

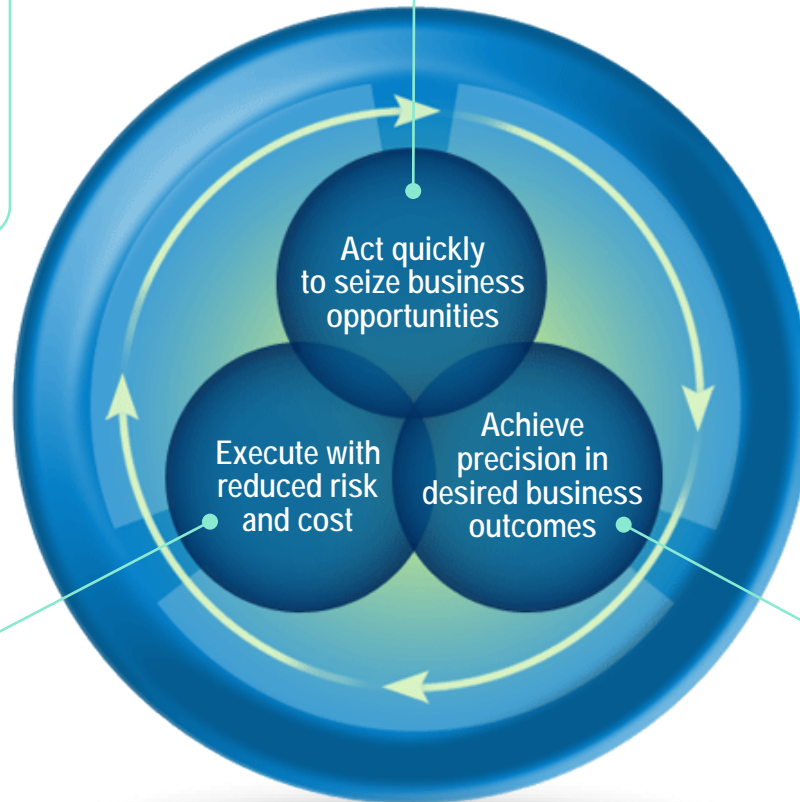
Integrated Requirements Management and Quality Management

John MacLeod
Consulting IT Specialist, IBM Rational Solutions
john.macleod@au1.ibm.com



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



Execute with reduced risk and cost

Analyst



Act quickly to seize business opportunities

Achieve precision in desired business outcomes

Tester



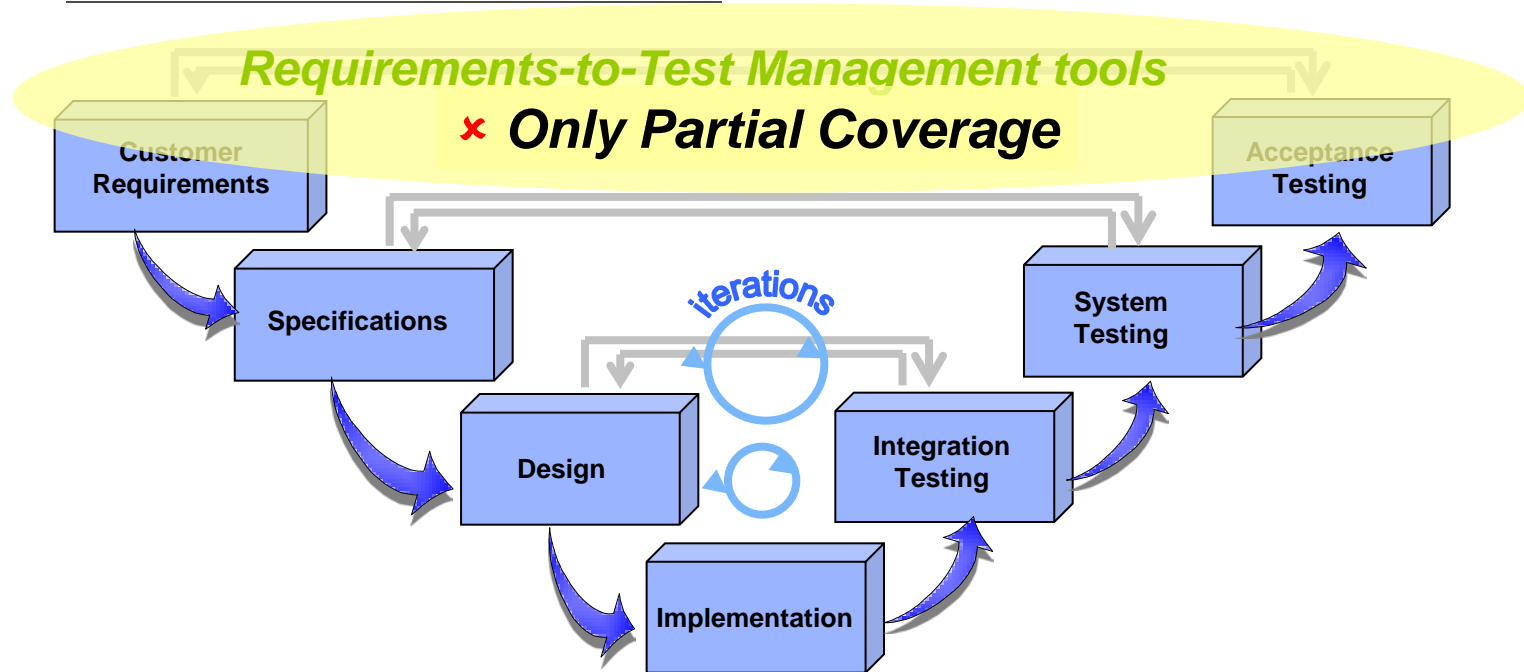
It's hard to accurately capture requirements & make sure they are implemented & tested

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

**The Solution:
Requirements Engineering and Quality Management**

Other Tools Offer Partial Coverage To Pain Points

- Approach focused on needs of test audience



Capability Gaps

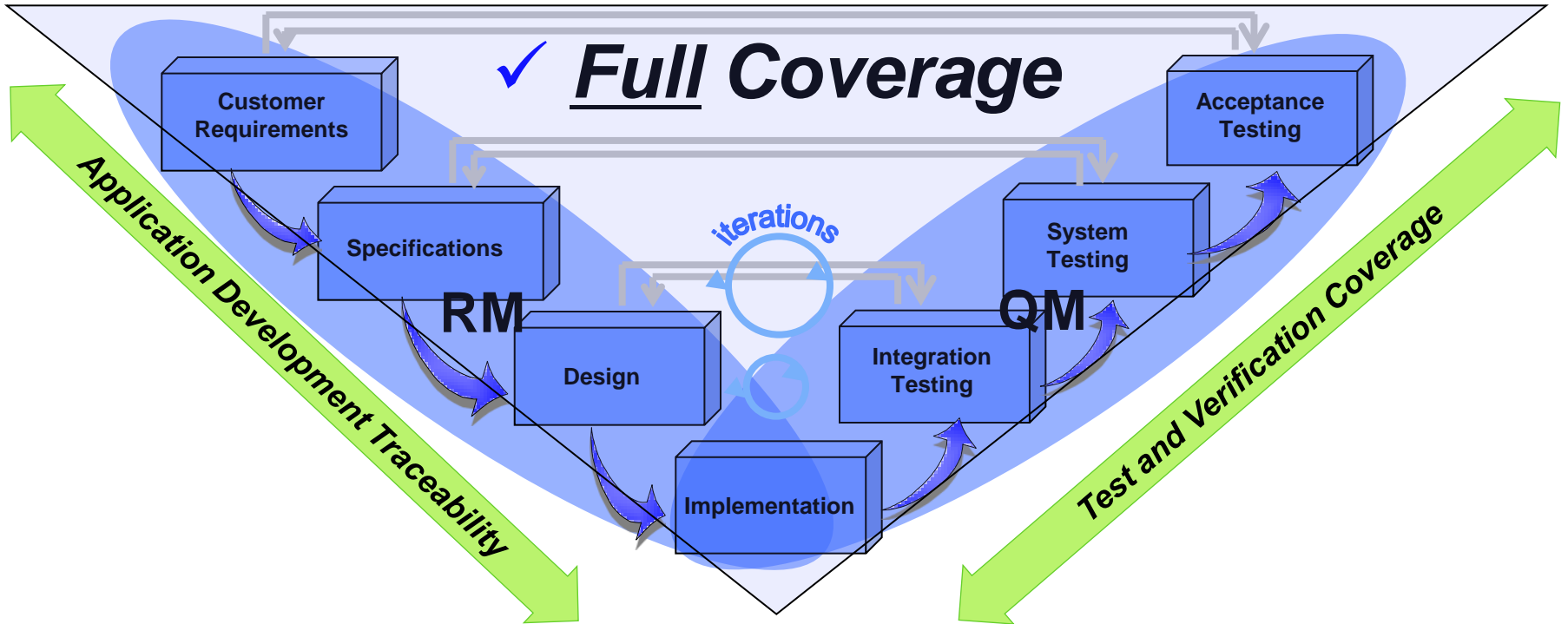
- Only support linkage of test to a single level of requirements
- Incomplete life cycle coverage (no design/build)

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)

IBM 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

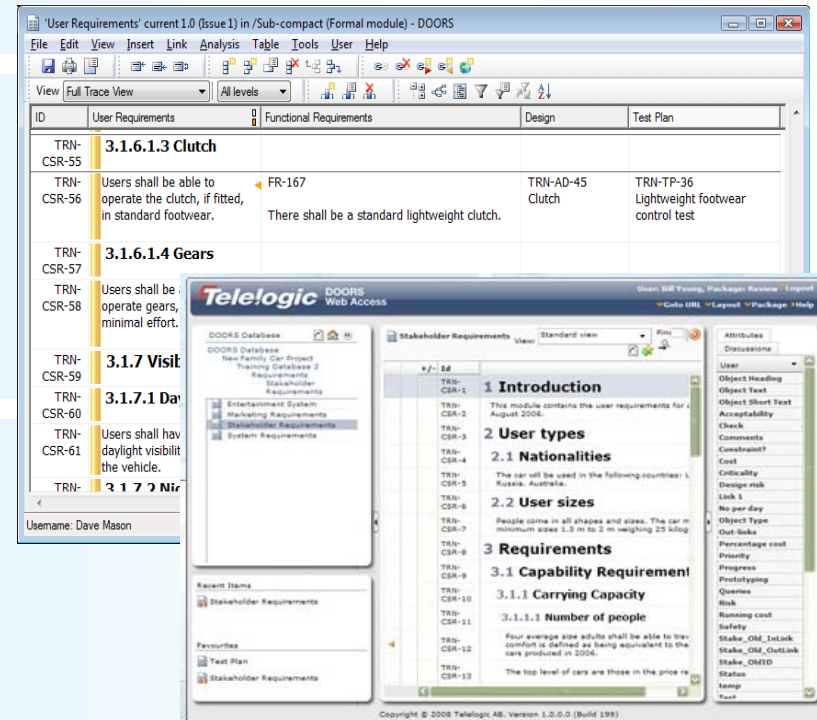
Highest compliance and audit capabilities

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



Yphise certifies Telelogic DOORS
as the best ranked software product in comparison with the competition for Agile Requirements-Driven Development (ARDD)

Yphise certifies that the product has the strengths that represent a valuable investment according to expected benefits by large companies, based on ISO 9001:2000-certified assessment.



The screenshot shows the IBM Rational DOORS application. The top window displays a table of requirements with columns for ID, User Requirements, Functional Requirements, Design, and Test Plan. The bottom window shows a detailed view of a requirement, including its introduction, user types, and specific requirements like 'Carrying Capacity' and 'Number of people'.

ID	User Requirements	Functional Requirements	Design	Test Plan
TRN-CSR-55	3.1.6.1.3 Clutch			
TRN-CSR-56	Users shall be able to operate the clutch, if fitted, in standard footwear.	FR-167 There shall be a standard lightweight clutch.	TRN-AD-45 Clutch	TRN-TP-36 Lightweight footwear control test
TRN-CSR-57	3.1.6.1.4 Gears			
TRN-CSR-58	Users shall be able to operate gears, minimal effort.			
TRN-CSR-59	3.1.7 Visit			
TRN-CSR-60	3.1.7.1 Day			
TRN-CSR-61	Users shall have daylight visibility the vehicle.			
TRN-CSR-62	3.1.7.2 Night			

Rational Quality Manager

Central hub for business-driven software quality delivery

Mitigate business risk with collaboration

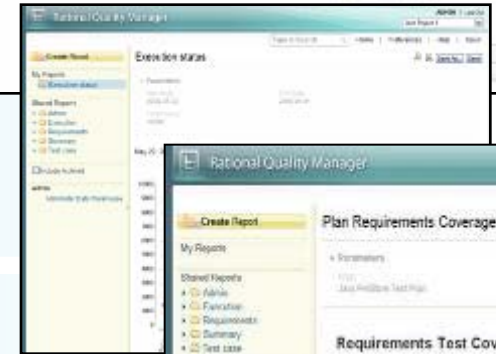
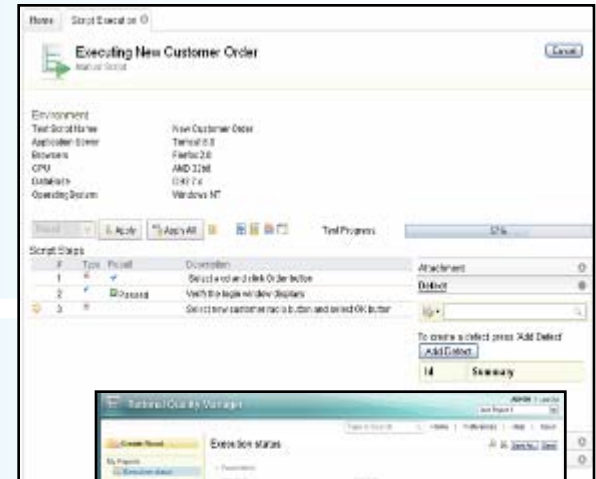
- ✓ Team coordination of test planning
- ✓ Enforceable process workflow
- ✓ Upstream and downstream quality

Improve operational efficiency with automation

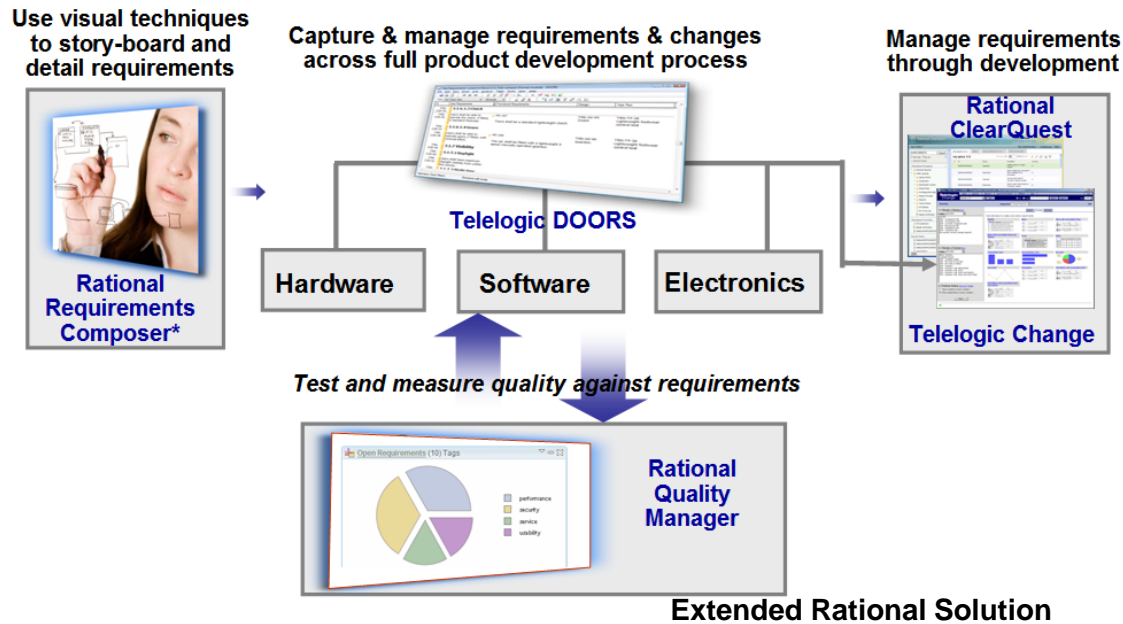
- ✓ Lab efficiency and asset utilization
- ✓ Test coverage optimization
- ✓ Environment and lifecycle coverage

Make confident decisions with effortless reporting

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



The Extended Rational Solution



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

- 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

Process-led Automation yields real savings

Examples of automation capabilities

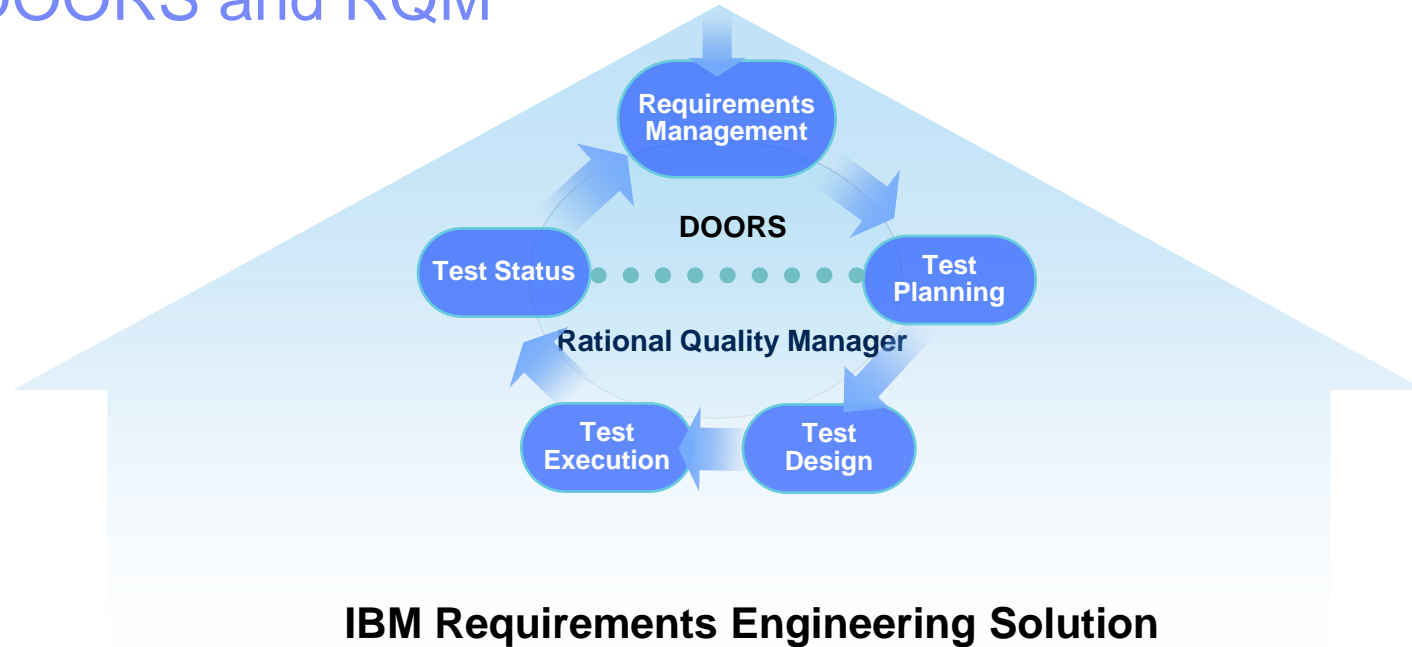
	Developing repeatable industry test solutions			Advanced Defect Analysis	Developing repeated test process models applicable to future projects		Integrating end to end processes	
Asset	Test cases copied	Manual scripts copied	Manual scripts Reuse	Prevent and Block duplicate Defects	Baseline & migrate documentation	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

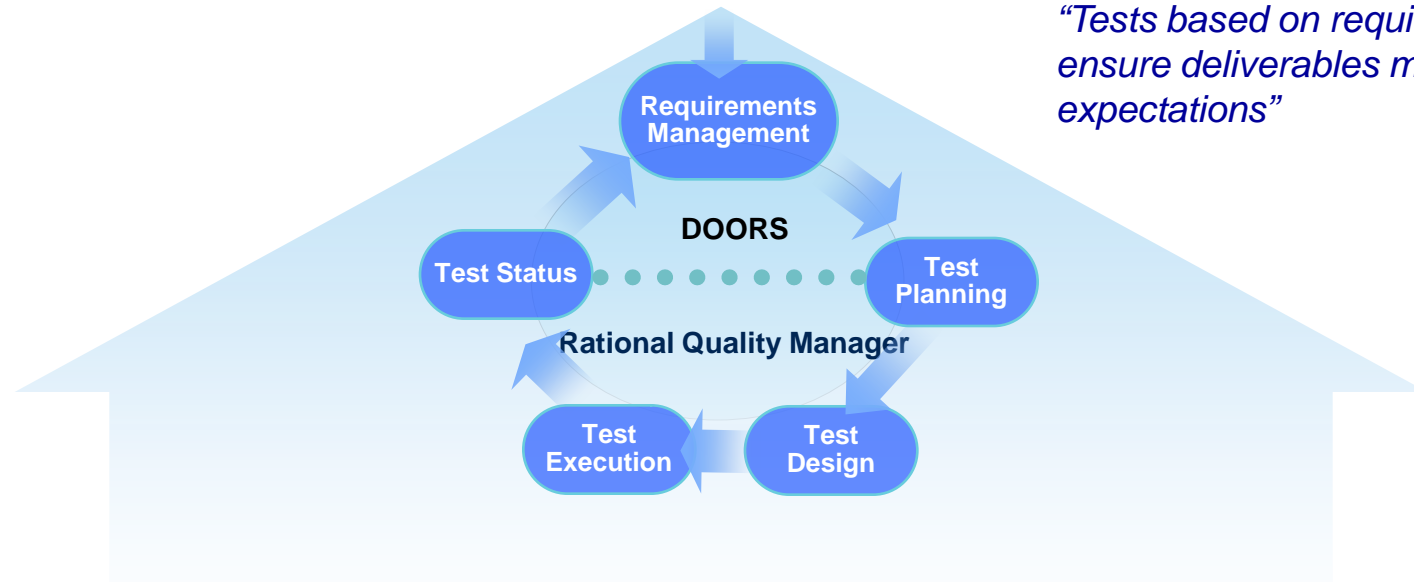
Estimated hours saved per project: 4700 hours

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

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.
- "How will you know the requirement has been met?"
- Improves understanding of the requirement

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

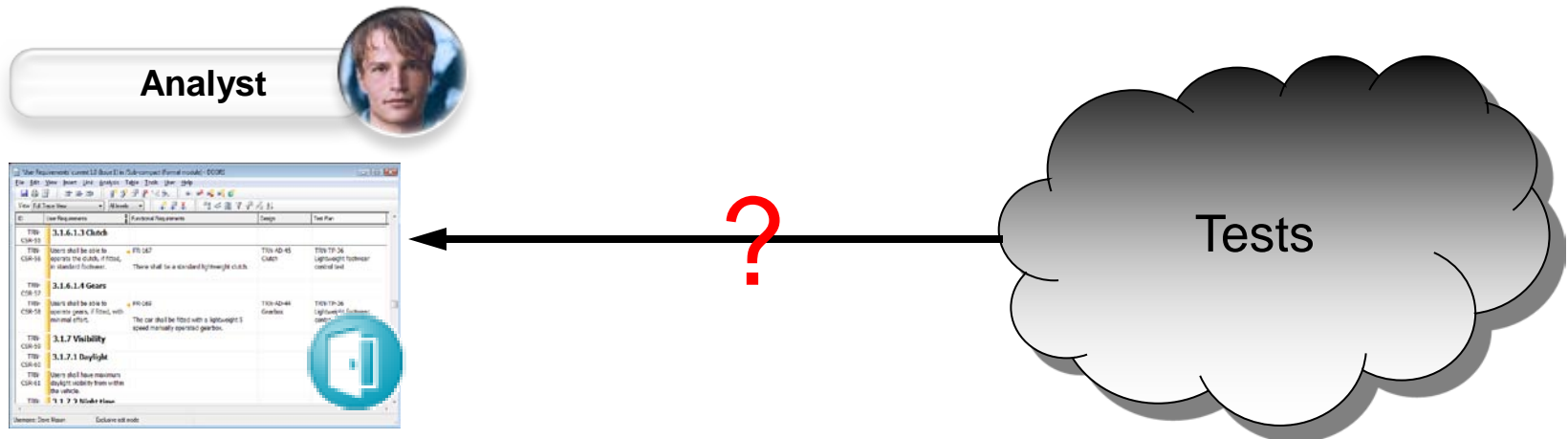
- Set targets
- Measure the progress of testing in terms of satisfied/unsatisfied requirements

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

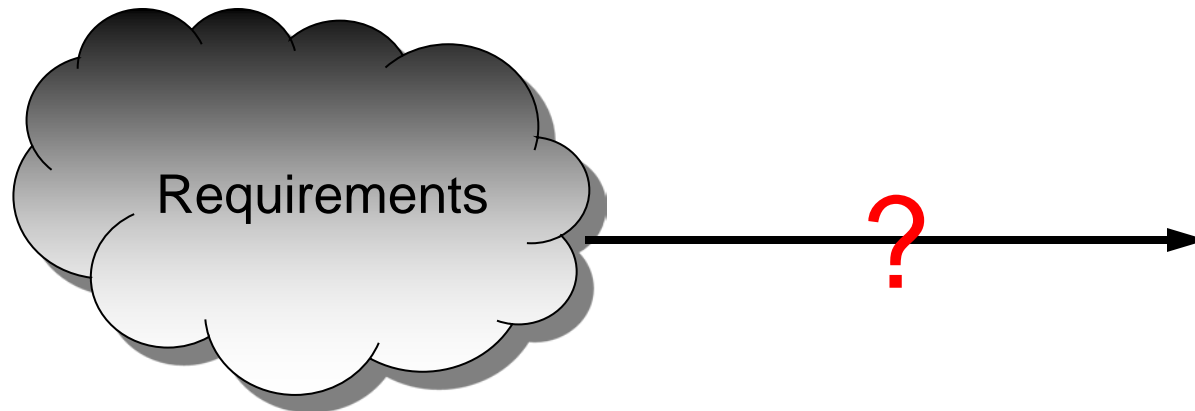
Role: Analyst

- 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.

Requirements - Test Integration

- Test against requirements rather than what is built
- See Requirements data inside requirements tab in Testing tool
- Integration with Rational Quality Manager & HP Quality Centre



ADMIN's Dashboard

Welcome

Welcome to IBM Rational Quality Manager

IBM Rational Quality Manager is a collaborative, web-based, quality management solution that offers comprehensive test planning and project management for the full software lifecycle.

Announcements

Join us on the [Rational Quality Manager blog](#) where you can have your questions answered and share your thoughts about Rational Quality Manager.

Getting started

Take a few minutes to become familiar with some of the key product features.

- [Product overview](#)
- [Planning the test effort](#)
- [Developing test scripts](#)
- [Running your tests](#)
- [Managing lab machines](#)
- [Working with lab requests](#)
- [Evaluating tests results](#)

Tutorials

My Tasks

Table with columns: ID, Summary, Artifact, State

Live Execution Status

Java PetStore Test Plan

Test Plan

TER Count

State

- Blocked
- Failed
- Not Run
- Passed

September 15, 2008 9:59:38 AM

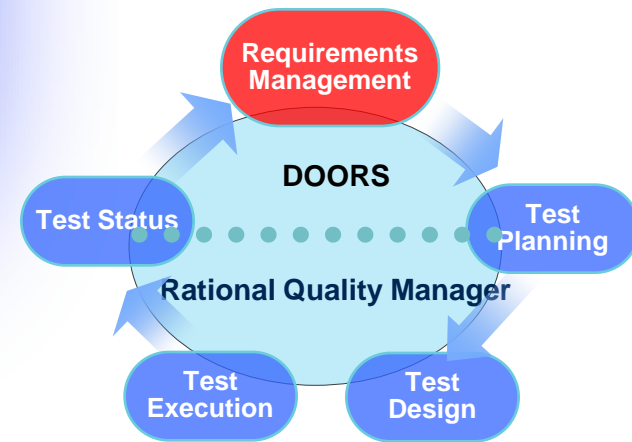
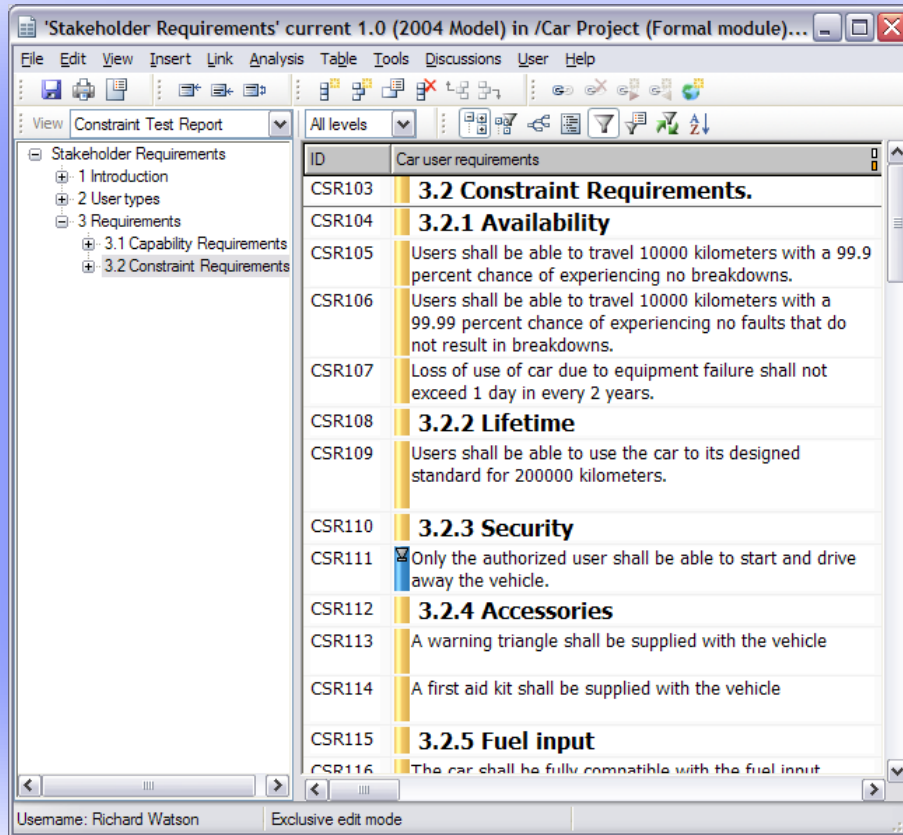
Execution Trend Report

Line chart showing TER Count over time with data points: 246, 357, 448, 509, 543, 561, 571, 575, 576

ID	Requirement
1	1 General Requirements
2	Users shall be able to interact with the ticket machine to purchase travel tickets
4	The ticket machine shall accept coin payments
5	The ticket machine shall accept note payments
6	The ticket machine shall accept credit card payment for amounts over 15
7	The user shall be able to purchase a ticket within 30 seconds
8	Change shall be given where appropriate
9	The ticket machine shall include a mechanism for printing tickets
30	The ticket machine shall be remotely configurable via a network connection
32	The ticket machine shall be configurable for different currencies
33	Ticket prices shall be configurable
34	Maintenance information shall be transmitted via a network connection
10	2 Rail Tickets
41	The ticket machine shall dispense rail tickets
11	The machine shall dispense single and return tickets
12	The machine shall allow the user to select the ticket zone
13	The machine shall display the price for the required zone
14	The machine shall allow the selection of adult or child ticket types
15	The machine shall allow the selection of first or second class ticket types
16	3 Bus Tickets
42	The ticket machine shall dispense bus tickets
17	The machine shall dispense single and zone-based tickets
18	The machine shall allow the user to select the ticket zone

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

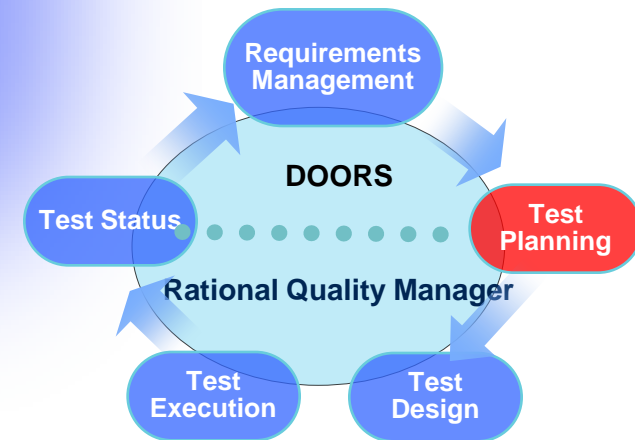
The Analyst Captures Requirements in DOORS



The QA Manager/Tester Sees Requirements in RQM

The screenshot shows the Rational Quality Manager (RQM) interface. The main window displays the 'Overall Car Test Plan' with a 'Requirements' section. The requirements are listed in a table with columns for Status, ID, Tag, Name, Description, and Owner.

Status	ID	Tag	Name	Description	Owner
<input type="checkbox"/>	478	12:Stakeh...	12:Stakeh...	Four average size adult...	Unass...
<input type="checkbox"/>	479	314:Stake...	314:Stake...	The top level of cars a...	Unass...
<input type="checkbox"/>	480	315:Stake...	315:Stake...	Five average size adu...	Unass...
<input type="checkbox"/>	481	316:Stake...	316:Stake...	Two average size adu...	Unass...
<input type="checkbox"/>	482	318:Stake...	318:Stake...	Users shall have easy...	Unass...
<input type="checkbox"/>	483	19:Stakeh...	19:Stakeh...	Users shall be able to ...	Unass...
<input type="checkbox"/>	484	20:Stakeh...	20:Stakeh...	Users shall be able to ...	Unass...
<input type="checkbox"/>	485	321:Stake...	321:Stake...	Users shall be able to ...	Unass...
<input type="checkbox"/>	486	319:Stake...	319:Stake...	Users shall be able to ...	Unass...
<input type="checkbox"/>	487	320:Stake...	320:Stake...	Users shall be able to ...	Unass...



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

Manage Sections

Table Of Contents

- Summary
- Business Objectives
- Test Objectives
- Formal Review
- Requirements
- Test Schedules
- Test Estimation
- Test Environments
- Application Security
- Test Team
- Quality Objectives
- Entry Criteria
- Exit Criteria
- Test Cases
- Resources
- Attachments
- Show All Sections

Classics Java ?

Test Plan Overview | [View Snapshots](#)

Originator: ADMIN

↔ State: Draft

Action: Select Action

Requirements ?

This section lists all of the content and requirements associated with a given test plan. You can select existing requirements or define new items to cover in the test plan.

Group by: Ungrouped

10 Items per page Previous | 1 - 10 of 11 | Next

Status	ID	Tag	Name	Description
<input type="checkbox"/>	5		Login	User shall have the ability to log into the application or proceed as a guest
<input type="checkbox"/>	9		Order single CD	Must be able to order a single CD.
<input type="checkbox"/>	8		Order Multiple CDs	Must be able to order multiple CDs through the web client.
<input type="checkbox"/>	6		Logout	Logout of the system.

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The Analyst Checks Test Coverage in DOORS

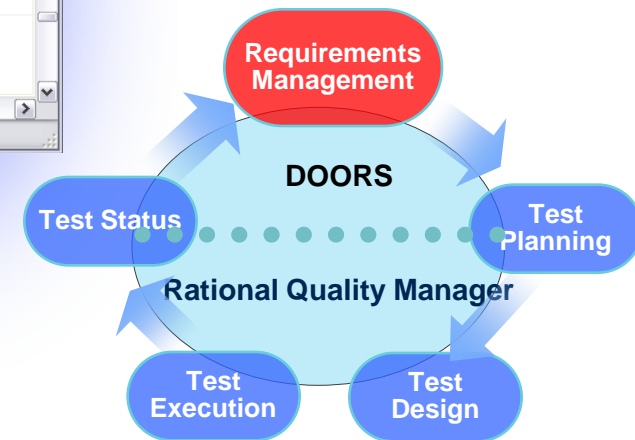
'Stakeholder Requirements' current 1.0 (2004 Model) in /Car Project (Formal module) - DOORS

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

Username: Richard Watson Exclusive edit mode



The QA Manager/Tester Executes Test Cases

Home | Script Execution

Executing New Customer Order Manual Script Cancel

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

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

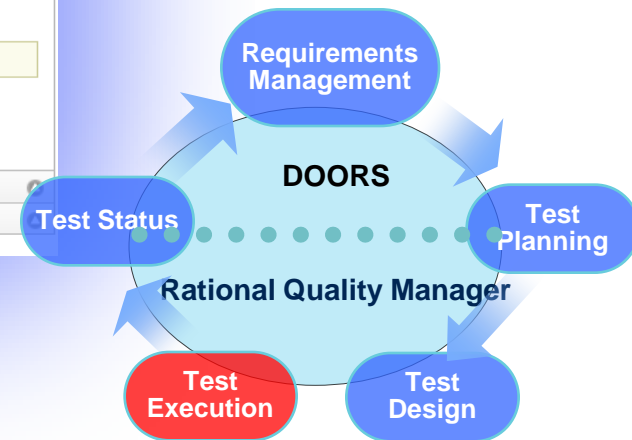
To create a defect press 'Add Defect'

Add Defect

Id	Summary

Result Attachment

Comment



The Analyst Checks QA Status in DOORS

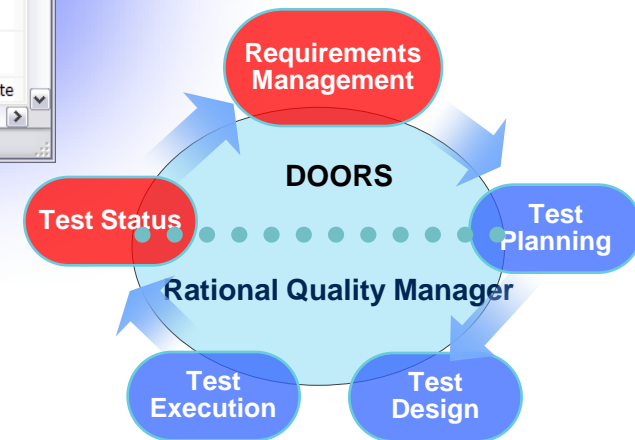
'Stakeholder Requirements' current 1.0 (2004 Model) in /Car Project (Formal module) - DOORS

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

Username: Richard Watson Exclusive edit mode



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

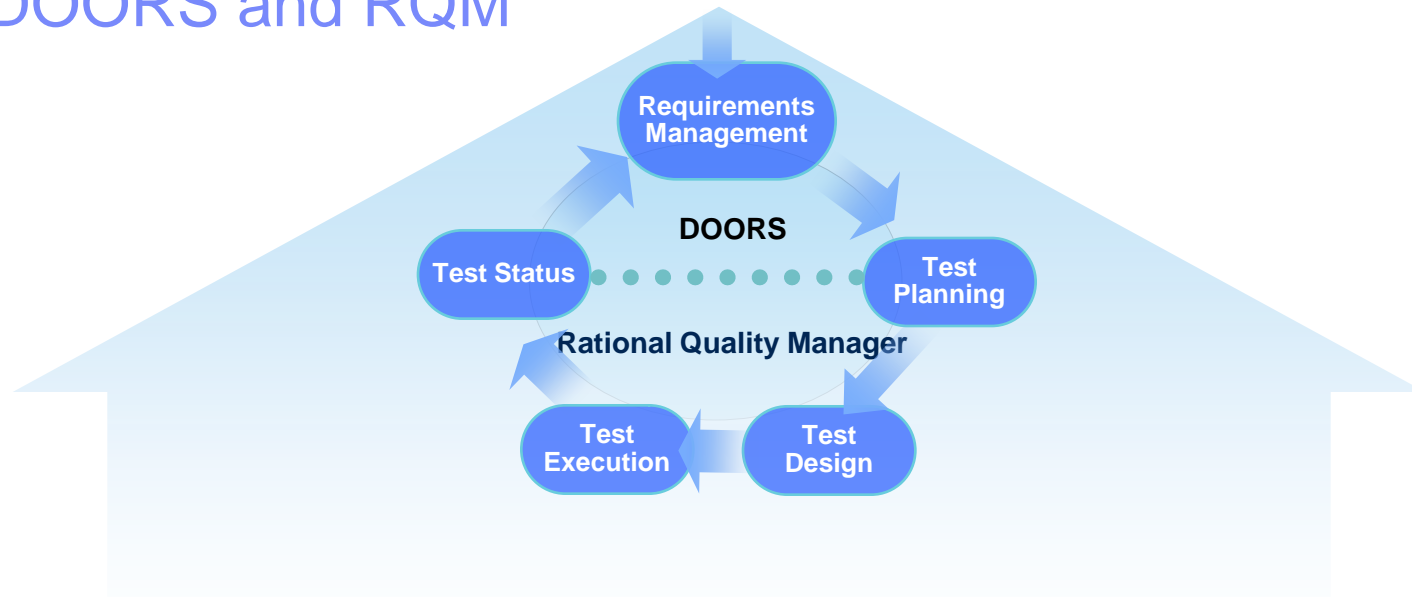
QA Manager/Tester Benefits

- 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



IBM Requirements Engineering Solution

- 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

Questions



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