Software Development Methodologies

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Lecture 9

Agile Methodologies: Scrum
Scrum

- First mentioned as a development method in 1986, referring to a fast and flexible product development process practiced in Japanese manufacturing companies.

- The variant of Scrum used for software development, jointly developed by Sutherland and Schwaber, was introduced in 1995.

- The name emphasizes the importance of teamwork in the methodology and is derived from the game of rugby.

- Originally intended as a general framework for systems development, but is currently advertised as a comprehensive software development methodology.
# Scrum: Process

1. **Pre-game:** setting the stage for the iterative-incremental development effort; this phase consists of the following subphases:

   1. **Planning:**
      1. producing an initial list of prioritized requirements for the system (Product Backlog)
      2. analyzing the risks associated with the project
      3. estimating and obtaining the resources needed for implementing the requirements
      4. determining an overall schedule for the project

2. **Architecture/High-level Design:** determining the overall architecture of the system in such a way as to accommodate the realization of the requirements identified so far

3. **Development (Game):** iterative-incremental development of the system; each iteration (Sprint) is typically one month in duration and delivers an operational increment satisfying a subset of the product backlog.

4. **Post-game:** with the focus on integrating the increments produced and releasing the system into the user environment
Scrum: Process

[Abrahamsson et al. 2002]
Scrum Process: Pre-Game - *Planning*

1. Development of an initial list of requirements (*Product Backlog*):
   - Containing the functional and non-functional requirements of the system
   - Managed and controlled by a dedicated caretaker (*Product Owner*)
   - Bug fixes and enhancements necessitated during the development

2. Estimation of the effort and resources needed
3. Assessment of the risk involved in developing product backlog items
4. Prioritization of the items on the product backlog
5. Definition of a delivery date for the release(s) of the system
6. Formation of development team(s) (*Scrum Teams*):
   - Typically consisting of five to ten members with diverse specialties.
   - Self-organizing, in that team-members collectively decide on issues of task assignment, team management and control.
   - Supervised by a *Scrum Master*, acting both as a facilitator in charge of removing the obstacles preventing the team’s progress, and an enforcer of Scrum practices.

7. Provision of tools and resources necessary for the development
Scrum Process: Pre-Game – *Architecture/High-Level Design*

1. **Problem domain analysis**: based on the items in the product backlog, domain models reflecting the context and requirements of the system are built. Prototypes may also be built in order to gain a better understanding of the problem domain.

2. **Definition of the architecture of the system**: this is done in such a way as to support the context and requirements of the system represented in the domain models.

3. **Updating the product backlog**: new backlog items are added and/or existing items are changed to accommodate the architecture designed
Scrum Process: Development (Game)

- Performed in iterations; each iteration (*Sprint*) consists of:

1. Sprint Planning
2. Sprint Development
3. Sprint Review
Scrum Process: Development (Game) – *Sprint Planning*

1. A *Sprint Planning Meeting* is held at the start of each sprint in which all parties concerned with the project – development team(s), users, customers, management, product owner and scrum master(s) – participate in order to define a goal for the sprint.
   - The *Sprint Goal* defines the objective of the sprint in terms of the product backlog items that it should implement.

1. The development team determines a *Sprint Backlog*, which is a list of tasks to be performed during the sprint in order to meet the sprint goal.
   - The *Sprint Backlog* is a fine-grained, implementation-oriented, expanded subset of the product backlog.

2. Items on the sprint backlog are assigned to the development team(s), and will be the basis for development activities performed during the rest of the sprint.
Scrum Process: Development (Game) – *Sprint Development*

- Analysis, design, and implementation of the requirements set in the sprint goal through performing the tasks detailed in the sprint backlog, all in the 30-day time frame set by the sprint.

- In order to effectively manage and control the activities of the sprint, 15-minute *Daily Scrum Meetings* are held:
  - The purpose of the meeting is to maintain and keep track of the progress of the team and resolve the problems.
  - Team-members discuss what they have achieved since the last meeting, their plans for the period leading to the next meeting, and the impediments they have encountered.
  - The management and the scrum master also attend the meetings and are to help overcome the problems.
Scrum Process: Development (Game) – *Sprint Review*

- A *Sprint Review Meeting* is held at the end of each sprint in which:
  1. The increment produced is demonstrated to all the parties concerned.
  2. A comprehensive assessment is made of the achievements of the sprint in satisfying the sprint goal.
  3. The product backlog is updated accordingly:
      - Fully realized requirements are marked as such.
      - Necessary bug fixes or enhancements are added.
      - Appropriate changes are made to partially developed requirements.
      - New requirements (or changes to already defined requirements) identified during the sprint are applied to the product backlog.
  4. Issues impeding the progress of the development team are discussed and resolved.
  5. The system architecture is updated according to the insight gained during the sprint.
Scrum Process: Sprint Activities

Sprint Backlog:
Feature(s) assigned to sprint

Product Backlog:
Prioritized product features desired by the customer

Backlog items expanded by team

every 24 hours

30 days

Scrum: 15 minute daily meeting. Team Members respond to basics:
1) What did you do since last Scrum Meeting?
2) Do you have any obstacles?
3) What will you do before next meeting?

New functionality is demonstrated at end of sprint

[Schwaber and Beedle 2001]
Scrum Process: Post-Game

1. Integration of the increments produced during the sprints
2. System-wide testing
3. Preparation of user documentation
4. Preparation of training and marketing material
5. Training the users and operators of the system
6. System conversion/packaging
7. Acceptance testing
Scrum: Strengths and Weaknesses

**Strengths**

- Iterative-incremental process
- Based on modeling the problem domain and the system
- Requirements are allowed to evolve over time.
- Traceability to requirements through the *Product Backlog*
- Architecture of the system drafted before the development engine is started
Scrum: Strengths and Weaknesses

- **Strengths (Contd.)**
  - Iterative development engine governed by careful planning and reviewing
  - Active user involvement
  - Simple and straightforward process
  - Early and frequent releases, demonstrating functionality at the end of each iteration (sprint) of the development cycle
Scrum: Strengths and Weaknesses

Weaknesses

- Integration is done after all increments are built
- Lack of scalability
- Based on the assumption that human communication is sufficient for running projects of any size and keeping them focused
- Not necessarily seamless (details of tasks are not prescribed)
- No clear-cut design effort
- Model-phobic
- Models are not prescribed, leaving it to the developer to decide what model can be useful
- Lack of formalism
References
