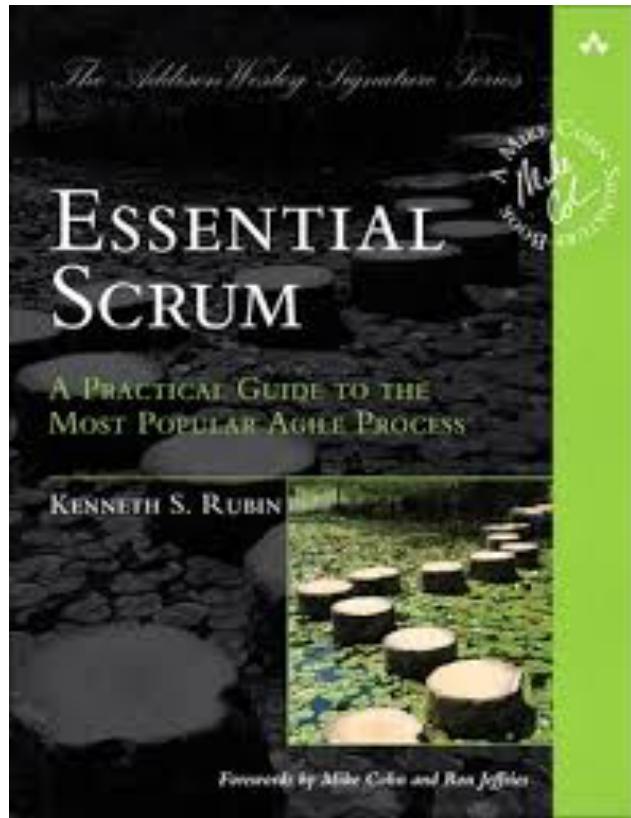


Scrum Framework

Software Engineering 2
(3103313-1)

Amirkabir University of Technology
Fall 1399-1400



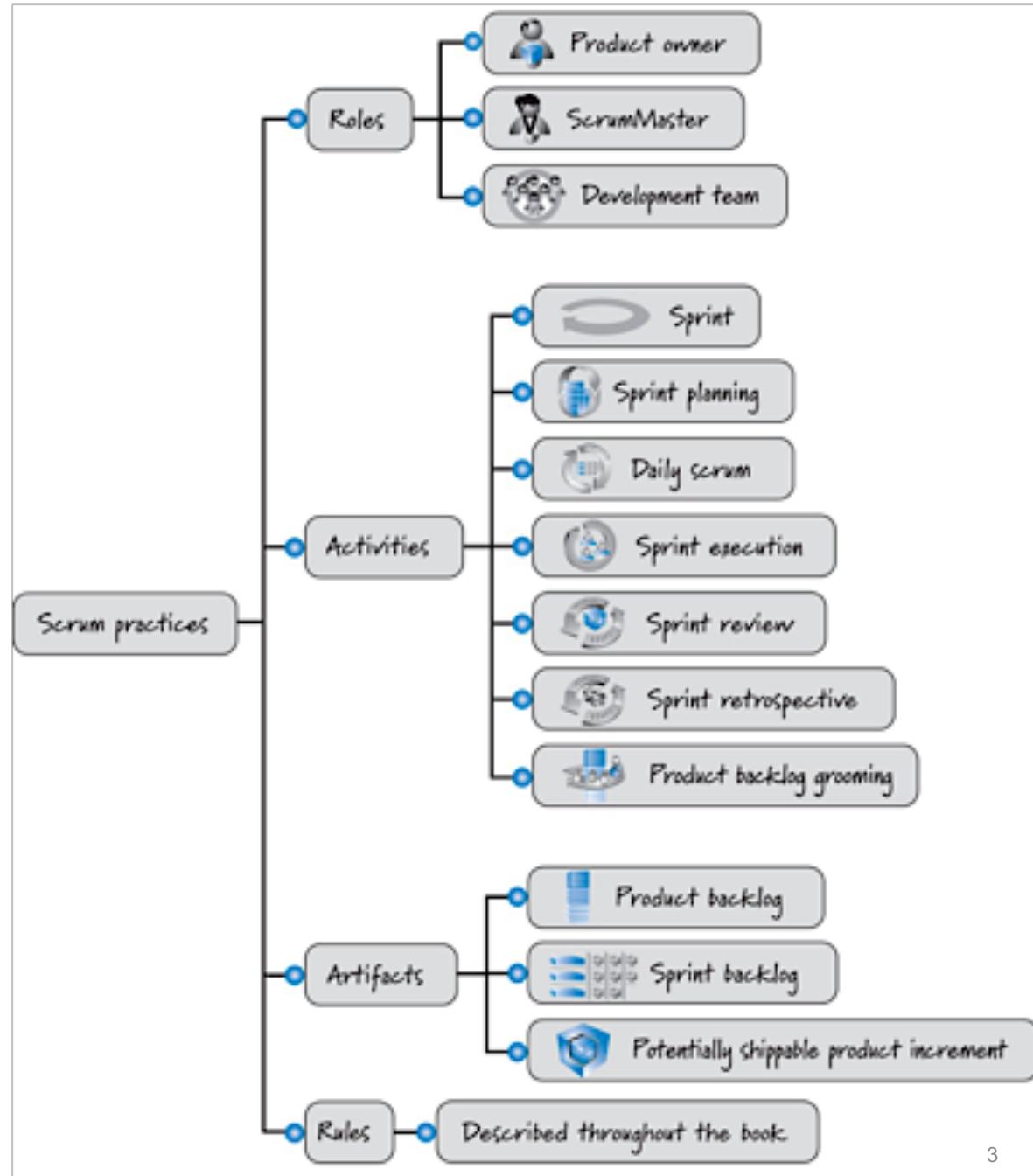
Ken Rubin is Managing Principal at Innolution, a company that provides Scrum and agile training and coaching to help companies develop products in an effective and economically sensible way. A Certified Scrum Trainer, Ken has trained over 20,000 people on agile and Scrum, Kanban,

- proven approaches that can help you implement Scrum far more effectively.
- Whether you are new to Scrum or years into your use, this book will introduce, clarify, and deepen your Scrum knowledge at the team, product, and portfolio levels.
- Drawing from Rubin's experience helping hundreds of organizations succeed with Scrum, this book provides easy-to-digest descriptions.

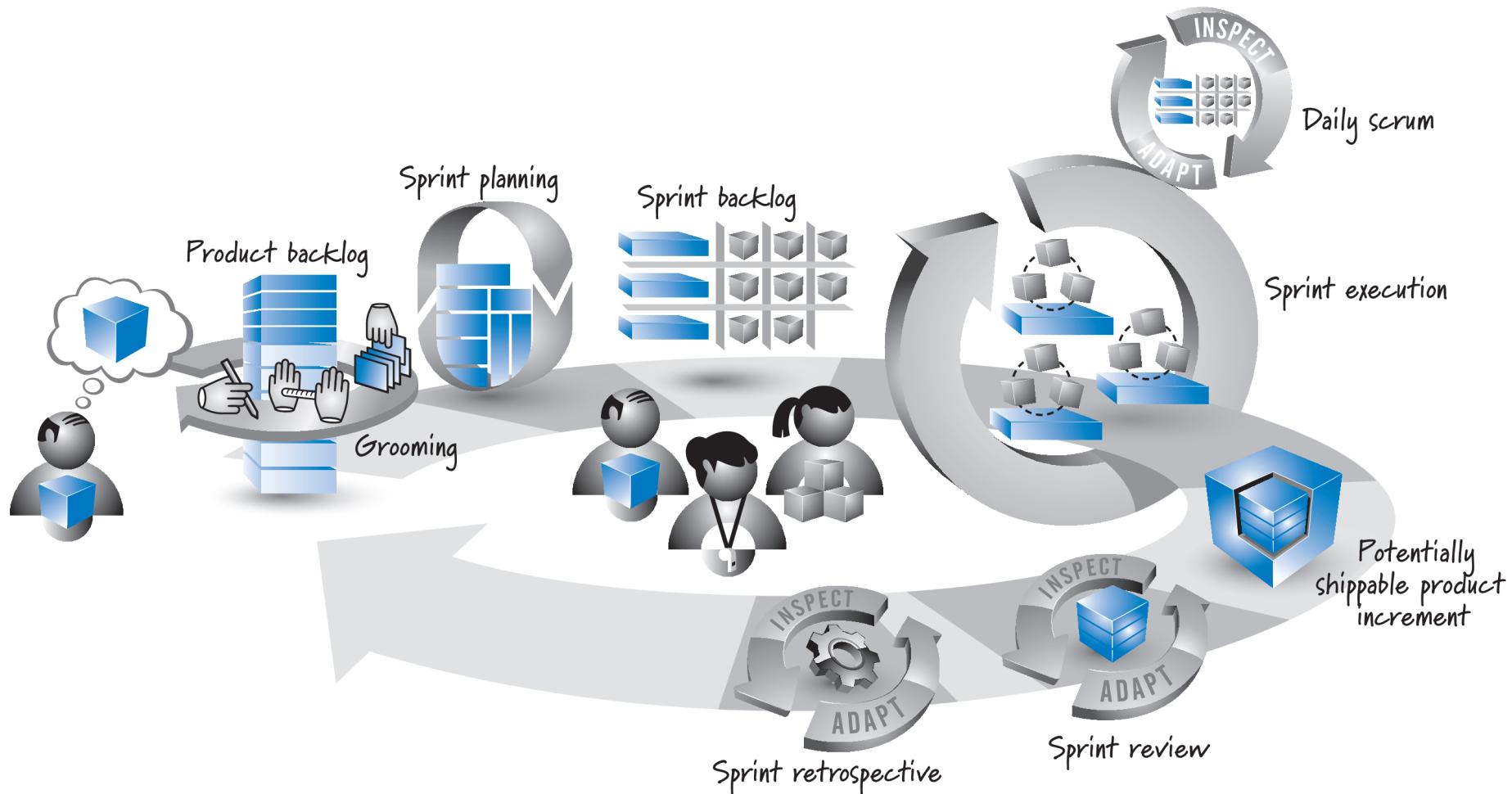


Scrum Practices

- Roles
- Artifacts
- Activities
- Rules



Scrum Process



[Rubin 2012]

Basic Concepts

Scrum Roles: Development Team

- Consists of members having the **skills** to define, develop, test, deploy, maintain, and communicate the various aspects of the product.
- A **cross-functional** collection of various types of people.
- A typical Scrum team is about **5-9** members in size.
- **Self-organizes** to determine the best way to accomplish the goal set out by the Product Owner.

Scrum Roles: Scrum Master

- The person **responsible** for making sure the team **adhere** to Scrum behaviors, rules, and guidelines.
- He/she is the **facilitator** who ensures everybody plays by the rules.
- Not only explains to the team **how various tasks/activities** are done but also explains it to the external stakeholders.
- Has no authority to exert control over the team
 - Functions as a leader, not a project manager or development manager.

Scrum Roles: Product Owner

- Responsible for **maximizing** the **value** of the product.
- Knows the business and the customer. So he/she **defines** **user stories** that matter to the business and the customer, and holds off on other stories.
 - Has a **vision** of what he wants to create.
- Is the **only** person responsible for **maintaining** the product backlog.
- He/she ensures that the **user stories** adhere to the DoR in terms of how requirements are described.

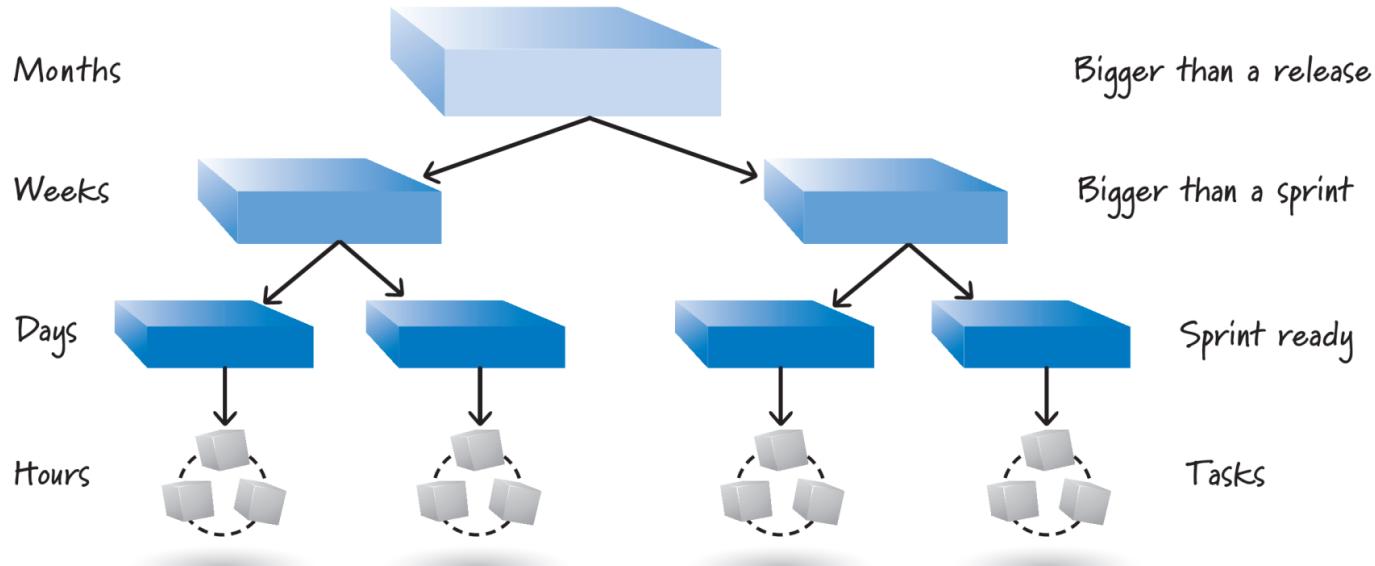
Scrum Artifacts: Product Backlog

- A **continuously** evolving and ordered **list of requirements** and topics, required to ensure the optimal product value is achieved.
- The product backlog is a **single source of truth** for modifications to the product.
- All modifications are on a single list to ensure everyone has the **same view** on what modifications are desired.

User Stories: Card

<p>User Story Title</p> <p>As a <user role> I want to <goal> so that <benefit>.</p> <p>Template</p>	<p>Find Reviews Near Address</p> <p>As a typical user I want to see unbiased reviews of a restaurant near an address so that I can decide where to go for dinner.</p>
---	---

User Stories: Levels of Detail



Preference Training Epic

As a typical user I want to train the system on what types of product and service reviews I prefer so it will know what characteristics to use when filtering reviews on my behalf.

Keyword Training Theme

As a typical user I want to train the system on what keywords to use when filtering reviews so I can filter by words that are important to me.

[Rubin 2012]

Main PBI Types

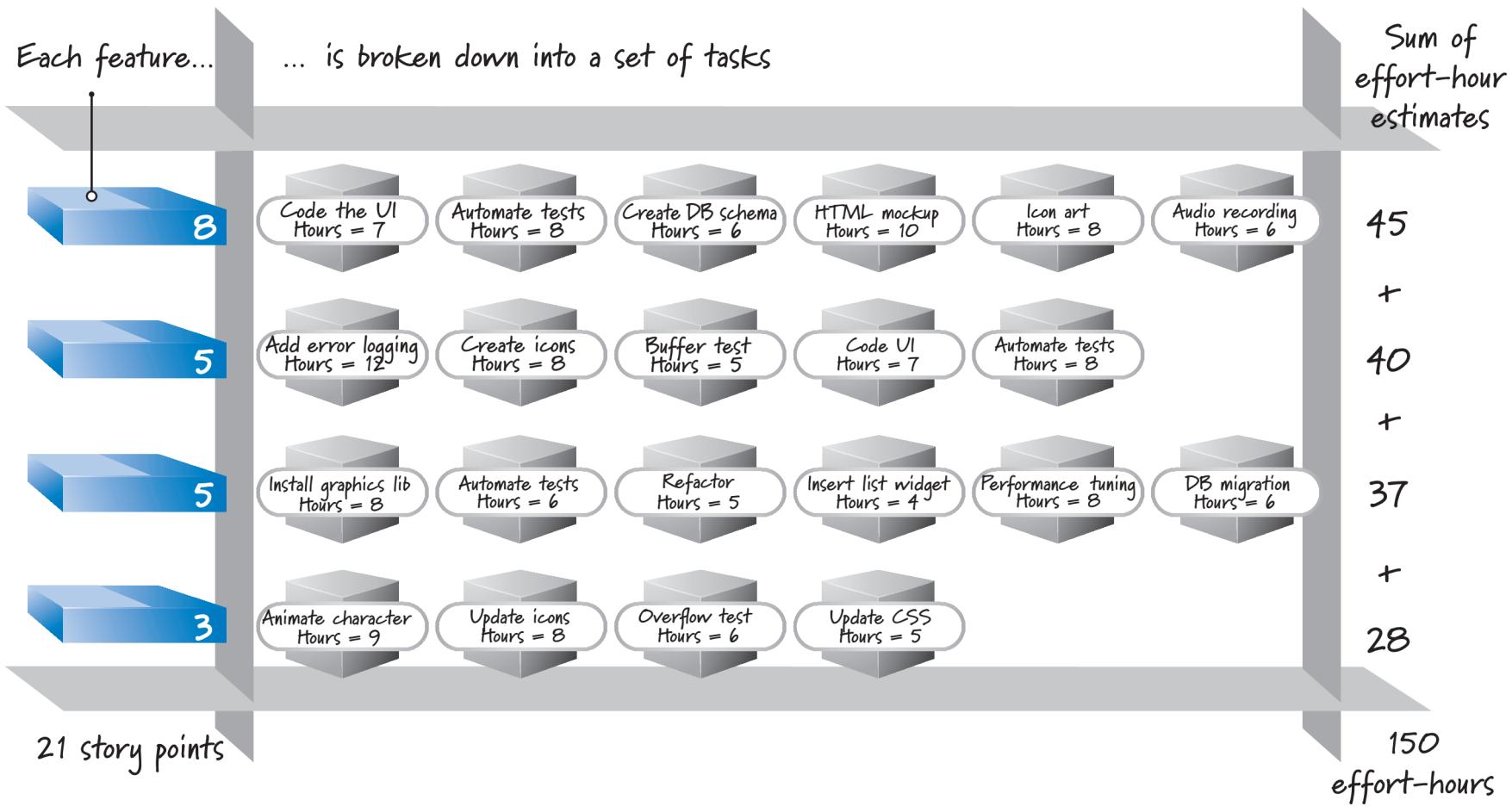
PBI Type	Example
Feature	As a customer service representative I want to create a ticket for a customer support issue so that I can record and manage a customer's request for support.
Change	As a customer service representative I want the default ordering of search results to be by last name instead of ticket number so that it's easier to find a support ticket.
Defect	Fix defect #256 in the defect-tracking system so that special characters in search terms won't make customer searches crash.
Technical improvement	Move to the latest version of the Oracle DBMS.
Knowledge acquisition	Create a prototype or proof of concept of two architectures and run three tests to determine which would be a better approach for our product.

[Rubin 2012]

Scrum Artifacts: Sprint Backlog

- A set of product backlog **items** that have been selected for the **Sprint**.
- Also contains **tasks** required **for delivering** the new feature at the end of a Sprint (for example, activities, such as develop, build, review, and test).
- Contains **an internal prediction** of the Development team only for the next increment.

Sprint Backlog



[Rubin 2012]

Scrum Artifacts: Potentially Shippable Product

- The product **increment**, which is **delivered** at the end of each Sprint.
- If the business requires, this artifact **can be shipped** to production straight away as it does not have any outstanding tasks.

Scrum States: Definition of Ready (DoR)

- A list of rules describing **standards** that must be adhered by **user story** in order to be **accepted** by the Development team.
- Ensures requirements are **clear** from its inception and additional conversations during the Sprint activity are kept to an absolute **minimum**.
- Eliminates the need for discussions as much as possible.

Definition of Ready: Example

Definition of Ready	
<input type="checkbox"/>	Business value is clearly articulated.
<input type="checkbox"/>	Details are sufficiently understood by the development team so it can make an informed decision as to whether it can complete the PBI.
<input type="checkbox"/>	Dependencies are identified and no external dependencies would block the PBI from being completed.
<input type="checkbox"/>	Team is staffed appropriately to complete the PBI.
<input type="checkbox"/>	The PBI is estimated and small enough to comfortably be completed in one sprint.
<input type="checkbox"/>	Acceptance criteria are clear and testable.
<input type="checkbox"/>	Performance criteria, if any, are defined and testable.
<input type="checkbox"/>	Scrum team understands how to demonstrate the PBI at the sprint review.

[Rubin 2012]

Scrum States: Definition of Done (DoD):

- A list of **criteria** describing which topics need to be addressed in order for a **product** to be considered “**potentially shippable**”.
- Containing **restraints**, such as code, unit plus coverage tested, functionally tested, performance tested, user acceptance tested, reviewed, and documented.
- The team only **delivers** that part of the product which **adheres to criteria** in the list.

Scrum Events: The Sprint

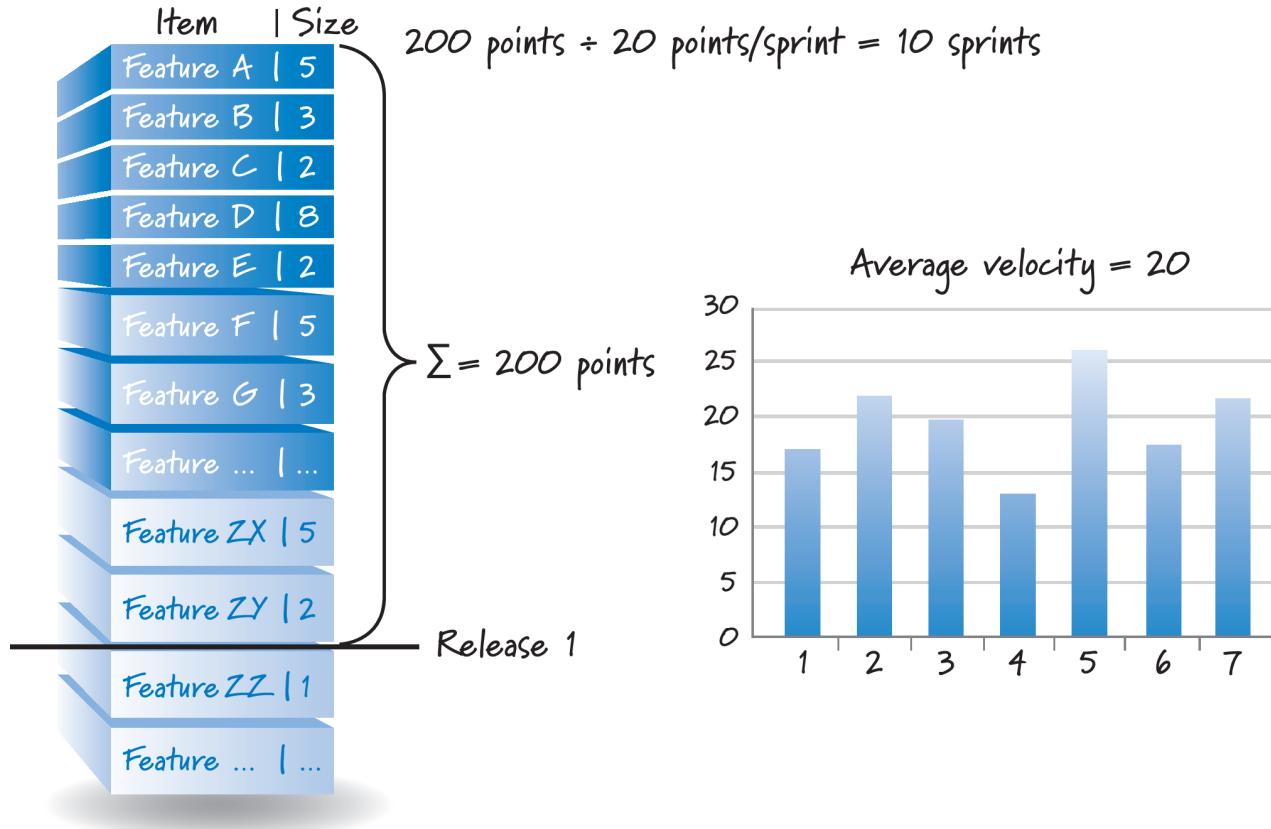
- A **predefined** amount of time during which activities on the Sprint backlog are **performed**.
- Sprints are often defined per week or every two weeks, but longer duration is also used.
- Shortening a Sprint results in shorter backlog refinement, poker, and retrospective sessions as the number of topics to discuss will become much lesser as well.

Scrum Events: The Planning Poker Session

- At the start of each Sprint (and often during the backlog refinement session), the team plays **Planning Poker** in order to **quantify** the amount of work that is required to fulfill a new activity.
- A **sizing** is agreed by the entire team and a '*common view*' is established on the topics at hand.
- Sizing will become more **reliable over time**, so the team starts to exhibit a **specific burn rate**, defining how fast the team is performing.

How much time do we need to create the features in Release 1?

Estimated size ÷ measured velocity = (number of sprints)



[Rubin 2012]

Planning Poker Cards

- Each development team member is provided with a set of Planning Poker cards.



Planning Poker: Common Interpretation of Cards (1)

Card	Interpretation
0	Not shown in Figure 7.11 but included in some decks to indicate that the item is already completed or it is so small that it doesn't make sense to even give it a size number.
1/2	Used to size tiny items.
1, 2, 3	Used to size small items.
5, 8, 13	Used to size medium items. For many teams, an item of size 13 would be the largest they would schedule into a sprint. They would break any item larger than 13 into a set of smaller items.
20, 40	Used to size large items (for example, feature- or theme-level stories).
100	Either a very large feature or an epic.
∞ (infinity)	Used to indicate that the item is so large it doesn't even make sense to put a number on it.

[Rubin 2012]

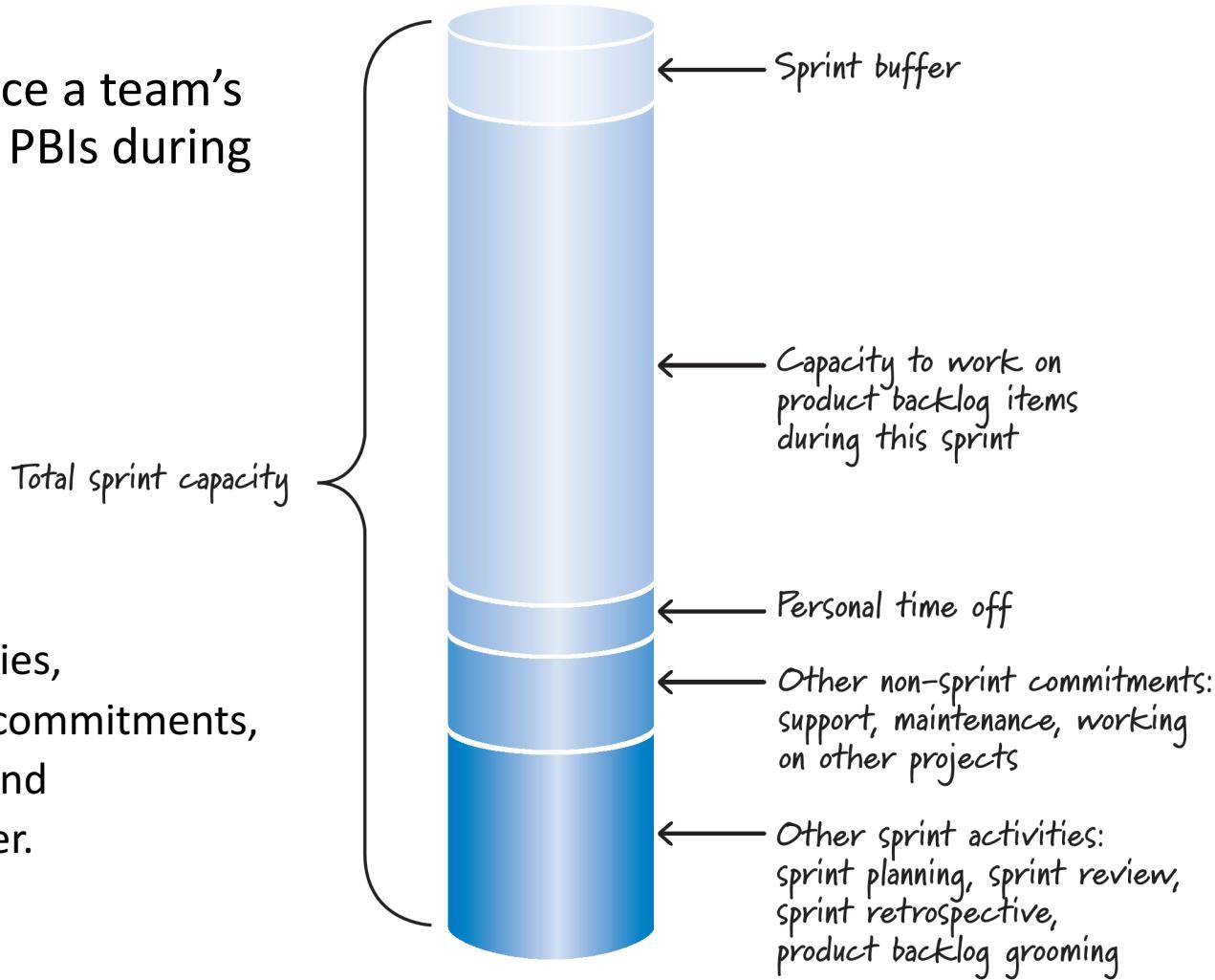
Planning Poker: Common Interpretation of Cards (2)

Card	Interpretation
? (question mark)	Indicates that a team member doesn't understand the item and is asking the product owner to provide additional clarification. Some team members also use the question mark as a way of recusing themselves from the estimation of the current item—typically because the person is so far removed from the item he has no idea how to estimate it. Although it is acceptable not to estimate, it is unacceptable not to participate! So, just because someone doesn't feel comfortable offering up an estimate, that doesn't allow him to disengage from the conversation or responsibility of helping the team find a consensus estimate.
π (pi)	In this context, π doesn't mean 3.1415926! Instead, the pi card is used when a team member wants to say, "I'm tired and hungry and I want to get some pie!" Some Planning Poker decks use a coffee cup image instead of pi. In either case, this card emphasizes an important point. The team members can engage in an intense estimation discussion for only a limited period of time (perhaps an hour or two). At that point, they really do need a break or the enthusiasm for the discussion will turn into an effort to figure out how to quickly get the estimates done, regardless of their accuracy or the learning that takes place. If people are playing the pi card, the team needs to take a break.

[Rubin 2012]

Determining Capacity

- Several factors reduce a team's capacity to work on PBIs during a sprint.



- Other Scrum activities,
- non-sprint-related commitments,
- personal time off, and
- the need for a buffer.

Sprint Execution: Process



[Rubin 2012]

Flow Management: Swarming

- **Swarming:** Team members with available capacity gather to work on an item to finish what has already been started before working on new items.
 - Teams with a **Musketeer attitude** and some degree of **T-shaped skills** swarm.
 - **Musketeer attitude:** “All for one and one for all.” Team members collectively own the responsibility of getting the job done.
 - **T-shaped skills:** Having deep skills in a preferred functional area, discipline, or specialty, but also able to work outside the specialty area.
- Misconceptions:
 - Swarming is not a strategy to ensure that team members are 100% busy.
 - Swarming does not necessarily mean working on only one PBI at a time.
 - Sprint execution should not be treated like a **mini-waterfall** project.
 - In this approach, we work on all PBIs at the same time: We first analyze all the items, then design them all, then code them all, and then test them all.
 - This approach is very risky: If the team does not finish all the testing, we could end up with 90% of each feature complete, but no feature 100% done.

Scrum Events: The Daily Stand up

- Every day, the team comes up to the Scrum Board where each member will explain
 1. What **did I accomplish** since the last daily scrum?
 2. What do I **plan to work** on by the next daily scrum?
 3. What are the **obstacles** that are preventing me from making progress?
- **Impediments**, blocking team members from progressing, are also raised in this standup.
- A standup should never take more than **15 minutes** of time.

Scrum Events: The Daily Stand up *Rules*

- At the daily scrum, only the **pigs** should talk; the chickens, if any, should attend as **observers**.



By Clark & Vizzdos

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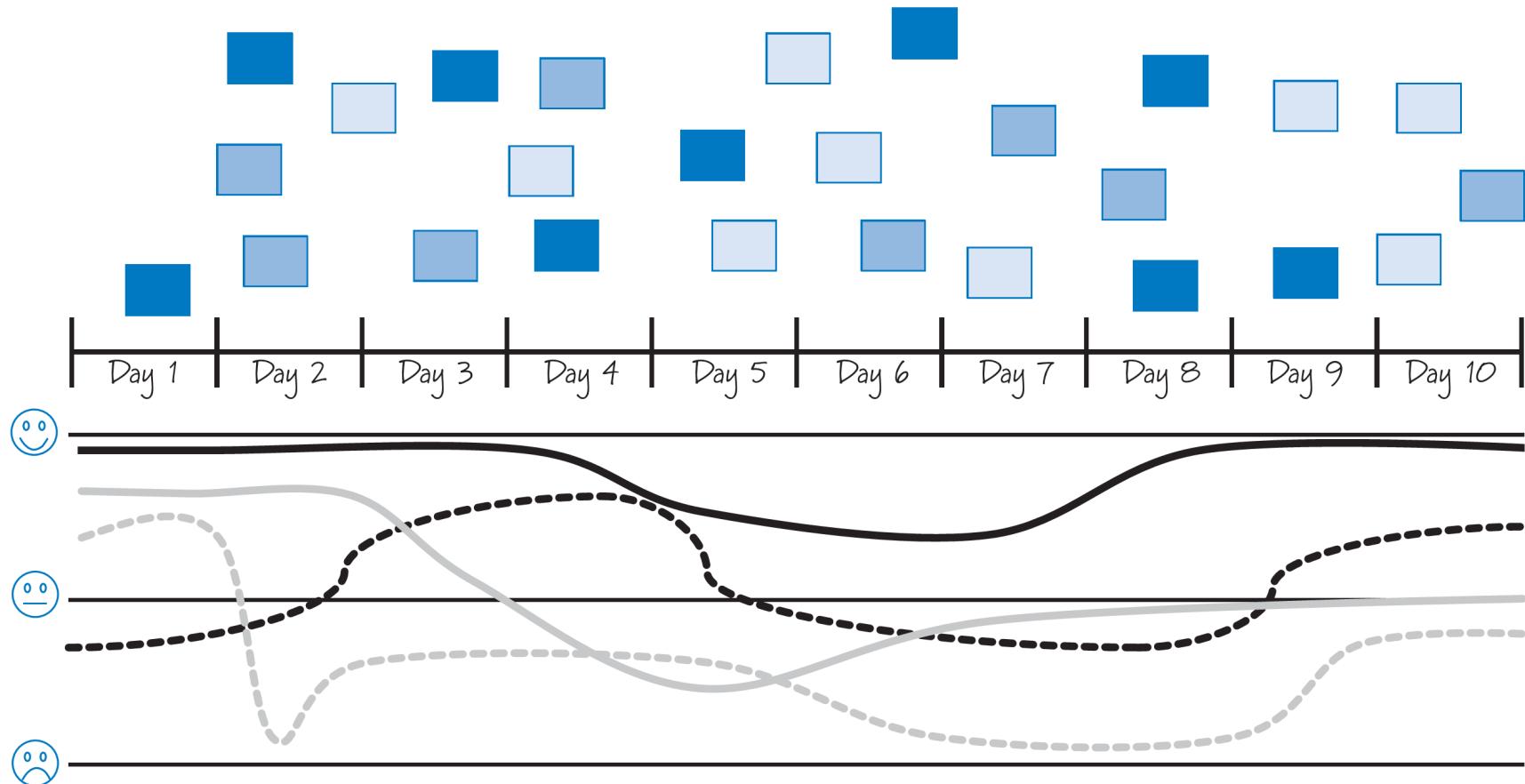
Scrum Events: The Sprint Review (Product Demo)

- Each Sprint closes off with a **product demo** for the team, Product Owner, and the business/customer.
- A way to provide and receive **feedback** from all stakeholders and **inject** this feedback into the product during the next Sprint.
- **Attending** the product demo is **essential** for improving collaboration, the next product backlog, and the product!

Scrum Events: The Team Retrospective

- After every Sprint, the team **evaluates** what went well and what went not-so-well, thus could **improve**.
- This is an important aspect of Scrum to **continuously improve** on the *way of working*.

Share Context: Event Timeline and Emotions Seismograph



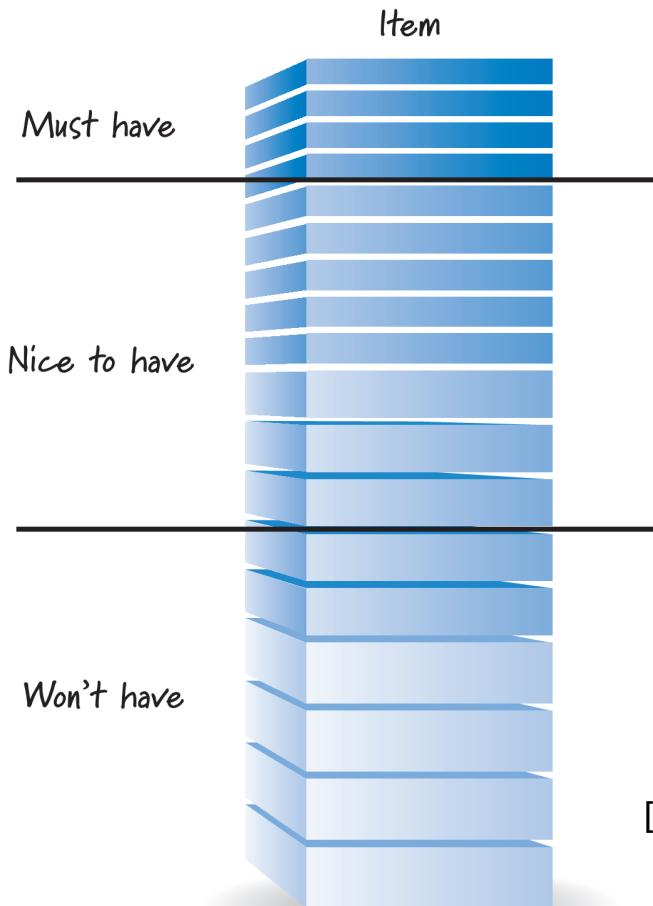
[Rubin 2012]

Scrum Events: The Backlog Refinement Session

- Used to anticipate and define what user stories are **expected** in the next Sprint.
- Communicate **uncertainties** if user stories are unclear.
- Typically takes place **halfway** to a Sprint.
- leaving room for *business* and *Product Owner* to **improve** user stories where required before next sprint.

Product Backlog: Release Flow Management

- The product backlog must be groomed in a way that **supports ongoing release planning** (the flow of features within a release).
- It is useful to partition the product backlog into three areas:
 - Must-have
 - Nice-to-have
 - Won't-have



[Rubin 2012]

Scrum Flow

1. Together with Product Owner, the team **defines the goal** for the next Sprint.
2. The team performs a Planning Poker session to **determine** the number of **stories** for the Sprint.
3. The **tasks that fit** the Sprint and adheres to the rules of **DoR**, such as tasks are clear enough to be fully processed by the team, are added to the Sprint backlog.
4. The **Sprint starts** and engineers will work uninterrupted on agreed tasks. The Product Owner is **not allowed to update** tasks/user stories in the middle of the Sprint.

Scrum Flow

5. At the end of the Sprint, the **updates** are **demonstrated** to the customer.
6. The **Sprint review** (a retrospective) is performed allowing the process to improve.
7. A **product backlog refinement** is conducted to help the Product Owner to get user stories to a state where they adhere to DoR. This activity can also be performed in the middle of a Sprint if required.
8. The Product Owner **adds updated** stories to the product backlog.

Communicating: Scrum Board

Backlog	To Do	In Progress	Testing	Done
<p>Feature 10 hrs HIGH</p>	<p>Bug Fix 2 hrs Medium</p>			
<p>Update 4 hrs Low</p>	<p>Research 3 hrs Medium</p>			
<p>Content 2 hrs HIGH</p>				

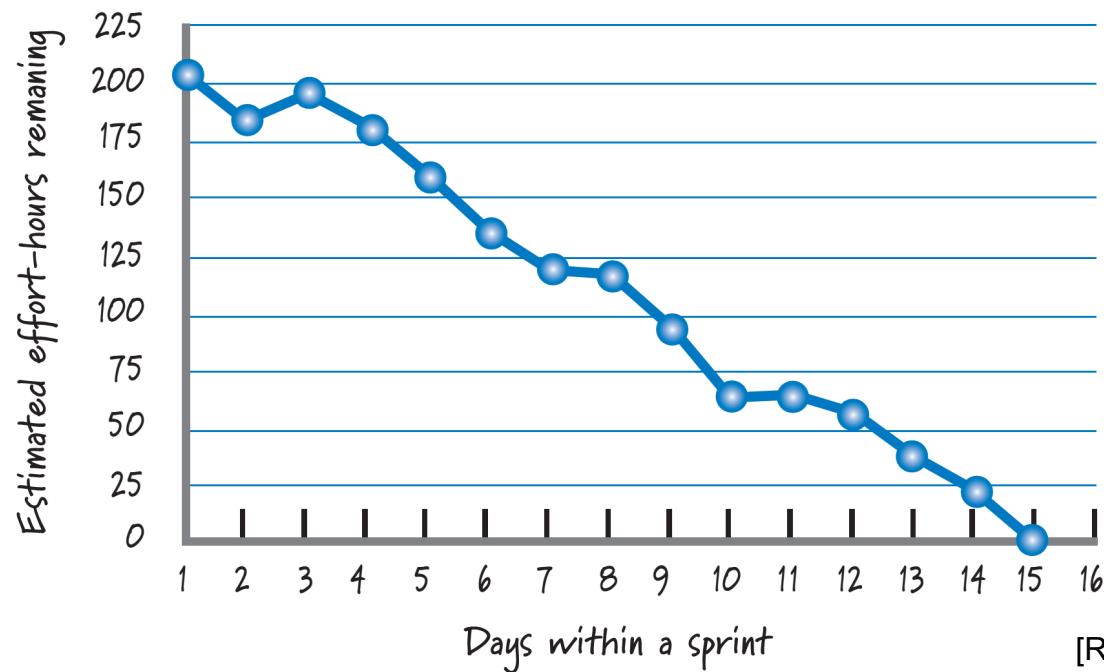
Communicating: Task Progress Table

Tasks	D1	D2	D3	D4	D5	D6	D7	D8	D9	...	D15
Task 1	8	4	4	2							
Task 2	12	8	16	14	9	6	2				
Task 3	5	5	3	3	1						
Task 4	7	7	7	5	10	6	3	1			
Task 5	3	3	3	3	3	3	3				
Task 6	14	14	14	14	14	14	14	8	4		
Task 7						8	6	4	2		
Tasks 8–30	151	139	143	134	118	99	89	101	84		0
Total	200	180	190	175	155	130	115	113	90		0

[Rubin 2012]

Communicating: Sprint Burndown Chart

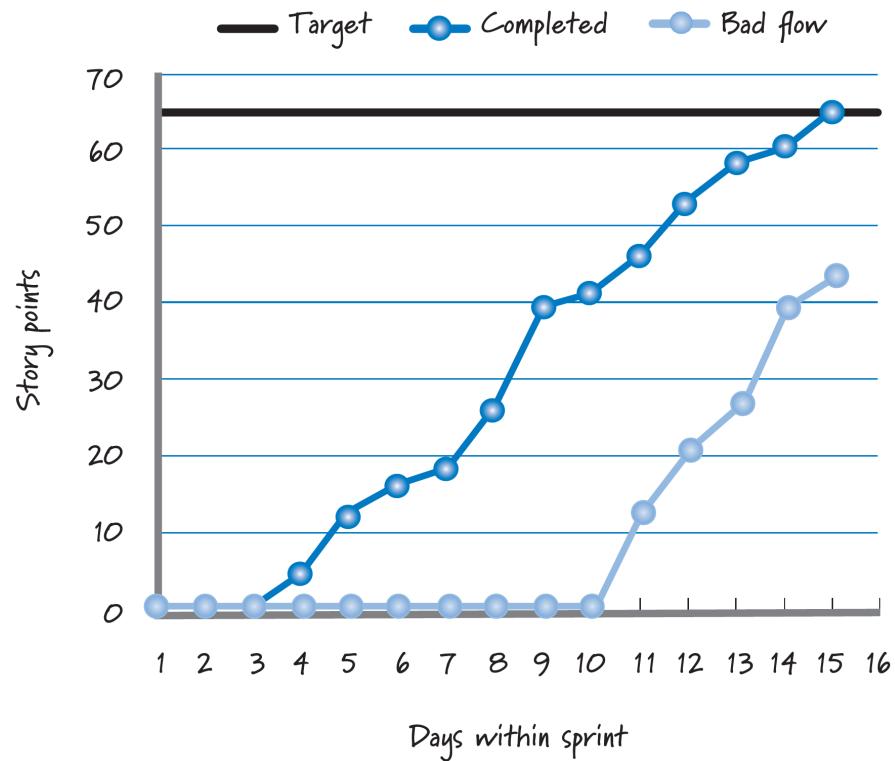
- The result of plotting the “Total” row, which is the sum of the **remaining effort-hours** across all tasks on a given day, on a graph.



[Rubin 2012]

Communicating: Sprint Burnup Chart

- Represents the amount of **work completed** toward achieving the sprint goal.



[Rubin 2012]

Communicating: Impediment Board

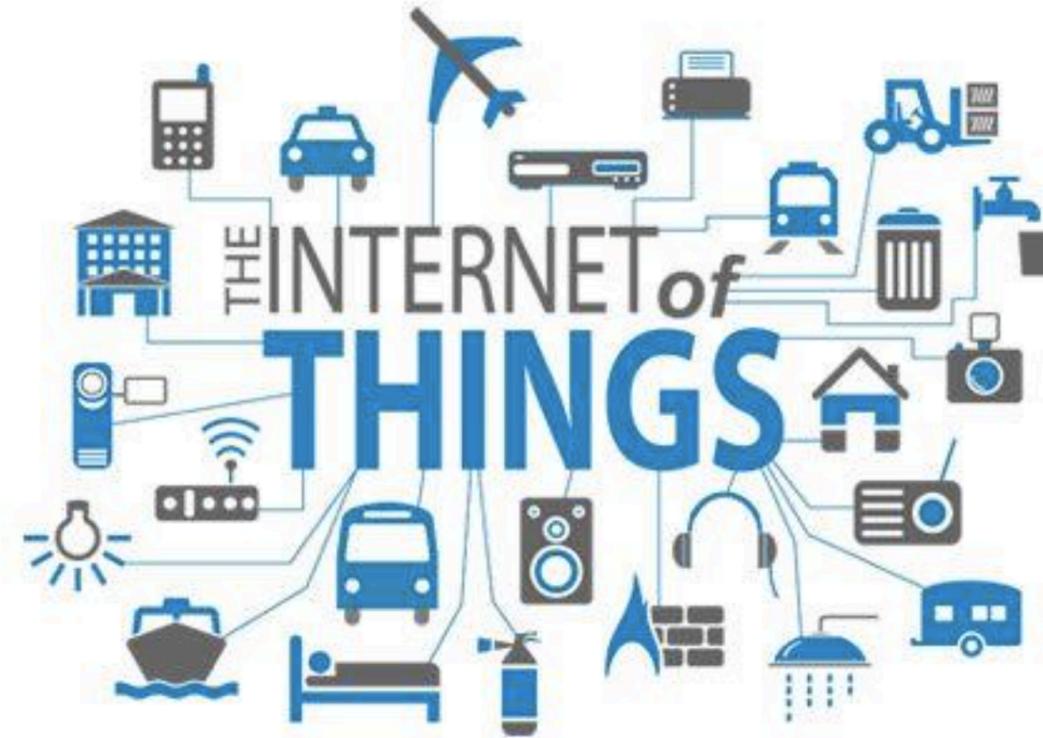
- This board contains all (external) topics which **prevent** the team from doing its work.
- Typically, the **Scrum Master** ensures impediments are handled.
- e.g: “not enough desks”, “team divided over multiple locations slows us down”, and “network is down several times a day”.

Improvement Cycles

- Improve Product Backlog
 - The backlog, product, and collaboration are **improved** over time during each of the **product demo** sessions.
- Improve Process
 - The process is improved over time during each **retrospective** in which topics for improvement are discussed.

break

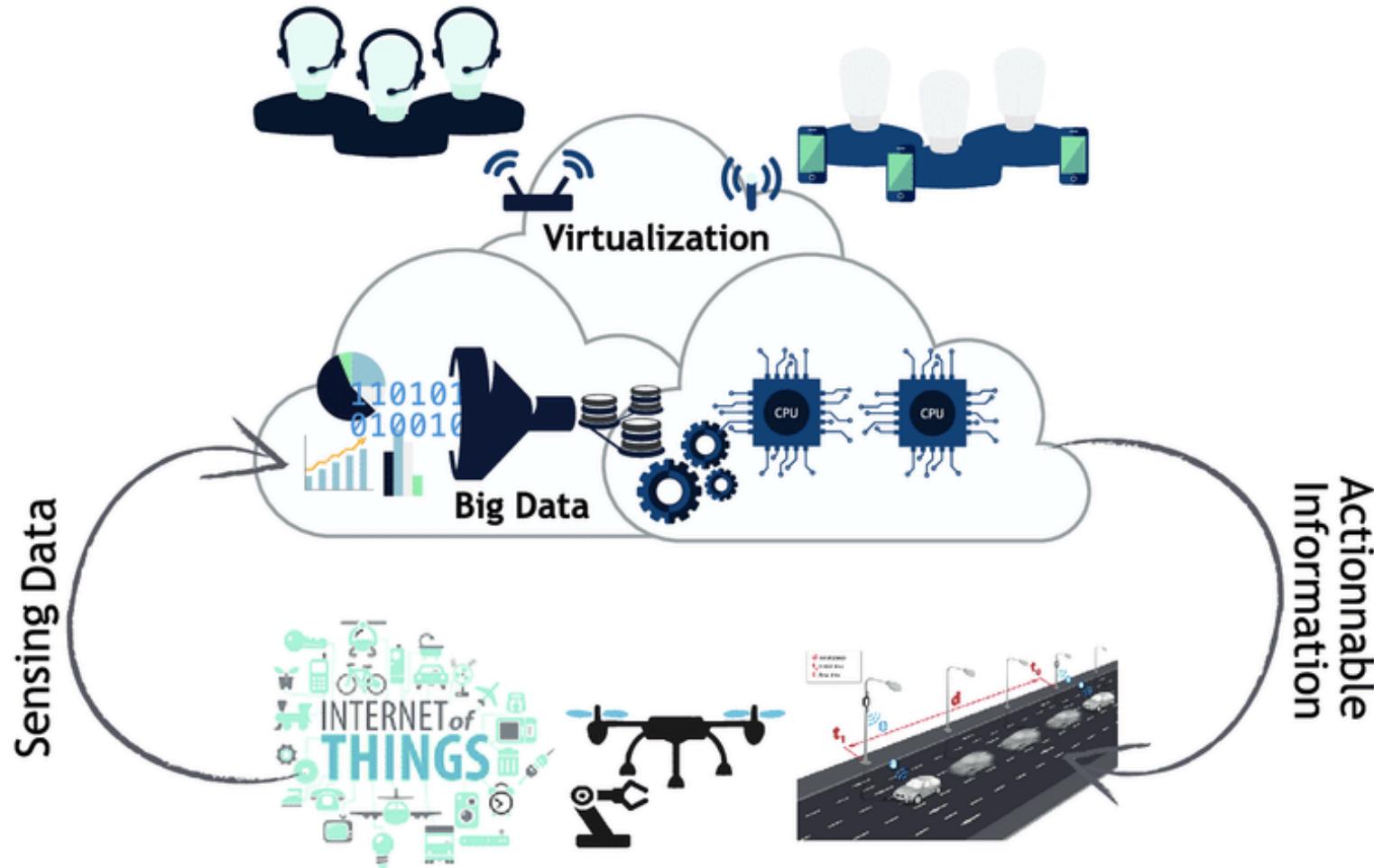




Kuva 1. Internet of Things. Lähde: Huffington Post

The **Internet of things (IoT)** is the network of devices, vehicles, and home appliances that contain electronics, software, actuators, and connectivity which allows these things to connect, interact and exchange data.

Cyber-Physical Systems



Platooning

- Automated highway system (AHS), or smart road
- Driverless cars or autonomous driving
- V2V communication
- Policies, regulations, ...



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✓ [Volvo Trucks and FedEx demonstrate Truck Platooning](#)

! [Daimler: There is 'no business case' for truck platooning](#)

Six brands of automated trucks- [DAF Trucks](#), [Daimler Trucks](#), [Iveco](#), [MAN Truck & Bus](#), [Scania AB](#) and [Volvo Trucks](#) - ran on public roads from several European cities to the Netherlands