

SOFTWARE ENGINEERING

Week 3

Agile Software Development – Part 2
(SCRUM)

Course ID 06016410,
06016321

Nont Kanungsukkasem, B.Eng., M.Sc., Ph.D.
nont@it.kmitl.ac.th

Scrum

2



History

3

<https://www.scruminc.com/takeuchi-and-nonaka-roots-of-scrum/>

- (1986) **Scrum** in “The New New Product Development Game” by Hirotaka Takeuchi and Ikujiro Nonaka describes the **product** development process.
 - <https://hbr.org/1986/01/the-new-new-product-development-game>
- (1995) **Scrum** proposed by Ken Schwaber and Jeff Sutherland is a process for **software** development.

Definition

4

<https://www.scrum.org/pathway/scrum-master>

- Scrum is a lightweight framework that helps people, teams and organizations generate value through adaptive solutions for complex problems.
- In a nutshell, Scrum requires a **Scrum Master** to foster an environment where:
 1. A **Product Owner** orders the work for a complex problem into a **Product Backlog**.
 2. The **Scrum Team** turns a selection of the work into an **Increment** of value during a **Sprint**.
 3. The **Scrum Team** and its stakeholders **inspect** the results and **adjust** for the next Sprint.
 4. Repeat

Scrum

5

- Scrum Pillars
 - Transparency
 - Inspection
 - Adaptation

- Scrum Team
 - Developers
 - Product Owner
 - Scrum Master

- Scrum Values
 - Commitment
 - Focus
 - Openness
 - Respect
 - Courage

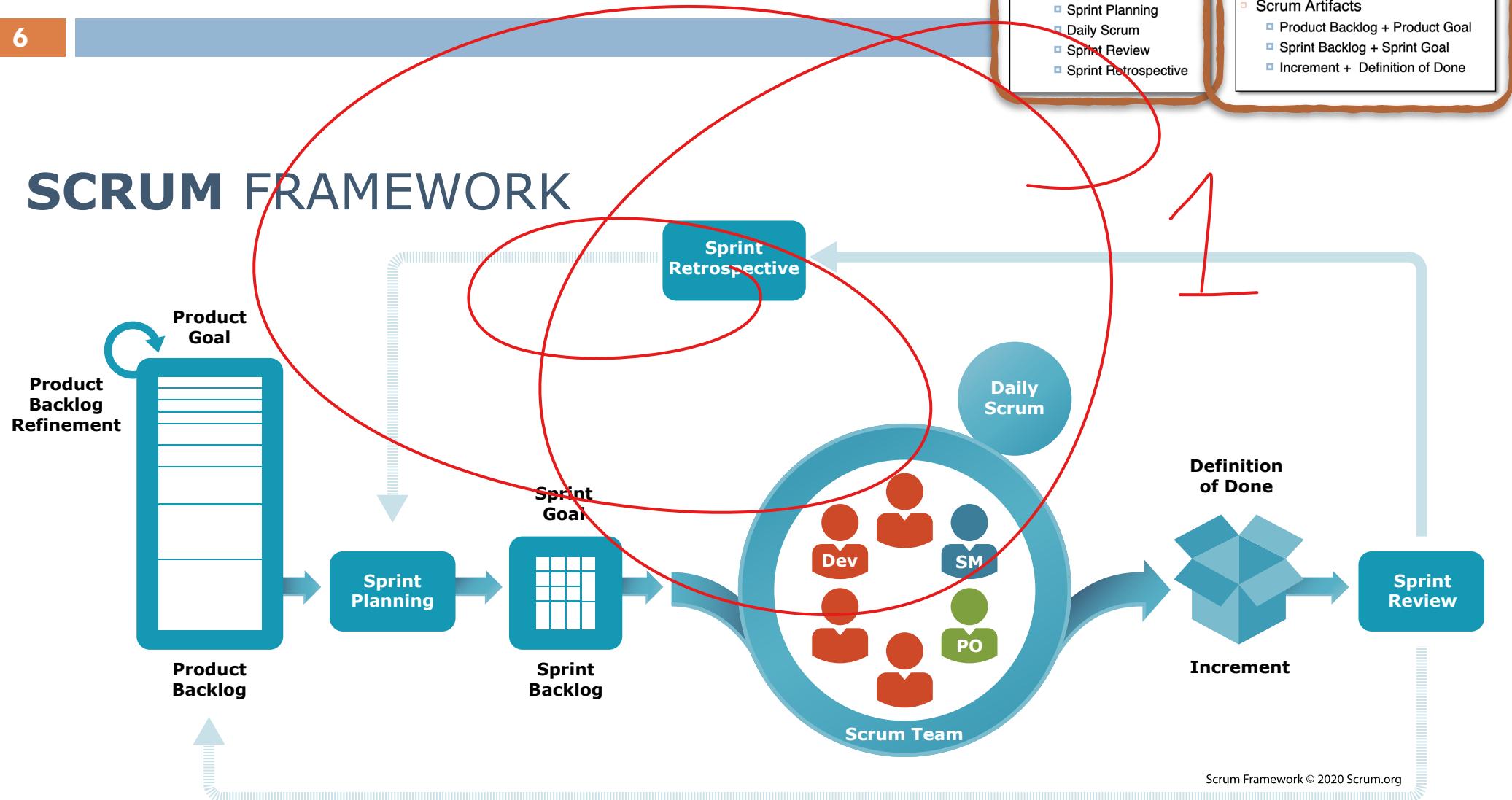
- Scrum Events
 - The Sprint
 - Sprint Planning
 - Daily Scrum
 - Sprint Review
 - Sprint Retrospective

- Scrum Artifacts
 - Product Backlog + Product Goal
 - Sprint Backlog + Sprint Goal
 - Increment + Definition of Done

Scrum Framework

6

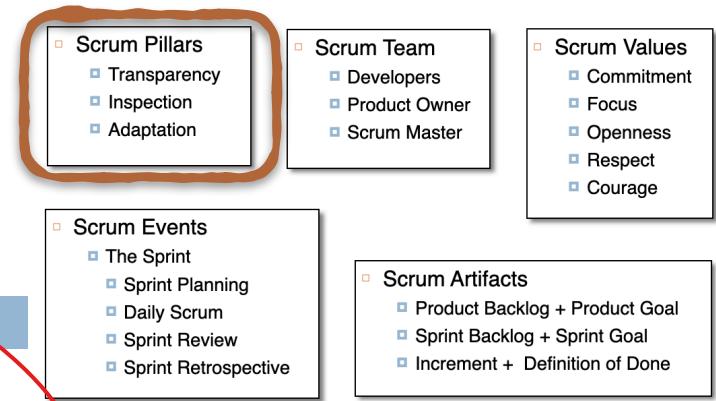
SCRUM FRAMEWORK



Scrum Framework © 2020 Scrum.org

Scrum Theory

7



- Scrum is founded on **empiricism** and lean thinking
- Scrum employs an iterative, incremental approach
- Scrum combines four formal **events** for **inspection** and **adaptation** within a containing event, the Sprint.
- These events work because they implement the empirical Scrum **pillars**

Scrum Theory

8

- Scrum Pillars
 - Transparency
 - Inspection
 - Adaptation

- Scrum Team
 - Developers
 - Product Owner
 - Scrum Master

- Scrum Values
 - Commitment
 - Focus
 - Openness
 - Respect
 - Courage

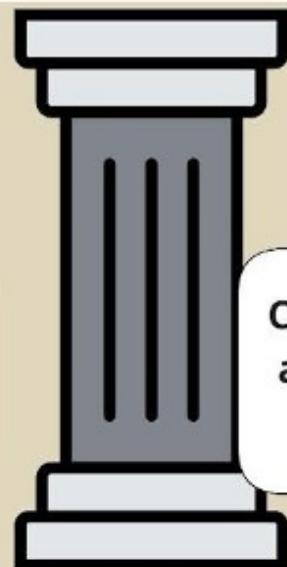
- Scrum Events
 - The Sprint
 - Sprint Planning
 - Daily Scrum
 - Sprint Review
 - Sprint Retrospective

- Scrum Artifacts
 - Product Backlog + Product Goal
 - Sprint Backlog + Sprint Goal
 - Increment + Definition of Done

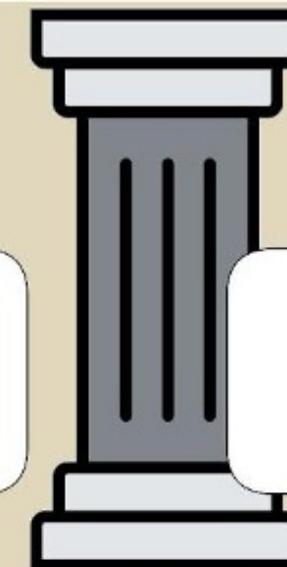
Scrum - Empiricism



Transparency



Inspection



Adaptation

Scrum Values

9



▫ Scrum Pillars
▫ Transparency
▫ Inspection
▫ Adaptation

▫ Scrum Team
▫ Developers
▫ Product Owner
▫ Scrum Master

▫ Scrum Values
▫ Commitment
▫ Focus
▫ Openness
▫ Respect
▫ Courage

▫ Scrum Events
▫ The Sprint
▫ Sprint Planning
▫ Daily Scrum
▫ Sprint Review
▫ Sprint Retrospective

▫ Scrum Artifacts
▫ Product Backlog + Product Goal
▫ Sprint Backlog + Sprint Goal
▫ Increment + Definition of Done

COURAGE

Scrum Team members have courage to do the right thing and work on tough problems



FOCUS

Everyone focuses on the work of the Sprint and the goals of the Scrum Team



COMMITMENT

People personally commit to achieving the goals of the Scrum Team



RESPECT

Scrum Team members respect each other to be capable, independent people



OPENNESS

The Scrum Team and its stakeholders agree to be open about all the work and the challenges with performing the work



Scrum Team

10



Product Owner

"The Transmitter"



As the liaison between key stakeholders, the ScrumMaster and thereby the Scrum Team, the PO determines the highest priority projects and sets expectations to ensure the highest value.



ScrumMaster

"The Translator"

The key advocate and servant leader for their Scrum Team — and the lead communicator with the Product Owner — the ScrumMaster keeps Scrum/Agile artifacts and ceremonies consistent to drive the proper application of the framework.



Development Team

"The Specialists"



Naturally self-organizing and capable of cross-functional completion of work based on the guidance of the ScrumMaster and Product Owner, the Development Team is the irreplaceable component of delivering high value products for their organization.

- Scrum Pillars
 - Transparency
 - Inspection
 - Adaptation

- Scrum Team
 - Developers
 - Product Owner
 - Scrum Master

- Scrum Values
 - Commitment
 - Focus
 - Openness
 - Respect
 - Courage

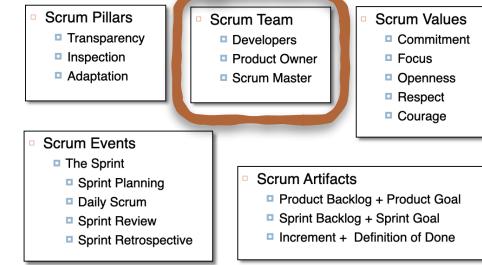
Scrum Events

- The Sprint
 - Sprint Planning
 - Daily Scrum
 - Sprint Review
 - Sprint Retrospective

Scrum Artifacts

- Product Backlog + Product Goal
- Sprint Backlog + Sprint Goal
- Increment + Definition of Done

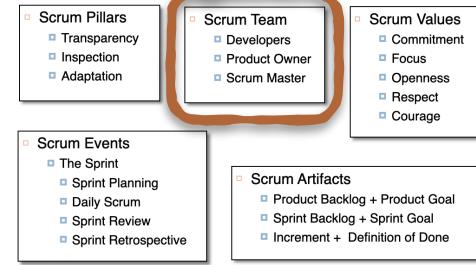
Team: Developers



11

- Developers are the people in the Scrum Team that are committed to creating any aspect of a usable Increment each Sprint.
- Developers are accountable for:
 - Creating a plan for the Sprint, the Sprint Backlog
 - Instilling quality by adhering to a Definition of Done
 - Adapting their plan each day toward the Sprint Goal
 - Holding each other accountable as professionals

Team: Product Owner

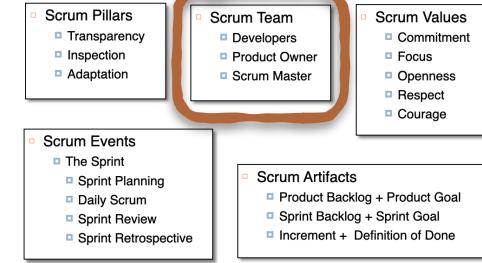


12

- The Product Owner is accountable for maximizing the value of the product resulting from the work of the Scrum Team.
- The Product Owner is also accountable for effective Product Backlog management, which includes:
 - Developing and explicitly communicating the Product Goal
 - Creating and clearly communicating Product Backlog items
 - Ordering Product Backlog items
 - Ensuring that the Product Backlog is transparent, visible and understood

Team: Scrum Master

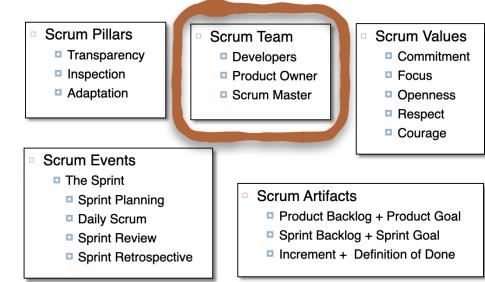
13



- The Scrum Master is accountable for establishing Scrum and the Scrum Team's effectiveness.
- The Scrum Master serves the Scrum Team in several ways, including:
 - Coaching the team members in self-management and cross-functionality
 - Helping the Scrum Team focus on creating high-value Increments that meet the Definition of Done
 - Ensuring that all Scrum events take place and are positive, productive, and kept within the timebox

Team: Scrum Master

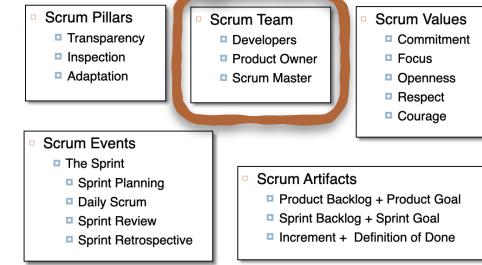
14



- The Scrum Master serves the Product Owner in several ways, including:
 - Helping find techniques for effective Product Goal definition and Product Backlog management
 - Helping the Scrum Team understand the need for clear and concise Product Backlog items
 - Helping establish empirical product planning for a complex environment
 - Facilitating stakeholder collaboration as requested or needed

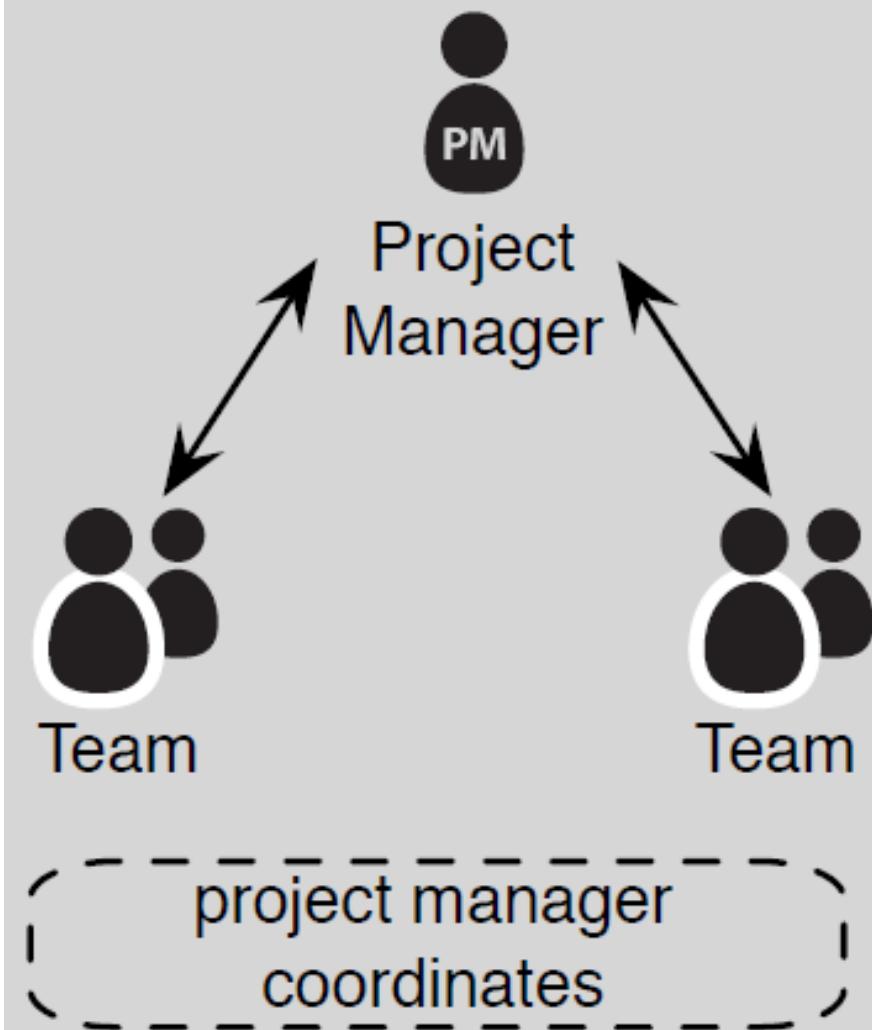
Team: Scrum Master

15

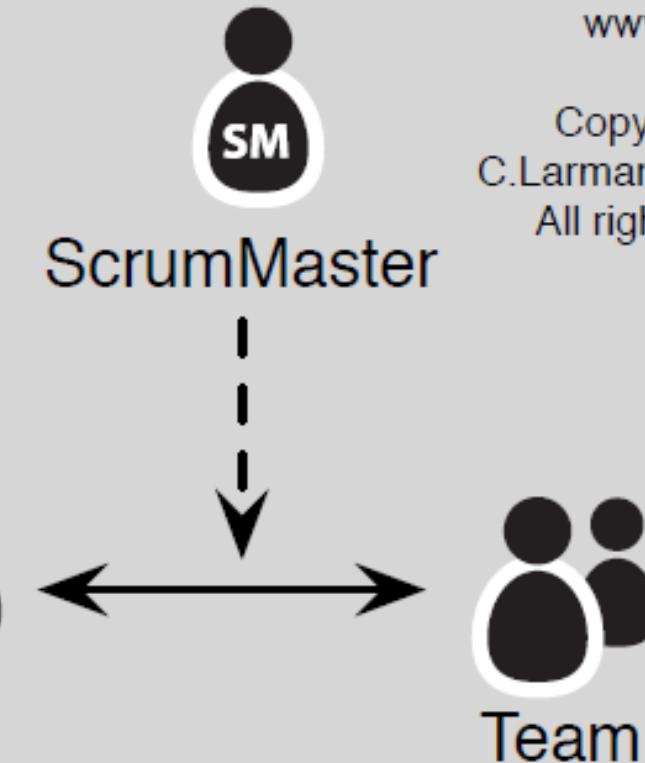


- The Scrum Master serves the organization in several ways, including:
 - Leading, training, and coaching the organization in its Scrum adoption
 - Planning and advising Scrum implementations within the organization
 - Helping employees and stakeholders understand and enact an empirical approach for complex work
 - Removing barriers between stakeholders and Scrum Teams

Team coordination



~~Command and Control~~



Ritual of Appreciations among and within Team and Stakeholder

www.craiglarman.com
www.odd-e.com

Copyright © 2010
C.Larman & B. Vodde
All rights reserved.

Traditional managers



- Tell people what to do and then make sure they do it properly
- Maintain the right to authorize decision
- Limit the information or resources available to them

The change from traditional manager
to ScrumMaster is very hard!

Old habits die hard.

Scrum Events

18

- Scrum Pillars
 - Transparency
 - Inspection
 - Adaptation

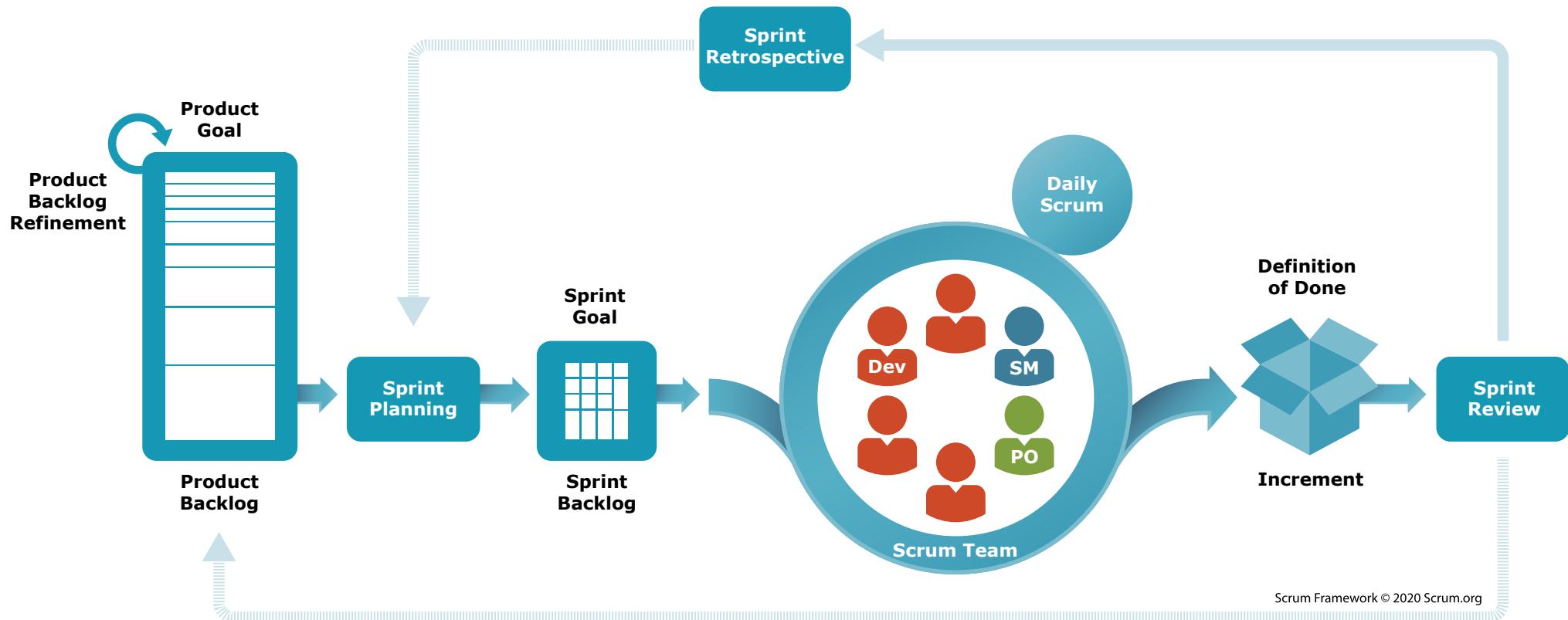
- Scrum Team
 - Developers
 - Product Owner
 - Scrum Master

- Scrum Values
 - Commitment
 - Focus
 - Openness
 - Respect
 - Courage

- Scrum Events
 - The Sprint
 - Sprint Planning
 - Daily Scrum
 - Sprint Review
 - Sprint Retrospective

- Scrum Artifacts
 - Product Backlog + Product Goal
 - Sprint Backlog + Sprint Goal
 - Increment + Definition of Done

SCRUM FRAMEWORK



Scrum Events

Math in mind

19

<https://www.scrum.org/resources/introduction-scrum-events>

- The Sprint = 1 month or less

Scrum Pillars

- Transparency
- Inspection
- Adaptation

Scrum Team

- Developers
- Product Owner
- Scrum Master

Scrum Values

- Commitment
- Focus
- Openness
- Respect
- Courage

Scrum Events

- The Sprint
 - Sprint Planning
 - Daily Scrum
 - Sprint Review
 - Sprint Retrospective

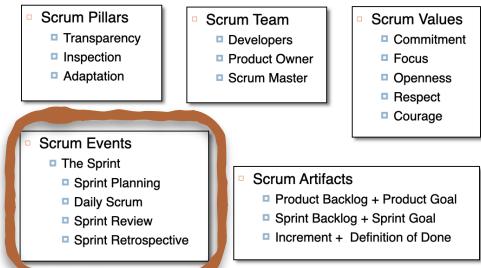
Scrum Artifacts

- Product Backlog + Product Goal
- Sprint Backlog + Sprint Goal
- Increment + Definition of Done

| Event | Inspection | Adaptation | Participants | Timebox |
|-----------------------------|--|---|-----------------------------|------------------------------------|
| <u>Sprint Planning</u> | Product Backlog, Product Goal, Definition of Done | Sprint Backlog, Sprint Goal | Scrum Team | 8 hours for a 1 month Sprint |
| <u>Daily Scrum</u> | Progress toward Sprint Goal | Sprint Backlog | Developers | 15 minutes |
| <u>Sprint Review</u> | Increment, Sprint, Product Backlog, Progress toward Product Goal | Product Backlog | Scrum Team, Stakeholders | 4 hours for a 1 month Sprint |
| <u>Sprint Retrospective</u> | Sprint, Definition of Done | Actionable improvements, Definition of Done | Scrum Team | 3 hours for a 1 month Sprint |

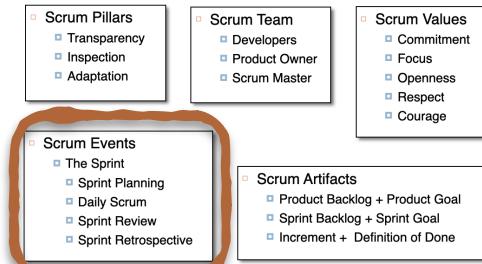
Event: The Sprint

20



- Sprints are the heartbeat of Scrum, where ideas are turned into value.
- They are fixed length events of one month or less to create consistency.
- A new Sprint starts immediately after the conclusion of the previous Sprint.
- During the Sprint:
 - No changes are made that would endanger the Sprint Goal
 - Quality does not decrease
 - The Product Backlog is refined as needed
 - Scope may be clarified and renegotiated with the Product Owner as more is learned
- Only the Product Owner has the authority to cancel the Sprint.

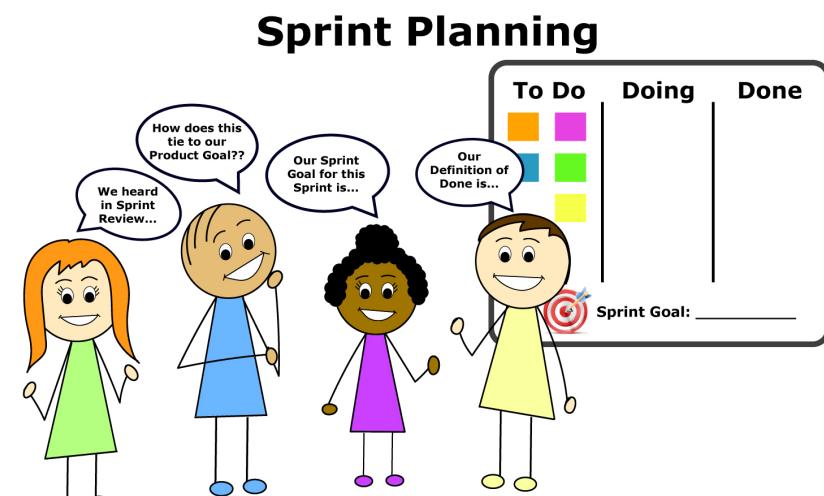
Event: Sprint Planning



21

<https://www.scrum.org/learning-series/sprint-planning/introduction-to-sprint-planning->

- Sprint Planning initiates the Sprint by laying out the work to be performed for the Sprint.
- This resulting plan is created by the collaborative work of the entire Scrum Team.
- The Product Owner ensures that attendees are prepared to discuss the most important Product Backlog items and how they map to the Product Goal.
- Sprint Planning addresses the following topics:
 - Why is this Sprint valuable?
 - What can be Done this Sprint?
 - How will the chosen work get done?



Sprint Planning: Antipatterns

22

<https://www.scrum.org/learning-series/sprint-planning/making-your-sprint-planning-events-more-effective>

- Participants not fulfilling their accountabilities correctly:
 - Unavailable Product Owner
 - PBIs and Sprint Goal are selected by the Product Owner with no conversation about the value of the work
 - Only the team lead or a trusted, “core” team provides estimates.
 - Pulling in too much work or Product Owner tells the Developers what work to pull into the Sprint

Sprint Planning: Antipatterns

23

<https://www.scrum.org/learning-series/sprint-planning/making-your-sprint-planning-events-more-effective>

- Backlog or Participants are Not Prepared for the Event:
 - Lack of Product Backlog Refinement
 - Ambiguous Requirements
 - Having undone work at the end of a Sprint
 - Work is broken down and estimated in this event
 - Sprint Planning takes too long

Sprint Planning: Antipatterns

24

<https://www.scrum.org/learning-series/sprint-planning/making-your-sprint-planning-events-more-effective>

- Purpose of the Event not fulfilled:
 - Erroneous Forecasts
 - No Shared Commitment or Unclear Sprint Goal
 - Team talks more about velocity than value
 - Testing is not complete by the end of the Sprint
 - Teams don't start work on the selected PBIs until all the work for the Sprint is defined

Sprint Planning: Tips

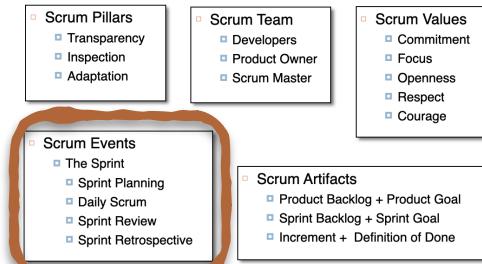
25

<https://www.scrum.org/learning-series/sprint-planning/making-your-sprint-planning-events-more-effective>

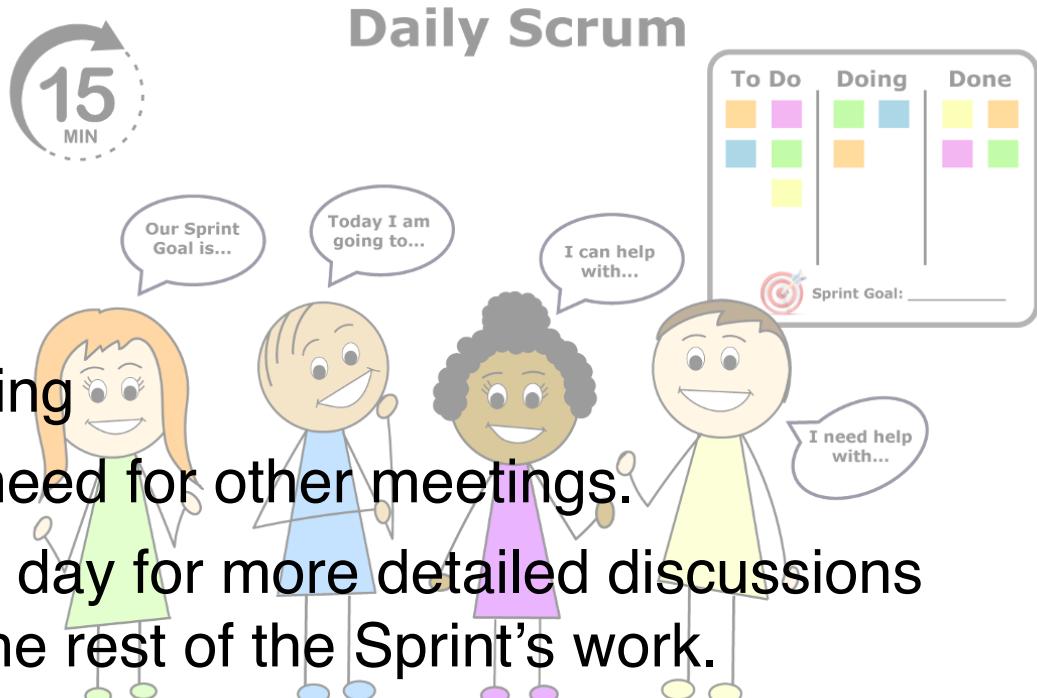
- Developers ask questions until it is clear how each PBI creates value or is useful to the customer
- Developers ask questions until they have a good sense of how they will implement the PBIs
- Scrum Teams collaborate on solving problems together
- Scrum Teams use metrics as criteria for selecting the amount of work selected for the Sprint
- Scrum Teams understand all the work needed to create an Increment that adheres to their Definition of Done and uses this understanding to help them with capacity
- Scrum Teams devise strategies that enable multiple team members to focus on a PBI
- Scrum Teams focus on strategies that enable the lean principle of “just enough”
- Scrum Teams add improvement items to the Sprint that were uncovered by a previous Sprint Retrospective

Event: Daily Scrum

26



- The purpose of the Daily Scrum is to inspect progress toward the Sprint Goal and adapt the Sprint Backlog as necessary, adjusting the upcoming planned work.
- The Daily Scrum is a 15-minute event for the Developers of the Scrum Team
- Daily Scrums
 - improve communications
 - identify impediments
 - promote quick decision-making
 - consequently eliminate the need for other meetings.
- They often meet throughout the day for more detailed discussions about adapting or re-planning the rest of the Sprint's work.



DAILY STAND-UP MEETING



Time Box (15 min)



Same place



Same time



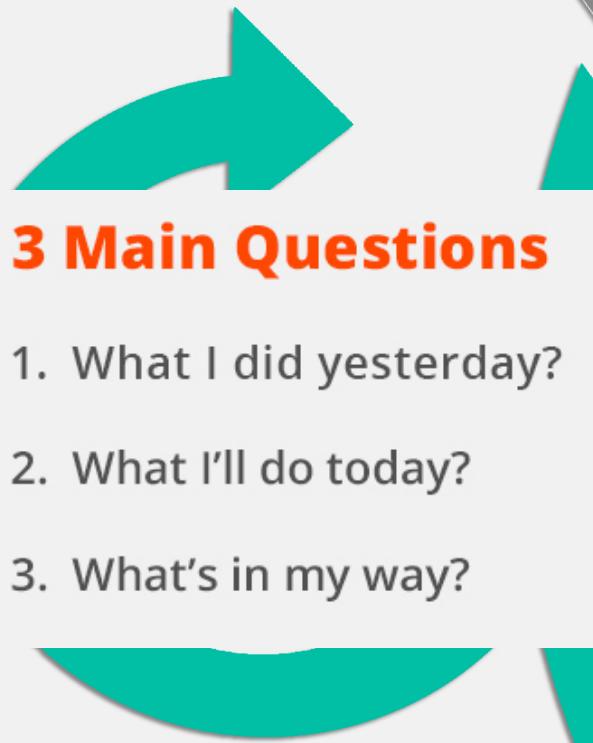
Facilitated by Scrum Master



Full team presence



Focus upon 3 questions



จุดประสงค์

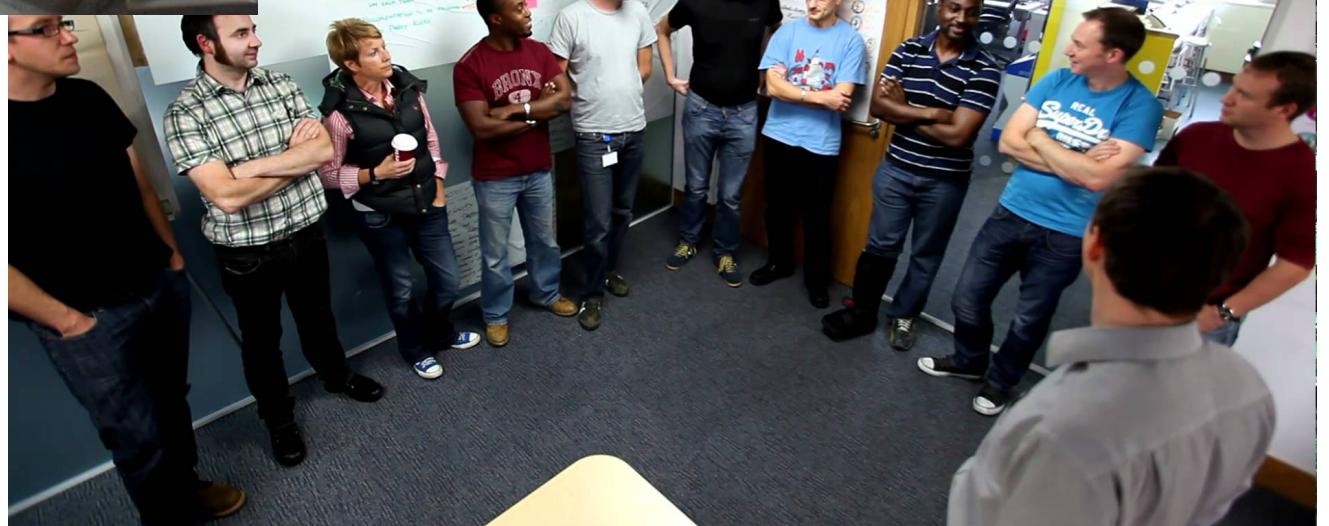
1. ให้รู้ว่าแต่ละคนในทีมทำ
อะไรอยู่ ไม่ใช่การรายงาน
ความคืบหน้า (ดังนั้น
manager หรือหัวหน้า
หรือเจ้าของบริษัท อยู่ได้
แค่นองค์รวมของการทำ
Daily Stand-up
meeting ในระยะที่ได้ยิน
ทีมคุยกัน และห้ามพูด)

2. เพื่อสร้างทีมให้ดูแลตัวเอง และจัดการตัวเองได้ในระดับหนึ่ง

(ดังนั้น หาก manager หรือหัวหน้า หรือเจ้าของ เข้าไปสั่งการโน้นนี่นั่นทีม มันก็จะ
กลับเข้าสู่การทำงานแบบเดิมที่เรียกว่า command and control)

Daily Stand Up Meeting

28



My Lab Daily (Plank) Meeting !! Just Kidding



Daily Scrum: Antipatterns

30

- The Scrum Master runs the meeting as a status meeting, asking everyone to update on their progress on tasks.
- Team members become focused on only their own work and forget to be on the lookout for opportunities to help other team members.
- One or several Daily Scrum attendees habitually dominate the event.
- Potential problems are not openly discussed by team members during the Daily Scrum and it sometimes takes until the end of the Sprint to find out that one or more team members are struggling.
- Daily Scrum attendees only use the three question format to conduct the meeting. (What did you do yesterday? What do you plan to do today? Do you have any blockers?)
- Developers only make changes to the Sprint Backlog at the Daily Scrum.
- The Product Owner and Scrum Master are forbidden from going to the Daily Scrum, even if their participation would be useful.

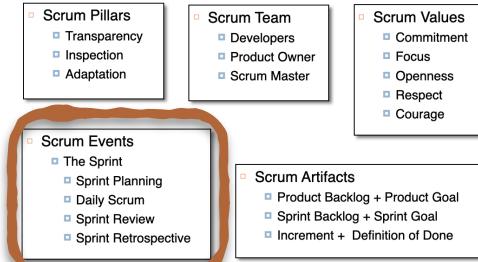
Daily Scrum: Tips

31

<https://www.scrum.org/learning-series/sprint-review/making-your-sprint-reviews-more-effective>

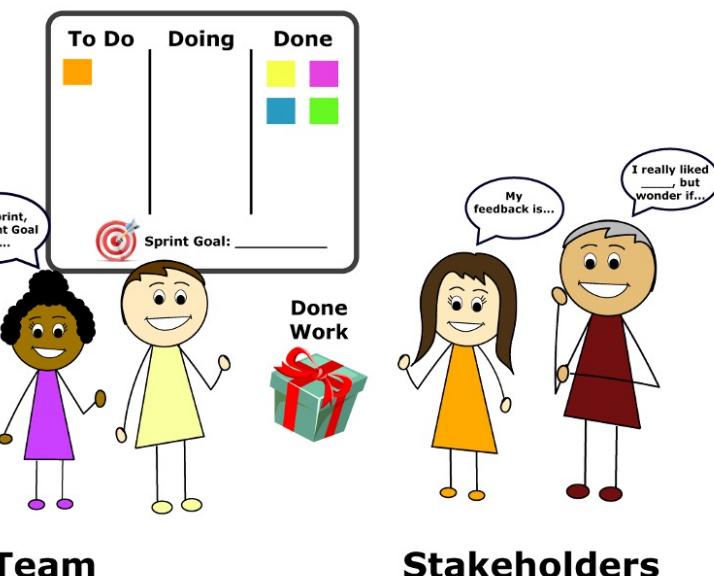
- Focus the meeting on the Sprint Goal and what is needed to achieve it
- Consider what value is being created toward the Sprint Goal.
- Create a safe space where everyone is comfortable in participating and can be open about any struggles or impediments
- Foster an environment where team members are eager to help one another
- The Scrum Master's assistance is not required at the Daily Scrum, the Developers should manage the meeting and consistently meet its purpose

Event: Sprint Review



32

- The purpose of the Sprint Review is to inspect the outcome of the Sprint and determine future adaptations.
- The Scrum Team presents the results of their work to key stakeholders and progress toward the Product Goal is discussed.



Scrum Team

Stakeholders

Sprint Review: Antipatterns

33

<https://www.scrum.org/learning-series/sprint-review/making-your-sprint-reviews-more-effective>

- Sprint Review is a status meeting, demo or one-way presentation
- The product shown does not conform to the Definition of Done or is not integrated into the Increment
- Team presents a list of the PBIs completed without showing the stakeholders the outcome of the PBIs or having a discussion about the work
- The result of the Sprint is only shown in a presentation
- The Sprint Review is conducted to have the Product Owner “accept” the work completed by the Developers
- Developers do not attend
- There are no actual users or customers among the stakeholders present

Sprint Review: Tips

34

<https://www.scrum.org/learning-series/sprint-review/making-your-sprint-reviews-more-effective>

- Make certain the correct stakeholders are invited
- Foster direct collaboration
- Facilitate the event
- Be clear on what was Done and not Done
- Discuss how the Sprint went
- Gather feedback
- Review current state of the Product Backlog
- Decide what to do next
- Adapt the Product Backlog based on the discussions during the Sprint Review
- Review the Product Vision, Key Value Drivers, Product Goal and Sprint Goal
- Ask Stakeholders to rate the Sprint Review to learn where improvements can be made

Event: Sprint Retrospective

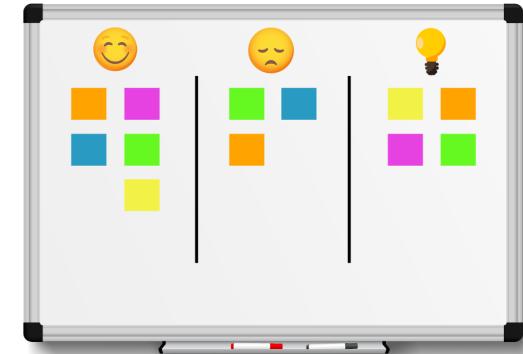
35

- The purpose of the Sprint Retrospective is to plan ways to increase quality and effectiveness.
- The Scrum Team inspects how the last Sprint went with regards to
 - individuals,
 - interactions,
 - processes,
 - tools, and
 - their Definition of Done

Event: Sprint Retrospective

36

- The Scrum Team discusses
 - what went well during the Sprint,
 - what problems it encountered, and
 - how those problems were (or were not) solved.
 - If the Definition of Done still serves them as written, or if it needs to be updated
 - If there are any improvements to how the team works that can be implemented in future Sprints



Sprint Retrospective: Antipatterns

37

- Scrum Team members do not actively participate
- Issues are not raised during the Retrospective
- Participants do not recall issues that came up during the Sprint
- The team becomes complacent
- Lack of honesty and communication
- Recurring items, nothing changes
- Team focuses on items they cannot improve
- Participants are told they are “being negative” when they identify items that need to be improved
- The Sprint Retrospective turns into a “blame game”
- The team is not comfortable with the Product Owner attending the Sprint Retrospective
- There is no plan for conducting or facilitating the Sprint Retrospective or it’s conducted in the same way each time

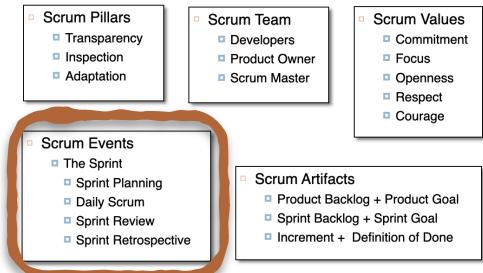
Sprint Retrospective: Tips

38

- Make certain that everyone participates and has a voice.
- Encourage an environment where team members are eager to improve their working environment.
- Encourage strong psychological safety and a culture of radical transparency and openness
- Make certain that items identified during the Retrospective are those that will actually improve the team's working processes or environment.
- Act on the items identified and make certain that the entire team knows how the items were resolved.
- Prioritize the improvements and then improve on 1-2 each Sprint.
- Be transparent about the resolution status of those issues.
- Ask Scrum Team members to keep a list of issues that occurred during the Sprint
- Identify ways to improve the Retrospective.
- Identify who will facilitate the Retrospective and encourage the use of varying facilitation techniques.

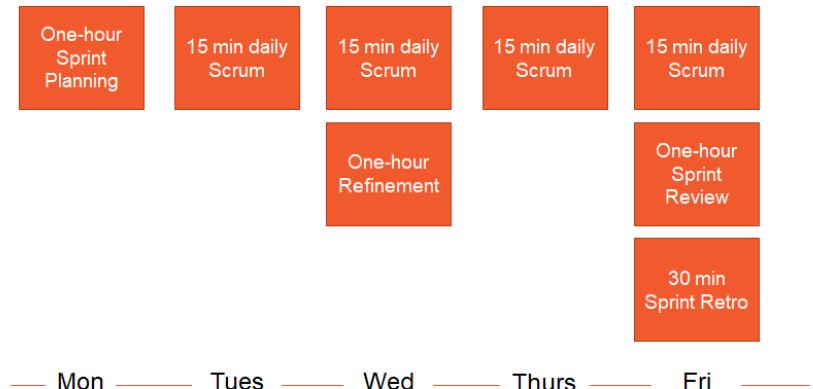
Event: Calendar

39



TYPICAL CALENDAR FOR A ONE-WEEK SPRINT

~ about 5.5 hours in one week



A Better TWO-WEEK SPRINT



TYPICAL CALENDAR FOR A TWO-WEEK SPRINT

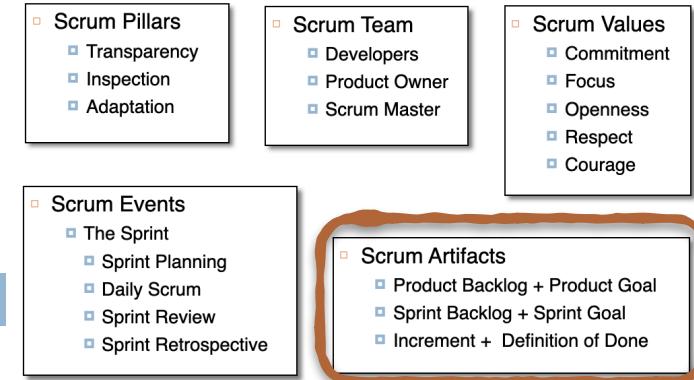
~ about 9 hours in two weeks!



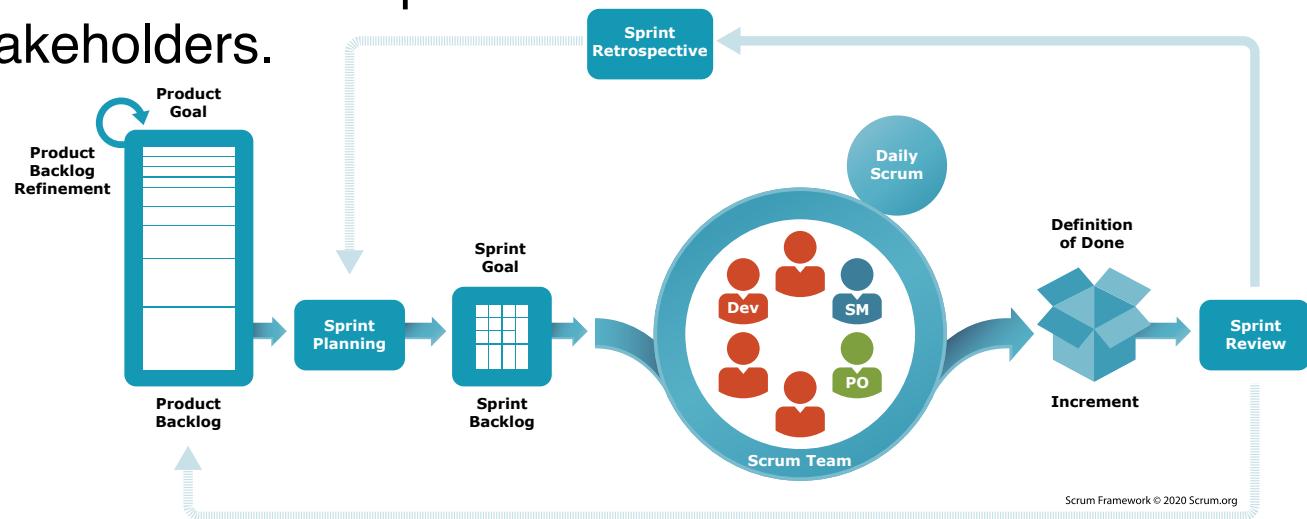
Mon Tues Wed Thurs Fri Mon Tues Wed Thurs Fri

Scrum Artifacts

40



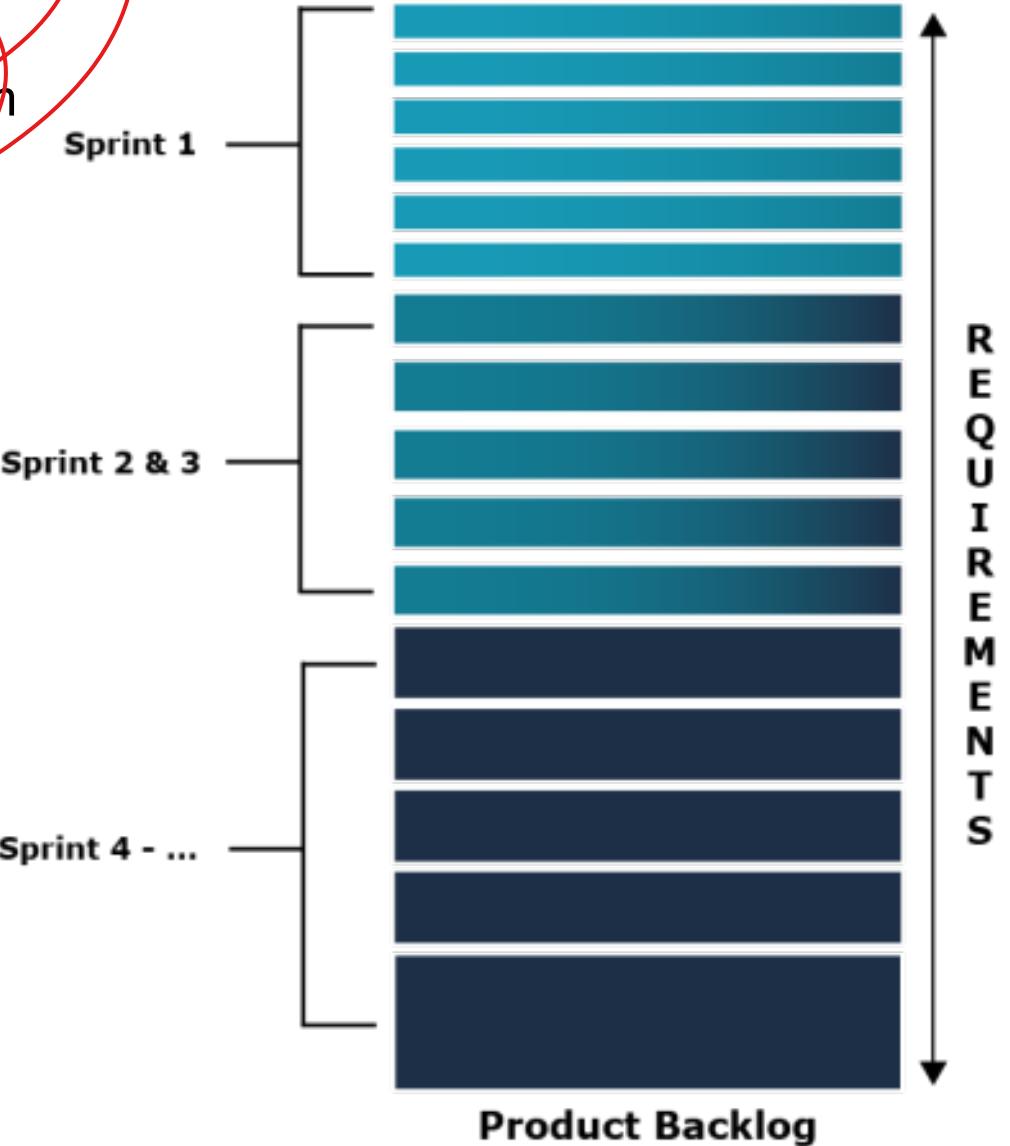
- Scrum's artifacts represent work or value. They are designed to maximize transparency of key information. Thus, everyone inspecting them has the same basis for adaptation.
- Each artifact contains a commitment to ensure it provides information that enhances transparency and focus against which progress can be measured:
 - For the **Product Backlog** it is the **Product Goal**.
 - For the **Sprint Backlog** it is the **Sprint Goal**.
 - For the **Increment** it is the **Definition of Done**.
- These commitments exist to reinforce empiricism and the Scrum values for the Scrum Team and their stakeholders.



Artifact: Product Backlog

41

- The Product Backlog's purpose is to represent all of the work the Scrum Team knows it needs to do in order to deliver the product. Teams can use the Product Backlog to make decisions about what they should do next.
- The Product Backlog consists of:
 - **Product Backlog items (PBIs)** - each of which represents something that needs to be done.
 - **A Product Goal** - that describes the Scrum Team's current long-term objective for the product.
- Product Backlogs are a **single, transparent** way to find the Scrum Team's **current** knowledge of all work that must be done. They are kept as an **ordered** list.



Scrum Pillars

Transparency
Inspection
Adaptation

Scrum Team

Developers
Product Owner
Scrum Master

Scrum Values

Commitment
Focus
Openness
Respect
Courage

Scrum Events

The Sprint
Sprint Planning
Daily Scrum
Sprint Review
Sprint Retrospective

Scrum Artifacts

Product Backlog + Product Goal
Sprint Backlog + Sprint Goal
Increment + Definition of Done

Artifact: Product Backlog Items

42

- Each PBI represents work that the team intends to do.
- PBIs are written in the form that serves the team best.
 - User stories, hypotheses, defect reports, etc.
- They can be anything, as long as they help the team understand what it needs to do
- PBIs are written at the right level of detail needed by the Developers at the time
- The Product Owner is accountable for creating PBIs
- The size estimations are done by the Developers
 - Absolute, Relative, Flow metrics, Right sizing, etc.

Artifact: Product Backlog Items

43



A Sample Product Backlog

Product Backlog

Allow a guest to make a reservation

As a guest, I want to cancel a reservation.

As a guest, I want to change the dates of a reservation.

As a hotel employee, I can run RevPAR reports (revenue-per-available-room)

Improve exception handling

...

User Story

45

| # | Backlog Item (User Story) | Story Point |
|---|---|-------------|
| 1 | As a Teller I want to be able to find clients by last name, so that I can find their profile faster | 4 |
| 2 | As a System Admin I want to be able to configure user settings so that I can control access | 2 |
| 3 | As a System Administrator I want to be able to add new users when required so that... | 2 |
| 4 | As a data entry clerk, I want the system to automatically check my spelling so that... | 1 |

The scrum team uses *Story Points* to estimate *effort* as relative estimates instead of time-based estimates.

Hypothesis

46

We currently believe that _____
Sprint Goal / Objective

will be achieved if we deliver _____

Possible Solution (Box 9 in Product Canvas)

because customer will gain _____
Customer Value (Box 4 in Product Canvas)

we know this for sure when we see _____

Consumer Outcome (Box 4 in Product Canvas)

Value Driven Metric (Box 2 in Product Canvas)

and _____ changed.

| | New Estimates at Sprint ... | | | | | | | | | |
|-----------------|---|-----------------------------------|----------------------------------|----------|----------|----------|----------|----------|----------|--|
| Priority | Item | Details (wiki URL) | Initial Size Estimate | 1 | 2 | 3 | 4 | 5 | 6 | |
| 1 | As a buyer, I want to place a book in a shopping cart (see UI sketches on wiki page) | ... | 5 | | | | | | | |
| 2 | As a buyer, I want to remove a book in a shopping cart | ... | 2 | | | | | | | |
| 3 | Improve transaction processing performance (see target performance metrics on wiki) | ... | 13 | | | | | | | |
| 4 | Investigate solutions for speeding up credit card validation (see target performance metrics on wiki) | ... | 20 | | | | | | | |
| 5 | Upgrade all servers to Apache 2.2.3 | ... | 13 | | | | | | | |
| 6 | Diagnose and fix the order processing script errors (bugzilla ID 14823) | ... | 3 | | | | | | | |
| 7 | As a shopper, I want to create and save a wish list | ... | 40 | | | | | | | |
| 8 | As a shopper, I want to add or delete items on my wish list | ... | 20 | | | | | | | |

Planning Poker

48

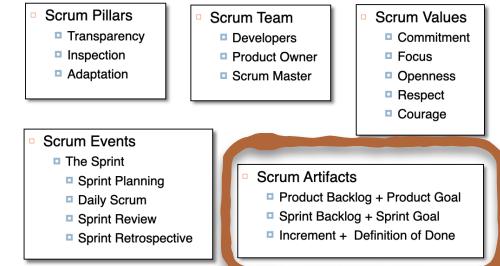
- Fibonacci – Less argument
- Clarification on the difference
 - Not on the agreements
- Everybody involved
 - Not dictated by most-knowledgeable person
- Quick
- Reliable
- Fun



Product Backlog Commitment: Product Goal

49

<https://www.scrum.org/learning-series/product-backlog/product-goal>



- The Product Goal describes a future state of the product which can serve as a target for the Scrum Team to plan against.
- The rest of the Product Backlog emerges to define “what” will fulfill the Product Goal.
- The Product Goal is the long-term objective for the Scrum Team. They must fulfill (or abandon) one objective before taking on the next.

Example: Product Goal

50

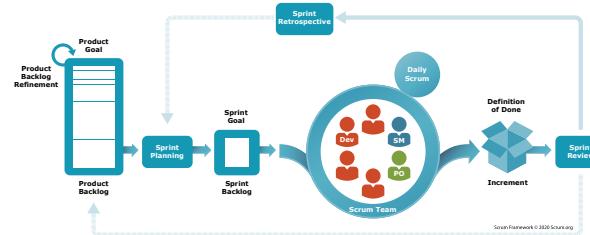
<https://www.scrum.org/resources/blog/product-goal-sprint-goals-simple-example>

- **Product Vision**
- This is our long term strategic goal. The Product Goals and Sprint Goals will help us advance towards and hopefully achieve this.
 - Product Vision - Be the leading online Bakery in the UK.
- **Product Goals**
- These are our intermediate goals which will advance us towards the Product Vision. We will work on these in sequence, 1 at a time. The Product Goals beyond the current one are ideas only until the current Product Goal is fulfilled or discarded. They may change before (or even as we) work on them as we shall see.
 - Product Goal 1 - Launch a website that allows sales to customers inside London.
 - Product Goal 2 - Expand production/delivery capability to allow sales to customers UK wide.
 - Product Goal 3 - Expand online presence via the Apple and Google Play app stores.

Product Backlog Refinement

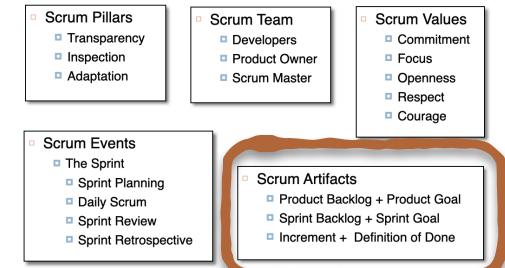
51

- Product Backlog items (PBI) evolve over time.
- The activity of continually improving PBIs until they are ready to be worked on is called “refinement.”
- Refinement of the Product Backlog may happen many times during the Sprint.
- It is good practice to have the Product Owner, Developers and appropriate stakeholders engage in refinement discussions on a regular basis.
- Self-managing teams determine how often refinement should happen, as well as who should attend each session.

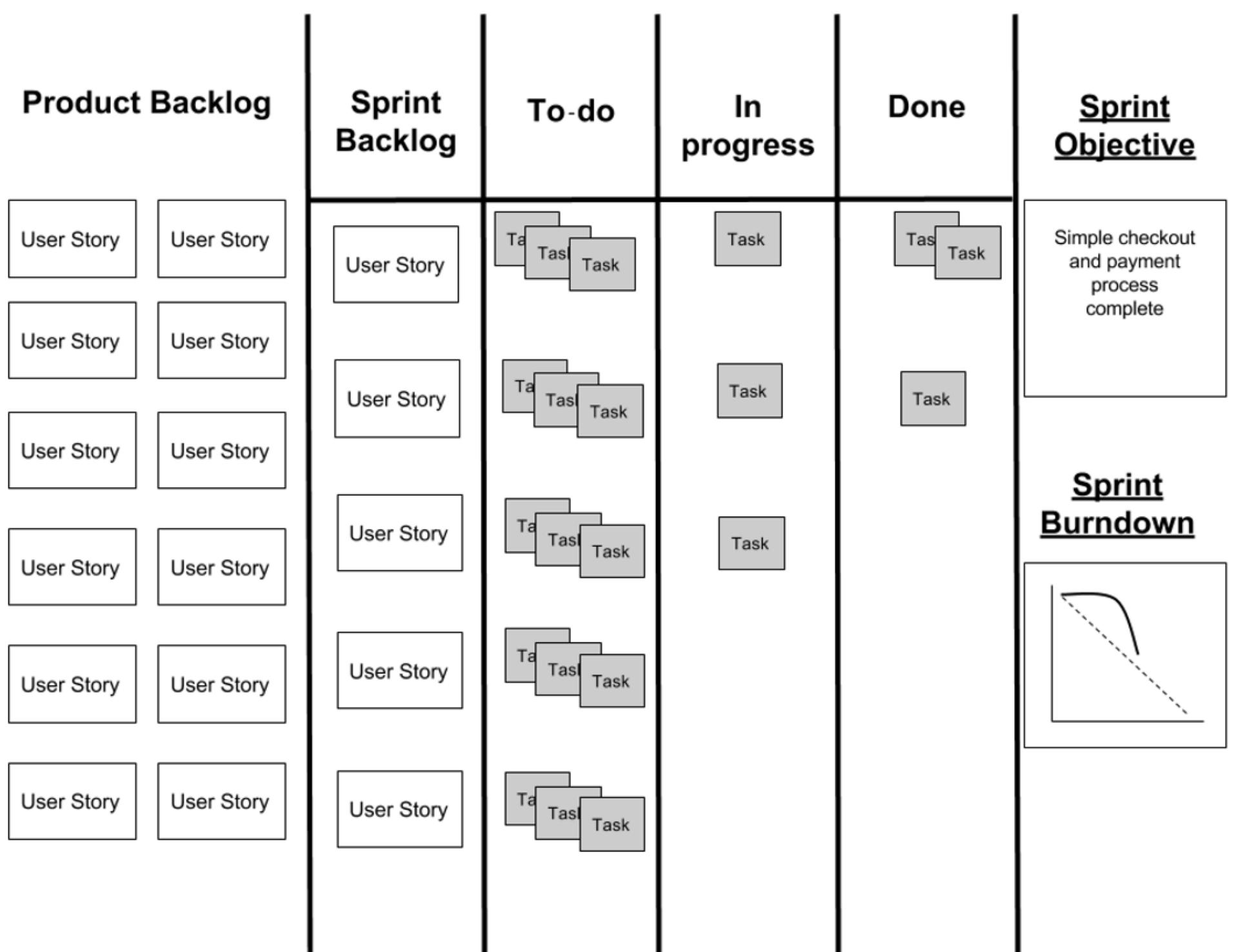


Artifact: Sprint Backlog

52



- The Sprint Backlog is composed of
 - the Sprint Goal (why),
 - the set of Product Backlog items selected for the Sprint (what), as well as
 - an actionable plan for delivering the Increment (how).
- The Sprint Backlog is a plan by and for the Developers
- It is what the Developers plan to accomplish during the Sprint in order to achieve the Sprint Goal.
- the Sprint Backlog is updated throughout the Sprint as more is learned
- The selected PBIs should be decomposed into multiple units of work that allow progress on the PBIs to be transparent



SPRINT [NUMBER] BACKLOG

| ID | User Story | Tasks | Owner | Status | Estimated effort | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 | Day 6 |
|-------|--|--|----------|-----------|------------------|-------|-------|-------|-------|-------|-------|
| US001 | As a call centre agent I need to be able to see the caller's previous tickets in their contact record. | Install standard contact record module | J Smith | Completed | 16 | 0.5 | 0 | 0 | 0 | 0 | 0 |
| | | Demo standard module and identify revised configuration. | J Smith | Completed | | 0 | 8 | 0 | 0 | 0 | 0 |
| | | Complete custom configuration as agreed in the demo. | J Smith | Completed | | 0 | 0 | 6 | 2 | 0 | 0 |
| US002 | As a customer I need to be able to login to my account from any page on the website. | Install login widget on website. | F Dole | Completed | 48 | 0 | 0 | 5 | 7 | 2 | 8 |
| | | Apply customer branding. | J Smith | Completed | | 0 | 0 | 0 | 0 | 0 | 0 |
| US003 | As a customer I need to be able to look up my address using my postcode. | Install contact page. | P Murphy | Completed | 24 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Integrate postcode plugin to contact page. | P Murphy | Completed | | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Demo plugin to customer | J Smith | Completed | | 0 | 0 | 0 | 0 | 0 | 0 |

Sprint Backlog

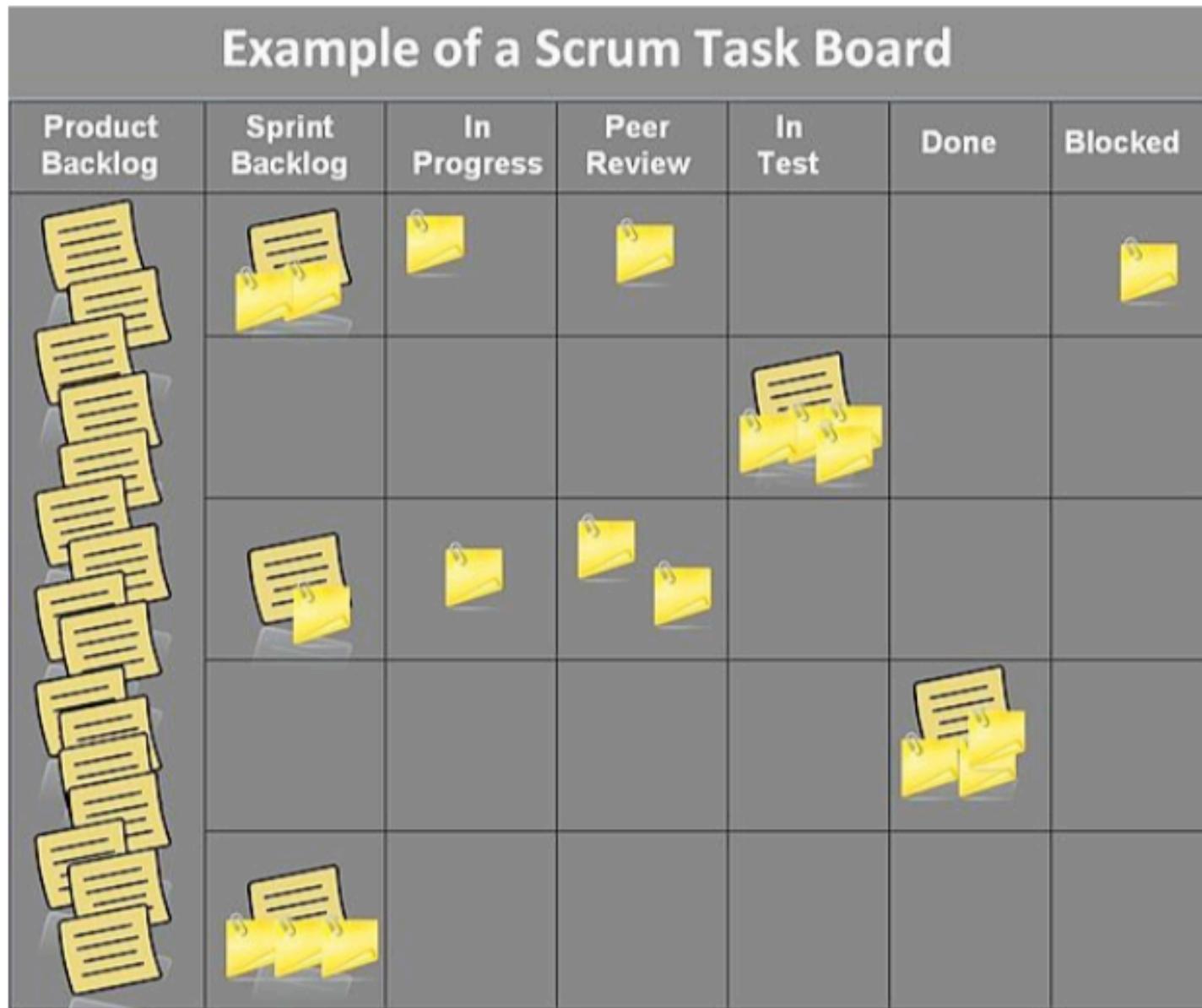
Sprint Backlog

| Forecast | To-Do | In-Progress | Done |
|--|---|--|--|
| <p>Fix My Profile</p> <p>5</p> | | <p><i>aliquip</i></p> | <p><i>ipsum</i></p> <p><i>duis</i></p> <p><i>sit</i></p> <p><i>ipsum</i></p> |
| <p>Filter Service Tickets</p> <p>8</p> | <p><i>dolor</i></p> <p><i>ipsum</i></p> <p><i>culpa</i></p> | <p><i>vale</i></p> <p><i>culpa</i></p> | <p><i>aliquip</i></p> |
| <p>Quick Tips</p> <p>3</p> | <p><i>ipsum</i></p> <p><i>sit</i></p> <p><i>duis</i></p> <p><i>duis</i></p> | | |

| New Estimates of Effort | | | | | | | | | | |
|---|---|---------------|----------------------------|-------|----|-----|----|-----|----|----|
| Remaining at end of Day... | | | | | | | | | | |
| Product Backlog Item | Sprint Task | Volunteer | Initial Estimate of Effort | 1 | 2 | 3 | 4 | 5 | 6 | |
| As a buyer, I want to place a book in a shopping cart | modify database | Sanjay | 5 | 4 | 3 | 0 | 0 | 0 | | |
| | create webpage (UI) | Jing | 3 | 3 | 3 | 2 | 0 | 0 | | |
| | create webpage (Javascript logic) | Tracy & Sam | 2 | 2 | 2 | 2 | 1 | 0 | | |
| | write automated acceptance tests | Sarah | 5 | 5 | 5 | 5 | 5 | 0 | | |
| | update buyer help webpage | Sanjay & Jing | 3 | 3 | 3 | 3 | 3 | 0 | | |
| | ... | | | | | | | | | |
| Improve transaction processing performance | merge DCP code and complete layer-level tests | | 5 | 5 | 5 | 5 | 5 | 5 | | |
| | complete machine order for pRank | | 3 | 3 | 8 | 8 | 8 | 8 | | |
| | change DCP and reader to use pRank http API | | 5 | 5 | 5 | 5 | 5 | 5 | | |
| ... | | | | ... | | ... | | ... | | |
| | | | | Total | 50 | 49 | 48 | 44 | 43 | 34 |

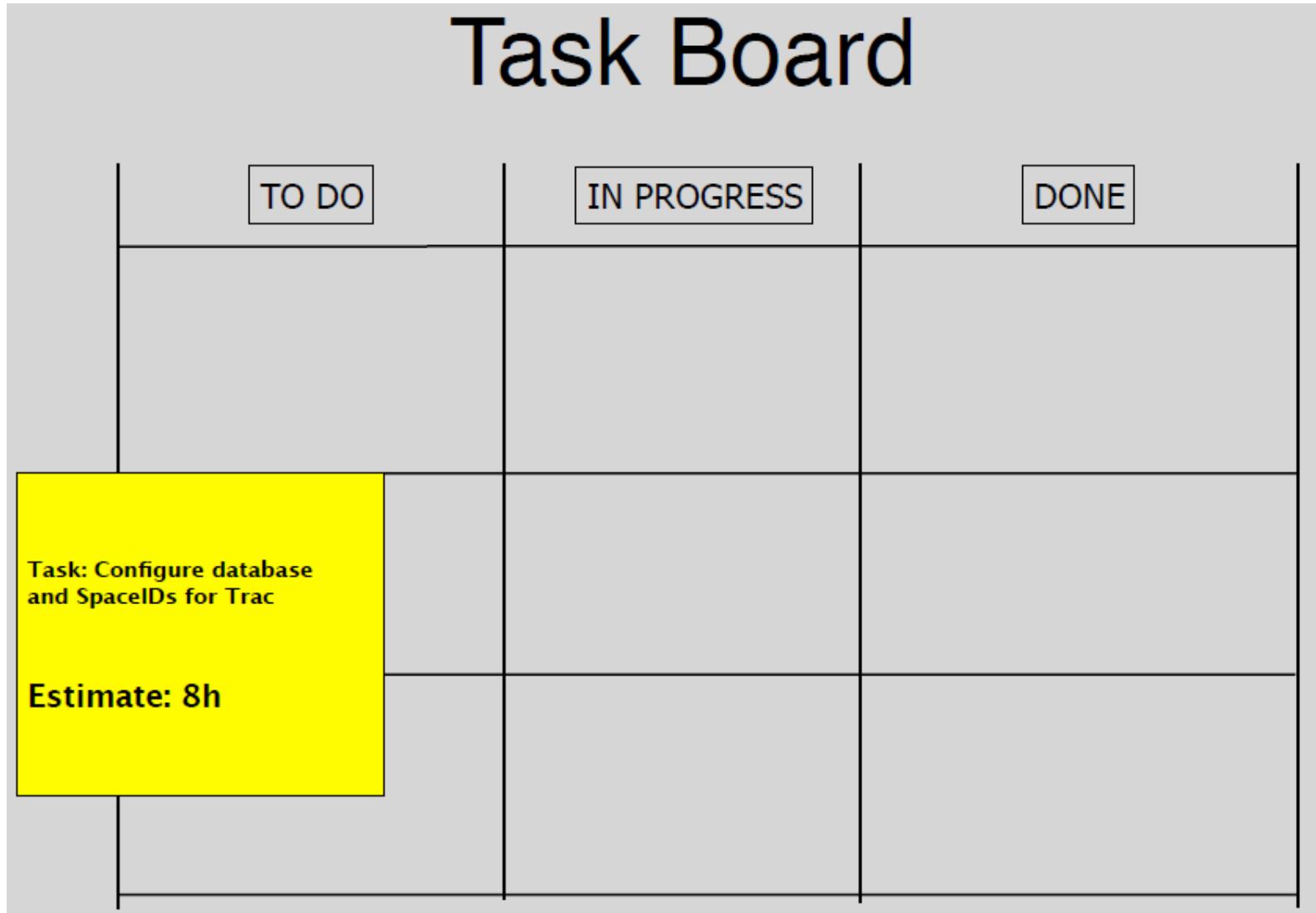
Complete version and the association between Product backlog and Sprint backlog

58



Just Enough for Simple Sprint Backlog, aka. Kanban Board

59

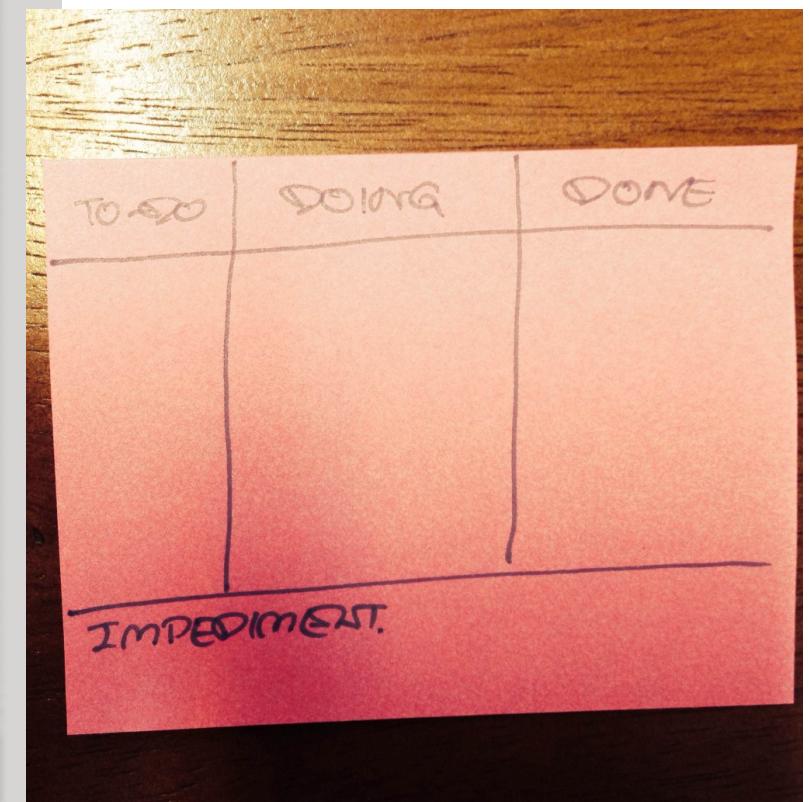


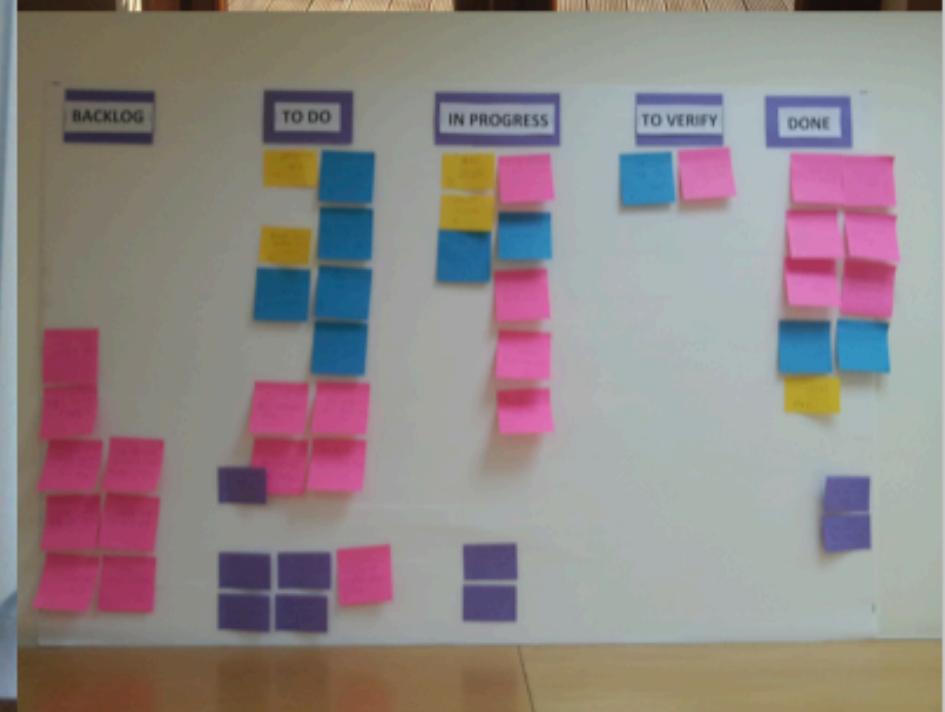
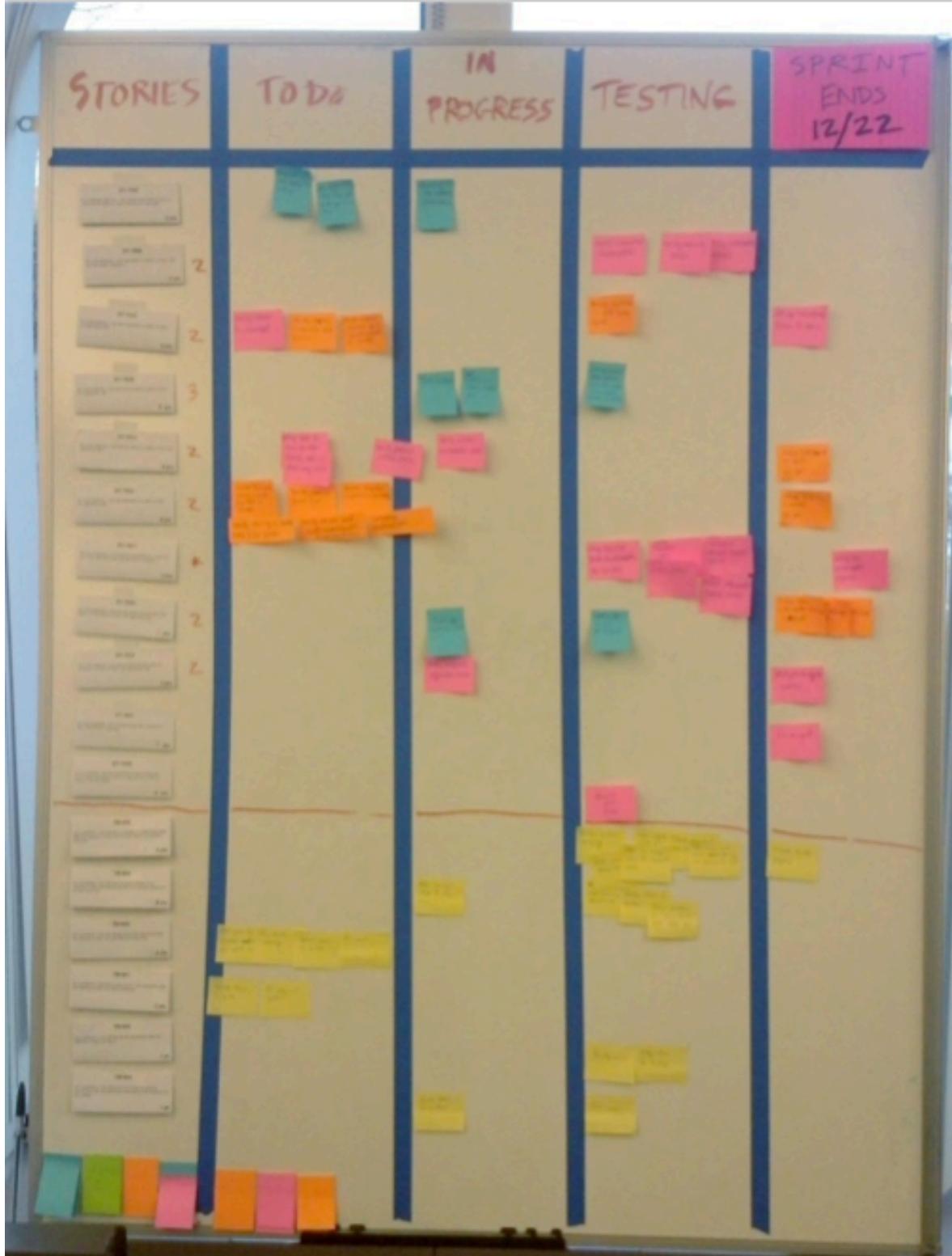
Task Board

| | TO DO | IN PROGRESS | DONE |
|--------|-------|-------------|------|
| PBI #1 | | | |
| PBI #2 | | | |
| PBI #3 | | | |

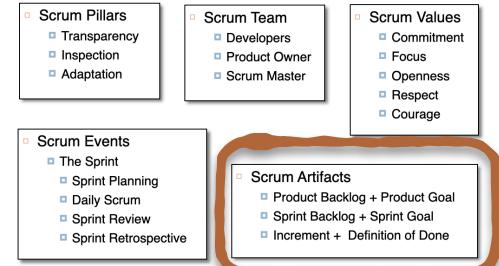
Day Two, End of Daily Scrum







Sprint Backlog Commitment: Sprint Goal



64

- The Sprint Goal provides the objective for the Sprint and frames many of the events during the Sprint:
- **Objective:** The Sprint Goal should indicate why this Sprint will bring value to the stakeholders, including customers and users.
- **Sprint Planning:**
 - The Sprint Goal is created by the entire Scrum Team during Sprint Planning. Ideally, all of the Developers on the Scrum Team will work on items that support the Sprint Goal. In this way, the Sprint Goal provides a unifying force to the Sprint and to the team.
 - The PBIs selected for the Sprint during Sprint Planning are intended to help the team reach the Sprint Goal.
- **Daily Scrum:**
 - During the Daily Scrum, the Developers assess whether they are making progress toward the Sprint Goal and adapt their plans accordingly. They may adjust the scope of the work they intend to do, but they must not make changes to the Sprint Goal.
- **Sprint Review:**
 - The Scrum Team and stakeholders discuss the progress made toward the Sprint Goal.

Example: Sprint Goal

65

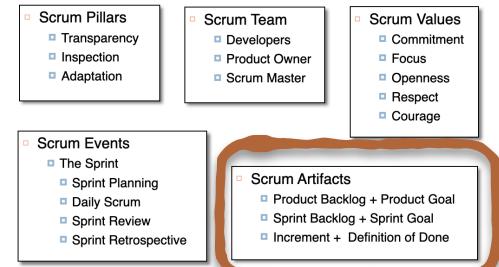
<https://www.scrum.org/resources/blog/product-goal-sprint-goals-simple-example>

□ Sprint Goals

- These are our immediate tactical goals which move us toward our Product Goal. The specific Sprint Goals may not be known or planned ahead of time. If they are planned in advance they will likely change as we learn more.
 - Product Goal 1 - Launch a website that allows sales to customers inside London.
 - Sprint Goal 1 - Create basic website structure.
 - Sprint Goal 2 - Build capability to list & purchase products using a credit card.
 - Sprint Goal 3+ - ... as many more Sprint Goals as needed.
 - Sprint Goal X - Launch the website and fulfil the first orders.
 - Product Goal 1 has now been fulfilled.
 - Product Goal 2 - Expand production/delivery capability to allow sales to customers UK wide.
 - Sprint Goal 1 - Find UK wide supply partners.
 - Sprint Goal 2 - Review potential partners and select 1-3.
 - Sprint Goal 3+- ... as many more Sprint Goals as needed.
 - Sprint Goal X - Beta launch of national capability with invited customers only and fulfil first orders.
 - Product Goal 2 has now been fulfilled.

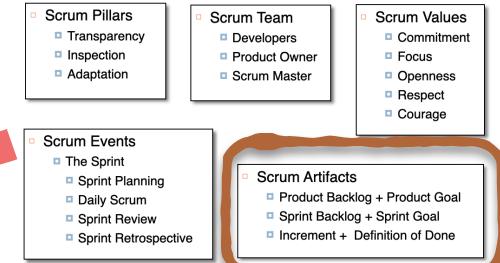
Artifact: Increment

66



- An Increment is a concrete stepping stone toward the Product Goal
- The Increment is the latest version of the product that conforms to the Definition of Done
- Multiple Increments may be created within a Sprint
- The sum of the Increments is presented at the Sprint Review thus supporting empiricism.
- However, an Increment may be delivered to stakeholders prior to the end of the Sprint.
- The Sprint Review should never be considered a gate to releasing value.
- Work cannot be considered part of an Increment unless it meets the Definition of Done.

Increment Commitment: Definition of Done (DoD)



67

- The Definition of Done is a formal description of the state of the Increment when it meets the quality measures required for the product.
- The Definition of Done creates transparency by providing everyone a shared understanding of what work was completed as part of the Increment
- If a Product Backlog item does not meet the Definition of Done, it cannot be released or even presented at the Sprint Review. Instead, it returns to the Product Backlog for future consideration.
- If the Definition of Done for an increment is part of the standards of the organization, all Scrum Teams must follow it as a minimum. If it is not an organizational standard, the Scrum Team must create a Definition of Done appropriate for the product.

Example: Definition of Done

68

<https://www.scrum.org/resources/blog/simple-example-definition-done>

- We have 2 items to create that are currently in our Product Backlog. They have acceptance criteria defined to help us understand aspects of the work that needs to be carried out. Here they are:
- Product Backlog item 1 - Baguettes

Acceptance Criteria:

- At least 18 inches long and 2 inches in diameter.
- Cooked for 20 minutes at 220 degrees.
- Golden brown all over after cooking.



- Product Backlog item 2 - Iced Buns

Acceptance Criteria:

- At least 5 inches long and 3 inches high.
- Cooked for 15 minutes at 200 degrees.
- Icing covers at least 80% of the top of the bun and it has a Cherry on top



Example: Definition of Done

69

<https://www.scrum.org/resources/crafting-definition-done>

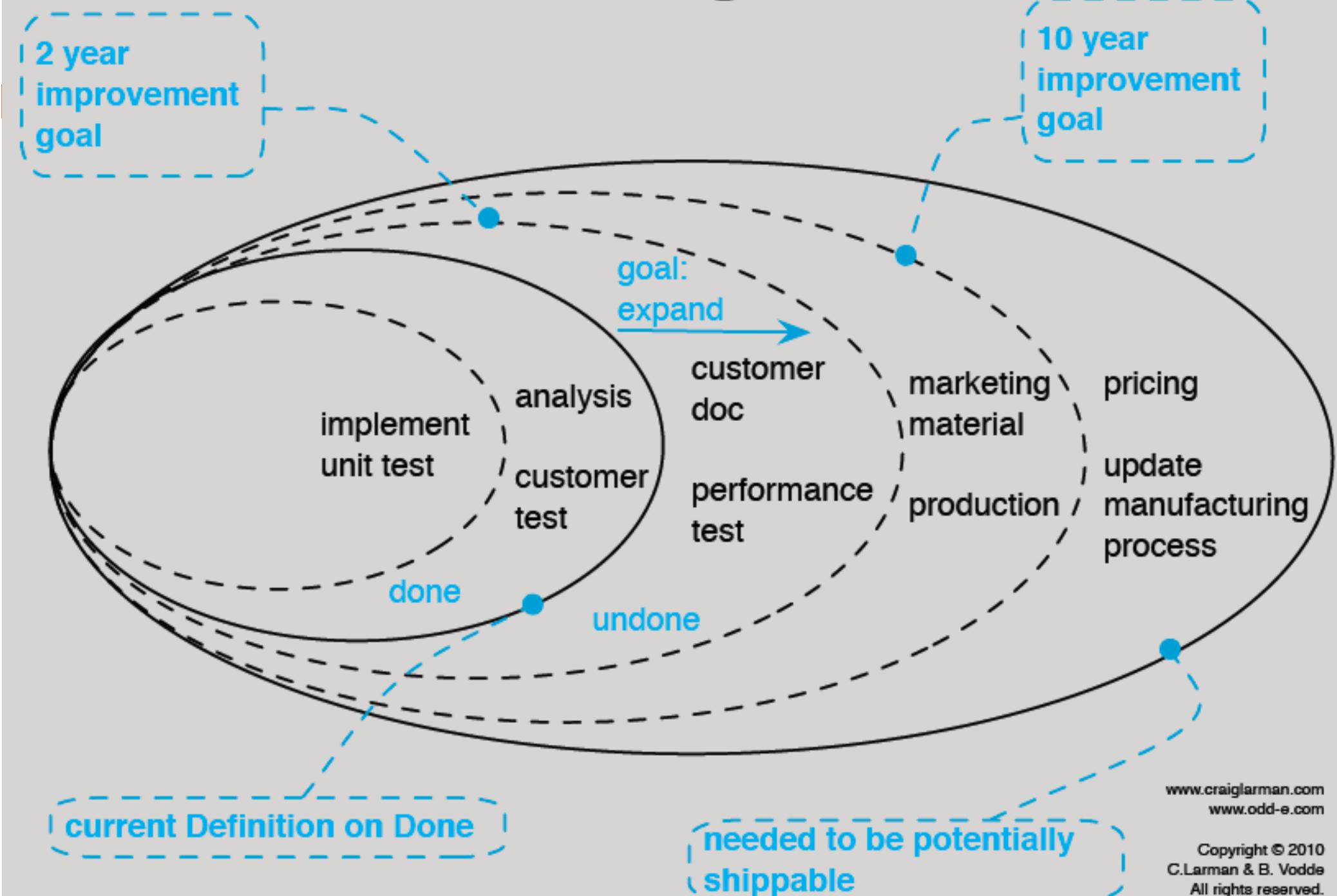
- Our Definition of Done would apply to both of these items before they could be considered part of an Increment that we would put on sale to customers. Here it is:
- **Definition of Done:**
 - All ingredients used were fresh.
 - The kitchen was clean at the time of preparation.
 - The product has been visually inspected after cooking and is attractive and defect-free.
 - 1 product in each batch has passed a taste test before the batch is put on sale.
- The Definition of Done is at the macro level and is applied to all Product Backlog items before they can be considered part of an Increment. The criteria here ensure a known level of quality has been reached, regardless of what specific work was carried out.

DONE

adjective

1. Unit tests passed
2. Code reviewed
3. Acceptance criteria met
4. Functional Tests passed
5. Non-Functional requirements met
6. Product Owner accepts the User Story

Extending “done”



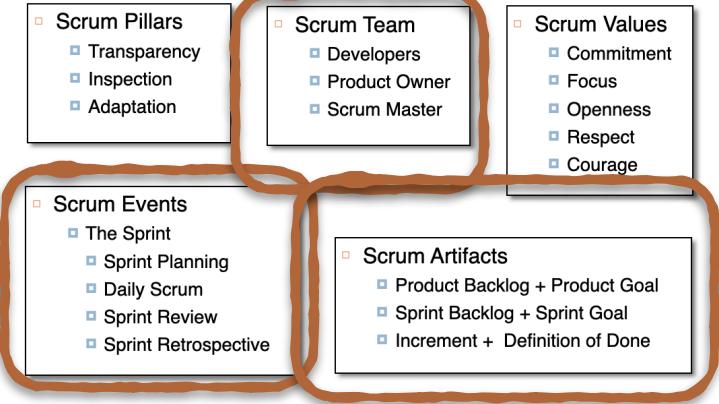
DoD

72

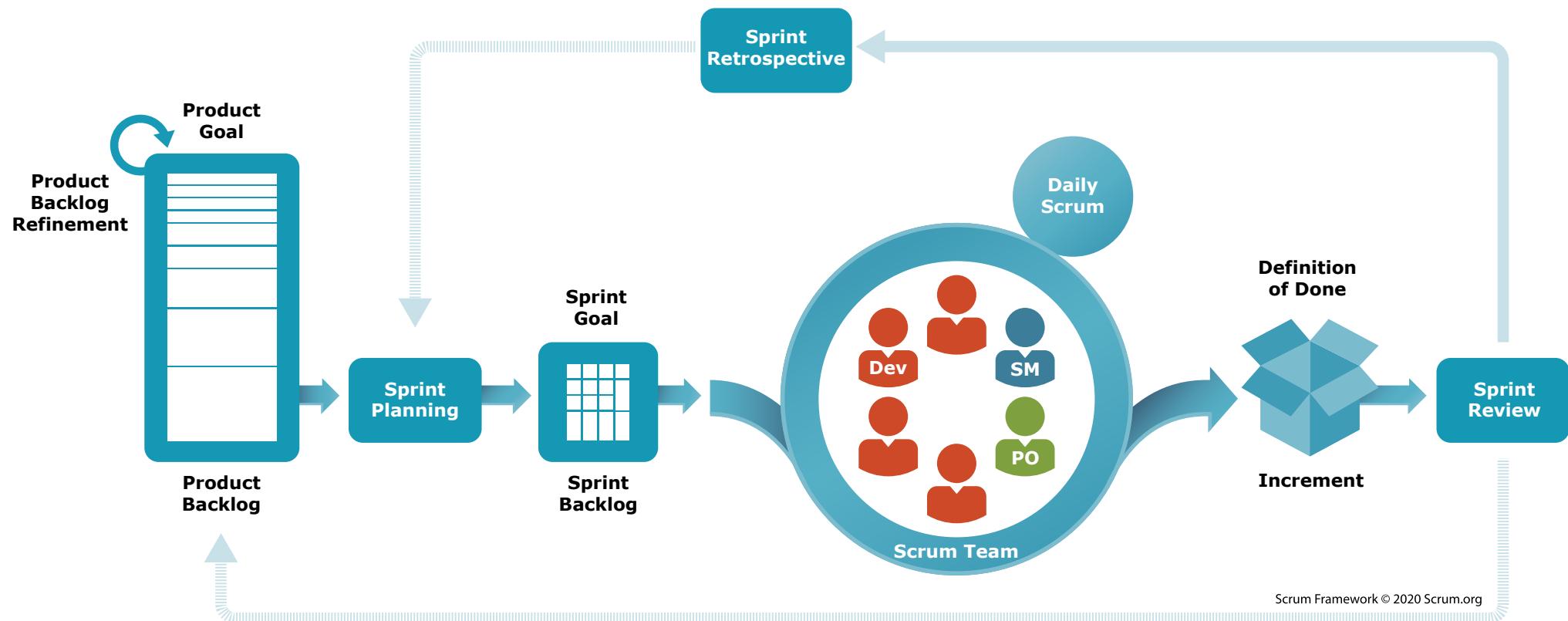
| | Initial DoD | Mature DoD | Stringent DoD |
|--|---|---|--|
| | <ul style="list-style-type: none"> All acceptance criteria met Unit test coverage >85% Functional test passed No known defects Peer code review Peer code review passed Documentation completed | <ul style="list-style-type: none"> All business functionality and acceptance criteria met No Dependence unattended Unit test coverage >85% No errors on coding standards Technical Debts <5 days (subjective) Maintainability index for the module/Code >90 Functional test automation >75% Functional test passed No known defects Peer code review passed Peer code review passed Documentation completed | <ul style="list-style-type: none"> All business functionality and acceptance criteria met No Dependence unattended No build failures Integration testing passed Unit test coverage >85% No errors in coding standards Technical Debts < 5 days (subjective) Maintainability index for the modules/Code>90 Functional test automation 75% Functional test passed Regression test passed PEN test passed Load test passed Performance test passed No known defects Peer code review passed Documentation completed Compliance Documents updated Regulatory requirements complete UAT approved |

Scrum Framework

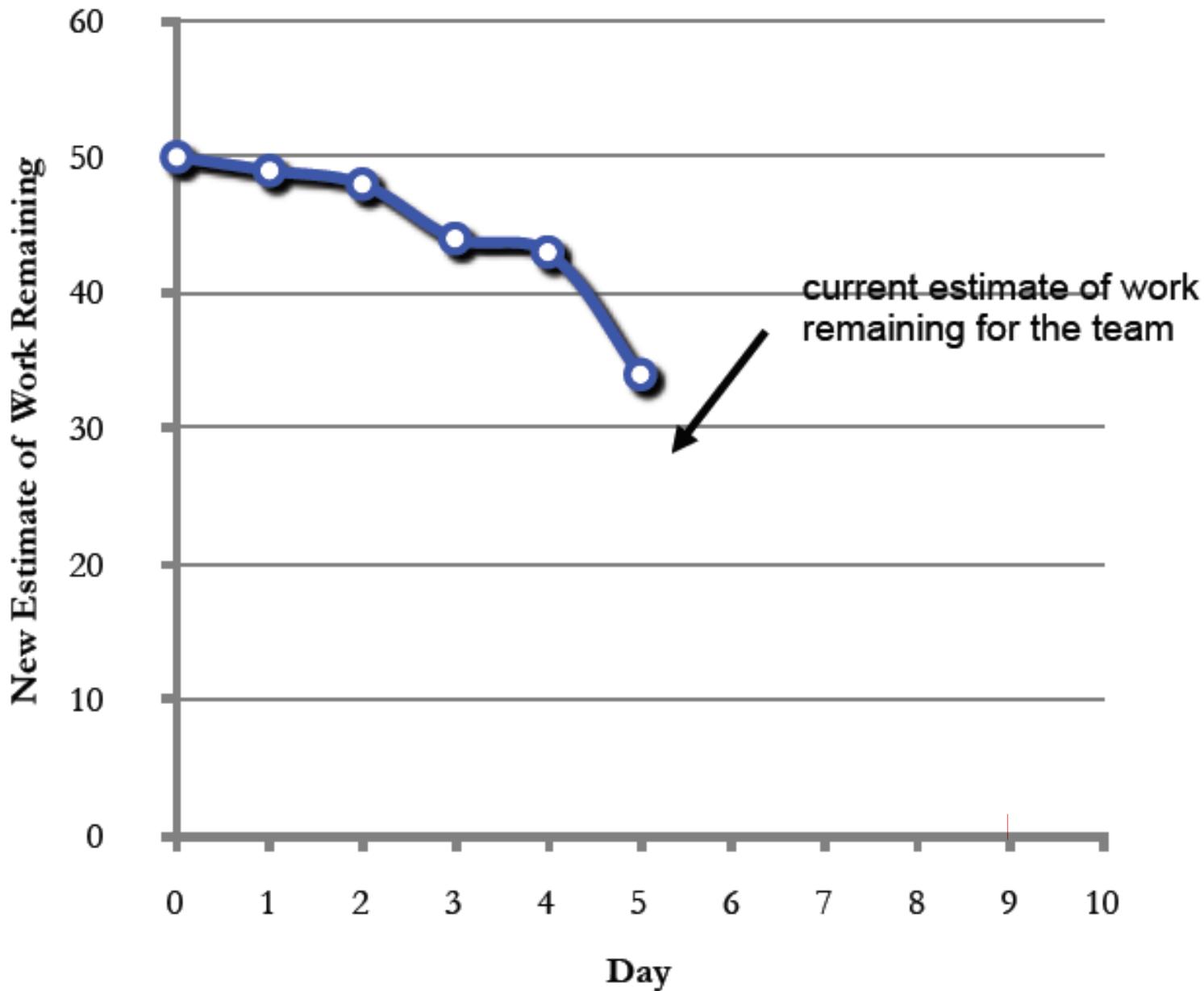
73



SCRUM FRAMEWORK

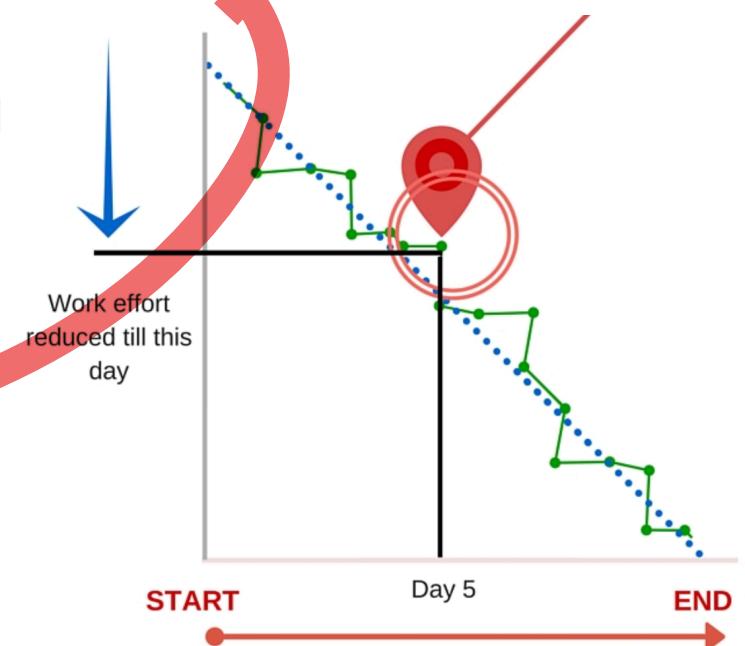


Burndown Chart



Burndown Chart

1. **Total Estimate** - It is the total number of works in hours, to which the team is committed. Such works are estimated efforts to carry out user-stories, tickets, or issues.
2. **Amount of Work Remaining or Effort Remaining** - This is what Burndown shows. The Agile team will burndown some effort each day so that on last day of sprint or release there is no work effort remains.
3. **Working Days** - The Burndown shows the total days of commitment of work in a Sprint (excluding holidays, weekend, etc.). Accordingly, the team needs to calculate and carefully work on the commit items each day. This total working days in one iteration is called the Sprint duration.
4. **Ideal Effort** - The ideal effort is drawn by calculating the exact amount of effort remaining which team need to burndown. It is presented as a very straight line from the top of Y-axis to X-axis, which is the last day of your Sprint.
5. **Real Effort** - Effort remaining line varies from team to team and day to day. It depends on how much effort remaining is added or reduced each day. If more items (user stories and issues) are added after the sprint started, this shows as an upward spike.



Burndown chart

Y-axis

Total committed hours
by team (total effort)



Each day amount of work
Remaining will be calculated
by subtracting from total effort

x-axis

Day-0

Working Days

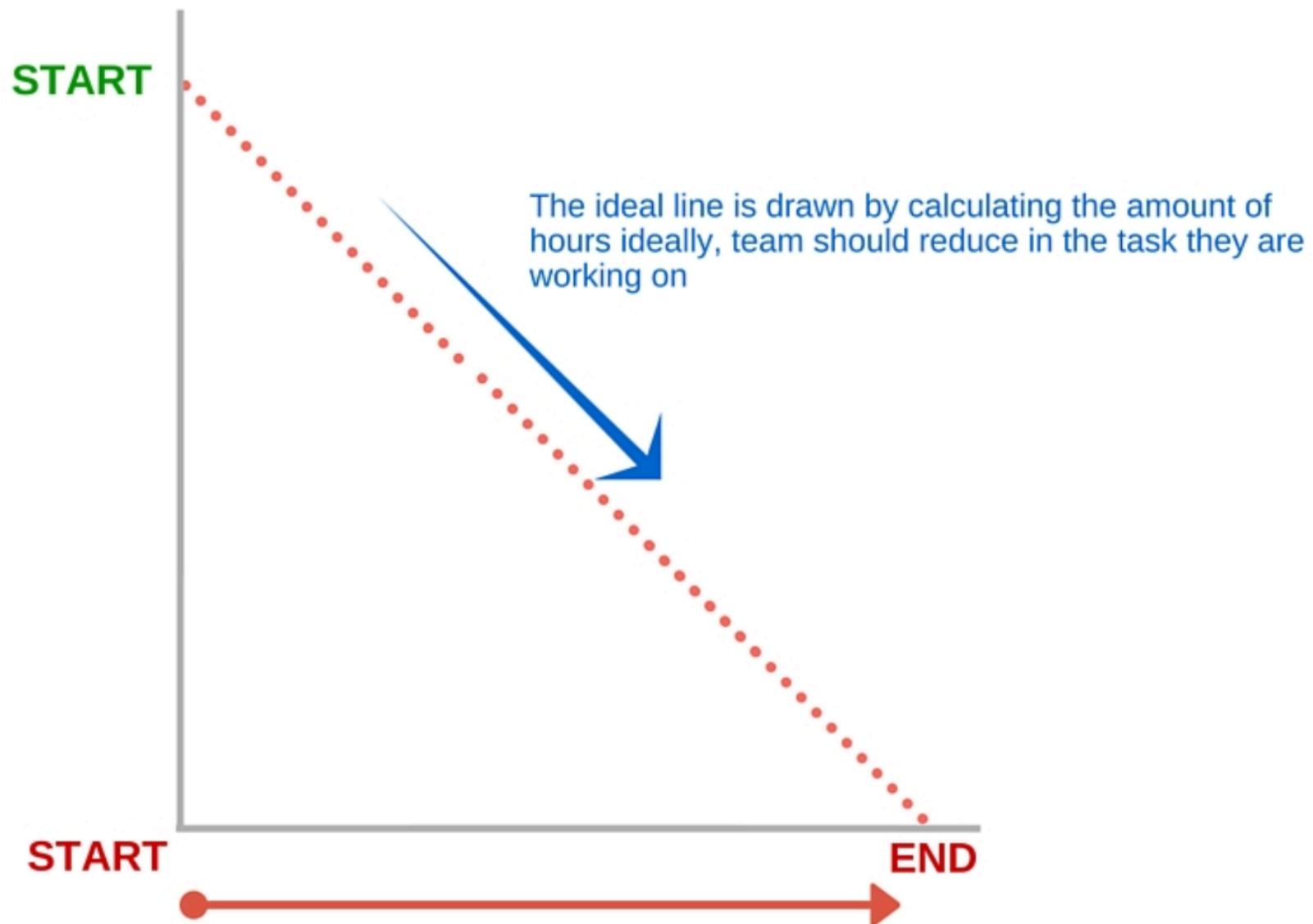
10th day

Last day of sprint

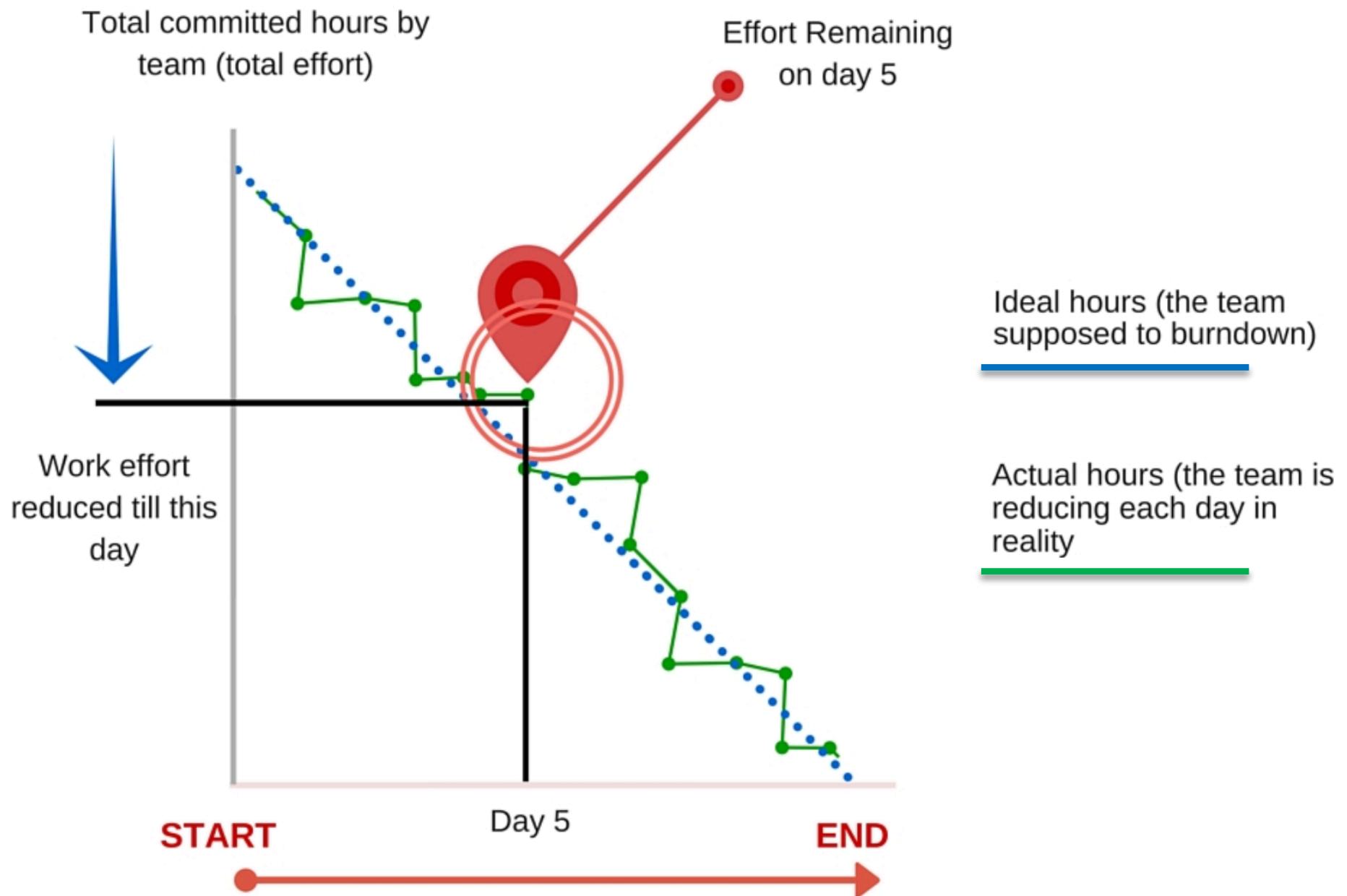


Burndown chart

Total committed hours by team (total effort)

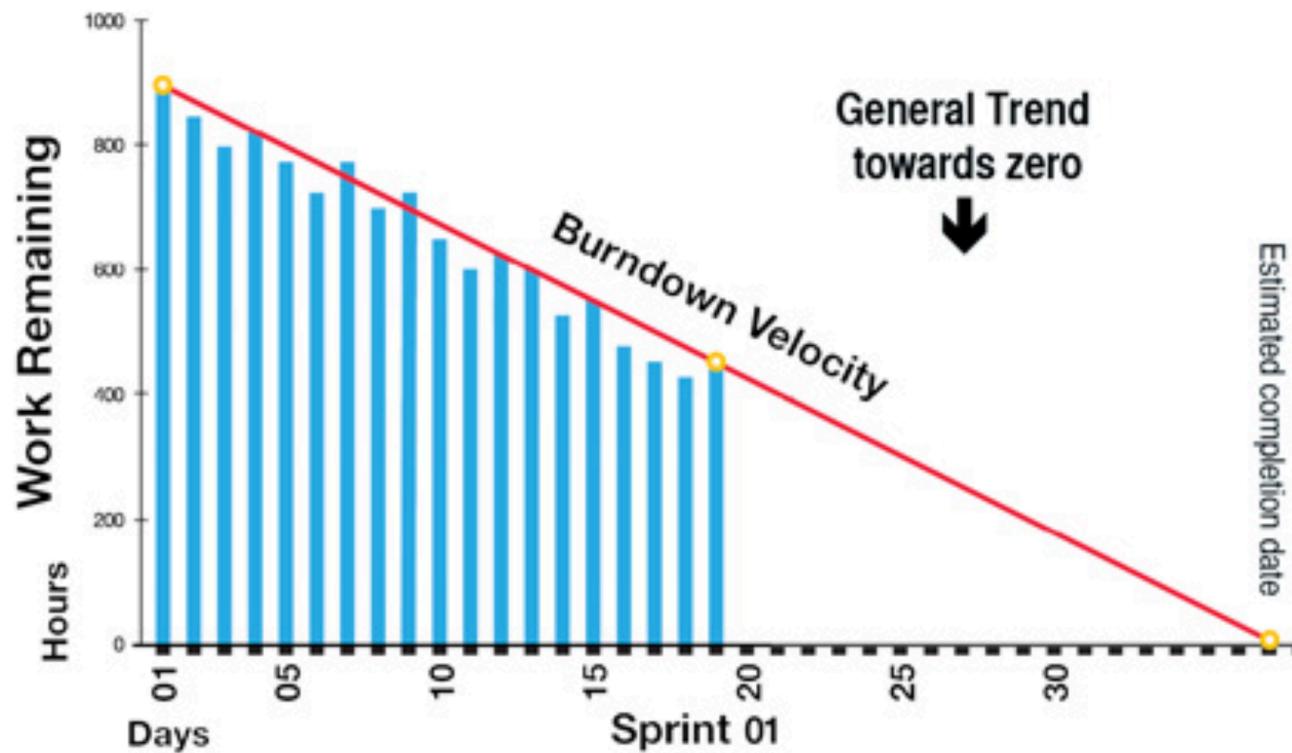


Burndown chart

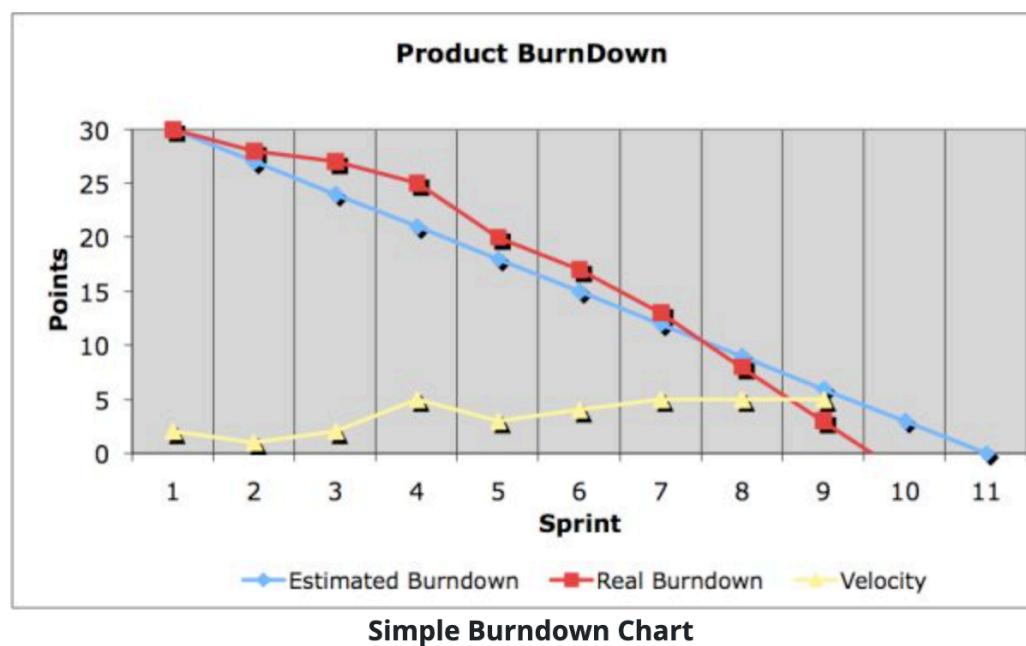
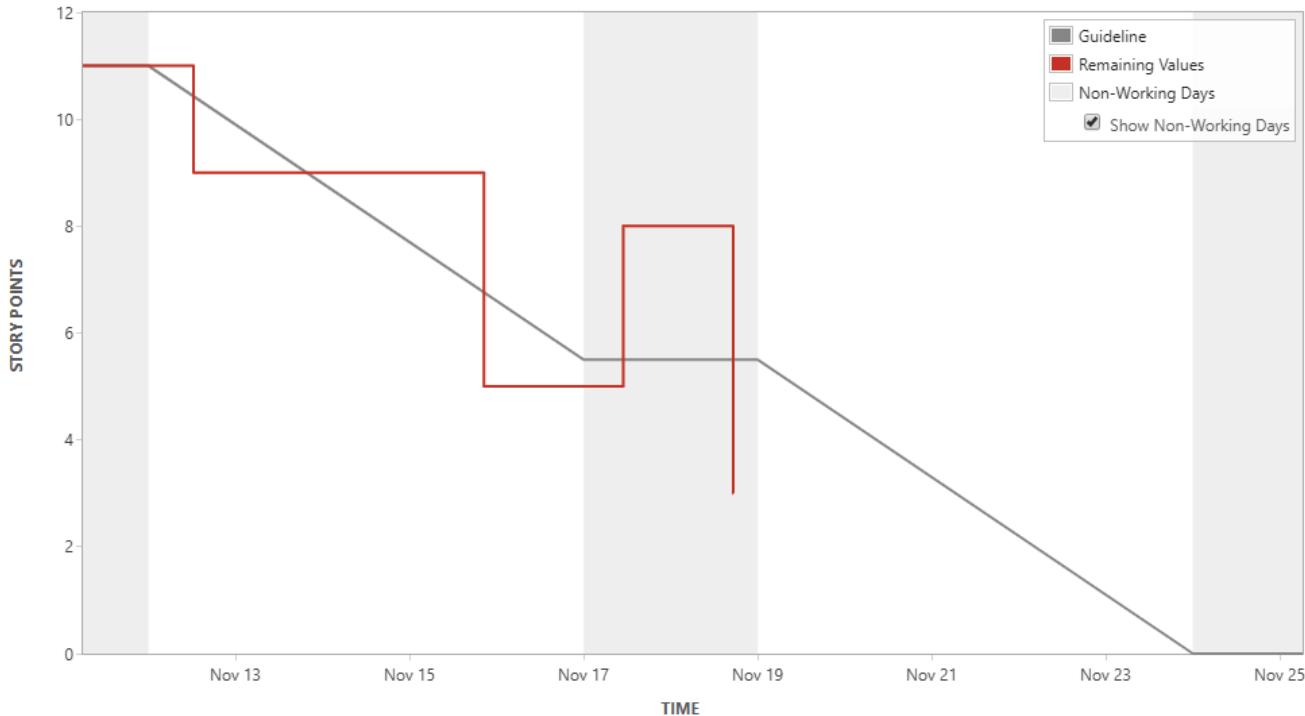


Two variations of Burndown Chart

Y-axis as
working hours
remaining



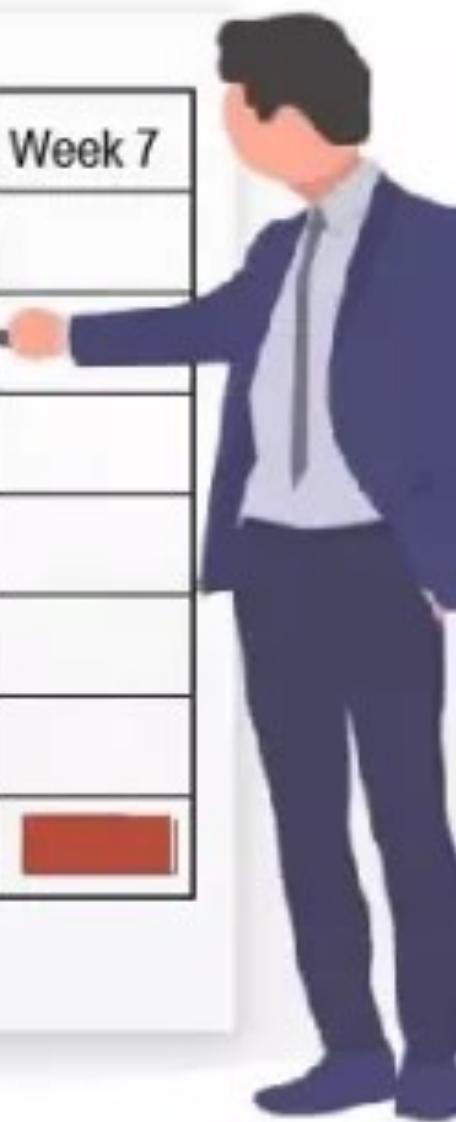
Two variations of Burndown Chart



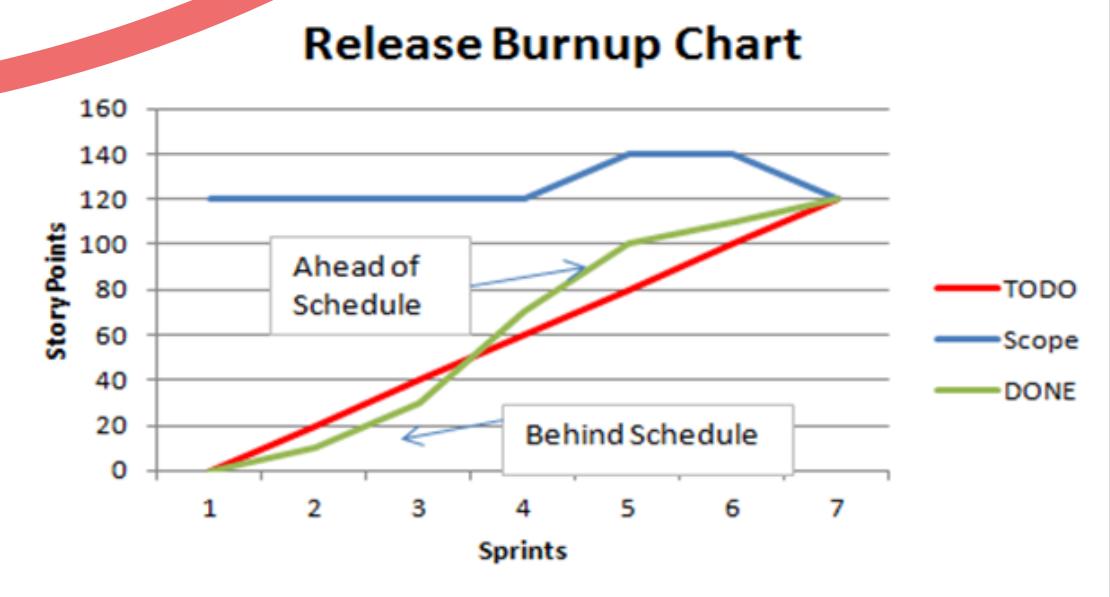
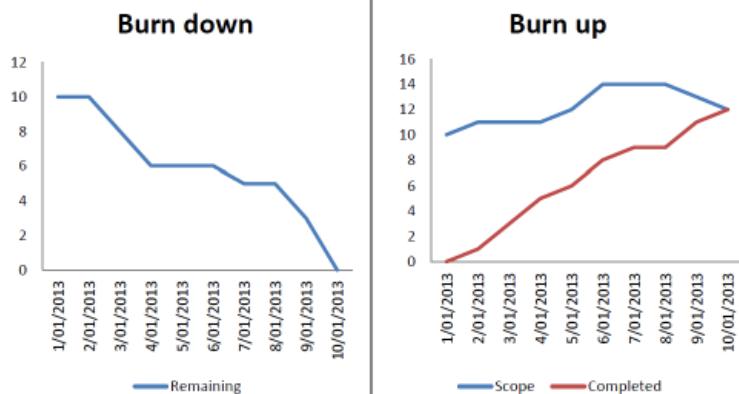
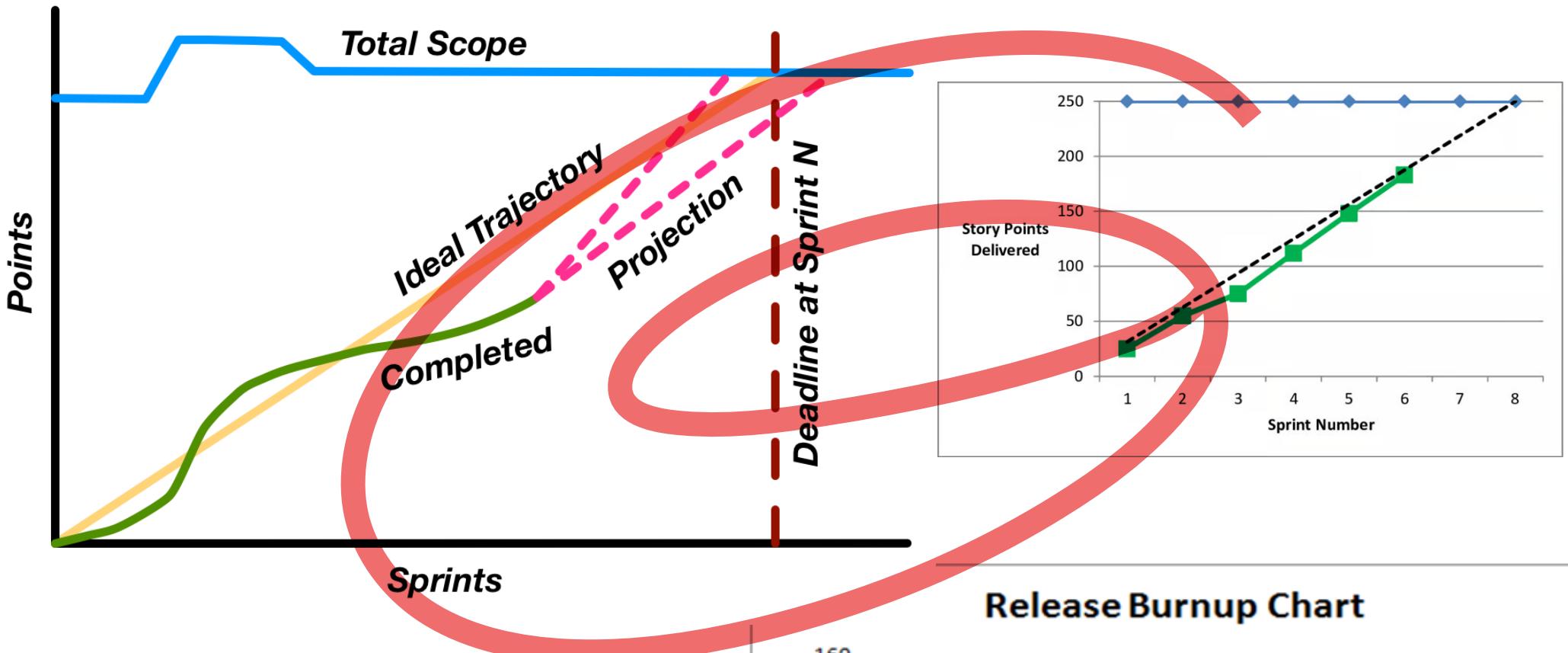
Gantt Chart

81

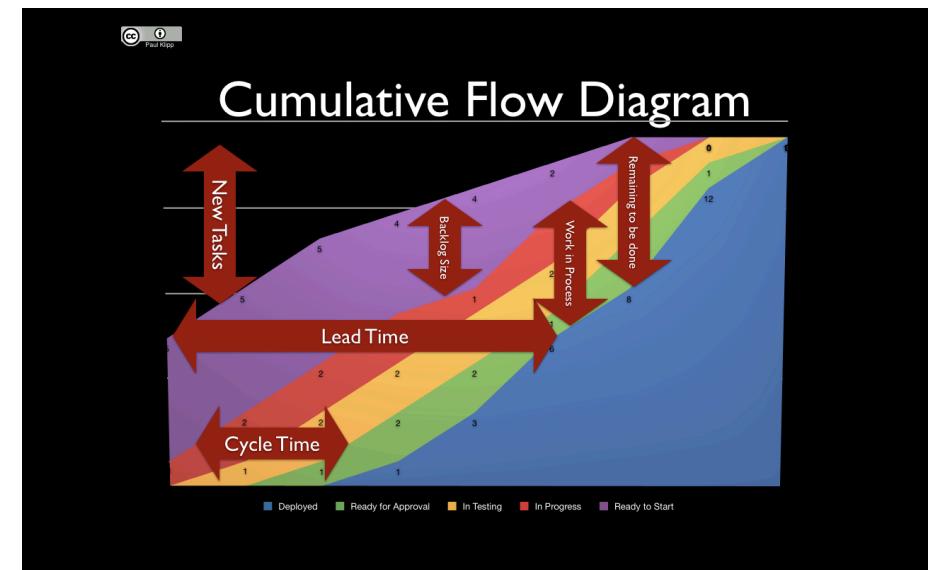
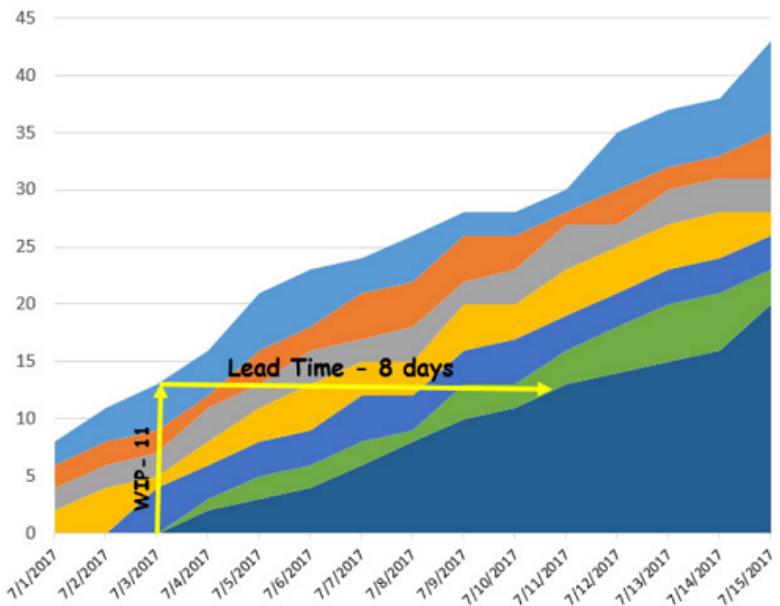
| | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 |
|------------|--------|--------|--------|--------|--------|--------|--------|
| Research | ■ | ■ | | | | | |
| Content | ■ | ■ | ■ | | | | |
| Design | | ■ | ■ | | | | |
| Uploading | | | | ■ | ■ | | |
| Developing | | | | | ■ | | |
| Finalizing | | | | | ■ | ■ | |
| Marketing | | | | | | ■ | ■ |



Burnup Chart



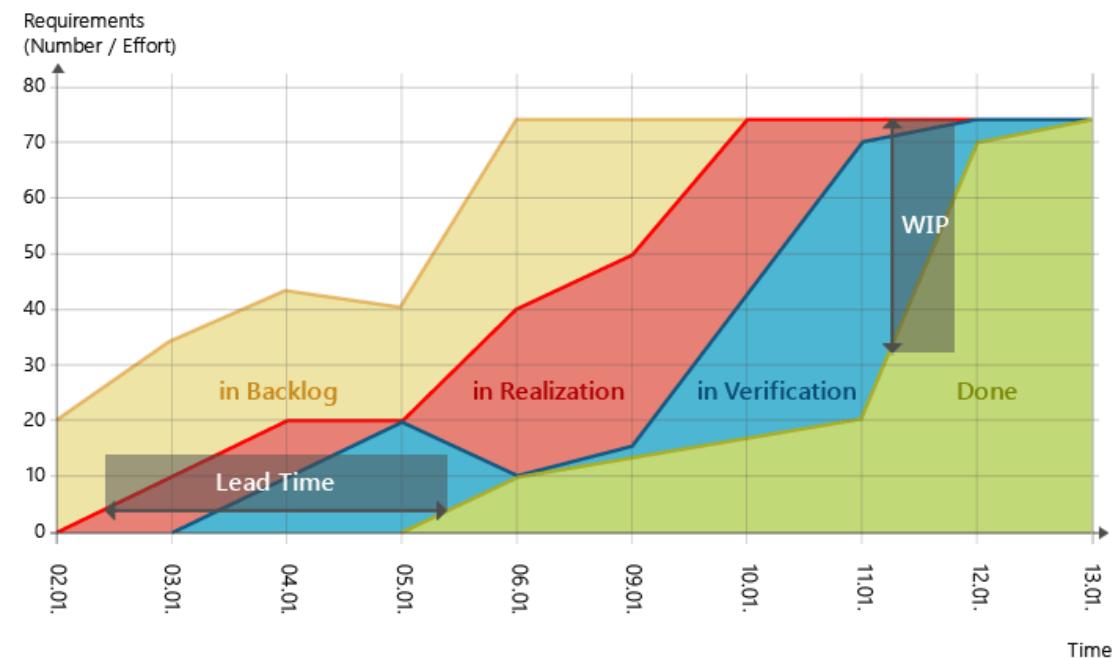
Cumulative Flows Chart



Status Report Techniques (IT Projects)

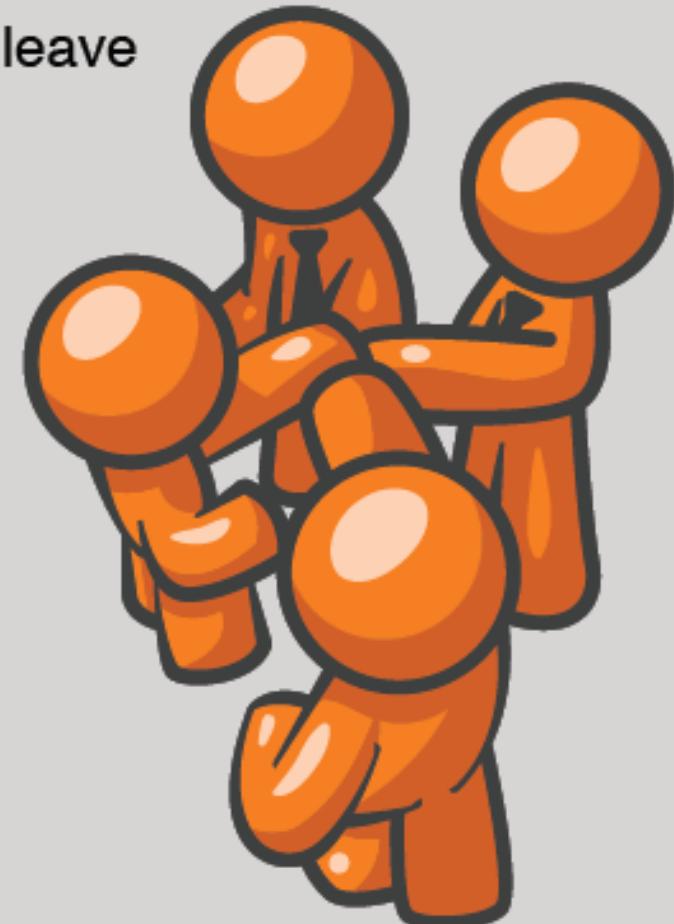
The table compares three status report techniques: Cumulative Flow Diagrams, Agile Burndowns, and Gantt Charts.

| | Cumulative Flow Diagrams | Agile Burndowns | Gantt Charts |
|----------------------|--------------------------|---------------------|------------------|
| Focus | Flow | Features Completion | Tasks Completion |
| Tooling | Simple | Simple | Complex |
| Supported Lifecycles | Any | Agile Only | Any |
| Types of Systems | Ordered & Complex | Ordered & Complex | Ordered Only |
| System Boundary | Expandable | Project Level | Project Level |
| WIP Tracking | Yes | No | No |
| Ownership | Organization | Team Level | Project Manager |



Working Agreements

- Examples:
 - Time of daily scrum
 - Penalty for being late
 - Everyone integrates daily, not just before they leave
 - When you see ugly code -> refactor
 - Whenever you are unsure, ask someone
 - Pair programming and tdd rules
- Related
 - Coding standards
 - Definition of “done”



Technologies

85

- **Trello** web-based, kanban-style, list-making application
- **Jira** a proprietary issue tracking product that allows bug tracking and agile project management.
- **Clickup**
- **Basecamp** or **Asana** for project management
- **Slack** for continuous team communication

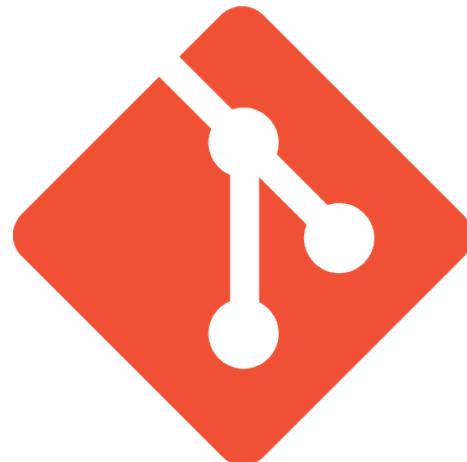
Technologies

86

- **Dropbox** for sharing files etc
- **Github** for better sharing of files etc
- **PowerPoint, MockFlow or pen and paper** for wireframing
- **ScreenFlow or Quicktime** for screen recording or editing
- **Skype, GoogleHangout, or Appear.In** for team meetings

Source Control Management (SCM)

87



git



github
SOCIAL CODING

References

88

- “The scrum guide.” The definitive guide to scrum: The rules of the game, Sutherland, Jeff, and Ken Schwaber, 2013, Scrum.org
<https://www.scrum.org/resources/scrum-guide>
- Software in 30 Days: How Agile Managers Beat the Odds, Delight, Ken Schwaber, 2012, Jeff Sutherland, John Wiley & Sons
- <https://www.scrumalliance.org/>
- <https://www.scruminc.com/>