CMMI and Process Improvement

Tom Walton
Patrick Shelton

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Agenda

- Case Studies
- Where IBM Rational Can Help
- Process Improvement Implementation
- Compliance
Software Process Improvement ROI

- The Return on Investment (ROI) of software process improvement projects is impressive:
  - 35% average gain in productivity
  - 39% average decrease in post-release defects
  - 5:1 average ROI

- This return can clearly be enhanced through the use of an integrated best practice/process/automation tool suite such as IBM Rational Suite

Source: CMU/SEI-94-TR-013 Benefits of CMM-Based Software Process Improvement: Initial Results, Software Engineering Institute
Client Quote

“Recently, we received CMM level 3 from the SEI organization out of Carnegie Mellon University. We use the Rational Suite of tools to help us enforce the use of processes necessary to reach this level. Rational has developed a suite of tools that permits you to follow the CMM processes and document the necessary information. It will help you along the way to enforce the processes and make sure that everyone does requirements management and change management all in the same manner. The Rational Suite of tools brings a great value to our software development”

Claude Mercier, Lockheed Martin Canada
Northrop Grumman Information Technology

- Rational client since 1994
  - Rose, ClearQuest, ClearCase, RequisitePro
- Three week formal assessment
  - Two divisions participated, four projects
- Used Staged Representation
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Symptoms of Process Failure

**Commitments consistently missed**

- Late delivery
- Last minute crunches
- Spiraling costs

**No management visibility into progress**

- You’re always being surprised

**Quality problems**

- Too much rework
- Functions do not work correctly
- Customer complaints after delivery

**Poor morale**

- People frustrated
- Is anyone in charge?
CMMI Acceleration

- Use of the Rational Unified Process, best practices, and Rational automation tools accelerates the achievement of CMMI Level 2 & 3

Diagram:
- Document As-Is Processes
- Improve Processes
- Institutionalize Processes
- Achieve CMM Level 2 & 3
- Time
CMM Level 2 or 3. Yes?
dalvey, 26-Nov-04

- Can be tailored/right-sized to balance management and technical perspectives
- Supports collaboration throughout the lifecycle
- Provides guidance on how to measure and control development through iterative methods
- Provides best practices on the effective use of the supporting infrastructure
Two Dimensions to the RUP

Disciplines

- Business Modeling
- Requirements
- Analysis & Design
- Implementation
- Test
- Deployment
- Configuration & Change Mgmt
- Project Management
- Environment

Phases
- Inception
- Elaboration
- Construction
- Transition

Iterations
- Initial
- Elab #1
- Elab #2
- Const #1
- Const #2
- Const #N
- Tran #1
- Tran #2

CONTENT

STRUCTURE

TIME
The RUP Project Management Framework

**Phases**

- **Inception:** Mitigate “Business” Risks; gain agreement on overall scope
  - Vision, high-level requirements, business case
  - Not detailed requirements

- **Elaboration:** Mitigate “Technical” Risks; agreement on solution approach
  - Baseline architecture, most requirements detailed
  - Not detailed design

- **Construction:** Mitigate “Logistical” Risks; apply approach
  - Working product, system test complete

- **Transition:** Mitigate “Deployment” Risks; roll-out solution into “production”
  - Stakeholder acceptance
### Rational Solutions Support for Level Two

<table>
<thead>
<tr>
<th>Process Area</th>
<th>Rational Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements Management</td>
<td>RequisitePro, RAD/RSA, RUP</td>
</tr>
<tr>
<td>Project Planning</td>
<td>Portfolio Manager, ProjectConsole, ClearQuest, RUP</td>
</tr>
<tr>
<td>Project Monitoring and Control</td>
<td>Portfolio Manager, ProjectConsole, ClearQuest, Test Manager</td>
</tr>
<tr>
<td>Supplier Agreement Management</td>
<td>RequisitePro, RUP + COTS Plug-in,</td>
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<tr>
<td>Measurement and Analysis</td>
<td>RUP, ProjectConsole, ClearQuest, RequisitePro</td>
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<tr>
<td>Process and Product Quality Assurance</td>
<td>RUP, ClearQuest, RequisitePro, Test Manager, Functional Tester</td>
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<tr>
<td>Configuration Management</td>
<td>ClearCase, ClearQuest, UCM</td>
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## Rational Solutions for Level Three

<table>
<thead>
<tr>
<th>Process Area</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Requirements Development</td>
<td>RUP, RequisitePro, RSM</td>
</tr>
<tr>
<td>Technical Solution</td>
<td>RUP, RSA/RSD, ClearCase</td>
</tr>
<tr>
<td>Product Integration</td>
<td>RUP, RSA/RSD, ClearCase, ClearQuest</td>
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<tr>
<td>Verification</td>
<td>RUP, TestManager, Purify</td>
</tr>
<tr>
<td>Validation</td>
<td>RUP, RequisitePro, ClearQuest, TestManager</td>
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<tr>
<td>Organizational Process Focus</td>
<td>RUP, RUP Builder/RMC, ClearQuest, RequisitePro</td>
</tr>
<tr>
<td>Organizational Process Definition</td>
<td>RUP, Process Workbench/RMC</td>
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# Rational Solutions for Level Three

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<thead>
<tr>
<th>Process Area</th>
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<tbody>
<tr>
<td>Organizational Training</td>
<td>RUP, Rational Services, Rational University</td>
</tr>
<tr>
<td>Integrated Project Management</td>
<td>RUP, RequisitePro, ClearCase, ClearQuest, ProjectConsole</td>
</tr>
<tr>
<td>Integrated Teaming</td>
<td>RUP, RequisitePro, ClearCase, ClearQuest, ProjectConsole</td>
</tr>
<tr>
<td>Decision Analysis and Resolution</td>
<td>RUP, RequisitePro, ClearQuest</td>
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<tr>
<td>Risk Management</td>
<td>RUP, ClearQuest, RequisitePro, SoDA</td>
</tr>
<tr>
<td>Organizational Environment for Integration</td>
<td>RUP, RequisitePro, ClearCase, ClearQuest, ProjectConsole</td>
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Implementing Automated Solutions in a CMMI Environment

- Interacting with the Software Engineering Process Group (SEPG)
- Selecting what tools to implement and when to implement
- Participating in the Assessment
- CMMI and Iterative Development
Probable Positive Forces of CMMI Environments

- Acknowledgement of performance or capability issues
- The recognition of the role of good process
- “Culture of Improvement”
Potential Challenges in CMMI Environments

- Process Improvement versus Capability Improvement
- Combating the “Process Definition + Training = Process Adoption” Fallacy
- Too much focus on obtaining the certification NOT intrinsic improvement of the certification
- Forgetting Improvement Motivators
- Documentation, Documentation, Documentation
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IBM SWG Solutions for Regulatory Compliance

**Business Controls Automation**

**Business Controls & Reporting**

Workplace Business Controls and Reporting
- Rational Requirements Management
- WebSphere Business Process Modeling and Monitoring

**IT Governance**

IBM Workplace for Business Strategy Execution,
- Rational Portfolio Management
- Tivoli Business Systems and Service Level Management

**BDD for Compliance**

*Enforce software development business controls*
- Rational Requirements Management / Change Management
- Portfolio Management

**Security/Identity**

*Ensure system security*
- Tivoli Identity, Security, Monitoring

**Information Management**

*Manage data privacy, access, and integration*
- DB2 Content / Storage / Records Management
- WebSphere Business Intelligence / Integration
Business-Driven Development for Compliance: *Three dimensions*

1. **WHAT you build**
   - IBM Rational RequisitePro
   - IBM Rational Manual Tester
   - Lifecycle traceability
   - Continuous validation
   - **Documents: Applications meet compliance mandates**

2. **HOW you build it**
   - IBM ClearCase and ClearQuest
   - Auditable workflows
   - Verifiable builds
   - **Documents: An audit-ready development infrastructure**

3. **HOW you manage it**
   - IBM Rational Portfolio Manager
   - Compliance *project tracking*
   - *Metrics* with drill-down analytics
   - **Documents: Effective IT oversight**
Thank You