Measuring the Return on Investment of Your Adoption of Agile and the IBM Rational Collaborative Lifecycle Management Solution

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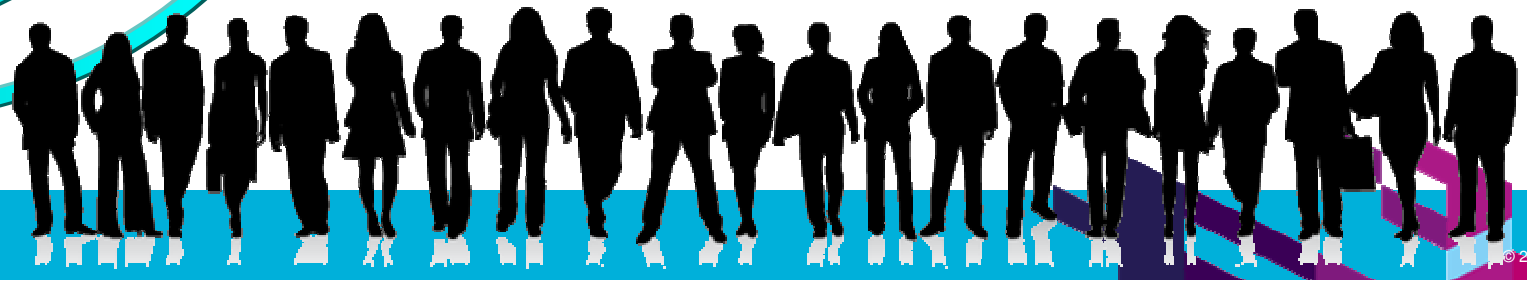
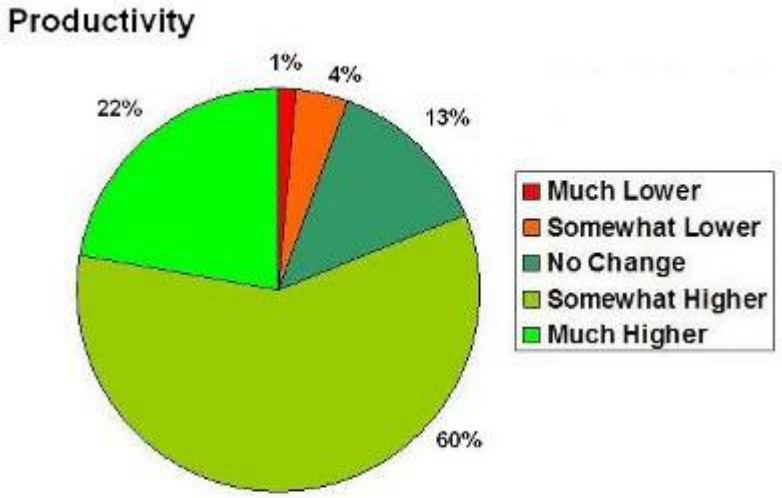
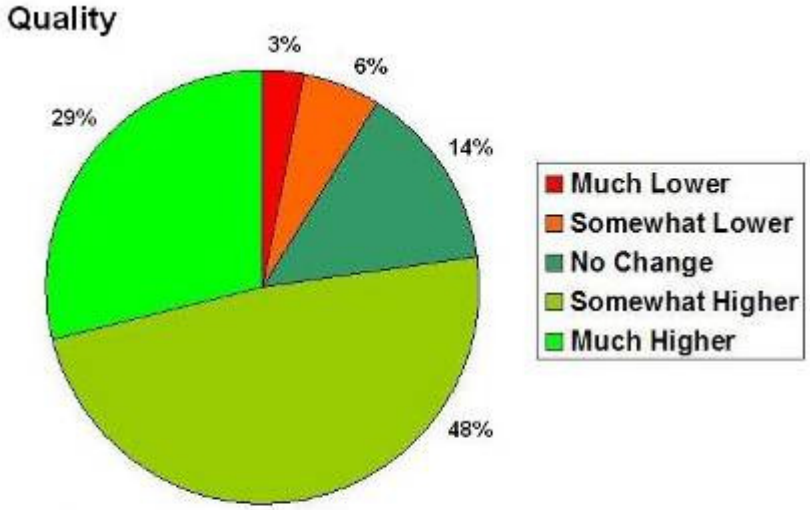
Discussion Points

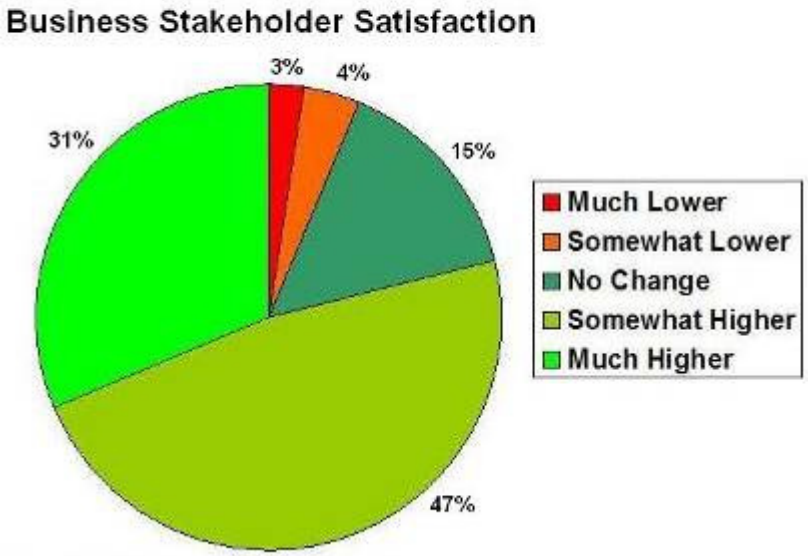
1. **Why agile and ALM?**
2. Establishing an adoption roadmap
3. Monetizing the value of agile and ALM
4. Monetizing organizational value
5. Monitor progress and take corrective action
6. In review

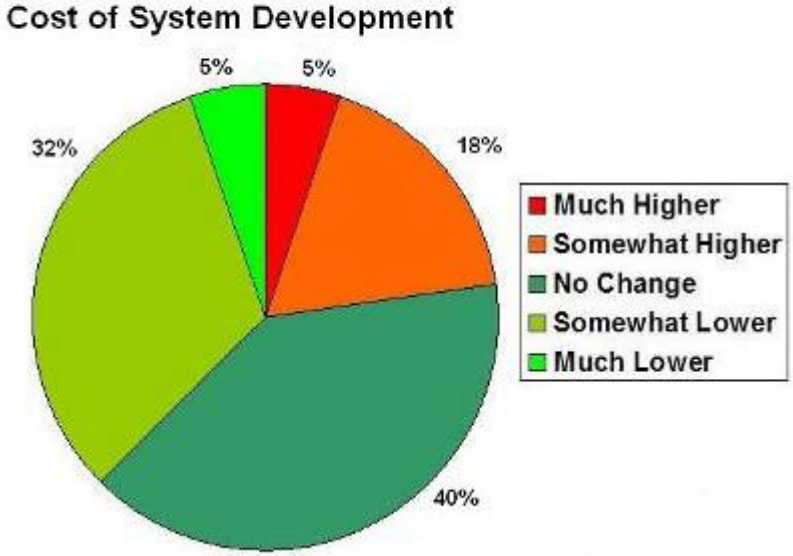


Why Agile? Because it Works!







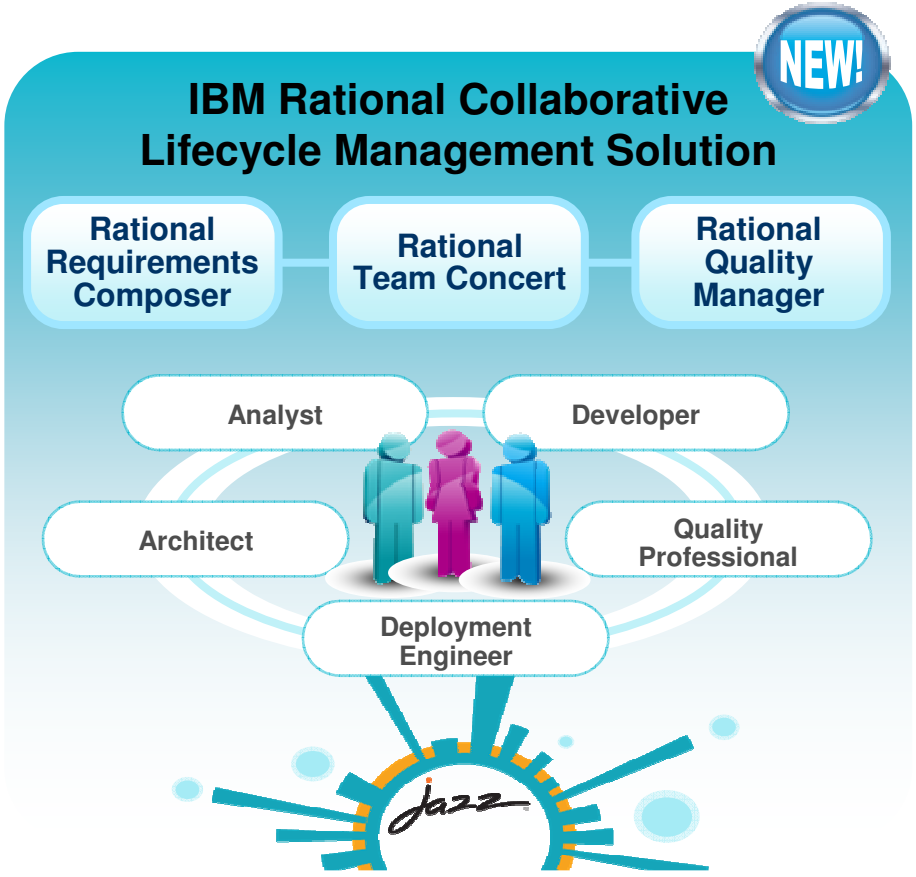


Source: Dr. Dobb's Journal 2008 Agile Adoption Survey

IBM Rational Collaborative Lifecycle Management Solution

Improve productivity by 4-6% annually with an integrated ALM solution

- **Optimize your team through support of the 5 ALM Imperatives**
  - Real-time planning
  - Lifecycle traceability
  - In-context collaboration
  - Development Intelligence
  - Continuous Improvement
- **Get up and running quickly**
- **Extend as your needs evolve**
- **Support heterogeneous development across multiple platforms and technologies**



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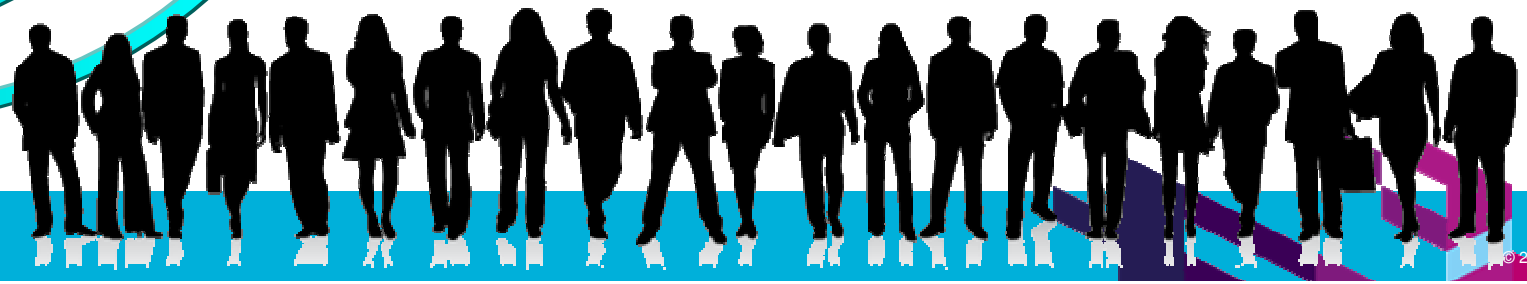
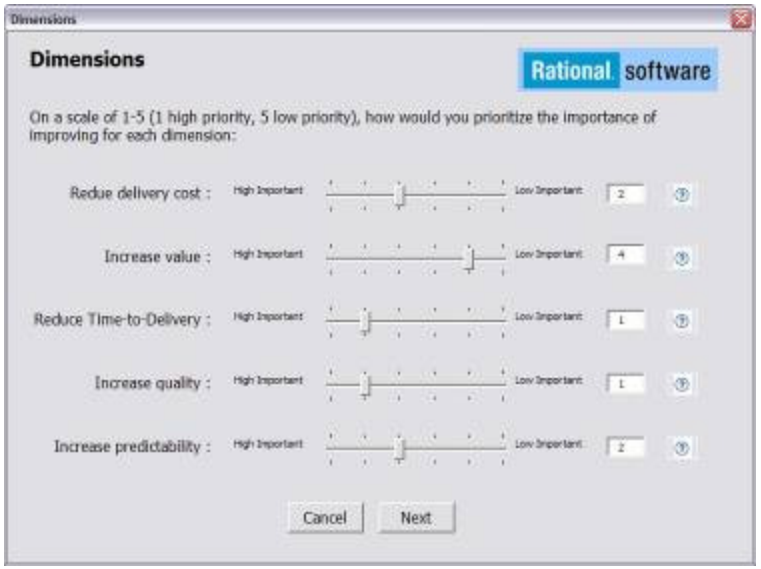


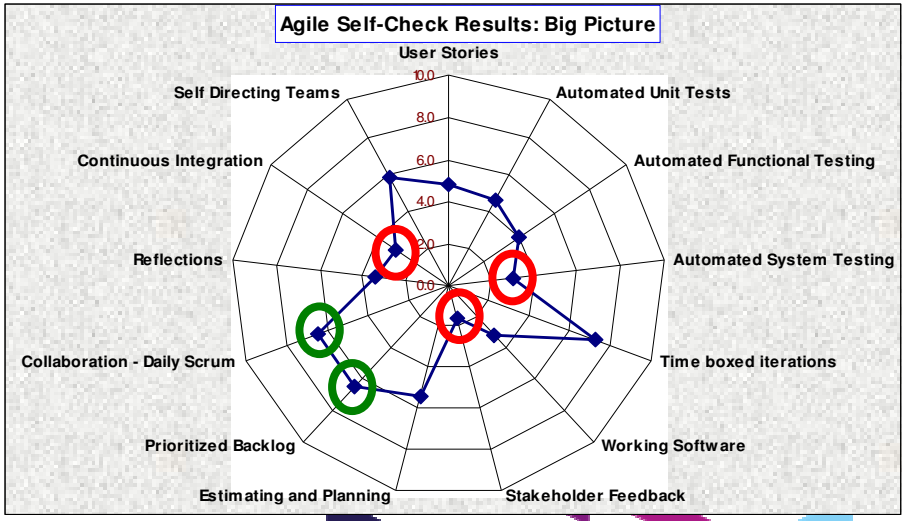
Key Steps When Identifying a Roadmap

1. Understand your business drivers and pain points
2. Understand the correlation between business drivers / pain points and practices / tool capabilities addressing those pain points
3. Understand your project profile and the value different practices / tool capabilities have for your project profile
4. Understand the state of your adoption level of key practices / tool capabilities
5. Focus adoption on the practices and tool capabilities providing your project with the greatest value

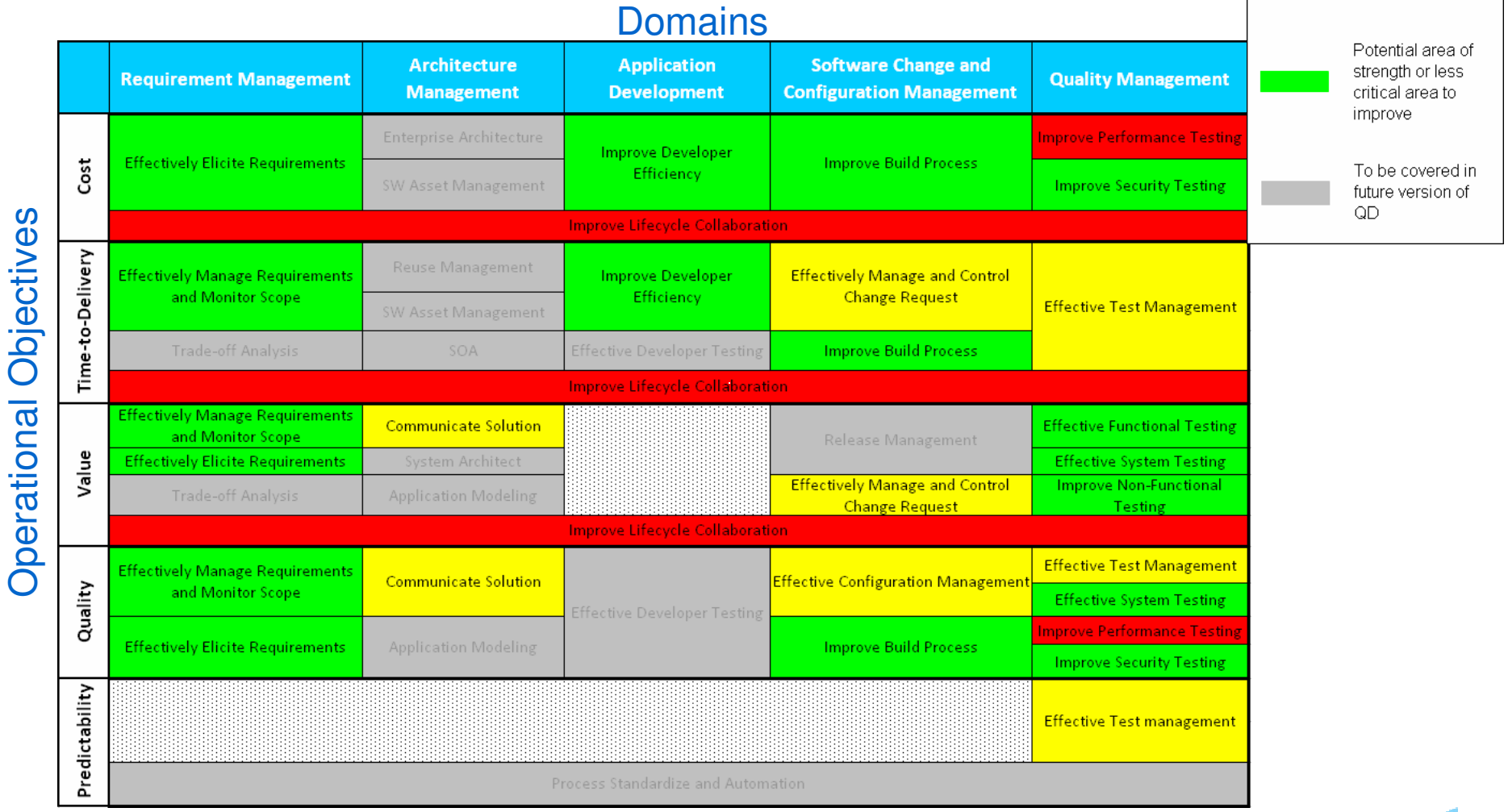
Quick Diagnostics and Self-Check

- IBM Rational has developed a quick and structured approach for determining what agile approach is right for you
  1. Discussion with leadership team. Determine complexity factors, prioritize operational objectives, discuss current issues and desired direction. (~2 hours)
  2. Facilitated self-assessment. Assess 1 or 2 teams agile strengths and weaknesses. (~3 hours)
  3. Rational team takes the results and propose adoption roadmap.
  4. Discuss with leadership team and agree to adoption roadmap; Workshops, mentoring, tool deployment, agile focus areas, metrics.





5) Results: Heatmap, overview of prioritized improvement areas



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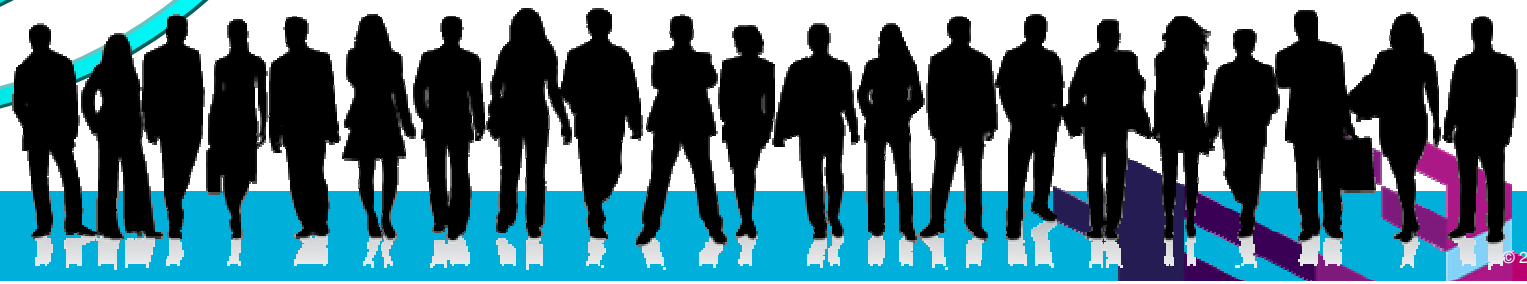

Monetizing the Value of Productivity Improvement

Step-by-Step Process

Function Points
Function Points
KSLOC
Story Points
Business Value Points

1. Decide on which unit you should use for measuring value
2. Determine past velocity for your teams and enter into spreadsheet
   - If you do not have baseline data, we provide industry baselines for FP and LOC if you fill in project type

Commercial
Web
MIS
Outsource
Commercial
Software Systems
Military

3. Enter your own velocity as you go through the project

	I1	I2	I3	I4	I5	I6	Average
Actual Value Delivered	50	80	80	90	100	120	86.67
Actual Effort (person-month)	7	7	7	7	7	7	7
Average velocity (value / person month)	7.14	11.43	11.43	12.86	14.29	17.14	12.38

4. Enter monthly burden cost

Monthly burden costs before ALM deployment	$12,000.00	Dollars
Monthly burden costs after ALM deployment	$11,000.00	Dollars

5. The spreadsheet calculates cost per unit of value delivered as well as cost savings

Costs per unit of value delivered before improvement	1659.75	Dollars
Costs per unit of value delivered after improvement	969.23	Dollars

This is your calculated improvement		
Productivity gain	5.150952381	FP / Person-month
Total Productivity Gain	**359,071**	**Dollars**

Optionally: Understand source of productivity improvement

- Measure time spent on different project times using the time tracking capability in RTC 3.0, and compare with baseline data
- Sample sources of customer-experienced productivity improvements
  1. Less time spent on face-to-face meetings
  2. Less rework
  3. Less time spent preparing status reports and documents
  4. Reduced integration, build, and system test cost
  5. Improved cost model due to larger percentage of developers in low-cost countries

Task 158

Summary:* Implement user authentication function

In Progress

Quick Information

May 1, 2011 - May 7, 2011 : 27 h

May 8, 2011 - May 14, 2011 : 37 h

Work item Total : 64 h

Time Tracking

Previous May 8, 2011 - May 14, 2011 Next

Owner	Time code	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Week Total	Total
user1	F2F meeting / Status update meeting	0	0	0	0	0	1	0	1	1
user1	Requirements	0	3	0	3	0	0	0	6	12
user1	Function / System Testing	0	0	0	0	1	1	0	2	2
user1	Review	0	2	2	0	0	0	0	4	4
user1	Deveelopment / Unit Testing	0	3	4	3	4	4	0	18	34
user1	Integration / Build	0	0	1	1	1	1	0	4	4
user1	Documentation	0	0	0	1	0	1	0	2	7

Monetizing the Value of Quality Improvement

Two key drivers:

1. Fewer defects found post deployment
   - A result of better test coverage, automated and frequent testing
2. The average defect is found earlier in the lifecycle, when the cost of finding them is lower
   - A result of iterative and agile development, enabled through improved lifecycle integration

- Problem: How do you know the cost of a defect
- Solution: If you have collected your own baseline data, use it. If not, we make it easy to select relevant industry data

Monetizing the Value of Quality Improvement

Step-by-step Process (1 out of 2)

Goal: Monetize the value of Quality Improvement post deployment of our ALM

1) Enter project information

Project Type	Commercial
Project Effort	48
Development Process before ALM deployment	Scrum

Web
MIS
Outsource
Commercial
Software Systems
Military

Iterative
RAD
RUP
Scrum
Six-Sigma for SW
SOA
Waterfall
XP

2) Adjust defect removal efficiency rate at release time (optional)

Adjust defect removal efficiency rate at EGA (optional)	
Defect Removal Efficiency Rate at eGA	94%
Defect Removal Efficiency Rate by Iteration:	
Iteration 1	5%
Iteration 2	9%
Iteration 3	28%
Iteration 4	52%

Pre-populated based on process selection

(Bseline data from Capers Jones)

3) Select industry baseline for the cost of fixing defects or adjust your own data (optional)

4) Estimated software size and number of potential defects (Automatically calculated)

Monetizing the Value of Quality Improvement

Step-by-step Process (2 out of 2)

5) Enter actual number of class 1 and class 2 defect closed for each iteration

	Class 1 Defects	In-Progress				% Defects Targeted for eGA+12 Months Remaining	Post-Delivery		Total
		I1	I2	I3	I4		eGA+3 months	eGA + 12 months	
Benchmark data	Cost of fixing a defect	$45	$120	$360	$1,440		$11,400	$11,400	
	% Defect Removal Baseline distributed by iterations	4%	9%	26%	47%	14%	7%	7%	
	Expected class 1 defect count for project X	45	90	269	492		73	73	1,041
	Expected cost for defect fixing	$2,015	$10,744	$96,699	$709,128		$830,814	$830,814	2,480,213
Actuals	% of Defect Removal	4.63%	12.30%	29.60%	42.74%		5.09%	5.64%	
	Actual class 1 defects closed	50	133	320	462		55	61	1,081
	Actual cost for class 1 defect fixing	$2,250	$15,960	$115,200	$665,280		$627,000	$695,400	2,121,090

Reduce cost by fixing defects earlier in the lifecycle

Reduce cost by having fewer defects post deployment

Savings: The diff between Actuals and Expected

6) Savings are automatically calculated from the above table

Total Costs of Saving Due to Improve Quality	**$488,771.10**

Monetizing the Value of Reduced Time To Value (TTV)

Applications fall into either of 3 main categories

1. There is no incremental value from early delivery
   - Example: Make this application SOX compliant before 2012-12-31.

2. The benefit stream of the application occurs earlier

   - Approximate benefit stream as linear.
   - We believe this to be the most common case for a majority of inhouse application.
   - Example: This application increases efficiency of our Travel Auditing process by 10%.

3. The benefit of early release increases (potentially dramatically) due to the benefit of being ‘early to market’
   - True for applications in a highly competitive market. Example: Mobile device market.
   - The size of this benefit should be estimated on a case by case basis, and we will not provide a formula for this.

Monetizing the Value of Reduced TTV

2) The benefit stream of the application occurs earlier

- Problem: How do I calculate the monthly benefit stream of my application?
- Case A: I have done an ROI analysis, and I hence know the size of the benefit stream (less common)
- Case B: Within my organization, we expect a payback within a certain time period, e.g. 18 or 36 months (more common)
  - Apply average payback time based on financial guidelines.
  - Benefit stream can be estimated as Project Cost / Standard Payback time

1)	**Enter total project costs**		
	Project Costs	1,800,000	Dollars
2)	**Enter an estimated payback period**		
	Payback Period	36	Month
3)	**Monthly benefit stream**	50,000	Dollars

- Value can now be calculated as
  - "Reduction in TDD" = "Past Average TDD" – "TDD for this project"
  - "Incremental value" = "monthly benefit stream" * "Reduction in TDD"

4)	**Enter project durations**	
	Average past Time-To-Value (months)	12
	Month that product is actually released	9
	Time-To-Value Reduction	3
5)	**Calculate a total benefit stream gain from early release**	
	Total benefit stream gain	**$150,000**

Monetizing the cost for process improvement

- To calculate ROI, we also need to calculate the cost of deploying agile and ALM
- The below showcases sample cost streams to account for

	Sample: Cost for deploying ALM	
1)	**Enter number of pilot team members**	50
2)	**Enter deployment costs**	
	Hardware costs (amortized over 3 years)	$58,000
	Software licences costs (amortized over 3 years)	$146,000
	Services costs (installation, configuration and customization)	$30,000
3)	**Enter costs of training and mentoring**	$218,000
4)	**Adjust administration costs (on-going per year)**	$36,000
5)	**Total investment**	
	Investment for ALM deployment	$488,000
	Investment for ALM deployment per a team member	$9,760

Summary: Monetizing the Value

- Productivity
  - Monetize value of acceleration (Points, LOC, FP, Business Points, …)
  - Optionally measure the source for the productivity gain

- Quality
  - Monetize value of fewer defects post deployment
  - Monetize value of defects found earlier in the lifecycle, when the cost of finding them is lower

- Time-To-Value
  - Monetize value of the benefit stream of the application occurring earlier
  - Enable capturing the value of being 'early to market' in competitive markets

	Optimistic	Most Likely	Pessimistic
Estimated Productivity Gain	$124,200	$92,000	$59,800
Estimated Saving due to Quality Improvement	$648,000	$480,000	$312,000
Estimated Earning due toTime-to-Value Improvement	$202,500	$150,000	$97,500
Estimated Total Value	**$974,700**	**$722,000**	**$469,300**

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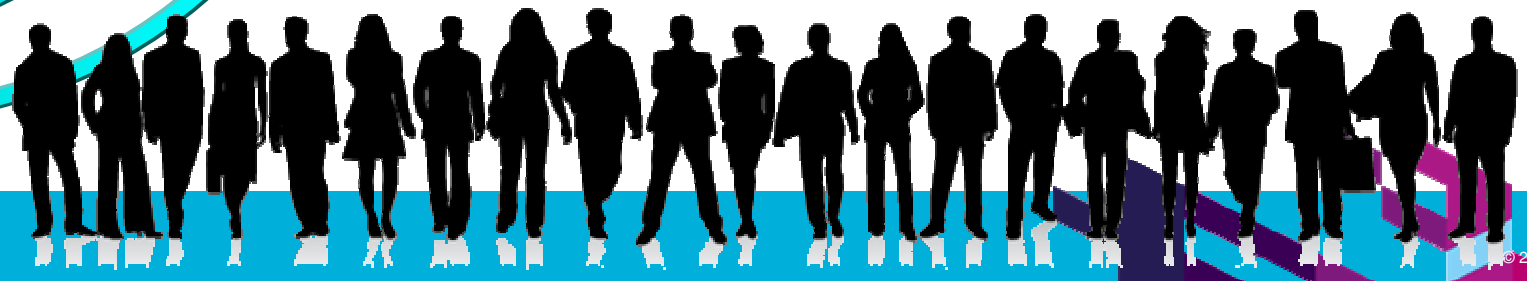


Developing a model for organizational level approval

- Problem:
  - When you adopt agile / ALM over a large organization, how can you assess the value?
  - If you extrapolate from a few projects, how do you know that they are representative?

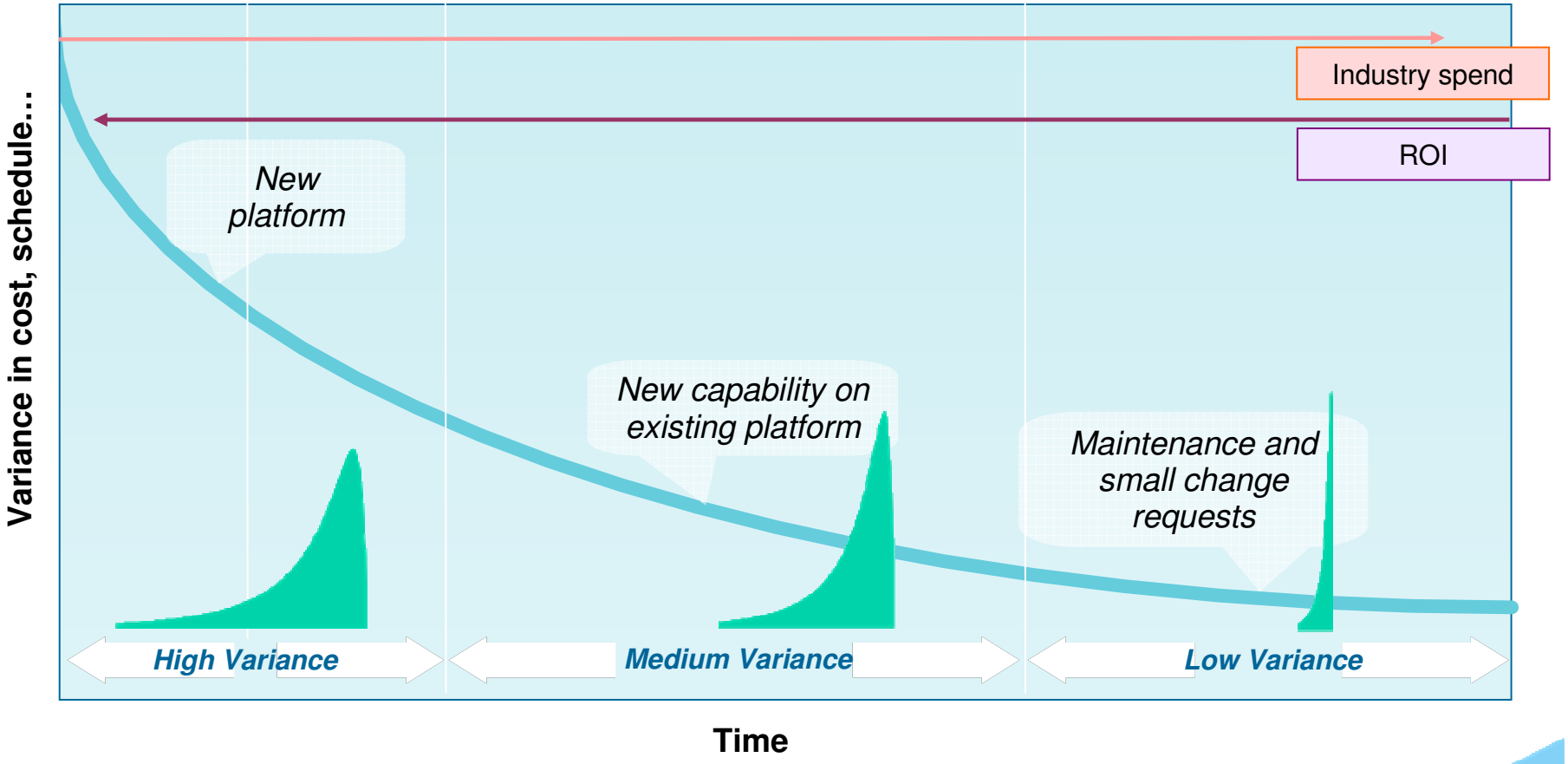
- Solution:
  - Categorize projects by type
  - Establish average monetized value by project type by measuring a set of individual projects for each project type
  - Do a sanity to ensure data is realistic. Did you only pick very successful projects? Some WILL fail…
  - Calibrate as you measure the data from more and more projects

This section borrows from Dave Lubanko and Murray Cantor

Variance in outcome reduces with increased application maturity

Leverage level of uncertainty as a primary category for project types

Other categories may apply for your organization, such current process, region, or maturity of team



Variance impact the importance of different productivity gains

	High Variance	Medium Variance	Low Variance
Productivity			
Quality			
Time-To-Value			

Legend
Critical
Valuable
Some value

The above table is the effect of a combination of what improvements can be achieved, and how much an organization cares about an improvement area.

Monetize value form multiple projects to understand organizational averages

Categorize by variance level

Sample calculation of value of enterprise-wide adoption

	High Variance	Medium Variance	Low Variance
Productivity (% of project cost)	3%	2%	2%
Quality (% of project cost)	2%	2%	3%
Time-To-Value (% of project cost)	4%	2%	1%
Cost of improvement effort (% of project cost)	-3%	-2%	-3%
Net gain (Sum of above %-ages)	6%	4%	3%
Total Organizational Expense ($K)	3,200	12,400	21,000
Monetized organizational value ($K)	$192	$496	$630

Be wary if your averages are too high!
Did you pick only the golden nuggets, or a true cross-sample?
See next slide for a sanity check…

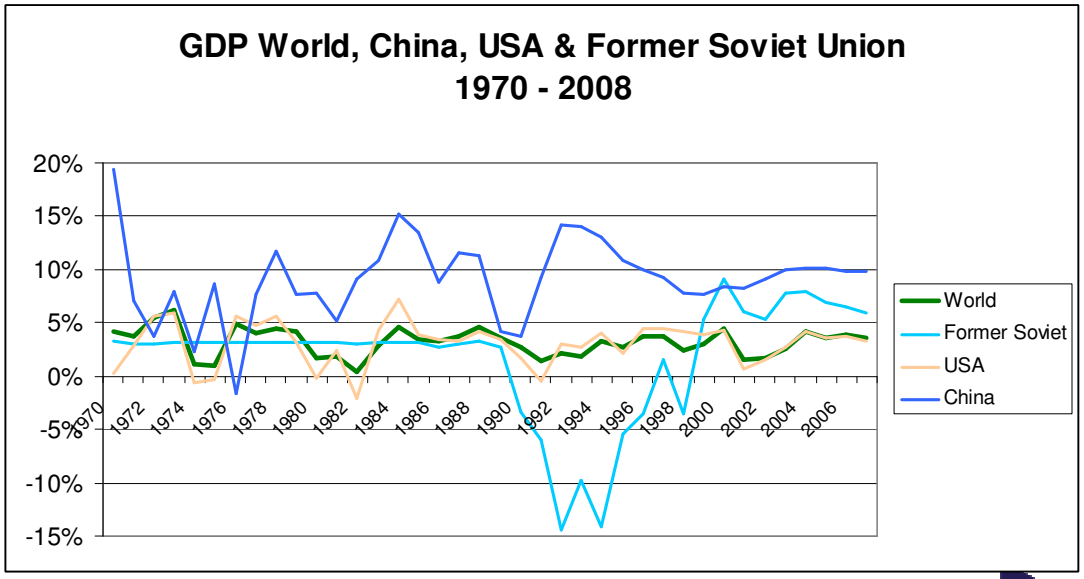
Improvement potential levels out with increasing organizational size Compare GNP growth

GDP Growth

- No one has sustained ~10% annual improvement for more than 5 consecutive years in the world in the last 40 years
  - Suitable as comparison for immature organizations

Software Development (What to expect)

- Mature organizations: Sustained annual productivity gains of 5%
- Emerging organizations: Target to outperform the rest of the market by 5% over a sustained period



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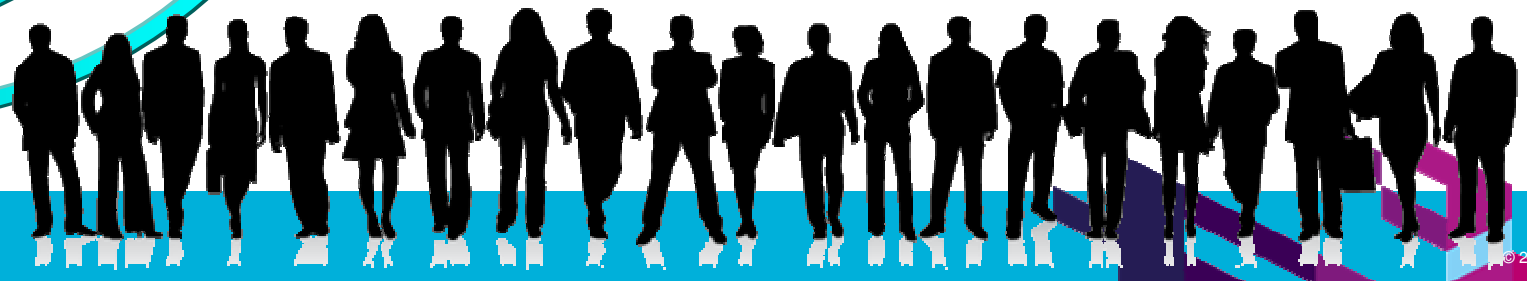
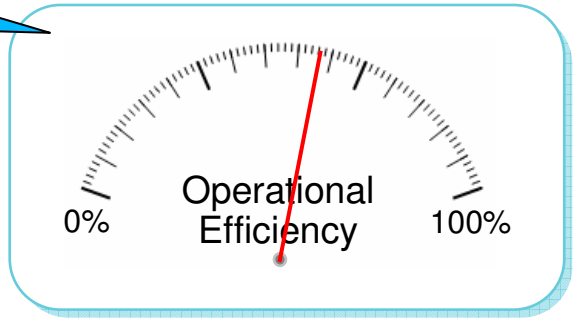


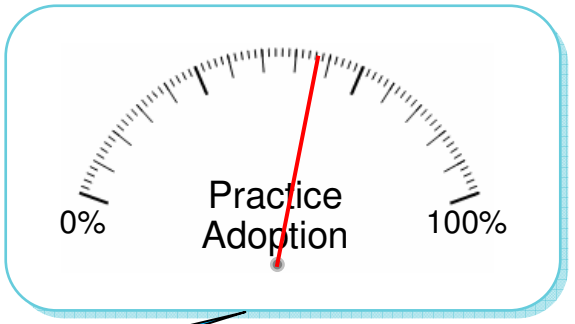
The wrong metrics can incent negative behavior

We need an architecture for our metrics

- Outcome measures
  - Productivity
  - Time to market
  - Quality
  - Predictability
  - …
- Practice-based control measures
  - Test Management: Defect density, test coverage
  - Iterative Development: Velocity, iteration burn down
  - Continuous integration: Build stability, Build frequency
  - …

Does agile lead to better results?

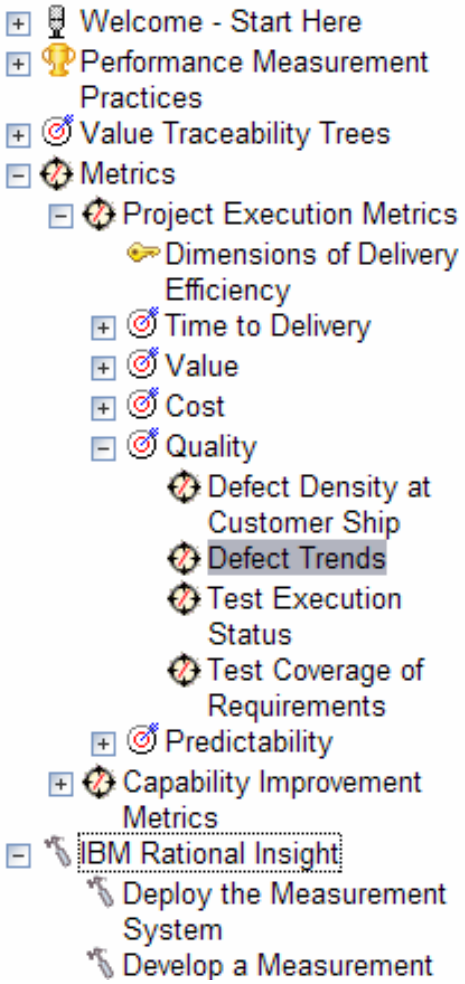




How agile am I?

Performance Measurement Practices

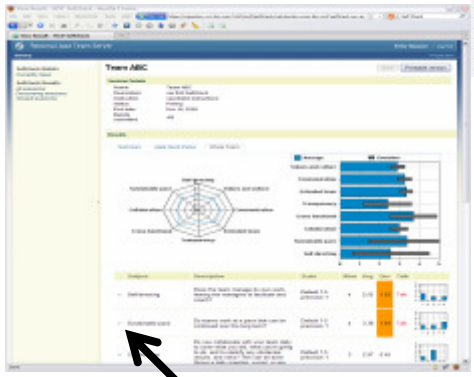
- Guide people in how to set up a performance measurement system, what metrics to have, how to interpret them, and what corrective actions to consider
  - Guidelines in RMC practices, supported by workshop for determining metrics, and workshop to implement metrics in Insight
- Measure whether desired outcome is reached (outcome metrics)
  - Centered on 5 operational goals
  - Proposes 2-6 metrics for each goal
  - The metrics are laggards
- Measure whether the practices the organization believes will drive desired outcome are effectively implemented (control metrics)
  - Enables us to take corrective actions
  - The metrics are predictors



Self-Check, Practices and Quick Starts

Applying Kaizen

Self-Check



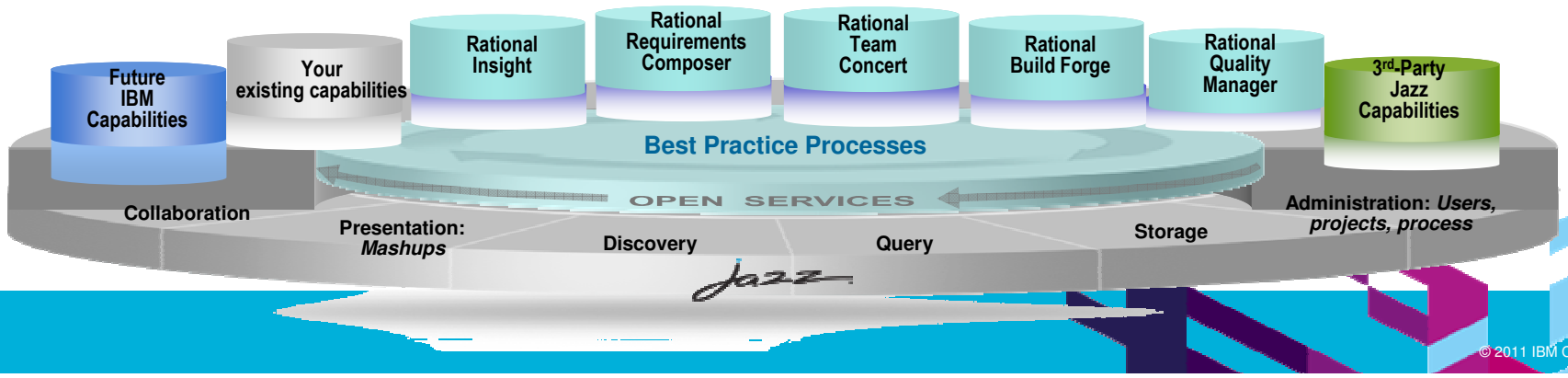
Understand strengths and weaknesses

Practices

Learn about industry best practices in weak areas

Get enabled on tools, practices and metrics to jump start you adoption

Quick Start



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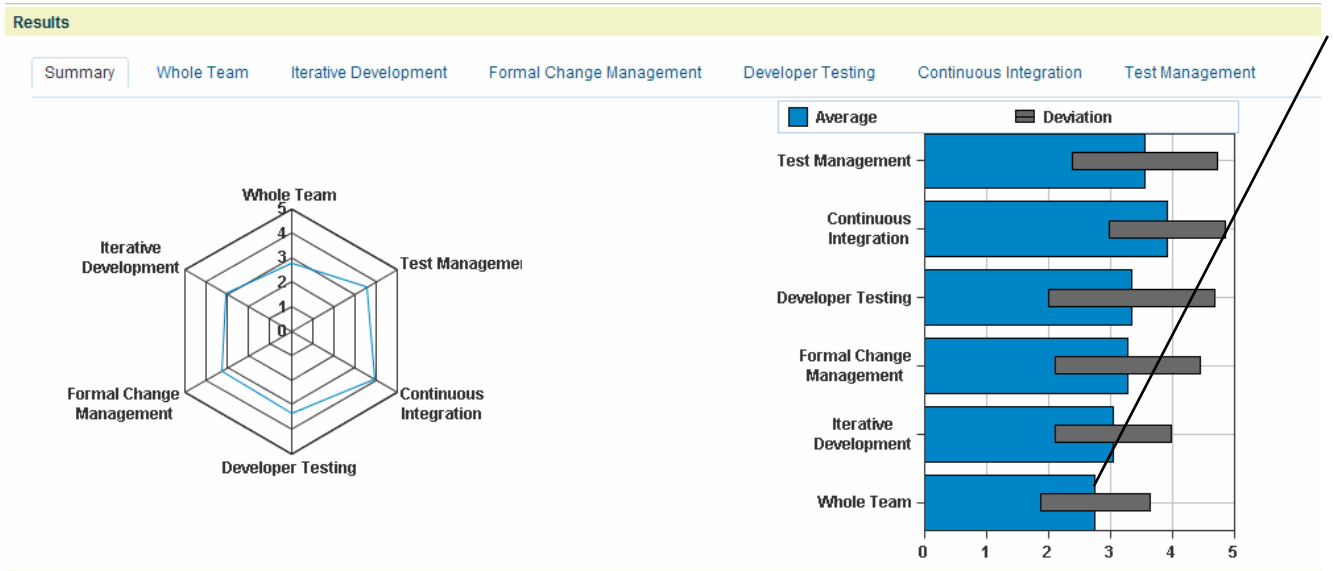
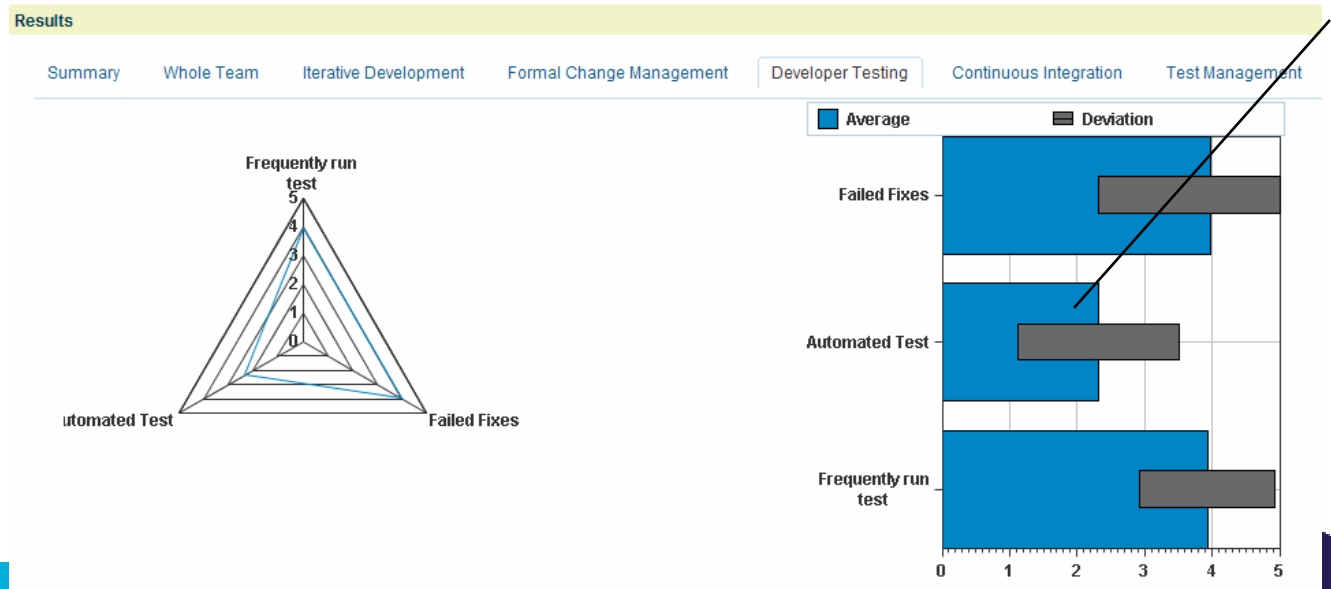
Sample Results and Improvement Actions



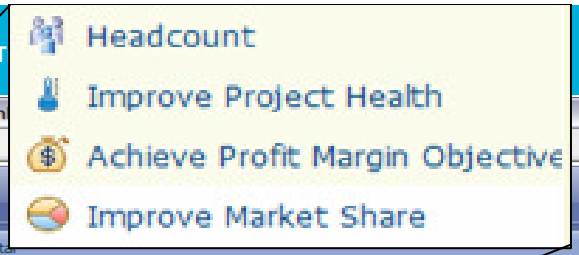
Problem area: Find more effective collaboration model between development and independent test team, enabling faster feedback to development.

Improvement Action: Increase test automation and test frequency.



Problem area: Only 50% of check-ins have an associated automated test. In some cases assumptions are made that tests exists, but they do not cover changes made.

Improvement Action: Enforce that automated tests are checked in with code.



Cognos Viewer - Executive Dash

File Edit View Favorites Tools

Rational Insight

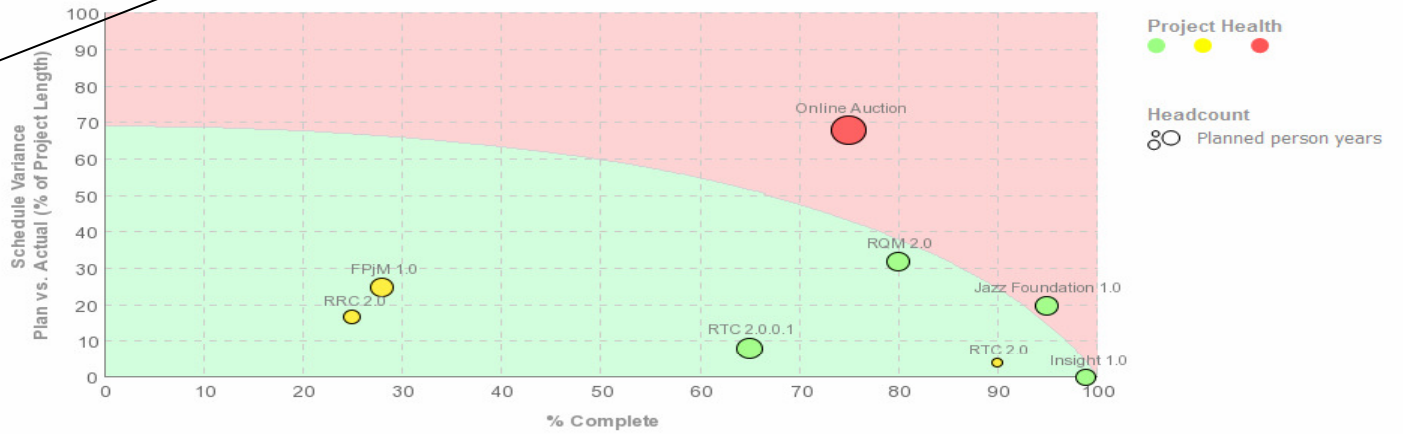
Cognos Viewer - Executive Dashboard Portal

Launch About

Welcome | Executive Dashboard | Project Development Portal | Performance Measurement Practice | Collaborate

- Executive Dashboard
- Headcount
- Improve Project Health
- Achieve Profit Margin Objective
- Improve Market Share

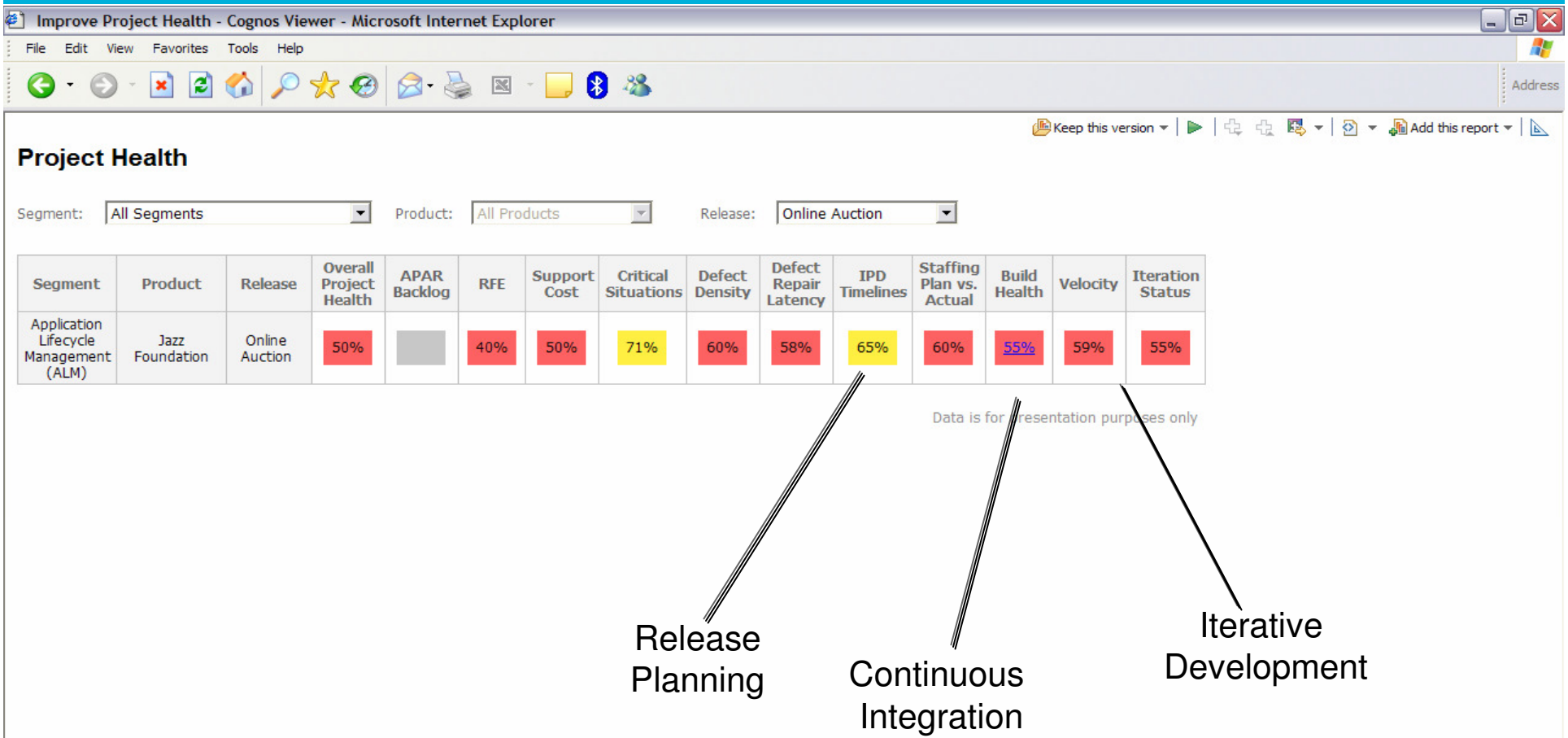
Segment: All Segments



Hide Table

Segment	Product	Revenue Year-To-Date (M)	Revenue % of Plan	Pipeline (M)	Release	eGA Plan	eGA Outlook	eGA Plan-Outlook	Headcount (PY)	Project Health	Overall Profit Margin	Overall Market Share
Application Lifecycle Management (ALM)	Jazz Foundation	75.7 ▼	96% ▼	87.9 ▼	Jazz Foundation 1.0	May 28, 2009	Jun 12, 2009	15 days	52 ◆	71% ◆	◆	▲
					Online Auction	Mar 31, 2009	Jul 7, 2009	98 days	118 ▼	50% ▼	▼	▼
	RTC	115.2 ▲	99% ◆	109.6 ◆	RTC 2.0	Jun 15, 2009	Jun 19, 2009	4 days	12 ◆	90% ◆	◆	▲
					RTC 2.0.0.1	Sep 22, 2009	Sep 30, 2009	8 days	72 ▼	86% ◆	◆	◆
Governance Solution	Focal Point for Project Management	29.1 ◆	93% ◆	84.2 ▲	FPjM 1.0	Oct 15, 2009	Nov 17, 2009	33 days	60 ◆	74% ▲	◆	◆
	Rational Insight	108.7 ▼	98% ▼	162.7 ▼	Insight 1.0	May 26, 2009	May 26, 2009	0 days	40 ◆	83% ▼	▼	◆
Quality Management (QM) Solution	RQM	35.2 ▲	112% ▲	79.6 ▲	RQM 2.0	Jun 15, 2009	Jul 31, 2009	46 days	56 ◆	89% ▲	◆	▲
	RRC	28.1 ◆	83% ▲	45.1 ▼	RRC 2.0	Nov 4, 2009	Nov 24, 2009	20 days	32 ▲	85% ◆	◆	▼

Project Health by Country



Project Health

Segment: All Segments Product: All Products Release: Online Auction

Segment	Product	Release	Overall Project Health	APAR Backlog	RFE	Support Cost	Critical Situations	Defect Density	Defect Repair Latency	IPD Timelines	Staffing Plan vs. Actual	Build Health	Velocity	Iteration Status
Application Lifecycle Management (ALM)	Jazz Foundation	Online Auction	50%		40%	50%	71%	60%	58%	65%	60%	55%	59%	55%

Data is for presentation purposes only

Release Planning

Continuous Integration

Iterative Development

Build Health - Cognos Viewer - Microsoft Internet Explorer

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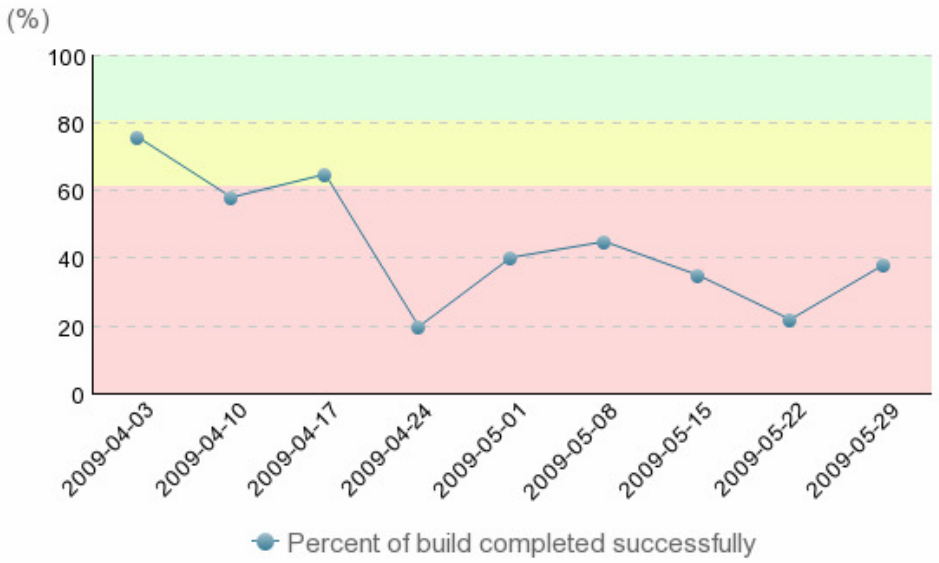
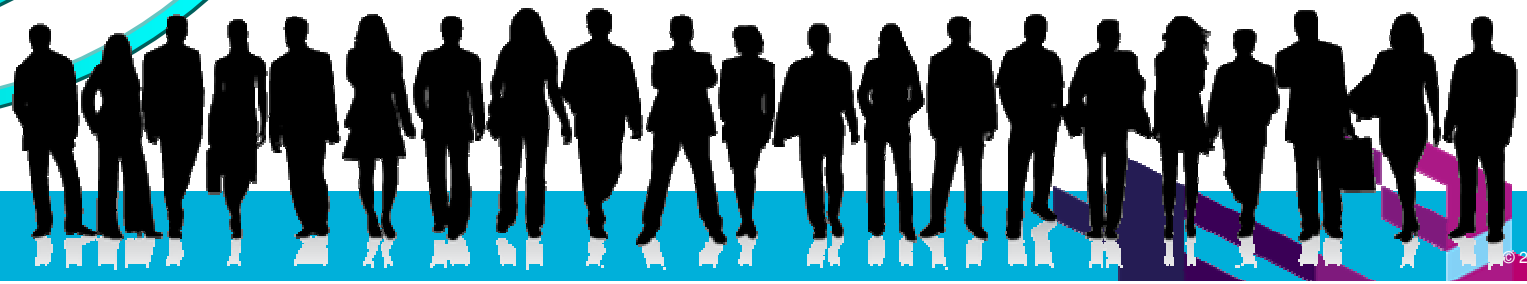
Build Health



Data is for presentation purposes only

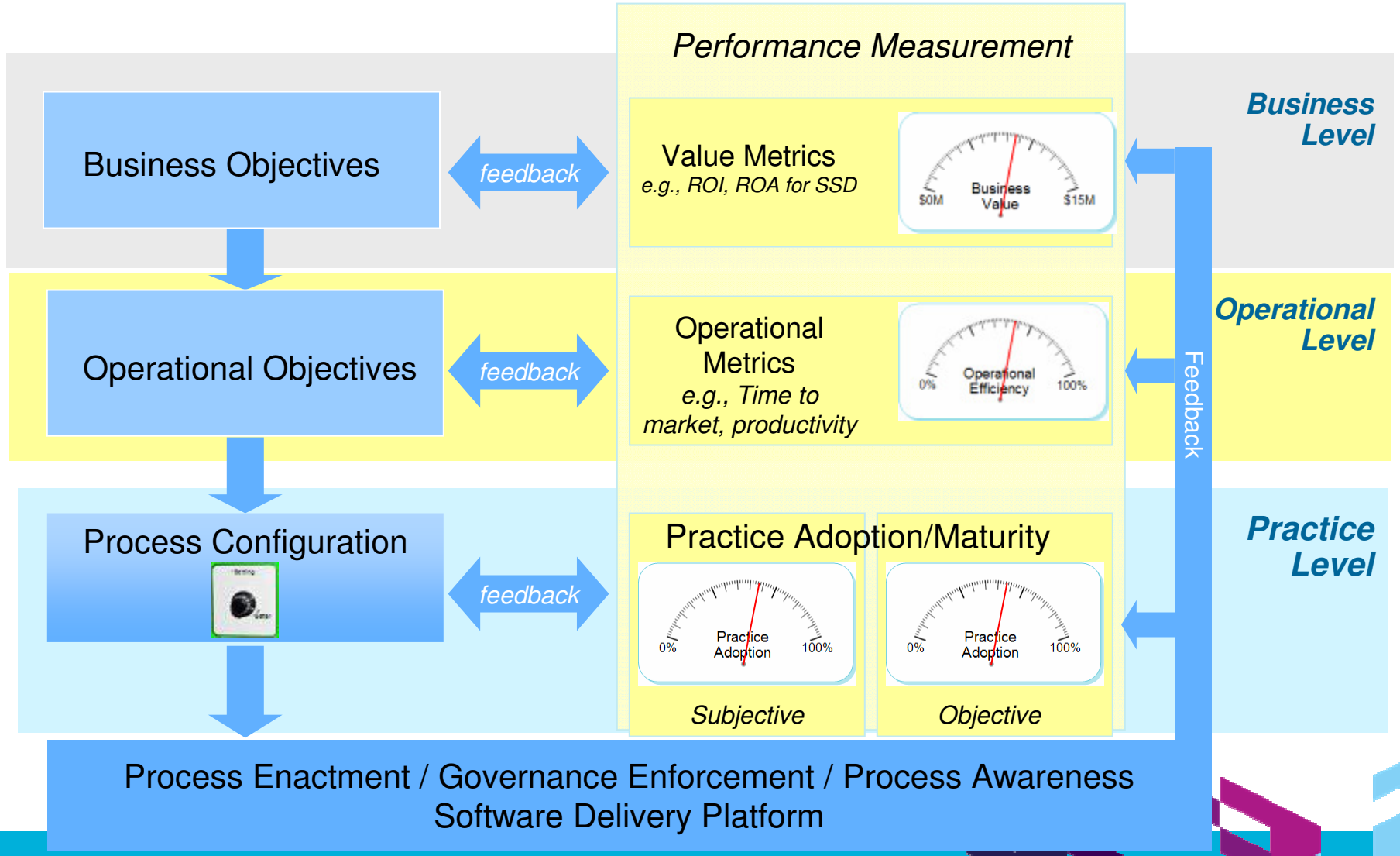
Discussion Points

1. Why agile and ALM?
2. Establishing an adoption roadmap
3. Monetizing the value of agile and ALM
4. Monetizing organizational value
5. Monitor progress and take corrective action
6. **In review**



Software Improvement Needs a Control Framework

Bring Order out of Chaos



Measurement is key to transforming and organization

- Understand what practices and tool capabilities will drive to your desired outcome
  - Establish roadmap for your needs and your current state
- Measure effective implementation of your target practices and tool capabilities
  - Take corrective actions as needed
  - Engage teams in self-corrections
- Measure outcome (productivity, quality, time-to-value)
  - Be realistic about organizational level improvements
  - Small improvements still provide potential for great ROI

Toyota:
- No work without process
- No process without metrics
- No metrics without measurement
- No measurement without analysis
- No analysis without improvement

For more information

- Measured Improvement - A primer for applying business analytics and process optimization to software and systems delivery
  ftp://public.dhe.ibm.com/common/ssi/sa/wh/n/raw14214usen/RAW14214USEN.PDF
- MCIF Page on IBM.COM
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To apply the approaches and assets described in this presentation, contact your Rational account team

Recognition

- Many have contributed to the approach and the assets described
- I want to especially call out
  - Scott Ambler
  - Murray Cantor
  - Peter Haumer
  - Jos Jenneken
  - Dave Lubanko
  - Monovorath (Molly) Phongpaibul
  - Walker Royce

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