

▶ POLITECNICO DI MILANO

Dipartimento di
Elettronica e Informazione

Session 7

Risk and Change Management

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- This slides are largely based on Prof. John Musser class notes on “Principles of Software Project Management”
- Original slides are available at <http://www.projectreference.com/>
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- Risk Management
- Feature Set Control
- Change Control
- Configuration Management

- Problems that haven't happened yet
- Why is it hard?
- Some are wary of bearing bad news
 - No one wants to be the messenger
 - Or seen as "a worrier"
- You need to define a strategy early in your project

- Identification, Analysis, Control
- Goal: avoid a crisis
- Thayer: Risk Mgmt. vs. Project Mgt.
 - For a specific vs. all projects
 - Proactive vs. reactive

- Project Risk
 - Characterized by:
 - Uncertainty ($0 < \text{probability} < 1$)
 - An associated loss (money, life, reputation, etc)
 - Manageable – some action can control it
- Risk Exposure
 - Product of probability and potential loss
- Problem
 - A risk that has materialized

- Schedule Risks
 - Schedule compression (customer, marketing, etc.)
- Cost Risks
 - Unreasonable budgets
- Requirements Risks
 - Incorrect
 - Incomplete
 - Unclear or inconsistent
 - Volatile
- Quality Risks
- Operational Risks
- Most of the “Classic Mistakes”
 - Classic mistakes are made more often

- Known Unknowns
 - Information you know someone else has
- Unknown Unknowns
 - Information that does not yet exist



[Source: “Software Risk Management”, Boehm, 1989]

- Get your team involved in this process
 - Don't go it alone
- Produces a list of risks with potential to disrupt your project's schedule (but also budget, quality, ...)
- Use a checklist or similar source to brainstorm possible risks
 - <http://www.construx.com/Page.aspx?hid=1134>
 - Cached version available
 - http://www.emanueledellavalle.org/slides/P&MSP2010_07_Complete-List-of-Schedule-Risks-by-McConnel.pdf

- Determine impact of each risk
- Risk Exposure (RE)
 - a.k.a. “Risk Impact”
 - $RE = \text{Probability of loss} * \text{size of loss}$
 - Ex: risk is “Facilities not ready on time”
 - Probability is 25%, size is 4 weeks, RE is 1 week
 - Ex: risk is “Inadequate design – redesign required”
 - Probability is 15%, size is 10 weeks, RE is 1.5 weeks
 - Statistically are “expected values”
 - Sum all RE’s to get expected overrun
 - Which is pre risk management

- Estimating size of loss
 - Loss is easier to see than probability
 - You can break this down into “chunks” (like WBS)
- Estimating probability of loss
 - Use team member estimates and have a risk-estimate review
 - Use Delphi or group-consensus techniques
 - Use gambling analogy” “how much would you bet”
 - Use “adjective calibration”:
 - highly likely
 - probably
 - improbable
 - unlikely
 - highly unlikely

- Remember the 80-20 rule
- Often want larger-loss risks higher
 - Or higher probability items
- Possibly group 'related risks'
- Helps identify which risks to ignore
 - Those at the bottom

- Can be 1 paragraph per risk
 - For an example see Service-Finder's "Risk Management and contingency plan"
 - http://www.emanueledellavalle.org/slides/P&MSP2010_07_Service-Finder_Risk-Management.pdf

- McConnell's example
 - <http://www.construx.com/Page.aspx?hid=1286>
 - Cached version available
 - http://www.emanueledellavalle.org/slides/P&MSP2010_07_Risk-Management-Plan-by-McConnell.pdf

- Risk Avoidance
 - Don't do it
 - Scrub from system
 - Off-load to another party

- Risk Assumption
 - Don't do anything about it
 - Accept that it might occur
 - But still watch for it

- Problem control
 - Develop contingency plans
 - E.g., allocate extra test resources
- Risk Transfer
 - To another part of the project (or team)
 - Move off the critical path at least
- Knowledge Acquisition
 - Investigate
 - Ex: do a prototype
 - Buy information or expertise about it
 - Do research

- Top 10 Risk List
 - Rank
 - Previous Rank
 - Weeks on List
 - Risk Name
 - Risk Resolution Status
- A low-overhead best practice
- Interim project post-mortems
 - After various major milestones
- McConnell's example
 - <http://www.construx.com/Page.aspx?hid=1293>
 - Cached version available
 - http://www.emanueledellavalle.org/slides/P&MSP2010_07_Sample-Top-10-Risks-List-by-McConnel.pdf

- Don't be afraid to convey the risks
- Use your judgment to balance
 - Sky-is-falling whiner vs. information distribution

- A risk-reduction technique
- Use of small goals within project schedule
 - One of McConnell's Best Practices (Ch. 27)
- Fine-grained approach to plan & track
- Reduces risk of undetected project slippage
- Pros
 - Enhances status visibility
 - Good for project recovery
- Cons
 - Increase project tracking effort

- Can be used throughout the development cycle
- Works with hard-to-manage project activities or methods
 - Such as with evolutionary prototyping
- Reduces unpleasant surprises
- Success factors
 - Overcoming resistance from those managed
 - Staying true to 'miniature' nature
- Can improve motivation through achievements

- Requires a detailed schedule
- Have early milestones
- McConnell says 1-2 days
 - Longer is still good (1-2 weeks)
- Encourages iterative development
- Use binary milestones
 - Done or not done (100%)

- It is a class mistake avoidance technique
- Early Stages
 1. Minimal Specification
 2. Requirements Scrubbing
 3. Versioned Development
- Mid-Project
 - Effective change control
- Late-Project
 - Feature cuts

- Drive for “traditional” specs
 - Necessity
 - Downstream cost avoidance
 - Full control over all aspects

- As McConnell notes:
 - “But the goal is not to build exactly what you said you would at the beginning. It is to build the best possible software within the available time.”
 - Idealistic but worth remembering

- Tradition spec. issues
 - Wasted effort
 - Too much detail
 - Obsolescence
 - Lack of efficacy -- details do not guarantee success
 - Overly constrained design
 - User assumption that costs are equal (UI ex.)

- Benefits
 - Improved morale and motivation
 - Opportunistic efficiency
 - Shorter requirements phase

- Costs and Risks
 - Omission of key requirements
 - Unclear or impossible goals
 - Gold plating
 - Used for the wrong reasons
 - Lazy substitute for doing good requirements

- Success Factors
 - Used only when requirements are flexible
 - Capture most important items; involve key users

- This is not XP (extreme programming)
- In XP Requirements are
 - expressed as automated acceptance tests rather than specification documents
 - defined incrementally, rather than trying to get them all in advance
- XP has broader goals
 - An attempt to reconcile humanity and productivity
 - A mechanism for social change
 - A path to improvement
 - A style of development
 - A software development discipline

- Removing a feature from the product
 - Eliminates all effort: spec., design, dev., test, doc.
 - The earlier the better
 - Typically done during or right after Requirements
- Less risky than minimal specification
- Aims
 - Eliminate all but absolutely necessary requirements
 - Simplify all complicated requirements
 - Substitute cheaper items

- Eliminate them from the current version
- “Let’s put it in release 1.1”
 - You’re still saying “Yes”, not “No”
- By next rev. the list has changed anyway
- My favorite ;-)

- Avg. project has 25% change in requirements during development
- Sources of change
 - Marketing: want to meet customer's check-list
 - Developers: want to perfect r1 deficiencies
 - Users: want more functionality or now 'know' what they want
- They will all try to 'insert' these during dev.

- The devil is in the details
- McConnell's example: "trivial" feature can have +/- weeks of impact
- Developers can insert things when you're not looking
- No spec. can cover all details. You must.
- Programmer ideal: flip switch
- Up to 10-1 differences in prog. size with the same specs.

- McConnell “best practice” (see Ch. 17)
- Structure: representatives from each stakeholder party
 - Dev., QA, Marketing, Mgmt., Customer support
- Perform “change analysis”
 - Importance, priority, cost, benefit

- Triage
 - Allocating scarce resources
 - Some will not receive treatment
 - Life-critical to the project
- Will say “No” more than “Yes”
- Watch for bureaucracy

CONTAMINATED

Personal Property Receipt
Evidence Tag

Destination _____
Via _____

TRIAGE TAG

S L U D G E
Salivator Laceration Urinifer Defecation GI Contents Emesis

AUTO INJECTOR 1 2 3 4 5

Trk	Nr	Crust Decon
Trk	Nr	Secondary Decon

Solution

Blunt Trauma
 Burn
 C-Open
 Cardiac
 Crushing
 Fracture
 Laceration
 Penetrating Injury

Age _____
 Male Female

Other: _____

VITAL SIGNS

Time	B/P	Pulse	Respiration

Time	Drug Solution	Dose

EVIDENCE

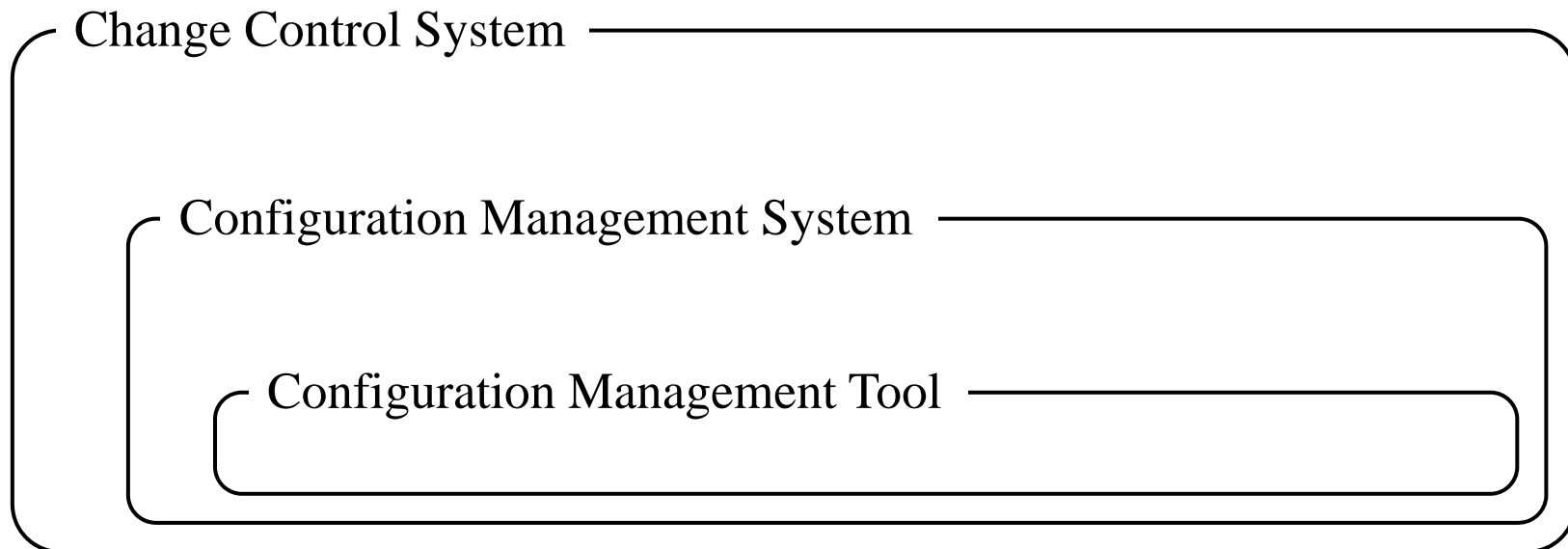
MORGUE
Pulseless/Non-Breathing

IMMEDIATE
Life-Threatening Injury

DELAYED
Serious, Not Life-Threatening

MINOR
Walking Wounded

- A set of fully fledged methods and tools



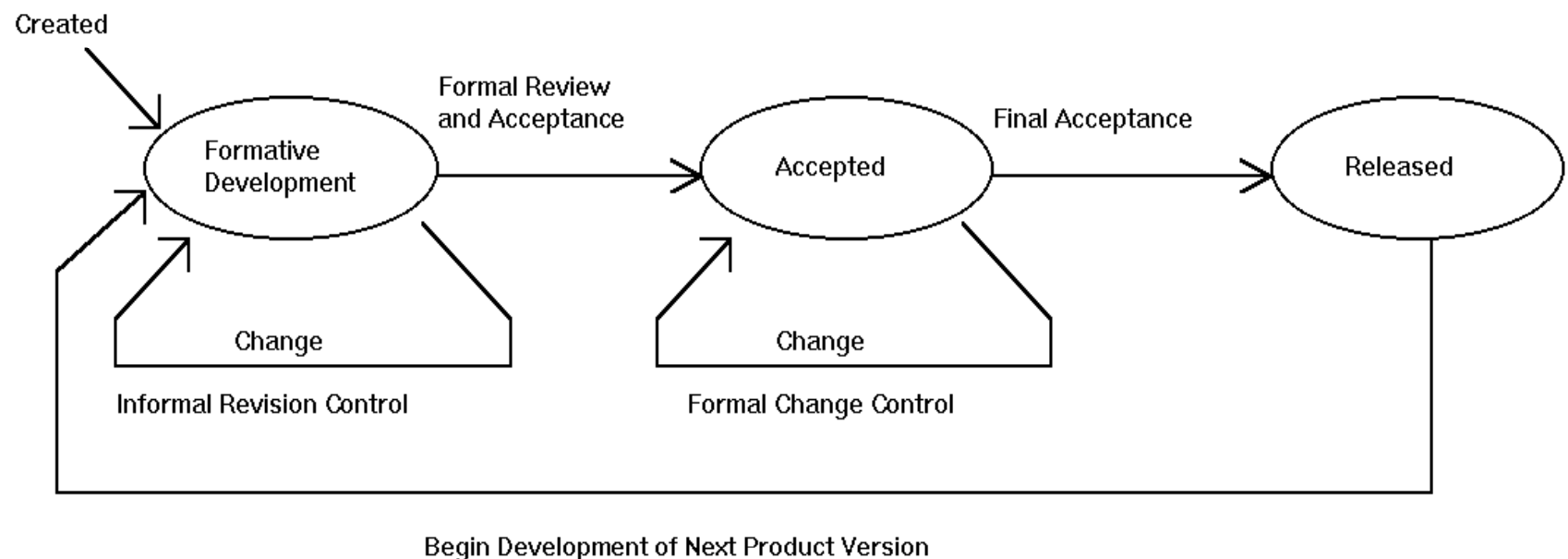
- Good Reference
 - "Quality Software Project Management", Futrell, Shafer, Shafer
 - Preview available on Google Books Search
<http://books.google.com/books?id=8GqC7xHTwGsC>

- Change Control: process of controlling changes
 - Proposal, evaluation, approval, scheduling, implementation, tracking
- Configuration Control: process of evaluating, approving and disapproving, and managing changes to SCCIs.
- Software Configuration Control Item (SCCI)
 - Anything suitable for configuration control
 - Source code, documents, diagrams, etc.
- Version Control: controlling software version releases
 - Recording and saving releases
 - Documenting release differences

- A management support function
- Includes
 - Program code changes
 - Requirements and design changes
 - Version release changes
- Essential for developed items
 - Code, documentation, etc.
- Example
 - The case of the code that used to work
 - But didn't in time for the demo

- Establish clearly defined mgmt. authority
- Setup control standards, procedures and guidelines
 - All team members must be aware of these
- Requires appropriate tools and infrastructure
- Configuration Management Plan must be produced during planning phase

- Must be produced during planning phase
- Often part of Software Development Plan
- Example of Control Procedure



- See <http://www.construx.com/Page.aspx?hid=1424>
- Cached version available
 - http://www.emanueledellavalle.org/slides/P&MSP2010_07_Change-Procedure-by-McConnel.pdf

- Formal engineering discipline
- Methods and tools to identify & manage software throughout its use
- For basic information consult http://en.wikipedia.org/wiki/Software_configuration_management

3rd Homework assignment

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- Top 10 Risk List for your project
- use the template available at http://www.emanueledellavalle.org/slides/P&MSP2010_07_template-homework-3.doc
- Fill it in with project code (e.g., **12**) and group members
- Submit by email to mpsp2010@gmail.com
 - Subject: [**12**] homework – 3
 - Attachment: **12**-homework-3.doc
- Note
 - Fine if you use a check-list (see slide 10) ...
 - **BUT** think about **your** project

Optional Readings

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- McConnell: 11 “Motivation”, 13 “Team Structure”
- Schwalbe: 8 “Project Human Resource Management”

Questions?

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