

Agile Part II: Scrum

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Agenda

- ▶ Recap: Why agile?
- ▶ Scrum:
 - ▶ Introduction
 - ▶ Scrum Teams
 - ▶ Scrum Events
 - ▶ Scrum Artifacts
 - ▶ Values

Recap: Why Agile?



Scrum

- ▶ Scrum is considered **the most popular agile** development methodology.
- ▶ Scrum is an agile method that provides a framework for agile project organization and planning. It does not mandate any specific technical practices.

Plans always change so anything apart from short-term plans are unreliable.

Companies using Scrum



Scrum framework

Scrum Team

- Product owner
- ScrumMaster
- Developers

Scrum Events

- Sprint
 - Sprint planning
 - Sprint review
 - Sprint retrospective
 - Daily scrum meeting

Artifacts

- Product backlog
- Sprint backlog
- Increment

Scrum pillars

- Transparency
- Inspection
- Adaptation

Scrum Values

- Commitment, Focus, Openness, Respect, and Courage

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Scrum team

► *Characteristics*

- *Cross functional: has all skills needed for an increment.*
- *Self Organizing: internally decides who does what, when, and how.*
- *Accountable as a whole: The entire Scrum Team is accountable for creating a valuable, useful Increment every Sprint*

► *Roles*

- *The Product Owner* is responsible for ensuring that the development team are always focused on the product they are building rather than diverted into technically interesting but less relevant work.
- **The ScrumMaster** is a Scrum expert whose job is to guide the team in the effective use of the Scrum method. The developers of Scrum emphasize that the ScrumMaster is not a conventional project manager but is a coach for the team. They have authority within the team on how Scrum is used.
- *Development team*
A small of (typically less than or equal 8 people) who are responsible for developing the product.

In scrum there is no traditional product manager

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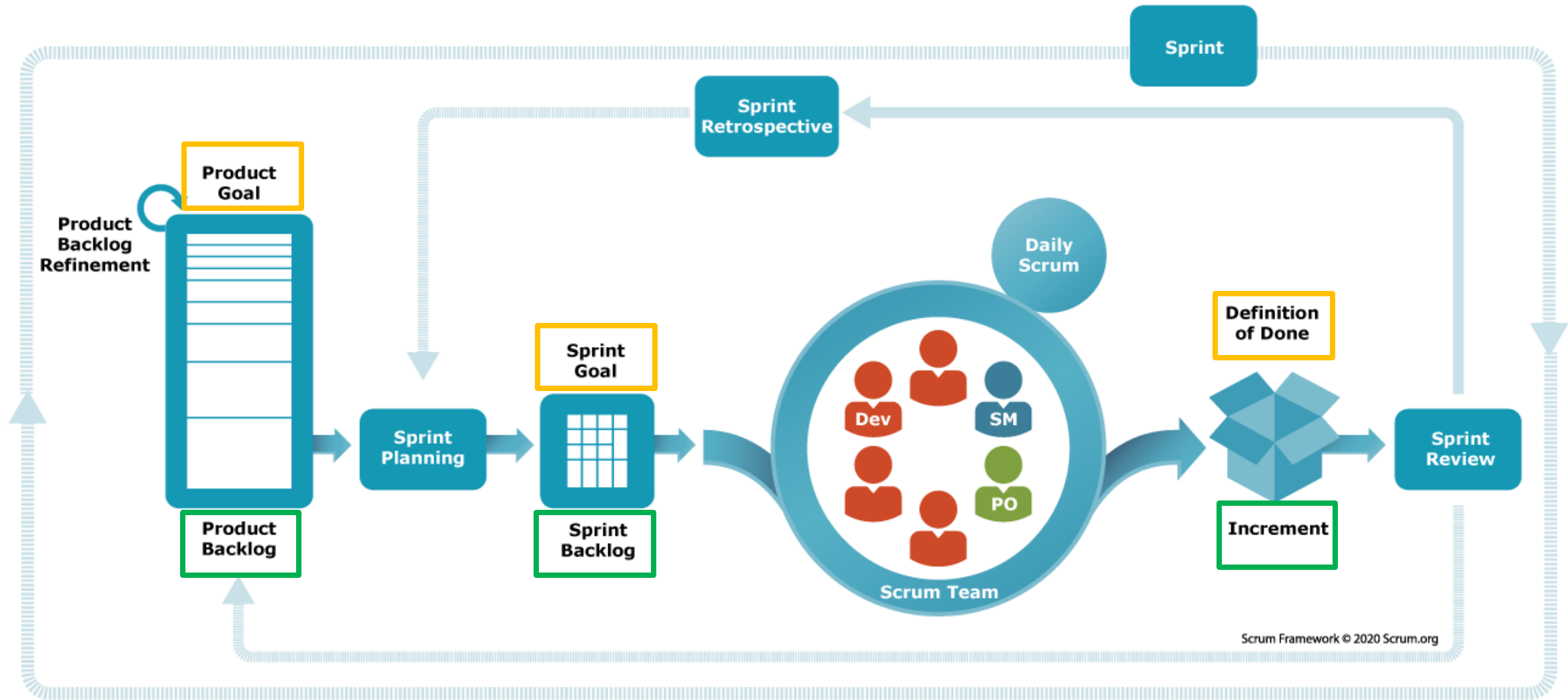
Scrum Values

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Scrum Events and Artifacts



Artifact

Commitment

Scrum terminology

- ▶ ***Product***

The software product that is being developed by the Scrum team.

- ▶ ***Sprint***

A short period, one month or less, when a product increment is developed. Sprints should produce a 'shippable product increment'. This means that the developed software should be complete and ready to deploy.

- ▶ ***Potentially shippable product increment***

The output of a sprint which should be of high enough quality to be deployed for customer use.

- ▶ ***Velocity***

An estimate of how much work a team can do in a single sprint.

Scrum Events

- ▶ **Planning [Once/Sprint]:**
 - ▶ *At the start of the sprint*
 - ▶ **3 main Questions:**
 - ▶ *Why is this Sprint valuable? → Spring Goal*
 - ▶ *What can be Done this Sprint? → Items*
 - ▶ *How will the chosen work get done? → Plan*
 - ▶ *Goal + items + Plan → Sprint Backlog!*
- ▶ **Scrum Stand-up [Daily]:**
 - ▶ *Focuses on progress toward the Sprint Goal and produces an actionable plan for the next day of work*
- ▶ **Review [Once/Sprint]:**
 - ▶ *inspect the outcome of the Sprint and determine future adaptations*
 - ▶ *Include: Stakeholders*
- ▶ **Retrospective [Once/Sprint]**
 - ▶ *inspects how the last Sprint went with regards to individuals, interactions, processes, tools, and their Definition of Done.*
 - ▶ *identifies the most helpful changes to improve its effectiveness*

Scrum Artifacts

- ▶ *They are designed to maximize transparency of key information*
- ▶ *Each artifact contains a **commitment***
- ▶ *Product Backlog [→ **Product Goal**]*
 - ▶ *A list of all TODOs*
 - ▶ *Prioritized by product owner*
 - ▶ *Estimated by developers*
- ▶ *Sprint Backlog [→ **Sprint Goal**]*
 - ▶ *Contains:*
 - ▶ **Sprint Goal** (why)
 - ▶ The **set of items** selected from the Product Backlog for the Sprint (**what**)
 - ▶ An **actionable plan** for delivering the Increment (**how**).

Scrum Artifacts

- ▶ ***Increment*** [➔ ***Definition of Done***]
 - ▶ Each Increment is additive to all prior Increments
 - ▶ The Increment must be usable
 - ▶ Multiple Increments may be included in one Sprint.

Key Scrum practices

- ▶ ***Timeboxed sprints***
Fixed-time (less than a month) periods in which items from the product backlog are implemented,
- ▶ ***Self-organizing (Self-managing) teams***
 - ▶ Coordinates the work by discussing issues and making decisions by consensus.
 - ▶ Make their own decisions on schedules and deliverables
- ▶ ***Cross-functional teams***
“meaning the members have all the skills necessary to create value each Sprint.” Scrum Guide

In Depth: Product Backlog



Product backlogs

- ▶ The product backlog is a list of what needs to be done to complete the development of the product.
- ▶ The items on this list are called product backlog items (PBIs).
- ▶ The product backlog may include a variety of different items such as
 - ▶ product features to be implemented,
 - ▶ user requests,
 - ▶ essential development activities and
 - ▶ desirable engineering improvements.
- ▶ The product backlog should always be prioritized so that the items that be implemented first are at the top of the list.

Examples of product backlog items

- ▶ 1. As a teacher, I want to be able to configure the group of tools that are available to individual classes. (feature)
- ▶ 2. As a parent, I want to be able to view my childrens' work and the assessments made by their teachers. (feature)
- ▶ 3. As a teacher of young children, I want a pictorial interface for children with limited reading ability. (user request)
- ▶ 4. Establish criteria for the assessment of open source software that might be used as a basis for parts of this system. (development activity)
- ▶ 5. Refactor user interface code to improve understandability and performance. (engineering improvement)
- ▶ 6. Implement encryption for all personal user data. (engineering improvement)

Product backlog item states

- ▶ ***Ready for consideration***

These are high-level ideas and feature descriptions that will be considered for inclusion in the product. They are tentative so may radically change or may not be included in the final product.

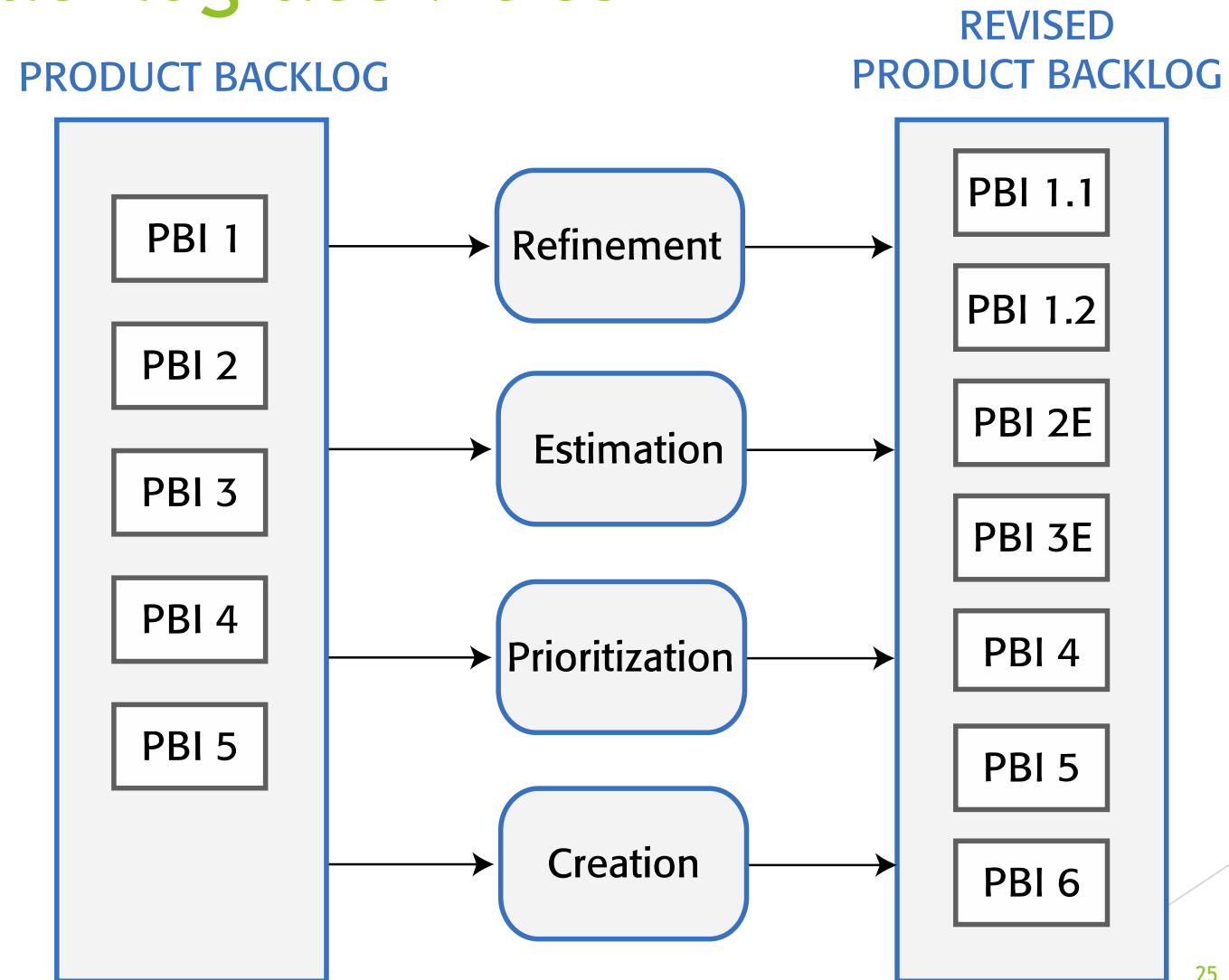
- ▶ ***Ready for refinement***

The team has agreed that this is an important item that should be implemented as part of the current development. There is a reasonably clear definition of what is required. However, work is needed to understand and refine the item.

- ▶ ***Ready for implementation***

The PBI has enough detail for the team to estimate the effort involved and to implement the item. Dependencies on other items have been identified.

Product backlog activities



Product backlog activities

► **Creation**

New items are added to the backlog.

► ***Refinement***

Existing PBIs are analysed and refined to create more detailed PBIs. This may lead to the creation of new product backlog items.

► **Estimation**

The team estimate the amount of work required to implement a PBI and add this assessment to each analysed PBI.

► **Prioritization**

The product backlog items are reordered to take new information and changed circumstances into account.

PBI estimation metrics (Sample methods)

► Effort required

- This may be expressed in person-hours or person-days i.e. the number of hours or days it would take one person to implement that PBI. Several people may work on an item, which may shorten the calendar time required.

► Story points

- Story points are an arbitrary estimate of the effort.
- They were derived originally by comparing user stories, but they can be used for estimating any kind of PBI.
- Story points are estimated relatively. The team agree on the story points for a baseline task and other tasks are estimated by comparison with this e.g. more/less complex, larger/smaller etc.

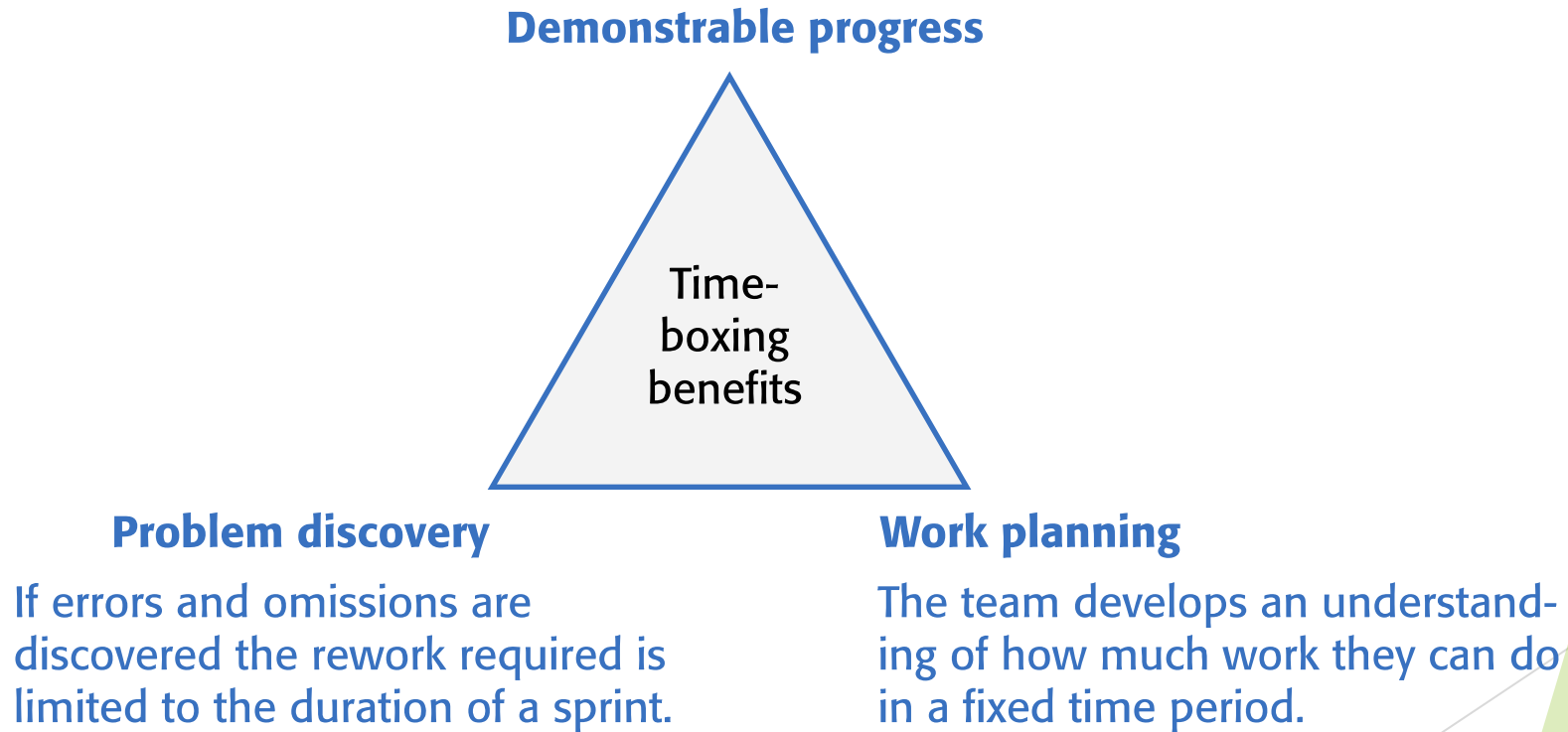
In Depth: Sprint



Benefits of using timeboxed sprints

There is a tangible output (usually a software demonstrator) that can be delivered at the end of every sprint.

Demonstrable progress



Time-
boxing
benefits

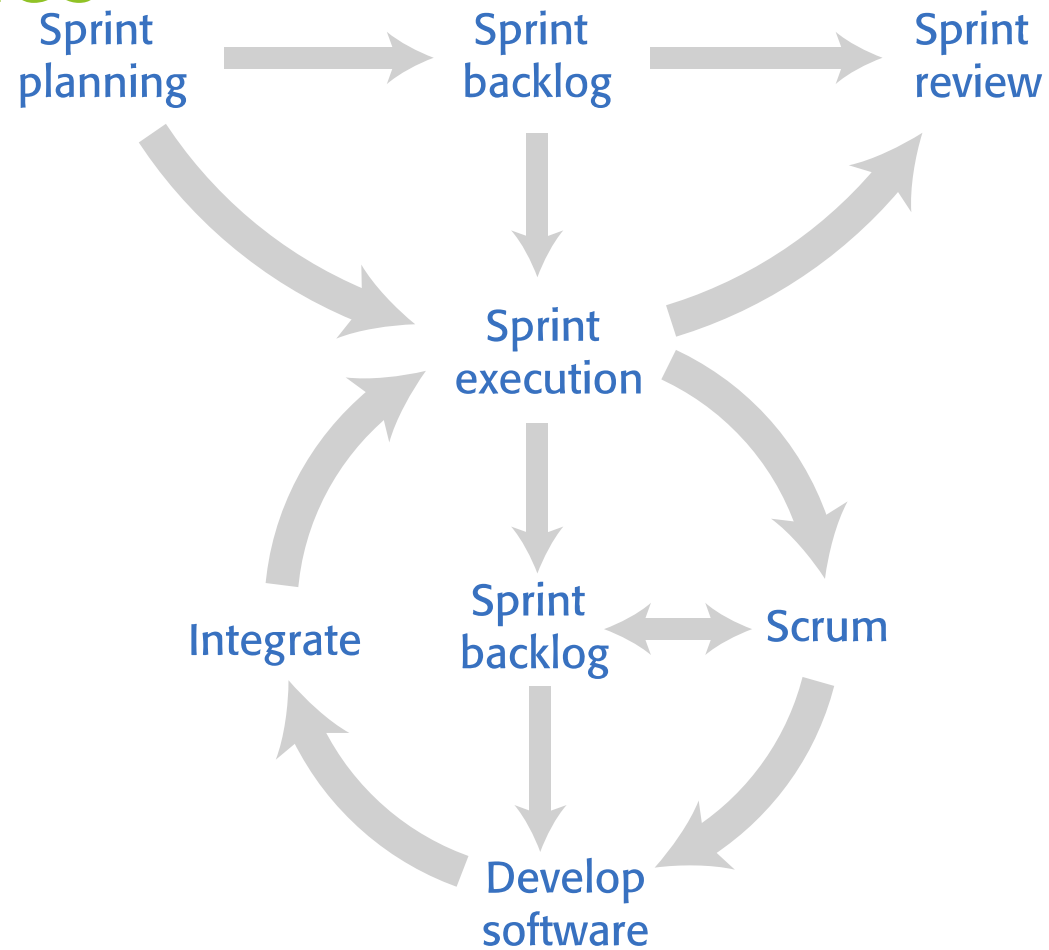
Problem discovery

If errors and omissions are discovered the rework required is limited to the duration of a sprint.

Work planning

The team develops an understanding of how much work they can do in a fixed time period.

Sprint activities



+ Sprint Retrospective

Sprint planning

- ▶ Establish an agreed sprint goal
 - ▶ Sprint goals may be focused on software functionality, support or performance and reliability,.
- ▶ Decide on the list of items from the product backlog that should be implemented
- ▶ Create a sprint backlog.
 - ▶ This is a more detailed version of the product backlog that records the work to be done during the sprint

Daily Scrums

- ▶ A daily scrum is a short daily meeting that is usually held at the beginning of the day. During a scrum, all team members share information:
 - ▶ describe their progress since the previous day's scrum,
 - ▶ problems that have arisen and
 - ▶ plans for the coming day.
- ▶ Scrum meetings should be short and focused. To dissuade team members from getting involved in long discussions, they are sometimes organized as 'stand-up' meetings where there are no chairs in the meeting room.

Sprint reviews

- ▶ At the end of each sprint, there is a review meeting, which involves the whole team [& PREFERABLY: STAKEHOLDERS]. This meeting:
 - ▶ reviews whether or not the sprint has met its goal.
 - ▶ Discuss the progress and what is next.

Sprint retrospective

- ▶ The purpose of the Sprint Retrospective is to plan ways to increase quality and effectiveness.
 - ▶ individuals,
 - ▶ interactions,
 - ▶ processes,
 - ▶ tools,
 - ▶ Definition of Done

The team identifies the most helpful changes to improve its effectiveness and may add them to backlog

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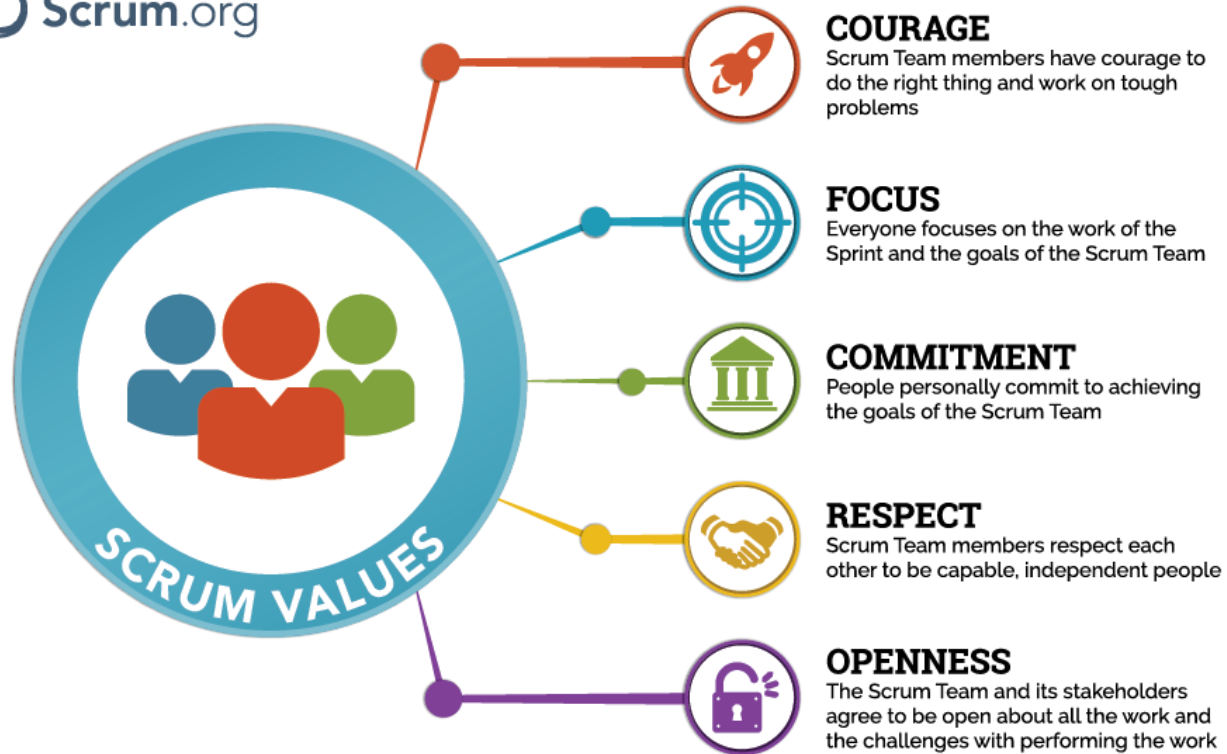
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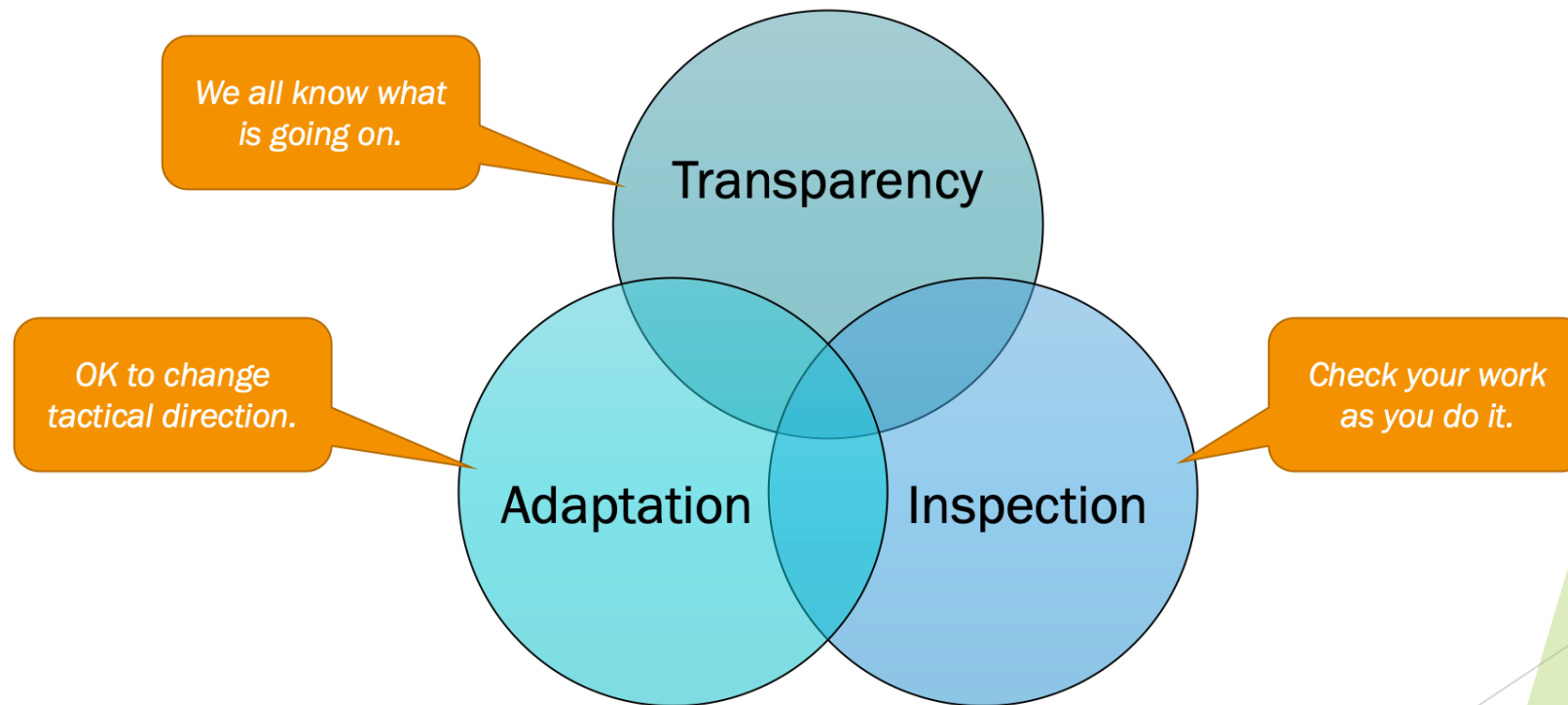
Scrum Values



Scrum Values

- ▶ “The Scrum Team commits to achieving its goals and to supporting each other. Their primary focus is on the work of the Sprint to make the best possible progress toward these goals. The Scrum Team and its stakeholders are open about the work and the challenges. Scrum Team members respect each other to be capable, independent people, and are respected as such by the people with whom they work. The Scrum Team members have the courage to do the right thing, to work on tough problems.” Scrum Guide 2020

Scrum Theory: Three Pillars of Empiricism



[NOT MANDATORY] Extra activities of Scrum: Test automation & Continuous integration

- ▶ Scrum does not suggest the technical agile activities that should be used. However, I think there are two practices that are beneficial to be used in a sprint.
- ▶ ***Test automation***
As far as possible, product testing should be automated. You should develop a suite of executable tests that can be run at any time.
- ▶ ***Continuous integration***
Whenever anyone makes changes to the software components they are developing, these components should be immediately integrated with other components to create a system. This system should then be tested to check for unanticipated component interaction problems.

[NOT MANDATORY] Extra activities: Code completeness checklist

- ▶ ***Reviewed***
The code has been reviewed by another team member who has checked that it meets agreed coding standards.
- ▶ ***Unit tested***
All unit tests have been run automatically and all tests have executed successfully.
- ▶ ***Integrated***
The code has been integrated with the project codebase and no integration errors have been reported.
- ▶ ***Integration tested***
All integration tests have been run automatically and all tests have executed successfully.
- ▶ ***Accepted***
Acceptance tests have been run if appropriate and the product owner or the development team have confirmed that the product backlog item has been completed.

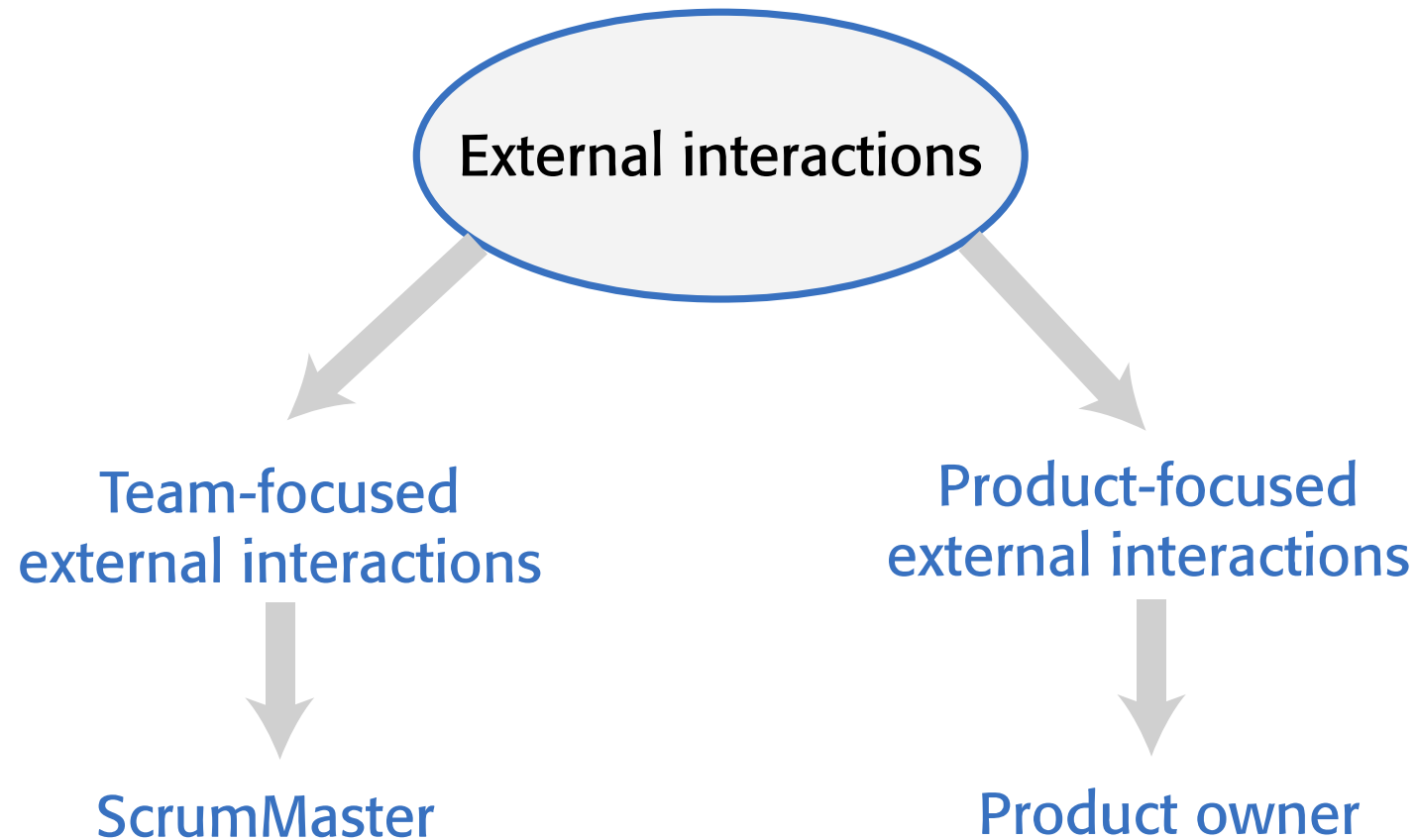
In Depth: Tips for Teams



Team size and composition

- ▶ The ideal Scrum team size is ≤ 8 people.
 - ▶ Different skills, such as networking, user experience, database design and so on.
 - ▶ Different levels of experience.
 - ▶ Should be
 - ▶ large enough to be diverse
 - ▶ small enough to communicate effectively.
- ▶ The advantage of a self-organizing team is that it can be a cohesive team that can adapt to change.
 - ▶ Because the team rather than individuals take responsibility for the work, they can cope with people leaving and joining the team.
 - ▶ Good team communication means that team members inevitably learn something about each other's areas

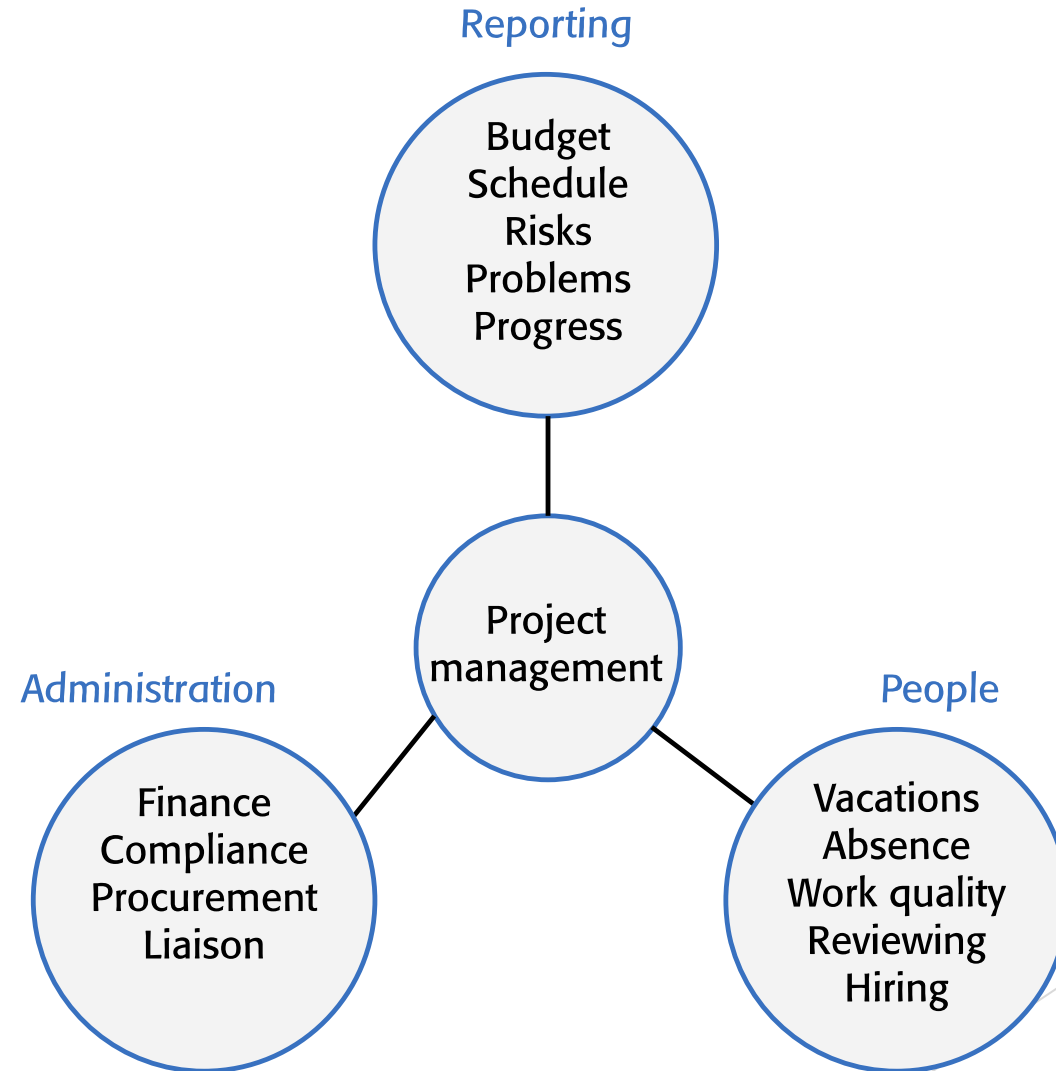
Tips for Managing external interactions



Project management

- ▶ In all but the smallest product development companies, there is a need for development teams to report on progress to company management.
- ▶ A self-organizing team has to appoint someone to take on these responsibilities.
 - ▶ Because of the need to maintain continuity of communication with people outside of the group, rotating these activities around team members is not a viable approach.
- ▶ The developers of Scrum did not envisage that the ScrumMaster should also have project management responsibilities.
 - ▶ In many companies, however, the ScrumMaster has to take on project management responsibilities.
 - ▶ They know the work going on and are in the best position to provide accurate information and project plans and progress.

Project management responsibilities



References

- ▶ The 2020 Scrum Guide: <https://scrumguides.org/scrum-guide.html>
- ▶ Engineering Software Products: An Introduction to Modern Software Engineering, Ian Sommerville.
- ▶ www.mountaingoatsoftware.com
- ▶ <https://doi.org/10.1016/j.jss.2021.111110>