SWEN90016

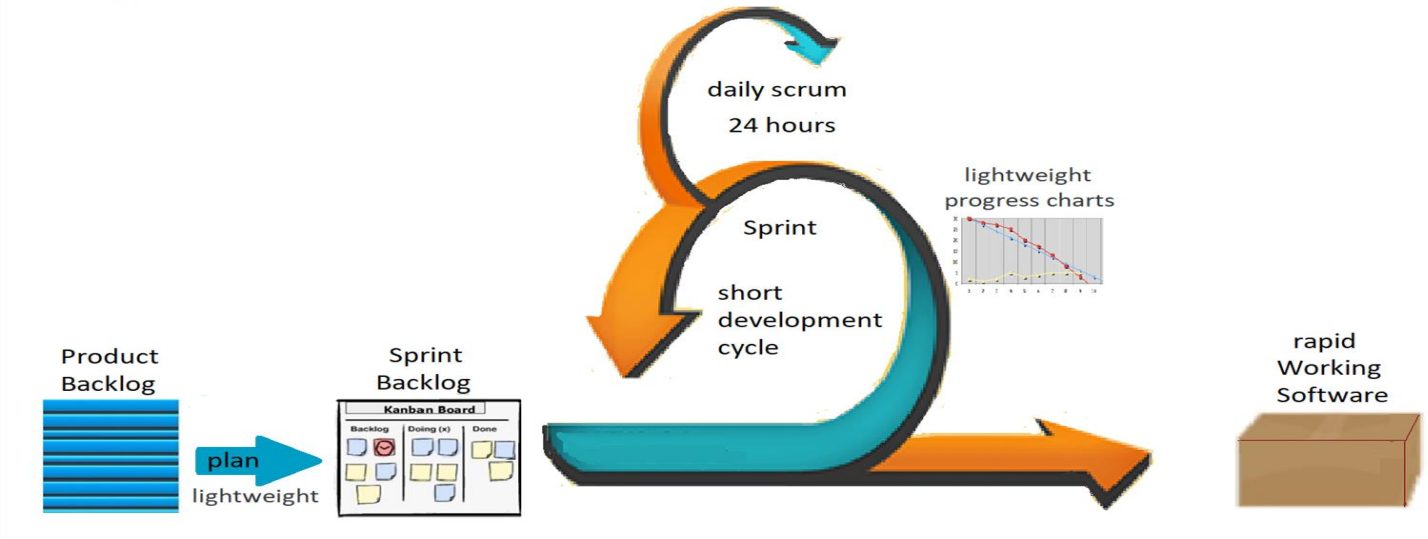
Software Processes & Project Management

Agile
Project Plan, Schedule, Cost (Monitor)

2021 – Semester 2

Tutorial 6

Today's aim



Explore Agile

Project Management,

Artefacts, Roles, Ceremonies.

User Story

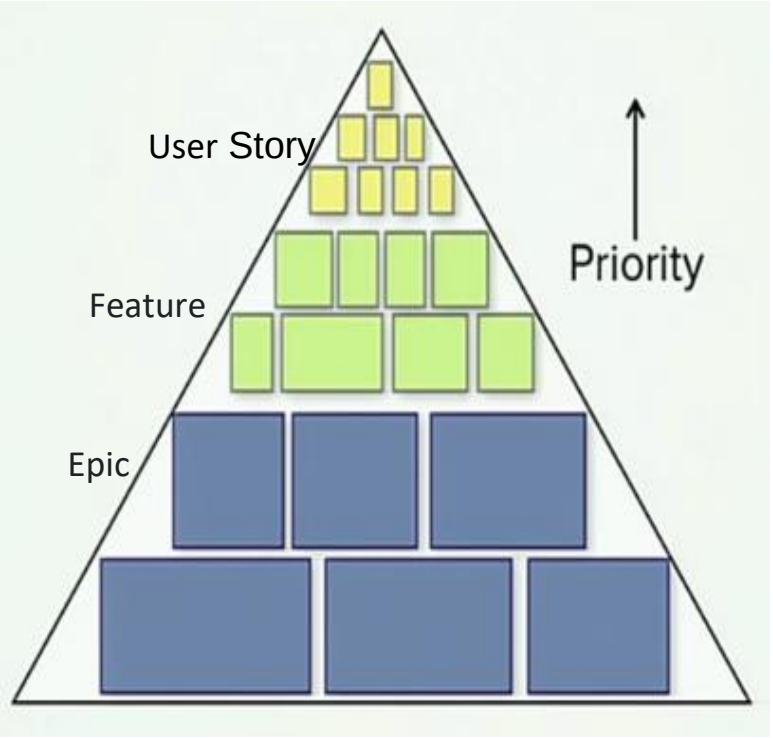
Level of Detail

(Sprint) **User Story**
- Detailed technical level
- A developer's perspective
- A conversation placeholder

Feature User Story
- Product capabilities
- Business level detail
- Product Owner perspective

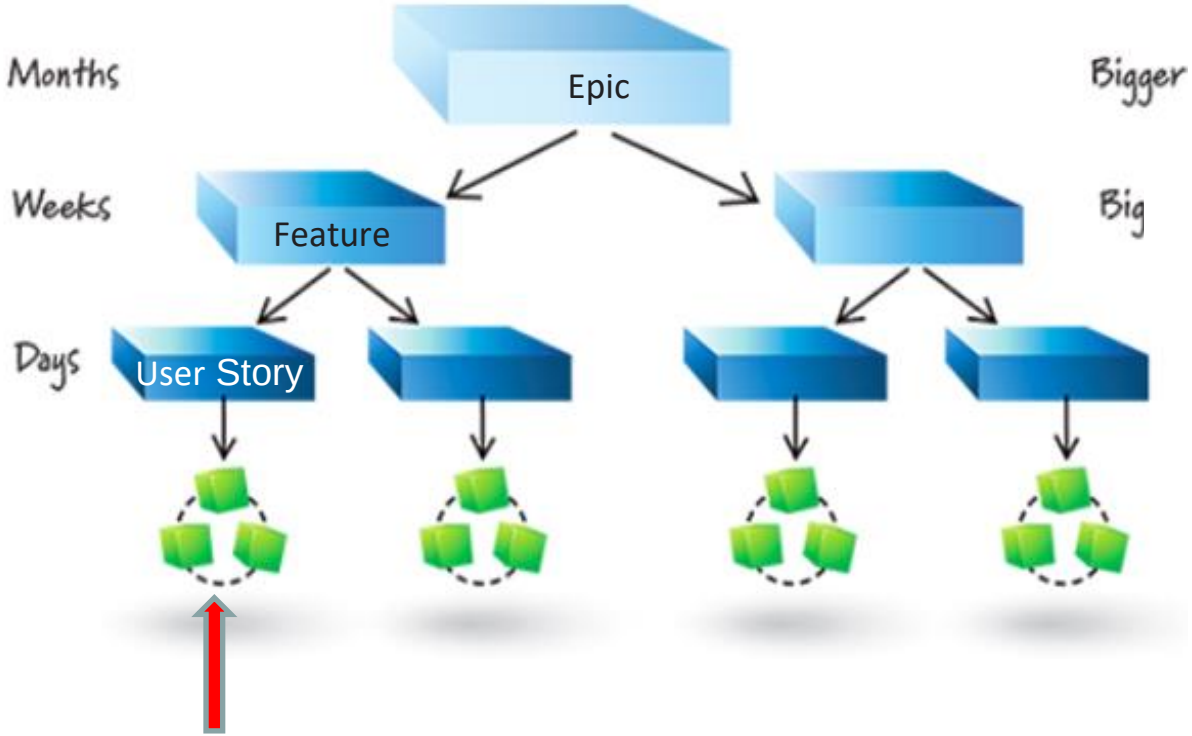
Epic User Story
- Lacks detail
- New business services
- A product

Contentious! Advice from the internet may vary …,
but use this description in exam



User Story

Decompose User Story



Just-In-Time planning has high productivity

Product Owner has ***a conversation*** with Developer so that Developer understands the requirement, Just-In-Time.

www.mountaingoatsoftware.com/articles/writing-the-product-backlog-just-in-time-and-just-enough

User Story – Story Points

Estimate User Story effort in Story Points

relative values matter,
raw values are unimportant

2 point story is twice the size of a 1 point story

User Story Effort Estimation

Compare **size** with **duration** estimation techniques

- Consider moving a pile of dirt from the front of my home to the back yard.
- Look at the pile of dirt, assess my tools [a shovel & a wheelbarrow], and directly estimate the job at **two hours** duration/time.

- The is a “one-step”, direct **duration estimate**
  does not estimate the size (story points) of the pile of dirt.

User Story Effort Estimation

Compare Size with Duration …

Instead, estimate size easily using:

- The pile's height & circumference indicate ~100 cubic meters **size**.

Better Accuracy

Find a **duration** estimate using size

- My wheelbarrow is labelled with a size of **two** cubic meters.
- Divide **100** by **two**, so need **50** wheelbarrow trips.
- Learn by doing:
  - three minutes to load wheelbarrow,
  - two minutes to walk to back yard & dump,
  - one minute to walk back.
- trip takes **6** minutes duration

50 trips taking **6** minutes each = duration 300 minutes (**5 hours**).

User Story Effort Estimation

Compare **Story Point Size** estimation with **Duration** estimation

The User Stories can be decomposed into tasks,

- Optionally estimate tasks in hours

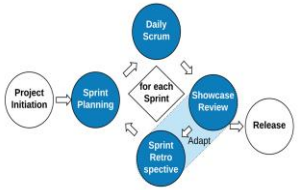
Less accurate www.scruminc.com/story-points-why-are-they-better-than/

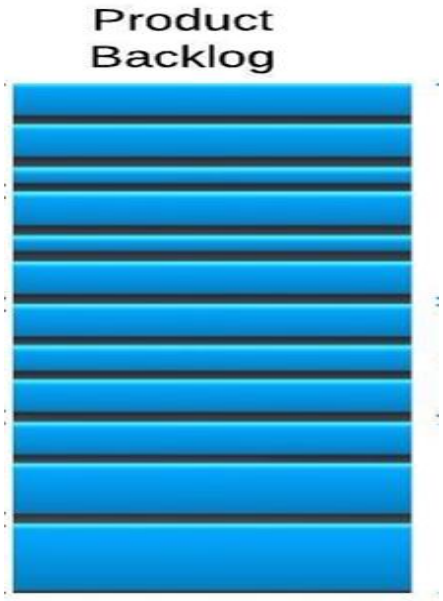
- A full task level Sprint Backlog estimated in hours is equivalent to a formal schedule (Gantt)

More work www.mountaingoatsoftware.com/agile/scrum/scrum-tools/sprint-backlog

Agile PM - Initialization

Project phase: Initiation





Business Roadmap identifies candidate project

Product vision established with external stakeholders

Create Product Backlog

Agile PM - Release Planning

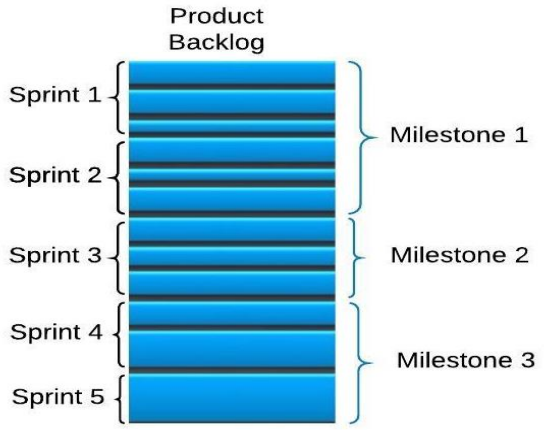
Project phase:
Initial
Sprint
Planning

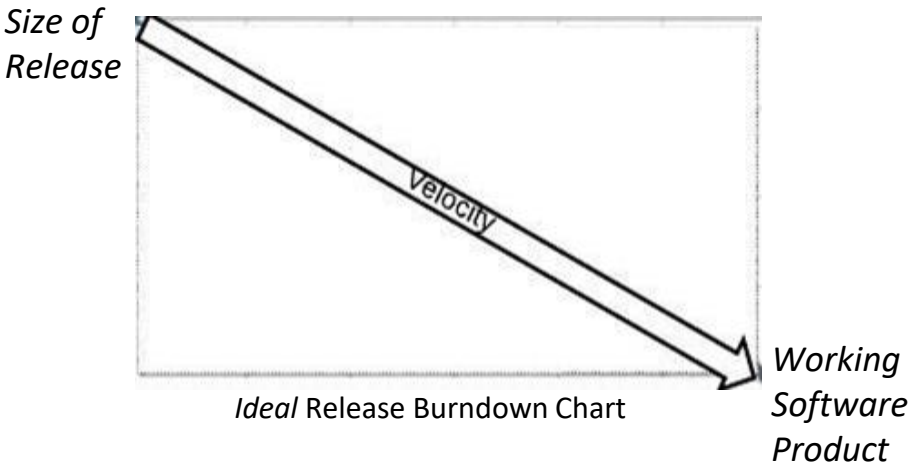
The groomed Product Backlog is estimated in Epic Story Points

- Cheap & quick estimation
- Low quality indicators
- Allow small & large value estimates, like 21 or 100

Find out how fast the Dev Team's can code software

- The coding speed is called Velocity
- It determines the Release schedule

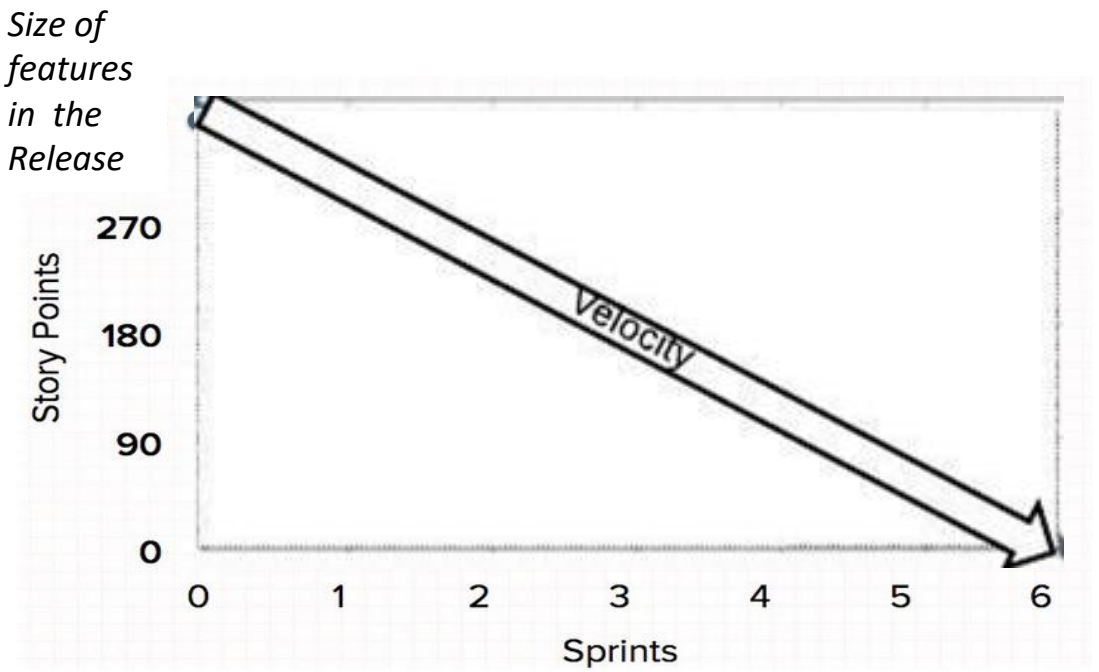




Release Burndown Chart

Project phase:
Initial
Sprint Planning

peek ahead to slide 24

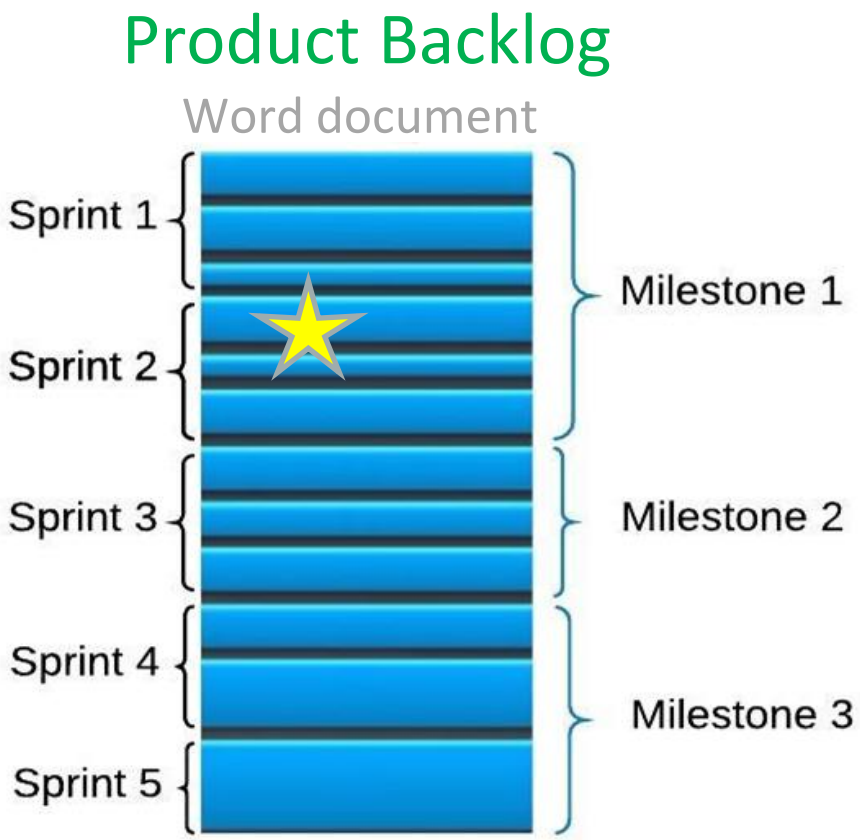


Ideal Release Burndown Chart

https://www.mountaingoatsoftware.com/agile/scrum/scrum-tools/release-burndown

Activity: Release Scope

Which artefact documents the product **requirements**?

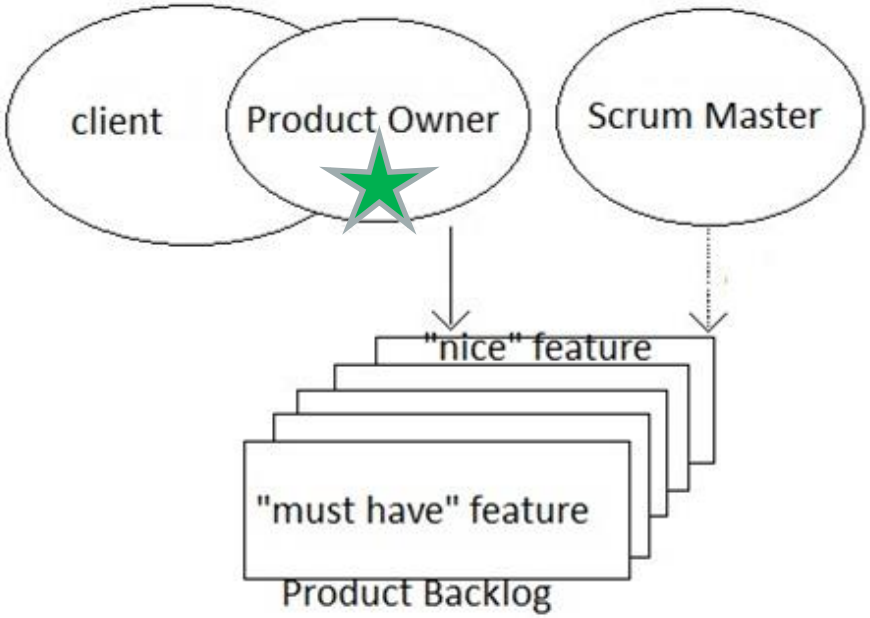


The requirements are expressed as a list of *epics* or *features* in the Product Backlog

Product Owner Role

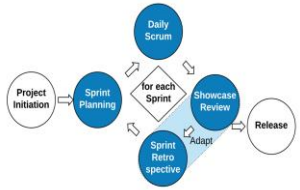
In a small start-up, the client and Product Owner may be the same person.

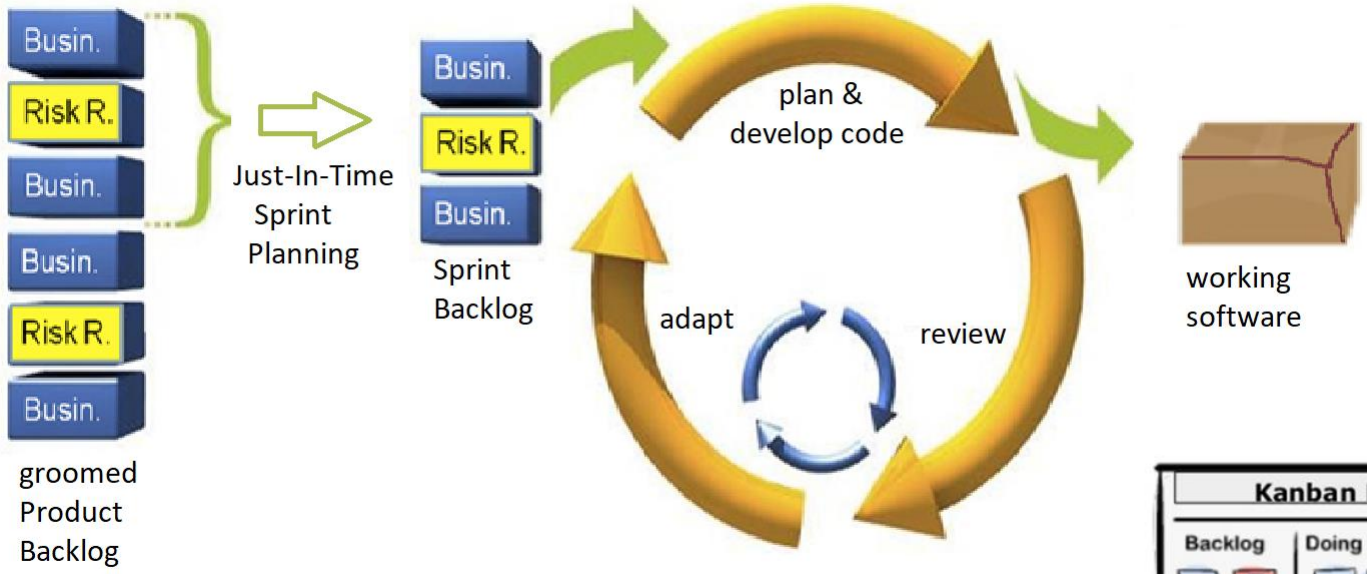
In a large corporation, the client may be an external VIP and not give time to the project
but delegate responsibility to the Product Owner.

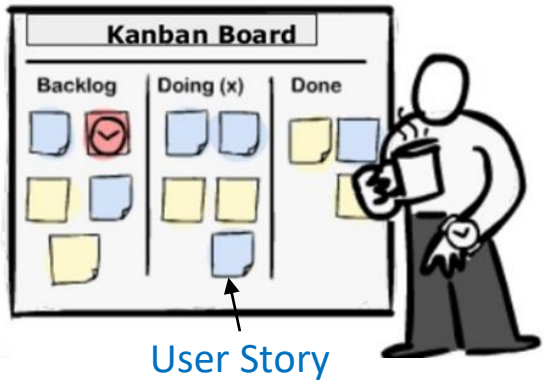


Agile PM - Sprint Planning

Project phase:
Sprint Planning







leadinganswers.typepad.com/leading_answers/2007/09/agile-risk-mana.html

Sprint Planning

Create Sprint Backlog

- Select high value User Stories from Product Backlog
- Use velocity to know appropriate number of Story Points

Decompose selected User Stories on Sprint Backlog

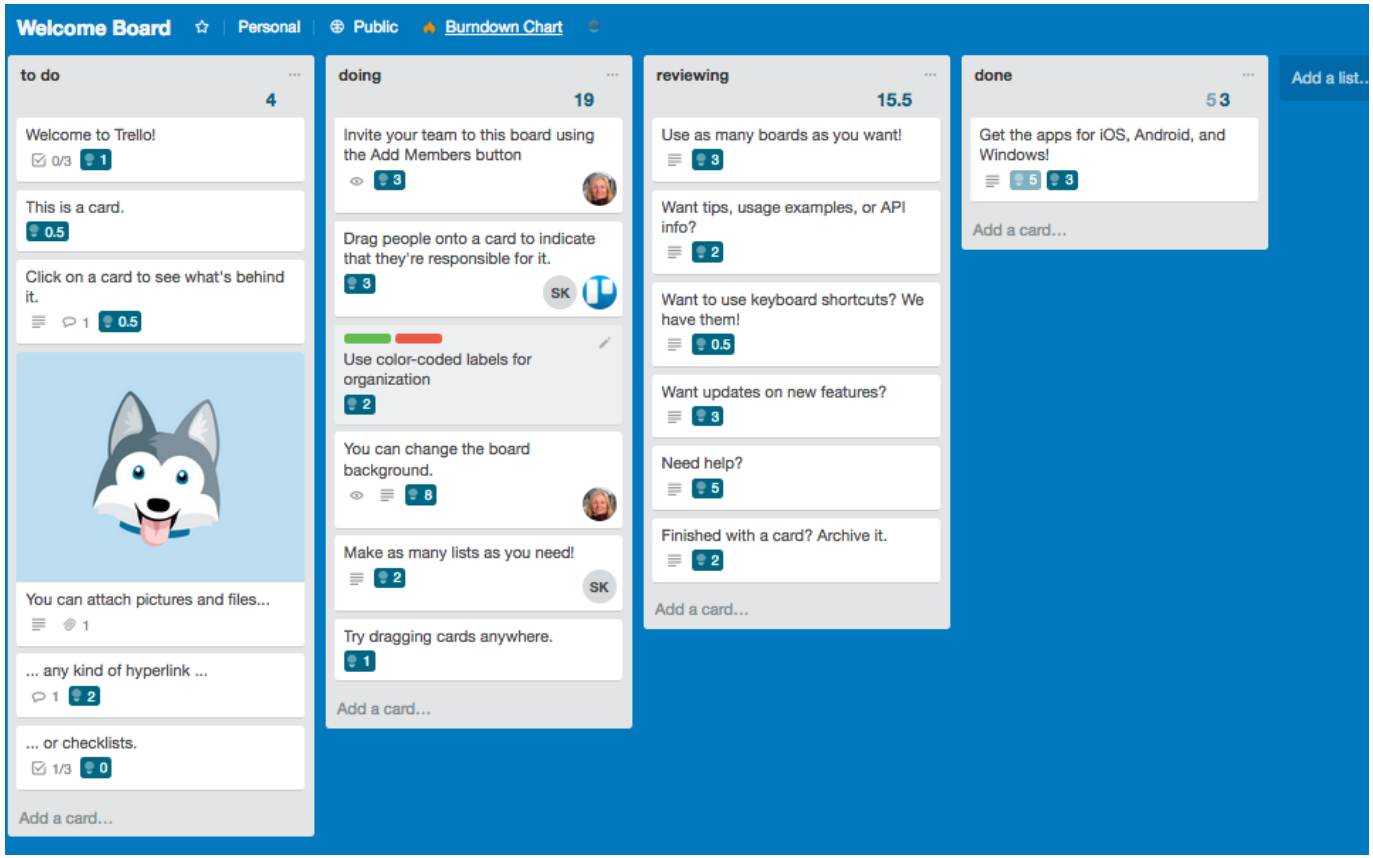
- Do ***Just-In-Time*** detailed estimation

- Check number of Story Points will still fit into Sprint
  - Detailed high-quality estimation
  - Estimates have smaller values, like 1 or 10 are valid

Humans have good judgement across one order of magnitude, but beyond that, humans are unreliable

Sprint Backlog

Trello tool implements a visual Swimlane Board.

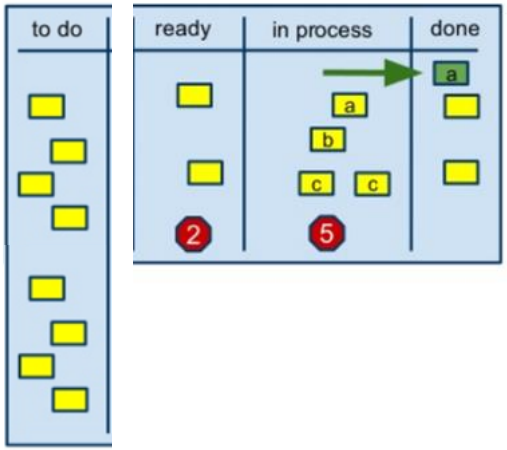


https://trello.com/b/pXMSk97J/welcome-board

Sprint Backlog Velocity

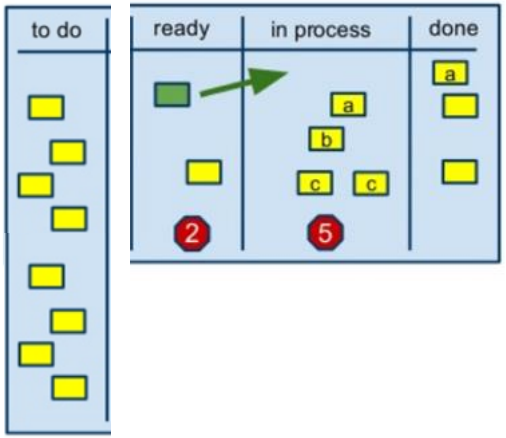
How many User Stories are *"done"* over the time-boxed Sprint?

- Only count 100% complete stories
- Reliably predict when the sprint goal will be reached



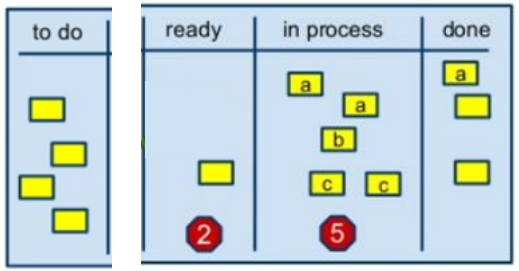
Team member A completes code for a card and moves it to "done"

Swimlane Board



Team member A "pulls" a new card from "ready" and moves it to "doing"

Sprint Backlog

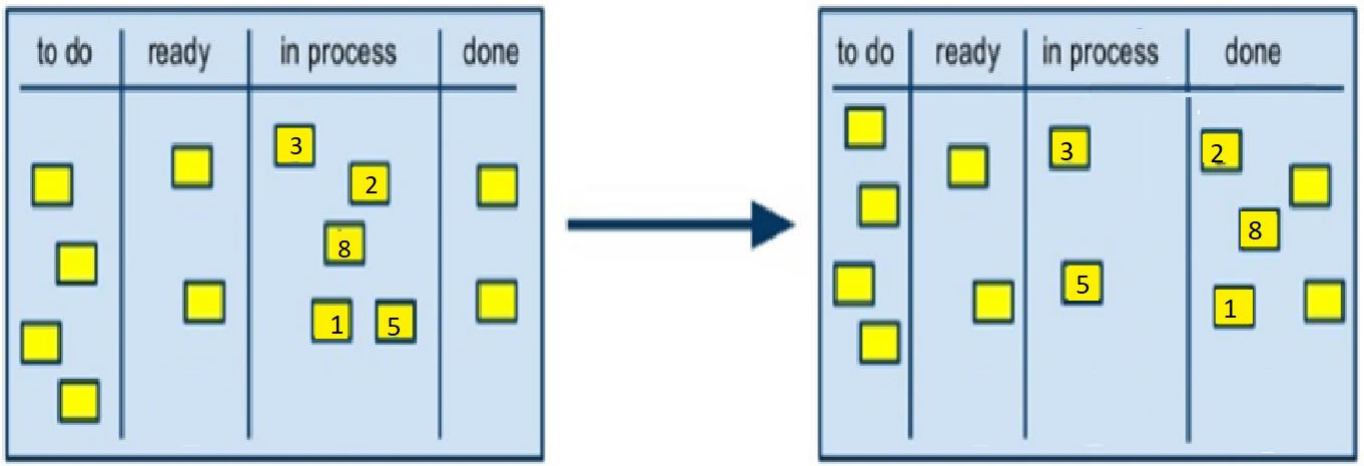


The Product Owner selects high priority cards for the Sprint Backlog, and adds detail to make them "ready"

Activity: Sprint Backlog Velocity

Velocity measures what the Dev Team has delivered.

What is the velocity of the Dev Team on day 7?



Swimlane Board – day 7

Swimlane Board – day 8

Day 7 velocity is 11 Story Points 100% done

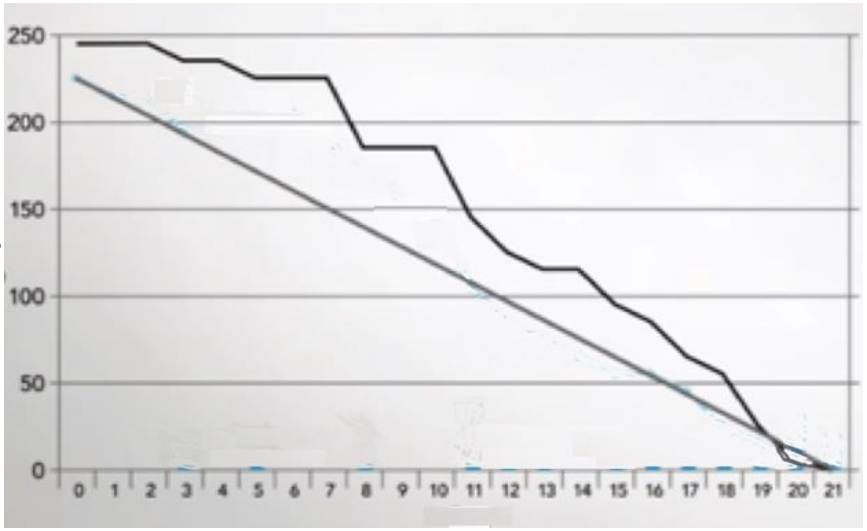
Burndown Chart

Sprint Burndown

Project phase: Sprint

- **monitor** velocity towards Sprint Goal
- Scrum Master updates **actual** Sprint Burndown chart after every Daily Standup

Sprint Burndown chart



- Ideal schedule is the straight line
- Actual schedule is the jagged line
- The height of the chart shows the amount of work remaining

Only ***"100% done"*** Story Points deliver business value items.

www.mountaingoatsoftware.com/blog/sprint-backlog-sums-all-work-remaining

Activity: Burn Down Chart

A project has this groomed **Product Backlog**, consisting of these **User Stories** which have been estimated to have these **Story Points**.

An established development team has an average ***velocity*** of **seven** User Story Points per fortnight.

Product Backlog	
User Story	Story Point
Story_1	3
Story_2	5
Story_3	13
Story_4	8
Story_5	1
Story_6	3
Story_7	2

1. Estimate how many weeks this team will take to deliver?

2. If the team actually completes the first two User Stories in two weeks, then what is the actual velocity of the team?

3. If a new User Story with Story Point=1 is added at the start of week 3, then in how many weeks do you estimate this project will take to be delivered now?

Calculations

Total = sum of SP / velocity per fortnight
= 35 total SP / 7 velocity
= 5 fortnights

8 SP per fortnight, 4 per week

Remaining = sum of SP / velocity per fortnight
= (1+ 27) / 8
= 3.5 fortnights
= 7 weeks

New Total = 7 + 2
= 9 weeks

Burn Down Chart: Activity

A project has this groomed **Product Backlog**, consisting of these **User Stories** which have been estimated to have these **Story Points**.

An established development team has an average ***velocity*** of **seven** User Story Points per fortnight.

Product Backlog	
User Story	Story Point
Story_1	3
Story_2	5
Story_3	13
Story_4	8
Story_5	1
Story_6	3
Story_7	2

4. Will User_Story_3 fit into a single sprint?

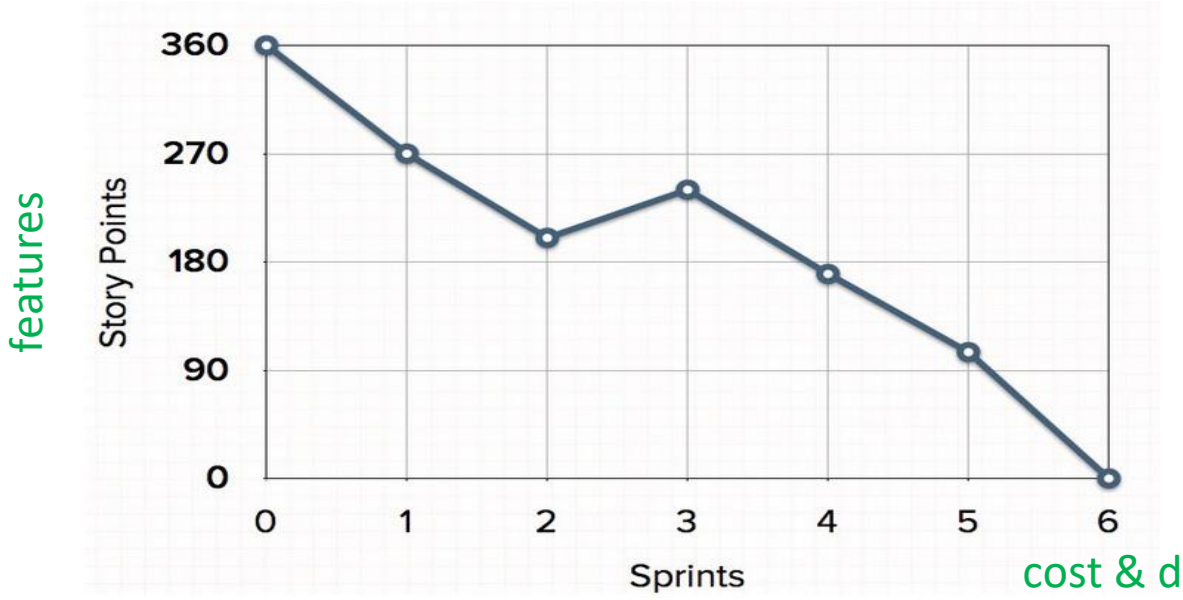
5. What process does Scrum have for completing User_Story_3 ?

Burndown Chart

Actual Release Burndown

Project phase: Adapt

- **monitor** velocity towards Release
- Scrum Master updates **actual** Release Burndown chart after every Review



monitor the product progress

https://www.mountaingoatsoftware.com/agile/scrum/scrum-tools/release-burndown

Activity: Burndown Chart

During Project Initialization phase for Product-X, a Scrum Dev Team has estimated 360 Story Points for the feature-level User Stories on the Product Backlog.

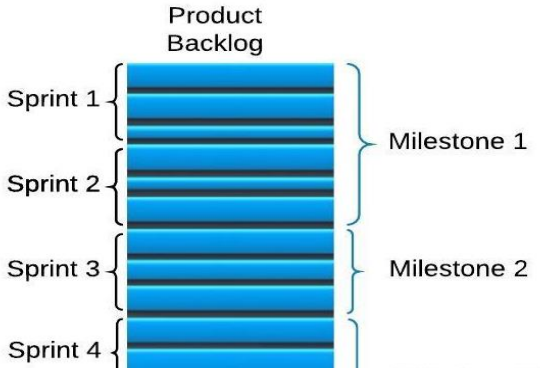
The client would like to release the envisioned product in the next 18 weeks.

The Scrum Dev Team estimate their velocity as 50 Story Points per 3-week Sprint.

What activities does the Product Owner do to schedule the envisioned product?

18 weeks = 6 sprints
estimated velocity = 50 SP per Sprint
6 sprints * 50 Story Points = 300 Story Points

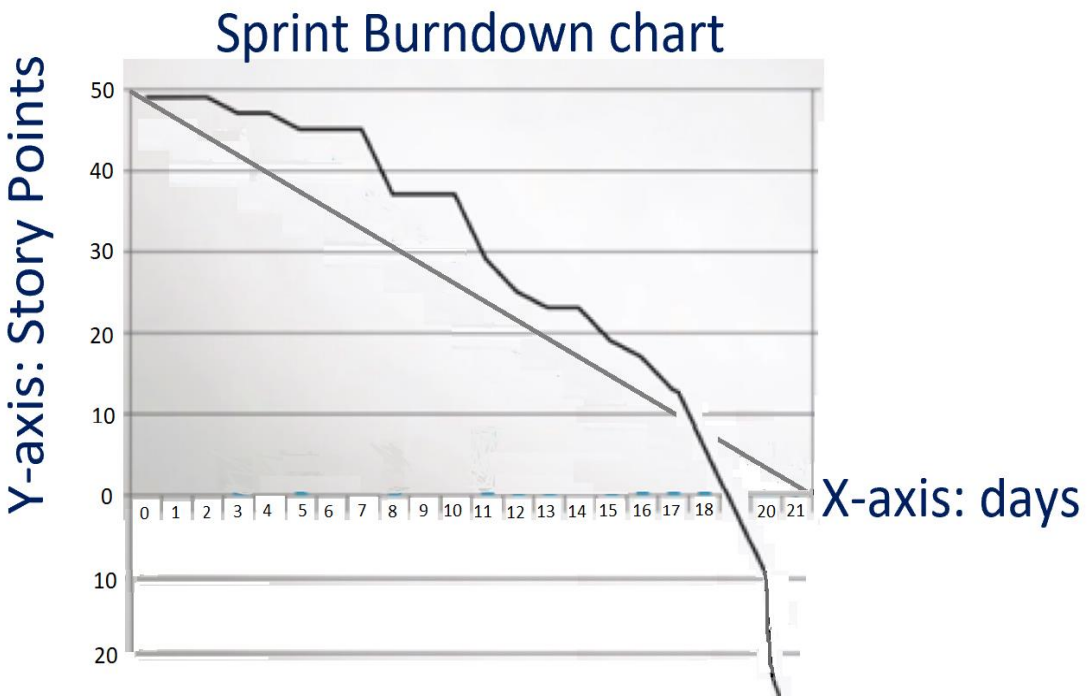
Groom the Product Backlog with the high priority User Stories at the top of the list.
De-prioritize bottom of list 60 Story Points worth of User Stories
Product envisioned with only 300 SP



Activity

Sprint 1 of Product-X has the following Sprint Burndown chart.

Describe the status of this Sprint



Initial User Stories took Dev Team 2 days to complete, so flat line is expected
Velocity was slow during first half of Sprint but increased towards the end
Dev Team completed more Story Points than expected velocity prediction

Activity

Product-X has the following Product Burndown chart.

1. What is the actual velocity of Sprint 1?

Sprint 1 = 75 SP => 225 SP remaining
actual velocity = 75 SP per Sprint, 50% faster
Scrum Master schedules remaining Sprints
using actual velocity

2. What could explain what happened during Sprint 3?

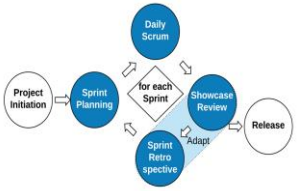
Sprint 2= 60 SP => 150 SP remaining
Sprint 3= -70 SP => 220 SP remaining
Scope creep: new feature emerged & added to Product Backlog by Product Owner, or
Sudden pivot into new direction to capture transient market opportunity
Some original User Stories were misunderstood during Project Initialization
Productivity decline, (sickness, Xmas party, …)
Sprint 4= 70 SP=> 150 SP remaining
Sprint 5= 75 SP => 75 SP remaining
Sprint 6= 75 SP => 0 remaining, project is all done

done scheduling and cost estimation ☺ !

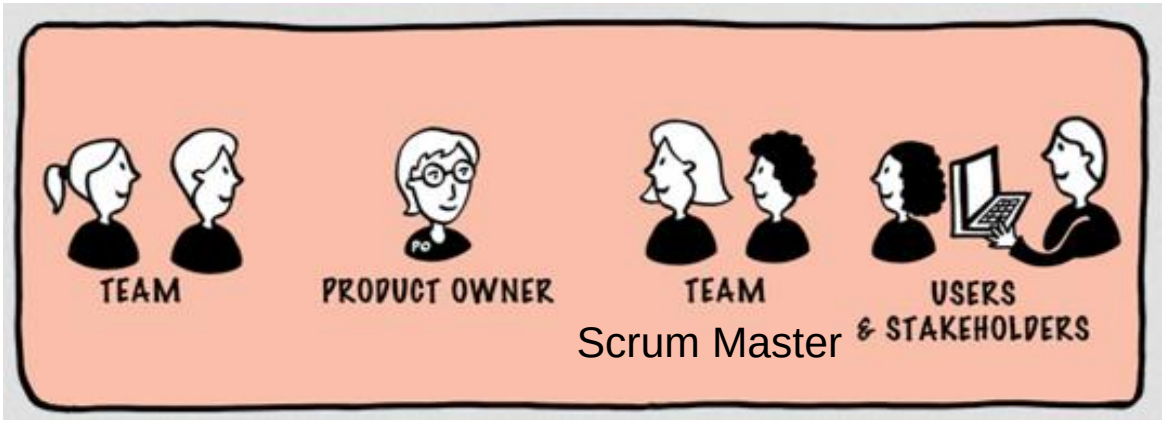
Agile PM – Adapt

Project phase: Adapt

Inspect and adapt the product



Who is invited to the end of **Sprint Review**?

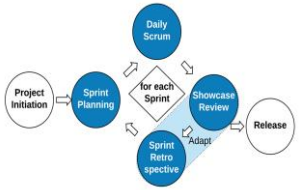


A showcase for a big audience

Agile PM – Adapt

Project phase: Adapt

Inspect and adapt the team

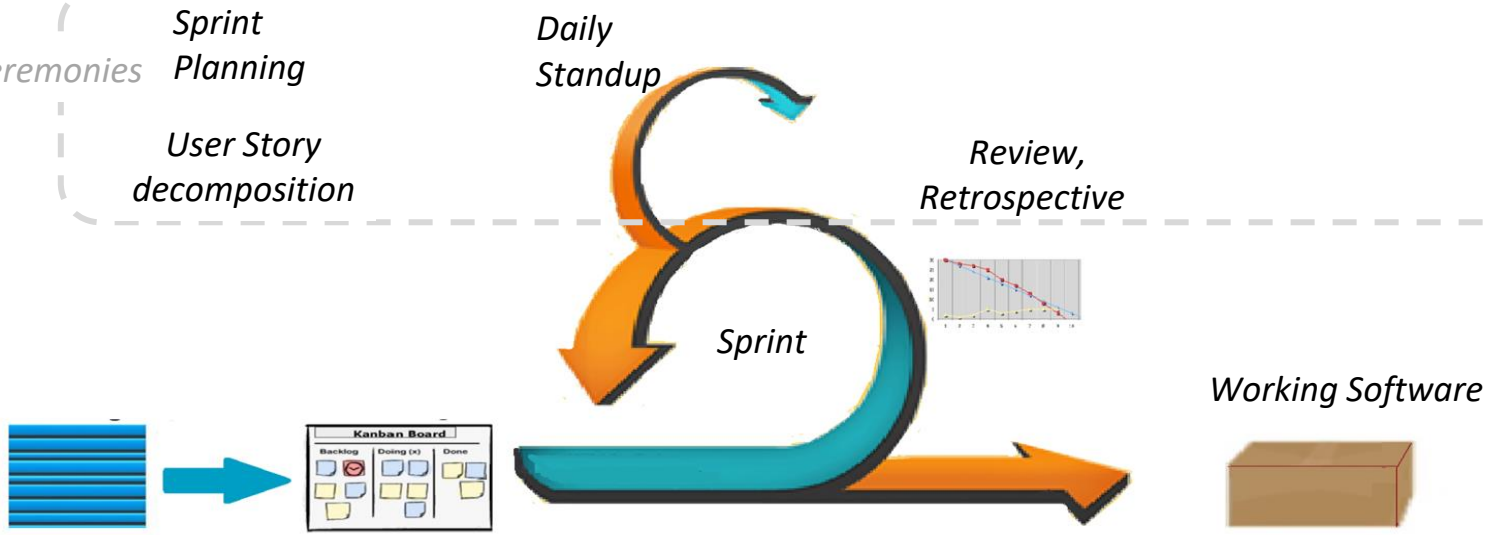


Who is invited to the end of **Sprint Retrospective**?

Reflection, without management overview

- The team includes the Scrum Master
- Product Owner is often invited.

Scrum Overview Summary

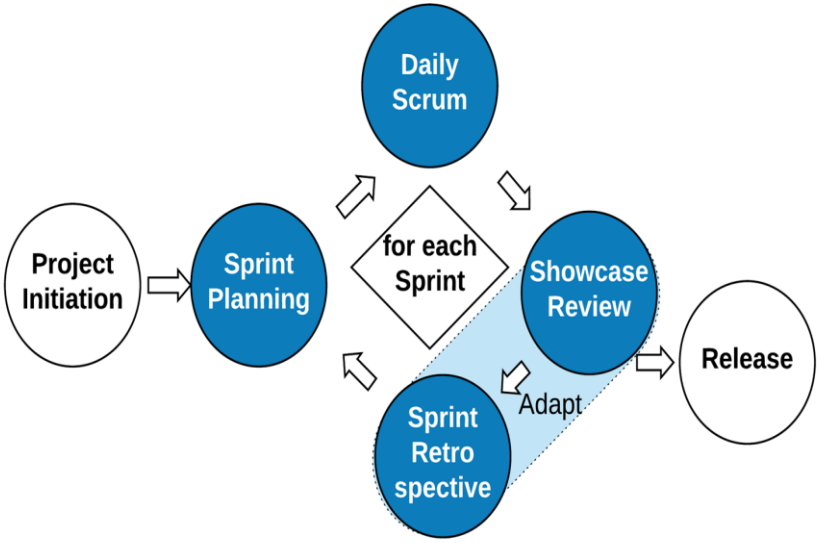


Thank You!

Software Project Management

Agile Scrum PM Stages:

- Initiate
- Sprint Plan
- Scrum (or Sprint)
- Review & Retrospective (or Adapt)
- Release



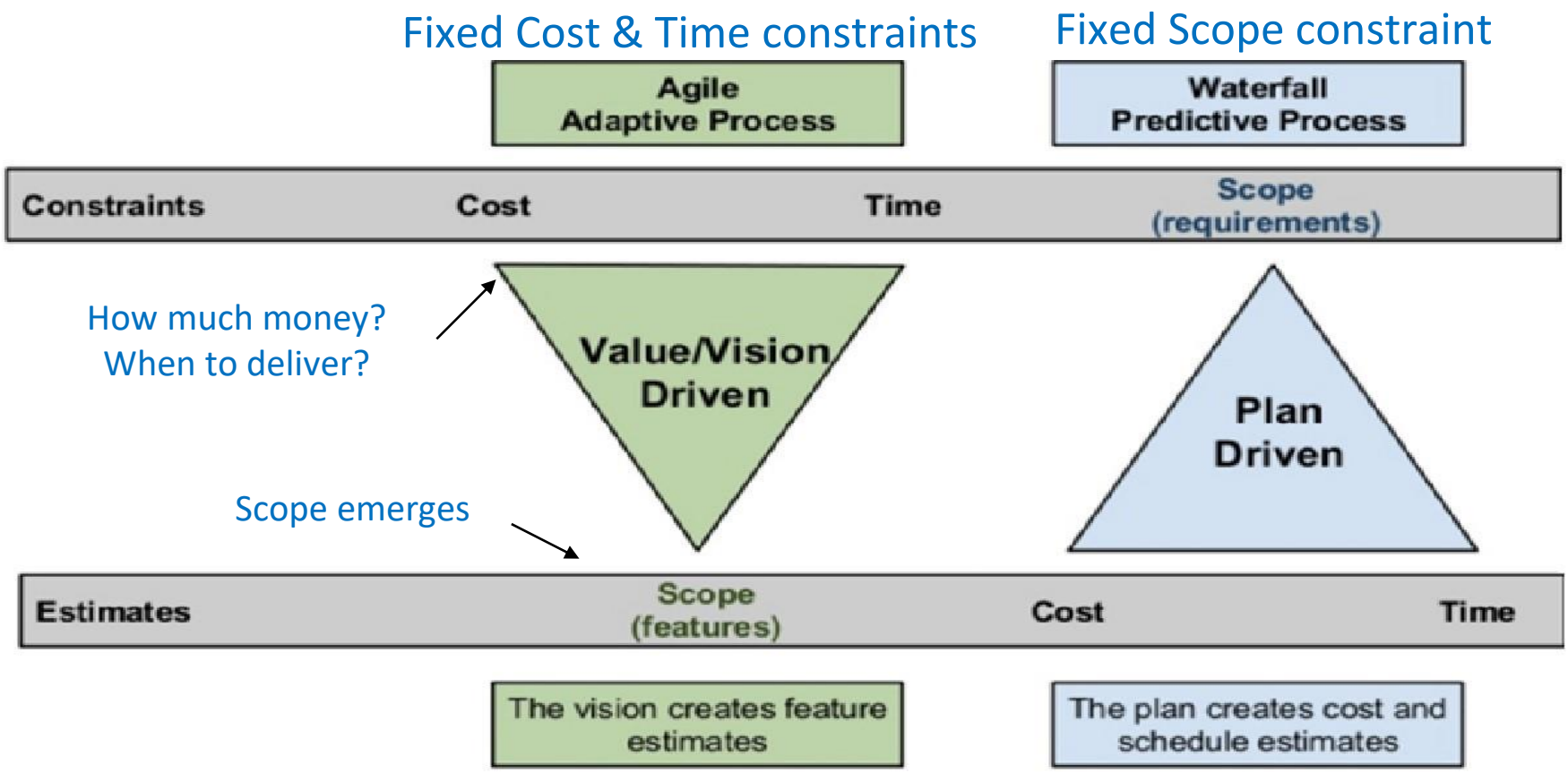
Formal PM Stages:

- Initiate
- Plan
- Execute
- Monitor & Control
- Close

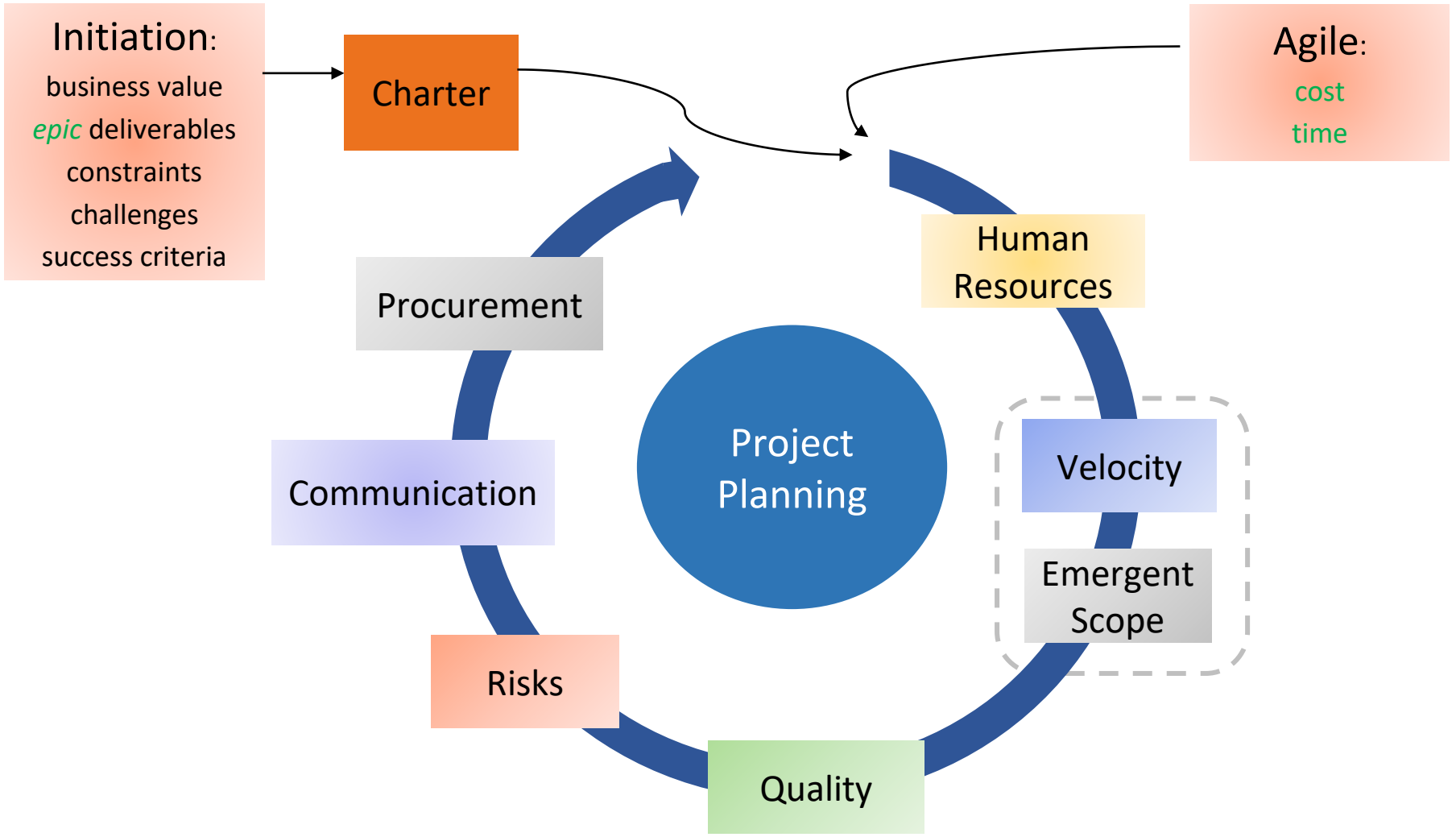
PMBOK PMI

Project Constraints

Know your projects constraints

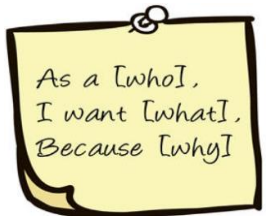


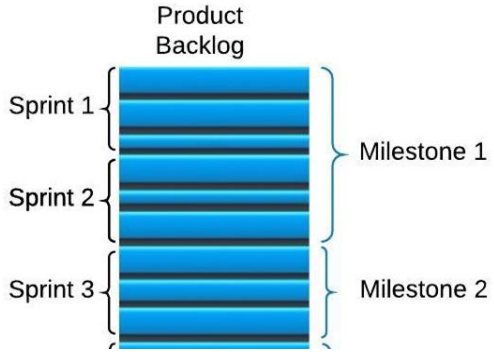
Project Planning Phase Activities

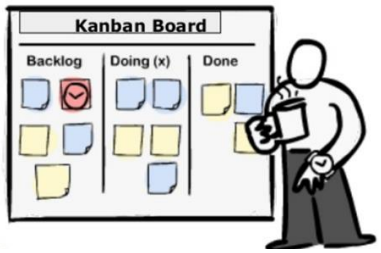


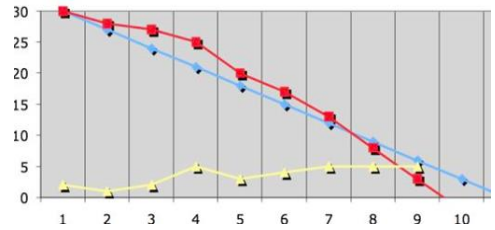
Scrum Artifacts Overview

- User Stories
  - *As a <user>, I want < goal> so that < reason>.*
- Product Backlog
  - Features listed in client priority order
  - Release milestones annotated to list
- Sprint Backlog
  - Features selected for this iteration
  - Visual Kanban board
- Burn Down Chart
  - Measure the features **100% done**



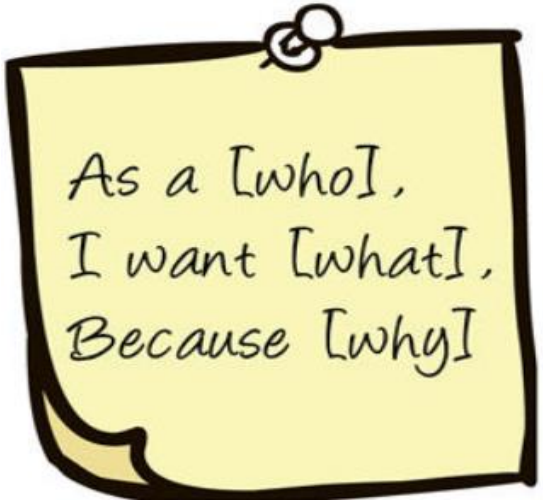






Requirement Artefact

How are requirement expressed in Agile?



As a **Feature** User Story

As a <online fashion shopper>,

- I want <the browser to display pictures of each item before I click on it>
- because <pictures make it are easy for me to decide>

The format of a User Story follows a pattern

The Product & Sprint Backlogs contain User Story artefacts