Rational DOORS and Rational Quality Manager

Dr. Keith Collyer

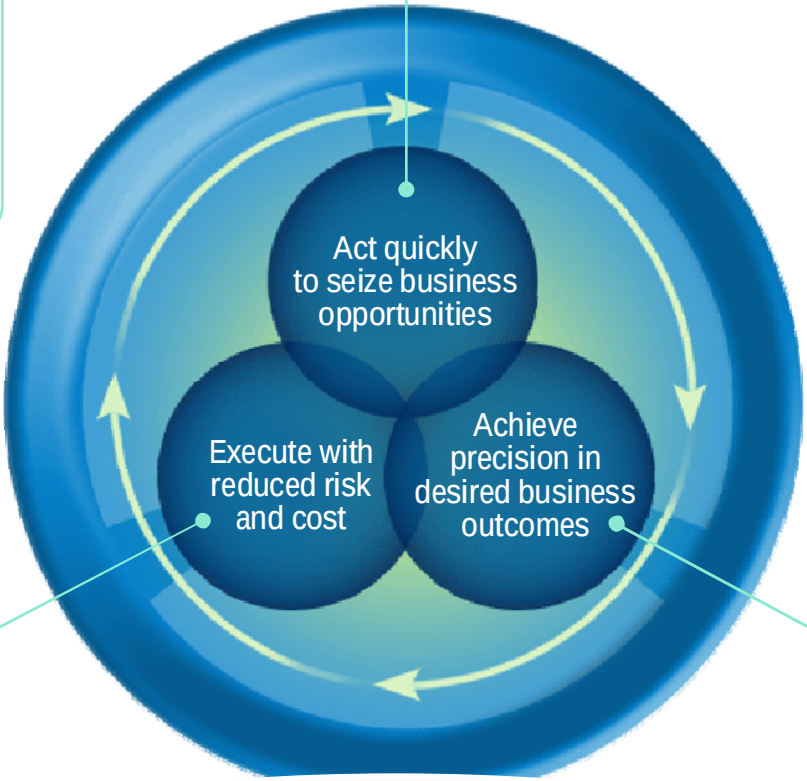
Innovate2010
The Rational Software Conference

Let's build a smarter planet.

Go to IBM

Driving Business Differentiation in Challenging Economic Times with Agility and Confidence

Analyze business opportunity and the impact of change and effectively manage organizational transformation by better aligning business and development priorities



Deliver quality solutions and improve efficiency through real-time team collaboration, automation and reporting and leveraging proven best practices

Build consensus through business and development collaboration making good decisions based on real-time and accurate information across all stakeholders

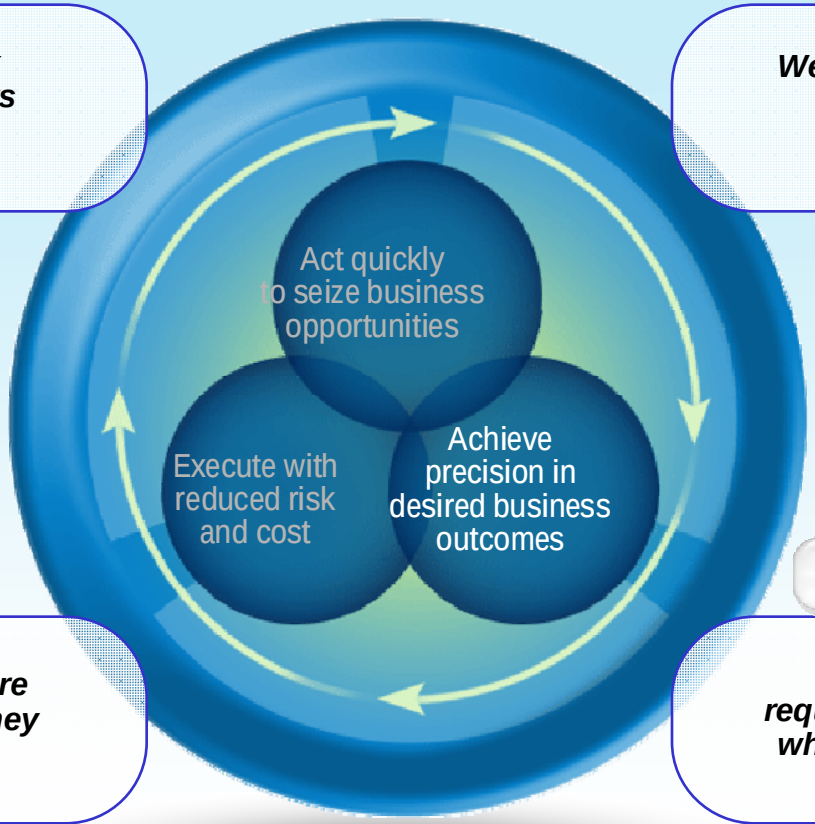
Achieve Precision in Desired Business Outcomes
Deliver the high quality products/systems the customer needs

We struggle with complex projects meeting customers needs a timely manner

CTO

We are continuously pushed to increase quality with less resources!

Quality Manager



Analyst

It's hard to accurately capture requirements & make sure they are implemented & tested

Tester

It's hard to keep up with requirement changes and know what is most important to test

The Solution:
Requirements Engineering and Quality Management

Consensus Building and Quality Delivery Among Business, Systems and Engineering Experts

Drive greater specificity in project guidance and identify quality issues early to reduce cost and risk
Drive consensus among business and technical experts using proven visual and collaborative techniques

"We spent most of our development budget in identifying and correcting defects!" CTO

Accelerate time to market and improve operational efficiency
Automate proven delivery processes to reduce rework and determine optimal plans

"70% of our rework is due to requirements errors. As a result our budgets get tighter and we fail to meet the release date." Project Manager

Adapt seamlessly to changing priorities with greater visibility and effortless reporting
Make confident decisions faster to proactively address ever-changing inputs and insights

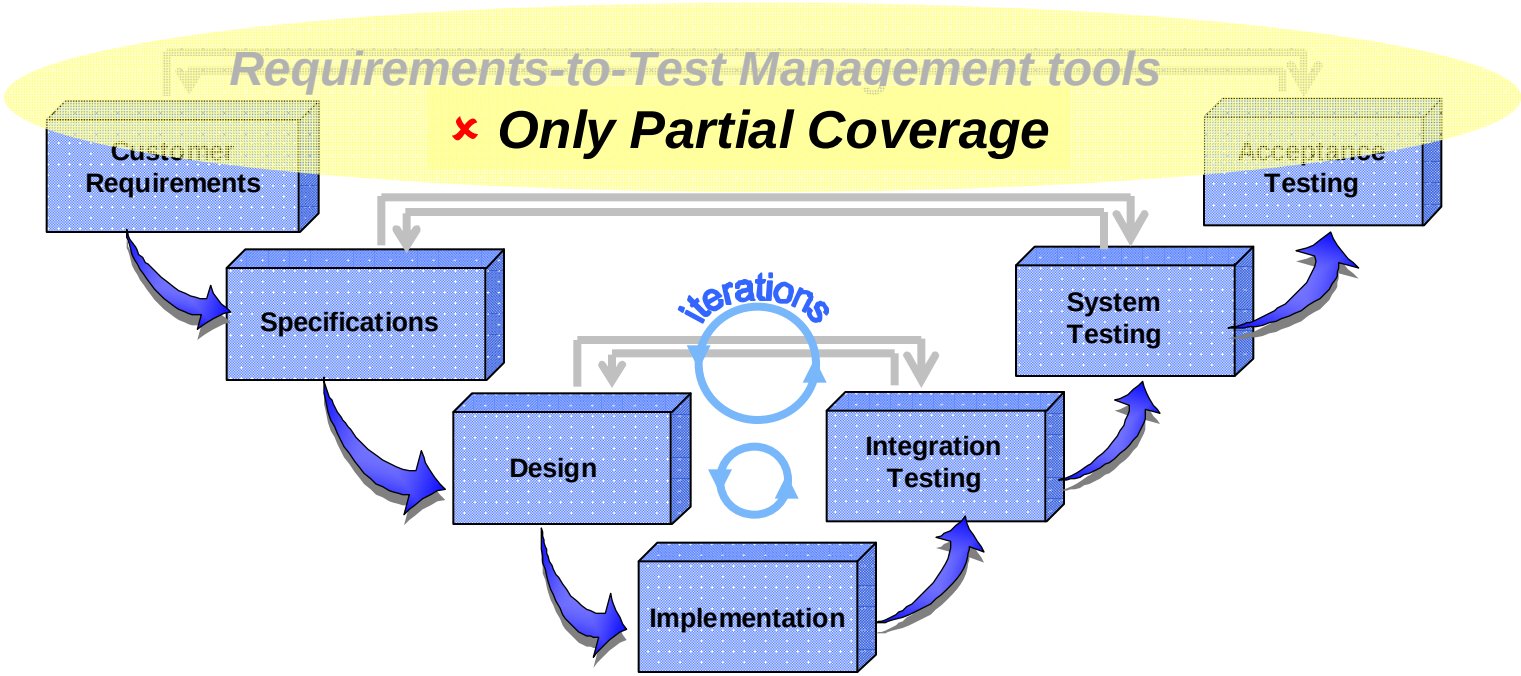
"If we don't release our products to market on time - we can't achieve our profit targets" Product Manager

Measure for ongoing process improvement
Adopt quality trends, leading practices and successful deployment patterns to impact future outcomes

*"Process led automation ROI is real – 4,752,886 hours saved in reusing 9,696,199 test artifacts – $1.1B in total value" ***

** 2008 GBS Test Practices study over 855 projects

Other Tools Offer Partial Coverage To Pain Points - Approach focused on needs of test audience



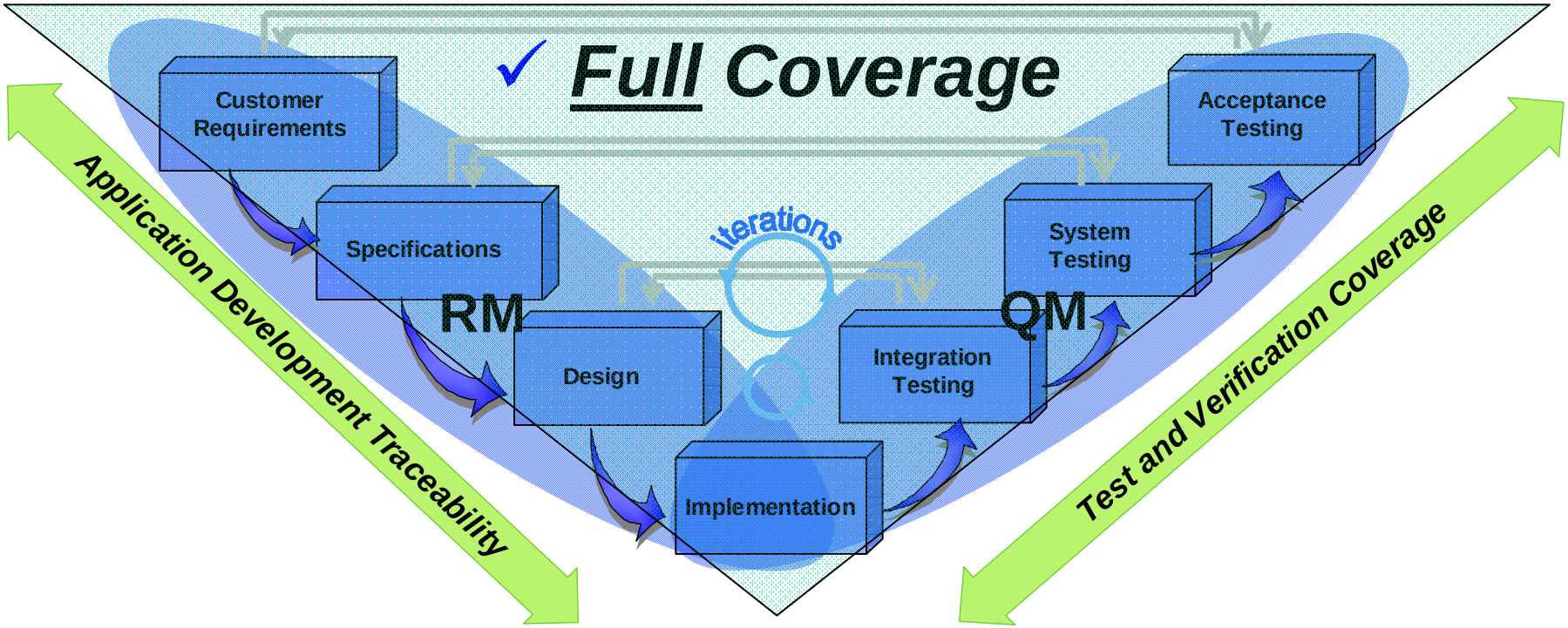
Capability Gaps

- Only support linkage of test to a single level of requirements
- Incomplete life cycle coverage (no design/build)

Implications of Gaps

- No common set of clear requirements shared by team
- Risk of missing critical requirements & serving business
- Limited ability to assess requirements change impact
- Limited ability to identify most critical requirements to test
- Difficult to prove compliance (traceability, audit-ability)

IBM Offers A Unique Solution That Ensures Entire Lifecycle Collaboration and Traceability



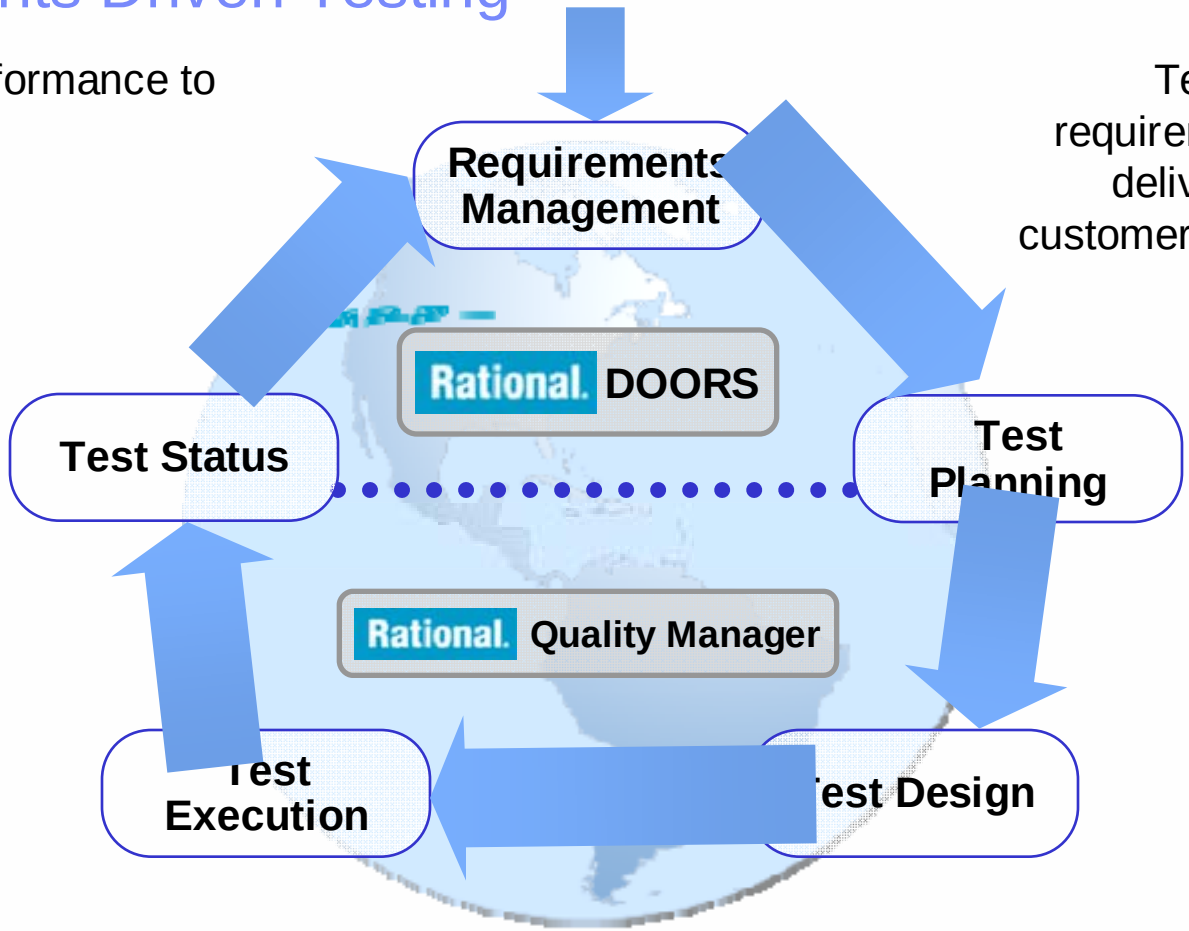
IBM's full life cycle coverage and traceability solution

- ✓ Common set of clear requirements shared by team
- ✓ Don't miss out critical requirements
- ✓ Assess requirements change impact
- ✓ Identify most critical requirements to test
- ✓ Prove compliance (audit-ability)

Requirements Driven Testing

Quality is conformance to requirements

Tests based on requirements ensure deliverables meet customer expectations



Process Automation and Increased Focus

The test team is working against the right set of requirements

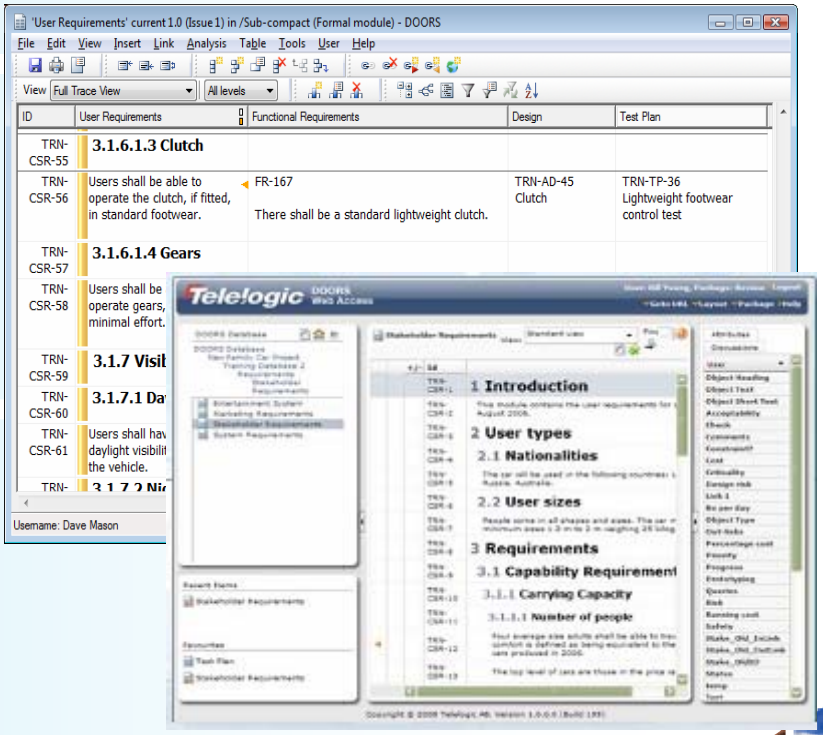
Rational DOORS

Worldwide market and technology leader

- ✓ Yphise award for best RM Product
- ✓ ISO 9001 Compliant development

Success from comprehensive requirements management process

- ✓ Easy-to-use document oriented views
- ✓ Lifecycle traceability to *any* information
- ✓ Web-based access and review



Highest compliance and audit capabilities

- ✓ Simple but powerful versioning
- ✓ FDA Compliant Electronic Signature
- ✓ Comprehensive traceability reporting

Rational Quality Manager
Central hub for business-driven software quality delivery

Mitigate business risk with collaboration

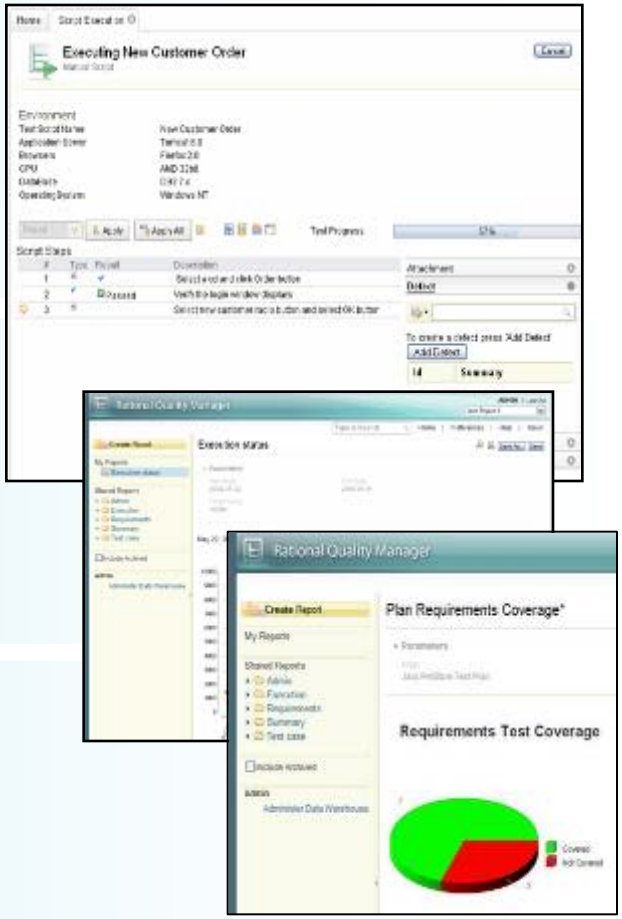
- ✓ Team coordination of test planning
- ✓ Enforceable process workflow
- ✓ Upstream and downstream quality

Improve operational efficiency with automation

- ✓ Lab efficiency and asset utilization
- ✓ Test coverage optimization
- ✓ Environment and lifecycle coverage

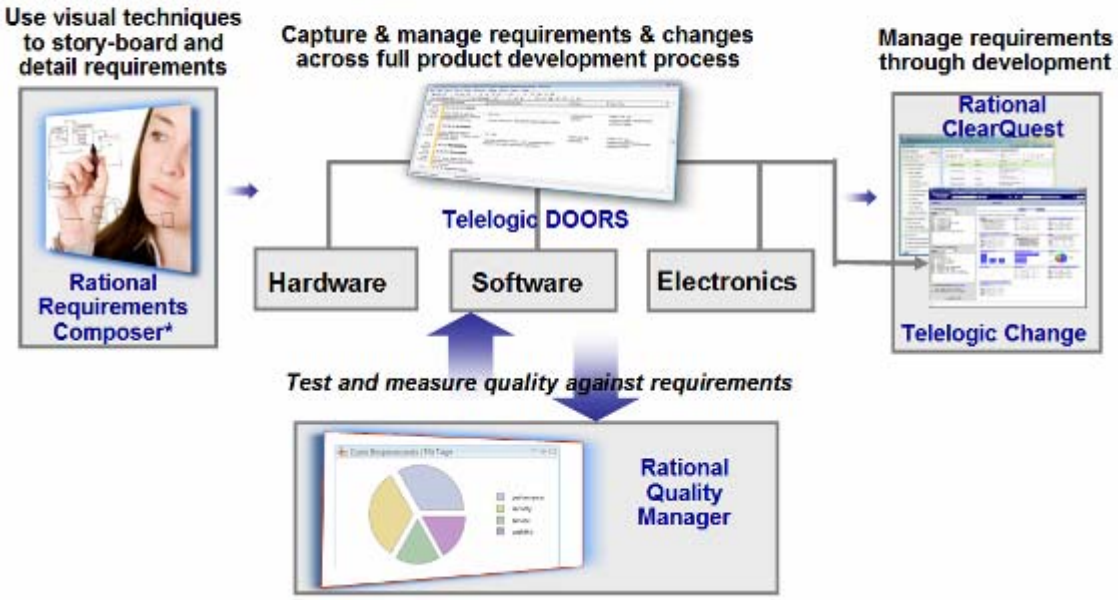
Make confident decisions with effortless reporting

- ✓ Ongoing analysis & process improvement
- ✓ Proactive risk management
- ✓ Greater predictability



IBM Requirements Engineering Solution

- Getting marketing , engineering, manufacturing, suppliers and subcontractors on the same page
- Managing scope, plus assessing and controlling the impact of change
- Ensuring end-to-end traceability
- Ensuring conformance to contractual agreements
- Demonstrating compliance to regulations



Extended Rational Solution

- **Rational Requirements Composer**
- **Rational ClearCase** or **Telelogic Synergy**
- **Telelogic System Architect**
- **Telelogic Rhapsody**
- **Rational Method Composer**
- Quality Management **portfolio** RQM integrates with many tools, including **Rhapsody TestConductor*** (for Model Driven testing), **Rational TestRT** (for Unit/Integration testing) and **Rational Software Analyzer** .
- **MCIF**

Customer comments on Rational Quality Manager

TietoEnator

"I think that IT organisations now have more options… They are not forced to use HP if it is not good in their development environment… And with the good integration with version control system it is my opinion that they [Rational] have a better integrated testing offer than the competitors right now."

-- Peer Eland, TietoEnator

ZURICH
Zurich Financial Services

"Easy to use and comprehensive Jazz Based Tool for the Test and Integration Business. Rational has found the way to make Testing and Integration a better place to work."

-- Massimiliano Russi, Zurich Financial Services

Trinity Software Solutions

"IBM Rational Quality Manager (RQM) represents a sea change in software quality enforcement. Customers will see an immediate return on investment not only from the administrative viewpoint, but from the insightful assimilation of process enforcement. RQM will transform quality teams by fostering greater collaboration without locality restrictions. Software development stakeholders will concur that RQM delivers the required features to deliver their own high-quality products with greater confidence."

– Russell Stanley, Trinity Software Solutions, Inc.

SOGETI

"IBM Rational offerings provide a business driven quality environment. By integrating and automating our process and Rational tools, Sogeti can deliver a consistent engagement approach, provide clients with process customization and transparency and accelerate the development of test plans and assets within Rational Quality Manager."

– Dan Hannigan, Sogeti

Process-led Automation yields real savings
Examples of automation capabilities

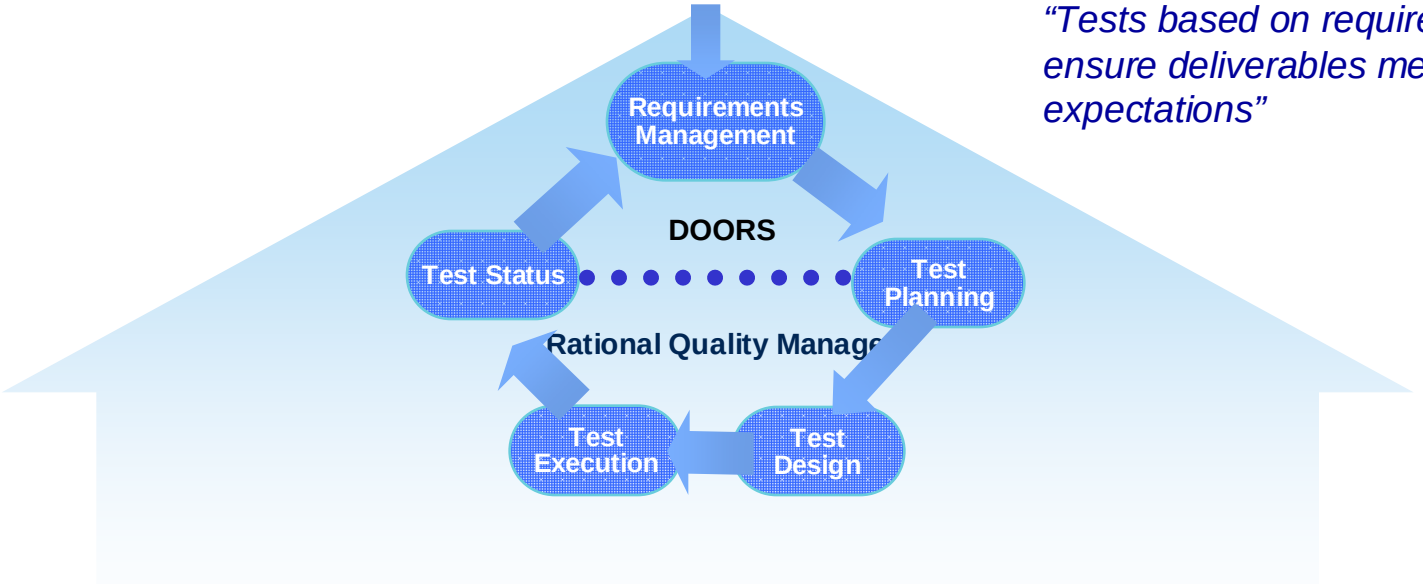
	Developing repeatable industry test solutions			Advanced Defect Analysis	Developing repeated test process models applicable to future projects		Integrating end to end processes	
Asset	Test cases copied	Manual scripts copied	Manual scripts Reuse	Prevent and Block duplicate Defects	Baseline & migrate documentation	Baseline artifacts	Leveraging component Reuse	Dynamic updates of test assets
Quantity	290	296	1,178	765	1,154	1,711	870	1,883
Hours saved	141	148	589	Discovery in 4 Hr 1,484	577	855	435	470
Value	$11, 600	$11,850	$47,000	$857,000	$46,200	$68,000	$34,800	$37,700

Source: 2008 GBS Test Practices study over 855 projects

Average per project saving with automation and collaboration best practices calculated on a per asset task and process savings

Estimated hours saved per project: 4700 hours

Principles of an Integrated Approach



"Tests based on requirements ensure deliverables meet customer expectations"

1. Plan Tests Early
- Plan tests for each requirement as the requirement is written.

2. Conduct Tests Early
- Perform tests as early as possible in the development process.

3. Relate Tests to Requirements
- Trace tests back to the requirements they are design to check.

4. Relate Defects to Requirements
- Trace defects back to the requirements that they show are not satisfied.

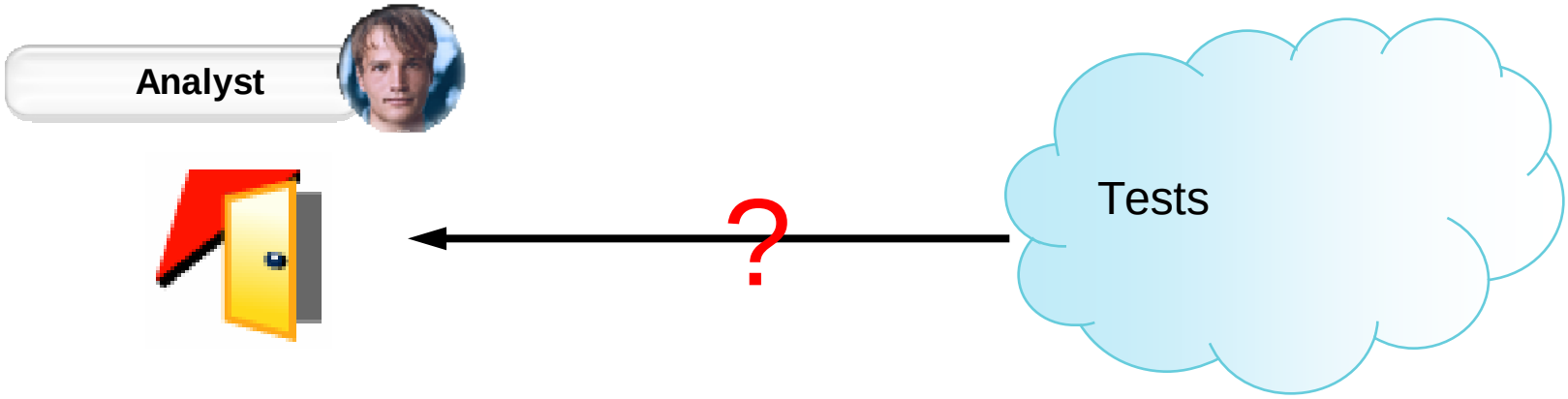
5. Measure Progress against Requirements
- Set targets and measure the progress of testing in terms of those requirements that are shown to be satisfied or are not satisfied.

Benefits

- Providing a requirements based integration between Requirements Management and Test Management enables:
  - The Requirements Analyst to focus on delivering testable requirements with fully defined qualification criteria
  - The QA/Tester to focus on developing tests against a known set of requirements
  - Release Management can be performed based on requirement quality measures rather than on statistics of test pass/failure

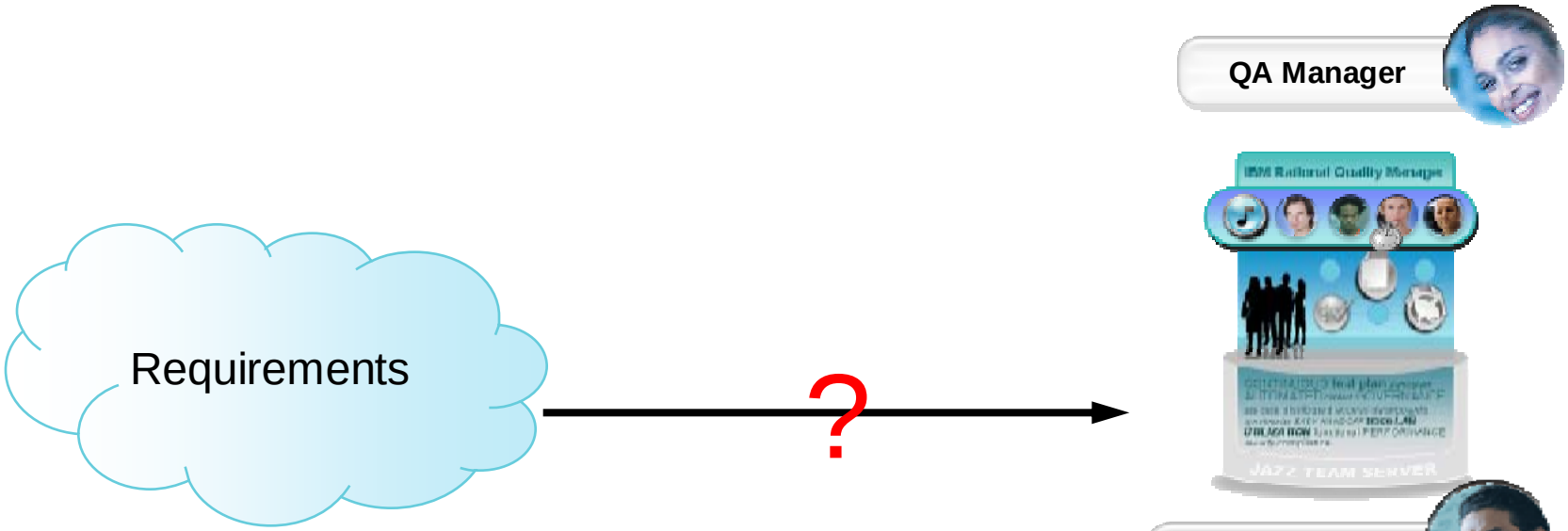
Role: Analyst

- The Analyst is a DOORS user principally interested in Requirements Management
- Specifies Qualification Criteria that must be met by testing
- Needs to know that requirements are tested
- Performs Impact analysis to cover requirements and test
- Wants to be involved with Release Review Boards

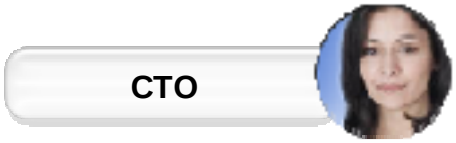


Role: QA Manager/Tester

- The QA Manager/Tester is a RQM user principally interested in Test Management and execution
- Uses the Qualification Criteria as test requirements
- Needs to be involved with requirements review
- Establishes traceability to requirements
- Test failure investigation



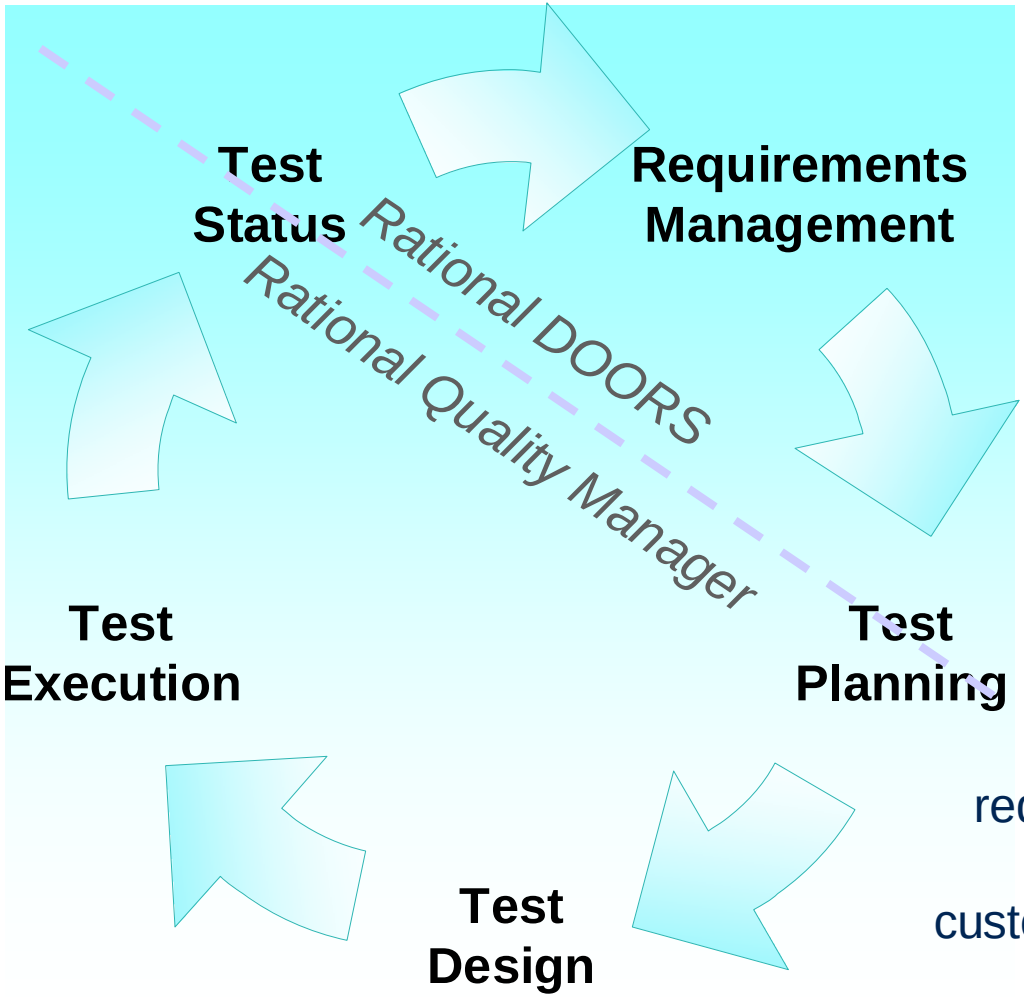
Role: CTO (Change Control Board)



- The Change Control Board (CCB)
  - Analyze impact of defects (priority, severity)
  - Have the final say regarding release decision
- Test managers
  - influence the CCB in the confidence that they have an efficient test process working against the requirements
- Development managers
  - influence the CCB based on the latest test information against their development efforts
- Analyst manager
  - influence the CCB with the full business impact of making a release based on requirements met or not.

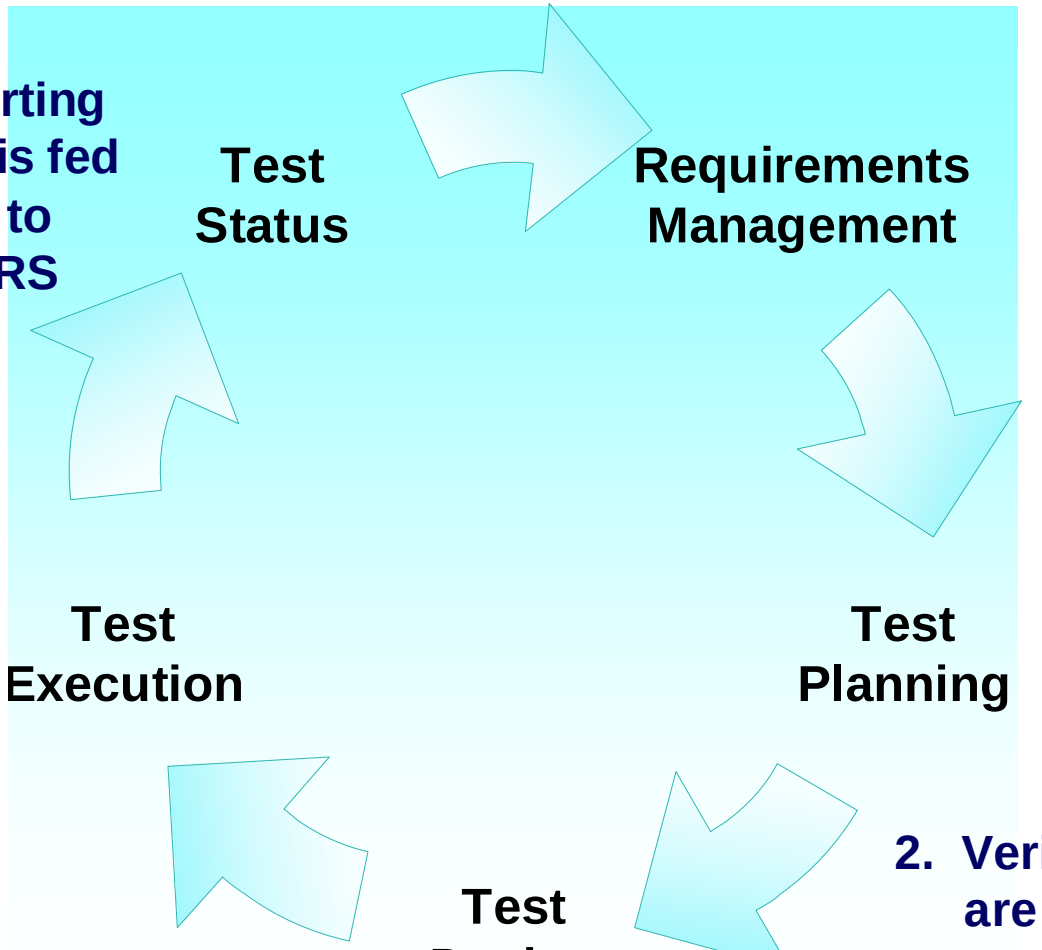
What's The Integration About?

"Quality is conformance to requirements"
Crosby



Tests based on requirements ensure deliverables meet customer expectations

How the Integration Works – High-level

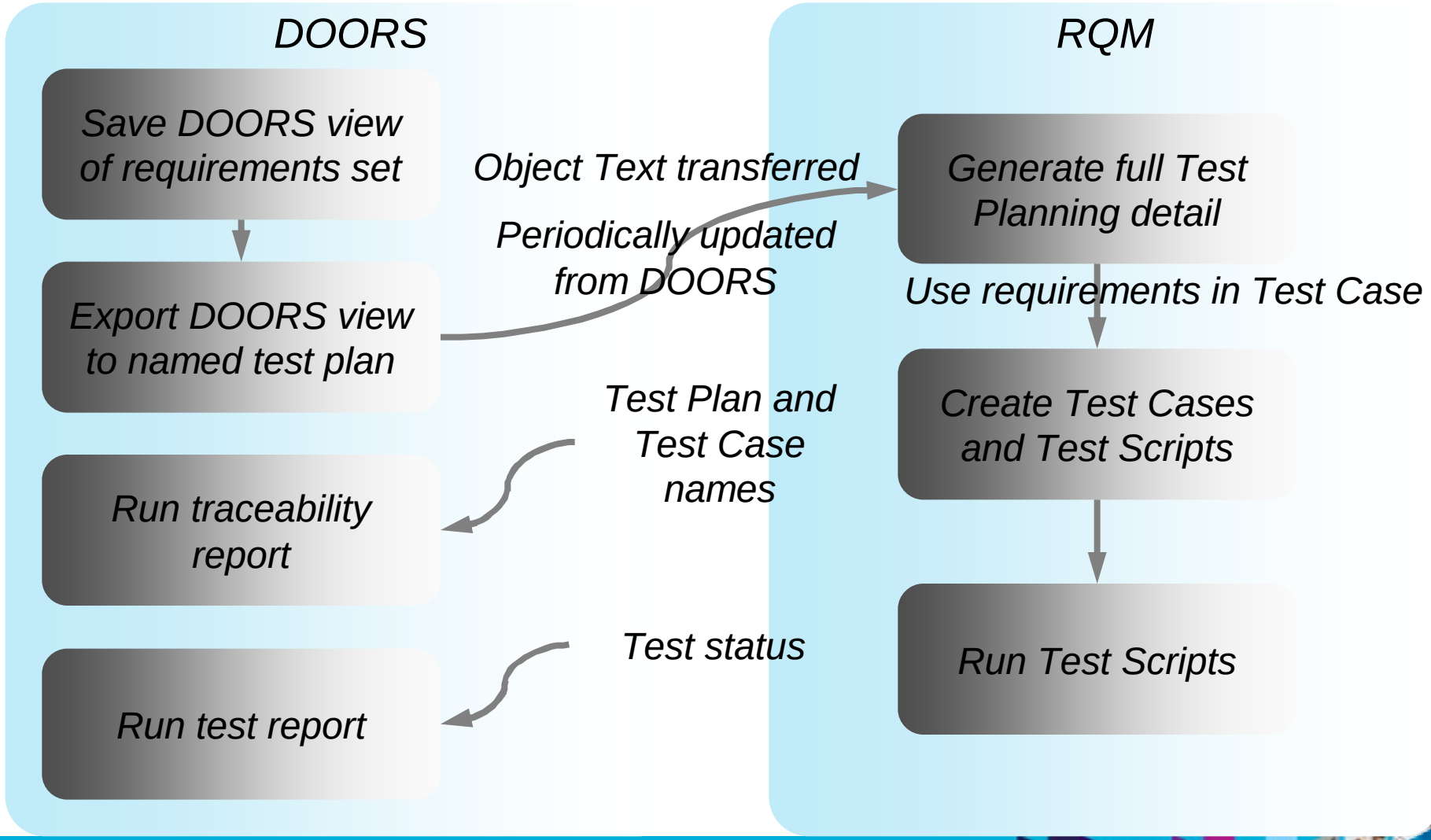


3. Reporting data is fed back to DOORS

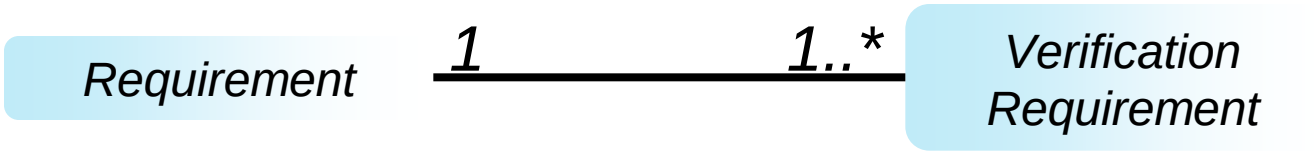
1. Requirements in DOORS are pushed to a named test plan in Rational Quality Manager

2. Verification activities are detailed in Rational Quality Manager

Basic Functionality Summary



Recommendation: Use verification requirements

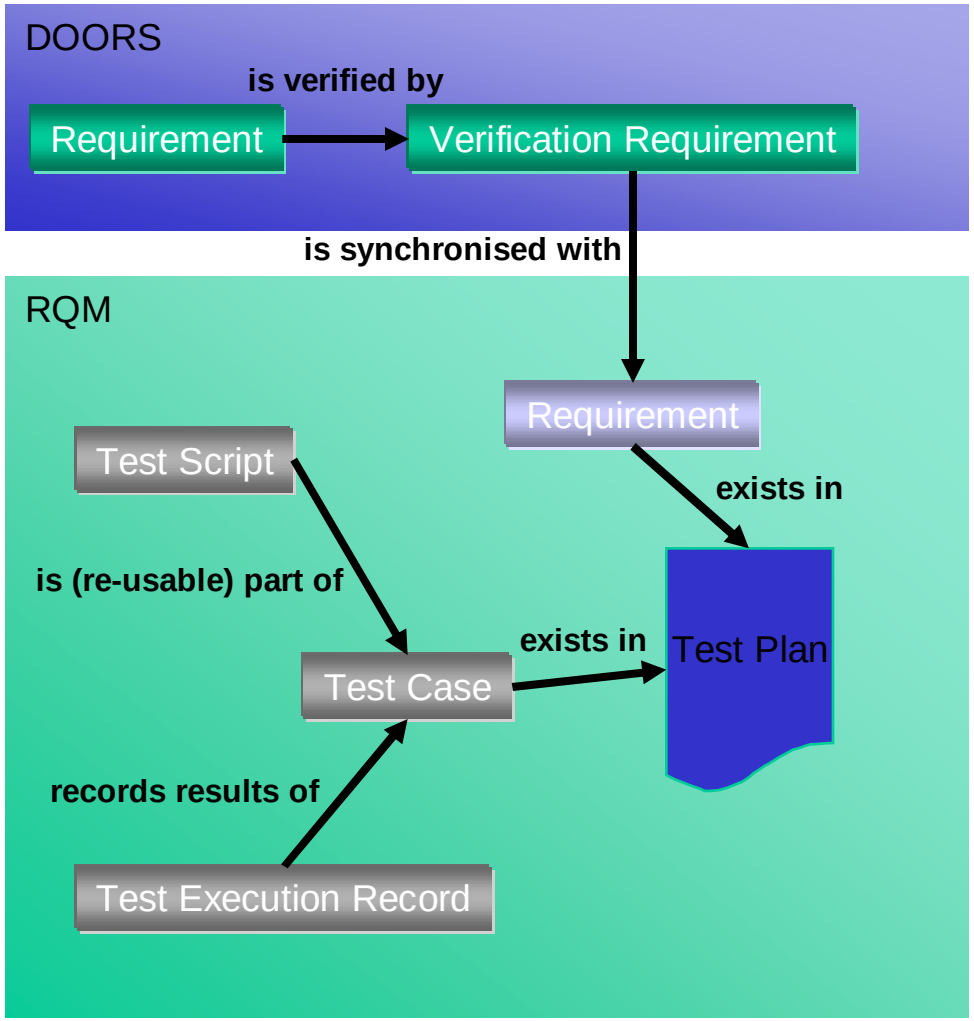


- **A verification requirement is explicit about the verification method, limits etc.**
- **Each requirement may have many verification requirements, each verification requirement only has one requirement.**
- **The verification requirements are the ones exported to RQM. This is not essential, but a 'good practice'**

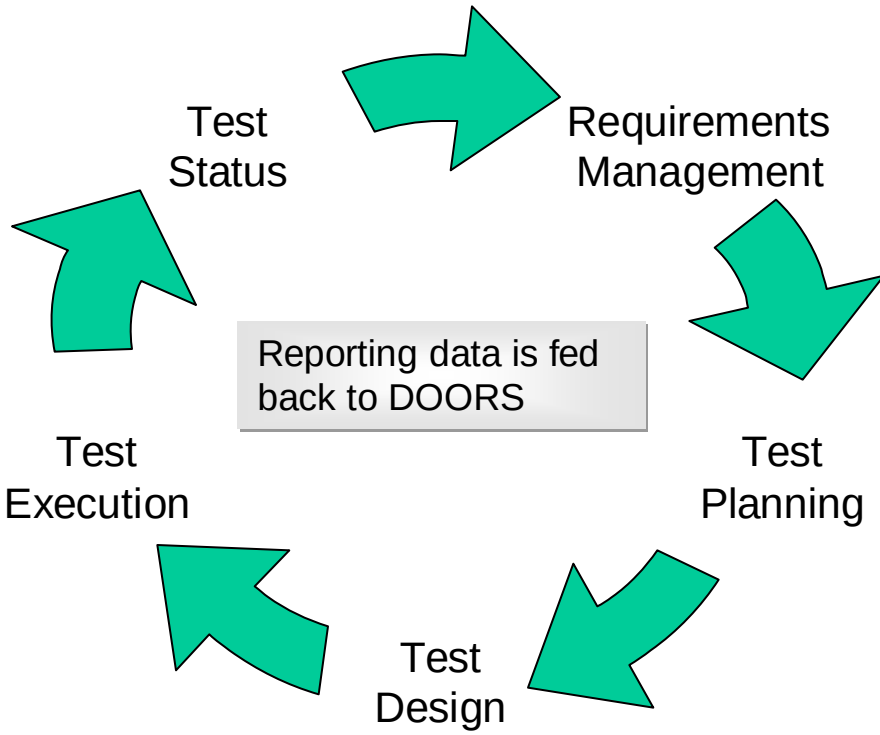
How The Integration Works: Detailed-Level

- Traceability
  - DOORS shows Test Plans and Test Cases, Test Cases have external links from DOORS
  - Quality Manager has hyperlinks back to DOORS on requirements
- Describe reporting
  - DOORS has test status visible
- Changes
  - Changes to requirements are flagged as updated in Quality Manager
  - DOORS is the master for requirements and changes made in Quality Manager will be overwritten

How The Integration Works



Requirement in DOORS is pushed to a named test plan in Rational Quality Manager

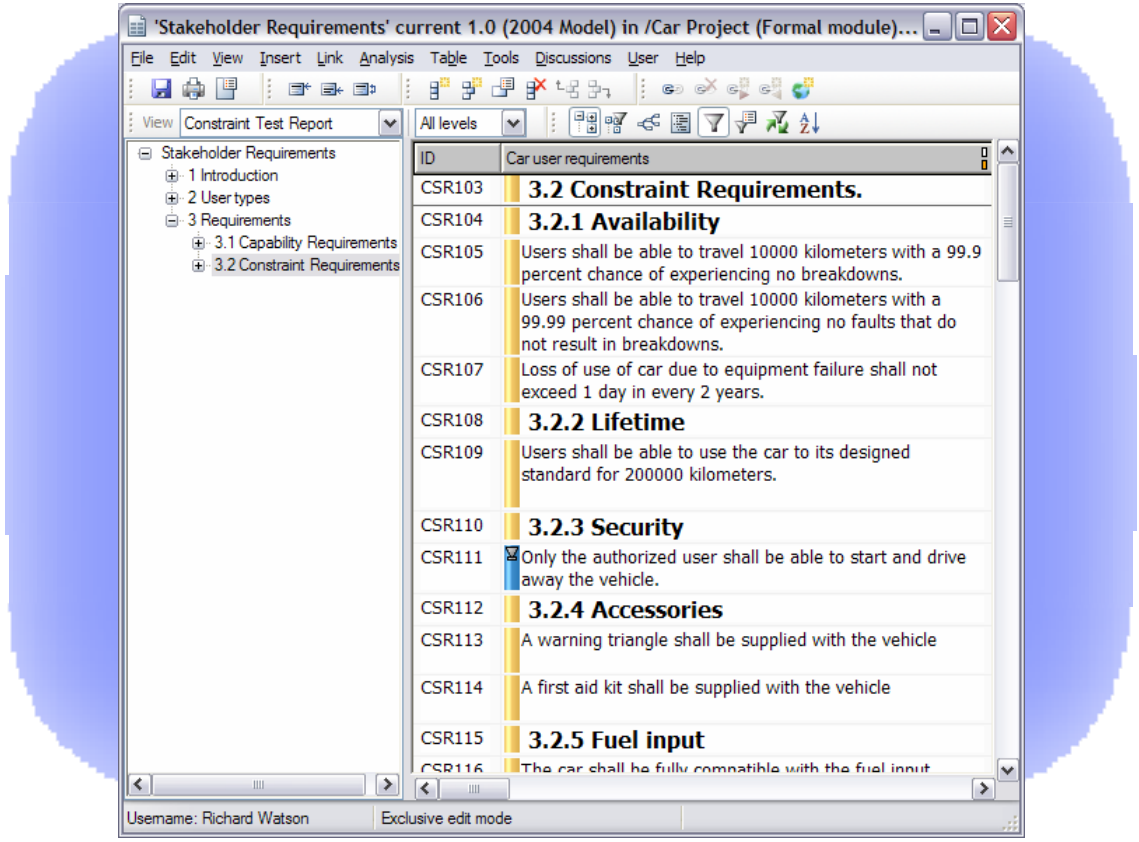


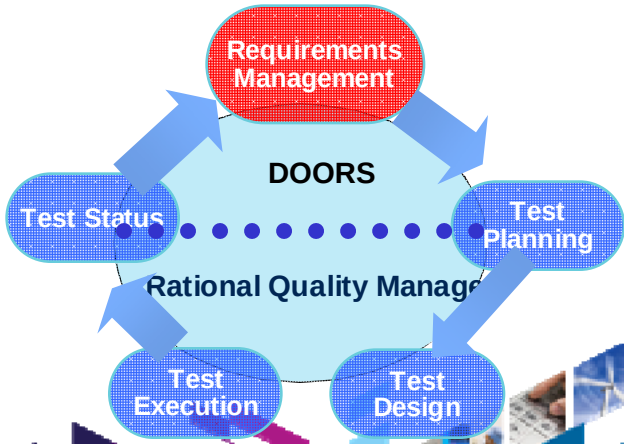
Reporting data is fed back to DOORS

Verification activities are detailed in Rational Quality Manager

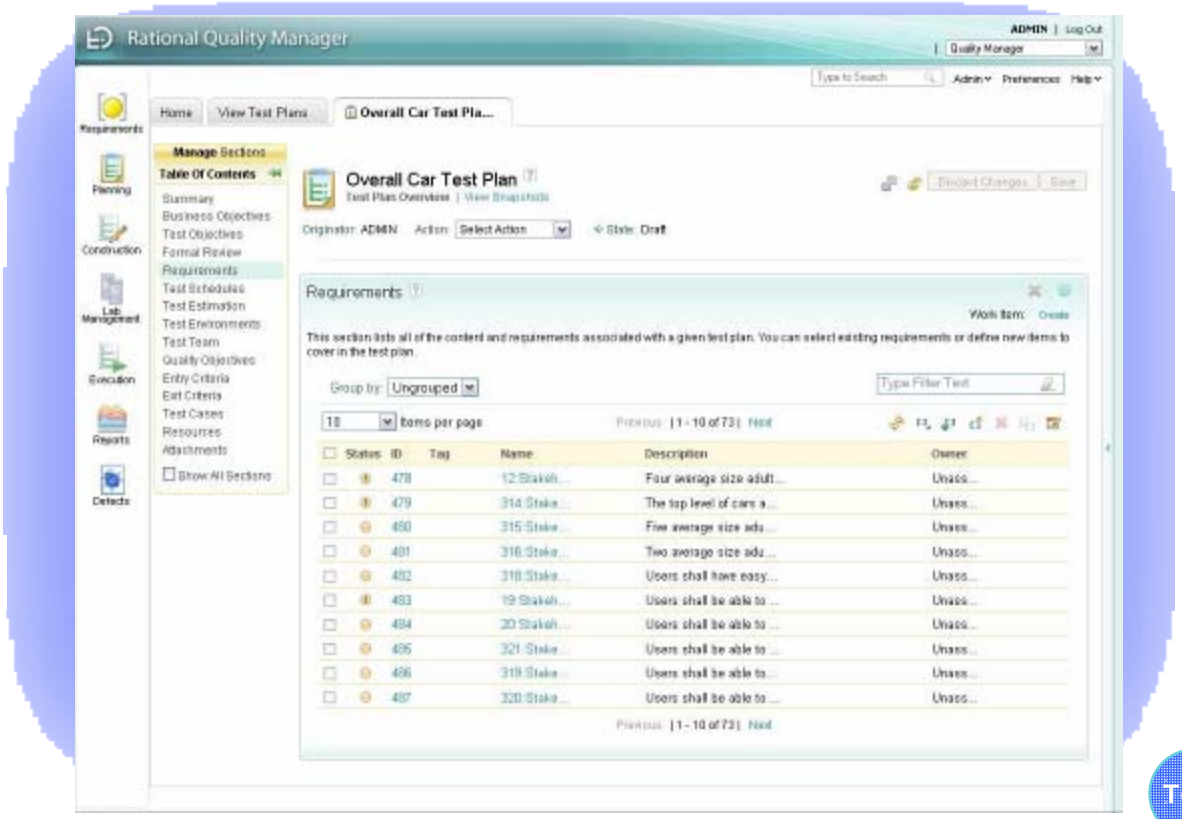
A walkthrough a Requirements-Based Testing scenario using DOORS and RQM

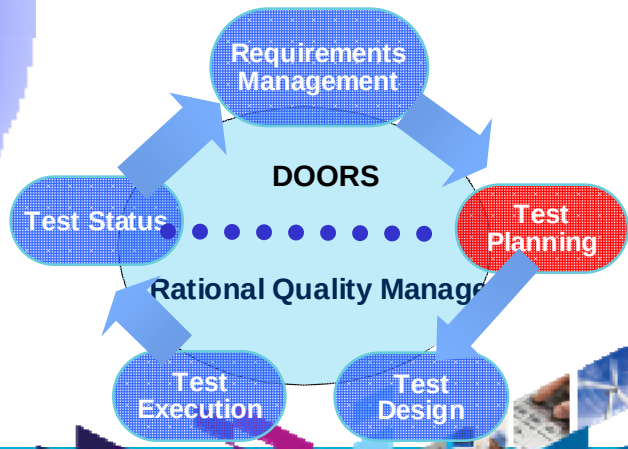
The Analyst Captures Requirements in DOORS



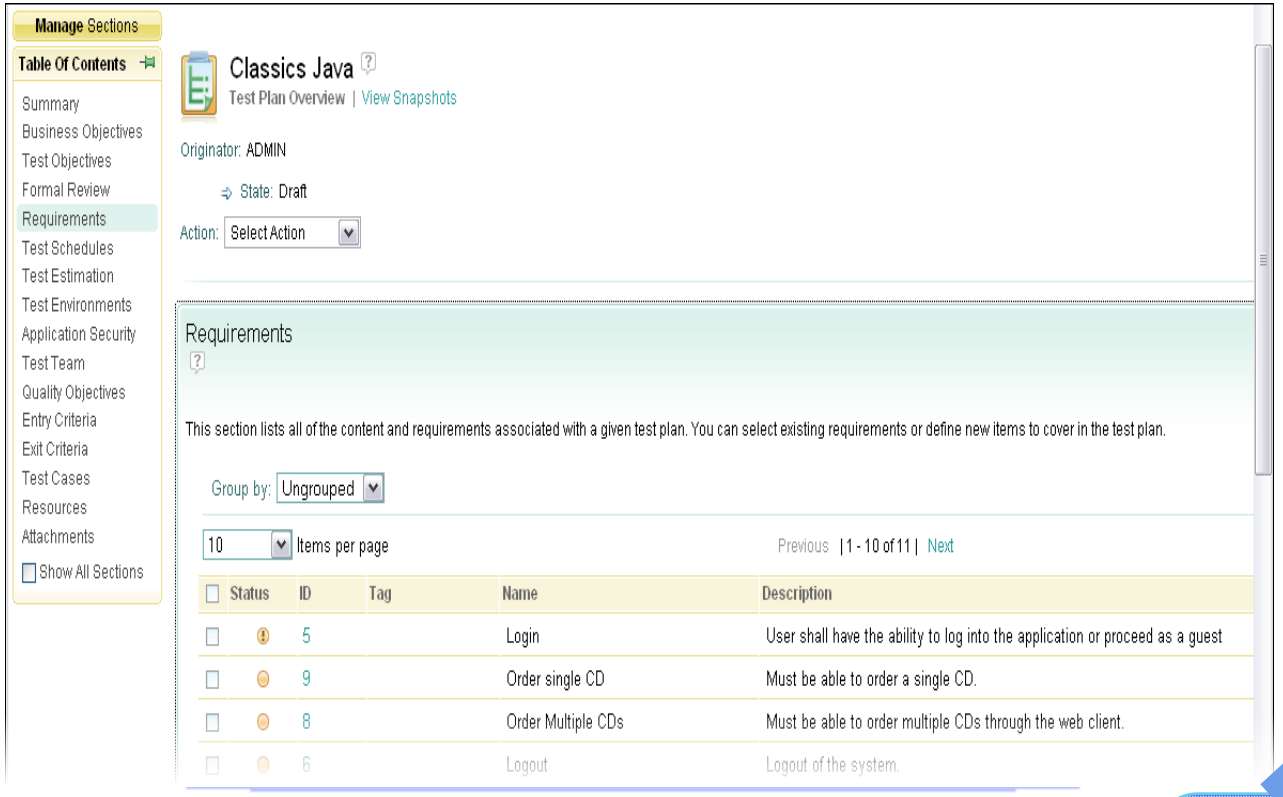


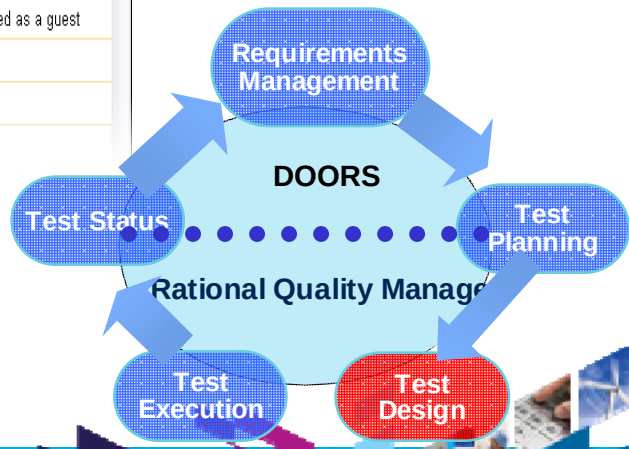
The QA Manager/Tester Sees Requirements in RQM





The QA Manager/Tester Develops Test Cases to Test the Requirements





The Analyst Checks Test Coverage in DOORS

'Stakeholder Requirements' current 1.0 (2004 Model) in /Car Project (Formal module) - DOORS

File Edit View Insert Link Analysis Table Tools Discussions User Help

View: RQM Traceability View | All levels

ID	Car user requirements	Test Plan and Test Cases
CSR103	**3.2 Constraint Requirements.**	
CSR104	**3.2.1 Availability**	
CSR105	Users shall be able to travel 10000 kilometers with a 99.9 percent chance of experiencing no breakdowns.	Quality Manager Car Constraints Test Plan 1: 10K Reliability Quality Manager Overall Car Test Plan 1: 10K Reliability
CSR106	Users shall be able to travel 10000 kilometers with a 99.99 percent chance of experiencing no faults that do not result in breakdowns.	Quality Manager Car Constraints Test Plan 1: 10K Reliability Quality Manager Overall Car Test Plan 1: 10K Reliability
CSR107	Loss of use of car due to equipment failure shall not exceed 1 day in every 2 years.	Quality Manager Car Constraints Test Plan 2: Stress Test Quality Manager Overall Car Test Plan 2: Stress Test
CSR108	**3.2.2 Lifetime**	
CSR109	Users shall be able to use the car to its designed standard for 200000 kilometers.	Quality Manager Car Constraints Test Plan 2: Stress Test 3: Security Check

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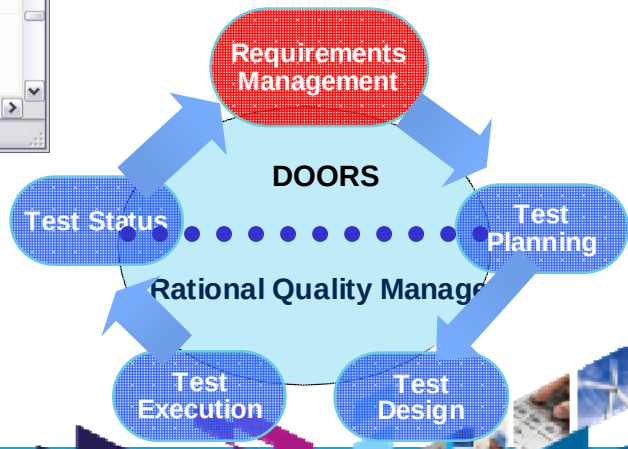
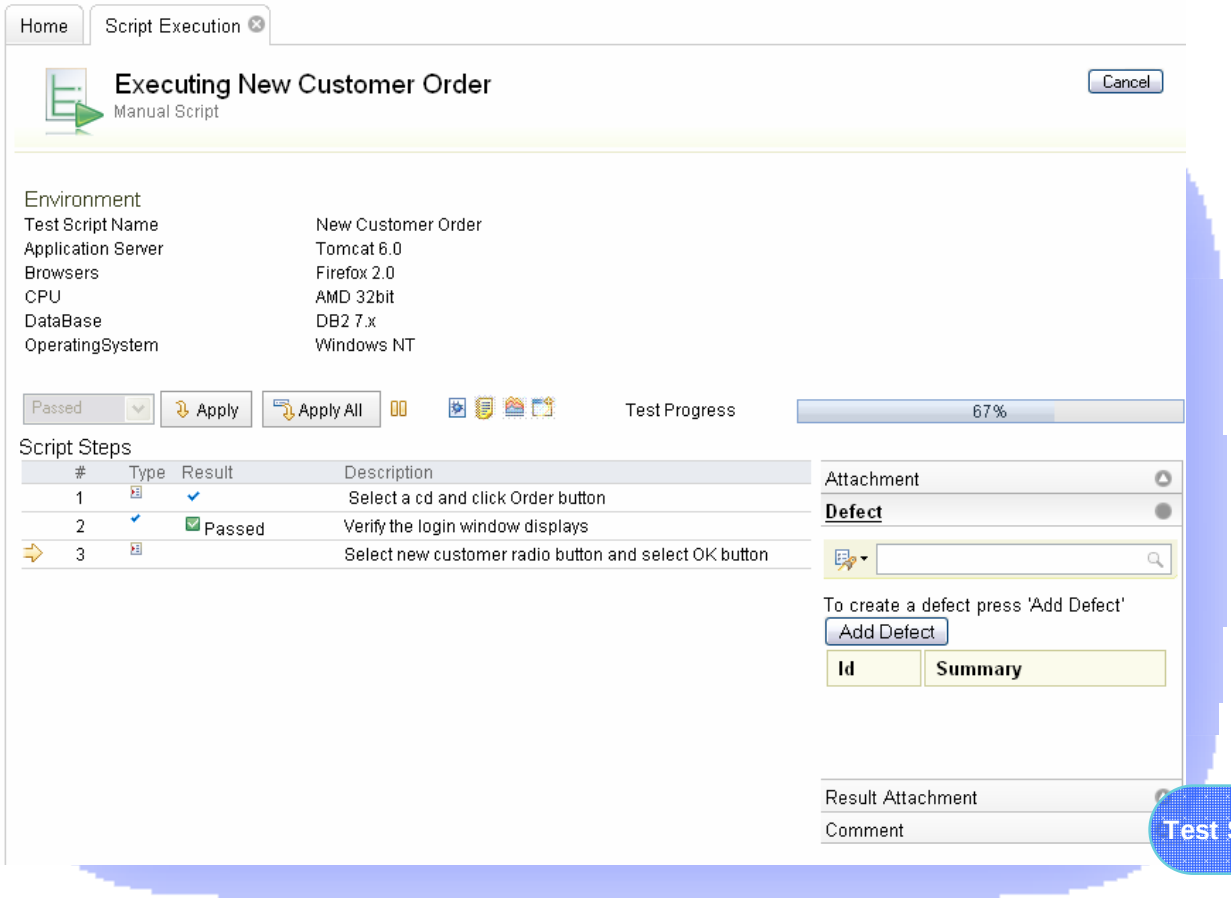
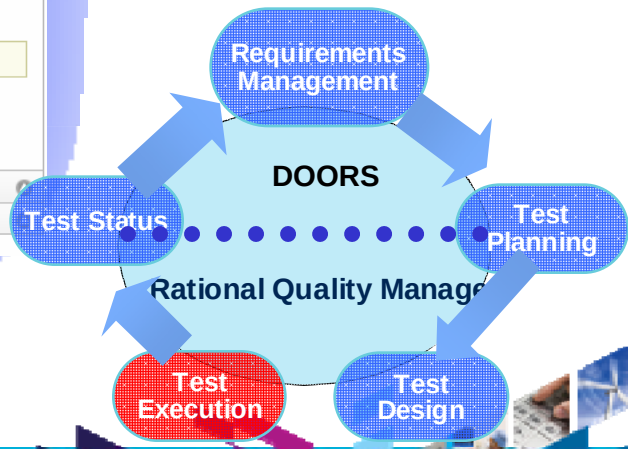


The QA Manager/Tester Executes Test Cases





The Analyst Checks QA Status in DOORS

'Stakeholder Requirements' current 1.0 (2004 Model) in /Car Project (Formal module) - DOORS

File Edit View Insert Link Analysis Table Tools Discussions User Help

View: Constraint Test Report | All levels

ID	Car user requirements	Test Cases	Test Status	Verdict
CSR103	**3.2 Constraint Requirements.**		Mixed Status	Failed
CSR104	**3.2.1 Availability**		Mixed Status	Failed
CSR105	Users shall be able to travel 10000 kilometers with a 99.9 percent chance of experiencing no breakdowns.	(1) 10K Reliability: Failed	Approved	Failed
CSR106	Users shall be able to travel 10000 kilometers with a 99.99 percent chance of experiencing no faults that do not result in breakdowns.	(1) 10K Reliability: Failed	Approved	Failed
CSR107	Loss of use of car due to equipment failure shall not exceed 1 day in every 2 years.	(2) Stress Test: Error	Not Approved	Error
CSR108	**3.2.2 Lifetime**		Not Approved	Error
CSR109	Users shall be able to use the car to its designed standard for 200000 kilometers.	(2) Stress Test: Error (3) Security Check: Passed	Not Approved	Error
CSR110	**3.2.3 Security**			
CSR111	Only the authorized user shall be able to start and drive away the vehicle.			
CSR112	**3.2.4 Accessories**		Approved	Passed
CSR113	A warning triangle shall be supplied with the vehicle	(4) Accessory Audit: Passed	Approved	Passed
CSR114	A first aid kit shall be supplied with the vehicle	(4) Accessory Audit: Passed	Approved	Passed
CSR115	**3.2.5 Fuel input**		Approved	Incomplete

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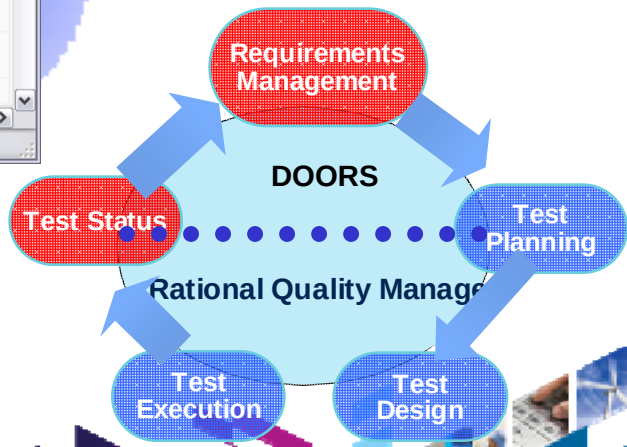


Benefits for each Role

Analyst Benefits

- Better visibility of test plan increases systems quality
  - Review construction of the audit trail to ensure that requirements have been planned to be tested
  - Monitor test status against requirements to identify business impact
- Fully role based integration within DOORS
  - Traceability columns on requirements and test
  - Reporting facilities
  - Suspect Links

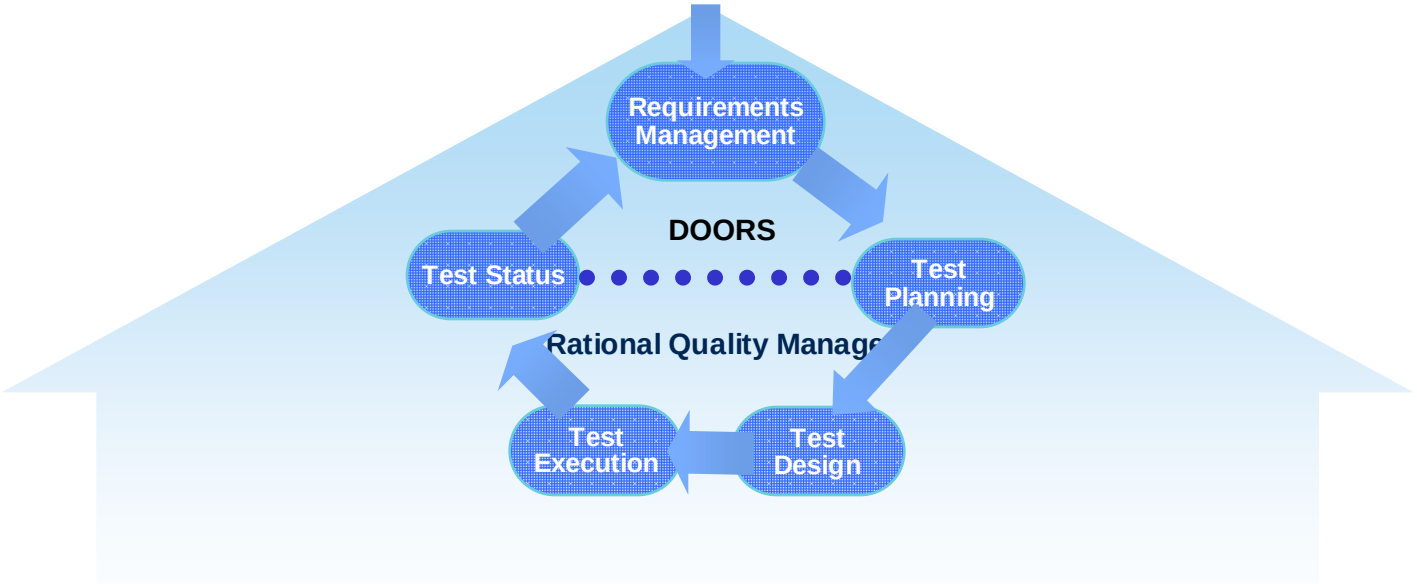
QA Manager/Tester Benefits

- Work against a defined set of requirements
  - Maximize system quality while controlling an efficient test process
  - How much testing is enough?
- Efficient test autopsy
  - is a defect in the test, implementation or requirement?
  - Traverse audit trails back to original requirements analysis
- Fully role based integration
  - Combined reports from within RQM
  - Traceability alerts so requirements changes are never lost

CTO Benefits

- Quality Assurance statistics alongside requirements ensure that:
  - Full business criticality understood and traced back to user need
  - Overall development process prioritized commercially rather than technically
- Statistics aggregated up through the requirements hierarchy
  - Fast identification of overall systems quality
  - Easier to communicate quality assurance to the end customer

Overall Benefits of an Integrated Approach with DOORS and RQM



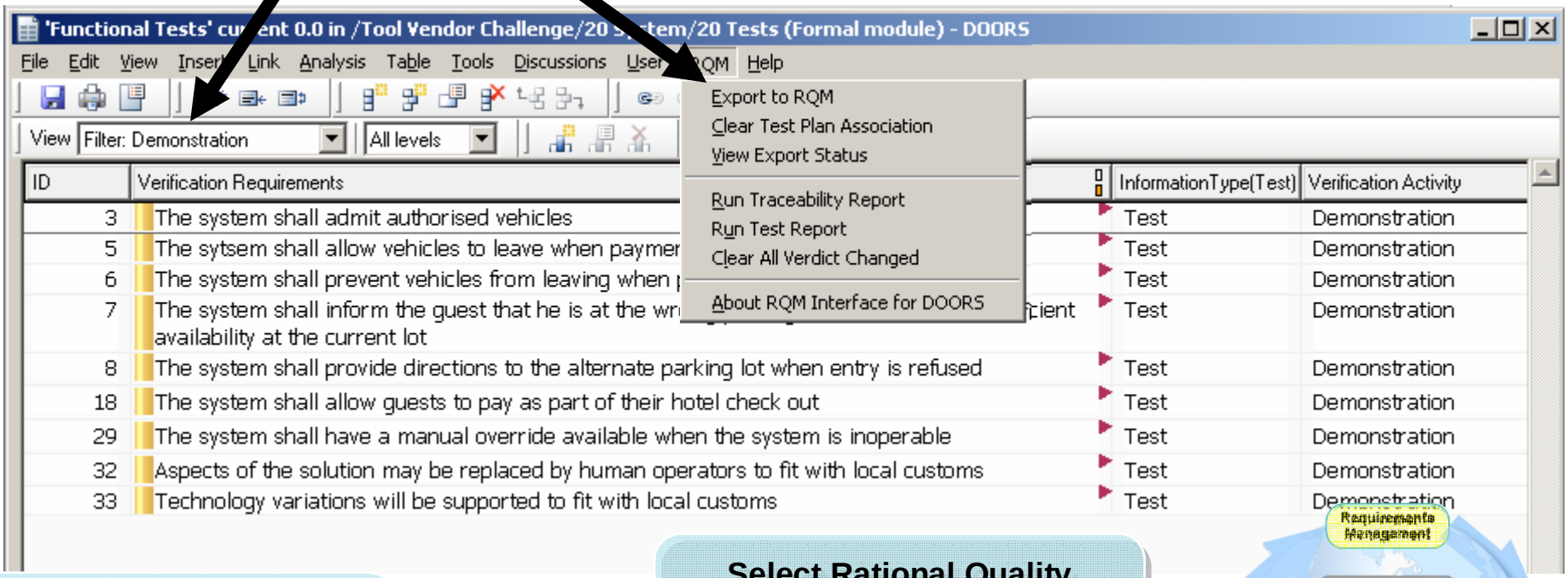
- Getting everyone on the same page with minimal learning curves
- Accessing information from other disciplines without the need to move outside of a preferred working environment
- Managing scope, plus assessing and controlling the impact of change
- Ensuring end-to-end traceability
- Ensuring conformance to contractual agreements
- Increasing systems quality
- Demonstrating compliance to regulations

Detail on Specific Activities

Requirements Management

Rational. DOORS

Export a named view



Module Name, Object Text and Object Identifier are transferred.

No OLEs, tables or additional attributes

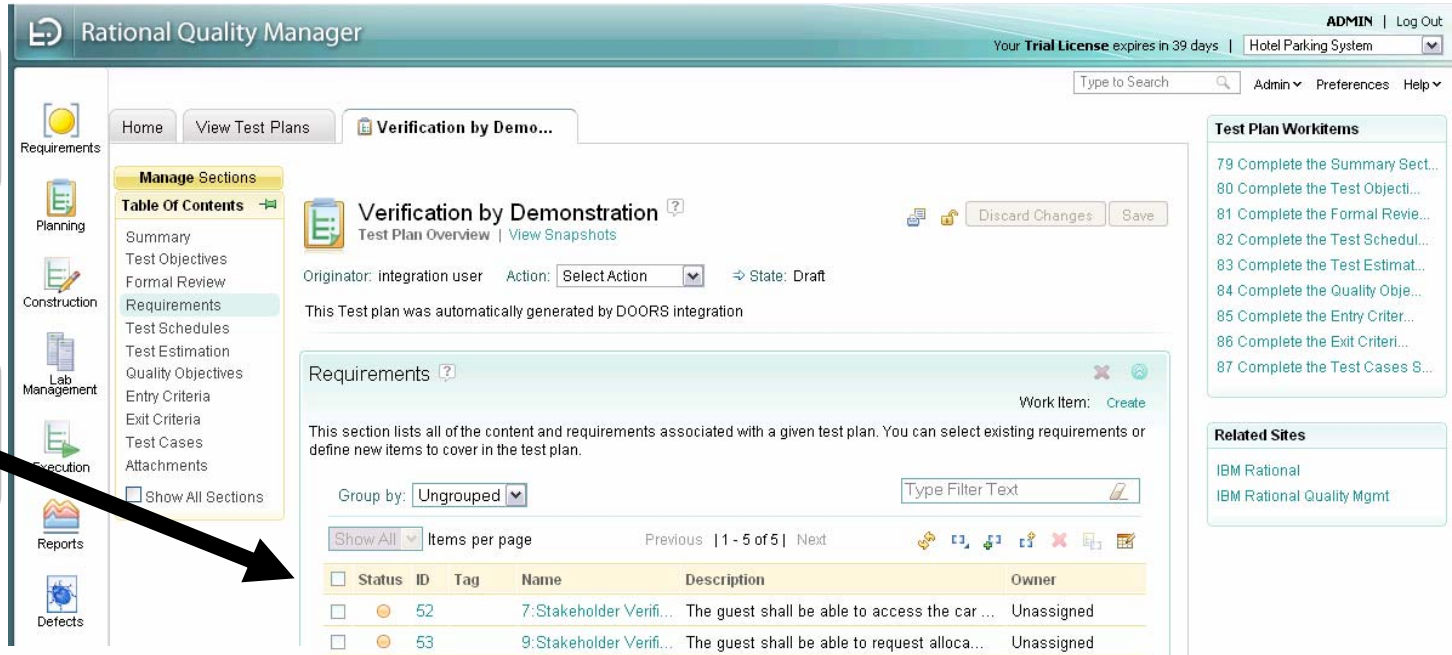
Select Rational Quality Manager Project and Test Plan during export

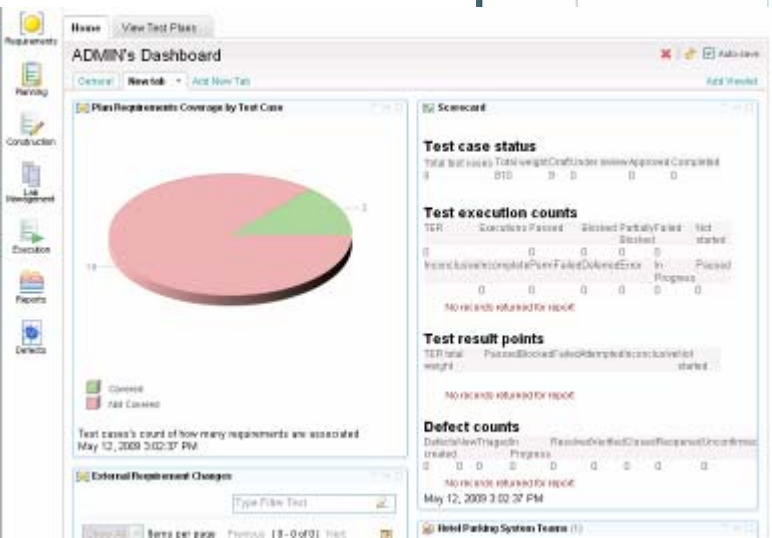
Test Planning

Rational. Quality Manager

Collaborate to create all necessary sections in test plan

Test plan includes requirements from DOORS





Report on activities and progress

Test Design

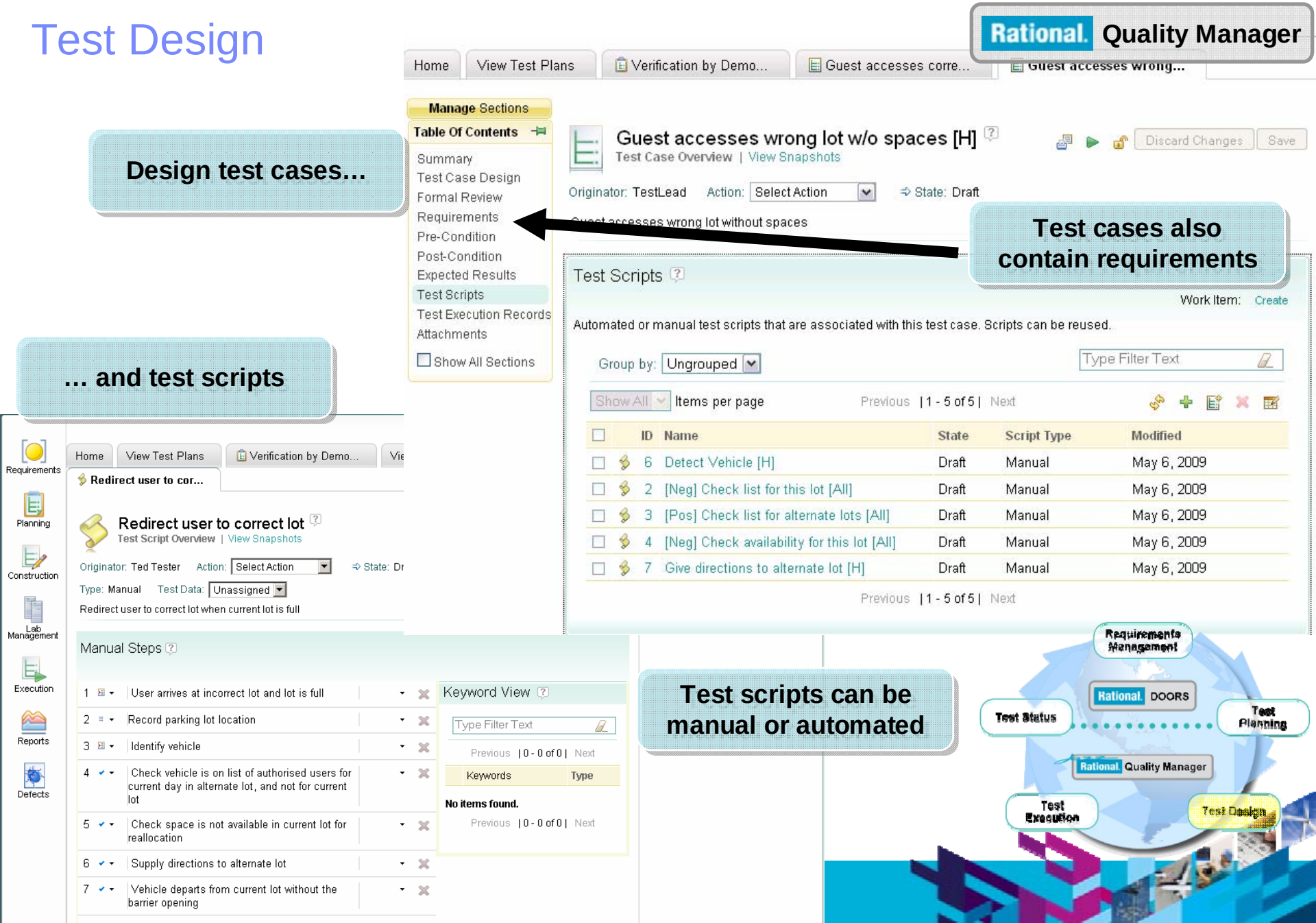
Rational. Quality Manager

Design test cases…

… and test scripts

Test cases also contain requirements

Test scripts can be manual or automated



Test Execution

Rational. Quality Manager

Execute test scripts manually from Rational Quality Manager and record results, or initiate automated tests

Home | Script Execution

Executing New Customer Order
Manual Script

Environment

Test Script Name	New Customer Order
Application Server	Tomcat 6.0
Browsers	Firefox 2.0
CPU	AMD 32bit
DataBase	DB2 7.x
OperatingSystem	Windows NT

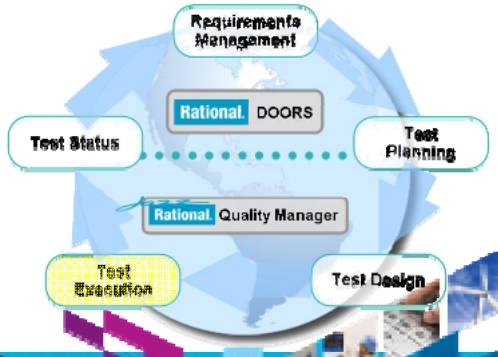
Test Execution linked to a test plan and a test environment with a Test Execution Record

Passed | Apply | Apply All | Test Progress 67%

Script Steps

#	Type	Result	Description
1			Select a cd and click Order button
2		Passed	Verify the login window displays
3			Select new customer radio button and select OK button

Attachment
Defect
To create a defect press 'Add Defect'
Add Defect
Id | Summary
Result Attachment
Comment



Test Status

Rational. DOORS

'All BRs for Claim Processing' current 0.0 in /Claims Processing (Formal module) - DOORS

ID	Business Rules with Test Steps	Test Cases	Test Status	Verdict	Passed	Failed	Deferred
CP-19	If all information is valid, Enterprice passes the claim information is passed to NetworX for processing.	(14) Verify User Enters Valid Claim Information: Failed	Not Approved	Failed		14: 1 of 1	
CP-24	**2 Fee Processing BRs**		Not Approved		1	0	0
CP-25	If claim processing is successful, a fee is calculated.						
CP-29	**3 FNX BRs**		Not Approved		1	0	0
CP-30	The FNX system attempts claim	(16) Verify NetworX passes claim to Fee Processing:	Not Appro				
		claim to Fee Processing:	Not Appro				
			Not Appro				
		claim to Fee Processing:	Not Approved				
		claim to Fee Processing:	Not Approved				

View pass/fail status in DOORS

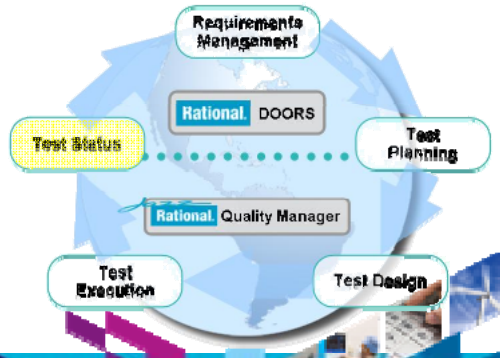
'Stakeholder Verification Requirements' current 0.0 in /Tool Vendor Challenge/10 Stakeholder/20 Tests (Formal module) - DOORS

File Edit View Insert Link Analysis Table Tools Discussions User RQM Help

ID	Rename this module for project specific use	Test Plan and Test Cases
StkVR-1	The hotel chain shall be able to realise maximum return on investment in car parking spaces	Hotel Parking System Verification by Analysis
StkVR-2	The hotel chain shall be able to position itself as a helpful service provider	Hotel Parking System Verification by Analysis
StkVR-3	The hotel shall be able to select a number of spaces as 'reserved' for unexpected guests	Hotel Parking System Verification by Test
StkVR-4	The hotel shall be able to vary the number of reserved spaces for each day	Hotel Parking System Verification by Test
StkVR-5	The hotel shall be able to ensure that payment for parking spaces is received	Hotel Parking System Verification by Test
StkVR-6	The guest shall be able to request a parking space when booking a room.	Hotel Parking System Verification by Test
StkVR-7	The guest shall be able to access the car park on arrival at the hotel	Hotel Parking System Verification by Demonstration 5: Guest accesses correct lot [H] 6: Guest accesses correct lot [M] 7: Guest accesses correct lot [L]
StkVR-8		Hotel Parking System Verification by Analysis
StkVR-21		Hotel Parking System Verification by Test
StkVR-9	car park by attempting entry	Hotel Parking System Verification by Demonstration 8: Guest accesses wrong lot w. spaces [H] 9: Guest accesses wrong lot w. spaces [M]
StkVR-10	The guest shall be able to leave the car park with no hinderance for identity checking	Hotel
StkVR-11	The guest shall be able to pay for parking at hotel check-out	Hotel
StkVR-12	The guest shall be able to pay for parking separately from hotel check out	Hotel
StkVR-13	The guest shall be given clear directions to the correct parking lot where space is unavailable for reallocation at the requested lot	Hotel 13: Guest accesses wrong lot w/o spaces [L]
StkVR-14	The visitor shall be able to pre-book a parking space 24 hours in advance	Hotel Parking System Verification by Test

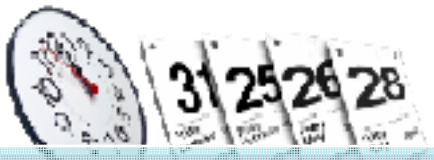
DOORS external links to test cases

View test plan and test cases associated with a requirement



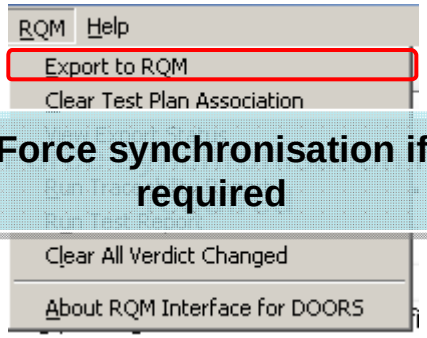
Updates

Update requirement in DOORS



Synchronisation runs automatically

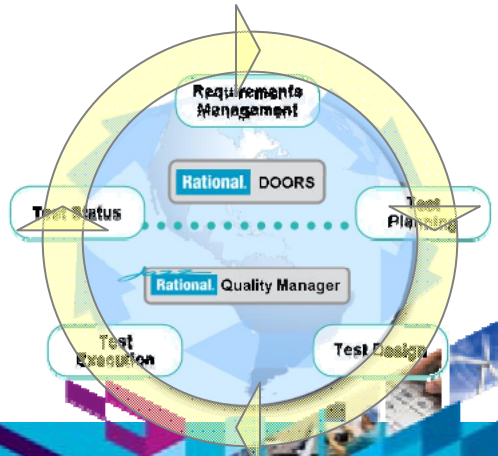
OR



Force synchronisation if required

RQM sees 'Updated' Requirement

Requirement changes accepted into RQM when needed



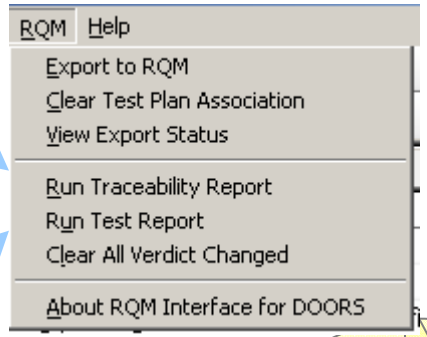
Progress

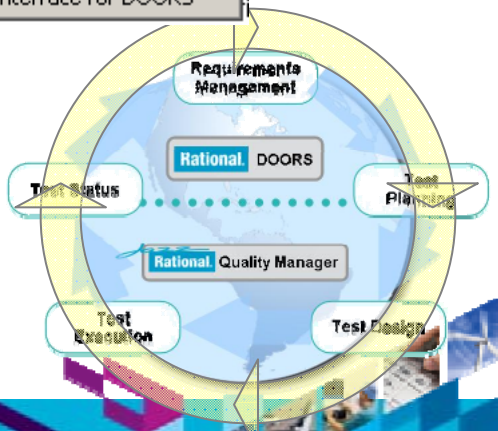
Create test cases in Rational Quality Manager for requirements

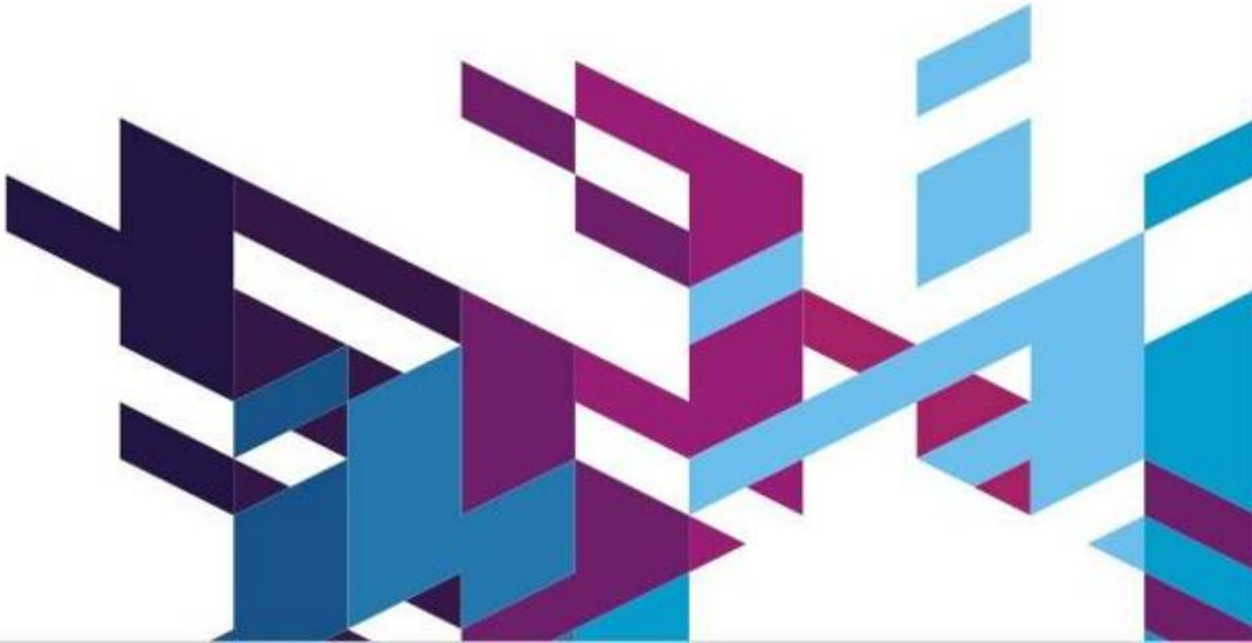
Run traceability report in DOORS to see test plan and test case coverage

Execute tests in Rational Quality Manager

Run test report in DOORS to see updated results





Innovate2010
The Rational Software Conference

THANK YOU