SLIIT UNI
THE KNOWLEDGE UNIVERSITY

Modern Software Development Methodologies

AGILE

Content

- Traditional Vs Modern Methodologies
- Why Agile?
- Agile's Role in Different Domains
- Agile Development Methodologies
- SCRUM

Traditional Vs Modern Methodologies

Traditional Way

- High Cost
- Changes are not acceptable
- Can detect errors only in the latter part of the
- SDLC
- Less or no iterations
- Lack of transparency

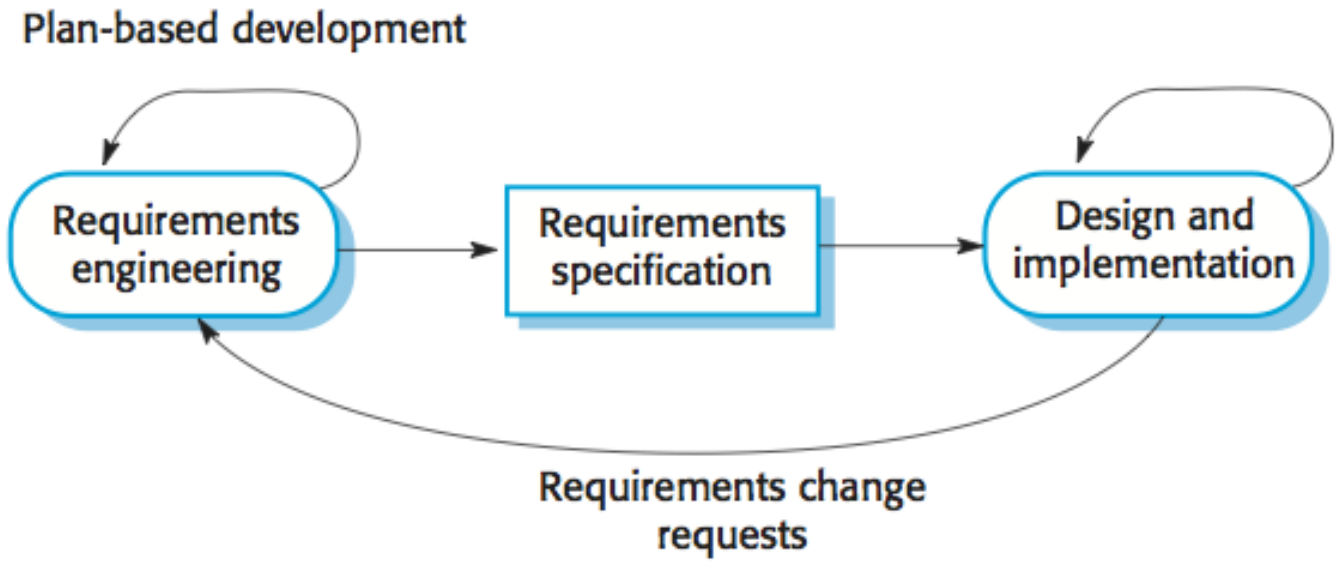
Modern Way

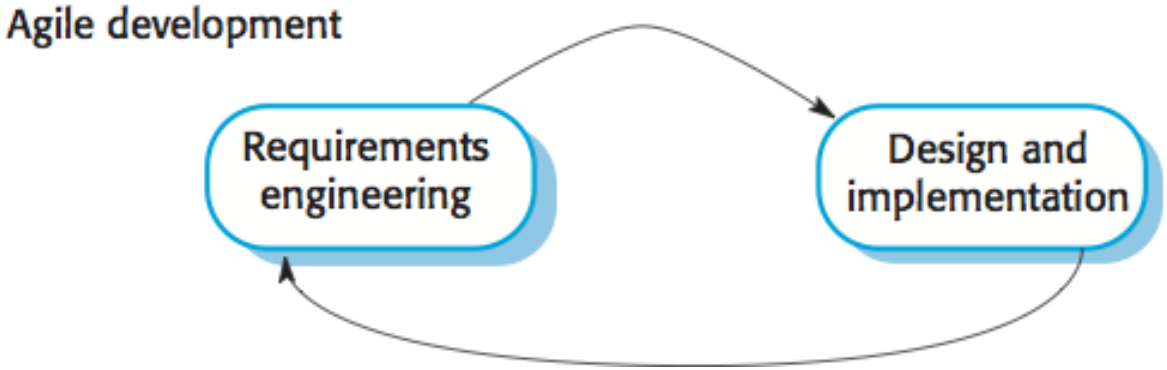
- Highest Value
- High Quality
- Shortest Time

Why Agile?

- Agile approaches' emphasis on adaptability, teamwork, and iterative development has led to their widespread adoption in the domains of software engineering (SE), computer science (CS), and computer science and network engineering (CSNE) and all these domains come under Information Technology

Why Agile?


Plan-based development
Requirements engineering
Requirements specification
Design and implementation
Requirements change requests


Agile development
Requirements engineering
Design and implementation

Agile's Role in SE, CS, and CSNE:

Software Engineering (SE):

- Because of their iterative nature and emphasis on continuous integration and delivery, agile approaches are especially well-suited for SE.

Agile's Role in SE, CS, and CSNE:

Computer Science (CS):

- Agile concepts can be used in CS for a variety of projects, such as system design, research, and algorithm development, encouraging cooperation and flexibility.

Agile's Role in SE, CS, and CSNE:

Computer Science and Network Engineering (CSNE):

- Agile's adaptability makes it valuable for CSNE projects, which often involve complex network infrastructure and require flexibility in design and implementation.

Agile Development Methodologies

What is Agile?

- Agile Software Development is an umbrella term for a set of methods and practices based on the Values and Principles expressed in the Agile Manifesto

- Agile Manifesto is a formal proclamation of 4 key Values and 12 Principles

4 Key Values

1. Individuals and Interactions

2. Working Software

3. Customer Collaboration

4. Responding to Change

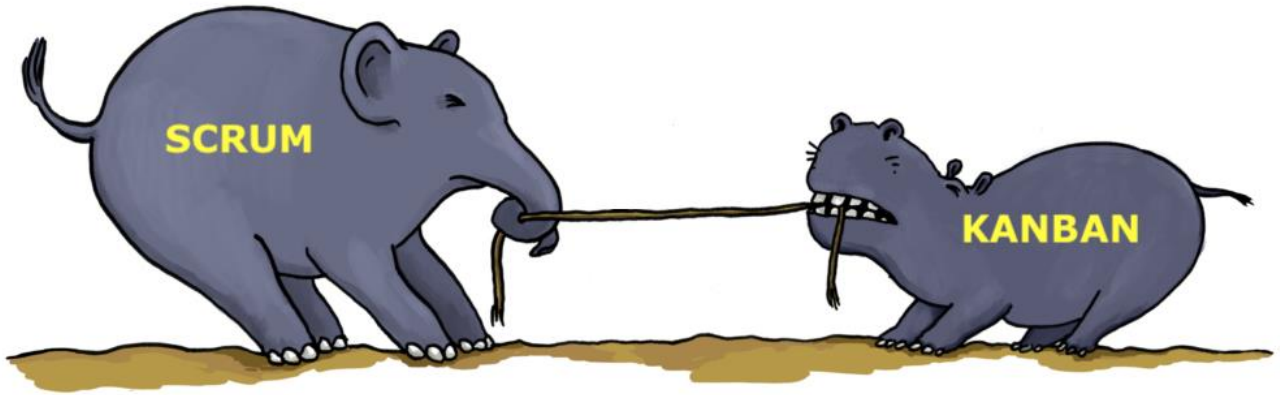
4 Key Values Vs Traditional

In Agile	In Traditional Ways
1. Individuals and Interactions	Over Process and Tools
2. Working Software	Over Comprehensive Documentation
3. Customer Collaboration	Over Contract Negotiation
4. Responding to Change	Over Following Plan

Agile Methodologies and Practices

- Scrum
- Kanban
- eXtreme Programming (XP)
- Test Driven Development (TDD)
- Pair Programming
- Behavior Driven Development (BDD)
- Lean Software Development

SCRUM



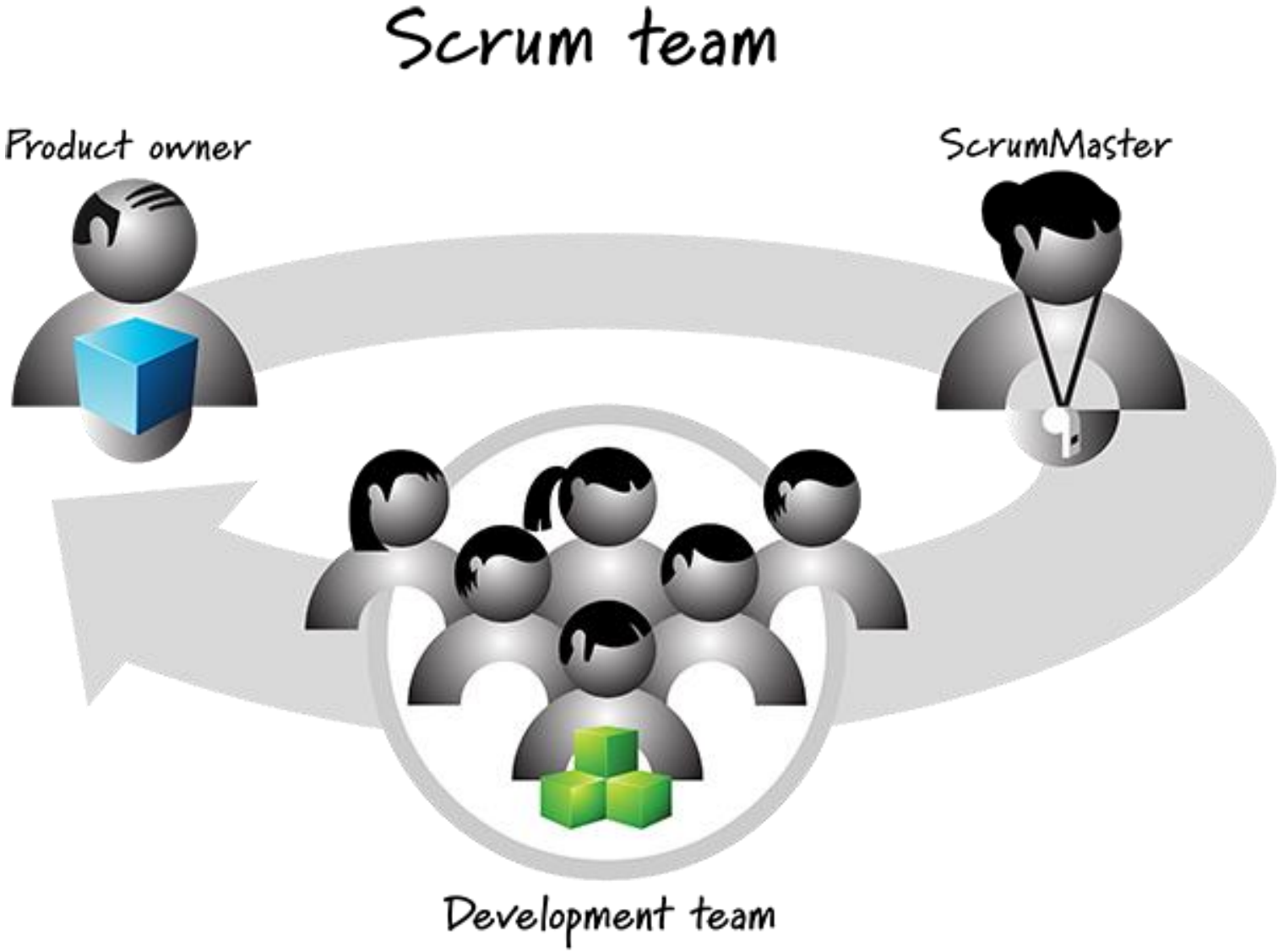
What is SCRUM?

- SCRUM is an Agile approach for developing innovative products and services
- There are many roles are involved (SCRUM Roles)
- We have to start the process by creating the Product Backlog
- Includes components as roles, activities and artefacts

SCRUM Roles

- SCRUM Development efforts consist of one or more SCRUM teams
- Each made up of SCRUM roles:
    - Product Owner
    - ScrumMaster
    - Development Team
- There Can be other roles when using SCRUM, but the SCRUM Framework requires only the three listed here.

SCRUM Roles



SCRUM Roles

- Product Owner:
  - The Empowered central point of product leadership
  - Responsible for deciding which features and functionalities to build
  - Maintains and Communicates to all the other participants
  - Client's representative
  - Decide on release date and content
  - Accept or Reject Work Results

SCRUM Roles

- ScrumMaster:
  - Helps everyone involved understand and embrace SCRUM values and practices
  - Represents Management to the Project
  - Shield the team from external interferences
  - Takes leadership role in removing
  - The ScrumMaster has no authority to exert control over the team, so this role is not the same as the traditional role of project manager

SCRUM Roles

- Development Team:
  - The development team self-organizes to determine the best way to accomplish the goal set out by the product owner
  - Cross Functional
  - Work Collaboratively
  - Share Responsibilities
- User/ Stakeholders
  - Individuals who will use the product or have a stake in its outcome

SCRUM Artifacts

- Product Backlog
- Sprint Backlog
- Burn Down Charts

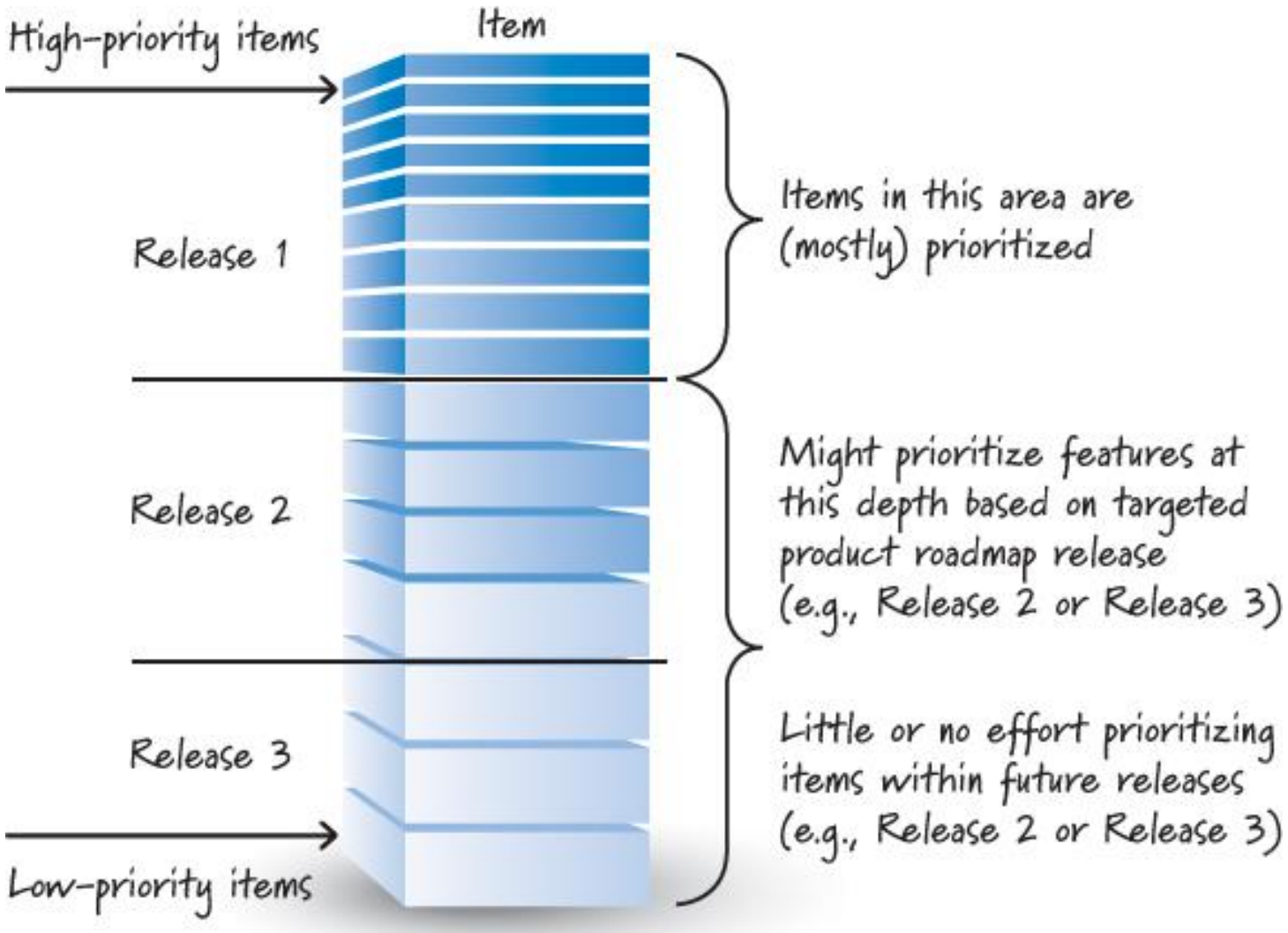
Product Backlog

- Using SCRUM, we always do the most valuable work first
- The product backlog is a prioritised list of work for the development team that comes from the product plan and its requirements.
- There are many ways to store the product backlog:
  - As a collection of index cards or post-its on the wall
  - In Excel
  - Write as user stories

Product Backlog

- Product Backlog items are placed in the correct sequence.
- High Value items appear at the top of the product backlog
- Lower-valued items appear towards the bottom
- The Product backlog is a constantly evolving artifact

Product Backlog

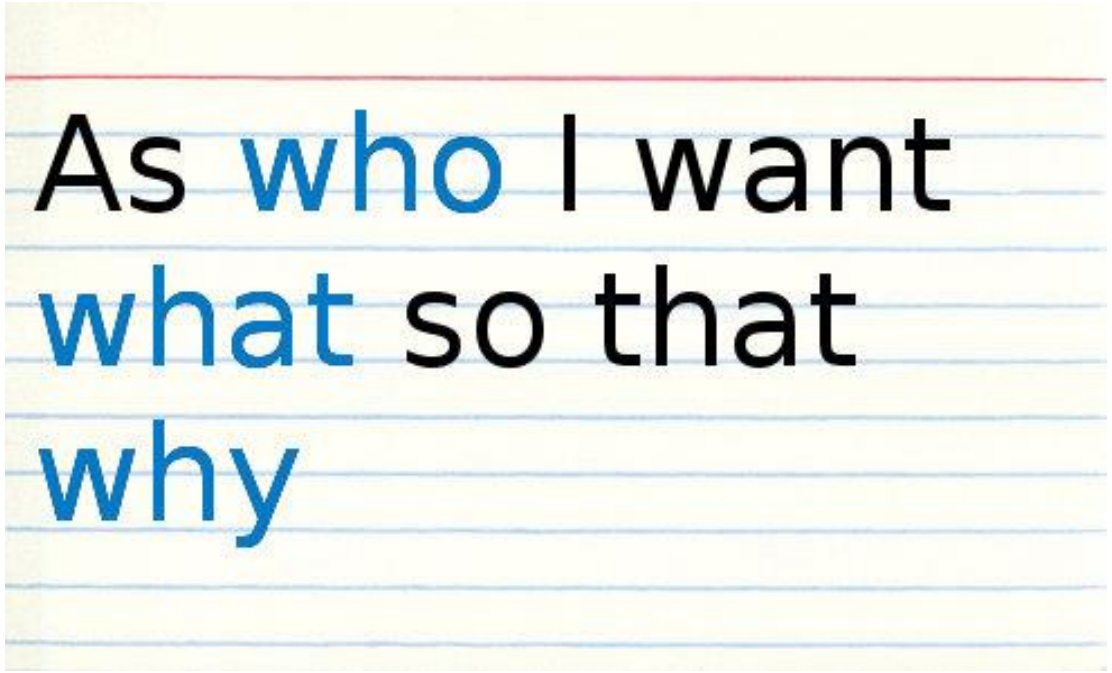


User Story

- This is a concise description of a Functionality that will be valuable to users of the system
- User stories are a convenient format for expressing the desired business value for many types of product backlog items
- User stories are crafted in a way that makes them understandable to both business and technical people

User Story Template

As a <user role> I want to <goal> So that <benefit>



Writing User Stories

Example – Online Banking System

- As a Customer I want to view account summary online so that I do not have to wait till the month end to view the statement.
- As an Employee I want to add new customers online so that it saves my time.
- As a User I want to update profile details so that my details are up-to-date

Activity 01

Write 5 detailed User Stories for Library Management System

Example:

- As a member I want to view my borrowing history so that I can easily get the details of the books I referred.

Activity 02

Compare these User Stories

A	B
As a recruiter I want to review resumes from applicants to one of her ads.	As a recruiter I want to manage the ads she has placed.

Compare these User Stories

A	B
As a user I want to have my previous orders stored in the database so they will be there permanently	As a repeat customer I want to access old orders so that I can quickly purchase the same order again.

Compare these User Stories

A	B
As a driver I want to find the store with the shortest drive time so I can get there quickly.	As a driver I want to find directions to a store in Google Maps so I can get there quickly.

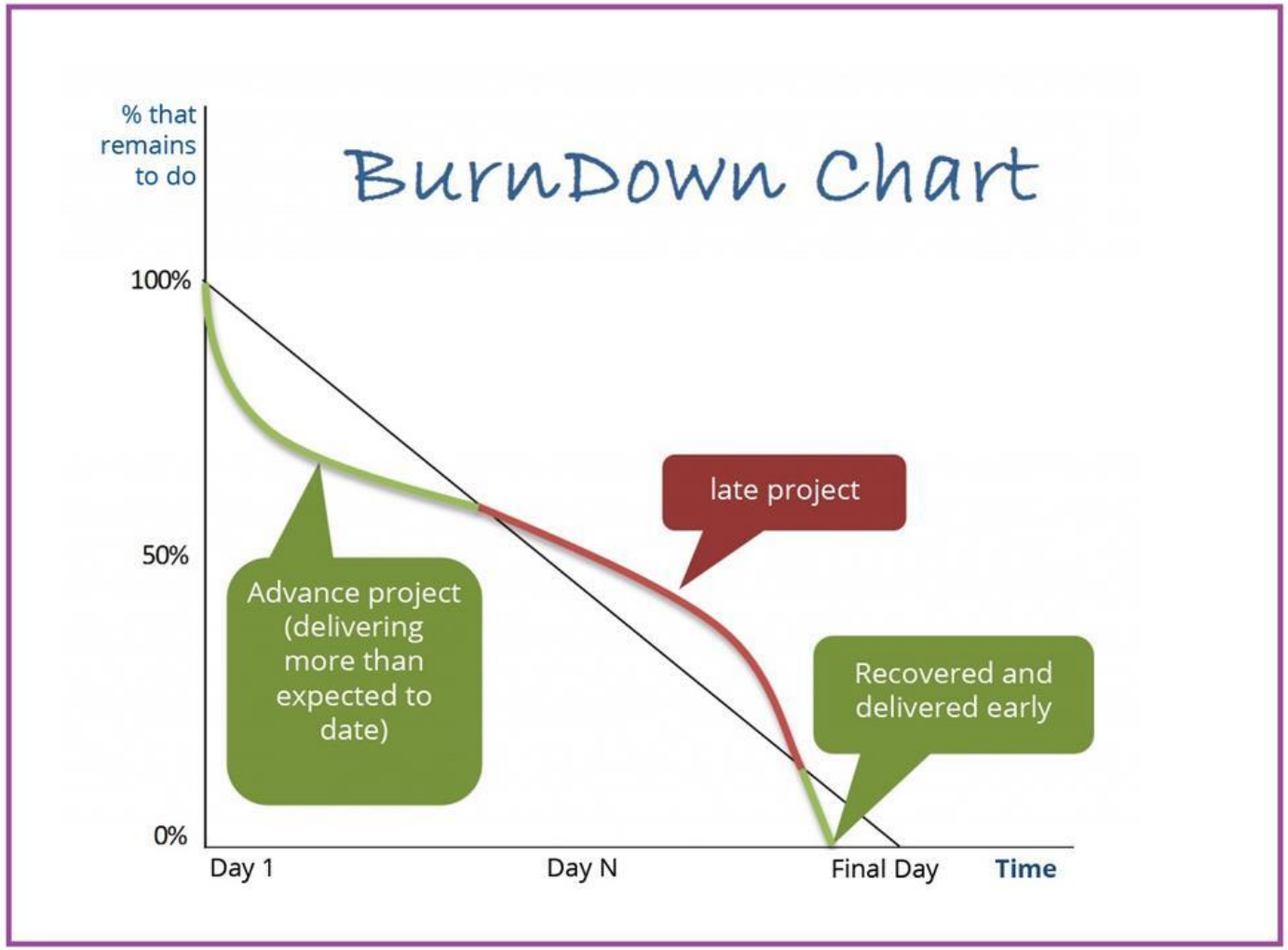
Sprint and Sprint Backlog

- In Scrum, work is performed in iterations or cycles of up to a calendar month called sprints
- Before starting a Sprint the Team should come up with a Sprint backlog
- The sprint backlog (release backlog) is a list of user stories identified by the Scrum team to be completed during the sprint
- This is a subset of Product backlog user stories defined only for a particular sprint

Sprint Burn Down Chart

- A burn down chart is a graphical representation of work left to do vs time.
- The outstanding work (or backlog) is often on the **vertical axis**, with time along the **horizontal**.
- That is, it is a run chart of outstanding work. It is useful for predicting when all of the work will be completed.

Sprint Burn Down Chart



Activity 03

A well-known project that supports many platforms are having 120 tasks to complete withing 5 days. Calculate Ideal Burn Down Velocity

According to the actual works that the workers have done are mentioned in the below diagram. Calculate the Actual Burn Down Velocity.

Mentioned which is most performed day

Mentioned which is least performed day

Days	01	02	03	04	05
Tasks	20	50	0	20	30

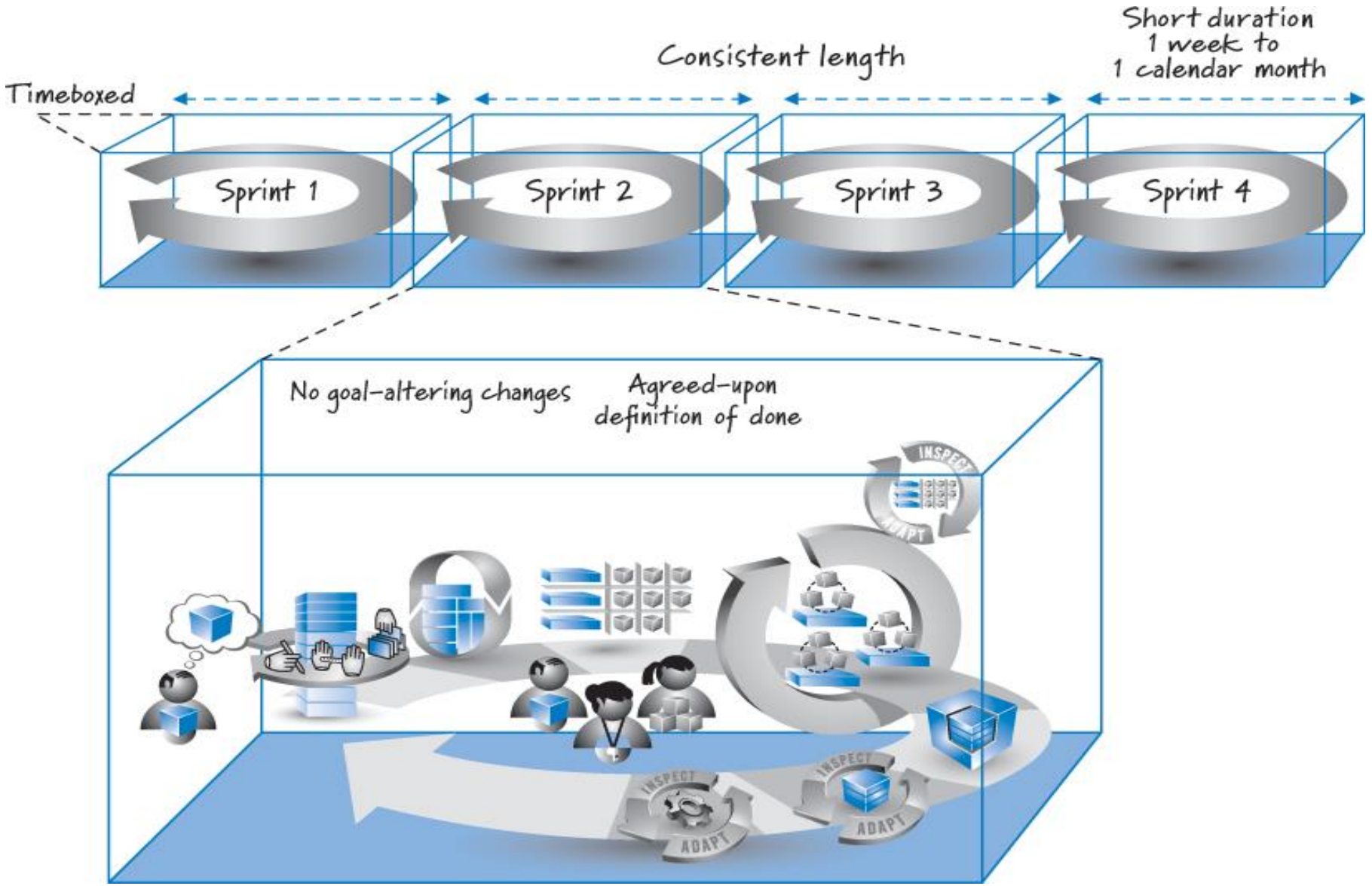
SCRUM Activities

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

Sprint Planning

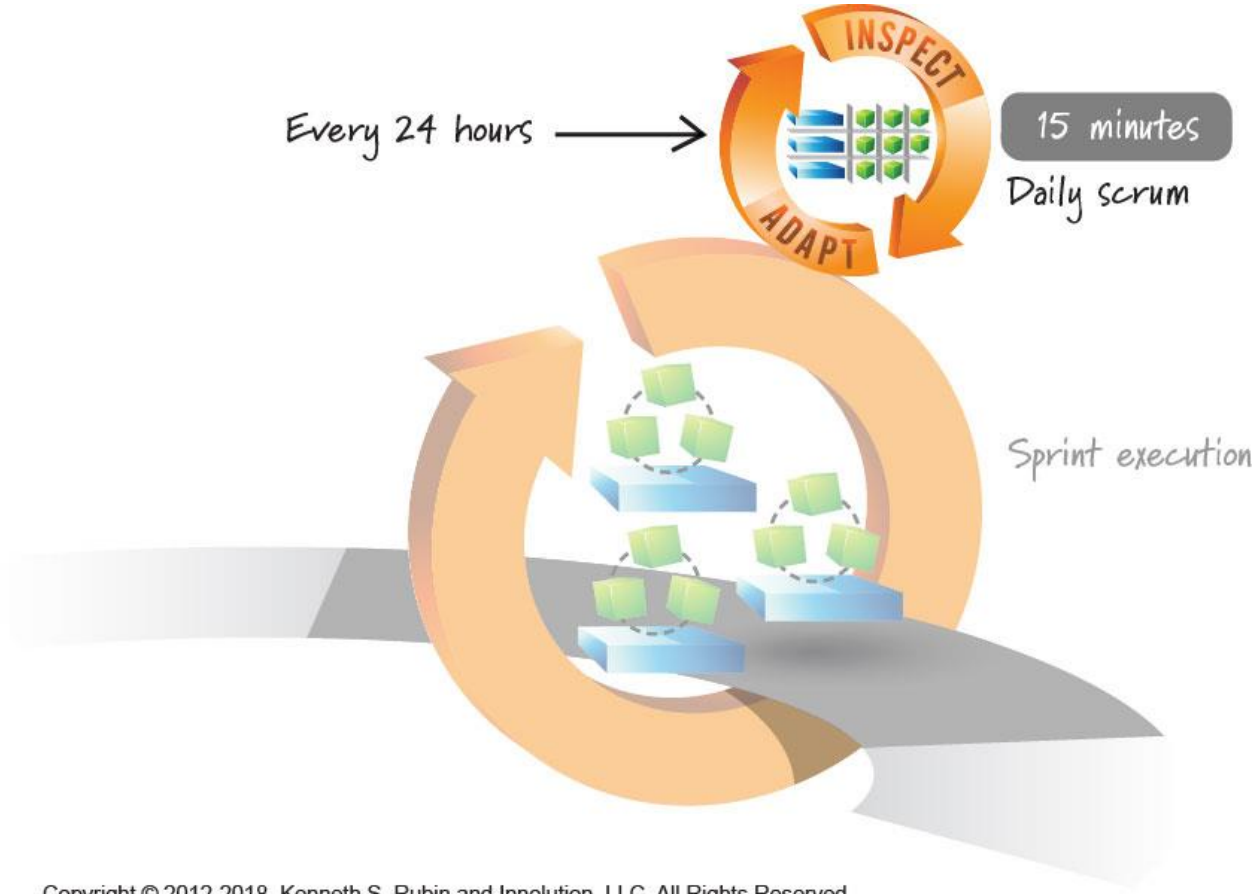
- A product backlog may represent many weeks or months of work, which is much more than can be completed in a single short sprint
- During sprint planning, the product owner and development team agree on a sprint goals that defines what the upcoming sprint is supposed to achieve

Sprint Planning



Daily Scrum

- Each day of the sprint, on same time, the development team members hold a meeting.



Daily Scrum

- Discussing about the scrum
  - ✓ What did I accomplish since the last daily scrum?
  - ✓ What do I plan to work on by the next daily scrum?
  - ✓ What are the obstacles or impediments that are preventing me from making progress?

Sprint Review

- Near the end of the sprint, the team conducts two important inspect and adapt activities: sprint review and sprint retrospective
- The sprint review provides a transparent look at the current state of the product
- Sprint Review is one of the most important loops in the scrum framework

Sprint Retrospective

- Inside the timebox of the retrospective, teams are free to examine what's happening, analyze the way they work, identify ways to improve, and make plans to implement these improvements

- It is important because it gives teams the chance to customize scrum to their unique circumstances

Activity 04

What is the primary goal of the Sprint Review?

1) To plan the next Sprint
2) To inspect the Increment and adapt the Product Backlog if needed
3) To assign new tasks to team members
4) To conduct a retrospective on team performance

Activity 05

What is the purpose of the Sprint Retrospective?

1)To review the product increment and get feedback from the stakeholder

2)To plan the work for the next sprint and prioritize the product backlog

3)To inspect the team's performance and identify improvements for the next sprint

4)To coordinate the work across multiple teams and align on the product vision

Thank You

References

- Rubin, K.S. (2013) *Essential scrum: A practical guide to the most popular agile process*. Upper Saddle River, NJ: Addison-Wesley.
- "What is Scrum?", *Scrum.org*, 2017. [Online]. Available: https://www.scrum.org/resources/what-is-scrum/
- "What is Agile Software Development?", *Agile Alliance*, 2017. [Online]. Available: https://www.agilealliance.org/agile101/