Management Practice

9. Performance and quality

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MPiE

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Course

Literature for the course:

Eisner, Howard. *Essentials of project and systems engineering management*. John Wiley & Sons, 2008.

Learning objective for this session:

- Understand relationship standards and regulations
- Understand the value of the application of standards
- Able to describe the V-model
- Able to describe the Agile methodology
- Able to describe the Scrum methodology
- Able to apply Agile to a project

Literature for this session:

http://agilemanifesto.org/

Performance and quality

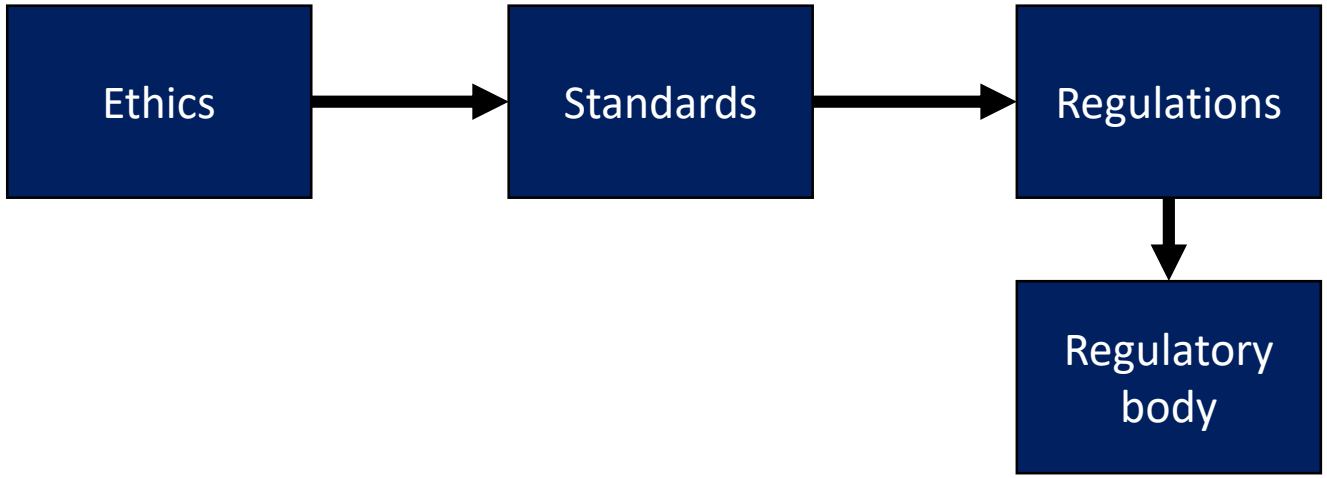
Quality driven management through:

- Ethics
- Standards
- Regulations

A range of management tools can be used to increase performance and quality

Ethics and regulations

- What is the difference between ethics and regulations?
- A regulation is a rule of order having the force of law, prescribed by a superior or competent authority, relating to the actions of those under the authority's control.



Source: Legal dictionary

Regulations VS Standards

Regulations	Standards
Mandatory	Voluntary
Created by legislator	Developed by standards organizations
Consultation according to government body's policy	Full open public consultation
Decided by government bodies	Based on consensus of all interested parties
Revised when legislator decides	Considered for revision every 5 years
Gives requirements to protect public interest	Provide specifications, test methods, codes, etc.

Source: BSI

How can standards be used to demonstrate regulations?

- Standards are market-based tools that can be used by Government to deliver better regulation: ‘Co-regulation’
- Can be used alongside accreditation, to verify conformity with a standard
- Benefits:

- Simplification of regulation
- Can incorporate technical development
- Reduce costs of Government policy delivery
- Legitimacy and market acceptance
- Business-friendly alternative to regulation

Quality management system

- ISO 9000 - Quality management - provide guidance and tools for companies and organizations who want to ensure that their products and services consistently meet customer's requirements, and that quality is consistently improved.

- ISO 9001:2015 sets out the criteria for a quality management system and is the only standard in the family that can be certified

Source: ISO.org

ISO 9001 - operations

The organization shall plan, implement and control the processes needed to meet the requirements for the provision of products and services, and to implement the actions by:

1) Determining the requirements for the products and services;

2) Establishing criteria for:

    a) the processes;

    b) the acceptance of products and services;

3) Determining the resources needed to achieve conformity to the product and service requirements;

4) Implementing control of the processes in accordance with the criteria;

5) Determining, maintaining and retaining documented information to the extent necessary:

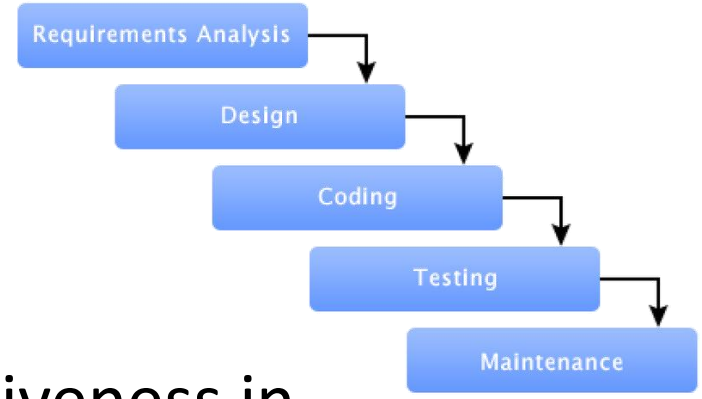
    a) to have confidence that the processes have been carried out as planned;

    b) to demonstrate the conformity of products and services to their requirements.

The output of this planning shall be suitable for the organization's operations. The organization shall control planned changes and review the consequences of unintended changes, taking action to mitigate any adverse effects, as necessary. The organization shall ensure that **outsourced processes are controlled**.

Project management

- The Waterfall model (1950s) assumes that the team has nearly perfect information about the project requirements, the solutions, and ultimately the goal. Hence, changes in requirements were not encouraged, and became an expensive affair.

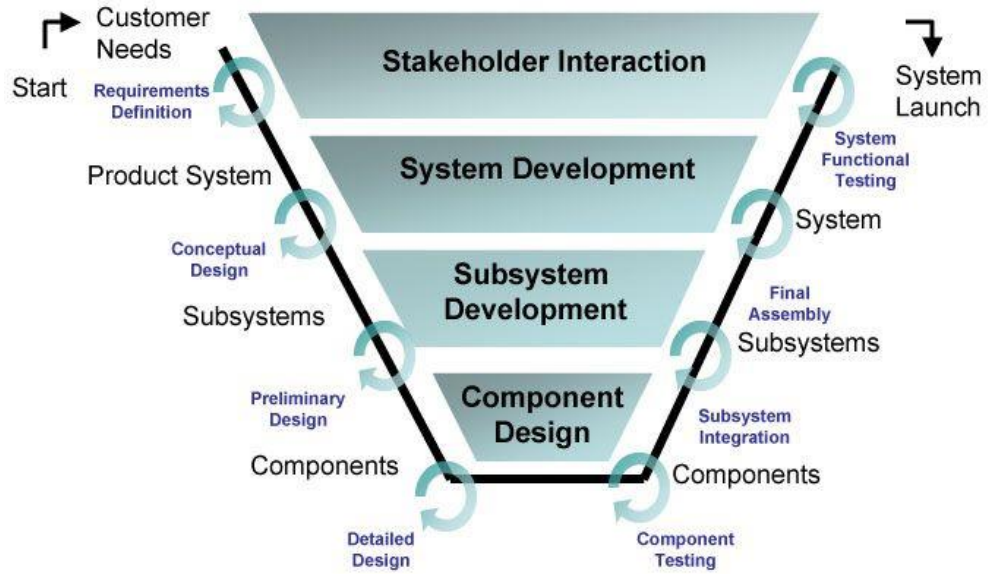


- It is a linear and sequential model.
- It became evident that the approach lacked effectiveness in addressing the needs of customers, managing rapidly changing scope, delivery time, and cost of the project

Source: Lei et al , A statistical analysis of the effects of Scrum and Kanban on software development projects, (2015); Calikus (2005)

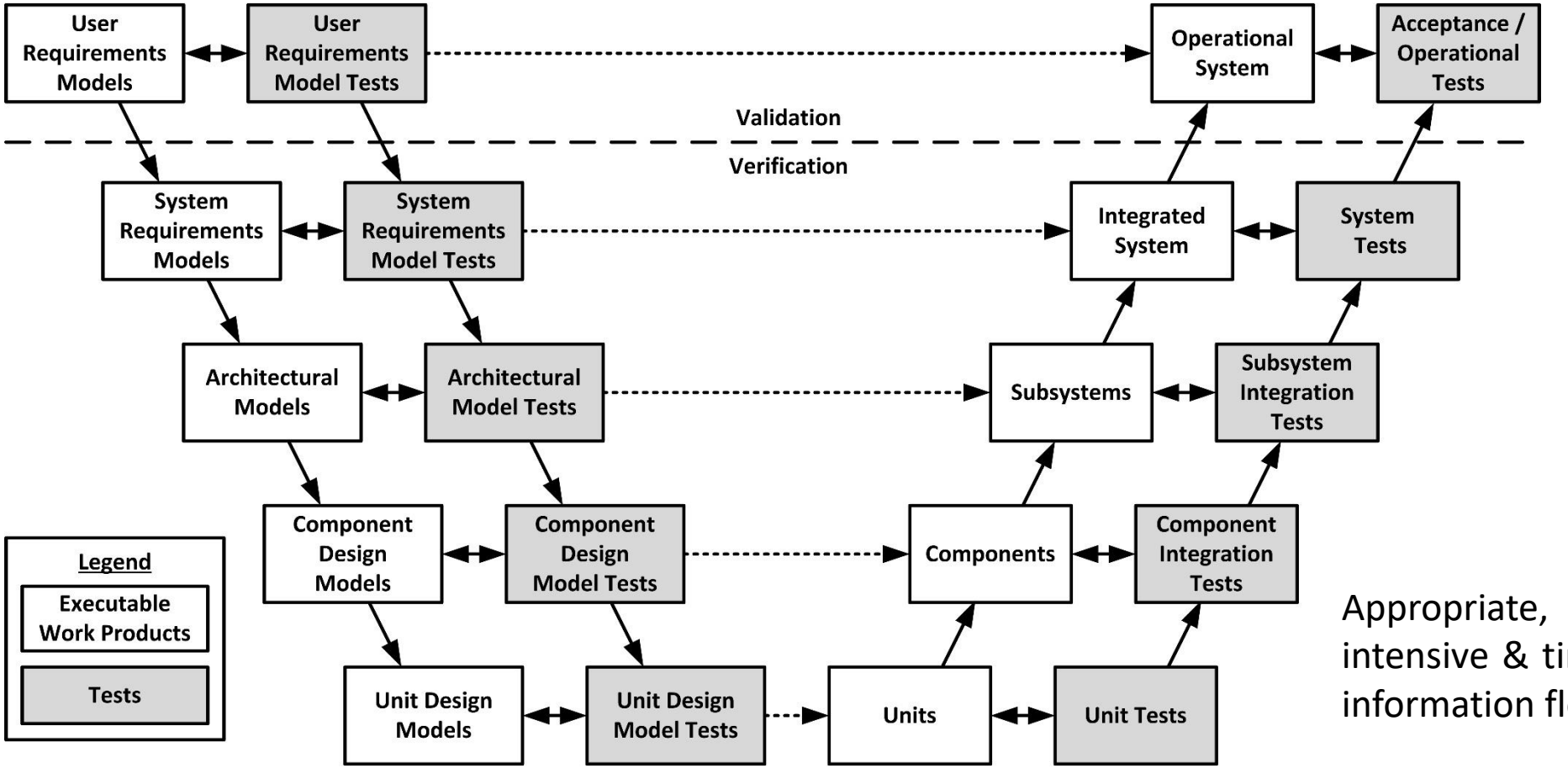
V-model

- In the V-model, testing and verification are performed at each stage of the system development, starting with the low-level components and ending with the higher-level components until the entire system has been verified.



Source: Lei et al , A statistical analysis of the effects of Scrum and Kanban on software development projects, (2015); MITSdm

V-model

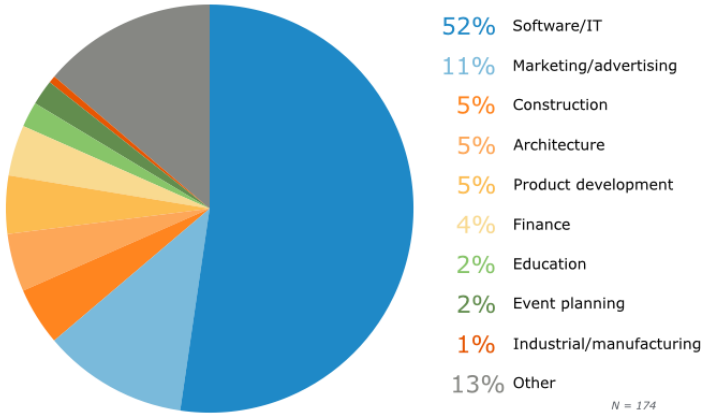


Appropriate, but time intensive & time delays on information flow back

Source: Software Engineering Institute

Agile

- In the mid-1990s, other software development methods evolved due to problems of these so-called “heavy weight software methodologies,” which are complex and require detailed documentation and expensive design.



Source: Lei et al , A statistical analysis of the effects of Scrum and Kanban on software development projects, (2015); Gartner and Software Advice

Agile

- Methods for agile software development constitute a set of practices for software development that have been created by experienced practitioners. These methods can be seen as a reaction to plan-based or traditional methods, which emphasize a rationalized, engineering-based approach.

- Ericksson defines it as “Agility means to strip away as much of the heaviness, commonly associated with the traditional software-development methodologies, as possible to promote quick response to changing environments, changes in user requirements, accelerated project deadlines and the like.”

- Agile methodologies are used to handle the challenges of managing complex projects during the development phase. These methodologies are a group of **incrementa**l and **iterative** methods that are seen as more effective, and have been used in project management.

Source: Dyba & Dingsøyr, Empirical studies of agile software development: A systematic review (2008)
Lei et al , A statistical analysis of the effects of Scrum and Kanban on software development projects, (2015)

Agile

A dominant idea in agile development is that the team can be more effective in responding to change if it can

- reduce the cost of moving information between people
- reduce the elapsed time between making a decision to seeing the consequences of that decision.

To reduce the cost of moving information between people, the agile team works to

- The team place people physically closer
- The team replace documents with talking in person and at whiteboards
- The Team improve the team's sense of community and morale so that people are more inclined to relay valuable information quickly.

To reduce the time from decision to feedback, the agile team

- The team makes user experts available to the team / part of the team
- The team works in an incremental fashion

Source: Cockburn & Highsmith (2001) Agile Software Development: The people factor

Agile

- It advocates adaptive planning, evolutionary development, early delivery, and continuous improvement, and it encourages rapid and flexible response to change

Source: Agile Alliance, What is Agile Software Development?

Agile evidence

- A review of 36 empirical studies on agile software development found that benefits were reported in the areas of customer collaboration, work processes for handling defects, learning in pair programming, thinking ahead for management and focusing on current work for engineers.
- However, it might work mainly for experienced, small development teams and it reduces the focus on design and architectural issues.
- The strength of evidence across the studies was very low.
- A more recent study in 2015 indicated that agile use improves time, budget and scope goals and is most effective at improving stakeholder satisfaction.
- It found there is a positive relationship between agile use and reported project success (n=1002 projects).

Source: Dyba & Dingsøyr, Empirical studies of agile software development: A systematic review (2008); Serrador & Pinto, Does Agile work? (2015)

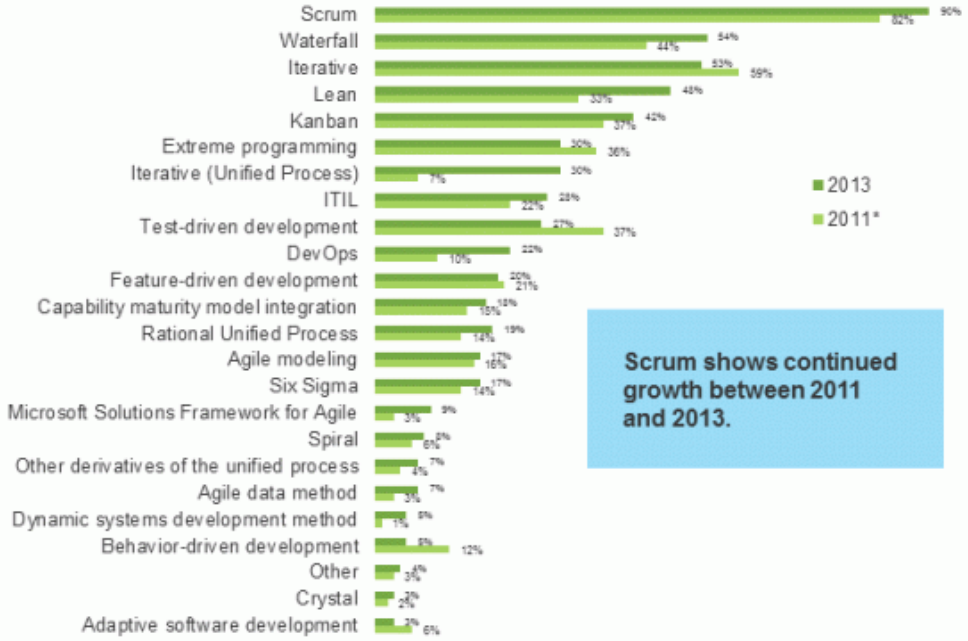
Scrum

- One of the models based on the Agile movement, known as Scrum, is based on principles of lean manufacturing

Source: Lei et al , A statistical analysis of the effects of Scrum and Kanban on software development projects, (2015); The American Society of Mechanical Engineers; Lean Enterprise Institute, Inc.

Scrum

Scrum, iterative, and waterfall are the most common approaches



Base: 149 IT professionals from organizations that are planning to implement or have implemented Agile;
*205 IT professionals from organizations that are planning to implement or have implemented Agile
Source: Q3 2013 Global Agile Software Application Development Online Survey;
*November 2011 Global Agile Software Application Development Online Survey

Scrum

- Scrum has been designed to manage rapidly-changing project requirements by improving communication between project developers, project owners, and other team members.

- Scrum is based on empirical process control theory, is an iterative and incremental project management methodology to control risk and optimize the predictability of a project through transparency, inspection and adaptation.

- Survey based results have indicated that Scrum can lead to successful qualitative software development projects.

Source: Lei et al , A statistical analysis of the effects of Scrum and Kanban on software development projects, (2015)

Scrum

- Transparency: The process must be visible to everyone who is involved in the project.
- Inspection: Scrum users must inspect Scrum artifacts frequently to detect problems in early stages.
- Adaptation: If an inspector determines that some aspects of the project are unacceptable and outside of the project scope, the process can be adjusted to avoid further problems.

Source: Lei et al , A statistical analysis of the effects of Scrum and Kanban on software development projects, (2015)

Scrum

- The three main artifacts that do result from the Scrum development process are the **Product Backlog**, the **Sprint Backlog** and the **Burndown Chart**.

- **Product Backlog:**
  The Product Backlog is an ordered list of everything that might be needed in the product and is the single source of requirements for any changes to be made to the product. The Product Backlog is never complete, it only lays out the known and best understood requirements. Product Backlog is dynamic, it consistently changes to identify what the product needs to be useful.

Source: www.umsl.edu/~sauterv/analysis/Fall2013Papers/Buric/agile-methodologies/scrum/scrum-artifacts.html

Scrum

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Source: www.umsl.edu/~sauterv/analysis/Fall2013Papers/Buric/agile-methodologies/scrum/scrum-artifacts.html

Scrum

- **The Sprint Backlog** defines the work the Development Team will perform to turn Product Backlog items into a “Done” Increment. The Sprint Backlog makes visible all of the work that the Development Team identifies as necessary to meet the Sprint Goal.

- **The Increment** is the sum of all the Product Backlog Items (PBI) completed during a Sprint and all previous Sprints. At the end of a Sprint, the new Increment must be “Done,” which means it must be in usable condition and meet the Scrum Team’s Definition of “Done.” It must be in usable condition regardless of whether the Product Owner decides to actually release it.

Source: www.umsl.edu/~sauterv/analysis/Fall2013Papers/Buric/agile-methodologies/scrum/scrum-artifacts.html

Steps

Steps

1. Plan–Build–Test–Review Small feature set – Suitable “product”

2. Repeat (1) Roughly 3 weeks per sprint (enough planning to complete cycle)

3. Reach a “shippable” product

Roles: Product Owner (defines the features of the product); Scrum master (manages to process, keep the process going), Team members (developers, tester, etc.)

Documents

Product Backlog, product owners create a ranking list of features (Changeable with every sprint).

User stories, describes features. It follows: **As an** *user* **I need a** *feature* **so that** *solves a requirement.* These user stories go to the **sprint backlog** to estimate required work (size of the task) in the sprint. Commitment made to complete these.

Burndown chart shows the progress during the sprint on the completion of tasks in the sprint backlog. It should be zero when the work is completed.

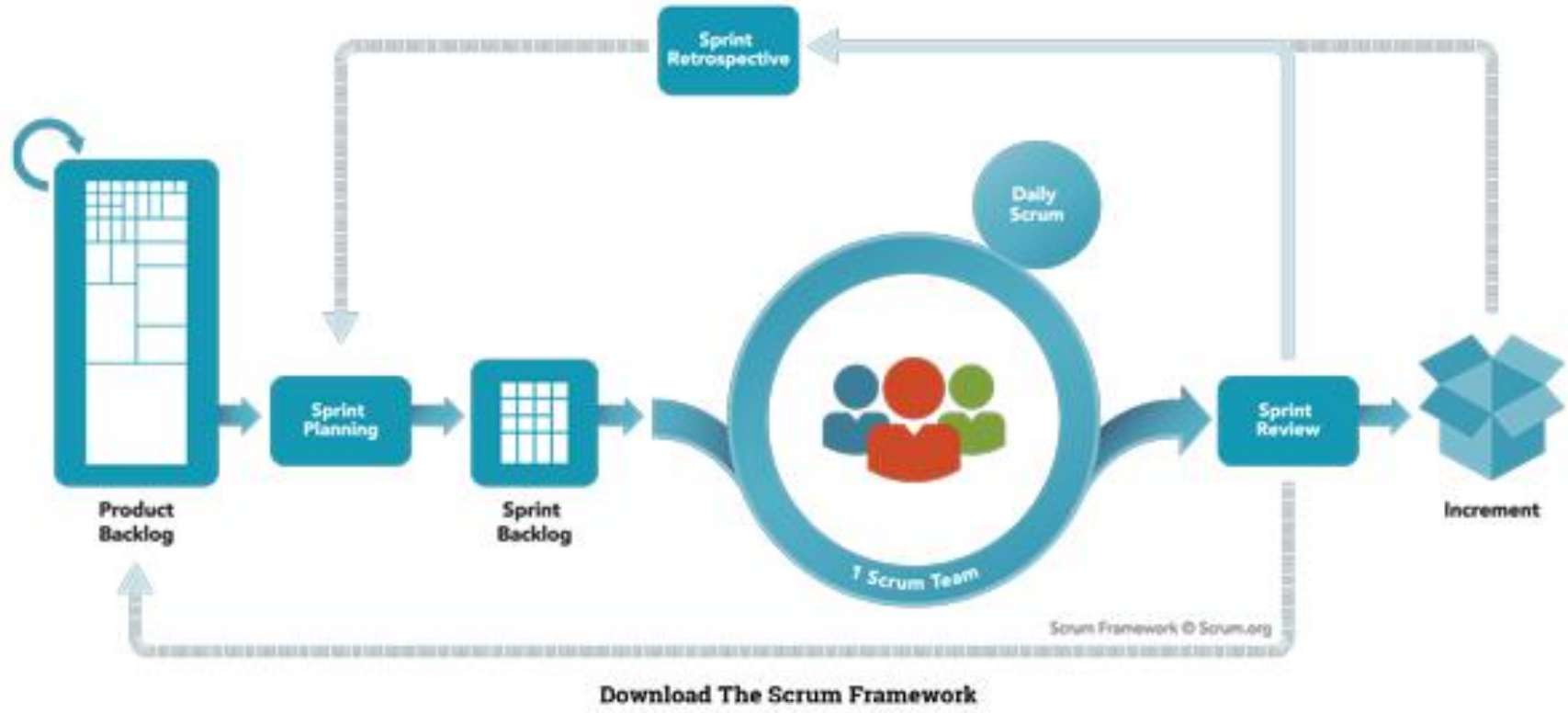
Discussions (ceremonies)

Sprint planning: everyone meets to discuss the user stories and estimate the relevant sizes.

Daily Scrum is a short stand-up meeting to discuss what has been completed since last time, what is being worked on and barriers.

Sprint review takes place at the end of the sprint and the result is presented to product owner. *Retrospective meeting* to see how the progress can be improved.

Scrum

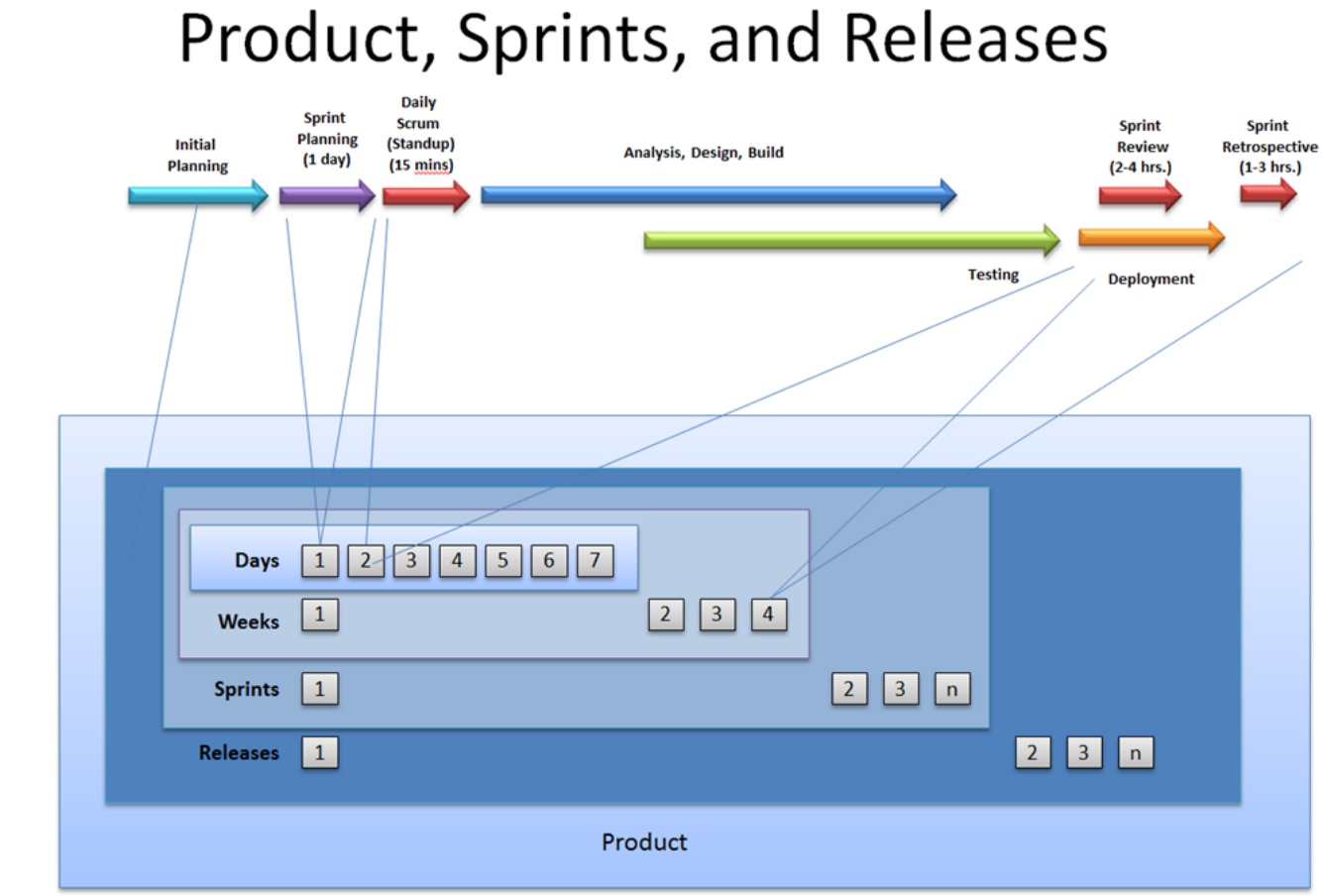

Sprint Retrospective
Daily Scrum
Sprint Planning
Sprint Review
Product Backlog
Sprint Backlog
Increment
1 Scrum Team
Scrum Framework © Scrum.org
Download The Scrum Framework

Scrum board

Backlog (user stories - PBI)	Tasks			
	To do	**In progress**	**Testing/verification**	**Done (well defined)**
As an user …	Code … Test …			
As an user …	Test …	Code …		
As an user …		Code …	Test …	
As an user …				As an user …

Label who takes on certain tasks

Scrum timeline



Sprint planning meeting (2 hrs)

- Understand the roles of the Product Owner, Scrum Master, and Scrum Development Team in Sprint Planning.
- Define Sprint Planning Meeting and sprint execution maximum duration. For example 2 hours planning meeting to define a 2 week sprint.
- Determine **which items** from the Product Backlog (or user stories) will be committed to the sprint backlog (make sure it fits the 2 week timeline).
- Set tasks that are needed to complete PBIs (some tasks will be identified as you go through the sprint and these will be updated).
- So, Product Backlog need to be available (this can be set in previous backlog refinement meeting) and then 1) Select BPIs and 2) Set Tasks
- Product owner can help set priorities in BPIs.

Daily Scrum (15 min max)

Have scrummaster starts (show **Scrum board**)

Per person

- What did you do yesterday

- What are you doing today

- Any roadblocks – use “Park that” (do not go in details)

Have scrummaster end (show **Burndown chart** – update sprint backlog if needed)

Any unrelated PBIs identified go to the backlog and should not effect your sprint.

Sprint – Recap and preparation

- **Roles Selection:** Product Owner, a Scrum Master and team members.
- **Create product Backlog:** The Backlog is where you list out everything the project needs, ordered by importance. Keep in mind that the Backlog is never complete. As the project takes shape and new needs emerge, you will add to this. The Product Owner takes primarily responsible for this.
- **Plan your Sprint:** Pick tasks from the backlog to be completed in your first Sprint. Sprint's are time-limited. You can decide a time length that works for you, but they are always less than one month. During the Spring Planning, the team decides what tasks to include in this Sprint and who will be responsible for them.
- **Sprint** Team members work on their tasks, and everybody checks in on their progress at the Daily Scrum Meeting. This meeting lasts no more than 15-minutes and answers three questions: What did you work on yesterday? What will you work on today? Is there anything blocking your work today that you need help with?
- **Review your work:** At the end of the Sprint, the team reviews the work accomplished and presents their completed tasks.
- **Review your process:** During the Retrospective meeting, you'll review how the actual work process went and plan ways you can improve your work and be more efficient next time.
- **Repeat sprint**

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Questions?

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