Agile Software Development
L5 – Scrum

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Agenda

1. Quick recap
2. ASD with Scrum
History
In today’s fast-paced, fiercely competitive world of commercial new product development, speed and flexibility are essential. Companies are increasingly realizing that the old, sequential approach to developing new products simply won’t get the job done. Instead, companies in Japan and the United States are using a holistic method—as in rugby, the ball gets passed within the team as it moves as a unit up the field.
Agile Software Development with Scrum

• Hirotaka Takeuchi and Ikujiro Nonaka presented the idea that companies were using a holistic approach, as in rugby - the ball gets passed within the team as it moves as a unit up the field

• The holistic approach was characterised by built-in stability, self-organizing project teams, overlapping development phases, multilearning, subtle control and organizational transfer of learning
Agile Software Development with Scrum

- Ken Schwaber and Jeff Sutherland developed Scrum in the early 1990s, based on the HBR article
- They began writing the Scrum Guide since 2010 to help people understand Scrum

https://www.scrumguides.org/scrum-guide.html
What is Scrum?
What is Scrum?

• Scrum is a **process framework** used to manage **product development** and other knowledge work

• Scrum is found on empiricism and lean thinking

  • **Empiricism** → knowledge comes from experience and making decisions based on what is observed

  • **Lean thinking** → reduces waste and focuses on the essentials

https://www.scrumguides.org/scrum-guide.html
What is Scrum?

- Scrum employs an iterative, incremental approach to optimize predictability and to control risk.
- Scrum is structured in a way that allows teams to incorporate practices from other frameworks.

https://www.scrumguides.org/scrum-guide.html
When is Scrum applicable?

• **Cross functional team** is working in a product development setting

• There is a **non trivial amount of work** that lends itself to being split into more than one 2 – 4 week iteration

• The individual team is **highly flexible and adaptive**

• Scrum has been used to develop software, hardware, embedded software, networks of interacting function, autonomous vehicles, schools, government, marketing, managing the operation of organizations and **almost everything** we use in our daily lives, as individuals and societies.

[https://www.scrumguides.org/scrum-guide.html](https://www.scrumguides.org/scrum-guide.html)
Scrum Team

• Consists of one SM, one PO, and devs

• There are no sub-teams or hierarchies, it’s a cohesive unit of professionals focused on the Product Goal

• Teams are cross-functional (the members have all the skills to create value)

• Teams are self-managing (they can decide who does what, when and how)

• Typically, 10 or fewer people (smaller teams communicate better)

• The entire Scrum Team is accountable for creating a valuable, useful Increment every Sprint.

https://www.scrumguides.org/scrum-guide.html
Scrum Roles

They are committed to creating any aspect of a usable increment each Sprint

The PO is accountable for maximizing the value of the product, and the effective Product Backlog manag.

Is accountable for establishing Scrum as defined in the Scrum guide

https://www.scrumguides.org/scrum-guide.html

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Scrum roles

Product Owner: Owns “what” is desired and “why” it’s desired

ScrumMaster: Keeper of Scrum Process, facilitator

Scrum Delivery Team: Owns “how” and “how quickly” work is delivered
Scrum phases

• Pregame:
  • **Planning**: Definition of a *new release* based on currently known backlog, along with an *estimate* of its schedule and cost
  New system → conceptualization and analysis
  Existing system → limited analysis
  • **Architecture**: Design how the backlog items will be implemented. This phase includes *system architecture* modification and *high-level design*

• Game:
  • **Development Sprints**: Development of *new release functionality*, with *constant respect* to the variables of time, requirements, quality, cost, and competition
  • Interaction with these variables defines the end of this phase

• Postgame:
  • **Closure**: Preparation for release, including final documentation, pre-release staged testing, and release
Sprints (a.k.a. iterations)

• The Sprint is a **container** for all other events

• A new Sprint starts **immediately** after the conclusion of the previous Sprint

• A Sprint could be **cancelled** if the Sprint Goal becomes obsolete. Only the Product Owner has the authority to cancel the Sprint

• **During** the Sprint:
  • No changes are made that would hinder the Sprint Goal
  • Quality does not decrease
  • The Product Backlog is refined as needed; and,
  • Scope may be clarified and renegotiated with the Product Owner as more is learned
The Sprint

Sprint Planning initiates the Sprint by laying out the work to be performed for the Sprint.

To inspect progress toward the Sprint Goal and adapt the Backlog, adjusting the upcoming planned work.

SPRINT PLANNING

DAILY SCRUM
The Sprint

To inspect the outcome of the Sprint and review what was accomplished. Present the results to stakeholders.

SPRINT REVIEW

To plan ways to increase quality and effectiveness. The team discusses what went well, the problems, and how those problems were solved.

SPRINT RETROSPECTIVE
Timebox

“A timebox is a previously agreed period of time during which a person or a team works steadily towards completion of some goal.”

<table>
<thead>
<tr>
<th>Event</th>
<th>Timebox</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily Scrum</td>
<td>15 minutes (strict)</td>
</tr>
<tr>
<td>Sprint review</td>
<td>4 hours (max) *</td>
</tr>
<tr>
<td>Sprint retrospective</td>
<td>3 hours (max) *</td>
</tr>
<tr>
<td>Sprint planning</td>
<td>8 hours (max) *</td>
</tr>
</tbody>
</table>

(*) for 1-month sprint
https://scrumguide.org/
https://www.agilealliance.org/glossary/timebox/
The Scrum framework

- Feedback
- Self-reflection
- Celebration
- Improvements

- Building of Product Backlog
- Configuration of development environment
- Distribution of workstations

- Product Increment
- Product Integration

- Sprint Backlog
- Planning Poker

- Closing the Sprint

- Daily Scrum 24 HS

- Organizing and Preparing User Stories

- Controlling and Monitoring Sprint Work

- Scrum Master & Scrum Team

- Agile Coach

- Planning the Sprint Backlog

- Delivering the Product

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User Stories

As a user, I can cancel a reservation.

- Must take less than 1 second

Details behind the user story come out during conversations with the Product Owner.

Requirements:
- Verify that a premium member can cancel the same day without a fee.
- Verify that a non-premium member is charged 10% for a same-day cancellation.
- Verify that an email confirmation is sent.
Definition of Done vs Acceptance Criteria

- List of requirements that a user story must adhere to
  - Common to all user stories
  - The criteria must be met to complete the story
  - Examples:
    - Unit tests passed?
    - Acceptance test passed?
    - Product owner accepted?

- Test scenarios that verify the functional correctness of the user story
  - Particular to a user story
  - The criteria must be met to complete the story
  - Examples
    - The password must contain more than 8 characters
    - The query must be resolved in less than 1 sec (99% of the time)
Product Backlog

- The Product Backlog is an emergent, ordered list of what is needed to improve the product. It is undertaken by the scrum team.
- Product Backlog refinement is the act of breaking down and further defining Product Backlog items into smaller more precise items.
The Sprint Backlog is composed of the Sprint Goal (why), the set of Product Backlog items selected for the Sprint (what), as well as an actionable plan for delivering the Increment (how).

It is a highly visible, realtime picture of the work that the Developers plan to accomplish during the Sprint in order to achieve the Sprint Goal.
How many stories fit in a sprint?
The Scrum framework

- **Organizing and Preparing User Stories**
  - As an User, I want - -
  - As an User, I want - -
  - As an User, I want - -
  - As an User, I want - -

- **Planning the Sprint Backlog**
  - Sprint Backlog
  - Planning Poker

- **Closing the Sprint**
  - Feedback
  - Self-reflection
  - Celebration
  - Improvements

- **Product Increment**
  - Product Integration

- **Controlling and Monitoring Sprint Work**

- **Daily Scrum 24 HS**
Agile Estimating and Planning

Size □ Calculation □ Duration

300 kilograms  Velocity = 20  300 ÷ 20 = 15 iterations
Agile Estimating and Planning

VELOCITY

- The amount of work a team can tackle during a single Sprint
- It is calculated at the end of the Sprint by totaling the Points for all fully completed User Stories
- It also facilitates very accurate forecasting of how many stories a Team can do in a Sprint.
  - For forecasting purposes the average of the last three Sprint's Velocity should be used.
  - This means it takes three Sprints of experience for a Team to determine its Velocity accurately.

https://www.scruminc.com/velocity/
Size

• Expert estimation is the dominant strategy when estimating software development effort *
• Analogy-based estimation (e.g. Function points)
• Parametric models (e.g., COCOMO)
• Group estimation: Wideband delphi (Boehm 1970), then Planning Poker

**Story points**

- How long a User Story will take to develop *(effort)*
- Influenced by:
  - Complexity
  - Risk
  - Uncertainty
How to determine story points?

• One popular alternative is **Planning Poker**
• Scrum poker or planning poker is a consensus based, gamified technique to estimate the complexity and effort of a software feature.
• All the team members discuss using **cards**
• The dialogue improves **accuracy** (Hoest and Wohlin 1998)
• Different **scales** can be used
  • Fibonacci (e.g., 1, 2, 3, 5, 8, 13, 20, ... )
  • T-shirt sizes
Planning Poker

Online version: https://scrumpoker.online/
Demo Time
Planning Poker (demo!)

User story: As a user, I want to be able to register online, so that I can start shopping online.

Acceptance criteria:

☐ User can only submit a form by filling in all required fields
☐ The email user provided must not be a free email
☐ Submission from same IP can only be made three times within 30 minutes
☐ User can only submit a form by filling in all required fields
☐ User will receive a notification email after successfully registration

Online version: https://scrumpoker.online/