



Advanced Software Engineering Internet Applications

Introduction to Scrum

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SE and Project Management in General

SE needs **project management** (PM)

- ▶ PM is about delivering the system within a given time, budget, and quality
- ▶ there are always trade-offs involved, i.e., decisions need to be taken

"A **software development methodology** or system development methodology in software engineering is a framework that is used to **structure, plan, and control the process of developing** an information system" :

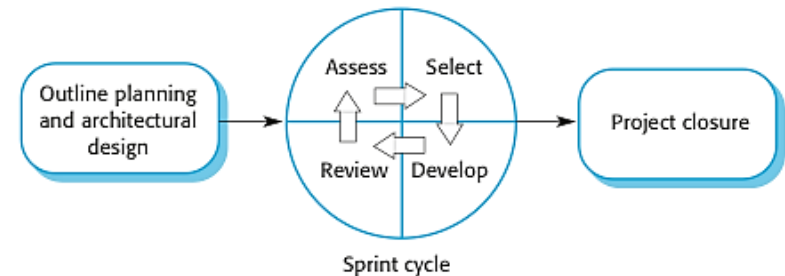
(https://en.wikibooks.org/wiki/Introduction_to_Software_Engineering/Process/Methodology#As_a_noun, last accessed on the 24th of september 2020)

- ▶ **Agile Software Development**
- ▶ Crystal Methods
- ▶ Dynamic Systems Development Model (DSDM)
- ▶ **Extreme Programming (XP)**
- ▶ Feature Driven Development (FDD)
- ▶ Joint Application Development (JAD)
- ▶ Lean Development (LD)
- ▶ Rapid Application Development (RAD)
- ▶ Rational Unified Process (RUP)
- ▶ **Scrum**
- ▶ Spiral
- ▶ Systems Development Life Cycle (SDLC)

Scrum Overview – 1 : The Three Phases

Scrum Phases

1. The initial phase is an outline planning phase to establish the general objectives for the project and design the software architecture. One result is the stories board or **product backlog**, which is prioritized by the owner.
2. It is followed by a series of sprint cycles, where each cycle develops an increment of the system. This is done by transforming the highest priority stories into tasks, thus creating the **sprint backlog**.
3. The project closure phase wraps up the project, completes required documentation such as system help and user manuals and assesses the lessons learned from the project.



Scrum Overview – 2 : Roles, Artifacts and Meetings

Roles

- ▶ product owner
- ▶ Scrum master
- ▶ developer
- ▶ plus customers, users, and managers

Artifacts

- ▶ product backlog
- ▶ sprint backlog
- ▶ burn down chart
- ▶ plus actual design models, code and other project-relevant artifacts

Meetings

- ▶ product planning
- ▶ sprint planning
- ▶ daily scrum
 - ▶ plus other meetings on demand
- ▶ code review
- ▶ sprint review
- ▶ product review

Teamwork in Scrum – 1 : Product Owner

Product Owner

- ▶ represents the customer (not necessarily is the customer)
- ▶ is part of the Scrum team: attends meetings, guides work, and answers questions promptly
- ▶ participates in all Scrum meetings
- ▶ maintains and decides on priorities of system features (= product backlog items)
 - ▶ prepares product backlog for sprint planning
 - ▶ priorities are based on customer/user value
 - ▶ may change features and priorities after every sprint
- ▶ reviews (accepts or rejects) delivered product backlog items
- ▶ is accountable for the success and the delivery of the product

Teamwork in Scrum – 2 : Scrum Master

Scrum Master

- ▶ supports the developer team (or may be part of it)
 - ▶ coaches the team to produce high quality results
 - ▶ ensures that the team adheres to Scrum values, practices and rules
 - ▶ e.g., self-management
 - ▶ helps to resolve blocking situations
 - ▶ BUT does not manage the team: the team is self-managing
- ▶ arranges (and participates in) all Scrum meetings
 - ▶ records decisions
- ▶ keeps track of the backlogs and measures progress
- ▶ protects the team from external distractions
 - ▶ communicates with customers and management outside of the team

Teamwork in Scrum – 3 : Developer Role

Developers

- ▶ develop the product
 - ▶ turns product backlog items into increments of potentially shippable functionality every cycle
 - ▶ participates in all Scrum meetings
- ▶ the team of developers (7 +/-2 members)
 - ▶ needs to have all the skills necessary to address the backlog items
 - ▶ is self-organizing: the team manages itself and its work
 - ▶ decides on product design and development (has the right to do everything within the boundaries of the project guidelines to reach the cycle goal)
 - ▶ shows work results to product owner and other stakeholders

Teamwork in Scrum – 4 : Other Stakeholders

Customers and Users

- ▶ participate in (product and/or sprint) review meetings
- ▶ represent business and user interests
- ▶ provide feedback to Scrum team

Managers

- ▶ participate in (product and/or sprint) review meetings
- ▶ provide healthy working environment and take resource decisions
- ▶ represent business interests

Scrum Artifacts & Meetings – 1 : Product Backlog

Product Backlog

- ▶ a list of **user stories** (= items) for implementing the product vision
 - ▶ user stories cover all major user and system requirements
- ▶ is prioritized by the product owner
 - ▶ based on business value, dependencies, date needed, effort estimate, risks ,must have, nice to have, etc.
- ▶ is dynamic (may change)
- ▶ highlights key features and focuses on major requirements
 - ▶ details to be added iteratively
 - ▶ **large user stories may be broken down into several smaller ones**

... and what it is not

- ▶ requirements specification with loads of detailed requirements
- ▶ endless wish list with all possibly useful requirements
- ▶ one-time contract between product owner and development team
- ▶ description of concrete implementation activities

Scrum Artifacts & Meetings – 2 : Prod Backlog Example

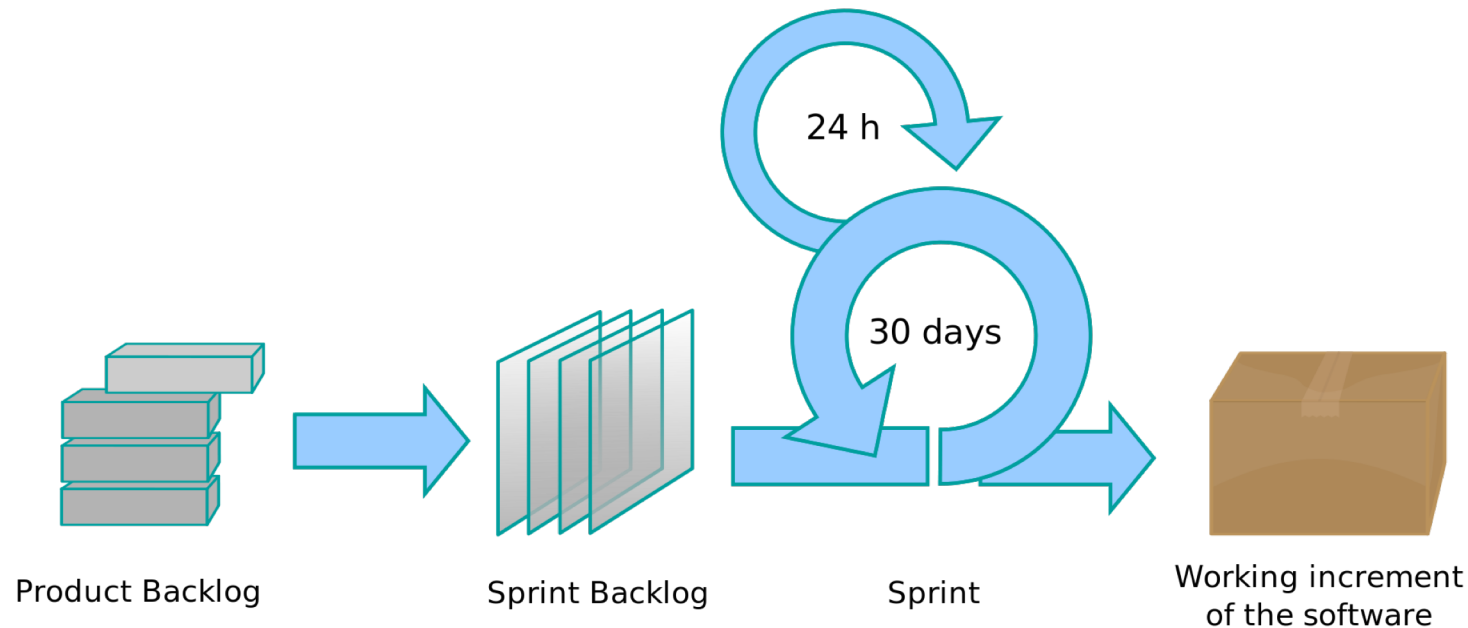
ID	Title	priority	Points	status
1	As a patient I need to make contact with a doctor for an appointment.	high	8	done
2	As a doctor I need to access a list of my awaiting patients.	high	6	work in progress
3	As a doctor I need to receive a notification before each consultation.	medium	3	waiting
	...			

Scrum Artifacts & Meetings – 3 : Product Planning

Product Planning

- ▶ attendance: all
- ▶ product owner presents product backlog (containing all relevant user stories)
 - ▶ incl. success (done) criteria
 - ▶ discussions & clarifications if needed
- ▶ results
 - ▶ prioritized product backlog
 - ▶ specifies what to build
 - ▶ final decision is by the product owner
 - ▶ architectural design of product
 - ▶ incl. high-level decisions such as context model, programming language, non-functional requirements, ...

Scrum Artifacts & Meetings – 4 : Scrum Sprint Cycles





- ▶ starting point for sprint planning is the Product Backlog
- ▶ team then selects the features and functionality to be developed during the sprint: Sprint Backlog
- ▶ in each sprint cycle, team develops software in self-organized way
- ▶ sprints are fixed length, normally 2-4 weeks
- ▶ at the end of the sprint, the work is delivered and reviewed
- ▶ then the next sprint cycle starts

Scrum Artifacts & Meetings – 5 : Sprint Backlog

- ▶ breaks down items from product (release) backlog into implementation tasks
 - ▶ tasks are very specific and have an
 - ▶ effort estimate in working hours (1, 2, 4, 8, or 16)
 - ▶ mostly based on experience from past projects
 - ▶ tasks longer than 16 hours need to be broken down further
- ▶ contains all implementation tasks foreseen for the sprint cycle at hand
 - ▶ number of tasks for a certain sprint depends on the summarized effort
 - ▶ vs. the available team capacity (also measured in hours)
- ▶ each developer selects his/her implementation tasks from the backlog
 - ▶ in the appropriate order (priority and technical dependencies)
- ▶ needs to be continuously updated
 - ▶ report on completed tasks incl. actual effort spent
 - ▶ new tasks discovered
 - ▶ corrections of effort estimation or available capacity
- ▶ is owned by the development team

Scrum Artifacts & Meetings – 6 : Sprint Backlog Example

ID	Sprint	Name	Description	Components	Owner 	Reviewer 	Priority	Effort Plan Original	Effort Plan Updated	Effort Actual	Status
1.1	2	Patient Model	Data model for patient record needs to be created based on standard....	Database	Martin	Hans	medium	2	2	0	waiting
1.2	2			UI, Controller	Hans	Jennifer	high	8	6	4	work in progress
1.3	1			All	Martin	Tom	high	16	20	20	done
2.1	1			Database	Tom	Martin	low	4	10	4	cancelled
2.2	2			Main Window	Jennifer	Martin	high	8	6	5	work in progress

- ▶ The eraser indicates a property we shall not consider for the Thingy project.
- ▶ The red part is no more the initial backlog, but its monitoring within the burn down chart.

Scrum Artifacts & Meetings – 7 : Sprint Planning

- ▶ attendance: developers, Scrum master, product owner
- ▶ create sprint backlog for the upcoming cycle
 - ▶ break down items from product backlog into implementation tasks
 - ▶ clarify details with product owner
 - ▶ effort estimation and task assignment
 - ▶ if necessary, postpone implementation tasks or backlog items to future sprints
 - ▶ based on priorities
- ▶ risk assessment and dependencies
- ▶ decisions are taken by the developers
- ▶ result: developer team is committed to deliver sprint backlog

Scrum Artifacts & Meetings – 8 : Daily Scrum

- ▶ attendance: developers, Scrum master, product owner
- ▶ short daily meetings where team members share their
 - ▶ progress since the last meeting
 - ▶ planning for the following day
 - ▶ current problems
 - ▶ and how to solve them
- ▶ rules
 - ▶ each developer reports
 - ▶ **max. 15 minutes**
 - ▶ product owner and other stakeholders are only there to answer questions
- ▶ if necessary, longer meetings can be arranged with the concerned team members
 - ▶ minimize time spent in meetings
- ▶ results
 - ▶ updated sprint backlog
 - ▶ all team members are aware of the current state



Scrum Artifacts & Meetings – 9 : Code Review

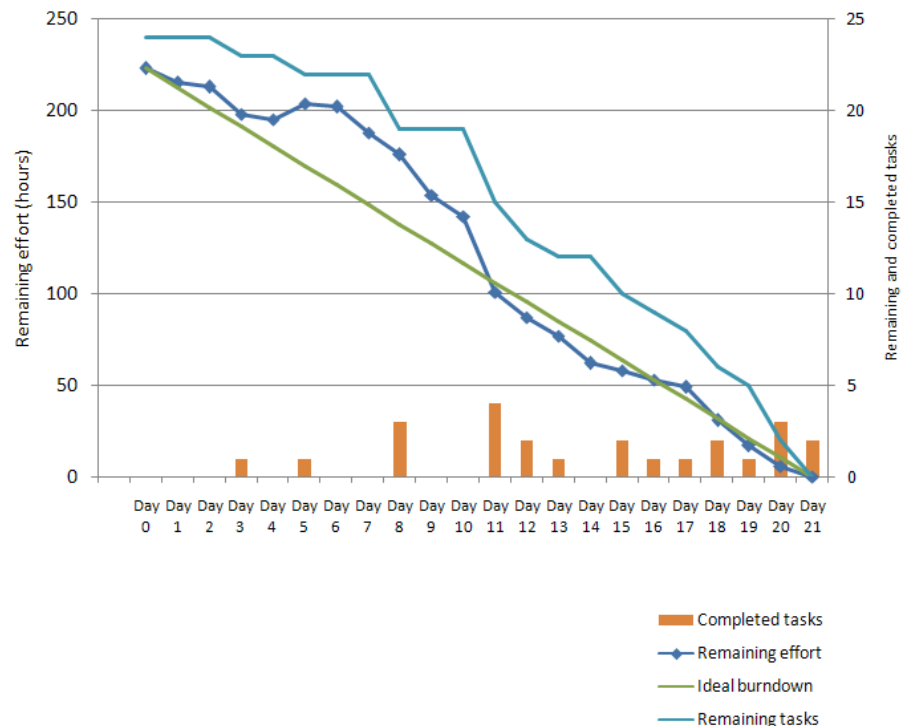
- ▶ before a finished implementation task is released into the overall code base (e.g. GitHub)
- ▶ the owner needs to conduct a code review with designated reviewer
- ▶ to ensure high quality design and implementation

Summary – 1 : Development Workflow

1. during sprint planning or daily scrum meeting, take over a certain task from your team's sprint backlog with ID `X.Y`
 - ▶ set yourself as owner in the sprint backlog and assign a reviewer
2. retrieve the appropriate code from git
3. implement and test feature `taskX.Y`
 - ▶ update/merge (resolve conflicts, if any)
 - ▶ test
4. conduct a code review
5. deliver completed `taskX.Y`
 - ▶ commit with appropriate comment: "`taskX.Y: ... completed`"
6. update the sprint backlog

Summary – 2 : Scrum Main Artifact, the Burn Down Chart

- ▶ chart that visualizes remaining effort estimates vs. remaining resources on a daily basis
 - ▶ trend line shows the presumably achievable scope
- ▶ goal: early identification of potential resource problems
 - ▶ and appropriate adjustments
 - ▶ modify backlog
 - ▶ request additional resources
- ▶ used in all meetings on different granularities
 - ▶ per product or sprint cycle



Summary – 3 : Scrum Meeting: Reviews

Sprint, Release, or Product Review

- ▶ attendance: all
- ▶ developers demonstrate the current state of the product based on product backlog items
- ▶ product owner decides on success
 - ▶ result accepted or
 - ▶ further work necessary
 - ▶ required changes and additional items are recorded in the backlogs
 - ▶ to be addressed in future sprints

Sprint Retrospective

- ▶ attendance: developers, Scrum master, product owner
- ▶ additional internal meeting on the Scrum process itself
 - ▶ any process improvements required?

Scrum Benefits

- ▶ the overall product is broken down into a set of manageable and understandable chunks
- ▶ whole team has overview on entire project and consequently **team communication** is improved
- ▶ unstable requirements do not hold up progress
- ▶ customers see on-time delivery of increments (releases), can evaluate the current product state and give feedback
- ▶ **trust between customers and developers** is established and a positive culture is created in which everyone expects the project to succeed

Managing Your "Thingy" Project with Scrum

Your team will implement your application in Scrum mode.

- ▶ plan your available resources
- ▶ keep product backlog and sprint backlog up to date in <https://taiga.io>
- ▶ update when needed the **GitHub** repository
- ▶ "daily" Scrum
 - ▶ every lecture
 - ▶ additional meetings if needed

Implementation Sprints	Start (Planning)	End (Review)
1	08.10.20	05.11.20
2	05.11.20	26.11.20
3	26.11.20	16.12.20

Recapitulative (Commercial) Video



https://www.youtube.com/watch?v=XU0IIIRtyFM&feature=iv&src_vid=Q5k7a9YEoUI&annotation_id=channel%3Acta%3AQ5k7a9YEoUI_1332524191191547