

# So how is your project *really* doing?

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IBM Rational Software Development Conference UK 2007



▶ What keeps me **Rational**?



# Agenda

- Introduction - Why Measure?
- Measurement Across the RUP phases
- Project Console – A Solution to help Measurement
- Portfolio Manager – Perform Measurement as part of Project Management
- Summary



# Agenda

- ■ **Introduction - Why Measure?**
  - Measurement Across the RUP phases
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# Why measure?

- To Communicate effectively
- To Identify and correct problems early
- To Make informed trade-offs
- To Track specific project objectives
- To Manage risks
- To Defend and justify decisions



Make Sure You are Collecting the information you wish to Report!

# Objective, Reliable Project Measurement

- Improve measurement quality
  - ▶ Collect measurements automatically
  - ▶ Present measurement from multiple product domains in single view
- Easily assess status through indicators and charts
- Enable trend analysis and drill-down



# What do we mean by Progress & Quality?

- Progress
  - ▶ How many requirements have been implemented and tested?
  - ▶ How many test cases have been executed?
  
- Quality
  - ▶ What is the defect discovery vs. fix rate?
  - ▶ Is the code stabilizing?
  - ▶ When can we release the product?



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- ■ Measurement Across the RUP phases
- **Project Console – A Solution to enable Measurement**
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# Monitoring The Inception Phase

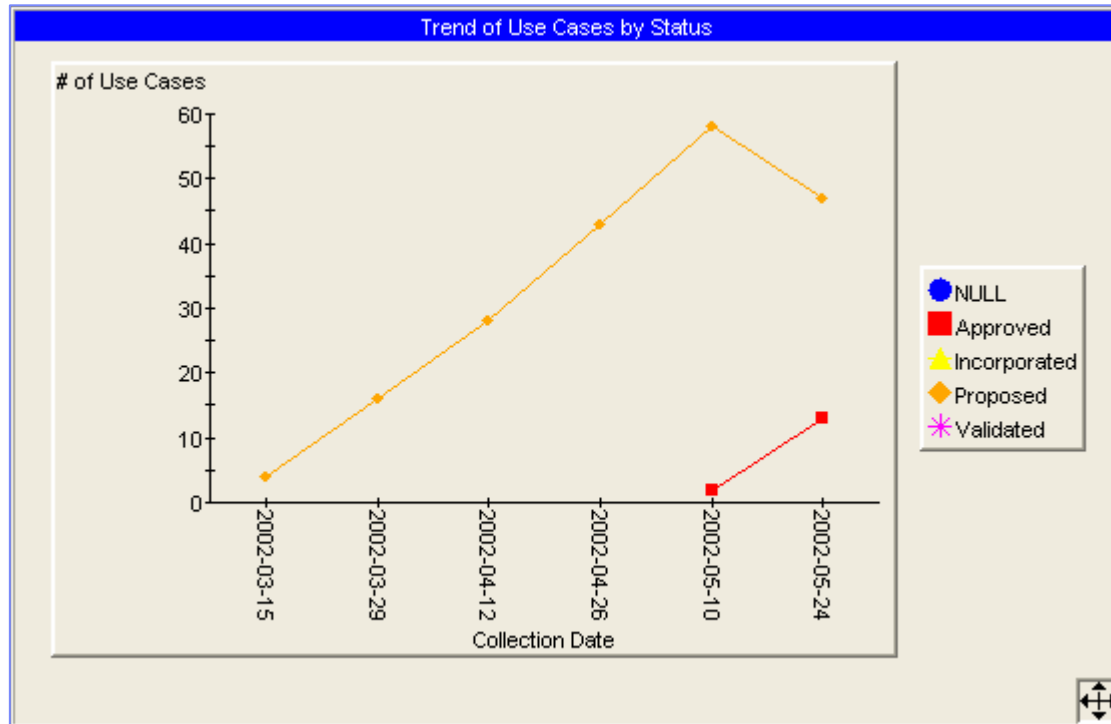
- Primary Objectives:
  - ▶ Establish Scope
  - ▶ Use cases
  - ▶ Candidate architecture
  - ▶ Estimate costs
  - ▶ Estimate risks
  - ▶ Prepare the environment
- Artifacts:
  - ▶ Vision of the project
  - ▶ Initial Software Development Plan
  - ▶ Initial Use-Case Model
  - ▶ Risk list
  - ▶ Risk Management Plan
  - ▶ Project Plan
- Evaluation based on:
  - ▶ Completeness of use case model reflecting vision features
  - ▶ Risk identification and resolution strategies
  - ▶ Sufficiency of software development plan to proceed to Elaboration
  - ▶ Stakeholder buy-in
  - ▶ Planned expenditures





# Monitoring The Inception Phase

- Trend of Use Cases by Status



## Inception: Other Measurements To Monitor

Information Category	Prospective Measures
Schedule and Progress	<ul style="list-style-type: none"><li>• Task Completion</li><li>• Requirements Status</li><li>• Business Use-Case Model Status</li><li>• Use-Case Model Status</li><li>• Design Model Status</li></ul>
Resources and Cost	<ul style="list-style-type: none"><li>• Staff Level</li><li>• Turnover</li><li>• Earned Value – BCWS, BCWP, ACWP, SPI, CPI, SV, CV</li></ul>
Process Performance	<ul style="list-style-type: none"><li>• Requirements-Design Traceability</li><li>• Requirements-Test Case Traceability</li><li>• Model Elements (e.g., Activity, Diagrams)</li></ul>



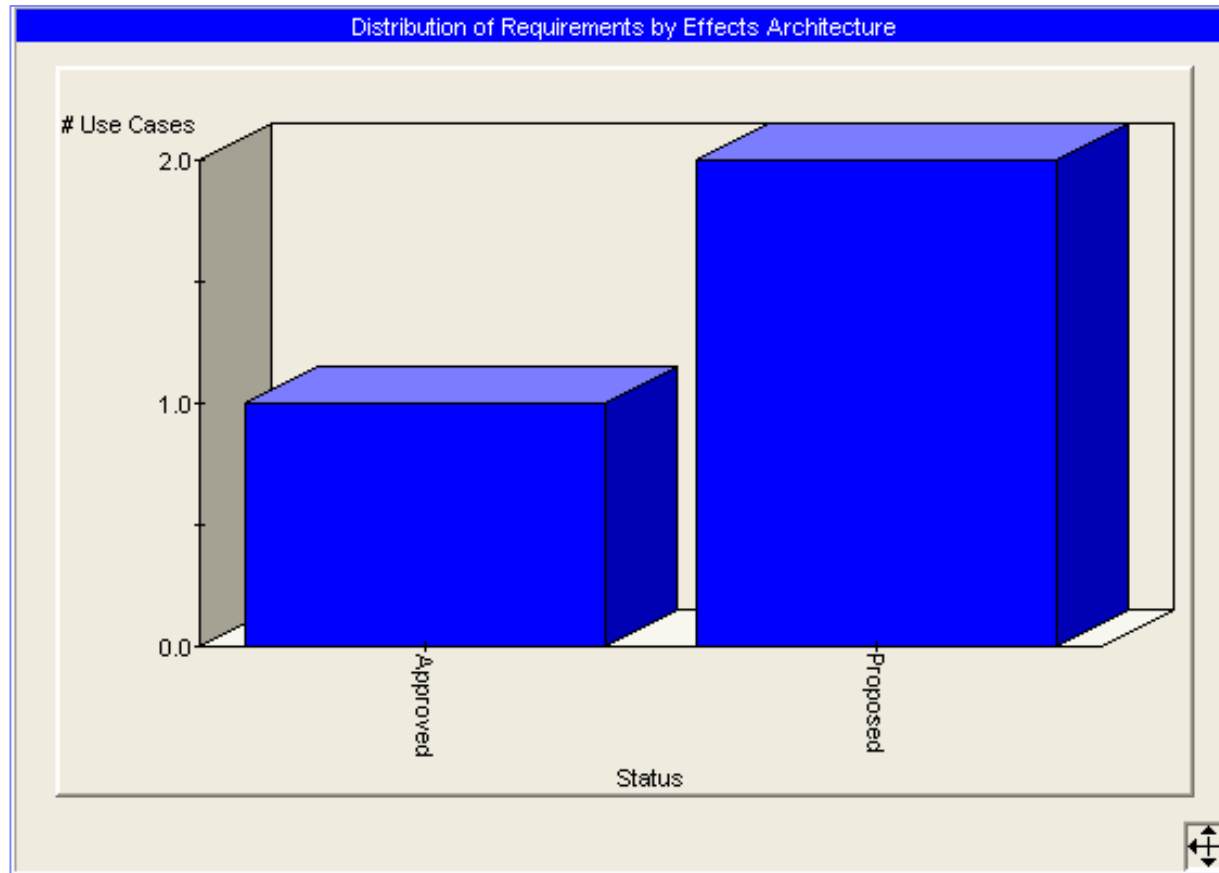
# Measuring The Elaboration Phase

- Primary Objectives:
  - ▶ Establish and demonstrate a sound architecture
  - ▶ Analyze the problem domain
  - ▶ Design the solution
  - ▶ Address the highest risk elements
  - ▶ Develop a comprehensive plan for the construction and transition
  - ▶ Refine previous course-grained plans
- Artifacts:
  - ▶ Use case model and other requirements
  - ▶ Software Architecture Document
  - ▶ Executable Baselines Architecture
  - ▶ Revised Software Development Plan
- Evaluation based on:
  - ▶ Stability of product vision
  - ▶ Stability of architecture
  - ▶ Resolution of risks
  - ▶ Sufficiency and credibility of plan for construction
  - ▶ Stakeholder buy-in
  - ▶ Planned Expenditures



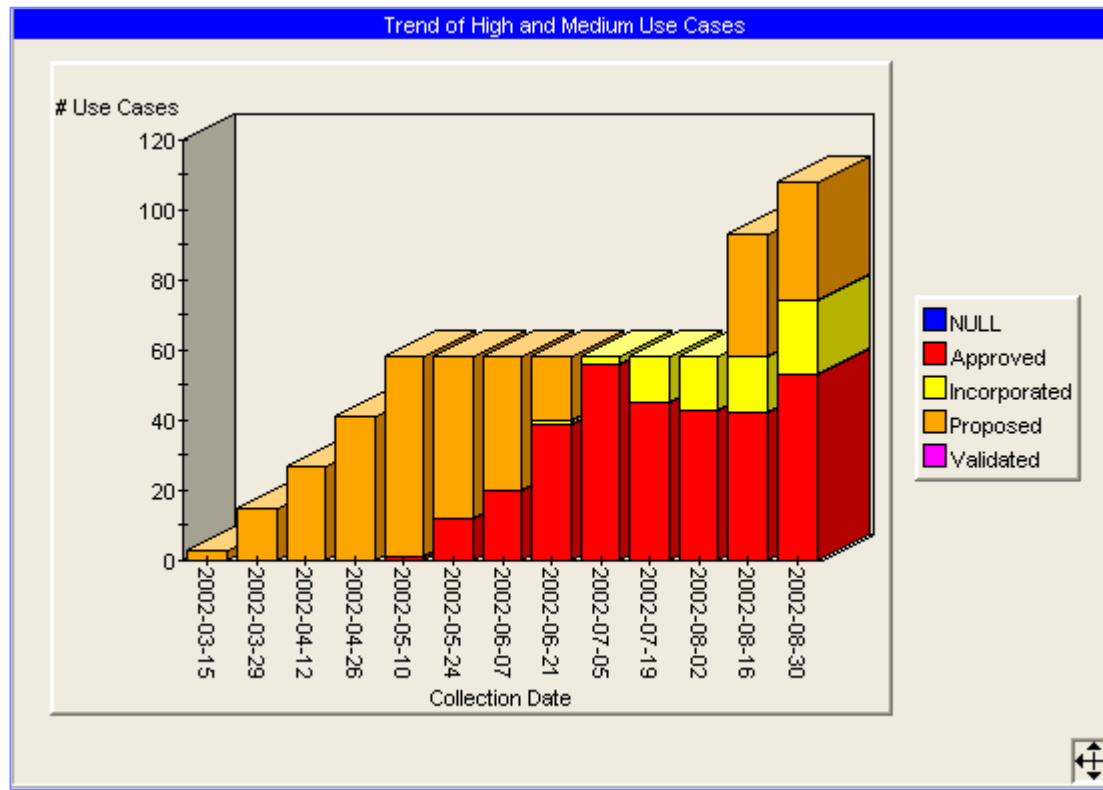
# Measuring The Elaboration Phase

- Distribution of Affects-Architecture Use Cases by Status



# Measuring The Elaboration Phase

- Trend of proposed, approved, incorporated, and validated Requirements by Status



## Elaboration: Other Measures to Monitor

Information Category	Prospective Measures
Schedule and Progress	<ul style="list-style-type: none"> <li>▪ Task Completion</li> <li>▪ Requirements Status</li> <li>▪ Requirements Tested</li> <li>▪ Use-Case Model Status</li> <li>▪ Design Model Status</li> <li>▪ Units Designed, Coded, Tested</li> <li>▪ Test Cases Attempted, Passed, Failed</li> </ul>
Resources and Cost	<ul style="list-style-type: none"> <li>▪ Staff Level</li> <li>▪ Turnover</li> <li>▪ Earned Value – BCWS, BCWP, ACWP, SPI, CPI, SV, CV</li> </ul>
Product Size and Stability	<ul style="list-style-type: none"> <li>▪ Requirements</li> <li>▪ Lines of Code</li> <li>▪ Function Points</li> <li>▪ Components</li> <li>▪ Interfaces</li> </ul>
Product Quality	<ul style="list-style-type: none"> <li>▪ Defects</li> </ul>
Process Performance	<ul style="list-style-type: none"> <li>▪ Requirements/Model Traceability</li> <li>▪ Requirements/Test Case Traceability</li> </ul>
Technology Effectiveness	<ul style="list-style-type: none"> <li>▪ Requirements Coverage</li> </ul>



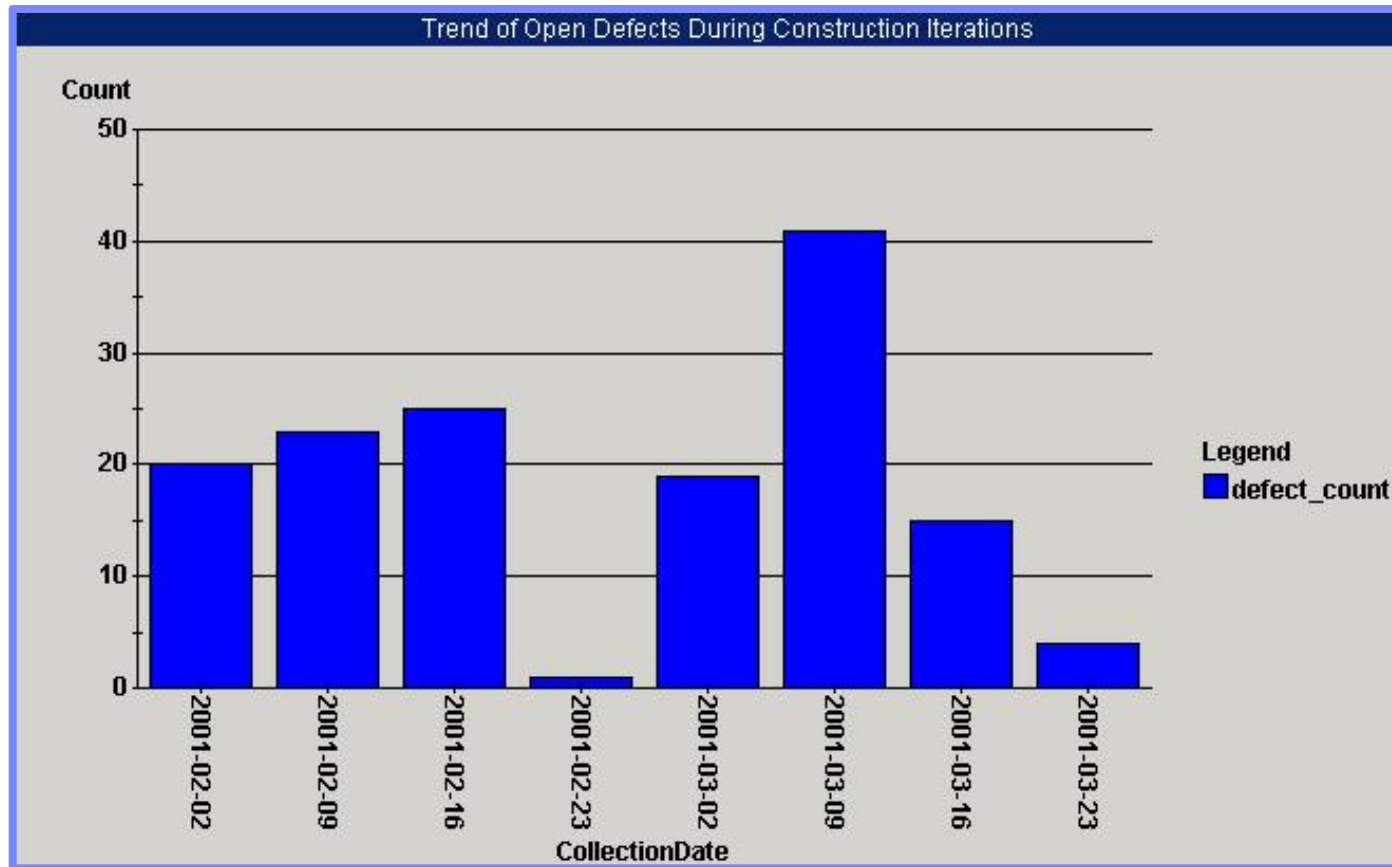
# Measuring The Construction Phase

- Primary Objectives:
  - ▶ Minimize development costs by optimizing resources and avoiding unnecessary scrap and rework
  - ▶ Achieve adequate quality as rapidly as practical
  - ▶ Build useful alpha, beta, and other release versions as rapidly as practical
- Artifacts:
  - ▶ Executable releases of increasing functionality
  - ▶ Models of the system's design and behaviour
  - ▶ User documentation
  - ▶ Deployment documentation
  - ▶ Evaluation criteria for each iteration
  - ▶ Release descriptions, including quality assurance results
- Evaluation based on:
  - ▶ Stability and maturity of product releases
  - ▶ Readiness of stakeholders for transition to user community
  - ▶ Expenditures planned



# Measuring The Construction Phase

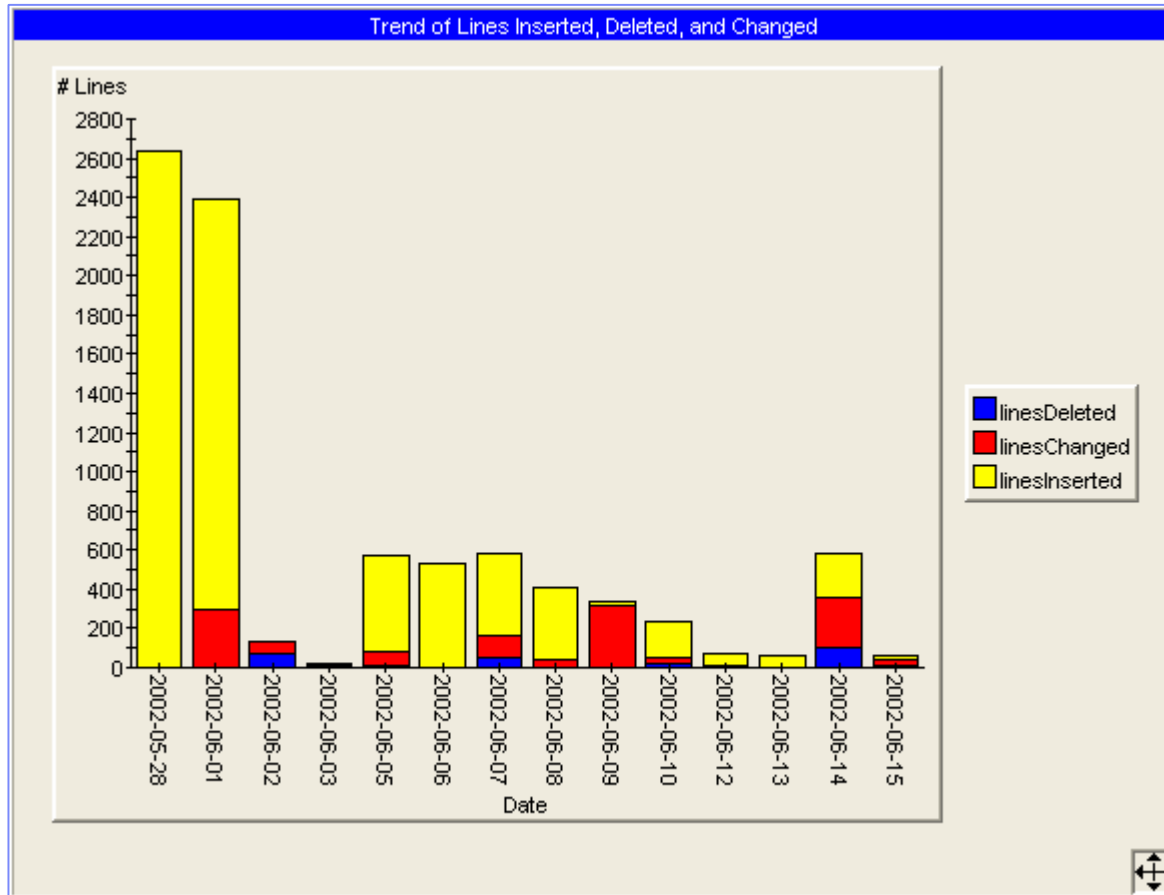
- Trend of Open Defects in Construction Iterations





# Measuring The Construction Phase

- Trend of Lines of code Added, Modified, and Deleted



## Construction: Other Measurements To Monitor

Information Category	Prospective Measures
Schedule and Progress	<ul style="list-style-type: none"> <li>▪ Task Completion</li> <li>▪ Change Requests Opened, Resolved</li> <li>▪ Units Designed, Coded, Tested</li> <li>▪ Test Cases Attempted, Passed, Failed</li> </ul>
Resources and Cost	<ul style="list-style-type: none"> <li>▪ Staff Level, Turnover</li> <li>▪ Earned Value – BCWS, BCWP, ACWP, SPI, CPI, SV, CV</li> </ul>
Product Size and Stability	<ul style="list-style-type: none"> <li>▪ Requirements</li> <li>▪ Lines of Code</li> <li>▪ Function Points</li> <li>▪ Components</li> <li>▪ Interfaces</li> </ul>
Product Quality	<ul style="list-style-type: none"> <li>▪ Defects</li> <li>▪ Age of Defects</li> <li>▪ Mean-Time-to-Failure</li> </ul>
Process Performance	<ul style="list-style-type: none"> <li>▪ Defects Contained</li> <li>▪ Defects Escaping</li> <li>▪ Scrap, Rework Effort</li> <li>▪ Requirements/Model Traceability</li> <li>▪ Requirements/Test Case Traceability</li> <li>▪ Change Request/Test Case Traceability</li> </ul>
Technology Effectiveness	<ul style="list-style-type: none"> <li>▪ Requirements Coverage</li> </ul>
Customer Satisfaction	<ul style="list-style-type: none"> <li>▪ Customer Reported Defects</li> </ul>



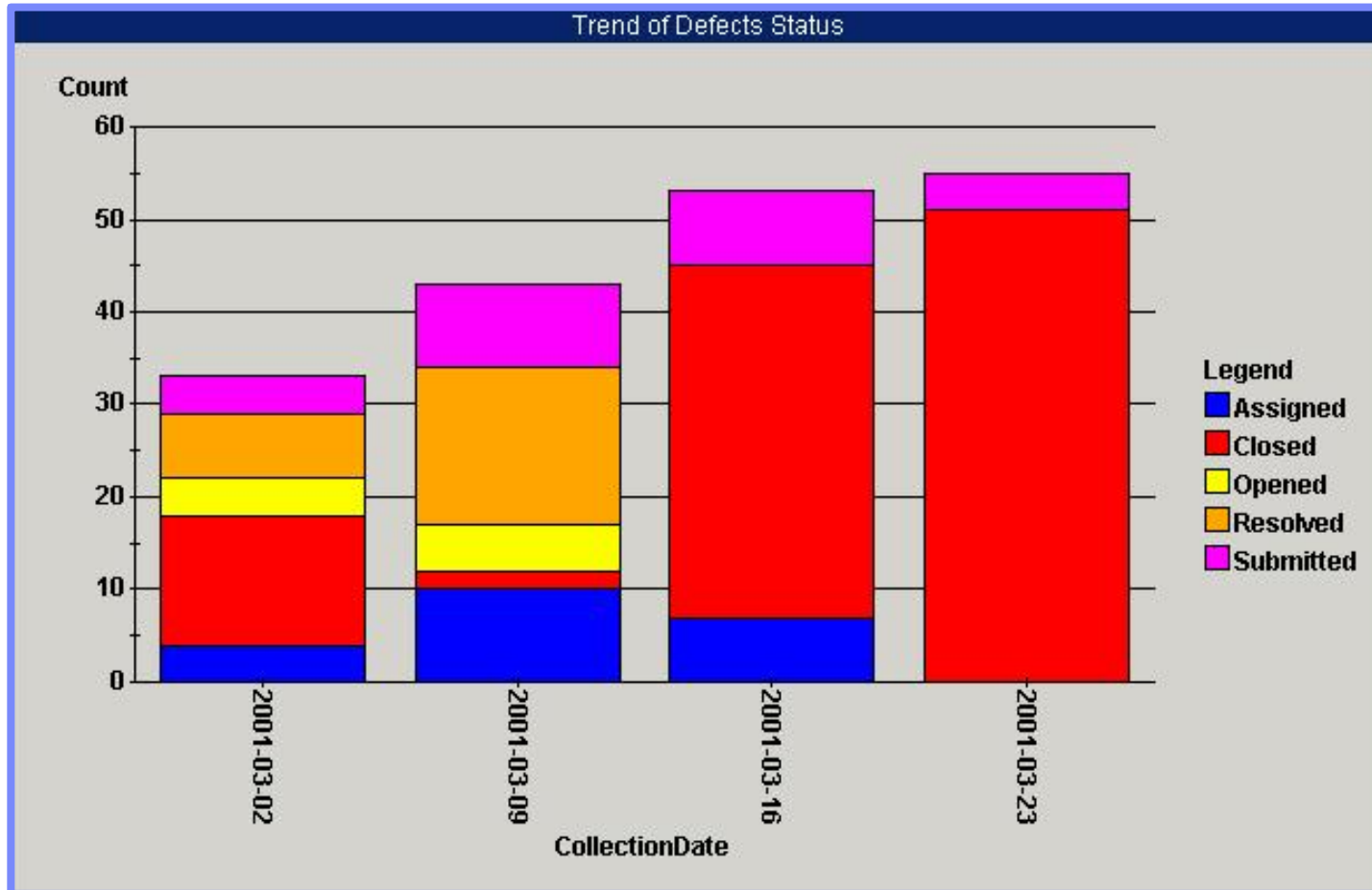
# Measuring The Transition Phase

- Primary Objectives:
  - ▶ Achieve user self-supportability
  - ▶ Achieve stakeholder concurrence that deployment baselines are complete and consistent with the evaluation criteria of the vision
  - ▶ Achieve final product baseline as rapidly and cost effectively as practical
- Artifacts:
  - ▶ Executable releases
  - ▶ Updated system models
  - ▶ Release descriptions, including quality assurance results
  - ▶ Updated user manuals
  - ▶ Updated deployment documentation
  - ▶ Training Materials
  - ▶ Project Close-Out Plan portion of the Software Development Plan
- Evaluation based on:
  - ▶ Satisfaction of user
  - ▶ Actual expenditures versus planned



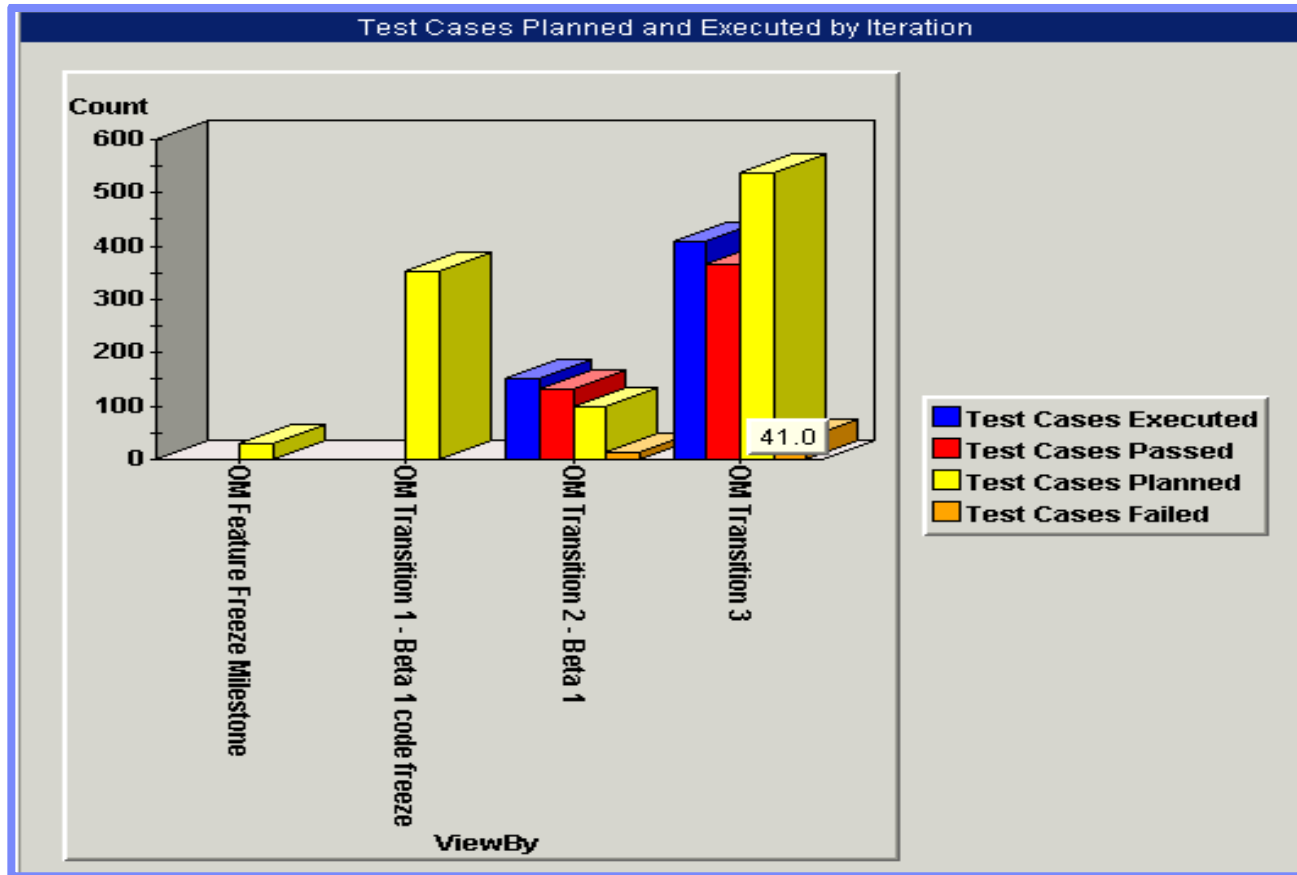
# Measuring The Transition Phase

- Trend of Defects Status in this Release



# Measuring The Transition Phase

- Trend of Tests Planned, Executed and Passed



## Transition: Other Measurements To Monitor

Information Category	Prospective Measures
Schedule and Progress	<ul style="list-style-type: none"><li>▪ Task Completion</li><li>▪ Change Requests Opened, Resolved</li><li>▪ Test Case Progress</li></ul>
Resources and Cost	<ul style="list-style-type: none"><li>▪ Earned Value – BCWS, BCWP, ACWP, SPI, CPI, SV, CV</li></ul>
Product Quality	<ul style="list-style-type: none"><li>▪ Defects</li></ul>
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# Accessible, Accurate Project Information

- Improve communication with a central project Web site
- Find current artifacts through dynamic Web site generation
- Adapt your information structure to organizational needs

*Simplify access to project information*



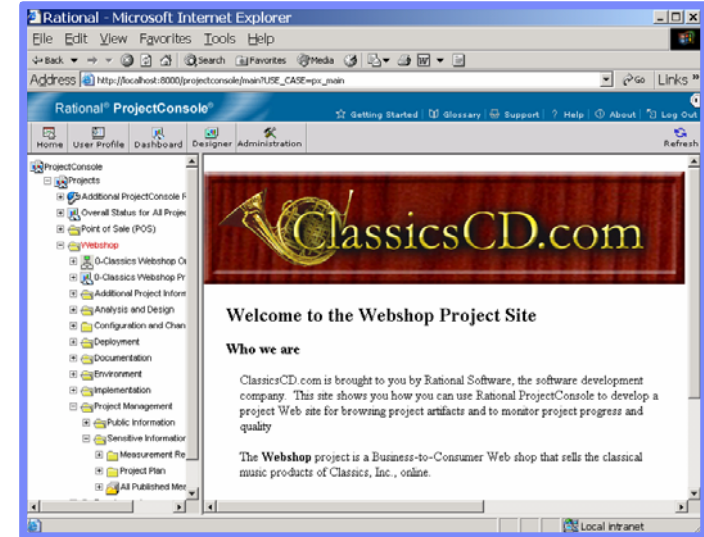


# Simplify Communication With Project Web Site

## Project Website



Extract & Organize



Navigate & Analyze



# Find Current Artifacts In a Dynamic Web Site

The screenshot shows the Rational ProjectConsole web interface in a Microsoft Internet Explorer browser. The main content area displays a class diagram for the 'Package: Point Of Sale'. The diagram includes the following classes and relationships:

- StoreInfo** (Class Module): Contains methods `getState()`, `getCity()`, and `getStoreID()`.
- Catalog** (Class Module): Contains methods `getReorderLevel()`, `getProduct()`, and `setProduct()`.
- ProductCategory** (Class Module): Contains attributes `mvarProducts : Collection` and `mvarName : String`. It has a 1..n association with the **Product** class.
- Product** (Class Module): Contains attributes `mvarDescription : String`, `mvarPrice : Currency`, `mvarSKU : String`, `mvarReorder_Level : Long`, and `mvarOnHand : Long`. It has a 1..n association with the **ProductCategory** class.

At the bottom of the interface, it states: "Subpackages: No subpackages are defined in this package." The browser's address bar shows "Local intranet".

**Tree Browser Navigation**

**Update Report on Demand**

**Current Project Information**

# Adapt Your Information Structure To Organizational Needs

- Sample Web site provided
  - ▶ IBM Rational RequisitePro, ClearQuest, ClearCase, Rose, and Microsoft Project used as a starting point
- Customizable templates for flexibility
  - ▶ 150+ out-of-the-box templates available as starting point
- Restrict information access by user/group
- Individuals can create personalized views

Query Results: Public Queries/All Unresolved Defects

ID	Headline	State	Priority	Owner
CLSI00000041	delete item not working correctly	Opened	2-Give High	Sandy Muldoon
CLSI00000046	too many spaces in 'change due' field	Assigned	3-Normal Queue	Dale King
CLSI00000049	sales tax incorrect for NH	Assigned	1-Resolve Immediately	Morgan Whiteside
CLSI00000051	inventory report is not running correctly	Assigned	1-Resolve Immediately	Morgan Whiteside
CLSI00000053	overriding price operation allows negative number	Assigned	2-Give High	Devon Platten
CLSI00000055	part number column not wide enough	Opened	3-Normal Queue	Jan Dillard
CLSI00000056	add item button is out of line with the other buttons	Assigned	3-Normal Queue	Morgan Whiteside
CLSI00000057	context sensitive help fails from reorder window	Assigned	2-Give High	Chris Maguire
CLSI00000059	formatting does not look right in inventory report	Opened	Attention	Dale King
CLSI00000059	add items fails for large quantities	Opened	2-Give High	Chris Maguire
CLSI00000061	shortcut to logout does not work	Assigned	Attention	Chris Maguire
CLSI00000062	unable to add item already in sale list	Assigned	2-Give High	Dale King
CLSI00000063	cancel sale leaves item in purchase list	Opened	3-Normal Queue	Dale King
CLSI00000065	inventory report is displaying an empty column	Assigned	3-Normal Queue	Alex Sawyer
CLSI00000070	application crashes with low memory condition	Assigned	2-Give High	Chris Maguire
CLSI00000071	application crash if logout before reorder is complete	Assigned	1-Resolve Immediately	Sandy Muldoon
CLSI00000072	reorder quantity is sometimes incorrect	Assigned	2-Give High	Dale King
CLSI00000073	Starting main	Submitted	Attention	
CLSI00000074	Leak search complete	Submitted	Attention	
CLSI00000074	Searching for all memory leaks...	Assigned	2-Give High	Dane Buckley
CLSI00000076	The System Sometimes Crashes When Ordering CDs	Assigned	1-Resolve Immediately	Dale King
CLSI00000077	The system takes forever when the customer orders a CD	Assigned	1-Resolve Immediately	Jan Dillard
CLSI00000078	Quick Search should not be case-sensitive	Opened	4-Low Priority	Chris Maguire
CLSI00000079	Catalog page after search is cleared not in alphabetical order	Assigned	2-Give High	Alex Sawyer
CLSI00000080	Site "hangs" when server is down	Assigned	2-Give High	Alex Sawyer
CLSI00000083	Link to "Home" does not go to ClassicsCD home page	Opened	3-Normal Queue	Jan Dillard
CLSI00000084	Registered user cannot proceed to Cashier	Submitted	Attention	
CLSI00000086	Wrong quantity of items placed in Shopping Cart	Assigned	1-Resolve Immediately	Sandy Muldoon
CLSI00000088	Home page is too big	Submitted	Attention	
CLSI00000089	Remove item from shopping cart... it still displays	Submitted	Attention	
CLSI00000091	Stock/reorder message not correct	Submitted	Attention	
CLSI00000092	Wrong error for incorrect password	Submitted	Attention	



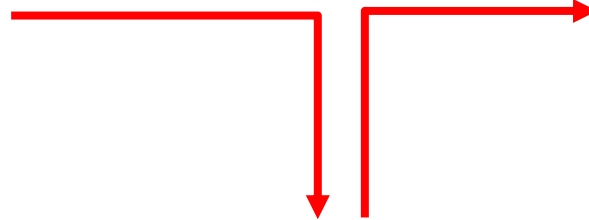
# Improve Measurement Quality: Automated Collection

Information dynamically collected from IBM Rational Suite and select third-party tools

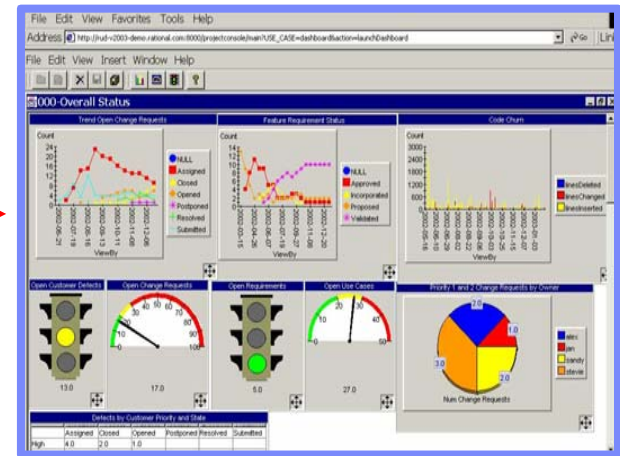


Collect

Analyze



Measurement Warehouse



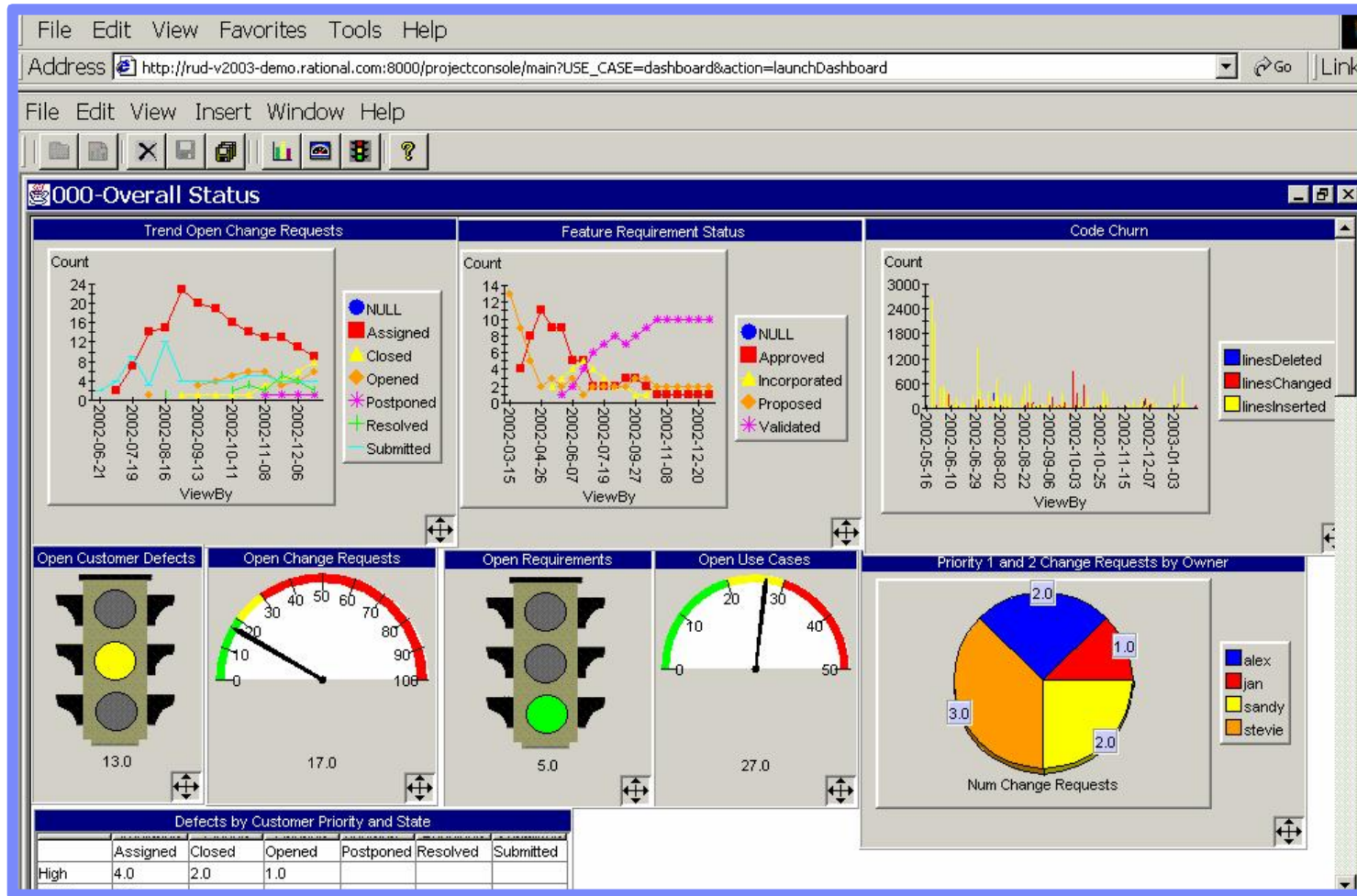
View & Query



Navigate & Analyze



# Assess Status Through Indicators And Charts



# Trend Analysts And Drill-Down

The screenshot displays the Rational ProjectConsole Dashboard in Microsoft Internet Explorer. The dashboard includes a tree view on the left, a gauge chart for 'Open Requirements', a bar chart for 'Distribution of Open Requirements by Priority', and a line chart for 'Trend of Lines Added, Modified, Deleted'. A context menu is open over the dashboard, listing various actions like 'Drill Down', 'Show Legend', and 'Delete'. A table is also visible in the bottom right corner of the dashboard area.

hed	Postponed	Resolved	Submitted
			4.0
	1.0		
		1.0	
		1.0	

# Summarize Status For Multiple Projects

Overall Status for All Projects - 2003-01-24

Project	Status	Open High Priority Change Requests	Gilespath*	Test Coverage	Change Requests to Verify
ClassicPOS		21	10.00%	No Data	11
Webshop		0	-15.43%	85.71%	2

Single report for all project status

Key status information for all projects

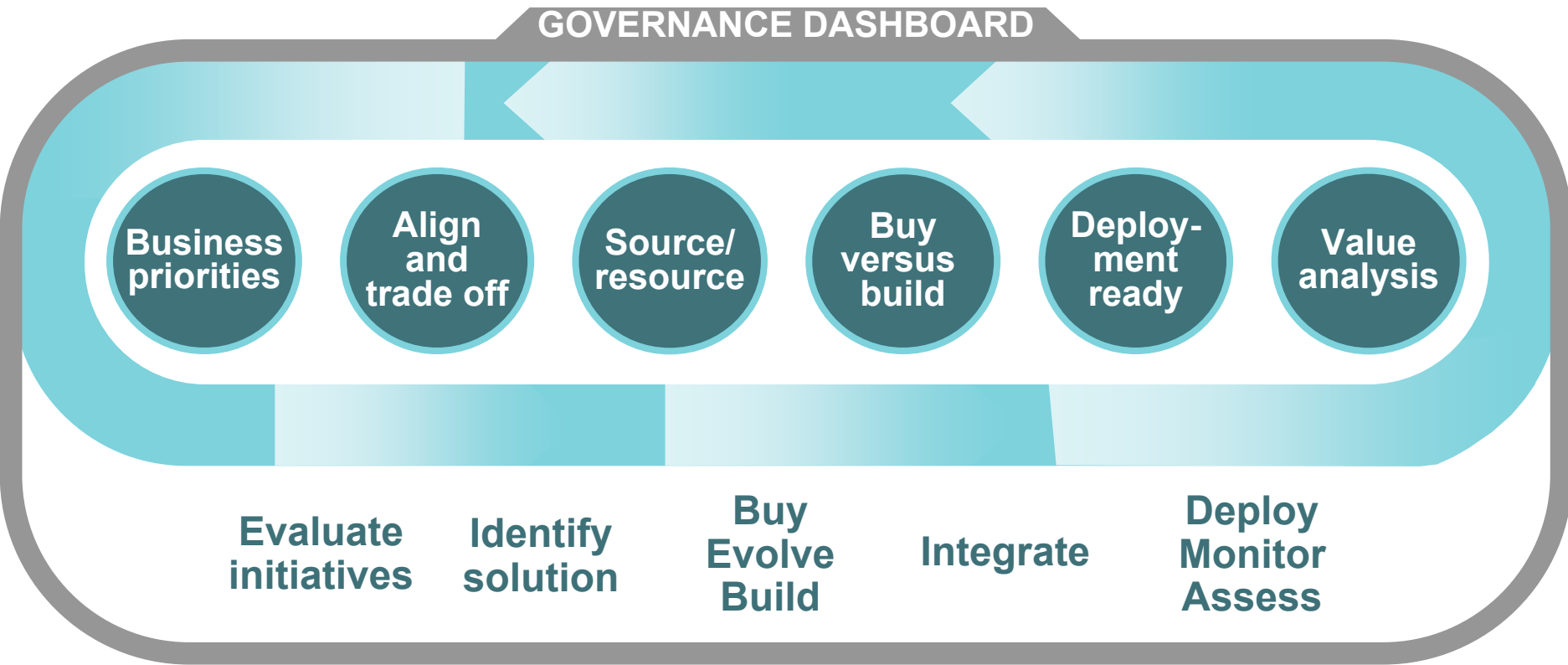
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# Business Driven Development lifecycle



**Informed decisions drive development activities**



# Rational Portfolio Manager in action

## *Determining investment priorities*

### GOVERNANCE DASHBOARD

Business priorities

Align and trade off

Evaluate initiatives

Identify solution

Buy  
Evolve  
Build

Integrate

Deploy  
Monitor  
Assess

***“Having a consolidated view of the project pipeline allows companies to realize savings of 20% to 45% by eliminating redundant projects, taking corrective action on those running off course, and selecting projects that provide the strongest paybacks.”***

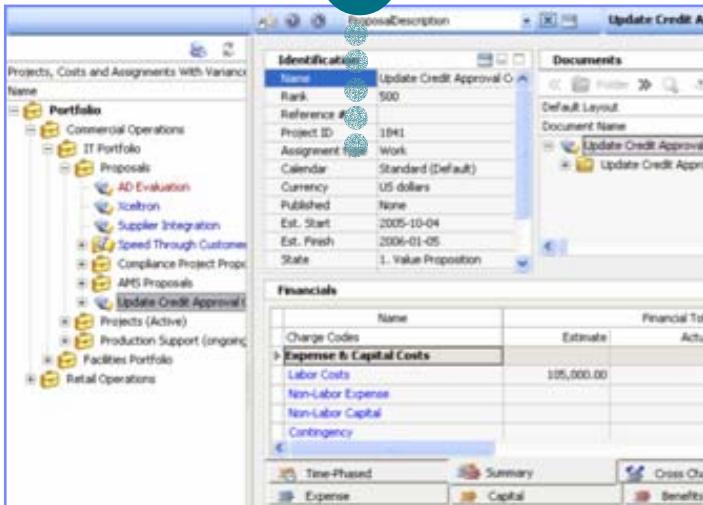
*Forrester Research “Integrated IT Management Drives Efficiency” February 2005*



# Rational Portfolio Manager in action

## Evaluating risk and reward of competing initiatives

Project proposal submitted for planning and assessment



Consistent criteria used to assess and prioritize proposals



Auditable project approval authorizes effort



***“Leveraging Rational Portfolio Manager, Information Management has earned a seat at the table for making strategic decisions. We are no longer viewed as a sunk cost or a necessary evil, we are viewed as an essential partner in Contact Energy’s business.”***

*Jos Kunnen, CIO, Contact Energy*



# Rational Portfolio Manager in action

## *Global resource management*

### GOVERNANCE DASHBOARD

Source/  
resource

Evaluate  
initiatives

Identify  
solution

Buy  
Evolve  
Build

Integrate

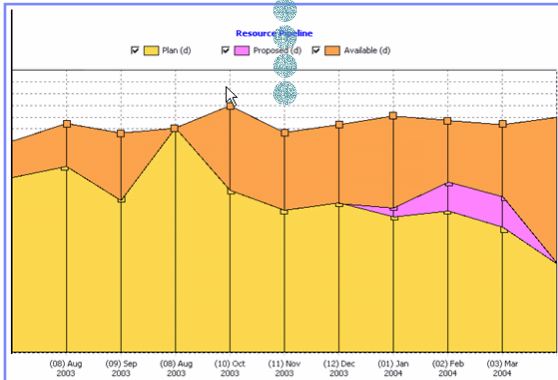
Deploy  
Monitor  
Assess



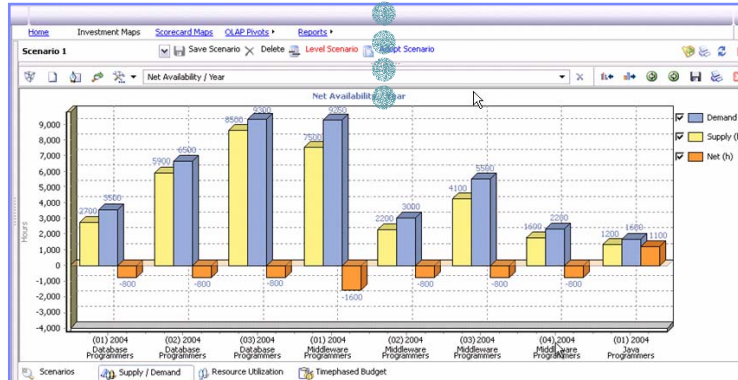
# Rational Portfolio Manager in action

*Forecast, plan and assign resources to create the solution in a global environment*

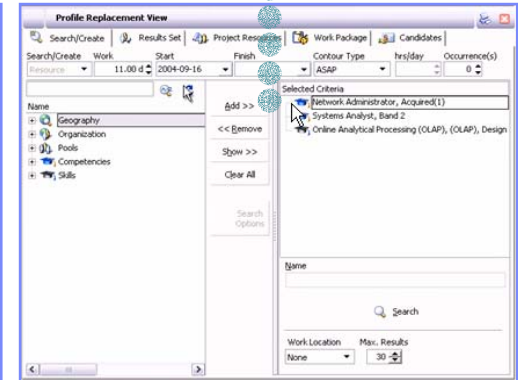
Supply and demand analyzed for early warning of spikes and shortages



What-if analysis optimizes resource allocation and demand scheduling



Globally distributed resources located and assigned in real-time



***“IBM Rational Portfolio Manager has provided us with a borderless resource environment”***

*Joe Londa, IBM Engineering & Technology Services*

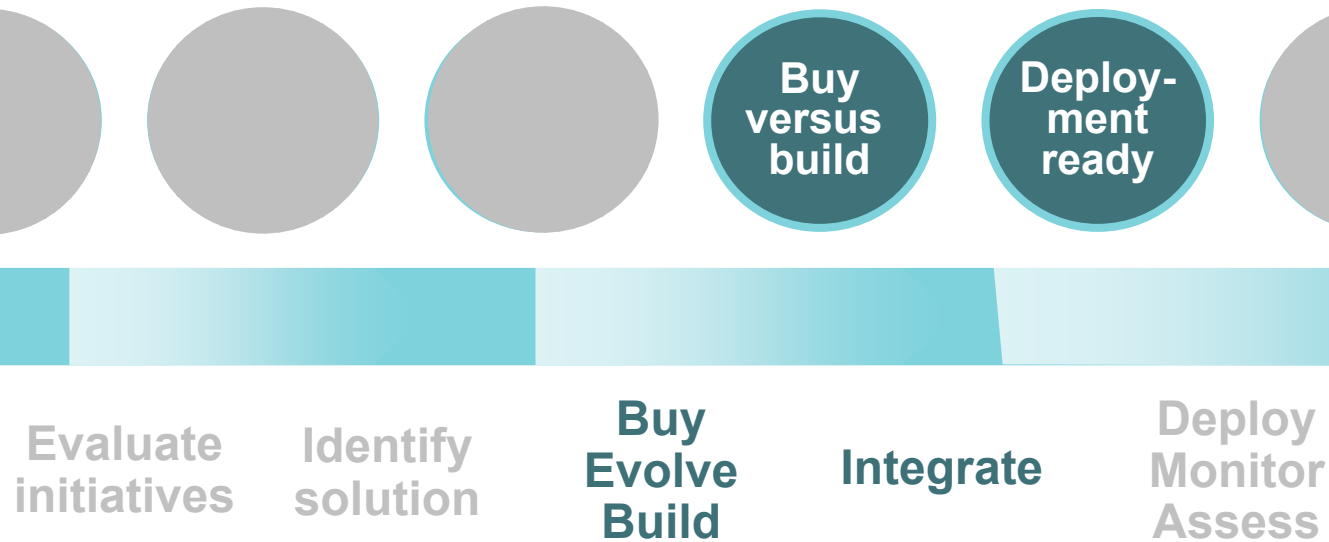


What keeps me Rational?

# Rational Portfolio Manager in action

*Optimize execution of projects and processes*

## GOVERNANCE DASHBOARD



***“Strategy without execution is hallucination.”***

*Thomas Edison*



# Rational Portfolio Manager in action

*Turn best practice into daily practice*

**RUP best practices captured, standardized and deployed consistently to project teams**

**Centralized enterprise project management integrates RUP and project execution**

**Integrated scope management assesses the impact of issues, changes and risks**



Role: Business Relationship Director

Service Proposal Process

- Service Identification
- Service Ownership
- SOA Center of Excellence
- Service Funding
- Business Representative
- IT roles

Business Relationship Director

- Responsible for Tasks
  - Develop Business Needs Request
  - Review BNR against SOA Guiding Principles
  - Create a New Service Request
  - Service Funding Prioritization
  - Approve Service Funding
- Participates in Tasks
  - Work Products Modified
  - Business Service Champion
  - Line of Business Stakeholder

Relationships

Business Relationship Director performs Develop Business Needs Request, Review BNR against SOA Guiding

Marketing

- Program 1
  - Proposal
  - Import
    - One: Feb 26, 50,0 %
    - Two: Feb 27, 50,0 %
    - Three: Mar 02, 0,0 %

Name	Initiative	Indicators
<b>Exceptions</b>		
Import	Import	
Sale Proposal For Volvo	n	
Requirements	n	
Change Requests	n	
Service Requests	n	
Action Items	n	
Defects	n	
Issues	n	
Risks	n	

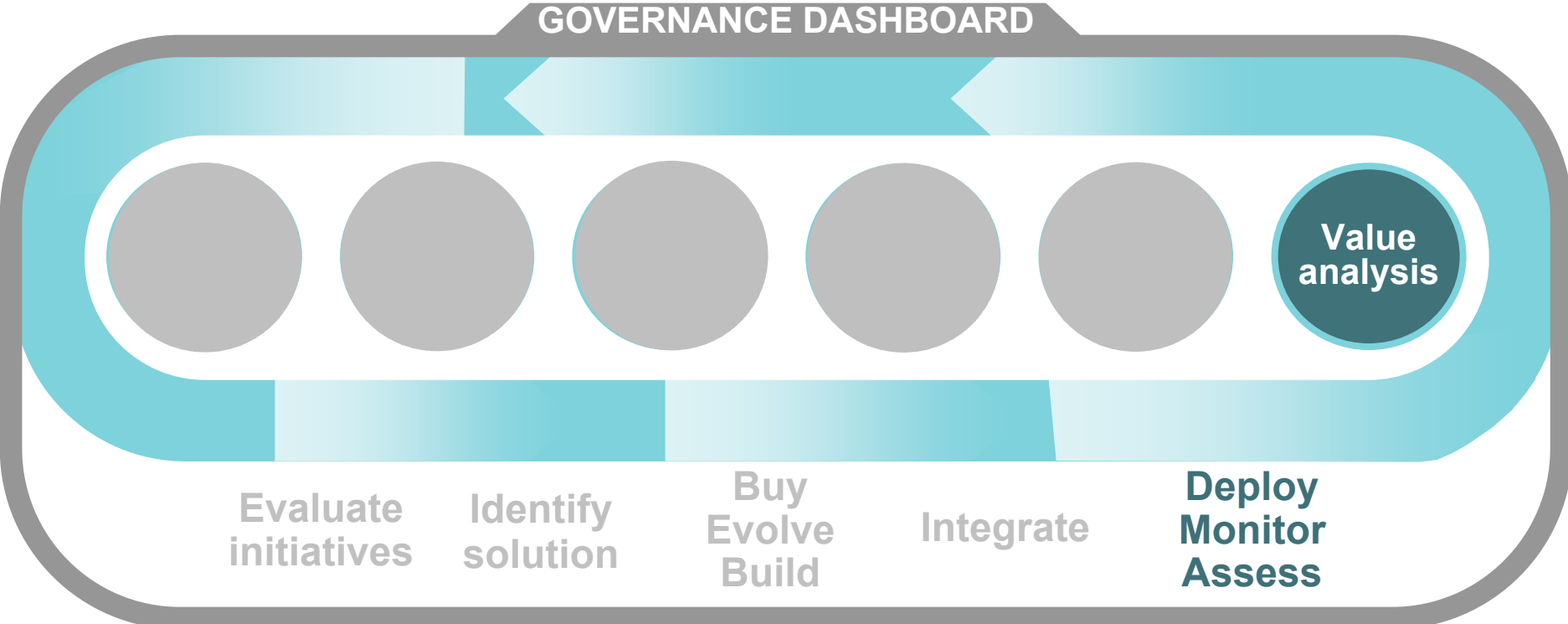
***“Rational Portfolio Manager has raised our project management up to a higher level. Our project managers feel more professional having a professional grade tool.”***

*John Kirkbride, Director of AME Delivery, SITA*



# Rational Portfolio Manager in action

## *Measure and control investments*



**Only 31% of firms are able to track data to evaluate IT investment performance and benefits. Most financial institutions lack both the data and the business-oriented metrics needed to measure returns on IT investments, so accepting the status quo offers little chance for performance improvement.**

*“Reaching efficient frontiers in IT investment management” IBM Institute for Business Value, Dec 2004*





# Rational Portfolio Manager in action

*Measure and control progress to ensure value creation*

Calculate earned value to predict project performance

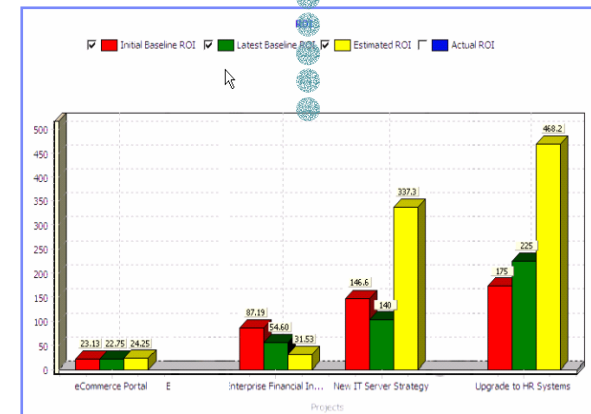


Default Layout		Earned Value								
Name	PV (BCWS)	EV (BCWP)	AC (ACWP)	BAC	EAC	VAC	SV	CV	CPI	SPI
<b>Portfolio</b>										
Austin Test 157			270,00	270,00	-270,00	-270,00				
Austin Test 157\{			270,00	270,00	-270,00	-270,00				
Austin Test 157\}			270,00	270,00	-270,00	-270,00				
Austin 159			40,00	40,00	-40,00	-40,00				
Deliverable			40,00	40,00	-40,00	-40,00				
Task			40,00	40,00	-40,00	-40,00				

Early warning through business and technical trends in an integrated dashboard



Detailed analysis through dashboard drill down



***“Prior to Rational Portfolio Manager, we were forced to guess about costs at the beginning of each new project. Now we are able to access real costs from previous similar projects and make more educated cost projections.”***

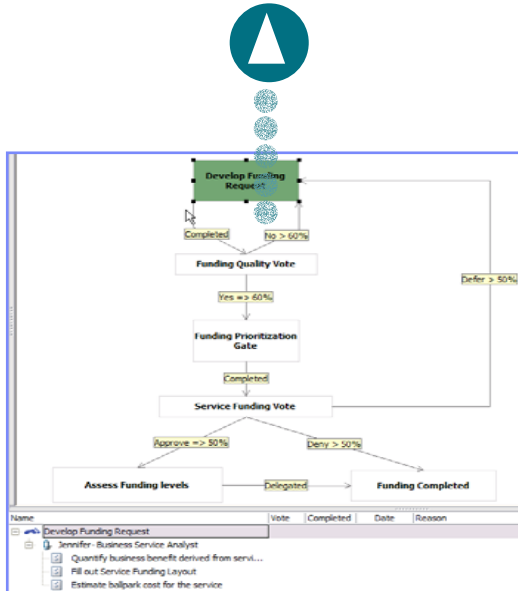
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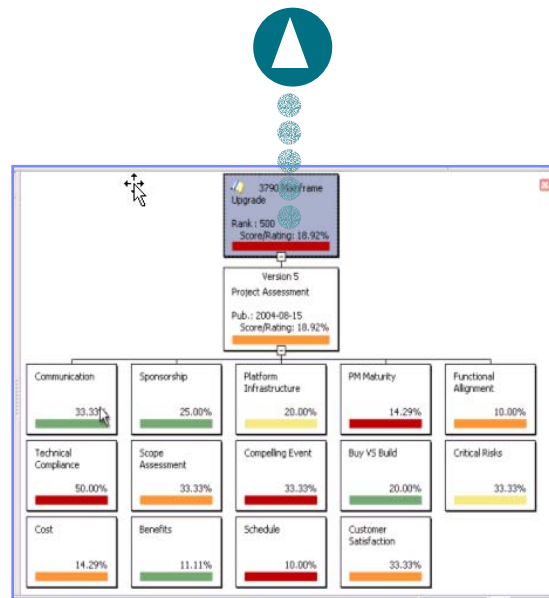
# Rational Portfolio Manager in action

*Ensure regulatory compliance and standards oversight*

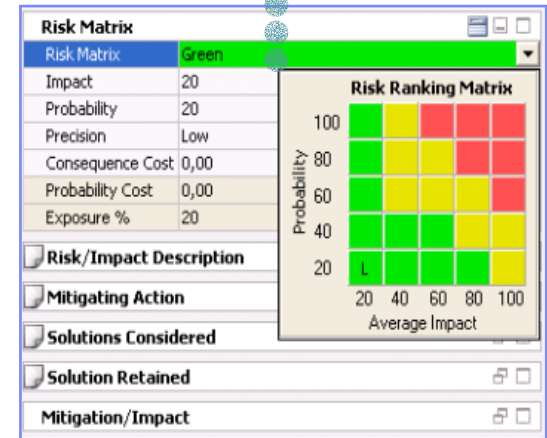
**Audit-ready automated workflows enforce decision rights and responsibilities**



**Scorecards assess organization and project-level compliance**



**Systematic risk management at the organization, portfolio and project levels**



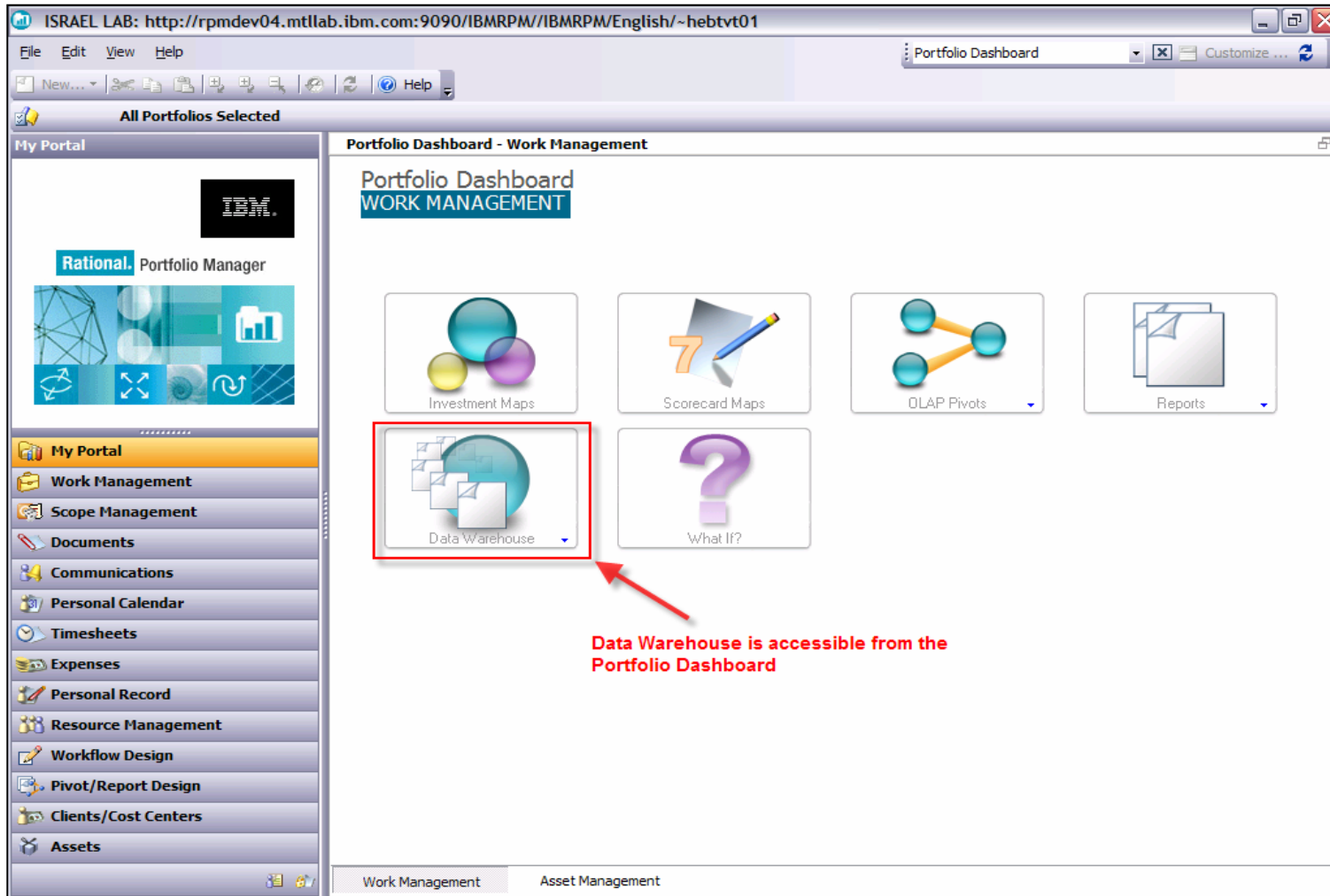
***“By 2006, public companies that do not adopt a compliance management architecture will spend 50 percent more annually to achieve Sarbanes-Oxley compliance”***

*Gartner*



What keeps me **Rational**?

# New in v7.1 – Data Warehouse



## New in 7.1 – Data Warehouse

- Can view details about current project assignments in RPM
- Can view RPM trend information
- Can create reports from information within the warehouse



The data warehouse has an open architecture



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# Measurement enables Governance

- You can't control what you can't measure
  - ▶ Need to measure current state
  - ▶ Need to measure historical state
- You can't achieve good governance without some control
  - ▶ Use the Governance Dashboard to control and Align your business with your development activities





# Questions





# Thank You

