Scrum and Agile Processes

Dr.-Ing. Oliver Ciupke
Haufe-Lexware GmbH & Co. KG

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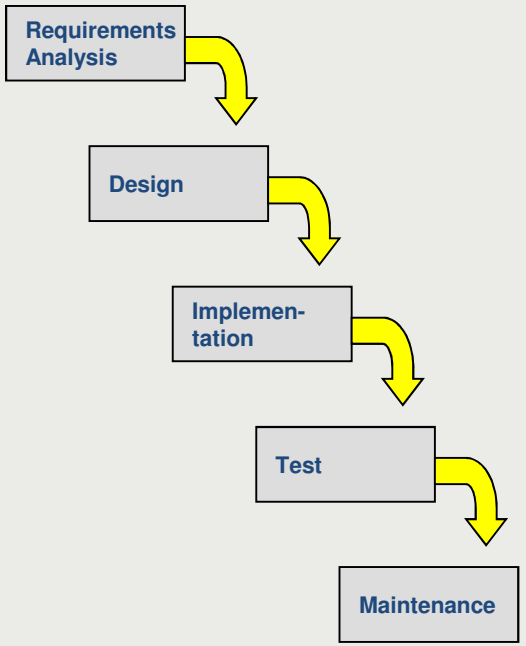
Scrum and Agile Processes: Outline

- Classical processes and their limitations
- Agile processes
- Scrum
  - Overview
  - History
  - Process
- Budgeting and planning agile projects
- Where does Scrum *not* fit?
- Advanced questions
- Summary

Classical Process Models

- Waterfall: adapted from hardware development by DoD 1960s/70s
- Phases separated by activity:
  0. Planning
  1. Requirements analysis
  2. Design
  3. Implementation
  4. Test
  5. Maintenance
- Many refinements, e.g.:
  - V-Model
  - Boehms spiral model
    (already predecessor to iterative methods)
- PS: „Maintenance" often 80% of overall effort ...



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Where's the problem?

Problems:

- Errors are made in every phase, including requirements specification
- Specification errors are often not detected before system is running
- Late requirement changes are nowadays more norm than exception
- Processes depending on absence of errors are doomed to fail

Effect:

⇒ Changes to requirements cause all phases to be re-done

⇒ Cost of a change is multiplied by number of phases and/or affected documents!

⇒ Approaches to fix this by increased perfection lead to again more steps and then even higher costs

"Proof"

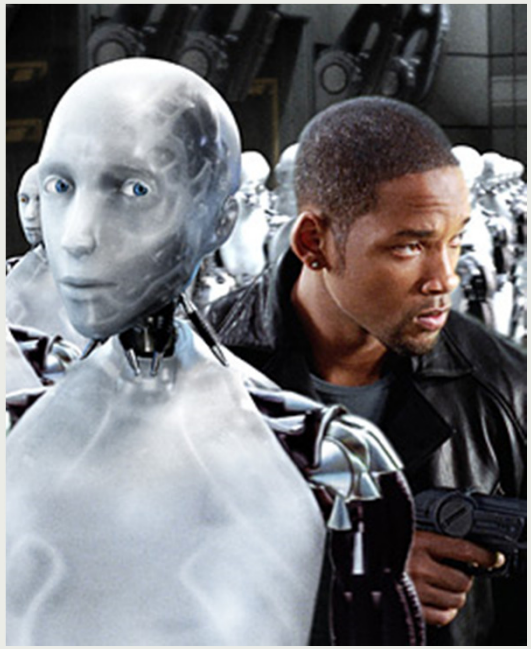
- Research found between 40% and 70% of all SW projects failing
- Governmental SW projects require very formal, typically pre-descriptive SW processes (e.g. V-model in Germany)
- Studies report 90% of large governmental projects to fail …
  - (There are of course other reasons as well, to be honest: E.g. large governmental projects tend to be a) complex and b) simply too ambitious.)

Non-Trivial Systems Cannot be Fully Specified both in Detail and in Advance

3-Requirements Example:

- A robot may not injure a human being or, through inaction, allow a human being to come to harm.
- A robot must obey any orders given to it by human beings, except where such orders would conflict with the First Law.
- A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

(Isaac Asimov, *"I, Robot"*, 1942)



Agile Processes

In a complex environment, following a plan produces the product you intended, just not the product you need. (Jim Highsmith)

Agile Manifesto:

Value

- ***individuals and interactions*** over processes and tools
- ***working software*** over comprehensive documentation
- ***customer collaboration*** over contract negotiation
- ***responding to change*** over following a plan

Numerous variants, e.g.:

- Adaptive Systems Development (ASD)
- Crystal
- Scrum
- Dynamic Systems Development Method (DSDM)
- eXtreme Programming (XP)
- Feature Driven Development (FDD)

Scrum: Overview

- Agile methods are meanwhile the norm in software industry
- Scrum is by far the most widespread agile method
- Advantages compared to other agile methods (e.g. RUP):
  - More a library than a framework with less need for company specific adaptation
  - Highly standardized and thus easier to apply and to onboard new team members
- Standard reference: http://www.scrum.org/scrumguides/
- Sure enough, there is no such thing as a silver bullet!

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Some Terms

- **Incremental:** iterate development and test
- **Iterative:** iterate requirements, development and test
- **Agile:** according to agile manifesto
- **Scrum:** one out of many, but recently the most successfull, iterative software process, that can be practiced in an agile manner

History & References

- **1986:** Takeuchi and Nonaka describe a iterative production as a rugby approach, compared to a classical relay race approach
  ("*The New New Product Development Game*" in Harvard Business Review, Jan/Feb 86)
- **1990/91:** Ken Schwaber and Jeff Sutherland with others used such an approach at their companies and referred to it as "Scrum"
- **1995:** Sutherland and Schwaber present the "*Scrum Development Process*"
  (OOPSLA'95 Business Object Design and Implementation Workshop in Austin, Texas)
- **2001:** Schwaber and Sutherland are among 17 first signees of the Agile Manifesto

Scrum Process

Three Roles

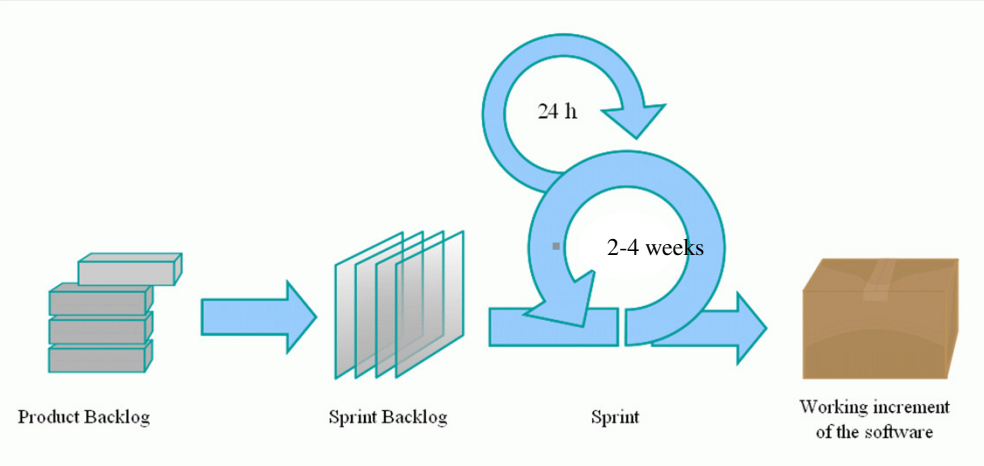
- Scrum Master
- Product Owner
- Team

Three Artefacts

- Product backlog
- Sprint backlog
- Burndown chart

Four Ceremonies

- Sprint planning
- Daily scrum meeting
- Sprint demo
- Sprint retrospective



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The 3 Scrum Roles

Scrum Team
=
SM + PO + Team

Scrum Master

- Responsible for ensuring that the Scrum team adheres to Scrum values, practices, and rules
- Helps the Scrum Team understand and use self-organization and cross-functionality

Product Owner

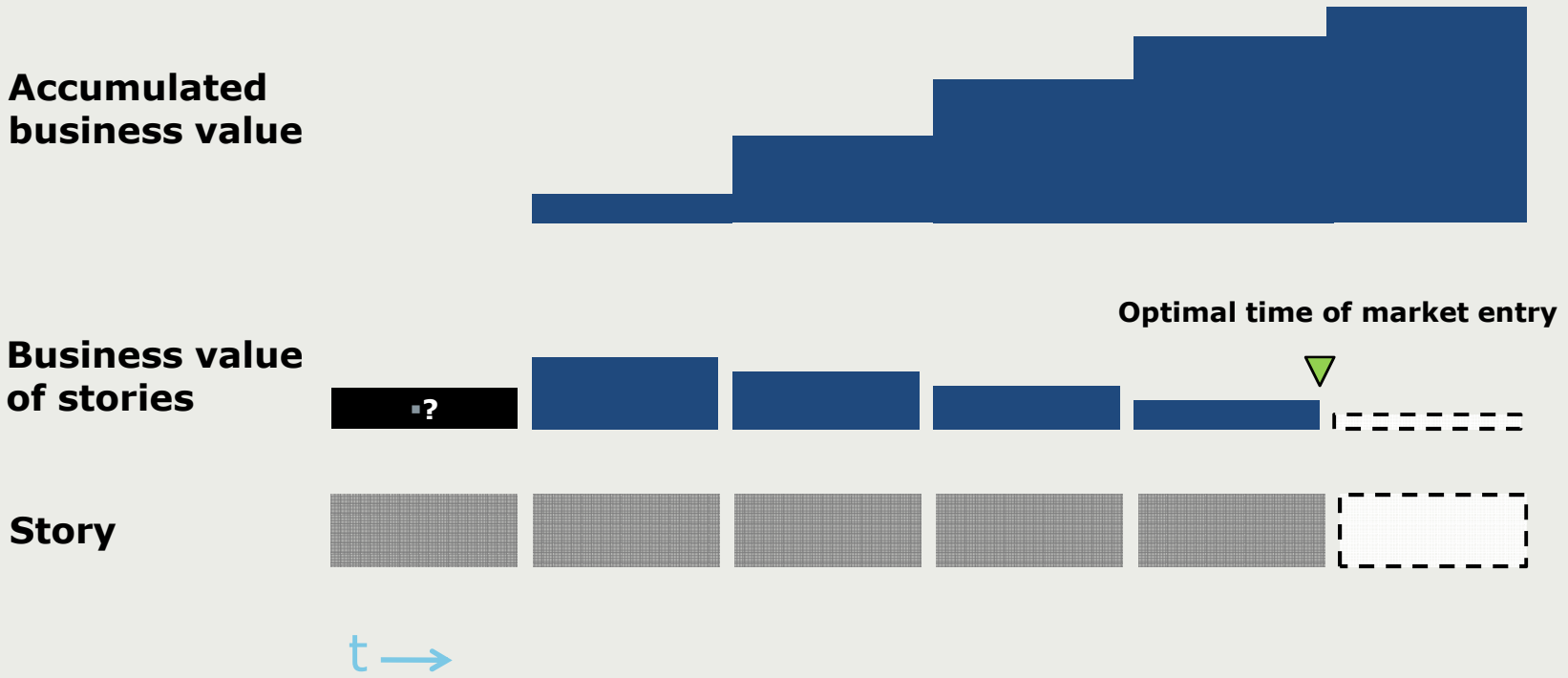
- Responsible for managing, prioritizing and maintaining the product backlog
- One person, no comitee
- May integrate backlog entries from other persons

Team

- Turns product backlog into increments of potentially shippable functionality every sprint
- Teams are self-organized without external interference
- Optimal size is seven people, plus or minus two

Scrum Master
always ≠
Product Owner

Optimize ROI along Business Value



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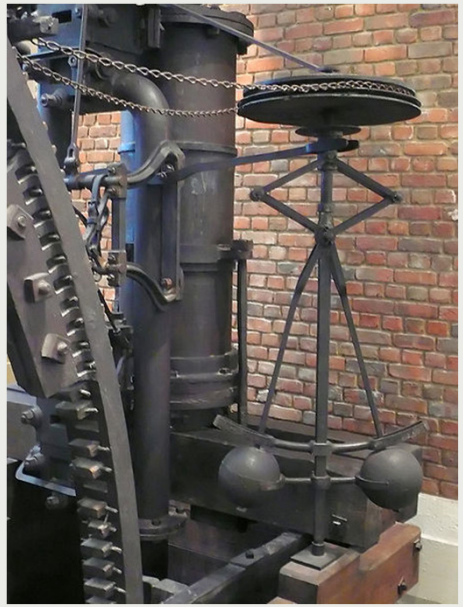
Some Principles

- **Pull instead of push:** Tasks are not assigned to individuals, but are taken on by individuals
- PO is always **available** for clarifying requirements, but may introduce new ideas only in form of prioritized requirements for the next sprint planning
- The team is **self-organizing** without external interference
- **Time boxing** both sprints and meetings: time determines scope, not the other way round

Technical Analogy

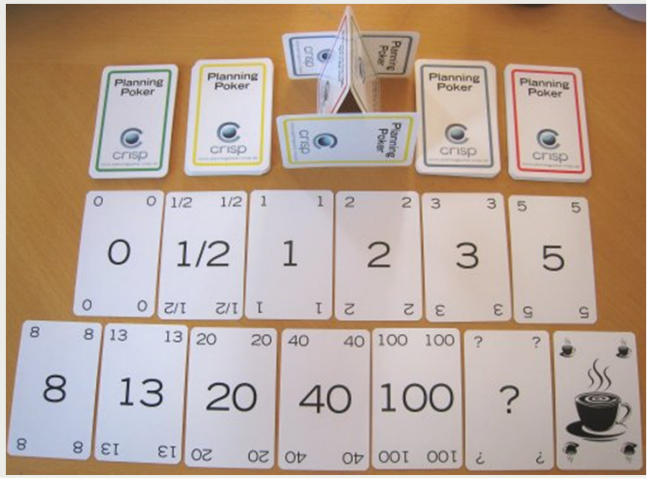
- A pre-descriptive process corresponds to a **open-loop controller** (German "**Steuerung**")
- An iterative process corresponds to a **closed-loop controller** (German "**Regelung**")



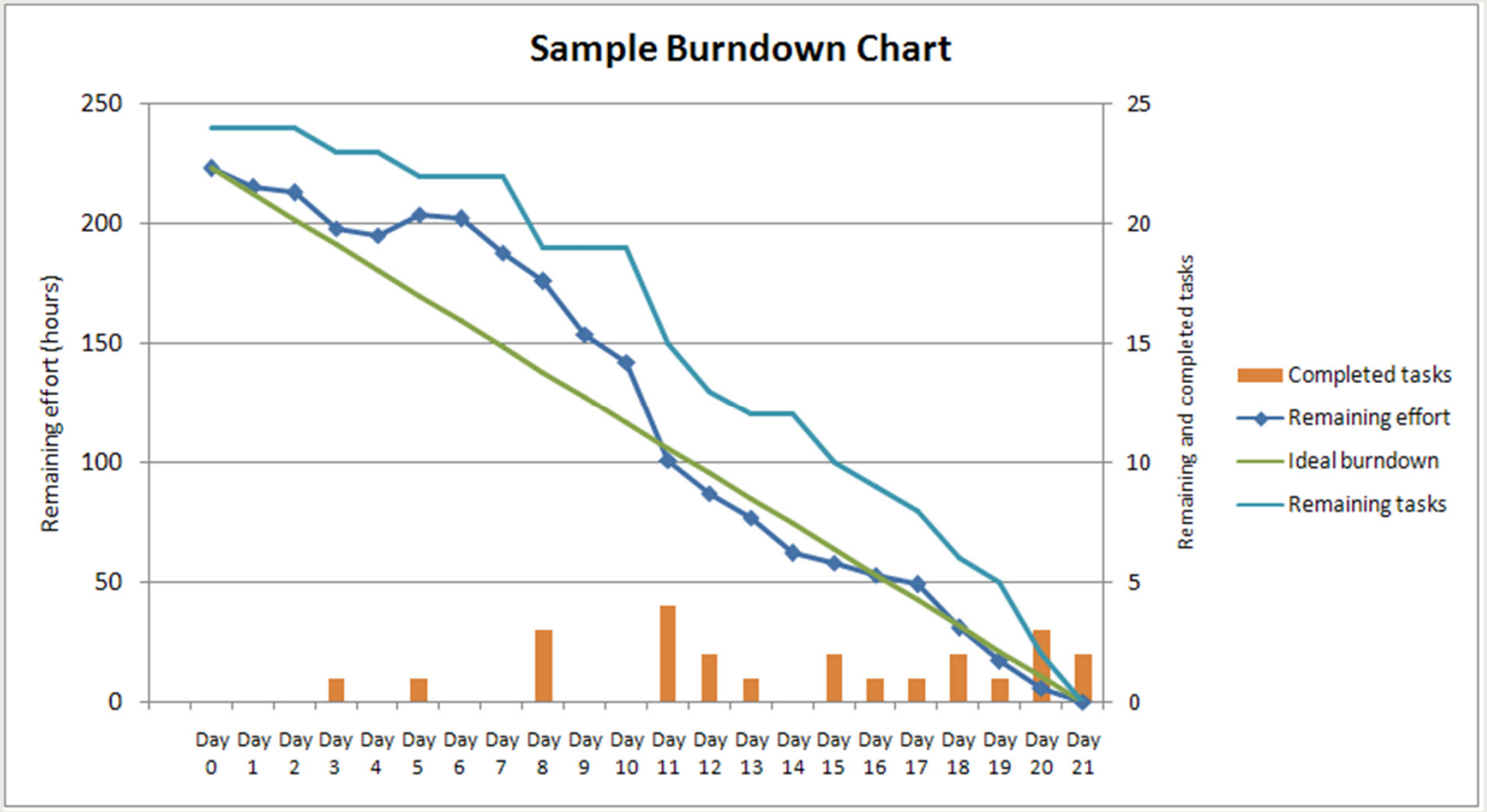
Non-trivial processes require the feedback of a closed-loop control

Planning Poker

- Origins in Scrum
- Accelerates Delphi-method
- “Poker”-cards avoid undesired mutual inducement
- (Roughly) Fibonacci numbers to model progression
- Many web applications available, e.g. for distributed teams



Sprint Burndown Chart



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Advanced Questions

- Where does Scrum not fit?
- Up-front planning
- Fixed price contracts
- Early phase of a new development
- Trailing efforts
- Cards & walls or tools?
- Scrum role questions
- Scaling scrum
- The tea leaves effect

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Cards or Tools?

In most teams:

- Product Backlog with tool
  - Spreadsheet or (preferably) task tracker
  - Nowadays Scrum-plugins for many trackers
- Sprint Backlog:
  - Cards on the wall for co-located teams
  - Tool for distributed teams
    - Tracker, since spreadsheet does not scale
    - Must support hierarchical decomposition
- Some trackers can visually simulate a task board

The Tea-Leaves-Effect

- Tea leaves swim at the very top in the beginning
- Dwindle down inside the cup until they reach the bottom a bit later
- Similar with product backlog items
  - Real business value is re-considered
- This occurs in many if not most projects
  - How would a pre-specifying project deal with it?

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Scrum: Summary of Advantages

- Meanwhile the one standard among software processes
- Easier to introduce than many other processes
- Many open questions, but most issues are shared by other approaches

And now:

Your questions please!