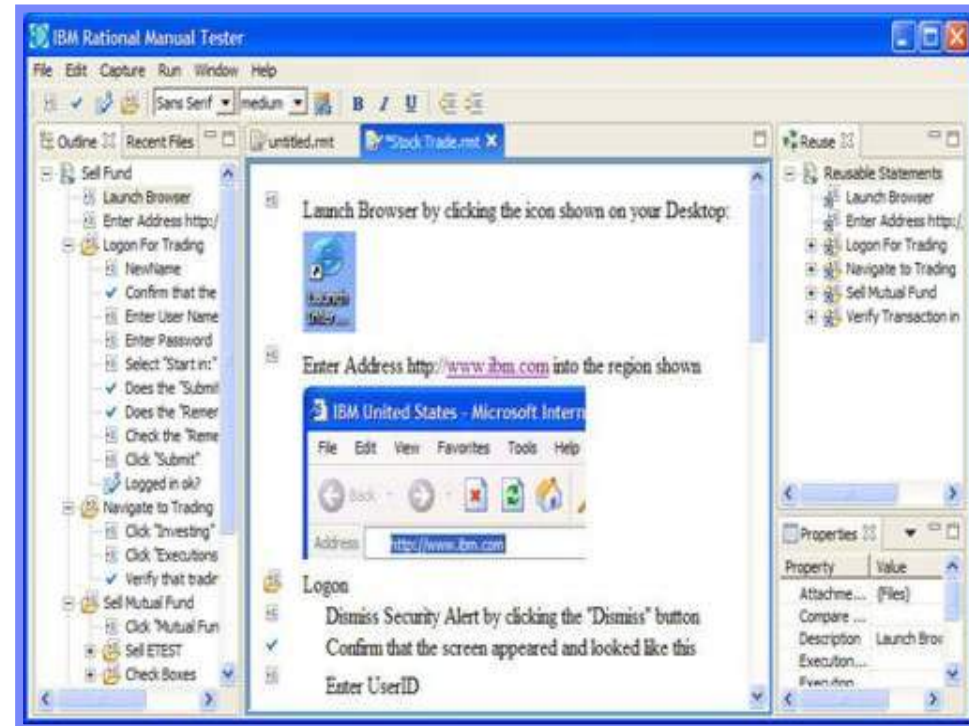
- ▶ Minimizes test maintenance with linked content. Make changes in only one location to update all tests.

## ■ 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

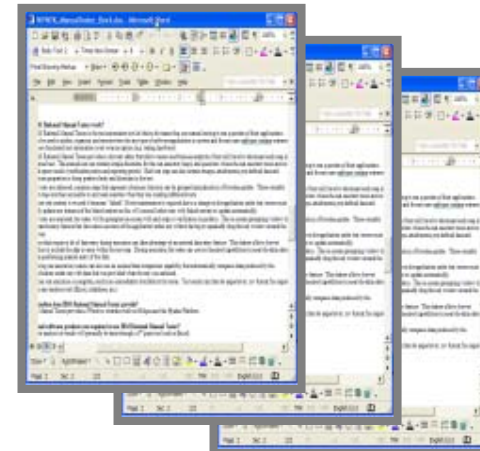


# Consolidate Test Creation and Maintenance

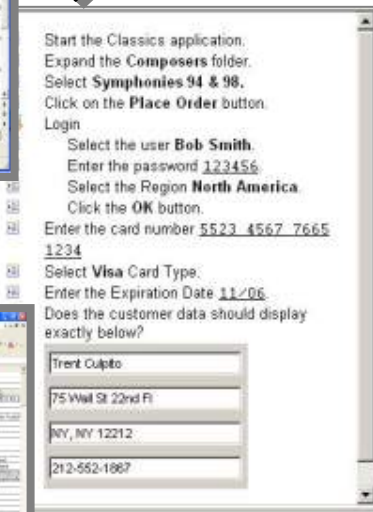
## Benefits:

- ▶ 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

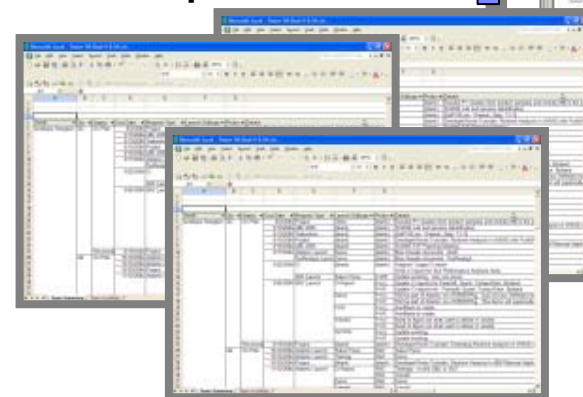
### Microsoft Word documents



### Rational Manual Tester test



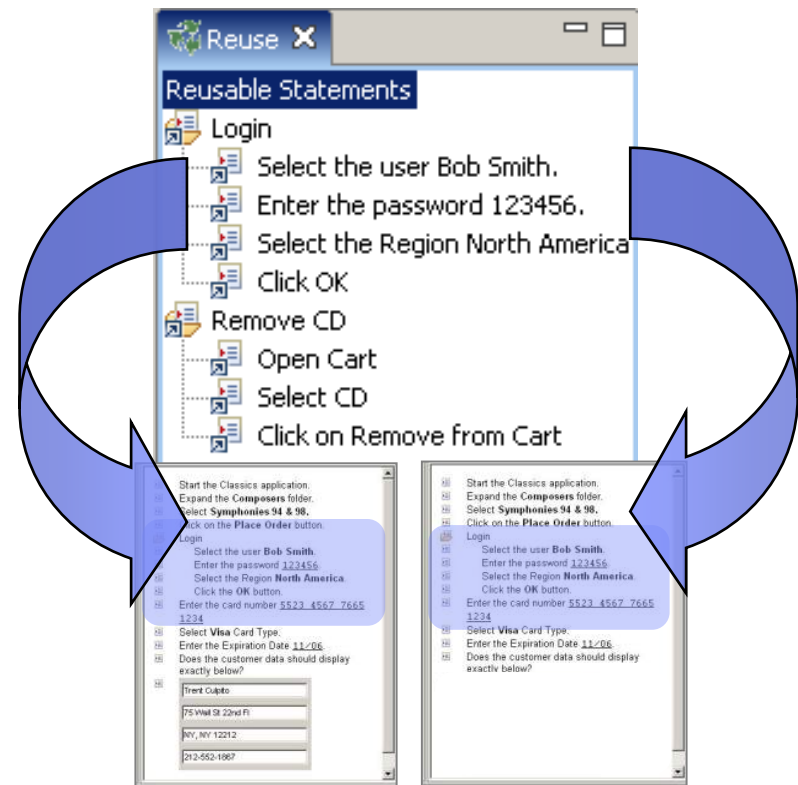
### Microsoft Excel spreadsheets



# Reduce test maintenance and ensure consistency

## Benefit:

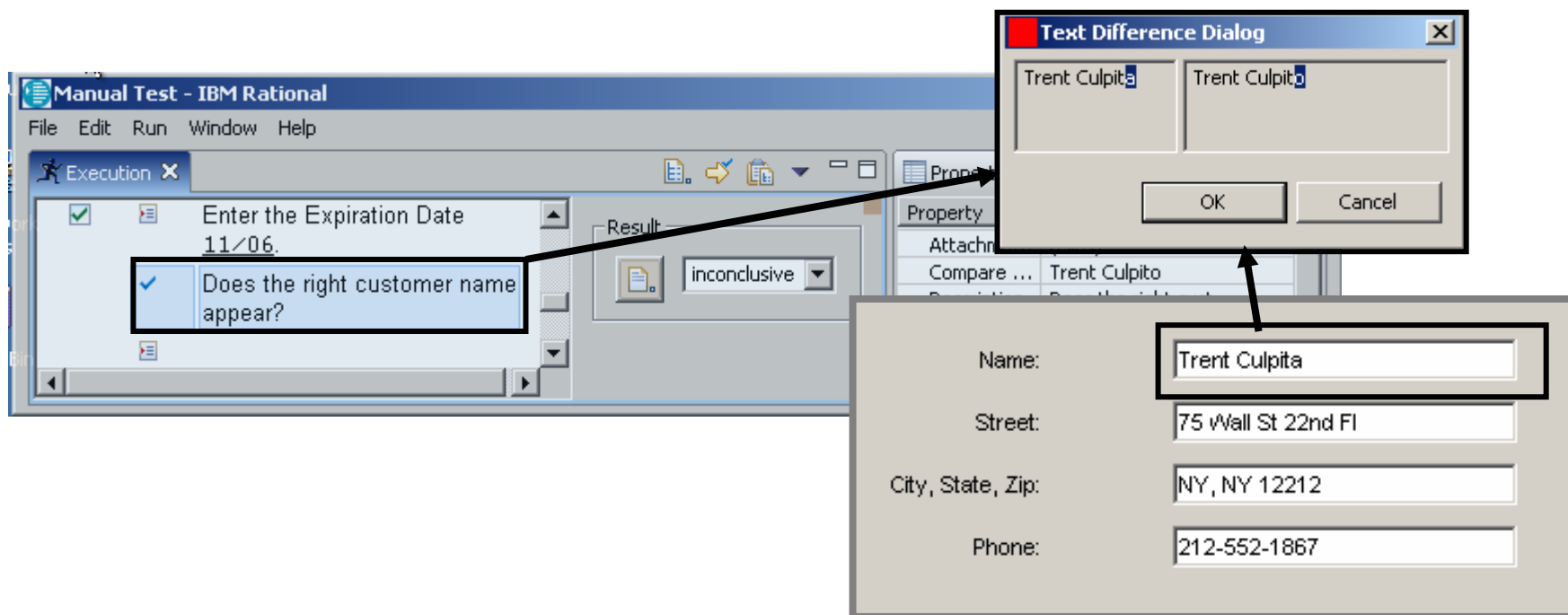
- ▶ Enable Shared Content Across Multiple Tests
- ▶ Create commonly used test statements once
- ▶ Reuse statements across multiple tests through simple drag and drop
- ▶ Maintenance of shared content is efficient with single-point updating of shared content
- ▶ Ensures consistency and reduces test maintenance



# 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



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# 自動化功能測試 :What is Automated Functional Testing (RFT)?

*The automated process of ensuring fitness for use*

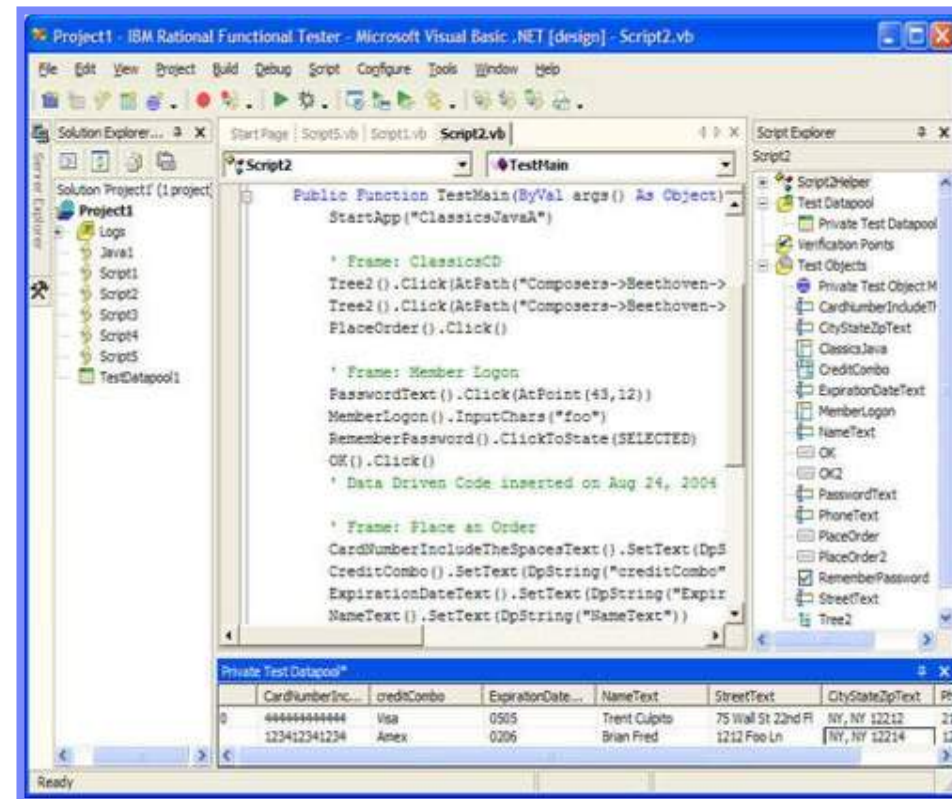
- Using automation tools to capture actions taken against an application in script format.
- Three Step Process
  - ▶ Record actions into a script format – either VB.NET or Java
  - ▶ Optionally enhance scripts with custom coding
  - ▶ Execute scripts – ideally overnight to increase test productivity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



# 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 included to incorporate support for parallel development and geographically distributed teams

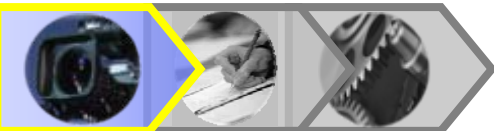


# Control of Test Automation

## *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

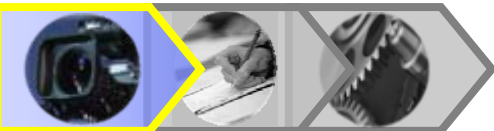


# Flexibility: Recording Scripts

## *Environment Support*

IBM Rational Functional Tester 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



# 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  
  
  
Click here to save your s

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

## Version 2.0

Customer Log On

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

**No User Intervention Required With ScriptAssure™**



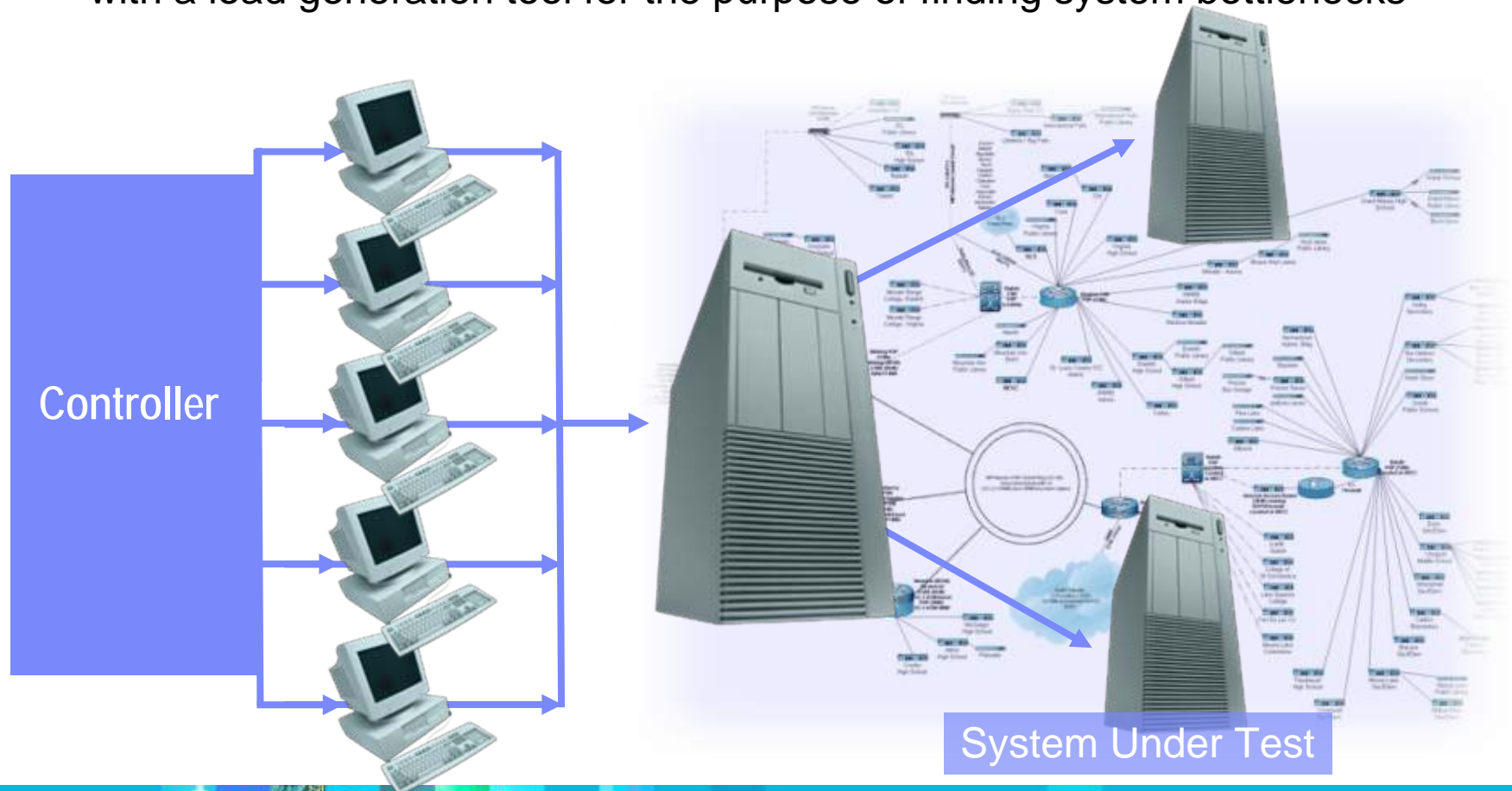
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# 壓力測試 :What Is Performance Testing?

- 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

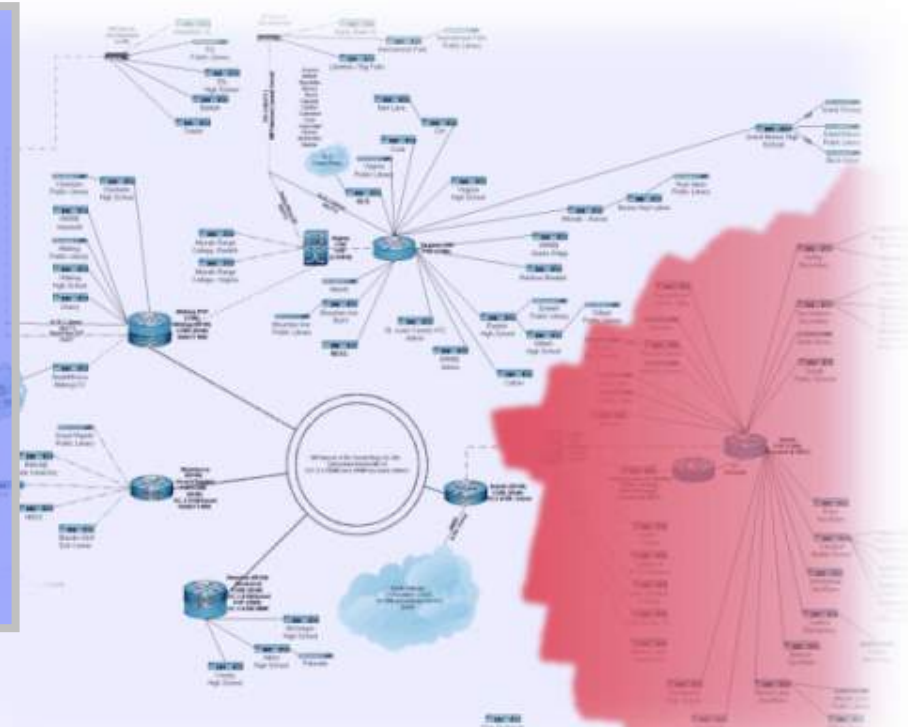
## The page cannot be displayed

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**

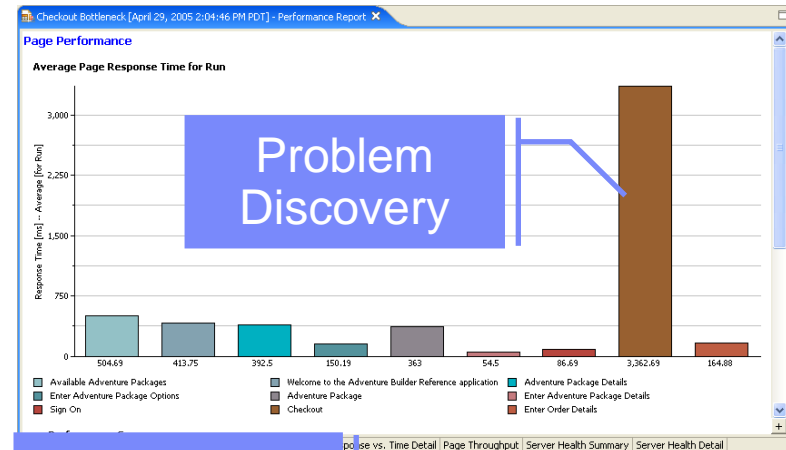
- ▶ Validating responses & finding the bottleneck



# 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



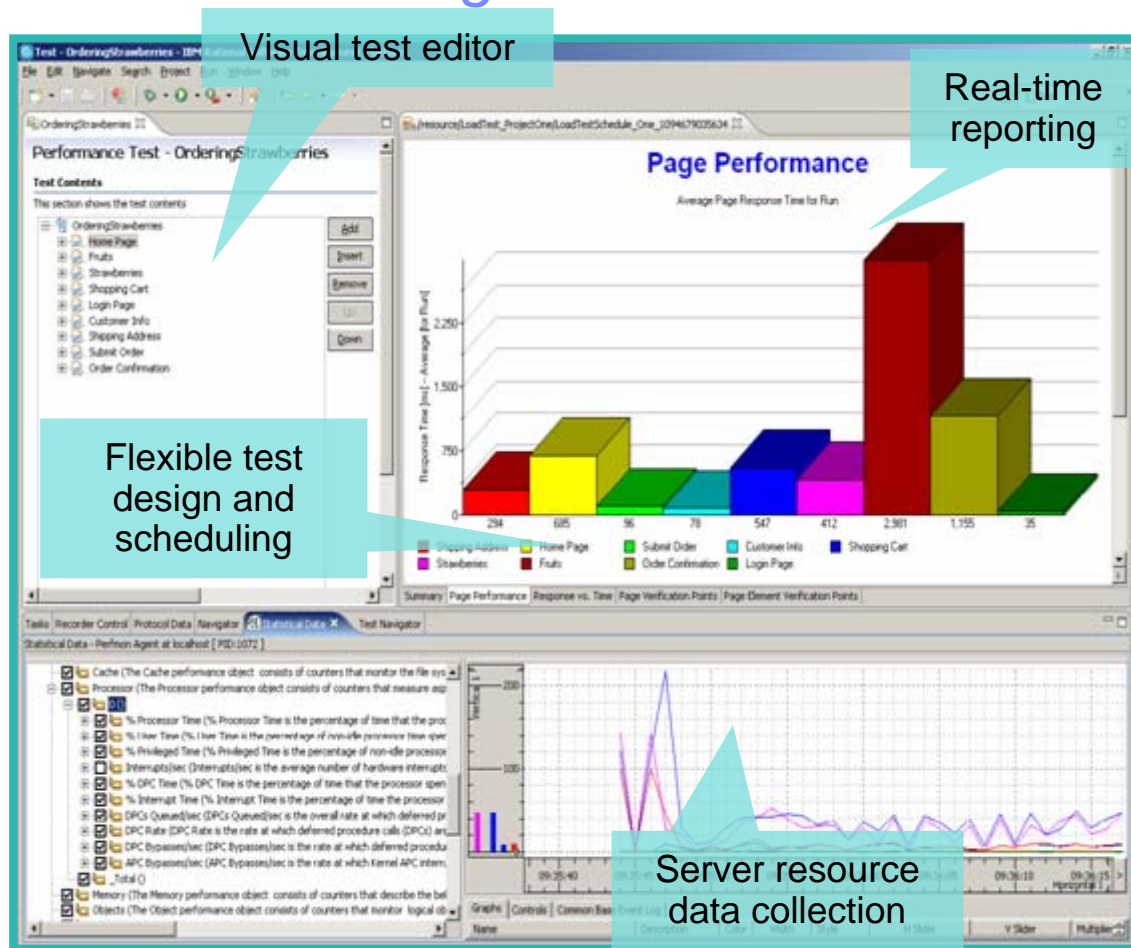
Problem  
Diagnosis

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



# 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

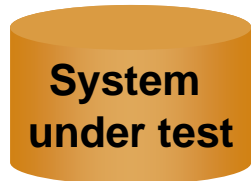
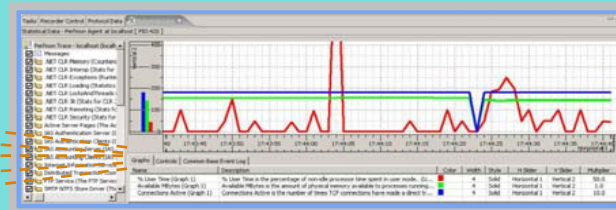


# Problem Discovery and Diagnosis: *Leverage production data for root cause analysis*

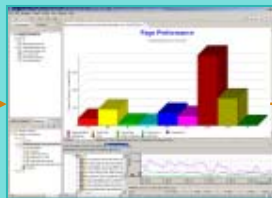


**Tester (Test Lab)**

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



**User Load**



**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**

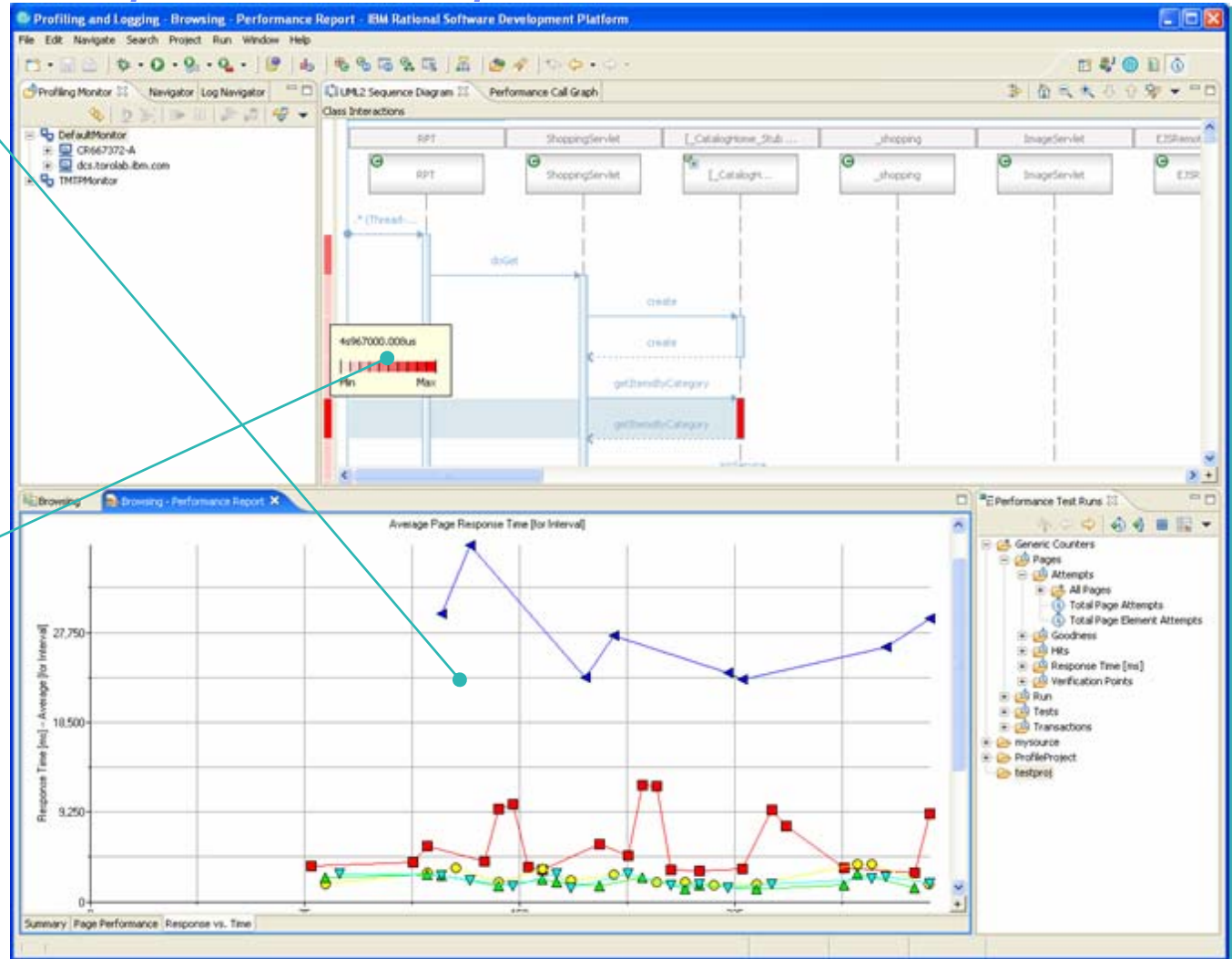


# Problem Discovery and Diagnosis:

## *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.



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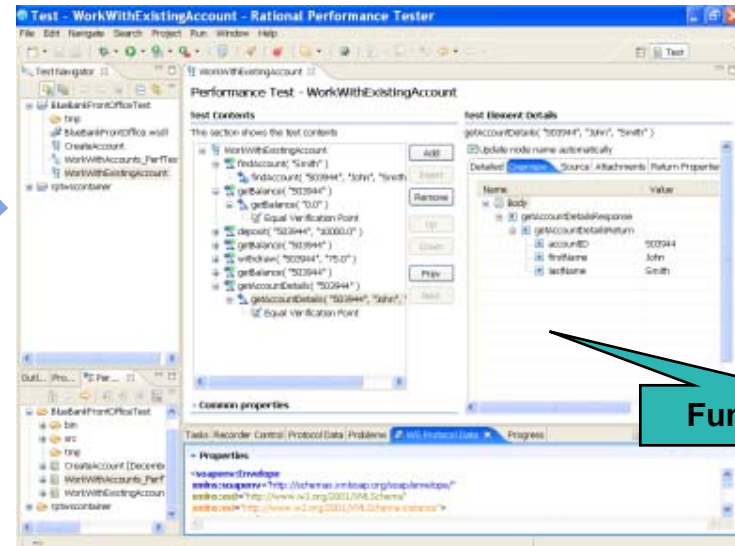


# Rational Tester for SOA Quality

-SOA功能性測試

## Rational Tester for SOA Quality

Automated regression and functional testing for GUI-less Web services



## Rational Tester for SOA Quality

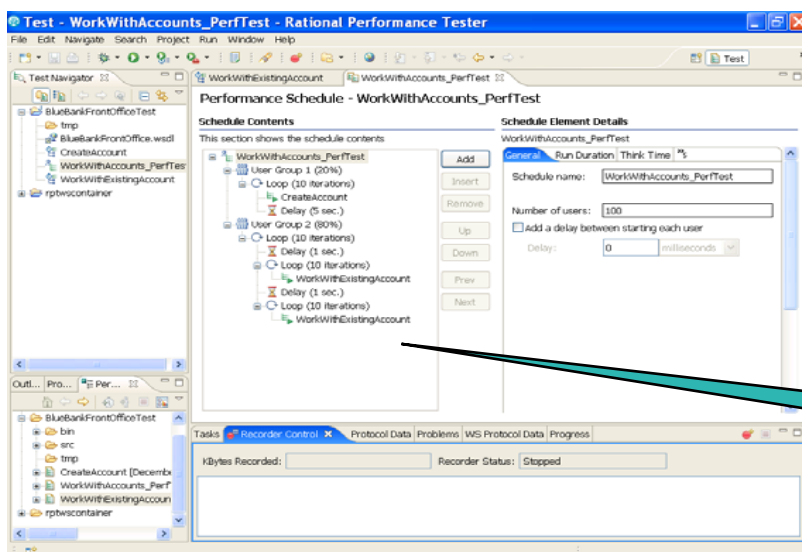
-不需要編碼的 **GUI-less** 服務測試

- IBM Rational® Tester for SOA Quality 可建立、納入、修改及執行 Web 服務測試。
- 這是一種功能性回歸測試工具，不需編碼即可測試 GUI-less 服務。
- 不需編碼的測試環境可支援各式平臺的不同使用者，可自動進行資料關聯及資料導向測試，不需手動編碼。
- 自動產生 Web 服務測試用戶端，簡化 GUI-less 服務測試並確保交互作業能力。
- 使用 Web Services Business Process Execution Language (WS-BPEL) 資源自動建立測試，以簡化服務整合測試。
- 支援 Web 服務標準（如 SOAP、HTTP(S)、JMS、WS-Security、UDDI）。



# Rational Performance Tester Extension for SOA Quality

## -SOA壓力測試



## Rational Performance Tester Extension for SOA Quality

Performance Testing for Web service - based applications

Performance schedule

## Rational Performance Tester Extension for SOA Quality

### -可進行 Web 服務效能測試及問題分析的單一工具

- IBM Rational® Performance Tester for SOA Quality 是測試負載與效能，以及分析問題的工具。它可以將效能和延展性測試擴充到 SOA 應用程式。
- 其中包括 Rational Tester for SOA Quality 的所有功能，以及下列各項：
  1. 驗證 SOA 系統延展性：
  2. 擁有彈性工作量建模，可自動產生 Web 服務測試用戶端。
  3. 自動產生 Web 服務效能測試。
  4. 即時回報伺服器的回應時間及總處理能力。
  5. 支援各式平臺的監視，包括已部署的 Web 服務以及伺服器資源資料的收集和視覺化，以找出效能瓶頸並進行 SOA 效率問題判斷。
  6. 透過 Java 程式碼插入彈性自訂測試，以進行進階的資料分析和剖析。



# RPT / Rational Tester for SOA Quality / RPT Extension for SOA Quality 產品關係

■ RPT Extension for SOA Quality-SOA功能性&壓力測試  
(包含Rational Tester for SOA Quality-SOA功能性測試,但不含RPT)

Rational Tester for SOA Quality-SOA功能性測試&網頁壓測  
(包含RPT)

RPT(Rational Performance Tester)-網頁壓測

VT (Virtual Tester ), ex VT250/VT500



THANK  
YOU

