

On Lock Down: Requirements Change Management

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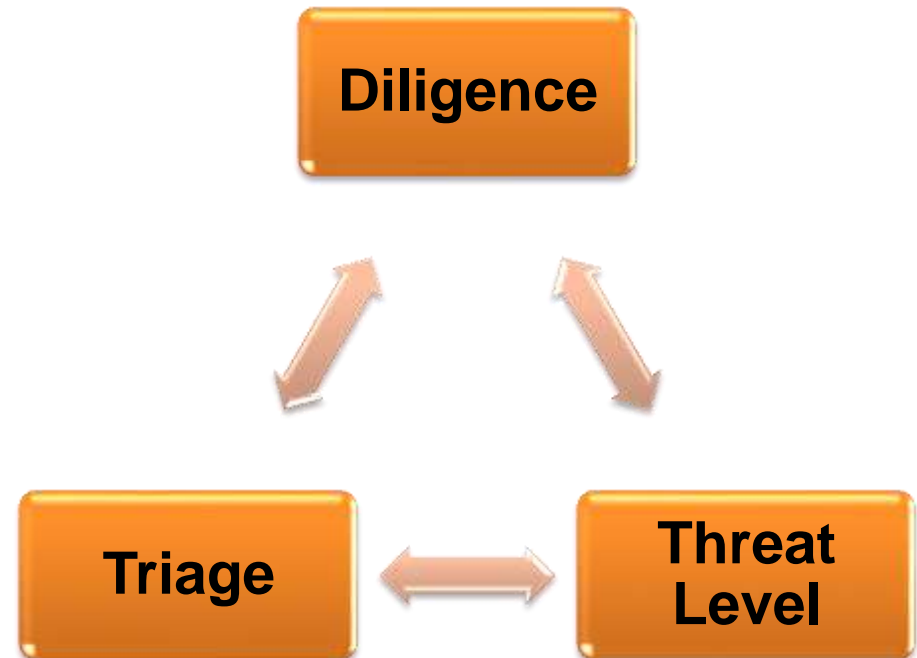
Ground Rules

- **This session is for you, so please participate.**
- **Interrupt me for clarifications.**
- **The content in this presentation is the sole responsibility of Hans Eckman.**
- **No animals were harmed during the creation of this presentation. Please support your local pet rescue groups.**



Conclusions

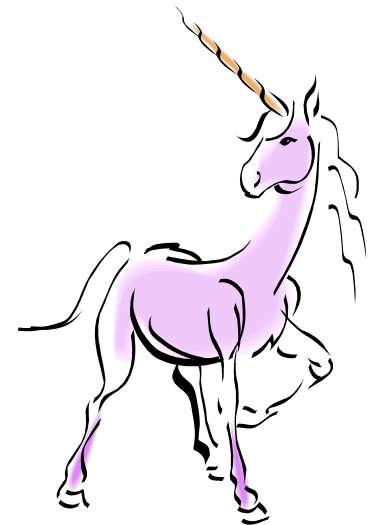
- **Principles of release management and change control can be applied to requirements management.**
- **Level of control must match risk and timing.**
- **Consistency and diligence are required for success.**



The Ideal Project Timeline



- **All stakeholders agree, and know exactly what they need from the beginning.**
- **Developers translate the requirements perfectly into a viable solution.**
- **No defects or missed requirements in solution.**
- **No change in business need or prioritization during the project.**



The High Cost of Change

Error Cost Factor	Requirements, Design	Coding, Unit Test	Integration Test	Acceptance Test	Post-product Release
Tassey ¹	1x	5x	10x	15x	30x
Boehm ^{2,3}	1x	3x	7x	50x	100x
When Errors are introduced ¹	3.5%	10.5%	35%	6%	15%

Other Cost Factors³

- **“One insight shows the cost-escalation factor for small, noncritical software systems to be more like 5:1 than 100:1.”**
- **“Current software projects spend about 40 to 50 percent of their effort on avoidable rework.”**
- **“Two major sources of avoidable rework involve hastily specified requirements and nominal-case design and development...”**

The Only Constant is Change

Define

Develop

Test

Deploy

Ambiguities, Clarifications, Invalid Requirements

Scope and Prioritization Changes

Constraints: Design, Resource, Time, Budget

Missed Requirements

Missed implementation

Change in business need

Threat Levels

No Material Impact:

Typos, Wording Ambiguities, Clarifications, Structure, Formatting, Decomposition, Supporting Requirements, Details, Etc.

Material Impact:

Missed Requirements, New Requirements, Constraints, External Impacts, Etc.

Governance Impact

Triage Levels

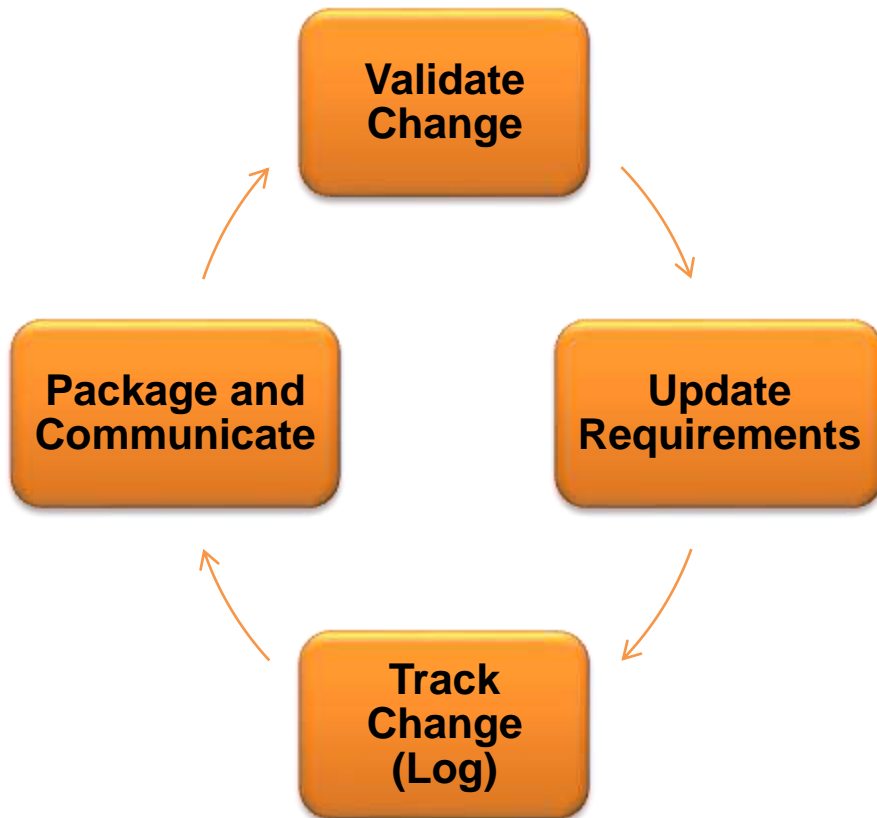


No Material Impact:
Log and communicate changes

Material Impact:
Determine impact,
approve before
implementing

**Governance
Change
Control**

No Material Impact - Update Process



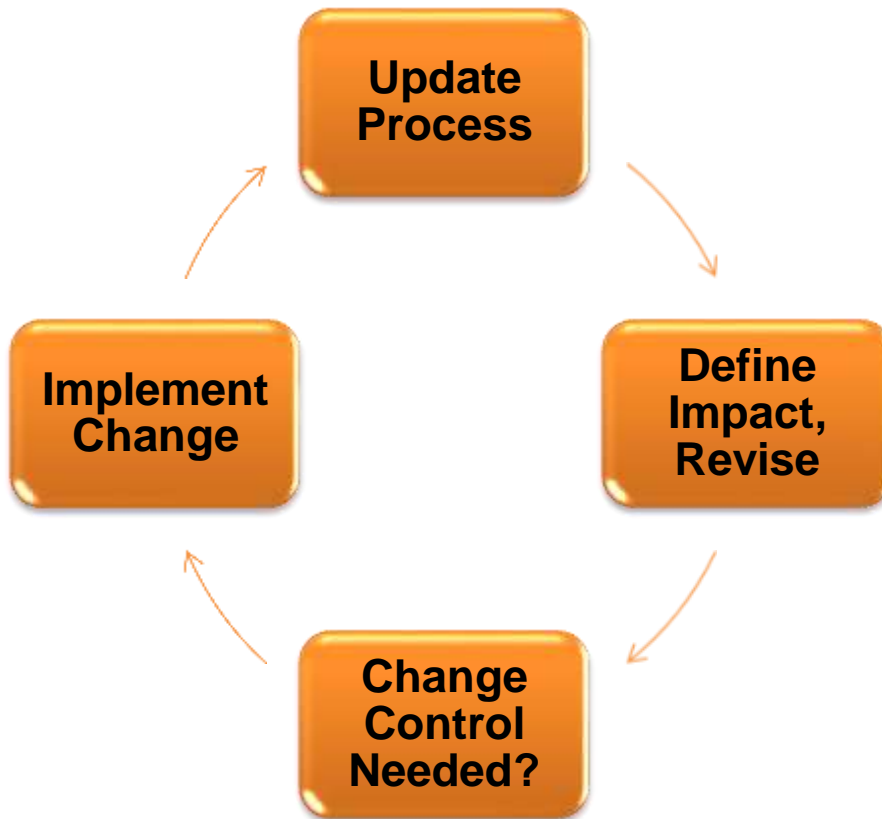
- **Begin after first formal communication of requirements**
- **Need to update system of record for requirements**
- **Log all changes with effective date**
- **Update Process is the foundation for Change Approvals**

Documenting Changes

- **Changes are logged by document version**
- **State changes source: defect, change control, etc.**
- **Identify owner, effective date and requirement ID**
- **Show before and after**

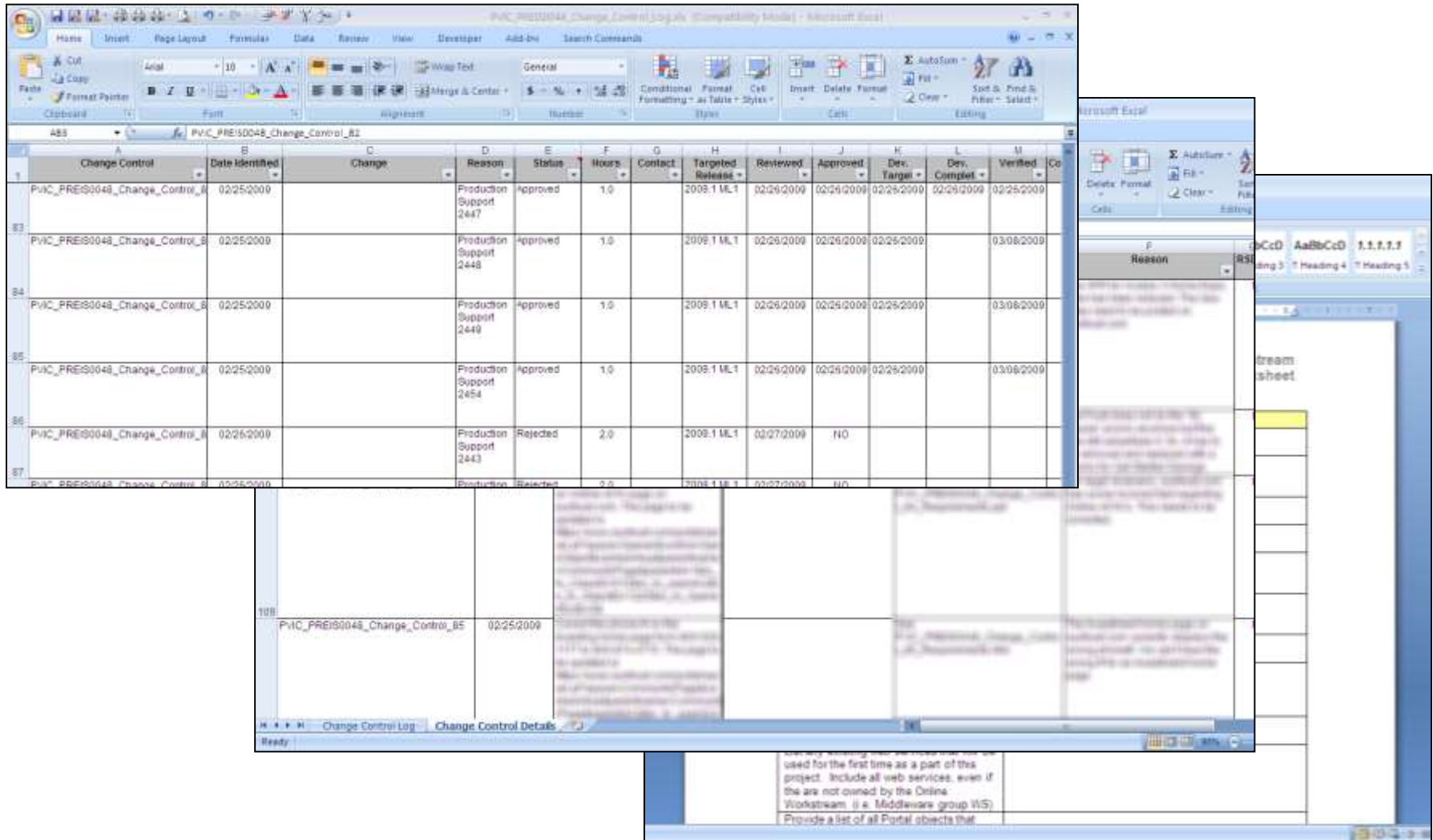
1.08	Eckman	<p>Correction to field value found during testing.</p> <p>UPDATE: 5.139.09.02 ID 5.139.09.02 - [REDACTED]</p> <p>TO: 5.139.09.02 ID 5.139.09.02 - [REDACTED]</p> <p>UPDATE: 5.142.09.02 ID 5.142.09.02 - [REDACTED]</p> <p>TO: 5.142.09.02 ID 5.142.09.02 - [REDACTED]</p>	11-24-2008
1.08	Eckman	<p>Defect ID: 27246</p> <p>UPDATED: 5.06.04.01 ID 5.06.04.01 - [REDACTED]</p> <p>5.06.08.01 ID 5.06.08.01 - [REDACTED]</p>	12-01-2008

Changes Requiring Approval



- **Occurs when:**
 - **After document approval**
 - **Change to functionality**
 - **Impacts other deliverables**
 - **Impacts cost or schedule**
- **Leverages Update Process**
- **Define impact and cost if change is implemented**
- **Complete Governance Change Control if needed**
- **Stakeholders must approve**

Tracking Approvals



The screenshot displays a Microsoft Excel spreadsheet titled "PVC_PREIS0048_Change_Control_Log.xls" in Compatibility Mode. The spreadsheet contains a table with the following columns: Change Control, Date Identified, Change, Reason, Status, Hours, Contact, Targeted Release, Reviewed, Approved, Dev. Target, Dev. Complet, Verified, and Co. The data rows show various change control entries, including those that are approved and rejected.

Change Control	Date Identified	Change	Reason	Status	Hours	Contact	Targeted Release	Reviewed	Approved	Dev. Target	Dev. Complet	Verified	Co.
PVC_PREIS0048_Change_Control_B	02/25/2009		Production Support 2447	Approved	1.0		2009.1 ML1	02/26/2009	02/26/2009	02/26/2009	02/26/2009	02/25/2009	
PVC_PREIS0048_Change_Control_B	02/25/2009		Production Support 2448	Approved	1.0		2009.1 ML1	02/26/2009	02/26/2009	02/26/2009		03/08/2009	
PVC_PREIS0048_Change_Control_B	02/25/2009		Production Support 2449	Approved	1.0		2009.1 ML1	02/26/2009	02/26/2009	02/26/2009		03/08/2009	
PVC_PREIS0048_Change_Control_B	02/25/2009		Production Support 2454	Approved	1.0		2009.1 ML1	02/26/2009	02/26/2009	02/26/2009		03/08/2009	
PVC_PREIS0048_Change_Control_B	02/26/2009		Production Support 2443	Rejected	2.0		2009.1 ML1	02/27/2009	NO				
PVC_PREIS0048_Change_Control_B	02/26/2009		Production Support 2443	Rejected	2.0		2009.1 ML1	02/27/2009	NO				

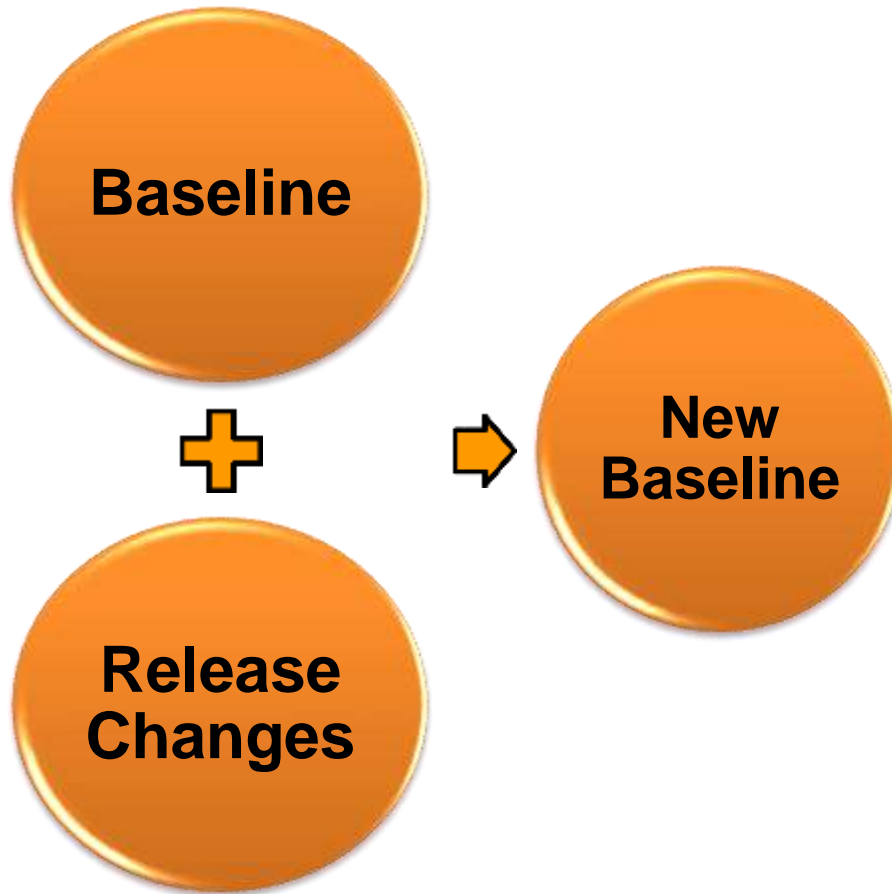
An inset window shows a detailed view of a change control entry, including a "Reason" dropdown menu and a "Stream sheet" section. The "Reason" dropdown is currently set to "Production Support 2443". The "Stream sheet" section contains a list of objects that are used for the first time as a part of this project.

used for the first time as a part of this project. Include all web services, even if they are not owned by the Online Workstream. (i.e. Middleware group WS). Provide a list of all Portal objects that

Best Practices

- **Communicate change process and templates as part of your requirements approach. No Surprises!**
- **Maintain consistent control and communication.**
- **Impact assessment is key to risk management.**
- **Leverage tools when available**
 - **Requirements management system**
 - **Defect/Change log**
 - **Track changes (Microsoft Word)**
- **Cross-reference every change**
 - **Source**
 - **Reason**
 - **Date**
 - **Supporting documentation: defect, change request, impact analysis, change control, etc.**

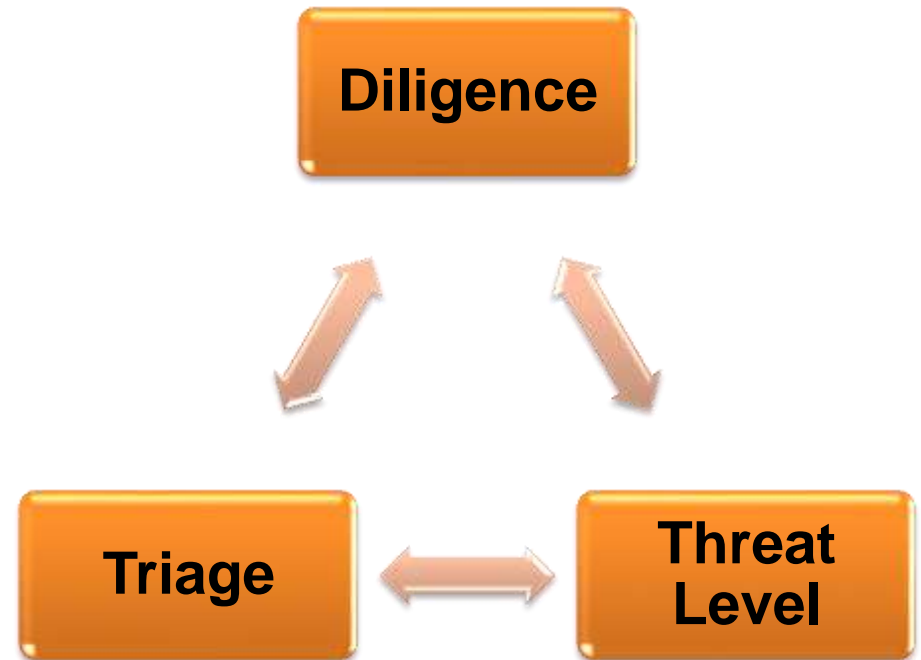
Applying to Baseline Documentation



- **Starting from baseline documentation dramatically reduces cost and risk**
- **Treat all scope as changes to baseline requirements**
- **Sum of changes is the release scope**
- **Sum of changes and original baseline becomes the new baseline**
- **May take additional time and effort to maintain accurate baseline**

Conclusions

- **Principles of release management and change control can be applied to requirements management.**
- **Level of control must match risk and timing.**
- **Consistency and diligence are required for success.**



Appendix: Cost of Changes and Defects

1. The Economic Impacts of Inadequate Infrastructure for Software Testing

- <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.122.3316&rep=rep1&type=pdf>
- Gregory Tasse, Ph.D., National Institute of Standards and Technology
- Prepared by RTI: Health, Social, and Economics Research, RTI Project Number 7007.011

2. Requirements-Based Testing: Encourage Collaboration Through Traceability

- <http://www.softwaremag.com/linkservid/0E91E962-AEE3-2E9A-B2B475D66F29CC30/showMeta/0/>
- MKS, 2009

3. Software Defect Reduction Top 10 List

- <http://www.cs.umd.edu/projects/SoftEng/ESEG/papers/82.78.pdf>
- Barry Boehm and Victor R. Basili, January 2001

4. An Introduction to Agile Software Development

- http://www.danube.com/docs/Intro_to_Agile.pdf
- Victor Szalvay, Danube Technologies, Inc., November 2004

5. Cost of Change - Modernized

- <http://www.aptprocess.com/whitepapers/CostOfChangeModernised.pdf>
- Paul Oldfield, Mentors, 2003, Appropriate Process Group

Stay Connected

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