



IBM Rational Software Conference 2009

Quality Management: From Requirements to Test Management

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Rational. software

Agenda

- “Pushing the Envelope” on Software Delivery
 - ▶ Driving business innovation while managing risk
 - ▶ Barriers to effective software delivery
 - ▶ How best of breed firms are improving business value, quality and time to market
 - ▶ Requirements Management: Rational DOORS
- Testing Management: Rational Quality Manager
- How the Integration Works

- Q & A



Business Innovation in Financial Services

Rethink business models & implement changes

Market Pressures

- **IBM CEO studies of 2006 & 2008**
 - ▶ Tremendous drive for *business transformation and change*
 - ▶ Increasing gap between expectation of change & organization's history to manage it
- **Economic survival requires rethinking business & I/T models for the future**



Execution

- **Innovation: examine business innovation models**
 - ▶ Customer centric models, e.g. rewards across portfolio
- **Efficiency: reduce cost of software delivery & operations**
 - ▶ Rethink software delivery processes
- **Improve quality & speed to market**
 - ▶ While measuring business risk of software & systems failures

Barriers to effective software quality & time-to-market

Impede team collaboration



*“Only **45%** of software projects are deemed successful. Downtime costs over **\$300B** annually”*



*“Only **37%** are satisfied with the speed of software development”*



*“**50%** of outsourced projects are expected to under perform”*



*“Only **42%** of users are satisfied with quality “*

Silos of people, process, and projects

Geographic Barriers Prevent Collaboration

- Poor communication
- Language, culture, time
- Process gaps resulting in rework
- High degree of friction

Organizational Barriers Impede Trajectory

- Lack of domain expertise
- Weak project governance
- Poor LOB oversight
- Security of IP when outsourcing

Infrastructure Barriers Slow Acceleration

- Incompatible tools / repositories
- Inflexible tooling integration
- Unreliable access artifacts
- Lengthy on-boarding

Why Focus on Requirements and Quality Management

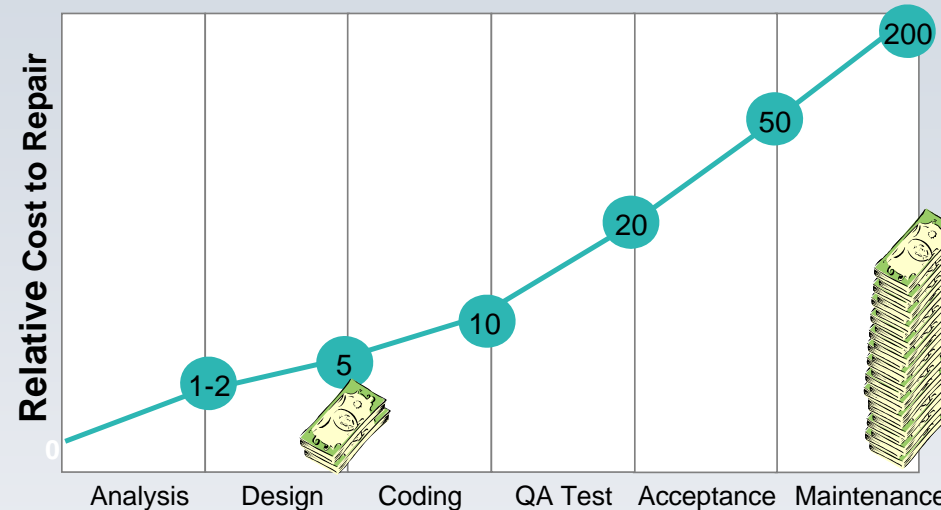
Traditional methods yield excess rework, delays & poor quality



Lost Opportunity

- Late to market by 6 months or more will cost organizations 33% of the 5-year ROI
- 41% of projects fail to deliver expected business ROI
- 49% of projects overrun original estimates

Standish Group



Cost

- 80% of development costs are spent identifying and correcting defects
- More than 40% of IT development budget will be consumed by poor requirements

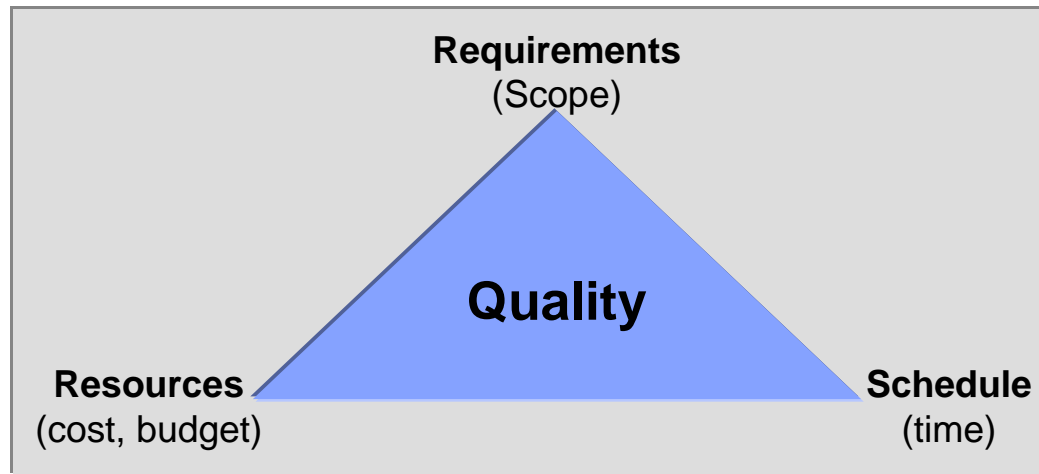
Traditional QA Testing

- 25 – 30 % delivery time in testing (IBM Study)
- Poor upstream quality yields rework
- Compressed schedules make it worse

Driving Business Opportunity While Reducing Risk and Cost

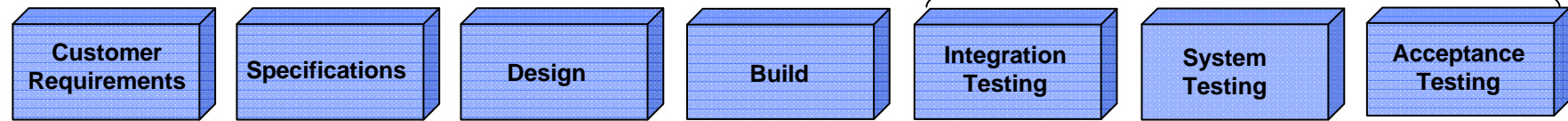
What fundamentally is the problem here?

- Changing business requirements create pressure on delivery schedules, cost & quality
- Must “Break the Iron Triangle” – traditional methods will not deliver
- Quality, on-time delivery requires collaborative, iterative and integrated lifecycle processes



Quality-enabling activities must start here and involve the entire team

Testing in isolation with weak single-tier requirements is a losing proposition



Quality paradigm is changing

Test – functional silo within software development

- Testing addressed by QA before deployment
- Test as gatekeeper on final release decisions
- Distributed, single project orientation
- Scope – fit for use, reduction of application level defects

Quality – A strategic IT competency

- Quality considerations addressed at all phases
- Agile iterations involve multiple business & technical stakeholders
- Consolidation with internal center of excellence or outsourcing
- Scope – Customer satisfaction and improved business performance



How are best of breed firms improving software quality

Business value from a process-led collaborative and automated approach over time

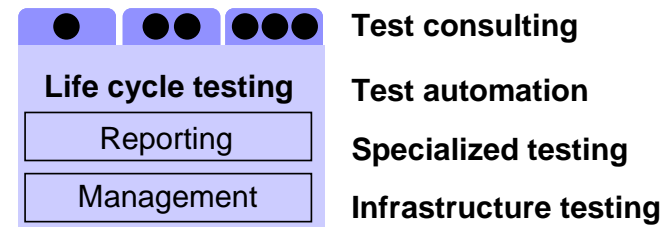
- Comprehensive test process model
 - *7:1 return on system engineering investments*
- Integrated end-to-end technology
 - *Reduced manual test effort of 90+%*
- Industry-based test solutions
 - *10 - 20% savings for test case and script reuse*
- Advanced defect analysis and quality management processes
 - *Defect reduction up to 69%*

Client Results

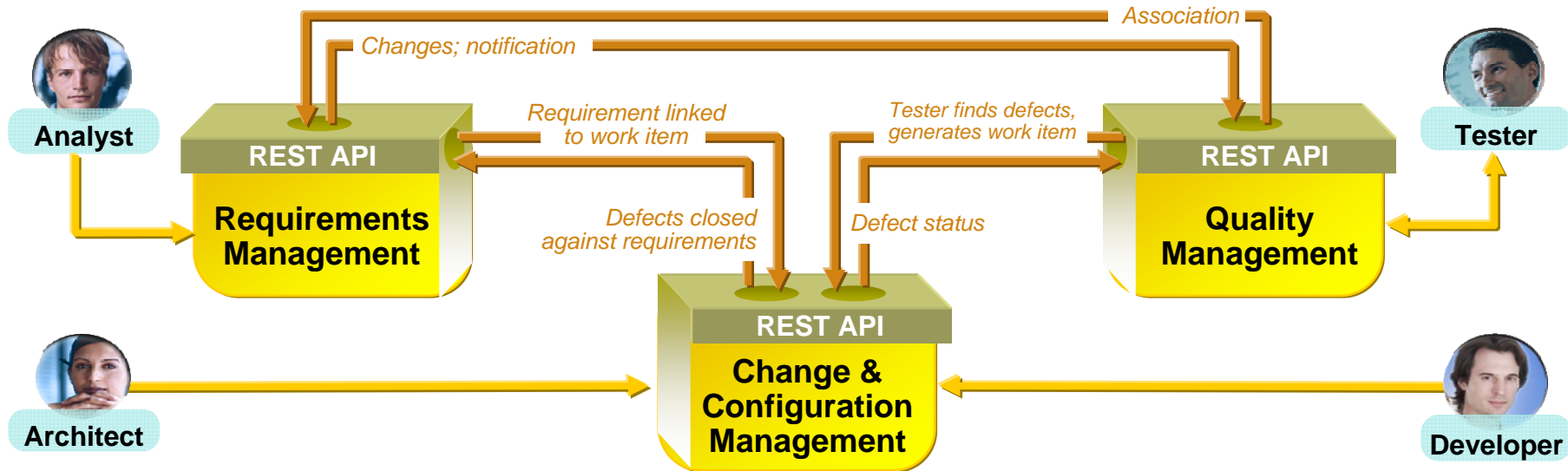
- Quality improvements ranging between 30 - 70%
- Cycle time improvements of 20 - 50%
- Cost reductions of 25 - 60%

Standardized Quality Offerings

Test Centers of Excellence



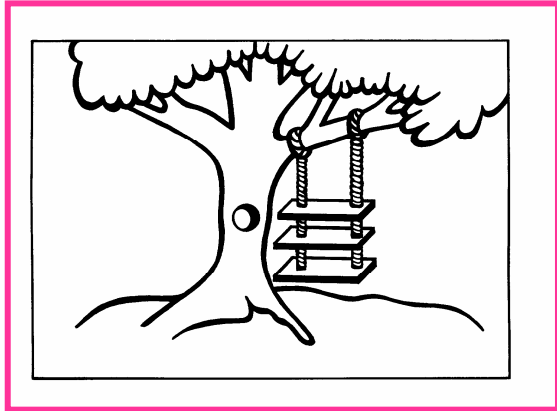
The benefits of a collaborative software delivery platform



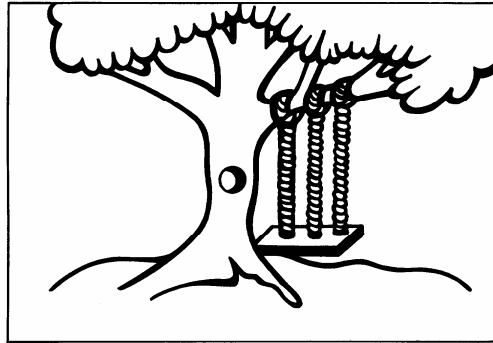
- **Coordinate analysts, developers and testers**
 - Collaborate in context and track status
- **Align teams on project plans**
 - Which requirements are in the development plan?
- **Track builds and the impact of defects**
 - What build is ready for test?
 - What defects are blocking test from proceeding?
- **Track status with C/ALM dashboard mashups**
 - Transparency across teams and artifacts



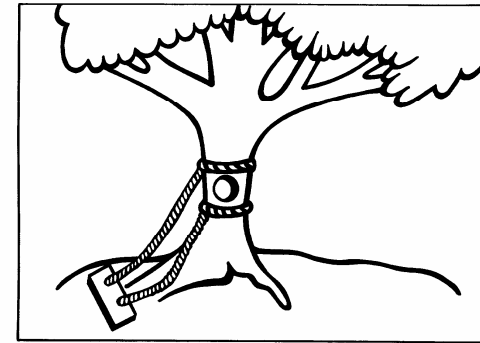
We've know about this for a long time...



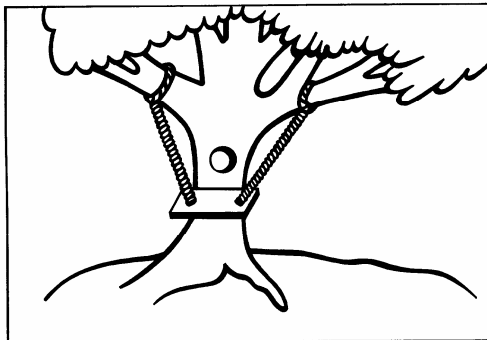
As it was requested



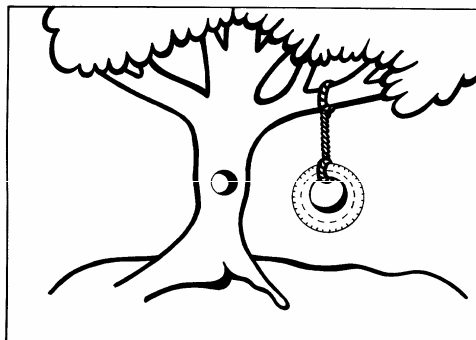
As the analyst saw it



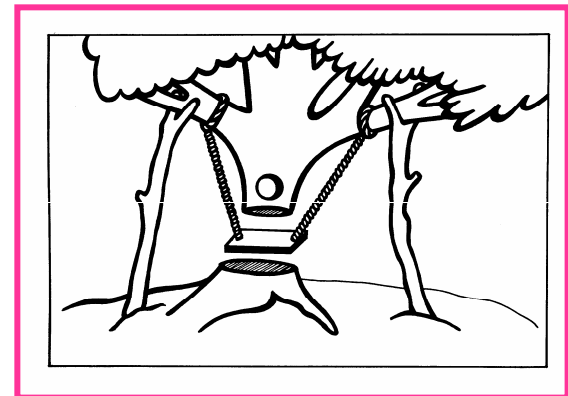
As the system was designed



As it was delivered

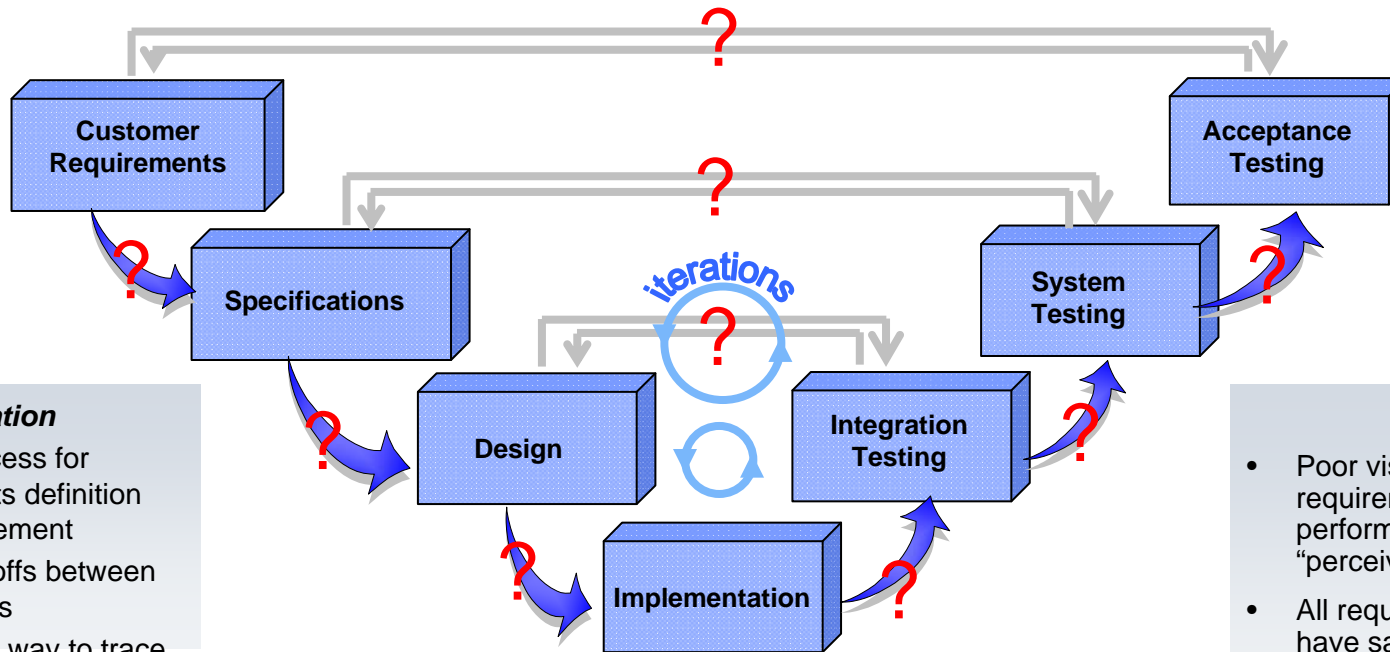


What the user really wanted



As it was installed

Today's Typical Siloed Development Lifecycle Environment



- Situation**
- Ad hoc process for requirements definition and management
 - Poor hand-offs between groups/steps
 - No practical way to trace changes in requirements

- Situation**
- Poor visibility to clear requirements so tests are performed against the "perceived" requirements
 - All requirements appear to have same priority

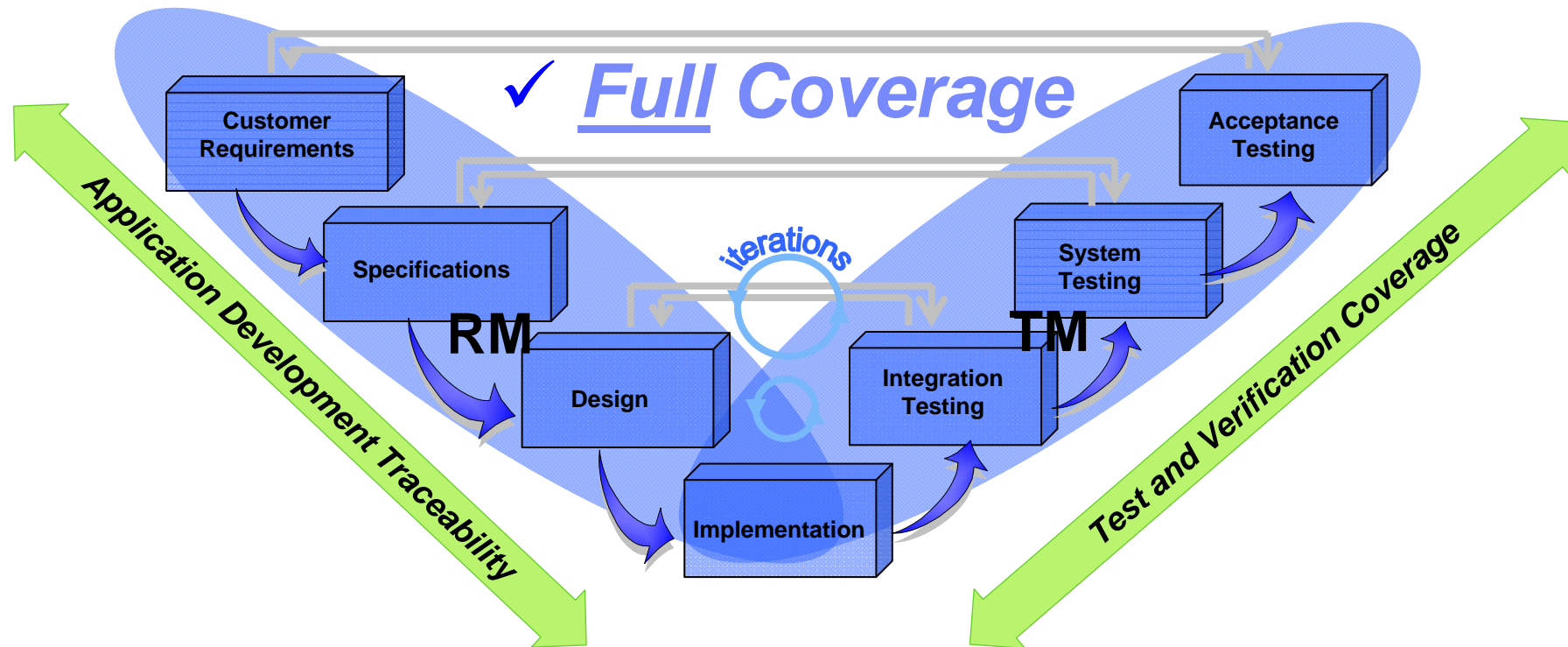
- Implications**
- **Requirements often missed** – fail to meet stakeholder and business needs, missed schedules and cost targets
 - **Lack of impact analysis** – can't react to changing business needs
 - **Lack of traceability** – can't demonstrate compliance

- Implications**
- **Testing to "perceived" requirements** – rework after acceptance testing fails, induces schedule slip, more cost
 - **Business impact not used to drive testing** – increased business risk since high priority requirements may be pushed to end of process and dropped



IBM Offers A Unique Solution

That Ensures Entire Lifecycle Collaboration and Traceability



IBM's full life cycle coverage and traceability

- ✓ Promotes traceability through the development and QA lifecycle
- ✓ Improves collaboration between teams
- ✓ Ability to assess requirements change impact
- ✓ Ensures adherence to compliance
- ✓ Ability to determine whether requirements are covered in all stages and when test is complete
- ✓ Ability to identify most critical requirements to test
- ✓ Guides management decisions thru proper metrics



Requirements Management



Requirements are...

■ Interdependent

- ▶ System Requirements depend on Users Requirements,
- ▶ User Requirements relate to Regulatory Requirements,
- ▶ Impacts project activities
- ▶ Determines the design and how code is done
- ▶ Contributes to risks
- ▶ Relates to test plans

■ Dynamic

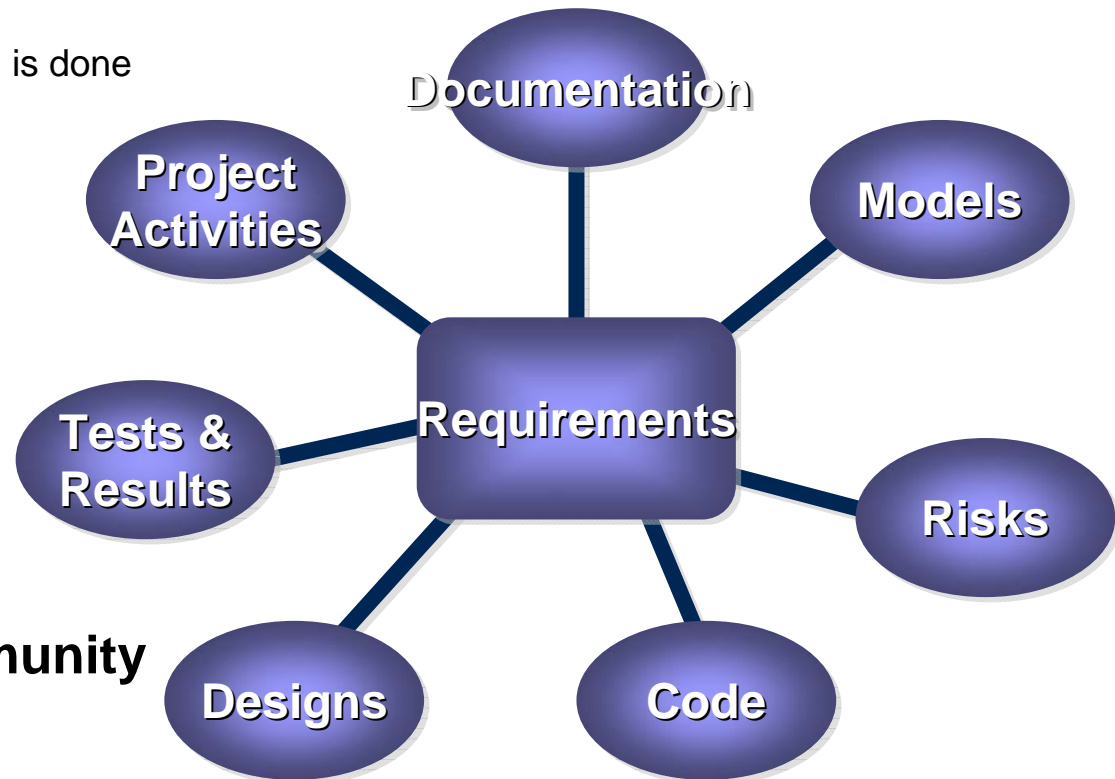
- ▶ Subject to (frequent) change
- ▶ Both the requirements and relationships

■ Complex

- ▶ Many requirements

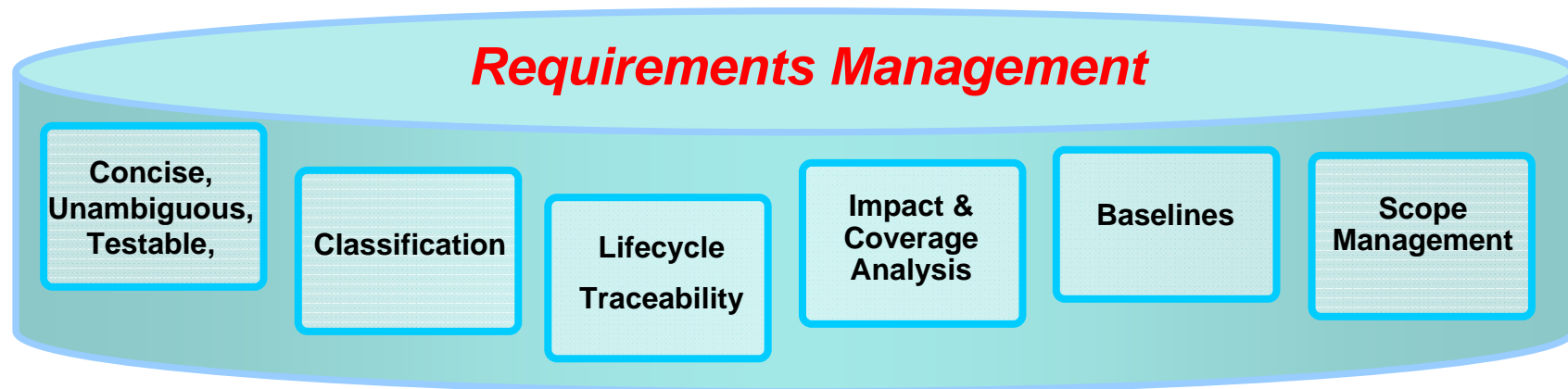
■ Of interest to a wide community

- ▶ Marketing, Sales, Engineering...



What is requirements management?

The set of disciplines and activities concerned with the capture, formulation, organization, versioning, publishing, tracing, analysis, and change of requirements.



What is IBM Rational® DOORS®?

- ***Dynamic Object Oriented Requirements System***
- **The market and technology leader in Requirements Management**
 - ▶ Increases the quality of business-critical IT and software development projects
 - ▶ Improves requirements communication, collaboration, and management
- **Demonstrates strengths in capturing, linking and analyzing requirements during their lifecycle**
 - ▶ Alignment of requirement definition to the customer needs
 - ▶ Flexible, easy-to-use version management of requirements
 - ▶ Track and compare capabilities by comparing baselines
- **Capabilities**
 - ▶ **Capture and manage** requirements for complex IT or systems development projects
 - ▶ **Collaboration** capabilities for globally distributed team
 - ▶ **Scalable** to support 1000s and 10s of thousands of requirements
 - ▶ **Integration** with Rational Quality Manager, Focal Point, Synergy Change





What is DOORS?

Compared to general office tools & collaboration solutions

Value

Office Tools


- Requirements captured in
 - Word processors
 - Spreadsheets
 - Presentation software (PowerPoint & Visio)

Collaboration Solutions

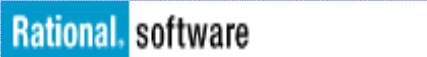
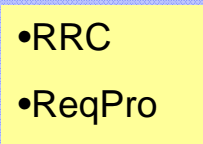
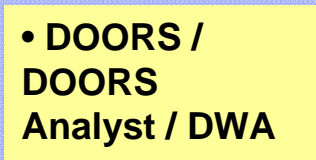
- Requirements information can be communicated via:
 - Email
 - Wikis and blogs
 - Notes, SharePoint
 - Newsgroups
 - Instant messaging
 - Doc Mgt System





Purposeful RDM Solutions

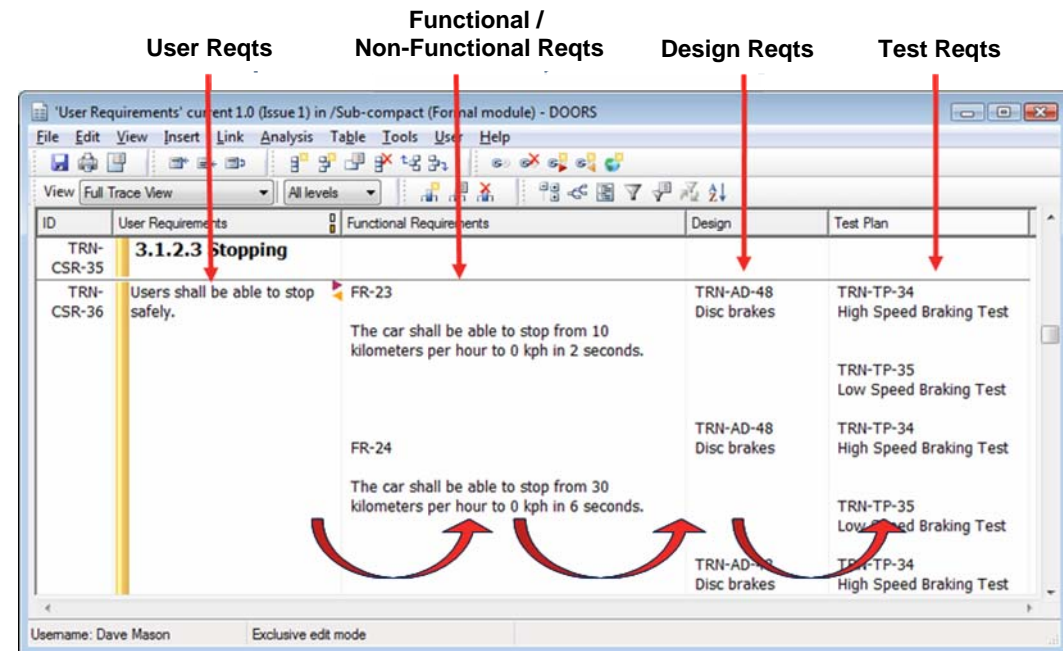
- High-productivity tools for expressing requirements
 - High-productivity editors supporting RD techniques,
 - Use office tools as editors or content sources
- Collaboration around RD + RM
- ALM support
 - Relate requirements to project milestones and work items
 - Validate requirements in test
 - Coverage analysis
 - Understand the impact of change


How DOORS Can Address Complex IT

Multiple levels of requirements Traceability

- ▶ Provides a complete picture of traceability from user requirements to systems requirements to test requirements
- ▶ Impact analysis
- ▶ Coverage analysis
- ▶ Derivation analysis
- ▶ Provides support for external links - requirements to be associated with information outside of the DOORS domain



How DOORS Can Address Complex IT

- **Rich audit trail and baseline capability**
 - ▶ Know who did what and when
 - ▶ Preserve versions of requirements documents

- **Requirements security at different levels**
 - ▶ Provides security at several levels
 - Projects
 - Document
 - Requirements
 - View
 - Attribute

The screenshot displays two overlapping windows from the DOORS application. The top window, titled "Test Requirements Properties - DOORS", shows the "History" tab. It contains a table of user actions:

User	Session	Date	Modification
Joycelyn	629	07/06/2009 5:52:06...	Modify Object 49: drsrqmVerdict0000...
Joycelyn	629	07/06/2009 6:04:24...	Delete Attribute: drsrqmTestPlanTest...
Joycelyn	629	07/06/2009 6:04:24...	Create Attribute: drsrqmTestPlanTest...
Read Locked...	Read Locked D...	Read Locked Data	Read Locked Data
Read Locked...	Read Locked D...	Read Locked Data	Read Locked Data
Joycelyn	631	07/06/2009 11:19:4...	Modify Object 39: Object Text

Below the table, the "Details of selected history record" section shows a comparison between two requirement statements:

From: Verify that the car can transmit and receive voice communication by a standard commercial telephone system, (wireless).

To: Verify that the car can transmit and receive voice communication by a standard commercial telephone system (wireless).

The bottom window, titled "UserRequirements Properties - DOORS", shows the "Access" tab. It displays the "Access Rights" for the selected requirement, listing users and their permissions:

Name	Access rights
Joycelyn	RMCD
Mary	RMCD
Everyone else	R

Buttons for "Add...", "Remove", and "Edit..." are visible below the table. The "Propagate" section shows "Propagate additional access rights with create access" set to "None".



How DOORS Can Address Complex IT

- **DOORS provides a collaboration across all of IT**
 - ▶ Multiple users can access the same document at the same time; locking sections for edit
 - ▶ DOORS Discussions allows business users/customers to discuss the requirements

The screenshot shows two windows from the DOORS application. The top window, titled ".0 in /New Folder (Formal module) - DOORS", displays a table with a discussion for "1 Overview". The discussion content includes a paragraph about "Join Finley and his friends" and a list of three "Spelling corrections" by Richard Watson, John Smith, and Richard Watson.

The bottom window, titled "Object 27 (Baselined) - DOORS", shows a detailed view of a discussion thread. It has tabs for "General", "Access", "History", "Attributes", "Links", and "Discussions". The "Discussions" tab is active, showing a table with columns "Summary", "Created By", and "Last Modified".

Summary	Created By	Last Modified
The maximum speed should be reduced	Toby	30/06/2008 19:35:49
Given the current environmental impact attributed to cars I think we should reduce the desired top speed.		
I agree, the max speed should be reduced to 240 kmh		
Agreed		
Perhaps the top speed should be higher	Toby	30/06/2008 19:36:17
In order to compete with other supercars the top speed should be 400kmh		
I disagree - see comments above		
I believe this would be socially irresponsible		

At the bottom of the window, there are buttons for "Previous", "Next", "OK", "Cancel", "Apply", and "Help". There is also a "View Closed Discussions" checkbox and "Refresh" and "New Discussion..." buttons.



DOORS Family of Products

Designed to give each stakeholder the right capabilities

- **DOORS**
 - ▶ Provides rigorous support for detailed and complex requirements management
- **DOORS Web Access**
 - ▶ Zero-footprint, web-based access to view and discuss requirements that are managed with DOORS
- **DOORS Analyst**
 - ▶ Provides a visual modeling capabilities which allows requirements to be described in diagrams as well as text

The screenshot displays three overlapping windows from the DOORS software family:

- Top Window: 'User Requirements' current 1.0 (Issue 1) in /Sub-compact (Formal module) - DOORS**

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				
TRN-CSR-59				
TRN-CSR-60				
TRN-CSR-61				
- Middle Window: IBM Rational DOORS Web Access**

Shows a web-based interface for viewing requirements. The main content area displays a hierarchical tree of requirements, including sections for 'Introduction', 'Nationalities', and 'Requirements'. A sidebar on the left shows a 'DOORS Database' tree with categories like 'Entertainment System', 'Marketing Requirements', 'Stakeholder Requirements', and 'System Requirements'. A 'Recent Items' and 'Favorites' section is also visible.
- Bottom Window: DOORS Analyst**

Shows a visual modeling diagram titled '4.1 Call Emergency Services'. The diagram is a use case diagram with the following elements:

 - Actors:** Caller, Operator, Ambulance.
 - Use Cases:** EmergencyCall, 'Receive & Analyze', Allocate, AmbulanceAvailable.
 - Relationships:**
 - EmergencyCall includes 'Receive & Analyze' (indicated by a dashed arrow with <<include>>).
 - EmergencyCall includes Allocate (indicated by a dashed arrow with <<include>>).
 - EmergencyCall includes AmbulanceAvailable (indicated by a dashed arrow with <<include>>).
 - 'Receive & Analyze' includes Allocate (indicated by a dashed arrow with <<include>>).

Below the diagram is a legend:

4.2 AmbulanceControlSystem	Subject
4.3 Caller	Actor
4.4 Ambulance	Actor
4.5 Operator	Actor
4.6 EmergencyCall	Usecase



Test Management



IBM Rational® Quality Manager

IBM Rational raises the bar for Test Management

Mitigate Business Risk



Collaborate

Collaborative, continuous, and comprehensive information sharing

- ⇒ reduces defects
- ⇒ improves handoff
- ⇒ increases customer satisfaction

Improve Operational Efficiency



Automate

Automating labor-intensive activities

- ⇒ reduces time-to-market
- ⇒ increases predictability
- ⇒ consistency to improve ROI

Make Confident Decisions



Report

Moment by moment understanding of software quality metrics

- ⇒ for immediate corrective action
- ⇒ for immediate addressing of both business and IT needs

Mitigate Business Risk

Comprehensive rich test plan - A quality contract for the entire software delivery team

The screenshot displays the IBM Rational Test Manager interface for a test plan titled 'Classics Java'. The interface is divided into several sections:

- Left Navigation Panel:** Contains icons for Requirements, Planning, Construction, Lab Management, Execution, Reports, and Defects. A 'Table Of Contents' is visible, listing sections such as Summary, Business Objectives, Test Objectives, Formal Review, Requirements, Test Schedules, Test Estimation, Test Environments, Test Team, Quality Objectives, Entry Criteria, Exit Criteria, Resources, Attachments, and Test Cases.
- Main Content Area:** Shows the 'Business Objectives' section for 'Classics Java'. It includes a 'Table Of Contents' on the left, a 'Summary' section, and a 'Business Objectives' section with the text: 'Define the overall business goals and strategy for your test phase(s)'. Below this is a '< Add Content >' button.
- Right Panel:** Shows the 'Test Cases' section. It includes a 'Table Of Contents' on the left, a 'Summary' section, and a 'Test Cases' section. The 'Test Cases' section contains a table of test cases:

ID	Suspect	Name	State	Category	Function	Theme	Weight	Modified
5		Login	Draft	Web UI	Login	Functionality	15	Jun 30, 2009
6		Logout	Draft	Web UI	Logout	Unassigned	10	Jun 30, 2009

A blue callout box with a white background and a blue border points to the 'Table Of Contents' in the right panel, containing the text: 'Structured test plan with multiple user defined sections'.

- **Collect and track all test data**
 - ▶ Central location for business objectives requirements, resources, platform and exit criteria, etc.
- **Goal Oriented**
 - ▶ Formalized and documented exit criteria
- **Extensible**
 - ▶ Add sections, import custom data
- **Keep track of changes**
 - ▶ Snapshot version control to track plan history throughout the life of the project



Mitigate Business Risk

Managing approval process at different phases



Artifact Reviews and Approvals

Review and Approvals

List the people who will be reviewers and approvers of this content and define your approval process.

View: All

Show All Items per page Previous | 1 - 2 of 2 | Next

	Review Type	Name	Status	Comments	Modified
<input type="checkbox"/>	Approver	Mary (Manager)	Pending		
<input type="checkbox"/>	Reviewer	Larry (Lab Manager)	Pending		

All project stakeholders can review, refine and sign-off on all quality related artifacts

Reviewers / Approvers receive a task

My Tasks

Type Filter Text

Previous | 1 - 4 of 11 | Next

ID	Summary	Artifact	State
77	Provide the RQM-KEY-TC-SUMMARY-TITLE Sec...	Create Customer Order	New
76	Complete the Formal Review Section of Test P...	DR_RQM_vw_Test3	New
75	Complete the authoring of Category: 4.0	4.0	New
71	Complete the Formal Review Section of Test Pl...	Classics Java	New

Improve operational efficiency

Know what others are doing, what is expected of you.

The screenshot shows a user interface for 'Tony(Tester)'s Dashboard. On the left is a vertical navigation menu with icons for Requirements, Planning, Construction, Lab Management, Execution, and Reports. The main content area has tabs for 'Home', 'View Test Plans', and 'Classics Java'. Below the tabs is a 'General' dropdown and an 'Add New Tab' button. The central widget is titled 'My Tasks' and contains a search box 'Type Filter Text' and a table of tasks.

ID	Summary	Artifact	State
73	Provide the RQM-KEY-TC-SUMMARY-TITLE Section for TestCase: Existing Customer Order	Existing Customer Order	New
72	Create test case for Existing Customer Order requirement	Classics Java	New

Individual Task List

Team Event Log

This screenshot shows the same dashboard as above, but with the 'Quality Manager Event Log' widget expanded. The log shows 95 new events, including test requirements, formal reviews, and authoring tasks.

- [2] 39:Test Requirements (30) Yesterday
- [14] Complete the Formal Review Section of Test Plan: Classics Java (71) Yesterday
- * Complete the authoring of Category: 4.0 (75) 2 days ago
- * Name not displayed Last First (74) 2 days ago

Page 1 of 20



Improve operational efficiency

Integrated manual test authoring and execution

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

Manual Test Execution

- ▶ Step by step capture and execution of manual tests
- ▶ Assisted data entry and validation for efficient execution
- ▶ Keyword support for integrated manual and automated testing
- ▶ Rich defect capture during execution, including screenshot and attachments

Track execution results and defects from manual test efforts



Make Confident Decisions

Constant access to quality metrics to proactively manage risk



Manual and functional test automation results available



Performance risks are always visible and quickly resolved



Security risks are monitored continuously to ensure business continuity

Quality Manager Dashboard



Testing of elements can be tracked to assure business needs are realized



Change management and defect tracking fully integrated to assure all changes to production are tested

Integrated Solution



Principles of an Integrated Approach to Requirements Management and Test Management

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

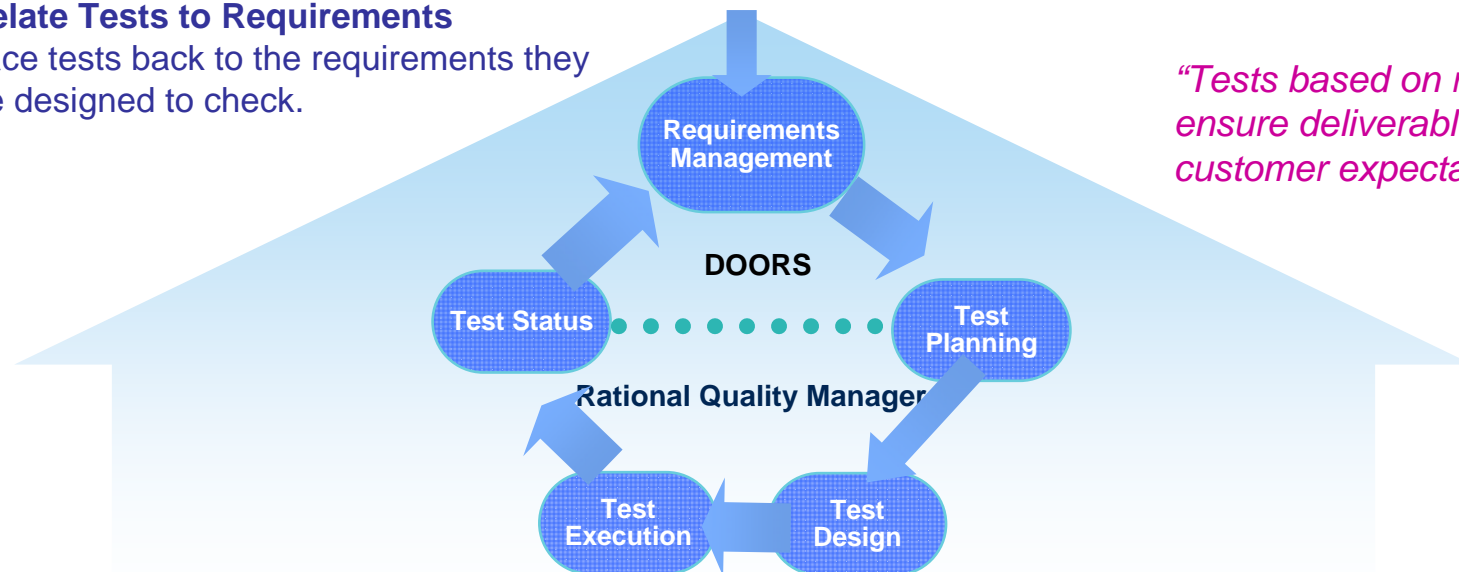
- Trace tests back to the requirements they are designed to check.

4. Relate Defects to Requirements

- Trace defects back to the requirements that they are not satisfying.

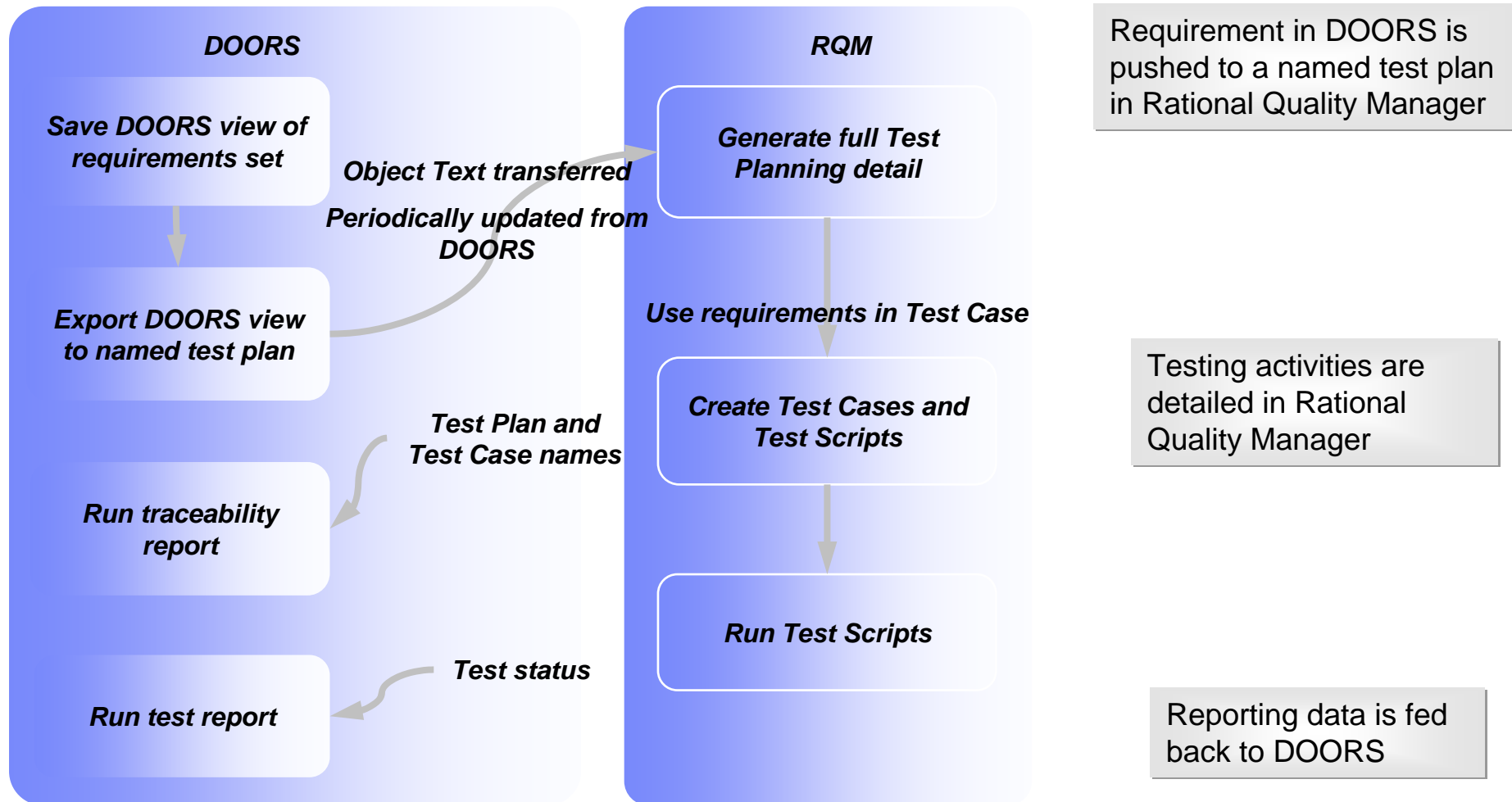
5. Measure Progress against Requirements

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

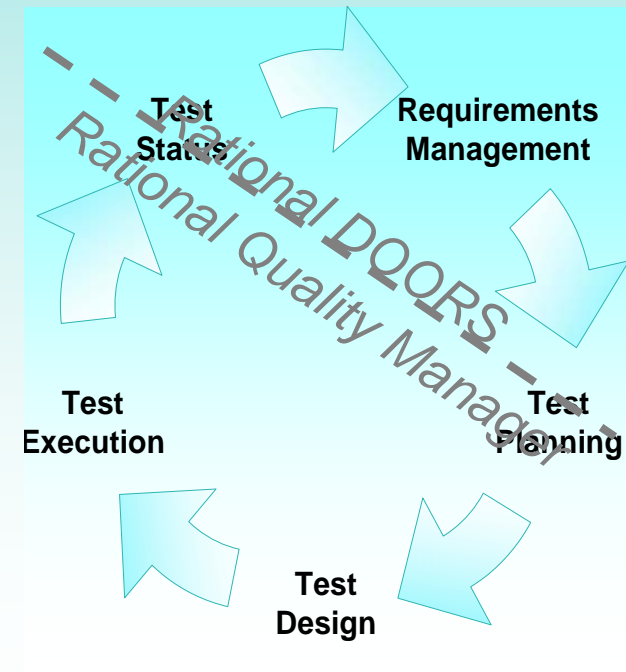


“Tests based on requirements ensure deliverables meet customer expectations”

How The Integration Works



DEMO



Questions



Learn more at:

- [IBM Rational software](#)
- [Rational launch announcements](#)
- [Rational Software Delivery Platform](#)
- [Accelerate change & delivery](#)
- [Deliver enduring quality](#)
- [Enable enterprise modernization](#)
- [Ensure Web security & compliance](#)
- [Improve project success](#)
- [Manage architecture](#)
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