

SE202

**Introduction to Software
Engineering**

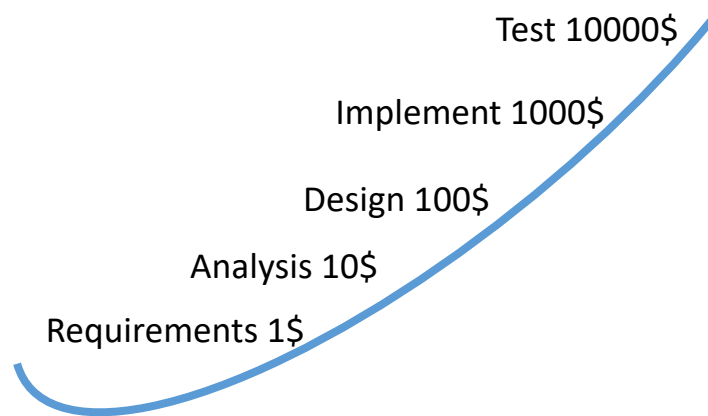
**Lecture 9 - 3
Agile method and Scrum**

Today

- Cost of change
- Agile method
- Scrum

Cost of change

- In 1988, Boehm said Cost of change grows exponentially with time



How do we prevent the raising costs?

If we can discover errors early, we can prevent the raising cost.

Something changed in the last 30 years



Easy to change!!!

Maybe the cost of change can be flat?



Waterfall vs Agile Project Management

- Number of iteration
- Number of test

Agile method

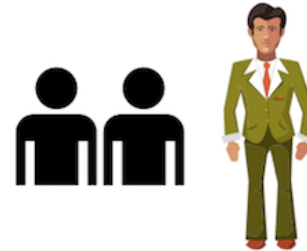
- Agile is a set of guidelines that help developers to generate as much high-quality code as possible as quickly as possible.
- Agile founders published the **Manifesto for agile software development** in 2001

Individuals and interactions over processes and tools
Working software over comprehensive documentation
Customer collaboration over contract negotiation
Responding to change over following a plan

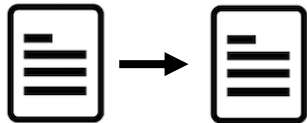
Lean & Agile principles



Focus on quality and
deliver real value to
customer



Team and Customer
Involvement
It's everyone's job!



Accept uncertainty
Build, measure, learn



Simple code design



Iterative approach

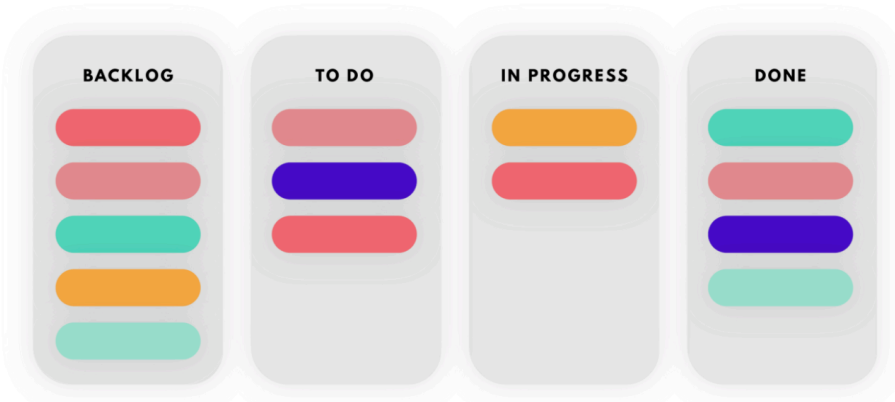




No one gets blamed!

Agile frameworks

- Extreme Programming (XP)
 - XP is a lightweight methodology for small to medium sized teams developing software in the face of vague or rapidly changing requirements.
 - XP Practices - Small release, Simple design, Test first, Refactoring, Pair programming
- Kanban
 - Kanban is a workflow management method designed to help you visualize your work, maximize efficiency and be agile.
 - Kanban board – Backlog, To do, In progress, Done (no sprint)
- Scrum **
 - Scrum is an agile project management methodology or framework used primarily for software development projects with the goal of delivering new software capability every 2-4 weeks
 - Scrum board - – Backlog, To do, In progress, To verify, Done (have sprint)

KANBAN BOARD

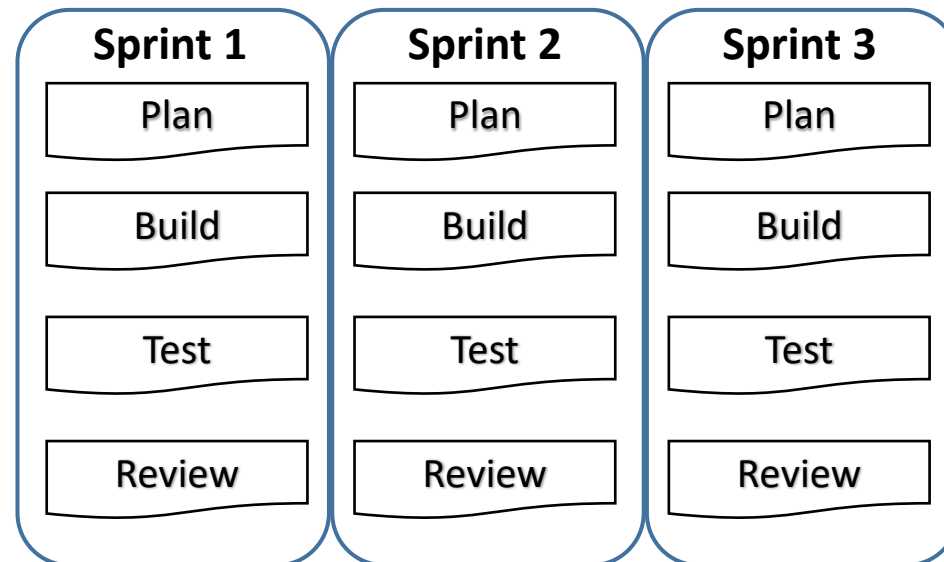


The Scrum Board				
Story	To Do	In Progress	To Verify	Done
	 			 
	 		 	
		 		 

Introduction to Scrum

- Scrum is an implementation of Agile development methodology
- A winner among Agile method due to its simplicity, project management based, structure process and customer involvement.

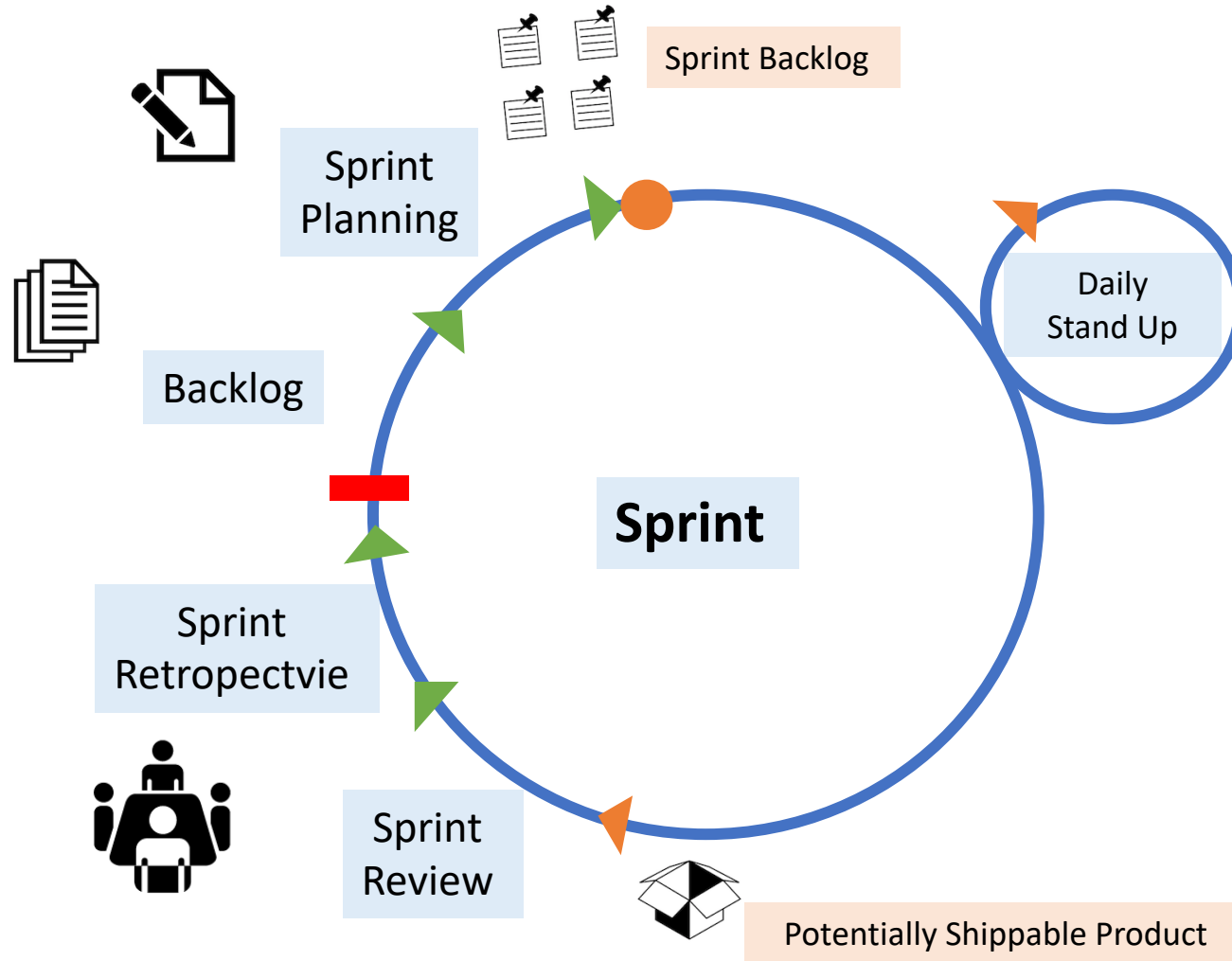
Start with
→ planning a minimum of feature set
→ building what has planned
→ testing and review small feature set
→ a potentially shippable product



Several time-boxed incremental releases are called sprints

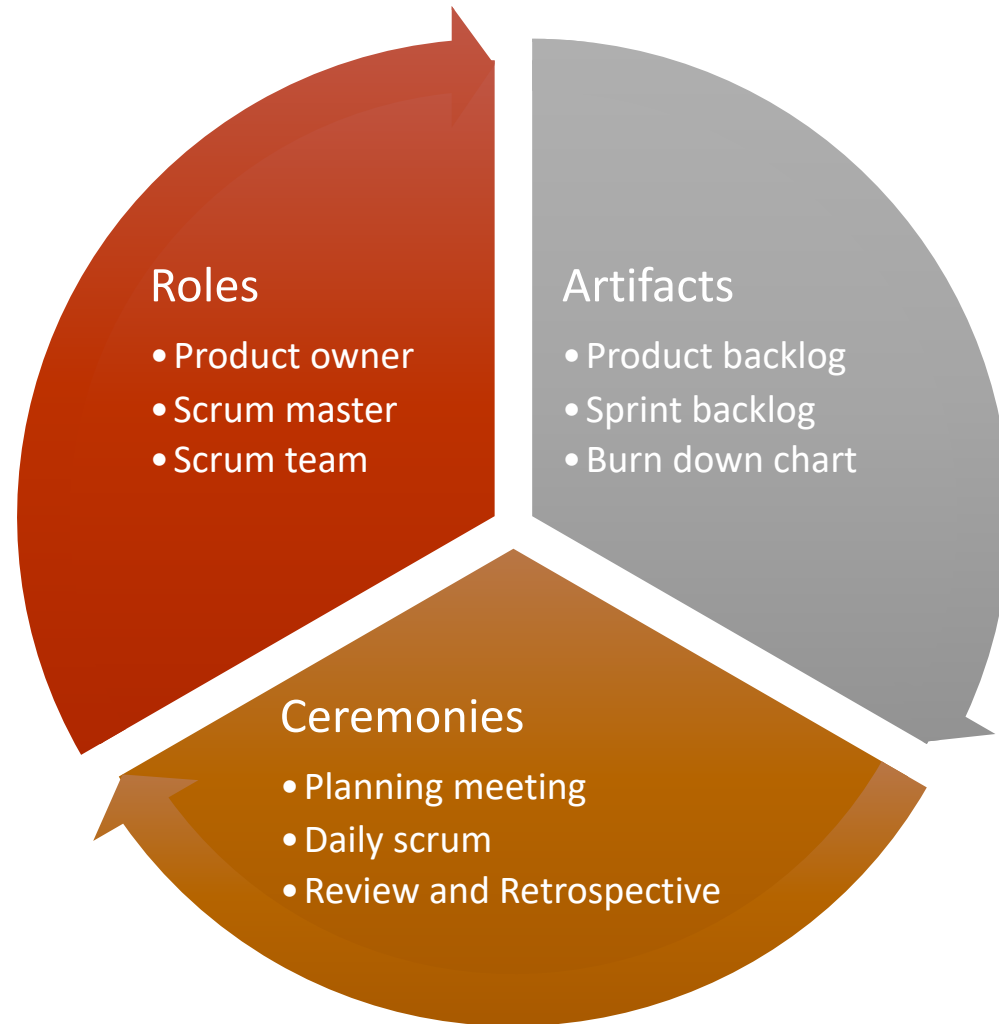
Each sprint takes 1- 4 weeks

Scrum Big Picture



Repeat this workflow for each Sprint!!!

Scrum Framework



Scrum Roles

- Product Owner
- Scrum Master
- Scrum Team

Product owner (Customer, user or other stakeholders)

- Describe project's goals
- Define the features of the product
- Prioritize features according to market value
- Decide on release date and content
- Be responsible for the profitability of the product (ROI)
- Adjust features and priority every iteration as needed
- Accept or reject work results

Scrum master

- Represents management to the project but not Project Manager
- Responsible for enacting scrum values and practices
- Removes obstacles for the team
- Ensure that the team is fully functional and productive
- Enable close cooperation across all roles and functions
- Shield the team from external interferences

Scrum team

- Typically 5-10 people
- Cross- functional
 - Tester, Programmers, UI designer and etc.
- Members often play multiple roles
- Teams are self-organizing
 - During each iteration, each team member helps handle all the typical tasks you need to write a decent piece of software (analysis, design, program, test, document, and so forth), sharing duties and guiding themselves in a good self-organizing manner.

Artifacts

- Product backlog
- Sprint Backlog
- Burndown Chart

Product Backlog

- Requirements for a system , express as a prioritized list of Backlog items
 - A list of all desired and prioritized work on the project
 - User stories are a great way of contextualizing customer wants and needs.
 - User story: **As a [user], I want [what], so that [value].**
- Is managed and owned by a Product Owner
- Usually is created during the Sprint Planning Meeting
- The highest priority Product Backlogs go to Sprint Backlog
- Can be changed and re-prioritized before each Planning Meeting

Sample Product Backlog

PRODUCT BACKLOG EXAMPLE						
ID	As a...	I want to be able to...	So that...	Priority	Sprint	Status
1	Administrator	see a list of all members and visitors	I can monitor site visits	Must	1	Done
2	Administrator	add new categories	I can allow members to create engaging content	Must	1	Done
3	Administrator	add new security groups	security levels are appropriate	Must	1	Done
4	Administrator	add new keywords	content is easy to group and search for	Must	1	Done
5	Administrator	delete comments	offensive content is removed	Must	1	Done
6	Administrator	block entries	competitors and offenders cannot submit content	Must	1	Done
7	Administrator	change site branding	the site is future-proofed in case brand changes	Could	1	Done
8	Member	change my password	I can keep secure	Must	1	Done
9	Member	update my contact details	I can be contacted by Administrators	Must	2	Work in Progress
10	Member	update my email preferences	I'm not bombarded with junk email	Should	2	Work in Progress
11	Member	share content to social networks	I can promote what I find interesting	Could	2	Work in Progress
12	Visitor	create an account	I can benefit from member discounts	Must		To be started
13	Visitor	login	I can post new entries	Must		To be started
14	Visitor	add comments	I can have a say	Must		To be started
15	Visitor	suggest improvements	I can contribute to the site usability	Should		To be started
16	Visitor	contact the Administrators	I can directly submit a query	Could		To be started
17	Visitor	follow a member's updates	I'm informed of updates from members I find interesting	Should		To be started
18	Visitor	view a member's profile	I can know more about a member	Must		To be started
19	Administrator	generate incoming traffic report	I can understand where traffic is coming from	Must		To be started

Sprint Backlog

- A subset of Product Backlog items, which define the work for a Sprint
- Team estimates the size of the task from each Product Backlog
- Is created only by team member; Product Owner is not allowed to do it
- Should be updated everyday by team member
- No more than 300 tasks in the list
- If a task requires more than 16 hours, it should be broken down

Sprint Backlog during the Sprint

- Changes
 - Team adds new tasks whenever they need to in order to meet the Sprint Goal
 - Team can remove unnecessary tasks
 - But Sprint Backlog can only be updated by the team
- Estimates are updated wherever there is new information

Sample Sprint Backlog

Story points = the score of task effort

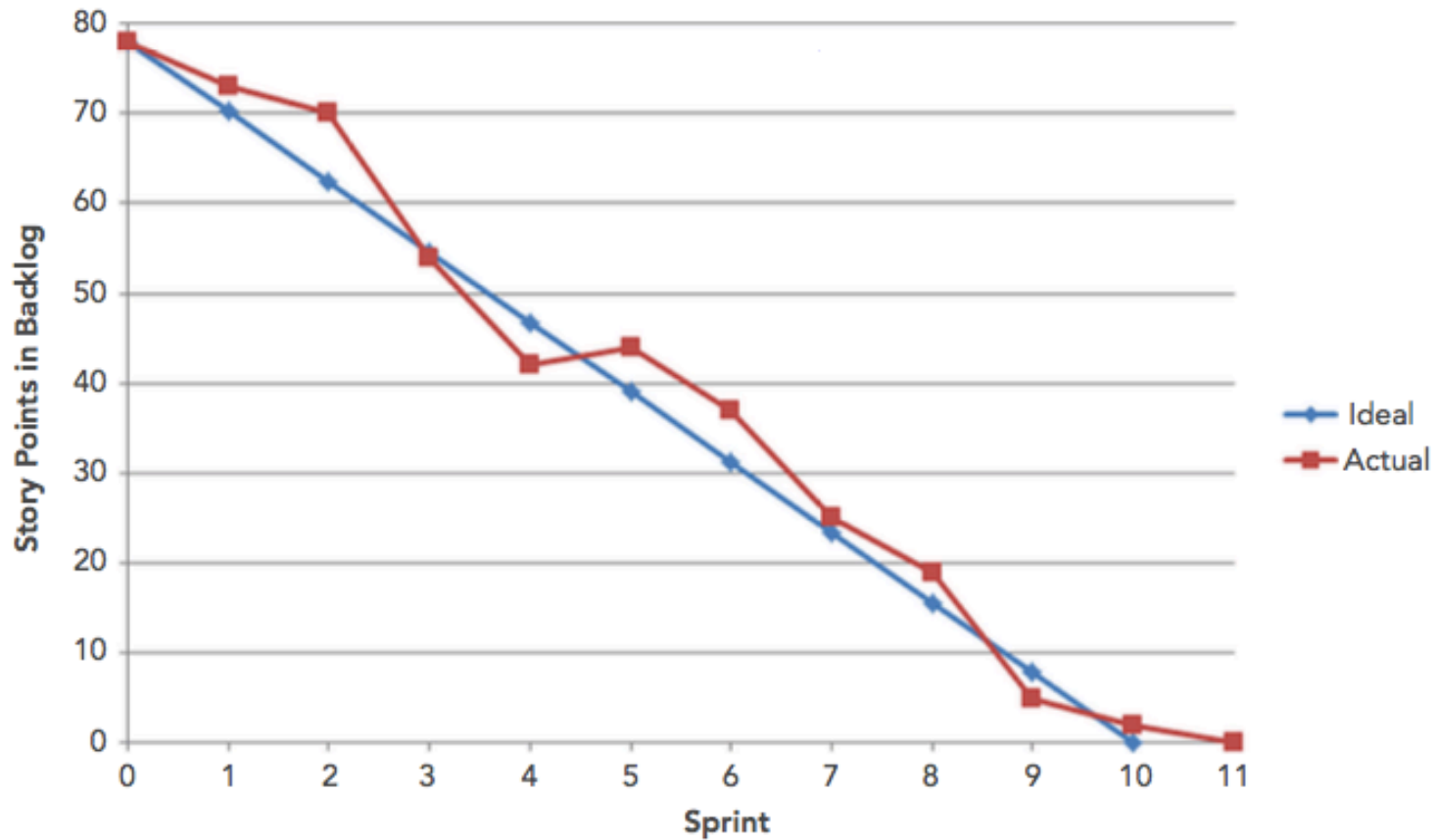
Backlog Item	Task	Task Owner	Initial Estimate	Hours of Work Remaining on Each Day of the Sprint									
				Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
Enable all users to place book in shopping cart	Design business logic	Sanjay	4	4	3	3	1	0					
	Design user interface	Jing	2	2	1	1	1	1					
	Implement back-end code	Philip	6	6	2	5	2	0					
	Implement front-end code	Tracy	4	4	3	2	2	2					
	Complete unit testing	Sarah	4	4	3	3	3	3					
	Complete regression testing	Sarah	2	2	3	3	3	3					
	Write documentation	Sam	3	3	4	2	0	0					
Upgrade transaction processing module (must be able to support 500 transactions /sec)	Merge DCP code and complete layer-level tests	Jing	5	5	2	2	1	0					
	Complete machine order for pRank	Jing	4	4	2	0	0	0					
	Change DCP and reader to use pRank http API	Tracy	3	3	3	2	2	2					
			Total	50	50	48	44	43	34				

Estimated velocity = the amount of estimated work the team can perform within each sprint.

Burn down chart

- Depict the total sprint backlog hours remaining per day
- Shows the amount of work remaining for the whole project.
- Ideally should burn down to zero to the end of the Sprints (the work is being complete)
- Actually is not a straight line

Sample Burn down chart

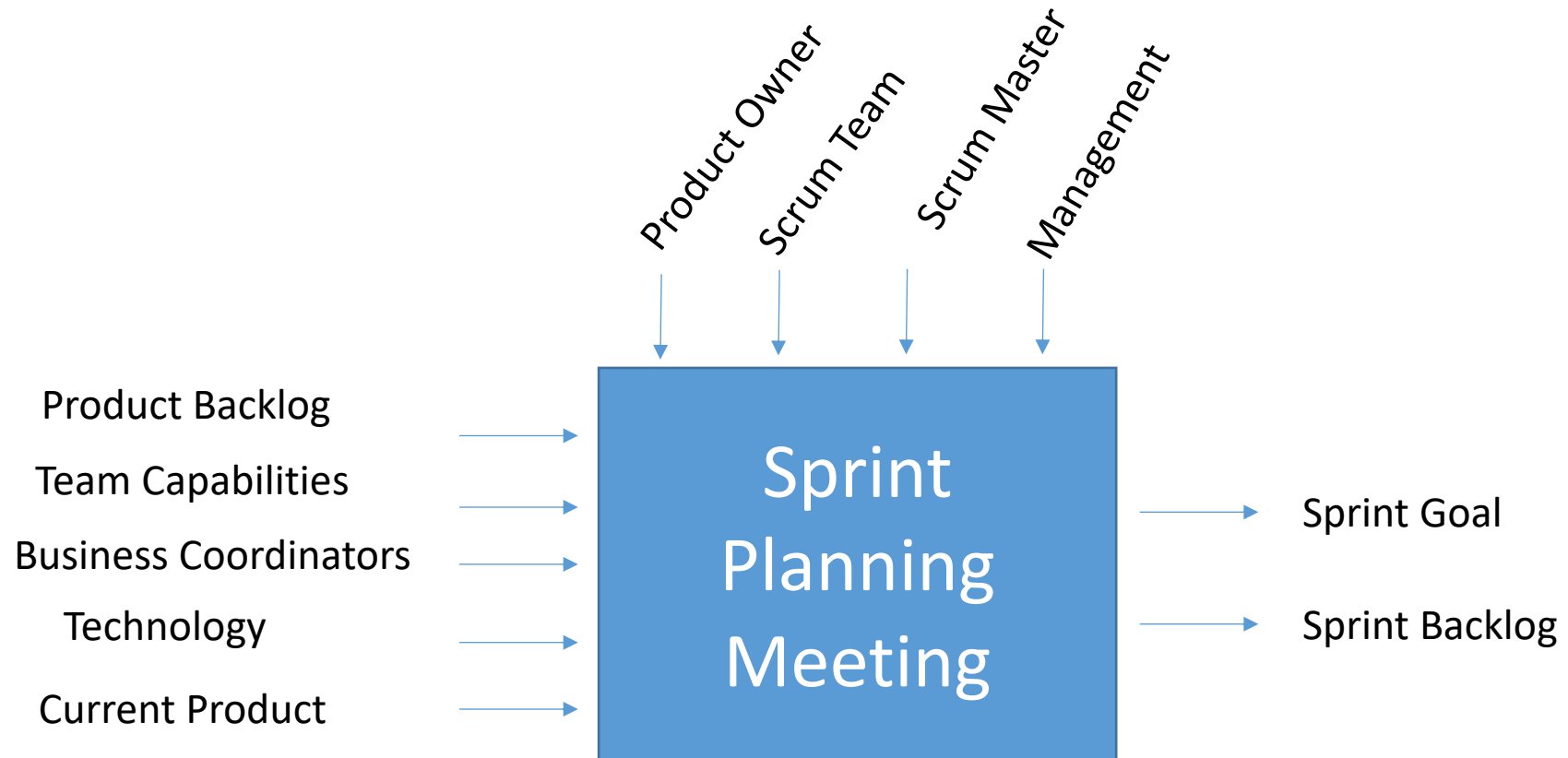


Scrum Ceremonies

- Sprint Planning Meeting
- Daily Scrum
- Sprint Retrospective Meeting
- Sprint Review Meeting

Sprint Planning Meeting

- Product owner, scrum master and team meet to discuss the user stories and estimate their relative sizes
- The output of Sprint planning meeting are Sprint Goal and Sprint Backlog



Sprint planning meeting parts

- Meeting time is up to 4 hours
- 1st Part:
 - Creating Product Backlog
 - Determining the Sprint
 - Participants: Product Owner, Scrum Master, Scrum Team
- 2nd Part:
 - Participants: Scrum Master, Scrum Team
 - Creating Sprint Backlog

Daily Scrum

- Parameters
 - Daily
 - 10-15 minutes
 - Stand up
 - Not for problem solving
- Three questions
 - What did you do since the last scrum?
 - What do you hope to accomplish before the next scrum?
 - What obstacles do you see in your way?

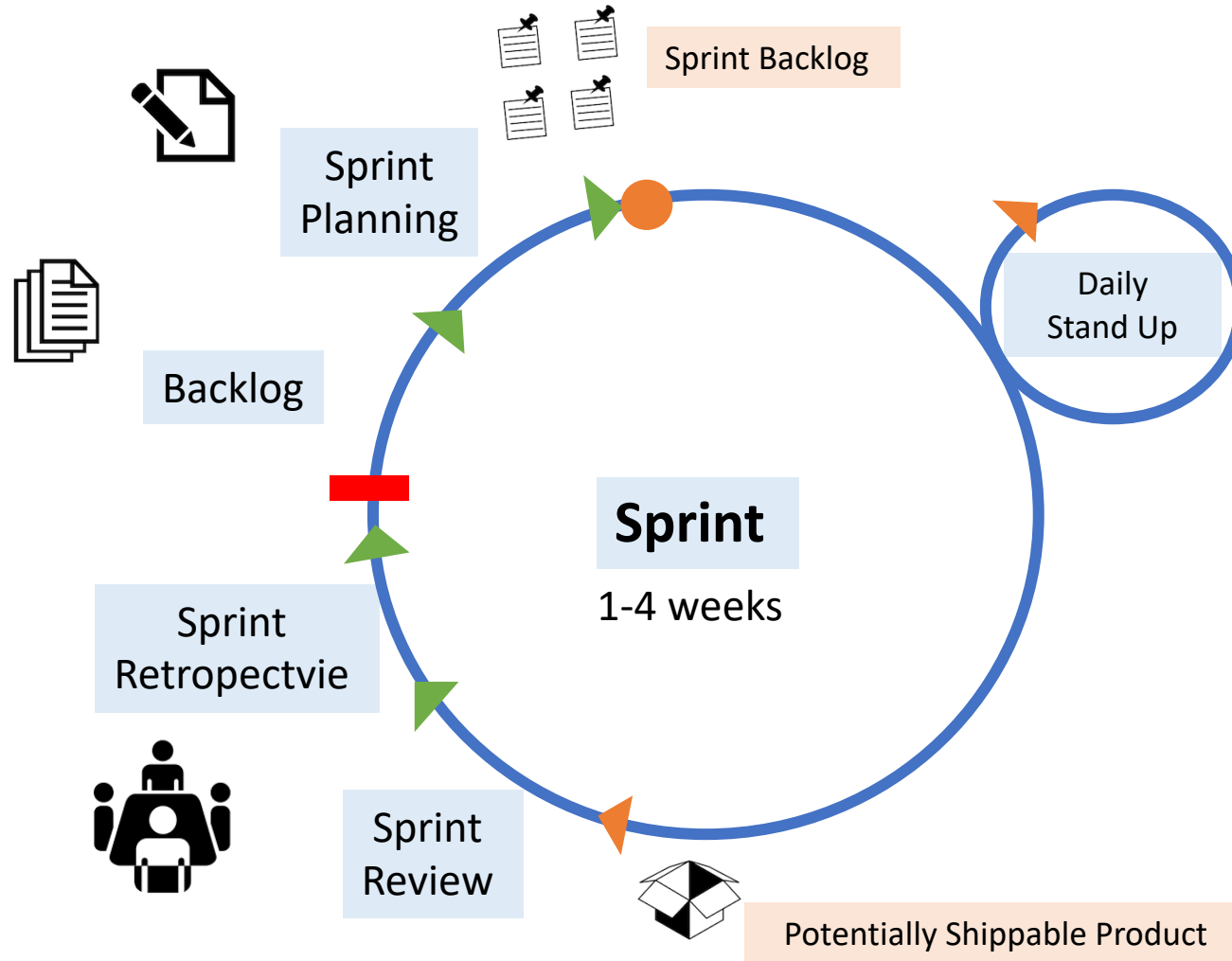
Sprint Review Meeting

- Occurs at the end of the sprint
- The development team presents the completed work to the product owner, who checks the results against the items that were originally selected for the sprint to make sure the sprint's goals have been met.
- If the application can't handle even part of any of the user stories, the product owner can tag that story as unfinished.

Sprint Retrospective Meeting

- Occurs at the end of the sprint
- Scrum Team only discuss what they can do to improve the team and the process going forward
- There questions
 - What went well and how can we make it happen again?
 - What went poorly and how can we avoid that in the future?
 - How can we improve the next sprint?

Scrum Big Picture



Repeat this workflow for each Sprint!!!

Quiz

- Calculate the number of estimate velocity over 2 sprints; each sprint takes 1 week.
- Calculate a burn down chart if the actual story points of each sprints are 13, 1 and 0.

ID	Story	Estimation	Sprint
7	As an unauthorized User, I want to create a new account	3	1
1	As an unauthorized User, I want to login	1	1
10	As an unauthorized User I want to logout	1	1
9	Create script to purge database	1	1
2	As an authorized User I want to see the list of items so that I can select one	2	1
4	As an authorized User I want to add a new item so that it appears in the list	5	1
3	As an authorized User I want to delete the selected item	2	2
5	As an authorized User I want to edit the selected item	5	2
6	As an authorized User I want to set a reminder for a selected item so that I am reminded when item is due	8	2
8	As an administrator I want to see the list of accounts on login	2	2