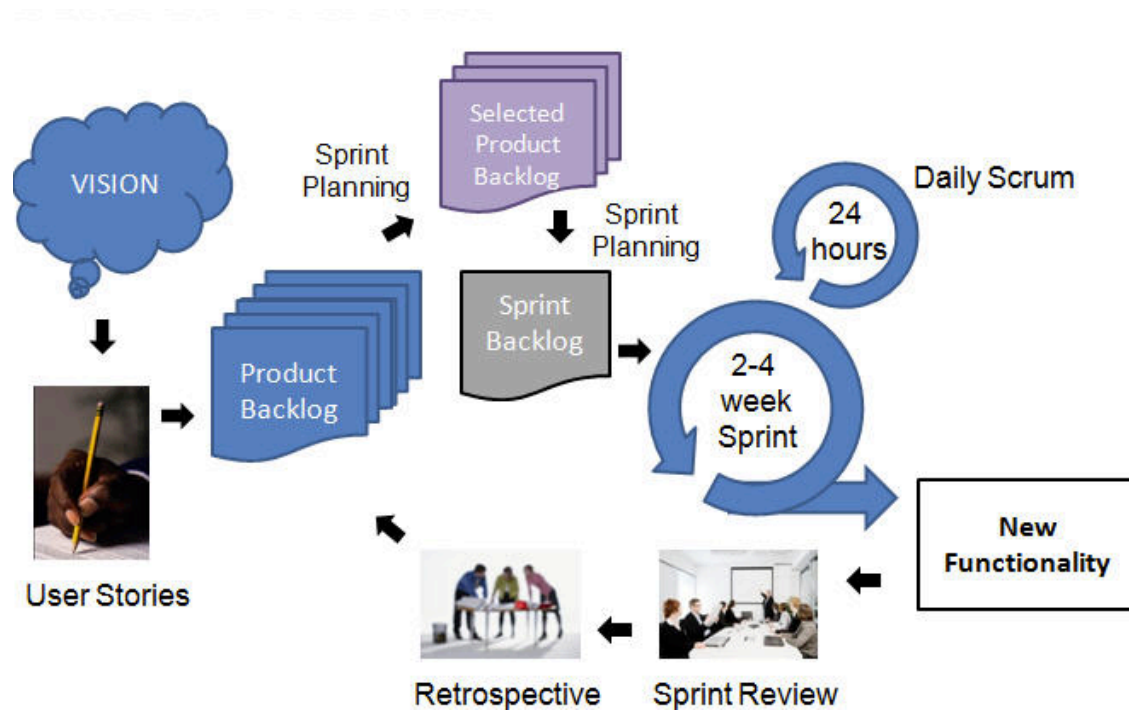




# Scrum

an agile development process methodology

-Abhijit Mahajan  
-Neelam Agrawal



# Introduction

- Scrum is an agile software development methodology
- It is an iterative and incremental methodology
  - for software projects and product- or application-development
- Projects progress via a series of iterations
  - called sprints
    - which are usually 2-4 weeks long
- A typical scrum team has between five and nine people
  - but Scrum projects can easily scale into the hundreds

# History

**1993**  
First Scrum team formed  
by Jeff Sutherland at Easel  
Corp.



**1996**  
"Scrum Development Process"  
published by Ken Schwaber.



**1998**  
"Scrum, a pattern language for  
hyperproductive software  
development" published by  
Ken, Jeff, et al.



**2001**  
"Agile Software Development  
with Scrum" published by Ken  
Schwaber and Mike Beedle.



"I think the root of both Scrum and Lean is complex adaptive systems theory.

....

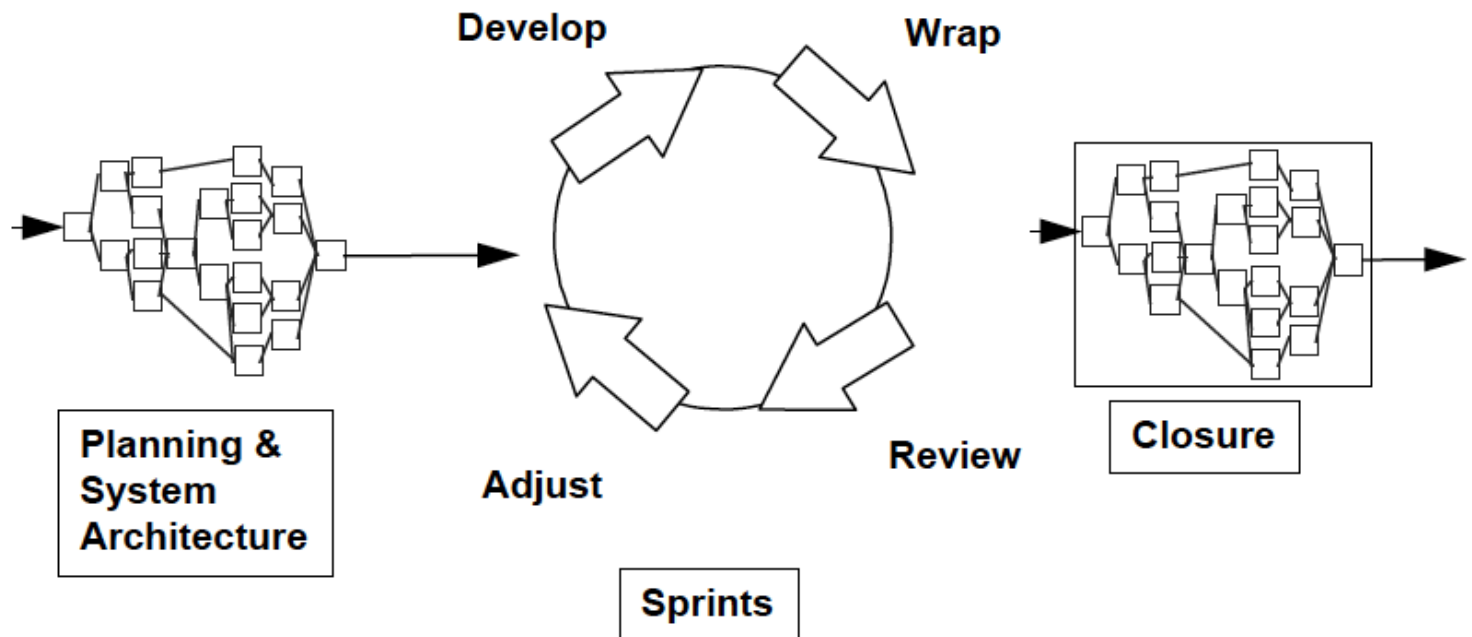
I think Scrum and Lean are complementary implementations of ways to deal with physical reality where things are often not linear, not simple, and not predictable."

# History

- 1993-Jeff Sutherland, John Scumniotales and Jeff McKenna, came up with an approach at Easel Corporation
  - first to refer it using the single word *Scrum*.
- In 1996, Sutherland and Schwaber jointly presented a paper describing the *Scrum method* at the Business Object Design and Implementation Workshop
  - held as part of OOPSLA '95 in Austin, Texas.
- 1998- Ken, Jeff, et al came up with “Scrum a pattern language for hyperproductive software development”
- In 2001, Schwaber worked with Mike Beedle to describe the method in the book *Agile with Scrum*

# SCRUM Methodology

## SCRUM Methodology



# Scrum & Rugby

- The SCRUM methodology shares many characteristics with the sport of Rugby :
  - The context is set by playing field (environment) and rugby rules (controls).
  - The primary cycle is moving the ball forward.
  - Rugby evolved from breaking soccer rules - adapting to the environment.
  - The game does not end until environment dictates (business need, competition, functionality, timetable).



# Scrum phase list

- Pregame
  - Planning
  - System Architecture/High Level Design
  
- Game
  - Sprints (Concurrent Engineering)
  - Develop (Analysis, Design, Develop)
  - Wrap
  - Review
  - Adjust
  
- Postgame
  - Closure

# SCRUM Phases (1)

## ➤ Pregame

### ➤ Planning :

- Definition of a new release based on currently known backlog, along with an estimate of its schedule and cost.
- If a new system is being developed, this phase consists of both conceptualization and analysis.
- If an existing system is being enhanced, this phase consists of limited analysis.

### ➤ Architecture :

- Design how the backlog items will be implemented.
- This phase includes system architecture modification and high level design.



# SCRUM Phases (2)

## ➤ Game

### ➤ Development Sprints :

- Development of new release functionality, with constant respect to the variables of time, requirements, quality, cost, and competition.
- Interaction with these variables defines the end of this phase.
- There are multiple, iterative development sprints, or cycles, that are used to evolve the system.

## ➤ Postgame

### ➤ Closure :

- Preparation for release, including final documentation, pre-release staged testing, and release.

# Planning (1)

- Development of a comprehensive backlog list.
- Definition of the delivery date and functionality of one or more releases.
- Selection of the release most appropriate for immediate development.
- Mapping of product packets (objects) for backlog items in the selected release.
- Definition of project team(s) for the building of the new release.

# Planning (2)

- Assessment of risk and appropriate risk controls.
- Review and possible adjustment of backlog items and packets.
- Validation or reselection of development tools and infrastructure.
- Estimation of release cost, including development, collateral material, marketing, training, and rollout.
- Verification of management approval and funding.

# Architecture/High Level Design (1)

- Review assigned backlog items.
- Identify changes necessary to implement backlog items.
- Perform domain analysis to the extent required to build, enhance, or update the domain models to reflect the new system context and requirements.
- Refine the system architecture to support the new context and requirements.

# Architecture/High Level Design (2)

- Identify any problems or issues in developing or implementing the changes
- Design review meeting, each team presenting approach and changes to implement each backlog item.
- Reassign changes as required.

# Sprint (1)

- A sprint is the basic unit in Scrum
  - lasts between one week and one month
- Each sprint is preceded by a meeting
  - where the tasks for the sprint are initiated for the sprint goal
- The work items come from the product *backlog*
  - which is a prioritized list of requirements
- During the sprint planning meeting, the Product Owner informs the group of the items in the product backlog that needs to be completed
  - the ones with the highest priority

# Sprint (2)

- The group then determines how much of this they can commit to complete during the next sprint
  - and records this in the sprint backlog
- During a sprint, no one is allowed to change the sprint backlog
  - which means that the requirements are frozen for that sprint
  - if requirements are not completed for any reason they are left out and returned to the product backlog

# More Game phase(1)

- Develop:
  - Defining changes needed for
    - the implementation of backlog requirements into packets, opening the packets, performing domain analysis
    - designing, developing, implementing, testing, and documenting the changes.
  - Development consists of the micro process of discovery, invention, and implementation.
- Wrap:
  - Closing the packets, creating an executable version of changes and how they implement backlog requirements.



# More Game phase (2)

## ➤ Review:

- All teams meeting to present
  - work and review progress
  - raising and resolving issues and problems
  - adding new backlog items
- Risk is reviewed and appropriate responses defined.

## ➤ Adjust:

- Consolidating the information gathered from the review meeting into affected packets, including different look and feel and new properties.

# Closure

- When the management team feels that the variables of time, competition, requirements, cost, and quality concur for a new release to occur, they declare the release “closed” and enter this phase.
- This phase prepares the developed product for general release.
- Integration, system test, user documentation, training material preparation, and marketing material preparation are among closure tasks.

# Roles

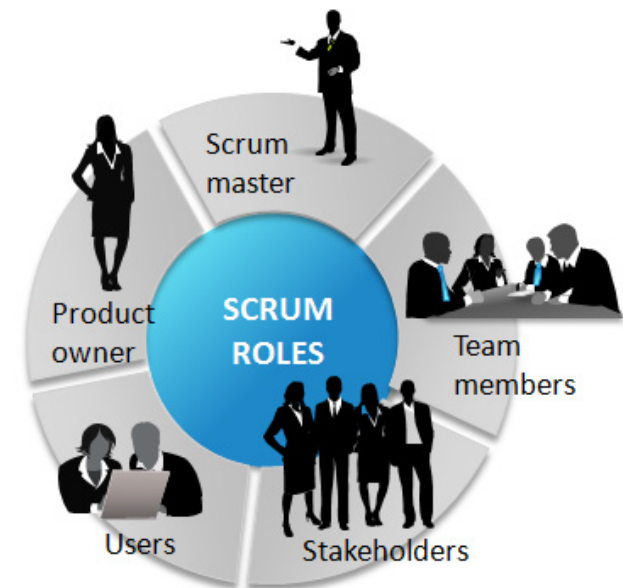
## The various roles in Scrum team

### ➤ Core Roles

- Product Owner
- Development Team
- Scrum Master

### ➤ Ancillary roles

- Stakeholders (customers, vendors)
- Managers



# Product Owner

- The Product Owner represents the voice of the customer
  - is accountable for ensuring that the Group delivers value to the business
- Writes customer-centric items (user stories),
  - prioritizes them
  - and adds them to the product backlog
- Scrum groups should have one Product Owner
  - She may also be a member of the Management Group
  - It is recommended that this role not be combined with ScrumMaster

# Development Team

- Responsible for delivering potentially shippable product increments at the end of each Sprint.
- It is made up of people with cross-functional skills
  - who do the actual work
    - analyze, design, develop, test, technical communication, document, etc
- It is self-organizing
  - even though they may interface with project management organizations (PMOs).

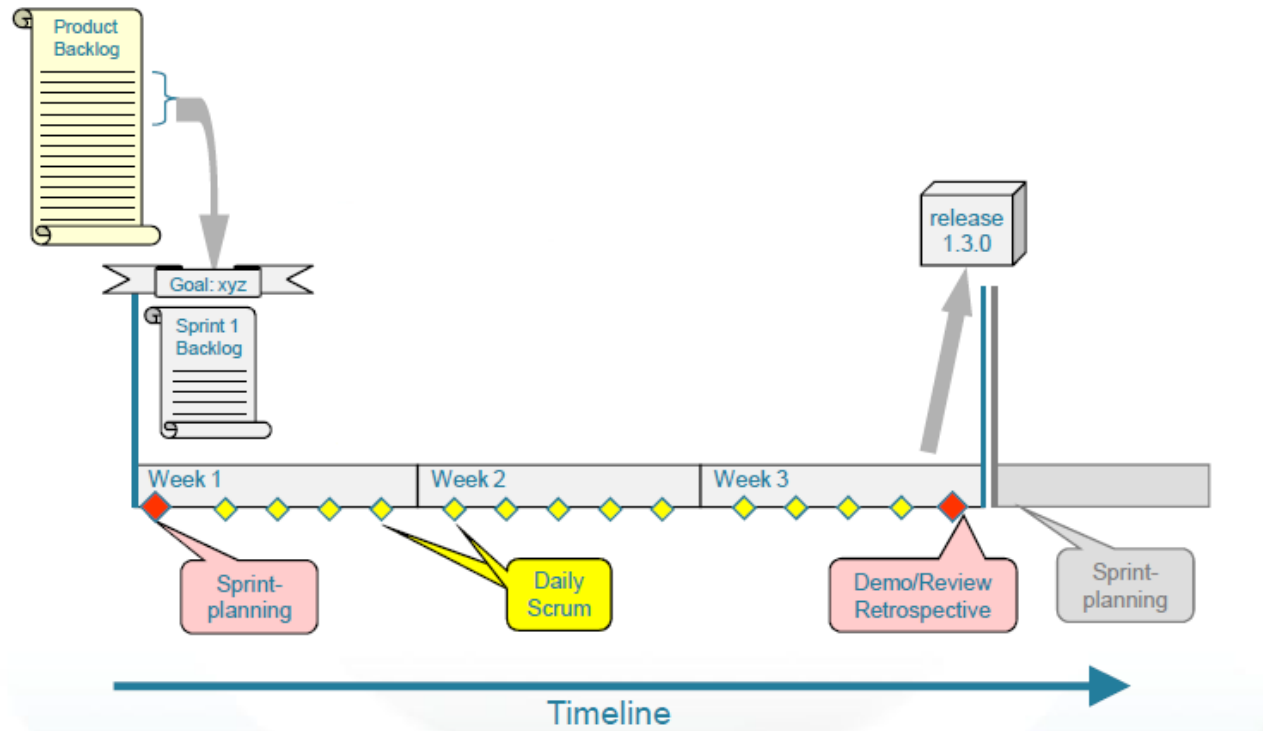
# Scrum Master

- Scrum Master is accountable for removing impediments to the ability of the group to deliver the sprint goal/deliverables.
- She acts as a buffer between the group and any distracting influences.
- The Scrum Master is the enforcer of rules.
- A key part of the role is to protect the Development Team and keep it focused on the tasks at hand.

# Ancillary Roles

- The ancillary roles in Scrum groups are those with no formal role and infrequent involvement in the Scrum process
  - but nonetheless, must be taken into account.
- Stakeholders (customers, vendors):
  - People who enable the project and for whom the project produces the agreed-upon benefit[s]
    - that justify its production
  - They are only directly involved in the process during the sprint reviews
- Managers:
  - People who control the environment

# Meetings Overview





# Meetings

The following is a list of meetings in Scrum development

- **Daily Scrum**
- **Backlog grooming: storytime**
- **Scrum of Scrums**
- **Sprint planning meeting**
- **Sprint review meeting**
- **Sprint retrospective**



# Daily Scrum (1)

- Happens each day during the sprint
  - is a project status meeting
- This meeting has specific guidelines:
  - The meeting starts precisely on time
  - All are welcome, but normally only the core roles speak
  - The meeting length is set to 15 mins
  - The meeting should happen at the same location and same time every day

# Daily Scrum (2)

- During the meeting, each group member answers three questions
  - What have you done since yesterday?
  - What are you planning to do today?
  - Any impediments/stumbling blocks?
- Scrum Master should facilitate resolution of these impediments, although the resolution should occur outside the Daily Scrum itself to keep it under 15 minutes.

# Backlog grooming: storytime

- This is the process of
  - estimating the existing backlog using effort/points
  - refining the acceptance criteria for individual stories
  - and breaking larger stories into smaller stories
- Meetings should not be longer than an hour
- Meeting does not include breaking stories into tasks
- Group can decide how many meetings are needed per week.

# Scrum of scrums

- Each day normally after the Daily Scrum.
- These meetings allow clusters of groups to discuss their work, focusing especially on areas of overlap and integration.
- A designated person from each group attends.
- The agenda will be the same as the Daily Scrum, plus the following four questions:
  - What has your group done since we last met?
  - What will your group do before we meet again?
  - Is anything slowing your group down or getting in their way?
  - Are you about to put something in another group's way?

# Sprint planning meeting(1)

- Takes place at the beginning of the sprint cycle
- The Sprint Planning Meeting is attended by
  - the product owner
  - Scrum Master
  - the entire Scrum Team.
- There are two defined artifacts resulting from this meeting:
  - A sprint goal
  - A sprint backlog
- A sprint goal is a short, one- or two-sentence, description of what the team plans to achieve during the sprint.
  - It is written collaboratively by the team and the product owner

# Sprint planning meeting(2)

- The team asks enough questions so that they can turn a high-level user story of the product backlog into the more detailed tasks of the sprint backlog.
- Sprint Backlog is prepared with details of the time it will take to do a particular work
- Identify and communicate how much of the work is likely to be done during the current sprint
- Eight hour time limit
  - (1st four hours) Product Owner + Group: dialog for prioritizing the Product Backlog
  - (2nd four hours) Group only: hashing out a plan for the Sprint, resulting in the Sprint Backlog

# Sprint review meeting(1)

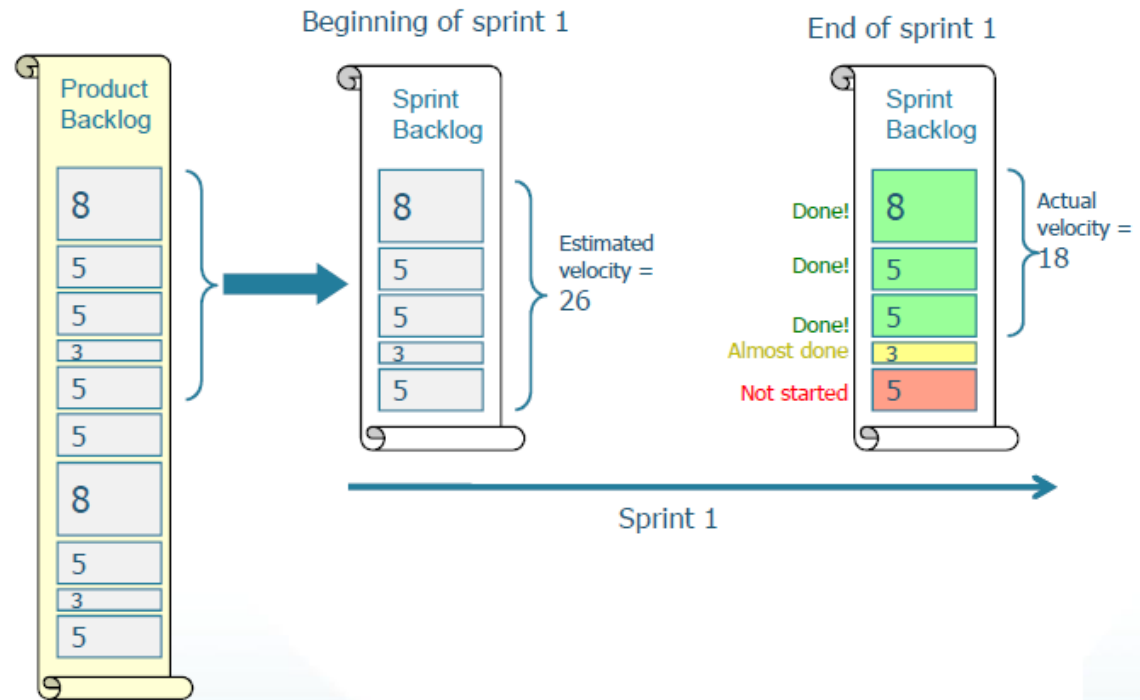
- Held at the end of each sprint during which the Scrum team shows what they accomplished during the sprint.
- Typically this takes the form of a demo of the new features.
- It is intentionally kept very informal, typically with rules forbidding the use of PowerPoint slides.
- A sprint review meeting should not become a distraction or significant detour for the team
  - rather, it should be a natural result of the sprint



# Sprint review meeting(2)

- Participants in the sprint review typically include
  - the Product Owner
  - the Scrum team
  - the ScrumMaster
  - management, customers, and developers.
- The project is assessed against the sprint goal determined during the Sprint planning meeting.
- It is important that the team has achieved the overall goal of the sprint.

# Sprint Review Meeting (3)

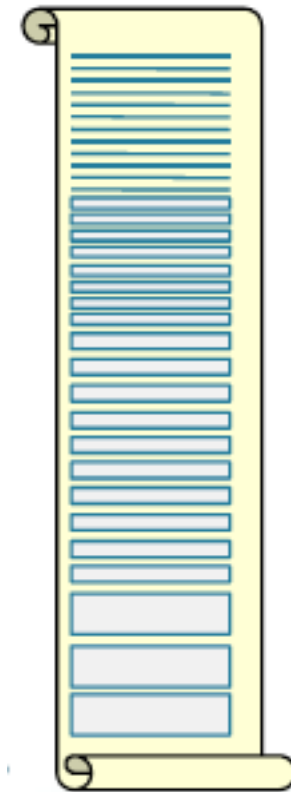


# Sprint retrospective

- The sprint retrospective is usually the last thing done in a sprint.
  - Many teams do it immediately after the sprint review.
- This is a period at the end of each sprint to deliberately reflect on how the team is doing and to find ways to improve.
- The entire team, including both the ScrumMaster and the product owner participate in this meeting.
- It has three hour time limit
- Two main questions asked in the sprint retrospective are:
  - What went well during the sprint?
  - What could be improved in the next sprint?

# Artifacts

- **Product Backlog**
- **Sprint Backlog**
- **Burndown Charts**



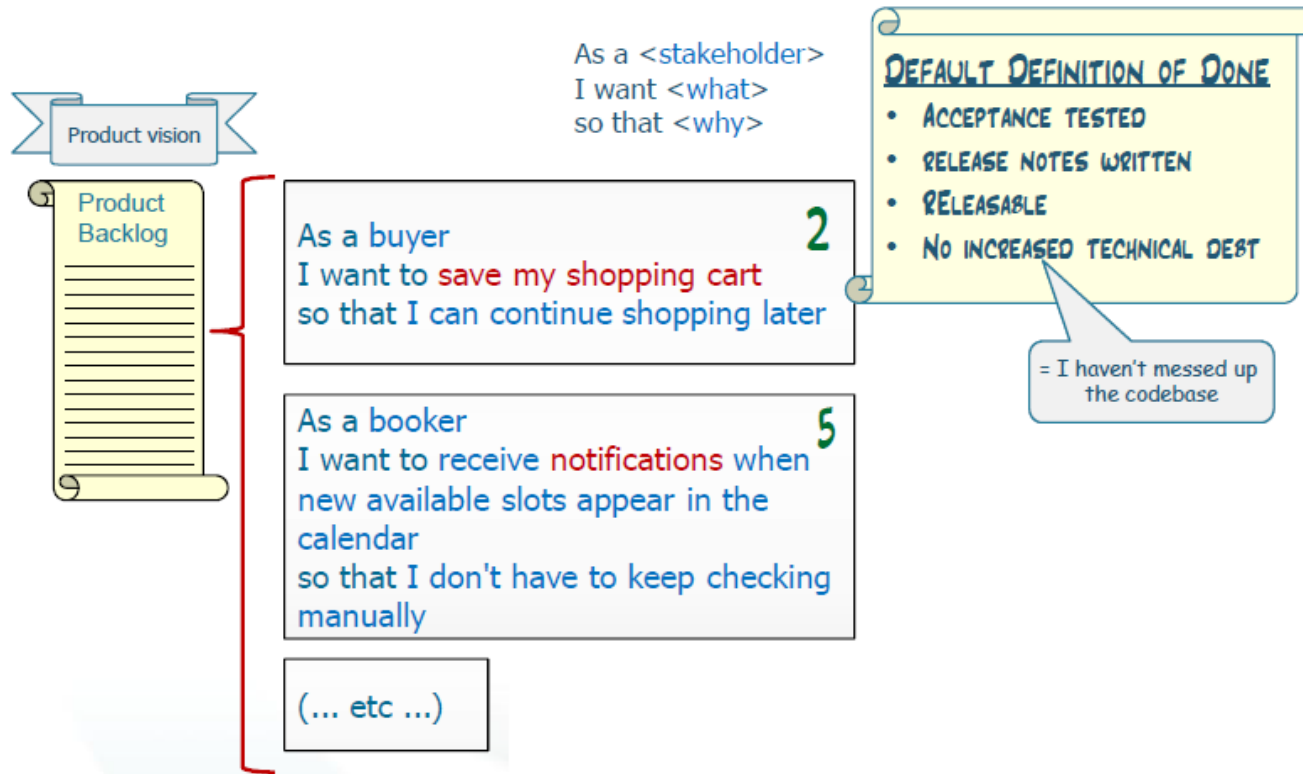
# Product Backlog(1)

- It is an ordered list of "requirements" maintained for a product.
- These items are ordered by the Product Owner based on considerations like risk, business value, dependencies, date needed, etc.
- The values in product backlog are often stated in story points using a rounded Fibonacci sequence.

# Product Backlog(2)

- Those estimates help the Product Owner to gauge the timeline and may influence ordering of backlog items.
- The Product Backlog, and business value of each listed item is the responsibility of the Product Owner.
- The estimated effort to complete each backlog item is determined by the Development Team.

# Product Backlog



# Sprint Backlog(1)

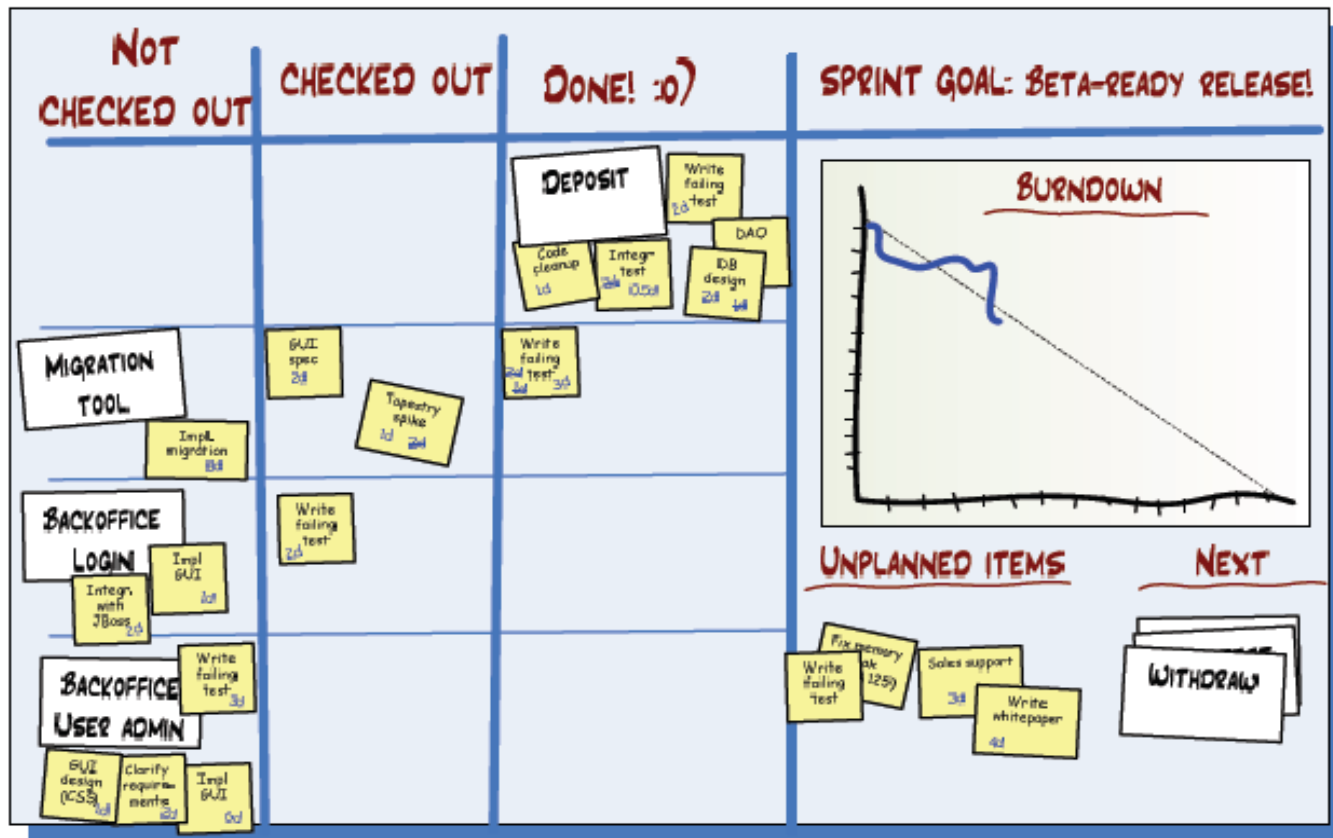
- It is the list of work the Development Team must address during the next sprint.
- The list is derived by selecting stories/features from the top of the product backlog.
- The Development Team should keep in mind the velocity of its previous Sprints when selecting stories/features for the new sprint.



# Sprint Backlog(2)

- The stories/features are broken down into tasks by the Development Team
  - should normally be between four and sixteen hours of work
- Tasks on the sprint backlog are never assigned;
  - rather, tasks are signed up for by the group members as needed during the daily scrum.
- Often an accompanying task board is used to see and change the state of the tasks of the current sprint,
  - like “not checked out”, “checked out” and “done”.

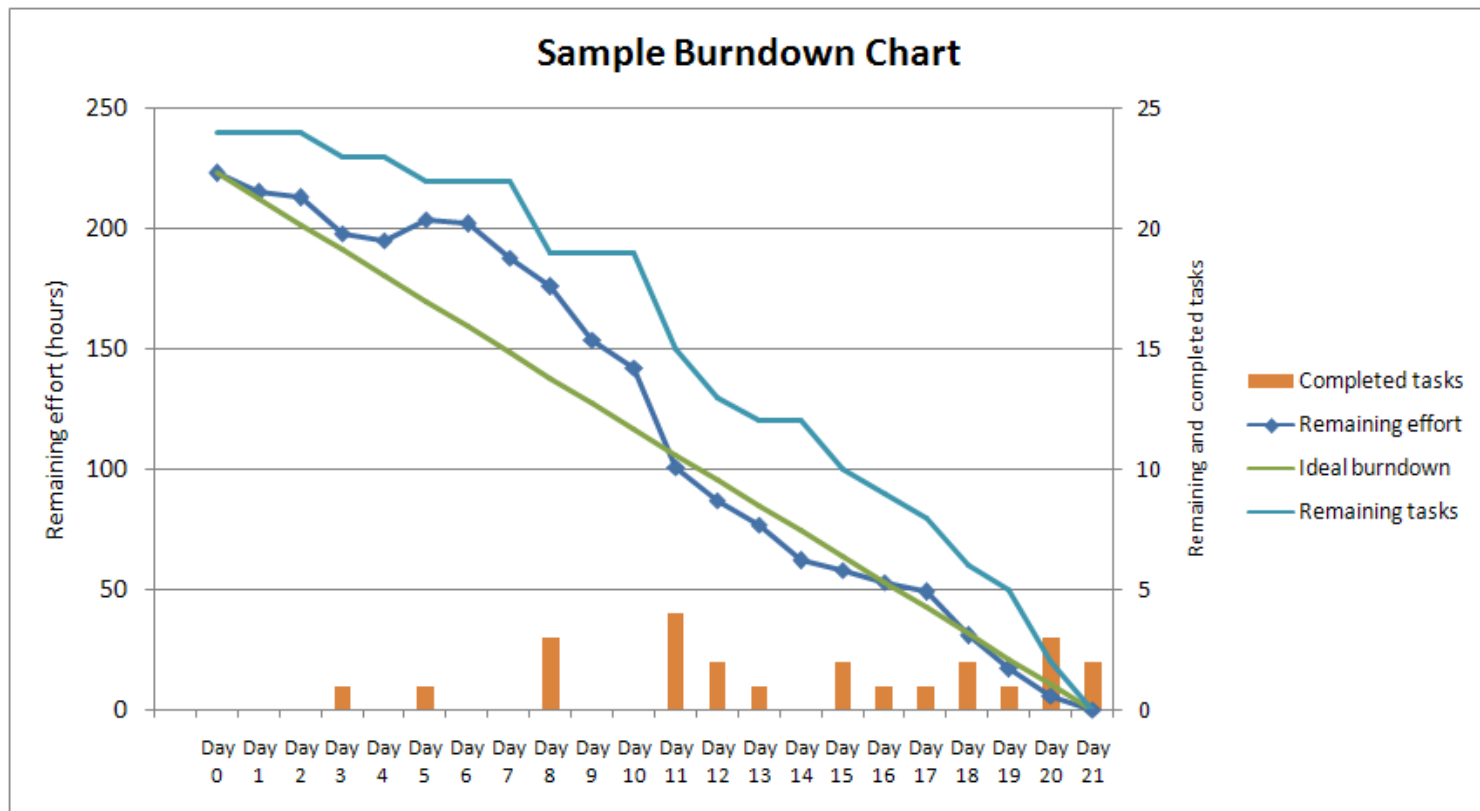
# Sprint Backlog



# Burndown Charts

- Sprint burndown chart
  - It is a publicly displayed chart (updated daily) showing remaining work in the sprint backlog.
  - It gives a simple view of the sprint progress.
- Release burndown chart
  - shows the amount of work left to complete the target commitment for a Product Release
- Alternative release burndown chart
  - which basically does the same, but clearly shows scope changes to Release Content, by resetting the baseline.

# Burndown Charts



# Modifications: Scrum-ban(1)

- Scrum-ban is a production model based on Scrum and Kanban.
- It is suited for maintenance projects or (system) projects with frequent and unexpected user stories or programming errors.
- In such cases the time-limited sprints of the Scrum model are of no appreciable use, but Scrum's daily meetings and other practices can be applied.
- Visualization of the work stages and limitations for simultaneous unfinished user stories and defects are familiar from the Kanban model.

# Modifications: Scrum-ban(2)

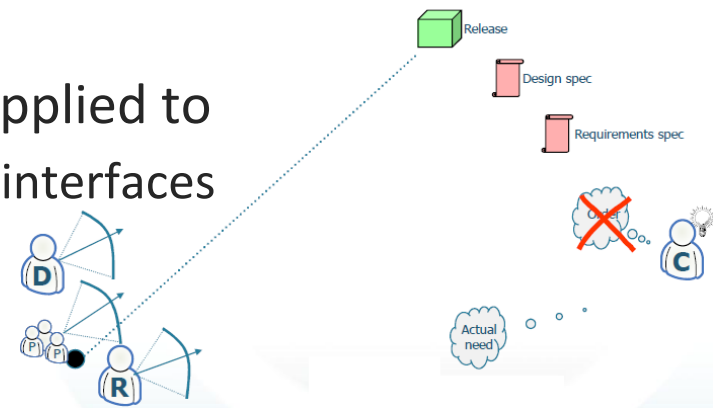
- Using these methods, the group's workflow is directed in a way
  - that allows for minimum completion time for each user story or programming error,
  - and on the other hand ensures each group member is constantly employed.
- The major differences between Scrum and Kanban are
  - in Scrum, work is divided into sprints that last a certain amount of time
  - whereas in Kanban the workflow is continuous.

# Advantages (1)

- The SCRUM methodology is designed to be quite flexible throughout.
- It provides control mechanisms for planning a product release and then managing variables as the project progresses.
- This enables organizations to change the project and deliverables at any point in time, delivering the most appropriate release.
- The SCRUM methodology frees developers to devise the most ingenious solutions throughout the project, as learning occurs and the environment changes.
- Small, collaborative teams of developers are able to share tacit knowledge about development processes.

# Advantages (2)

- Object Oriented technology provides the basis for the SCRUM methodology.
- Objects, or product features, offer a discrete and manageable environment.
- Procedural code, with its many and intertwined interfaces, is inappropriate for the SCRUM methodology.
- SCRUM may be selectively applied to procedural systems with clean interfaces and strong data orientation.





# Some difficulties

## Scrum works...

but not alone



## Scrum is simple...

but hard



## Scrum can be painful!

waste is ruthlessly exposed

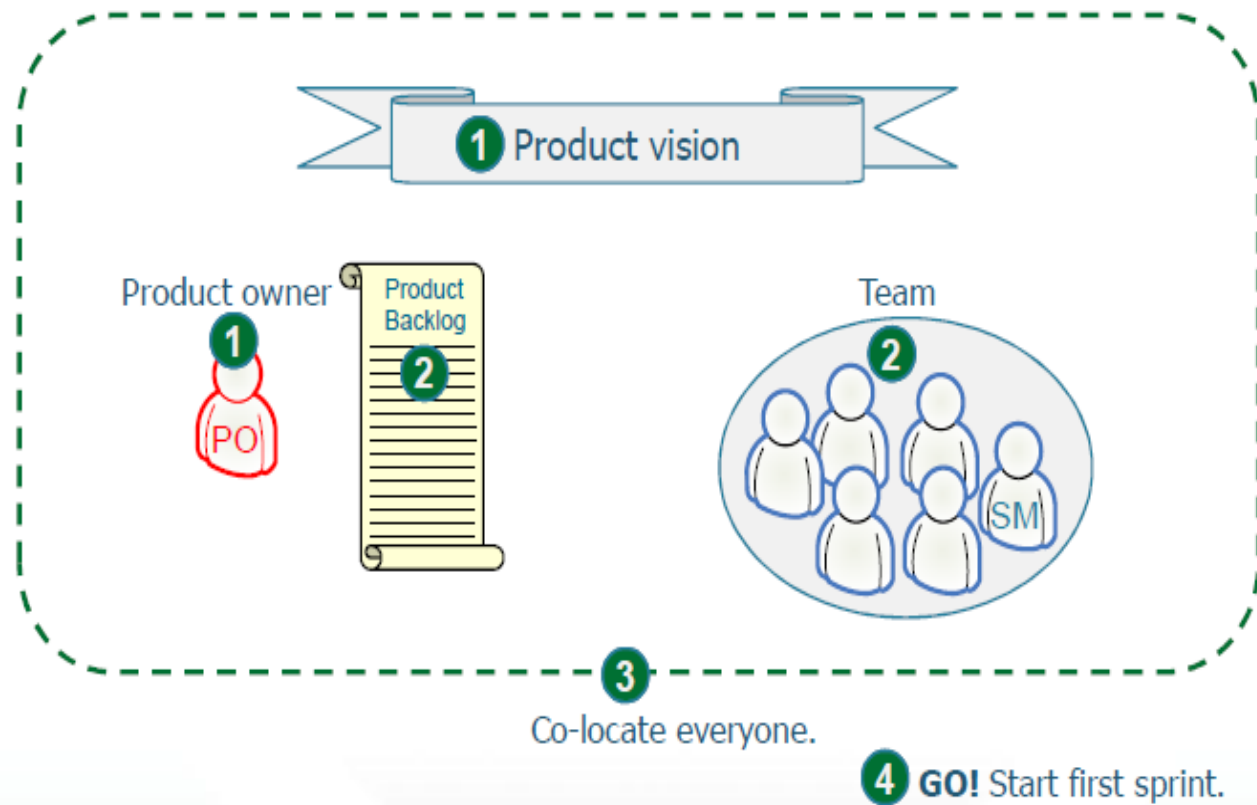


## Scrum is different!

old habits die hard



# Get set go!



# References

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