Organizational Matters

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Software Engineering II
WS 2018/19

Prof. Plattner, Dr. Uflacker
Enterprise Platform and Integration Concepts group

HPI Hasso Plattner Institut
IT Systems Engineering | Universität Potsdam

Communication

If you haven't yet ...

- Sign up to mailing list
- Join Slack, teaching team is available

- All links are on the course website
- Slides are uploaded there too

Next Weeks' Schedule

Previous weeks

- Introduction lectures
- Testing

Week Nov 5 – Nov 9

- Finish intro exercise
- Finalize teams + meeting times
- POs: Customer meeting!
  - Write initial user stories

Nov 9 Lecture

- 1st slot: Scrum LEGO Exercise!
  - Room **D.E-9/10**
- 2nd slot:
  - Kick-off
  - Present vision
  - Start of project

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Scrum

Software Engineering II
WS 2017/18

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Scrum

1. **The Case for Agile**
2. The Scrum Process
3. Scaling Scrum

How Traditional Projects Fail

- Delivering late
- Delivering over budget
- Delivering the wrong thing
- Unstable in production
- Costly to maintain

Why Traditional Projects Fail

- Smart people trying to do good work
- Stakeholders are well intended

Process in traditional projects

- Much effort for
  - Documents for formalized hand-offs
  - Templates
  - Review committees

Why Traditional Projects Fail

"The later we find a defect, the more expensive it is to fix it!"

Does front-loading a software development process make sense?

Reality shows:

- Project plans are wonderful
- Adjustments & assumptions are made during analysis, design, code
- Re-planning takes place
- Example: Testing phase at the end
  - Tester raises a defect
  - Programmer claims he followed the specification
  - Architect blames business analyst etc.
  - Exponential cost

Why Traditional Projects Fail

- People are afraid of making changes
- Unofficial changes are carried out
- Documents get out of sync
- …

Again, why do we do that!?

To minimize the risk of finding a defect too late…

A Self-Fulfilling Prophecy

- We conduct the front-loaded process to minimize exponential costs of change
  - Project plan
  - Requirements specification
  - High-level design documents
  - Low-level design documents
- This process causes the exponential costs of change!
  - ➔ A self-fulfilling prophecy

This makes sense for a bridge, ship, or a building
but software (and Lego) are easy to change!

The Agile Manifesto

We are uncovering better ways of developing software by doing it and helping others do it.

Through this work we have come to 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*

That is, while there is value in the items on the right, we value the items on the left more.

http://agilemanifesto.org/

How Agile Methods Address Project Risks

No longer late or over budget

- Tiny iterations
- Easy to calculate budget
- High-priority requirements first

No longer delivering the wrong thing

- Strong stakeholder communication
- Short feedback cycles

How Agile Methods Address Project Risks

No longer unstable in production

- Delivering each iteration
- High degree of automation

No longer costly to maintain

- Maintenance mode starting with Sprint 2
- Maintenance of multiple versions during development

The Cost of Going Agile

Outcome-based planning

- No complete detailed project plan

Streaming requirements

- A new requirements process

Evolving design

- No complete upfront design → flexibility required
- Emergent Design

Changing existing code

- Need for refactoring

The Cost of Going Agile

Frequent code integration

- Continuous integration

Continual regression testing

- Add nth feature; test n-1 features

Frequent production releases

- Organizational challenges

Co-located team

- Easy communication, keep momentum

Discuss!

Pros and Cons

- Short planning horizon
- No up-front design
- Stories instead of requirement documents
- Extreme ideology

Scrum

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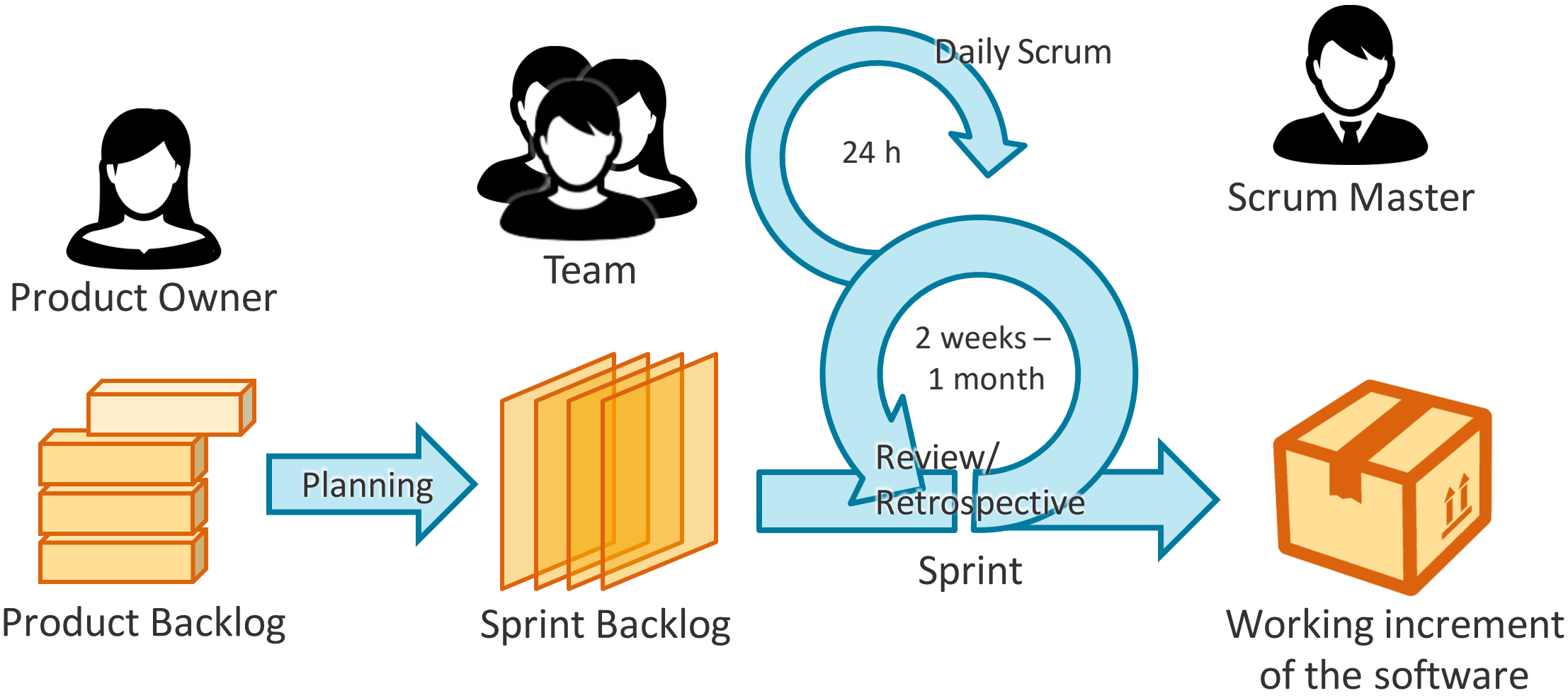
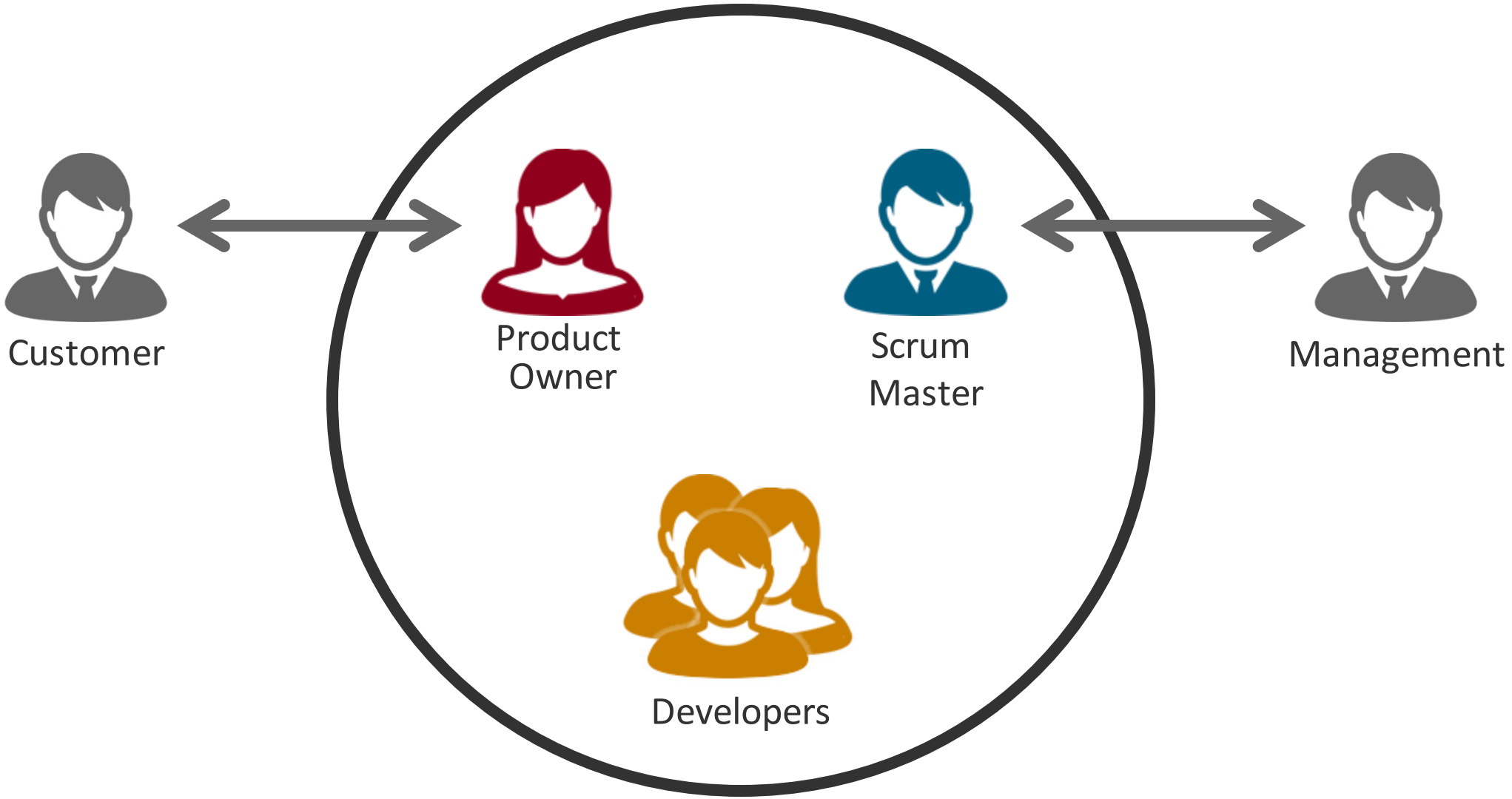
Scrum


Product Owner
Team
Daily Scrum
24 h
Scrum Master
2 weeks –
1 month
Review/
Retrospective
Sprint
Planning
Product Backlog
Sprint Backlog
Working increment
of the software

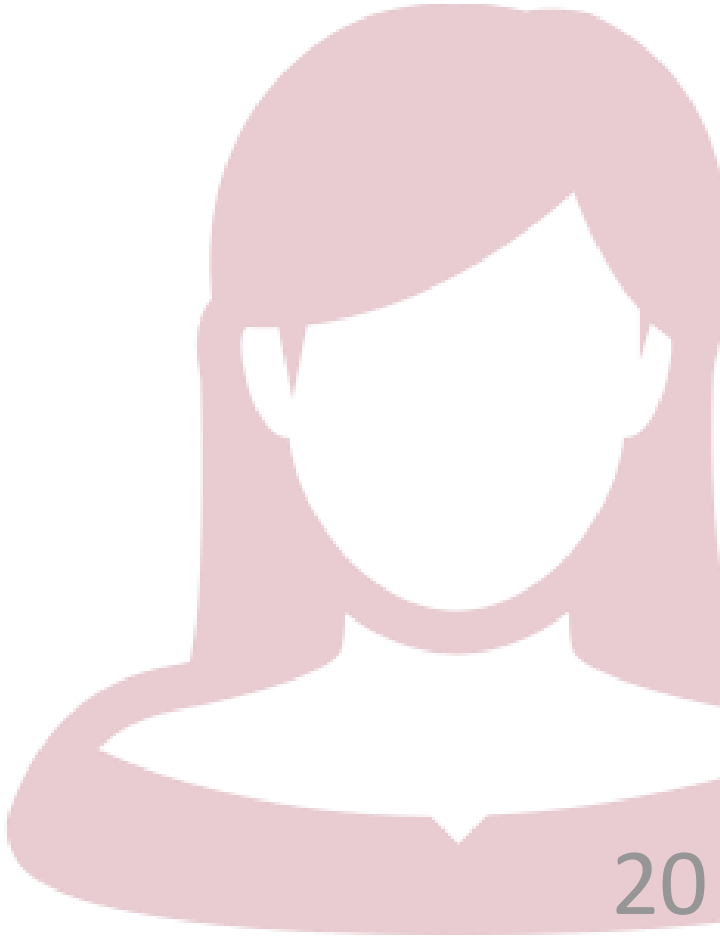
The Team


Customer
Product Owner
Scrum Master
Management
Developers

Product Owner

Responsibilities

- **Customer** communication
  - Contact person for team
- Product Backlog
  - **User Stories**
  - Priorities
- Acceptance Criteria & Tests



Scrum Master

Responsibilities

- **Process** manager
  - Moderator in meetings
- Management communication
  - Remove **impediments**
- Enabler, not boss

Developers

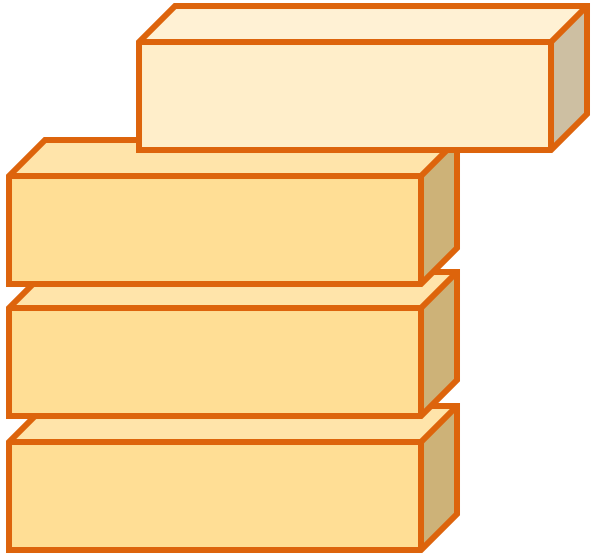
Responsibilities

- Communication
  - **Critically** discuss all inputs
  - Honestly share important information
  - Represent team as expert
- Sprint Backlog
- Developing ;-)

Product Backlog

List of work items

- Requirements (modification **requests**)
  - Features
  - Bug fixes
- Ordered/**prioritized**



Requirements

In Scrum, requirements are often defined as **user stories**:

"As <role>, I want <feature> to <reason>"

Requirements need to fulfill **INVEST** properties:

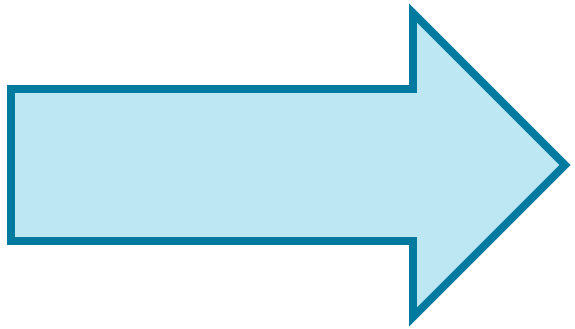
- I – Independent
- N – Negotiable
- V – Valuable
- E – Estimable
- S – Small
- T – Testable

http://xp123.com/articles/invest-in-good-stories-and-smart-tasks/

Planning Meeting

Filling the sprint

- Estimate Backlog items
- Move items from Product to **Sprint Backlog**



Defining the work

- **Break down** Backlog items into tasks
- PO not required

Total time: 2 hours per week of sprint

Tasks

For better planning, stories are broken down into tasks

Tasks should be **SMART**:

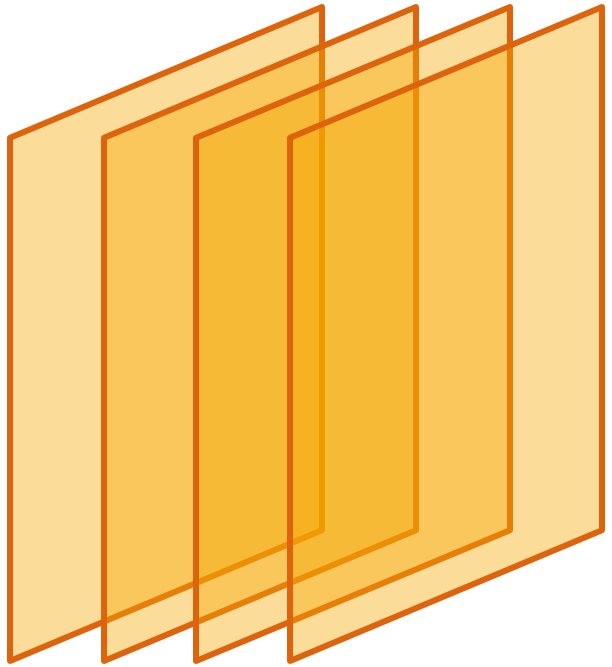
- S – Specific
- M – Measurable
- A – Achievable
- R – Relevant
- T – Time-boxed

http://xp123.com/articles/invest-in-good-stories-and-smart-tasks/

Sprint Backlog

List of tasks for a sprint

- Tasks are **signed-up** for, not assigned
- During the sprint
  - **No new features**
  - Team may change/add tasks



Daily Scrum Meeting

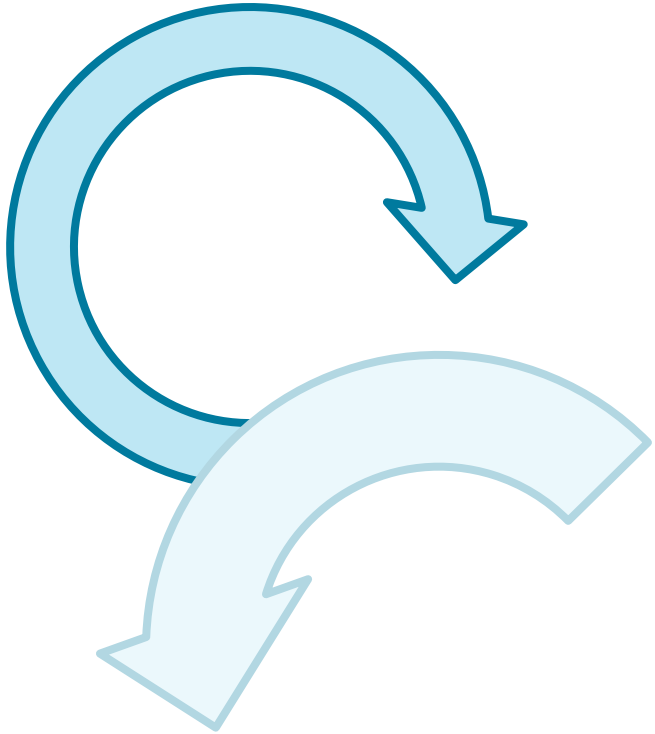
Status update

- Last achievements
- Next steps
- Problems

Max. **2 min** per person

Discussions?

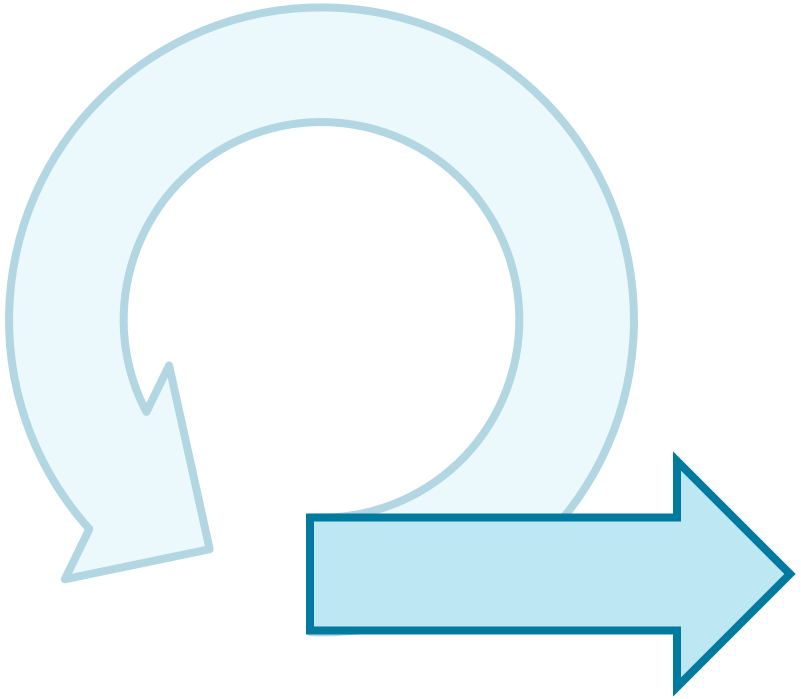
- Schedule **subsequent** expert's meeting



Review Meeting

Acceptance of Features

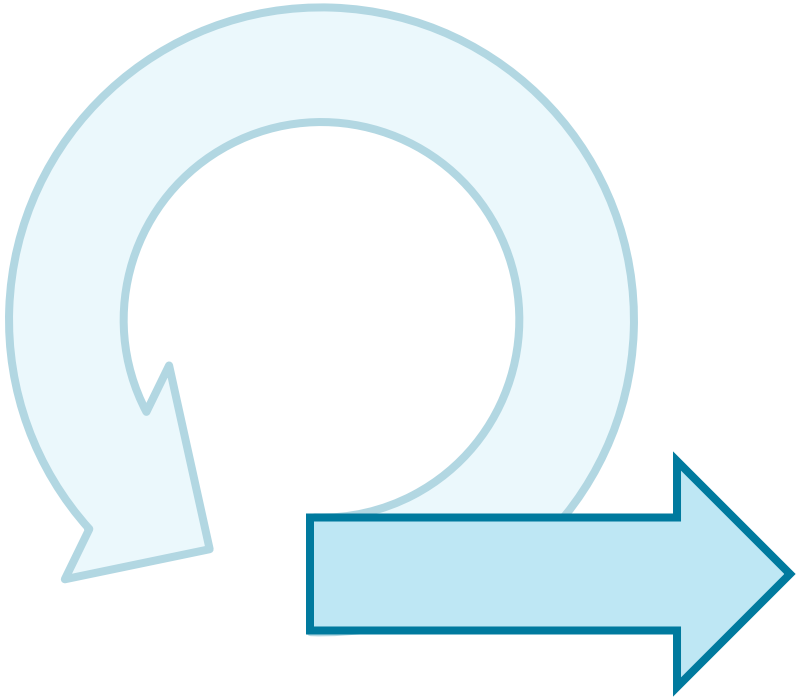
- Demo to PO
  - PO should be prepared
  - Optional: invite other stakeholders
- Comments by developers



Retrospective Meeting

Internal team evaluation

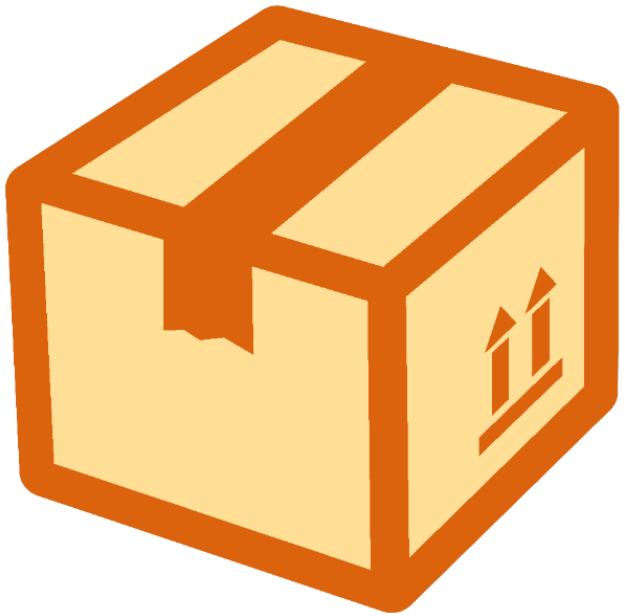
- PO not required
- Discuss process and problems
- **Measure** improvements



Product Increment

Potentially shippable increment

- Complete according to **Definition of Done**
  - Even if not actually released
- **No regrets** if project ended now



Scrum

Team

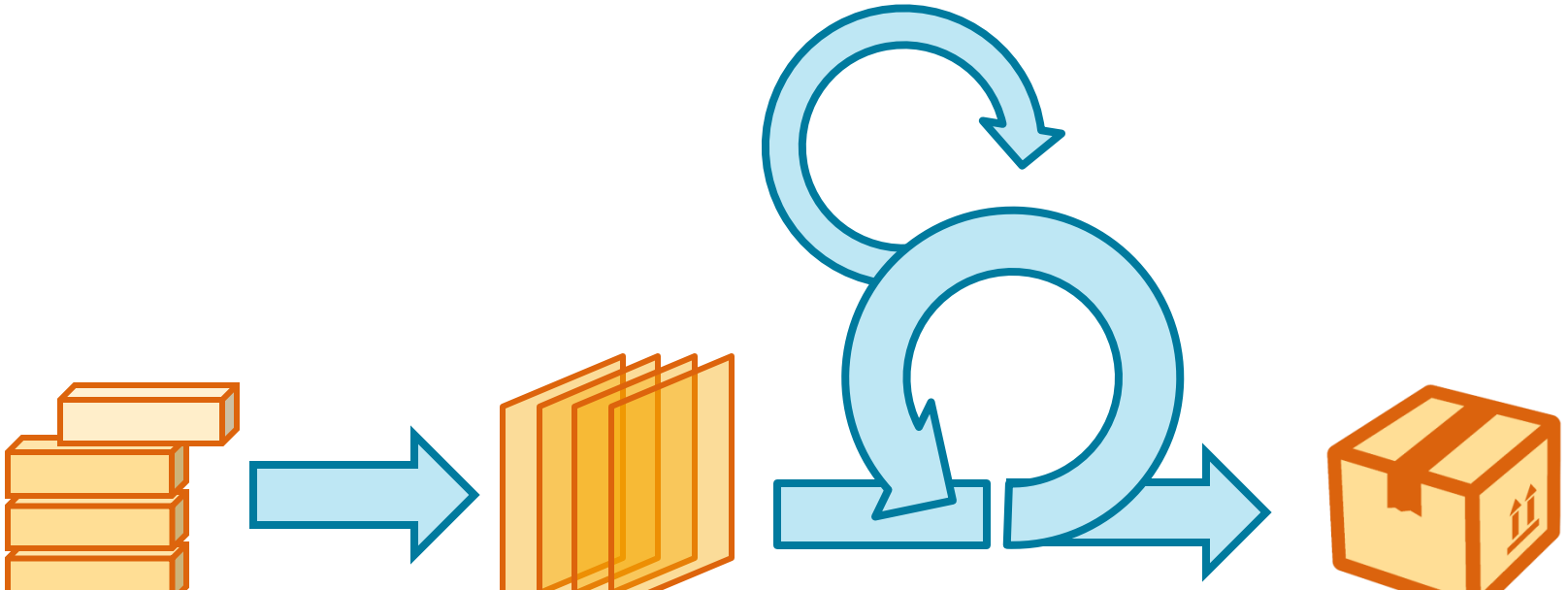
- Product Owner
- Scrum Master
- Developers

Meetings

- Planning
- Daily Scrum
- Review
- Retrospective

Artifacts

- Product Backlog
- Sprint Backlog
- User Stories
- Software Increment



Effort, Schedule, and Cost Estimation

- Depends on software engineering process
- Highly **uncertain**, must be negotiated and revised with stakeholders
- Waterfall effort estimation
  - Methods: calibrated estimation model based on historical size (Function Points, LOC, …); expert judgment; …
  - Output: X man-months
- Agile effort estimation
  - **Iterative** methods, **shorter** planning horizon
  - Output: functionality to be implemented in the **next iteration**
  - Different methods exist

Effort Estimation: “Planning Poker”

Participants

- **Everyone** operationally involved in creating the software product
- Product Owner (and Scrum Master) are not playing

Preconditions

- Product backlog is complete and **prioritized**
- Backlog items are known by the team
- The effort for a small backlog item was determined as a **reference**
- Every participant has a set of sizing cards

Planning Poker 1/2

- Product owner explains backlog item
- Product owner **answers questions** of team members
- Participants estimate complexity of item and choose a card (**hidden**)
- All cards shown simultaneously
- Participants with highest and lowest number **explain choices**
- The arguments are **discussed** in the group

Planning Poker 2/2

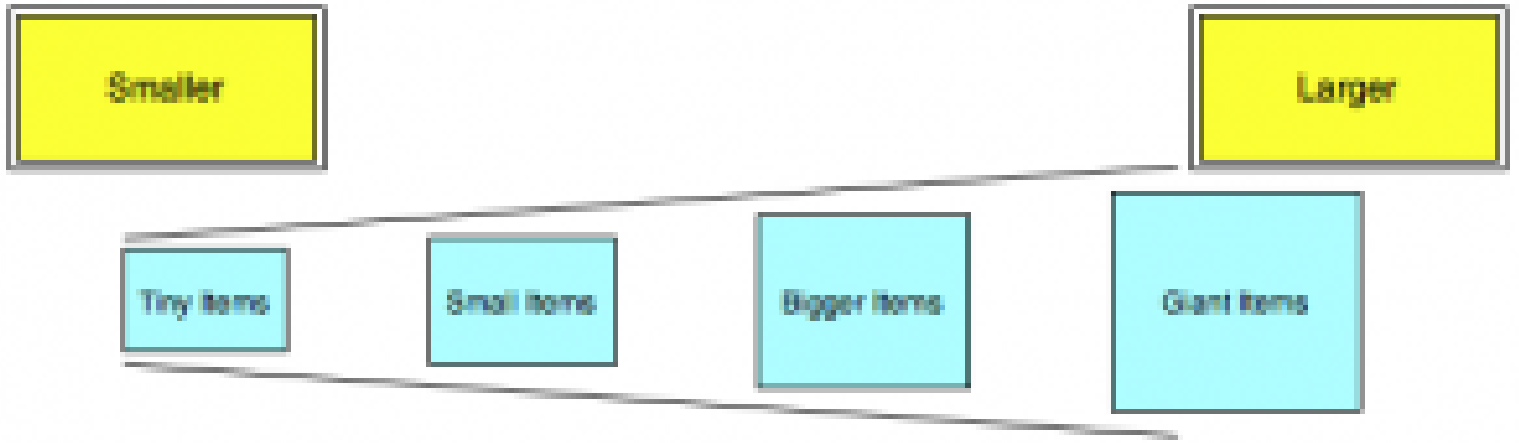
- A new vote is conducted
- **Team agrees** on item size
  - Most occurring or average value is acceptable
  - If not, another round is played
- The moderator notes size of backlog item in the product backlog
- The game ends if all backlog items are sized or **time is over**

Effort Estimation: “Affinity Estimation”

- Participants
  - **Everyone** operationally involved in creating the software product
  - Product Owner (and Scrum Master) are not participating, but are present for questions
- Preconditions
  - Product backlog is complete, **prioritized** and understood
  - A shared space to work in
  - User Stories in physical form (e.g. post-it notes or printed)

Affinity Estimation 1/2

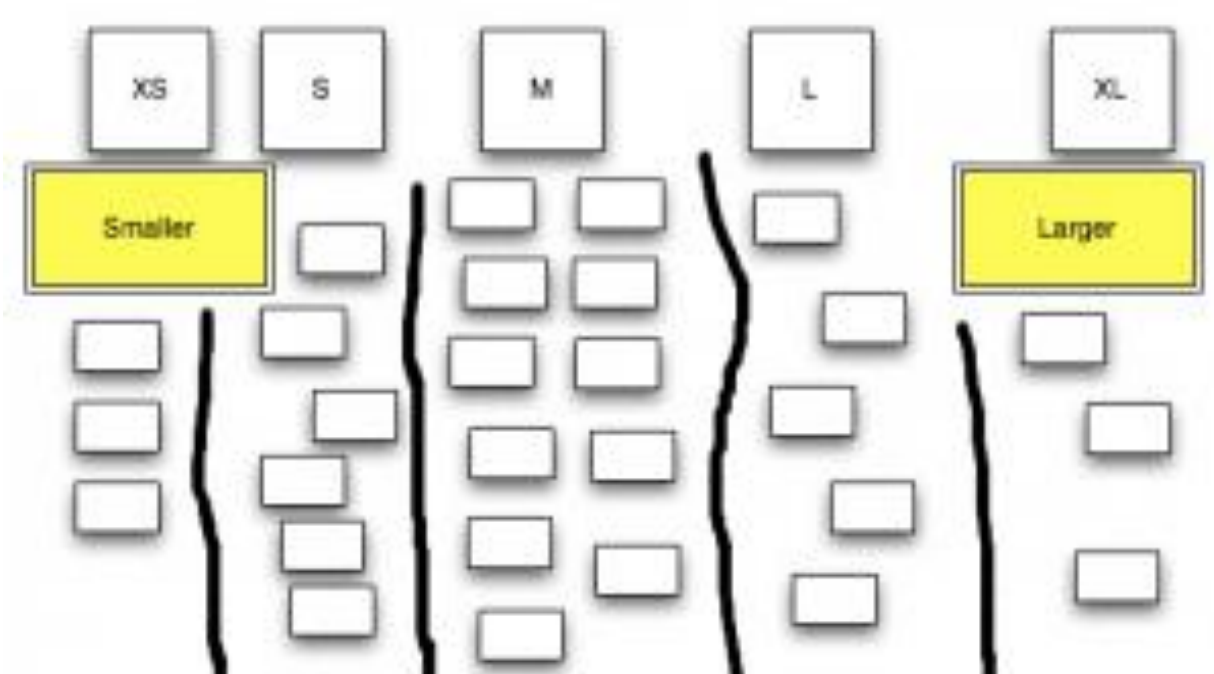
- **Step 1: Silent Relative Sizing**
  - Team members place backlog items on scale of “smaller” to “larger”
  - No discussion at this point



http://www.gettingagile.com/2008/07/04/affinity-estimating-a-how-to/

Affinity Estimation 2/2

- **Step 2: Editing**
  - Team members rearrange stories on the scale, discuss changes
  - Clarifications from PO
- **Step 3: Place stories into categories**
  - Place size categories (e.g. Fibonacci sequence) above scale
  - Assign each story a size based on location

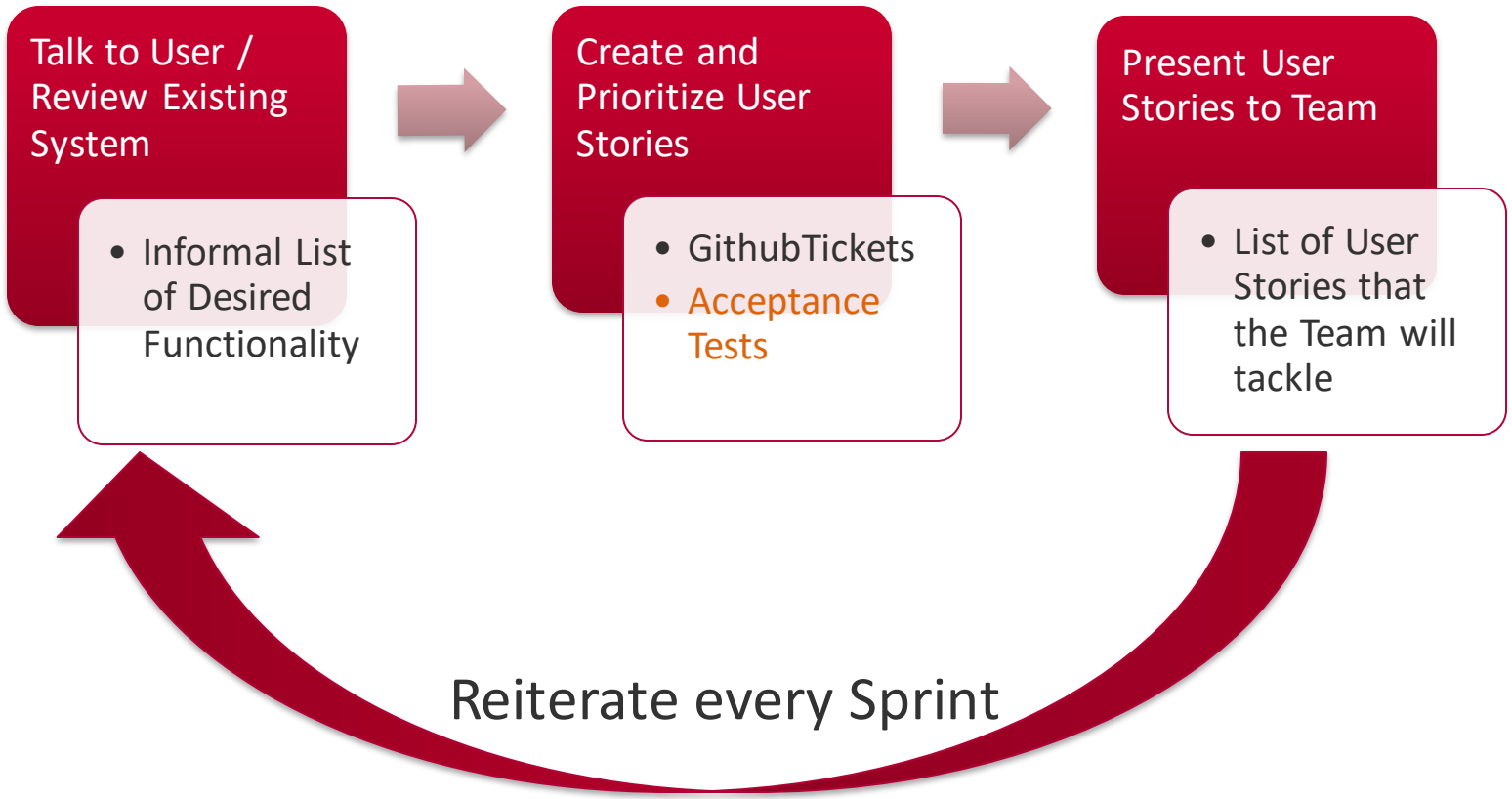


After the Planning Meeting

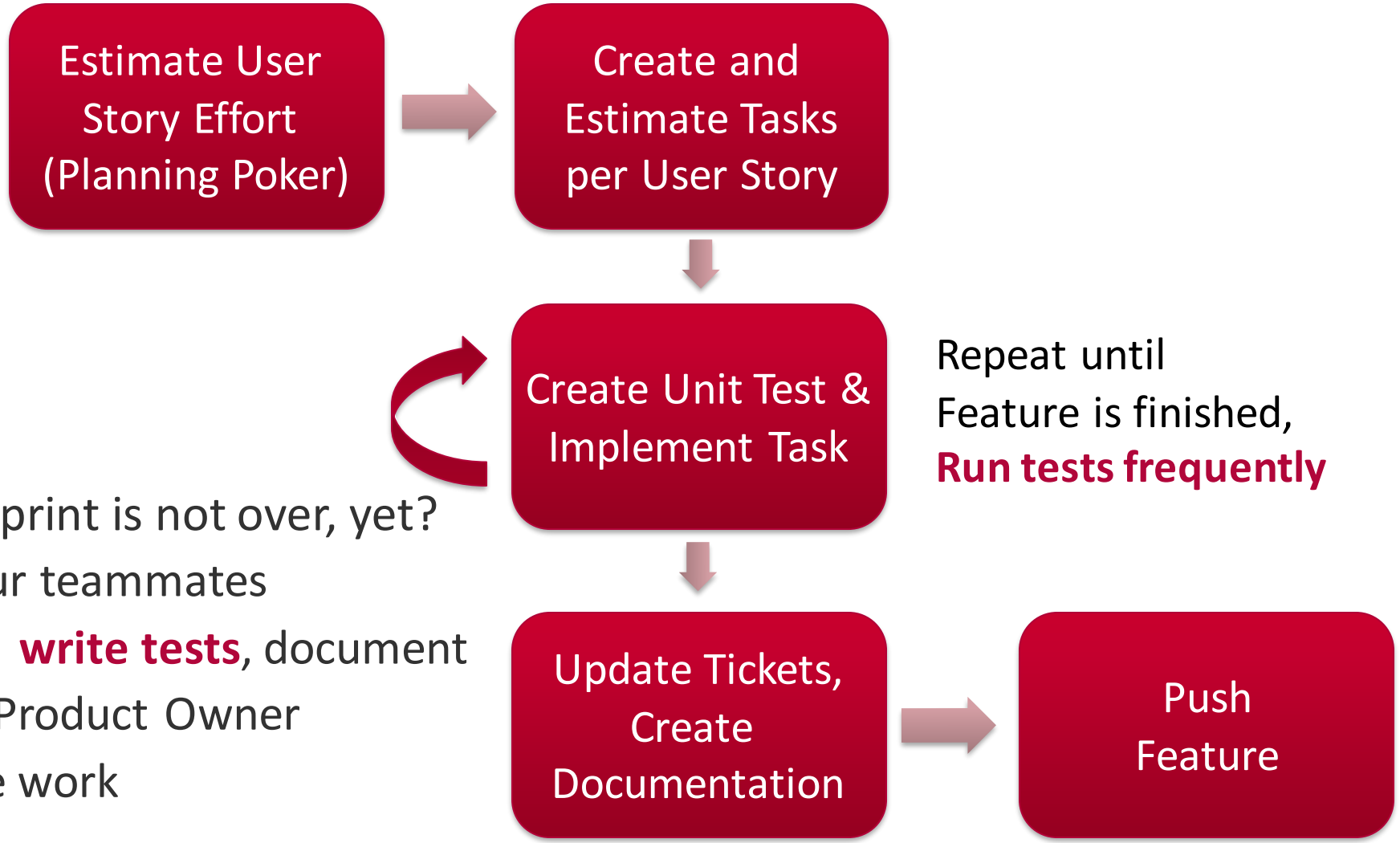
Begin the sprint

- Select stories until sprint is full
- Break down stories into tasks and fill your **Scrum Board**
- Assign stories to developer(s)
- **Implement** the stories task by task

Project Workflow: Product Owner



Project Workflow: Developers



Done and sprint is not over, yet?

- **Help** your teammates
- Refactor, **write tests**, document
- Ask the Product Owner for more work

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Scaling Scrum

Recap: SWTII High-level Overview

Implications of the Setup

What's needed in such an environment?

- Development **process**
- **Communication** on multiple levels
- Infrastructure for **collaboration**

Scaling Scrum: Project Start

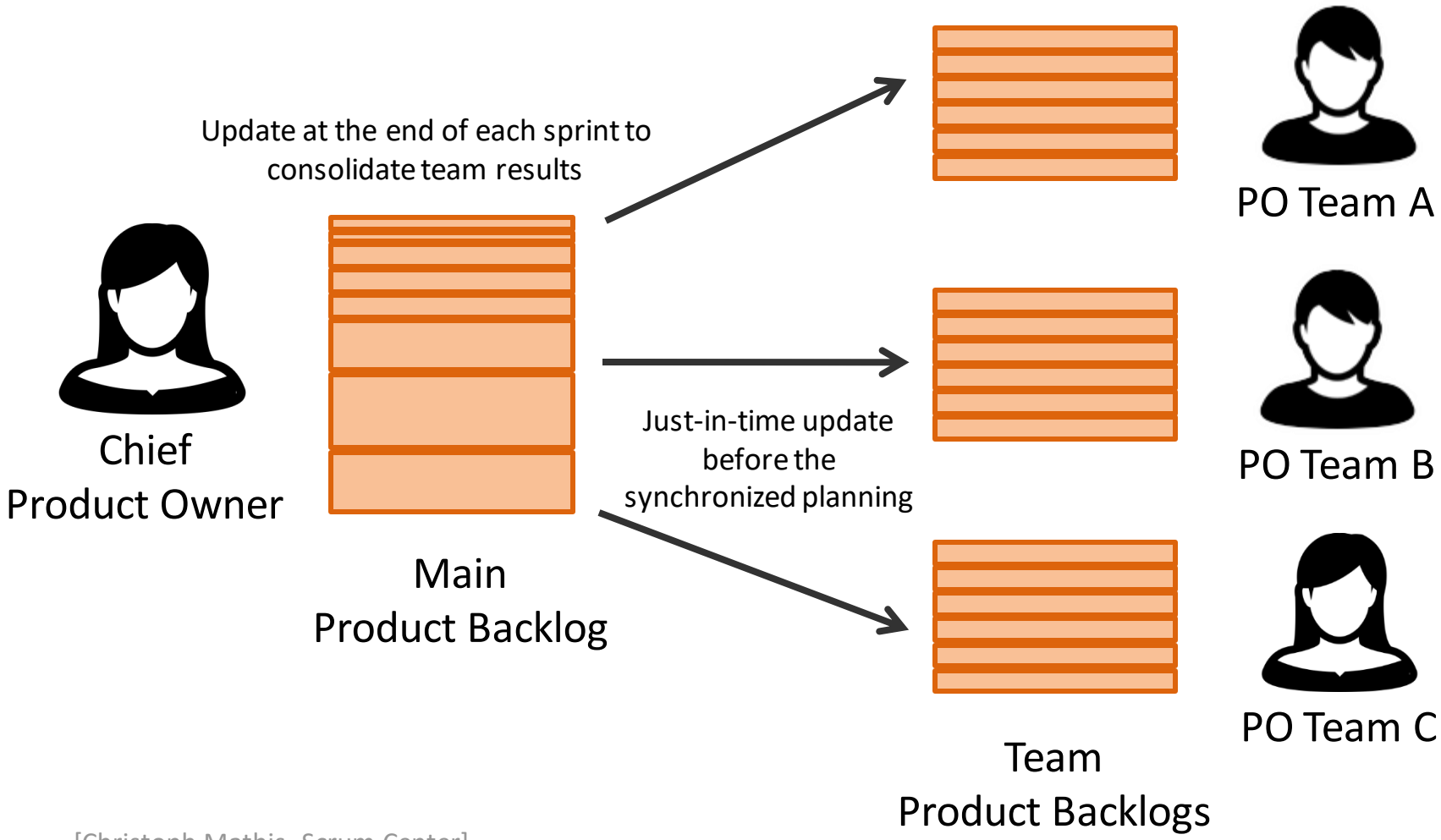
Start small and grow organically

- Single Scrum (teaching) team for preparation
- Work out foundation for the first sprints
- Scale when it becomes necessary

We are now at the first scaling point

- SWT II participants take over!

Product Owner / Backlog Hierarchy



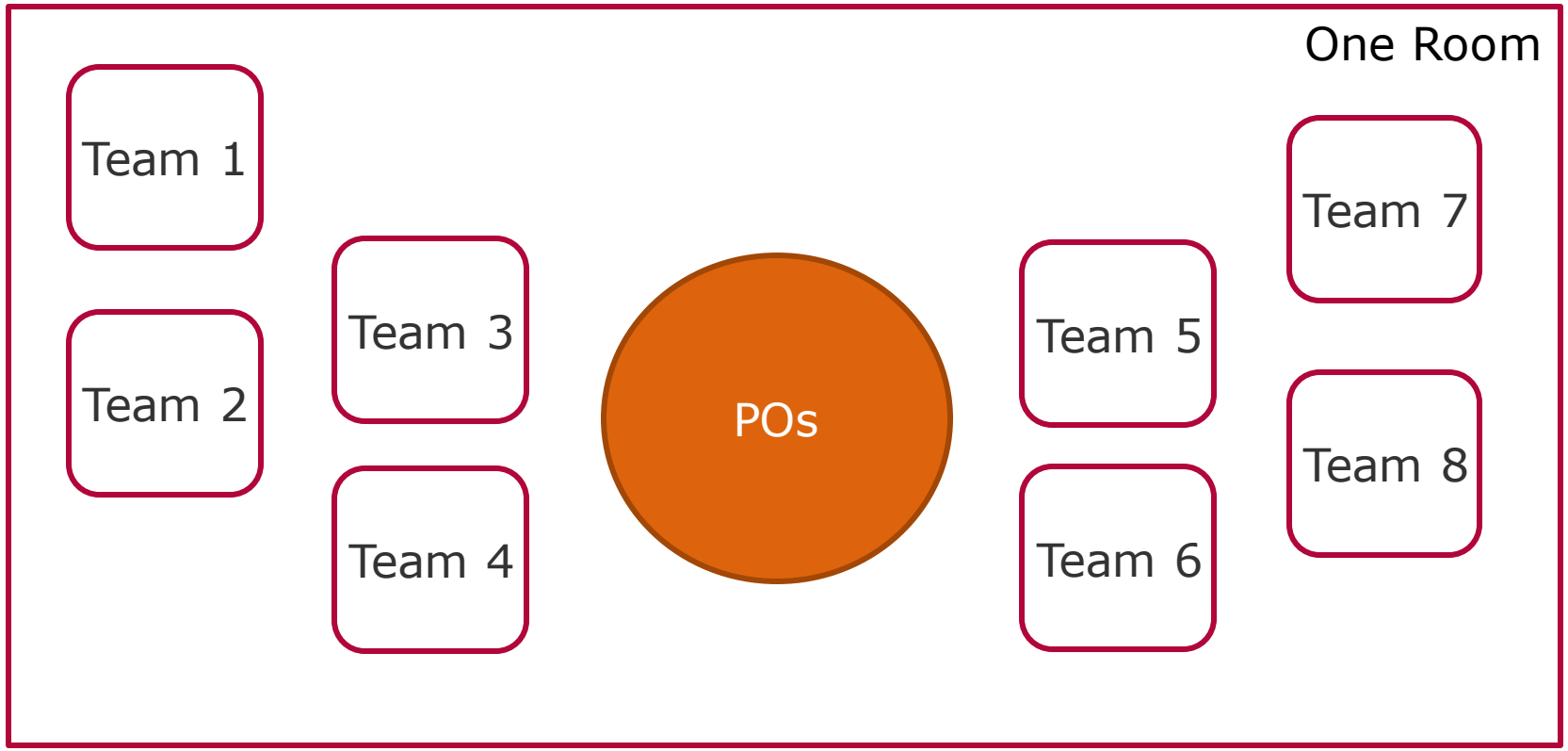
[Christoph Mathis, Scrum Center]

Scaling Scrum: Sprint Planning

- Preparation
  - Individual review and retrospection meetings
  - Meeting of all teams with 1-2 members each:
    - Review of the last sprint
    - Input dependencies (What is needed)
    - Output dependencies (What needs to be delivered)
- Execution
  - Individual plannings (strict timeboxing)
  - Discussion of identified additional input or output dependencies
  - Final sprint planning
- Problem: Time consuming & high degree of coordination needed!

Scaling Scrum: Sprint Planning

Another Option: Co-located planning



Scrum of Scrums

Goal: Synchronize team effort with minimal coordination overhead

- Regular meeting of all Scrum masters.
  - Developers join if necessary (**ambassador principle**)
- Scrum masters
  - Share their learnings
  - Report completions & next steps
  - Coordinate inter-team dependencies
  - Negotiate responsibility
- Developers discuss technical interfaces across teams
- Distribute information back into the teams

Scrum

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Questions?

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Next: Scrum Exercise

- Practical Scrum Exercise
- **09:15**
- **Room D.E-9/10,**
  D-School building,
  next to Villa