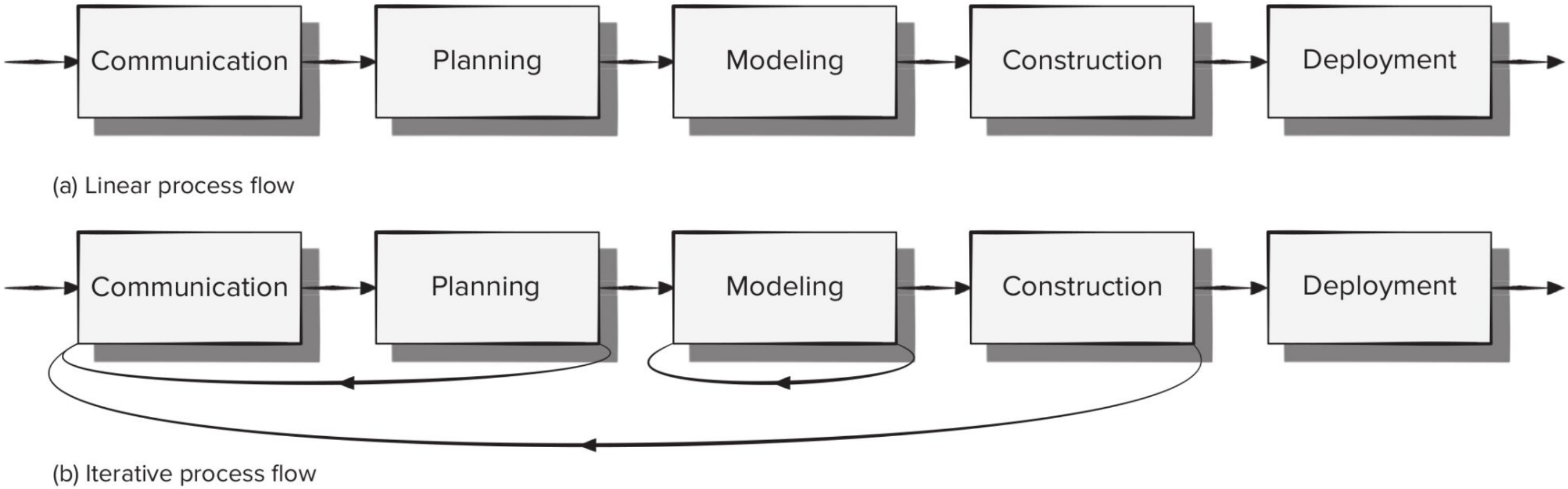
Software Engineering

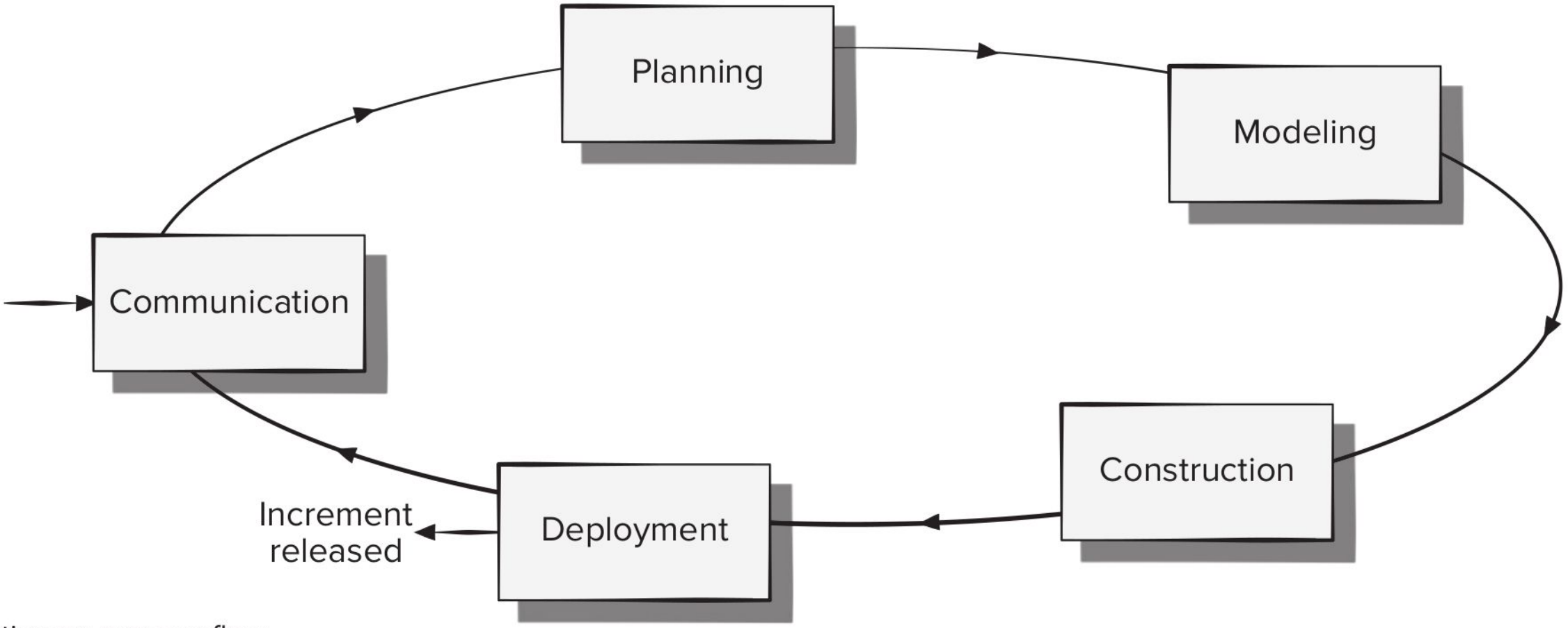
Part (III)- Software Process & Agile Development

By: Mehran Alidoost Nia
Shahid Beheshti University, Fall 2023

Types of Software Process Flow

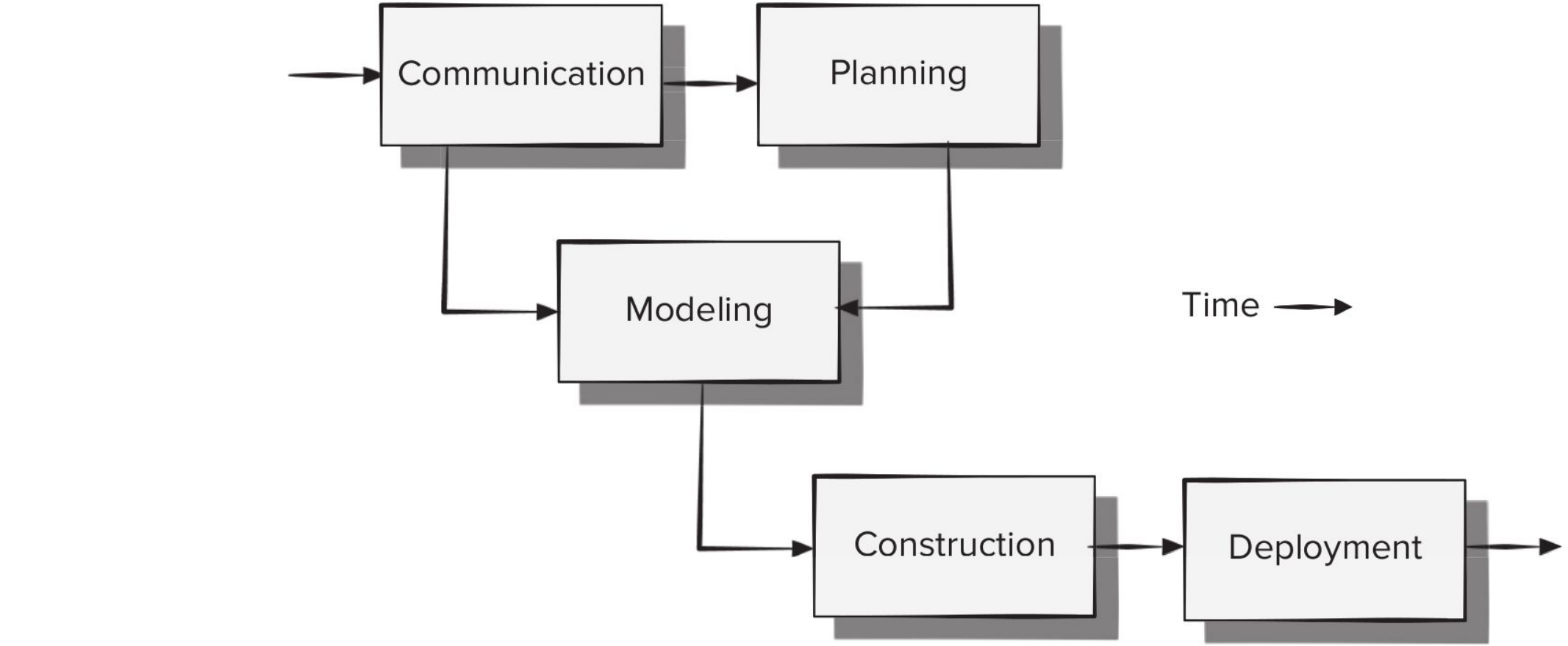


Types of Software Process Flow



(c) Evolutionary process flow

Types of Software Process Flow



(d) Parallel process flow

Task Set

- A task set defines the actual work that needs to be done to accomplish the objectives of a software engineering action.
- For example, "requirements gathering" is an important software engineering action that occurs during the communication activity.

Requirements Gathering for Small Projects

1. Make a list of stakeholders for the project.
2. Invite all stakeholders to an informal meeting.
3. Ask each stakeholder to make a list of features and functions required.
4. Discuss requirements and build a final list.
5. Prioritize requirements.
6. Note areas of uncertainty.

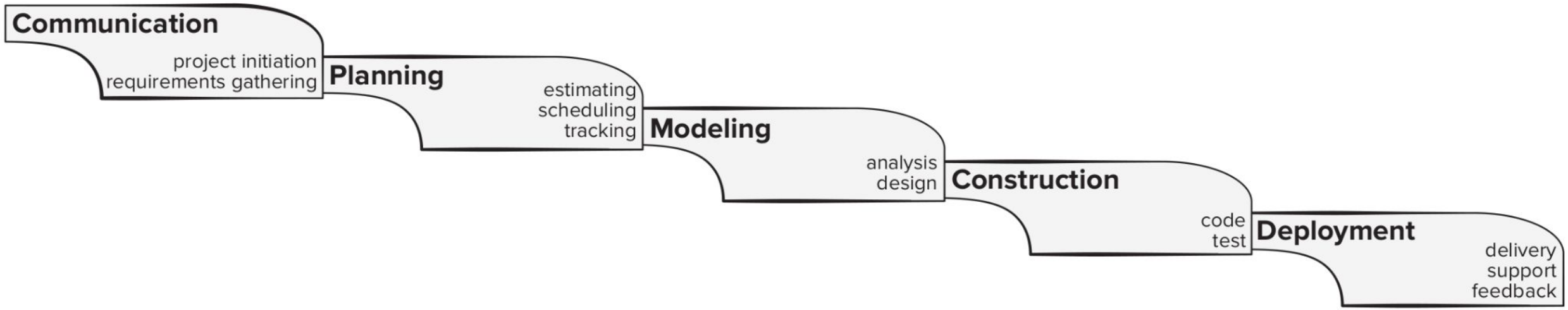
Requirements Gathering for Large Projects

1. Make a list of stakeholders for the project.
2. Interview each stakeholder separately to determine overall wants and needs.
3. Build a preliminary list of functions and features based on stakeholder input.
4. Schedule a series of application specification meetings.
5. Conduct meetings.
6. Produce informal user scenarios as part of each meeting.

Requirements Gathering for Large Projects

7. Refine user scenarios based on stakeholder feedback.
8. Build a revised list of stakeholder requirements.
9. Use quality function deployment techniques to prioritize requirements.
10. Package requirements so that they can be delivered incrementally.
11. Note constraints and restrictions related to the system.
12. Discuss methods for validating the system.

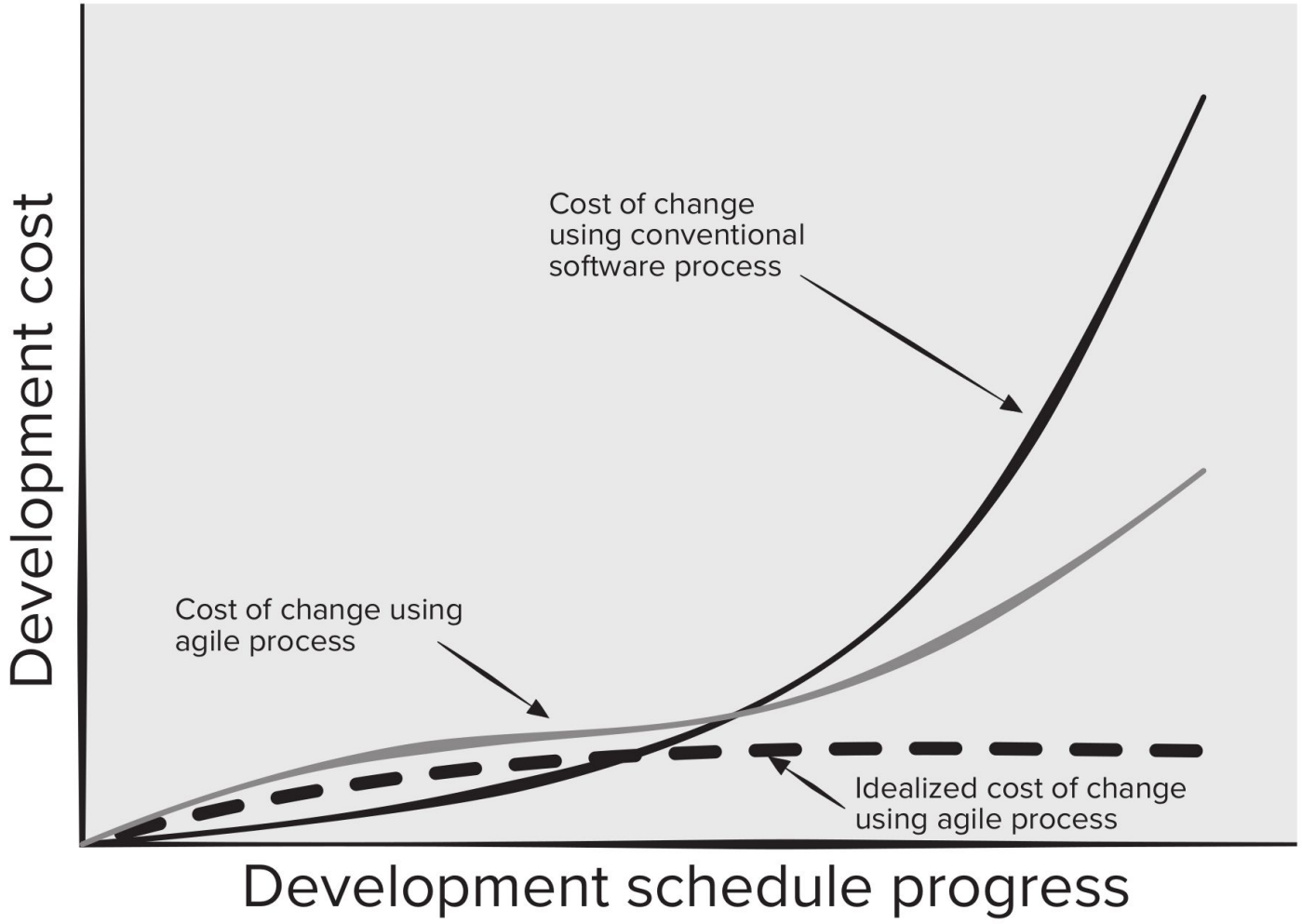
The Waterfall Model



What Is Agility?

- Ivar Jacobson argues that the pervasiveness of change is the primary driver for agility.
- But agility is more than an effective response to change.
- It encourages team structures and attitudes that make communication more facile.
- It emphasizes rapid delivery of operational software.
- it adopts the customer as a part of the development team and works to eliminate the "us and them" attitude.

Agility and the Cost of Changes

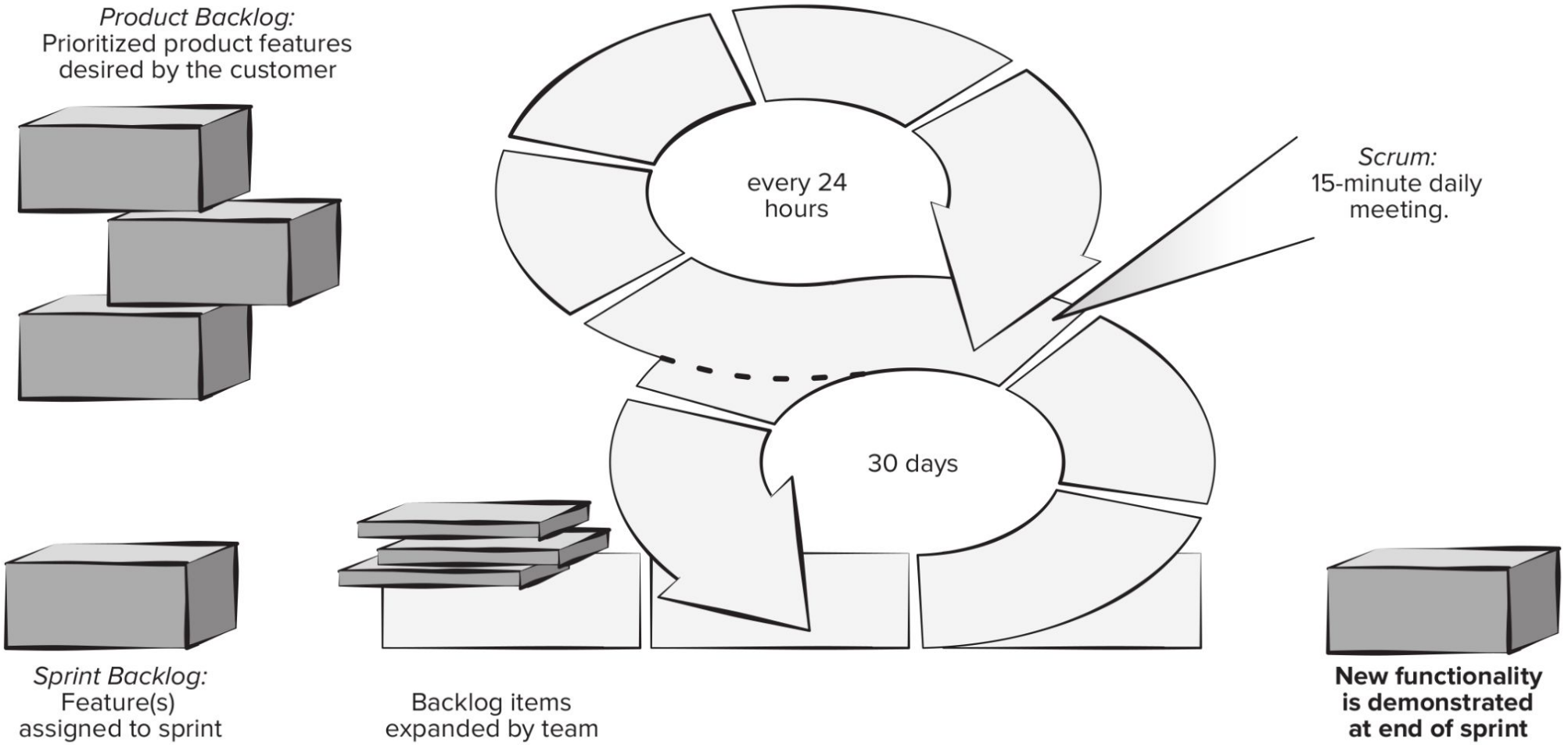


The 12 Agile Principles

Scrum

- Scrum is a management framework that teams use to self-organize and work towards a common goal.
- In Scrum, teams are autonomous.
- Product will deliver incrementally, and the process evolves over time.
- The requirements may change during the work.
- The product delivery is divided into time-frames called "sprint".

Scrum Process Flow



Roles and Artifacts of Scrum

- The roles:
  - Scrum master
  - Product owner
  - Development team members (up to 6 members)
- The artifacts:
  - Product backlog
  - Sprint backlog
  - Code increments

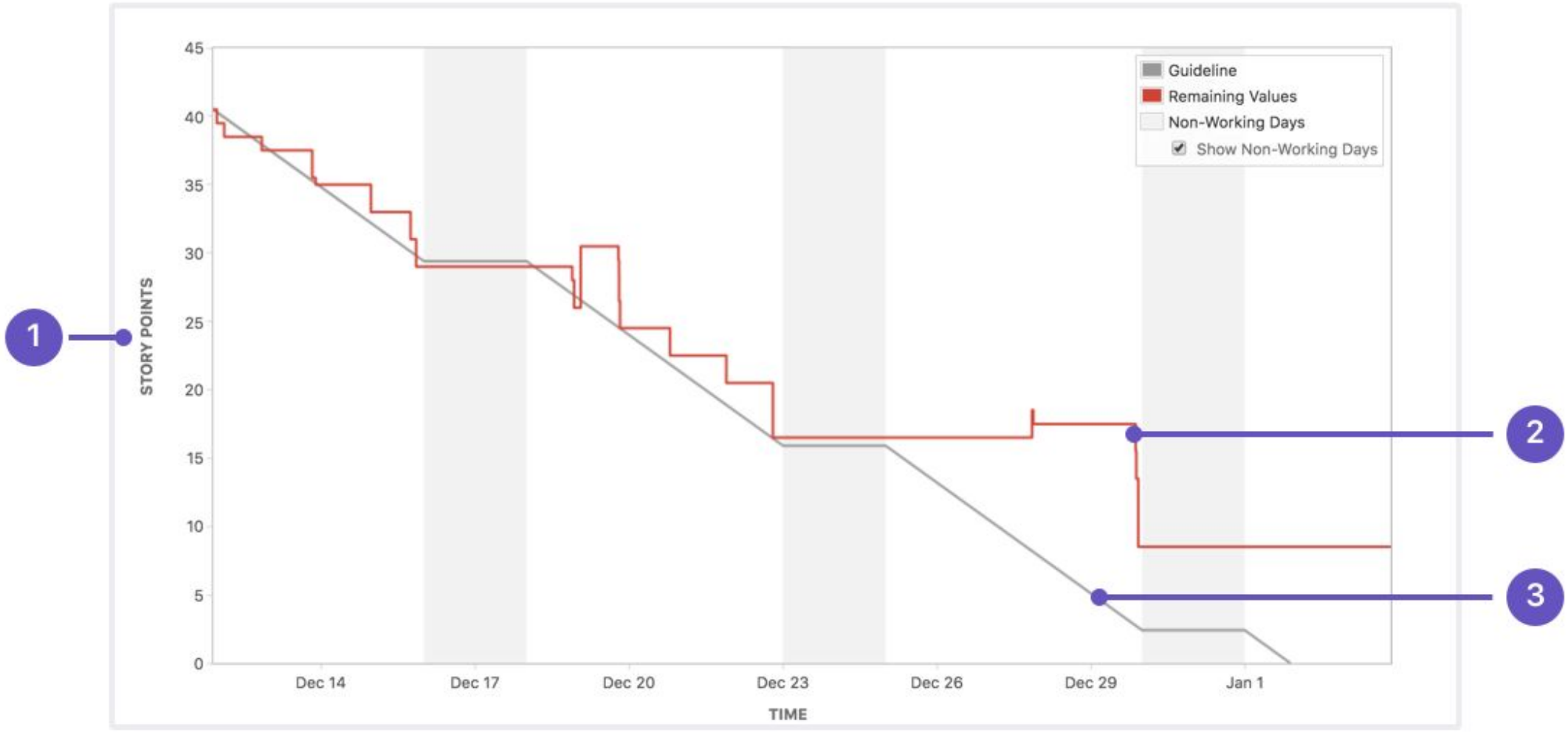
The Scrum Events

- Sprint planning meeting
  - Expected outputs: Stories, Tasks, Epics, Estimates
- Daily Scrum meeting
  - What done yesterday, do today and discuss obstacles.
- Sprint review meeting
  - Primary act is a demo for scrum team and stakeholders.
- Sprint retrospective
  - Discuss about Pros. and Cons. of the sprint.

How to Estimate?

- Cognitive load and complexity theory.
  - How much is the task big in your mind?
- Story points
  - Show the level of complexity.
  - Recommended to use Fibonacci series.
  - Poker planning technique.
  - In some literatures, teams use or map pure time as story points to estimate tasks.

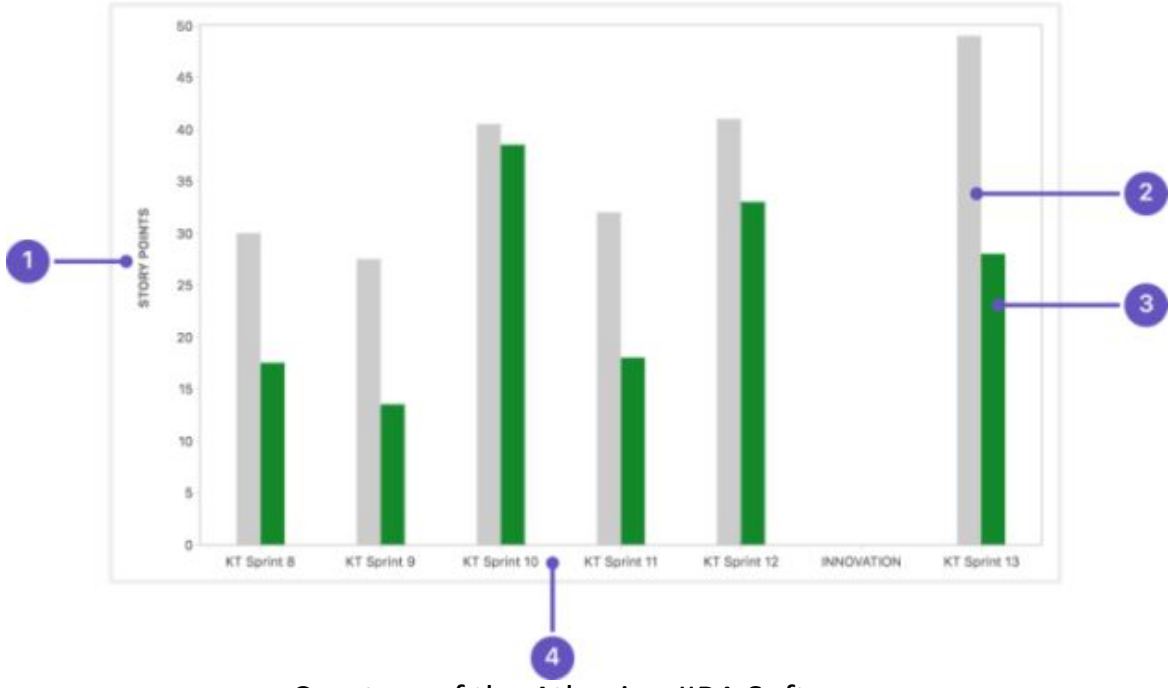
The Evaluation Metrics: Burndown Chart



Courtesy of the Atlassian JIRA Software

The Evaluation Metrics: Velocity

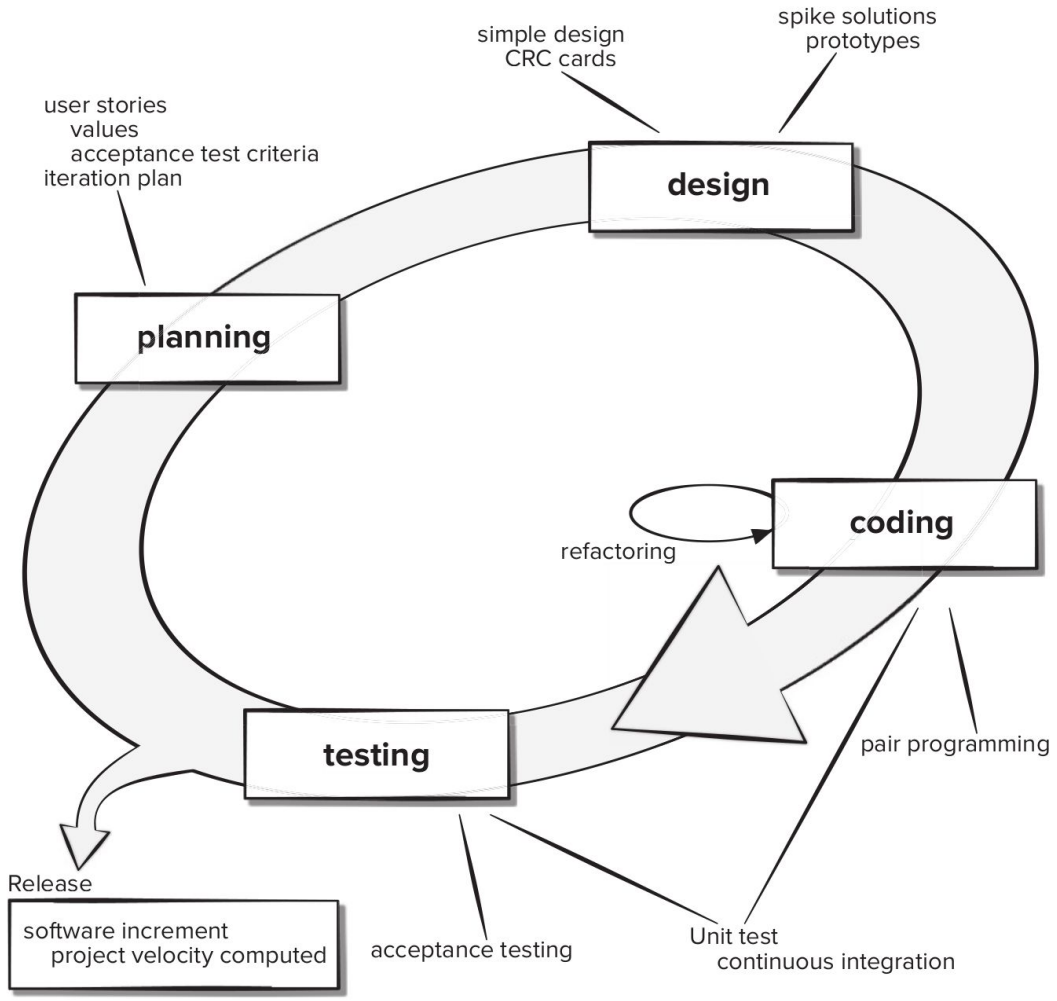
- Velocity is a measure of the amount of work a Team can tackle during a single Sprint.



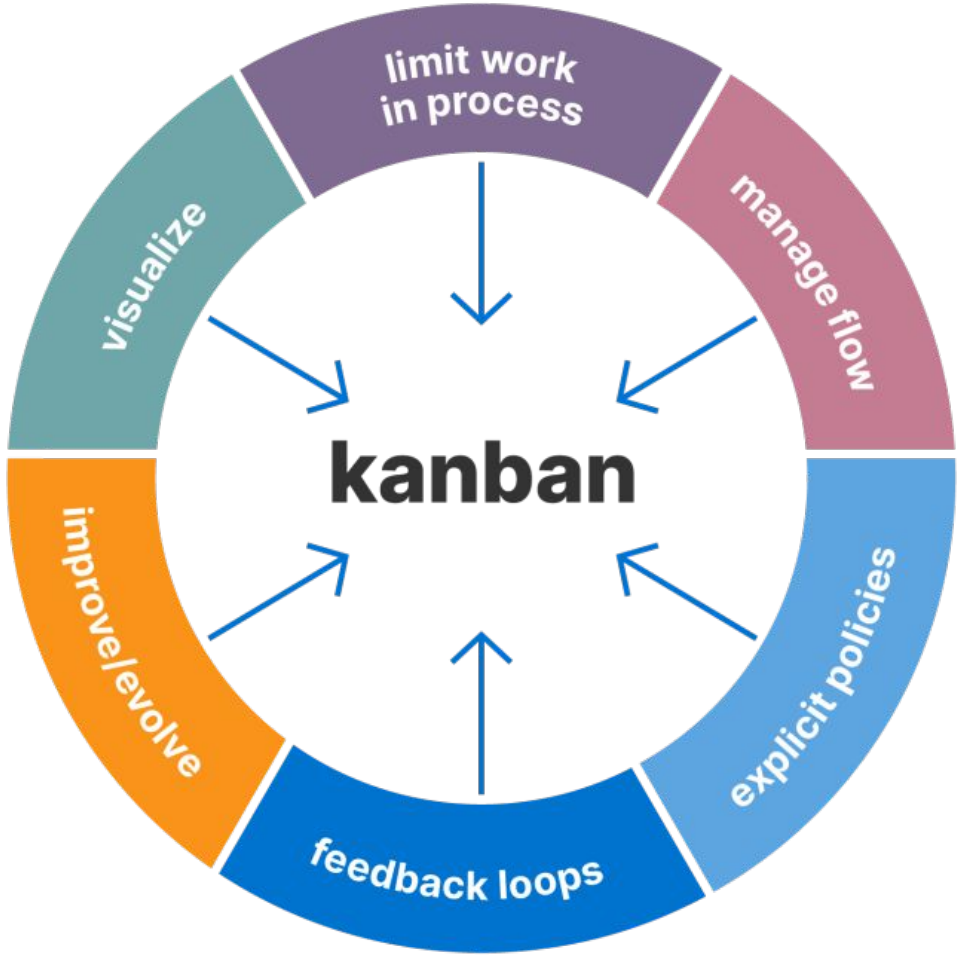
Courtesy of the Atlassian JIRA Software

SCrum is only a framework!

The Extreme Programming (XP) Framework

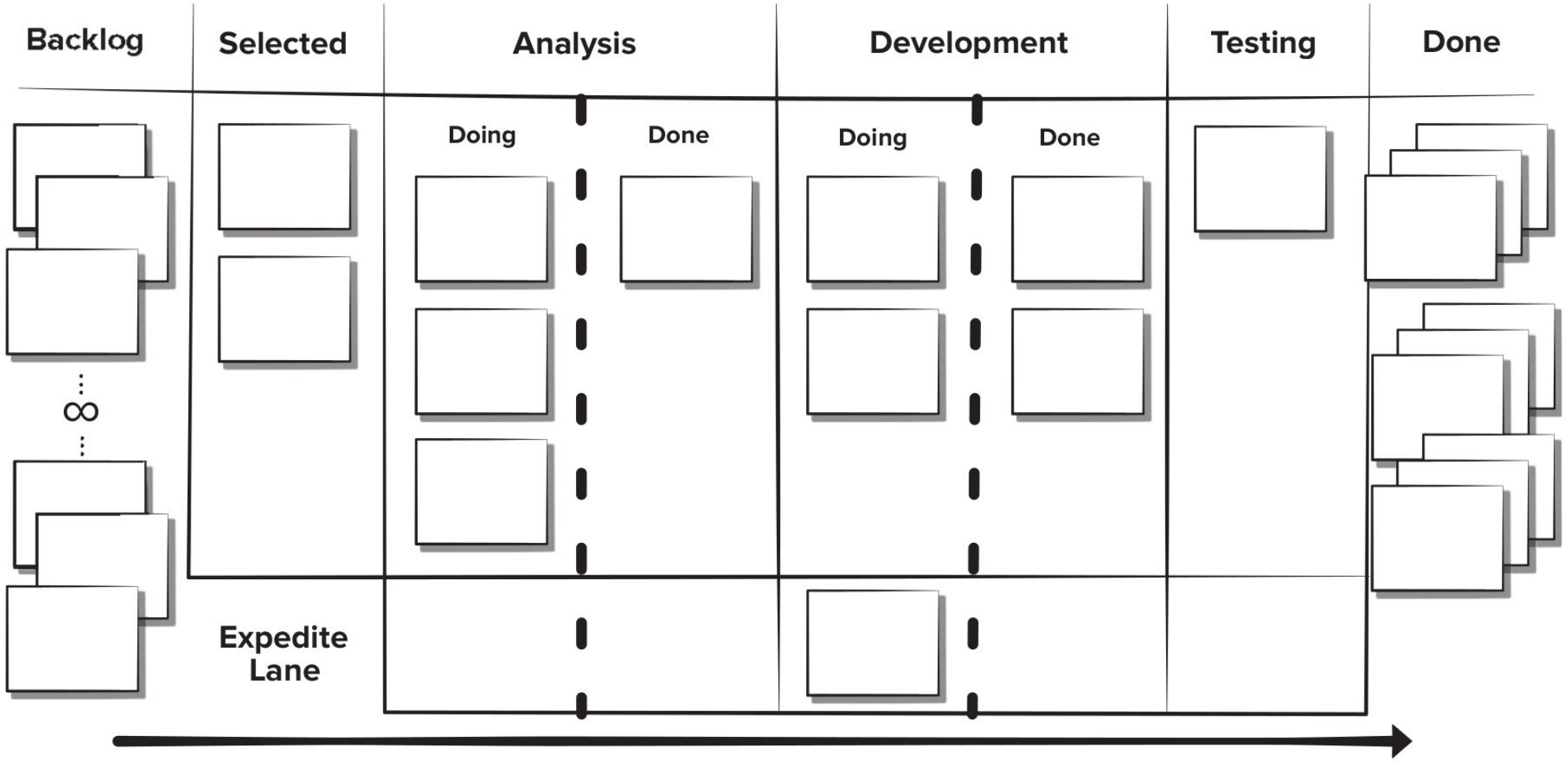


Kanban



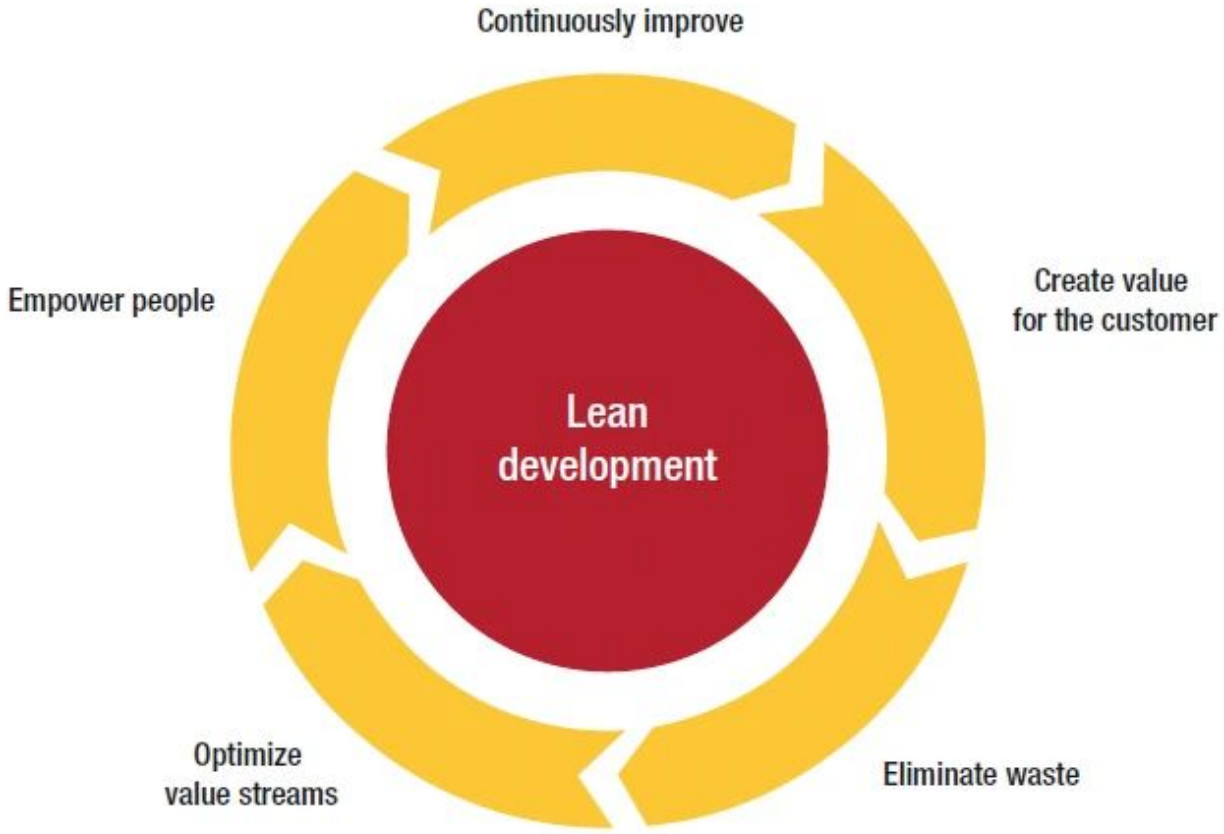
Courtesy of aha.io

Kanban Board



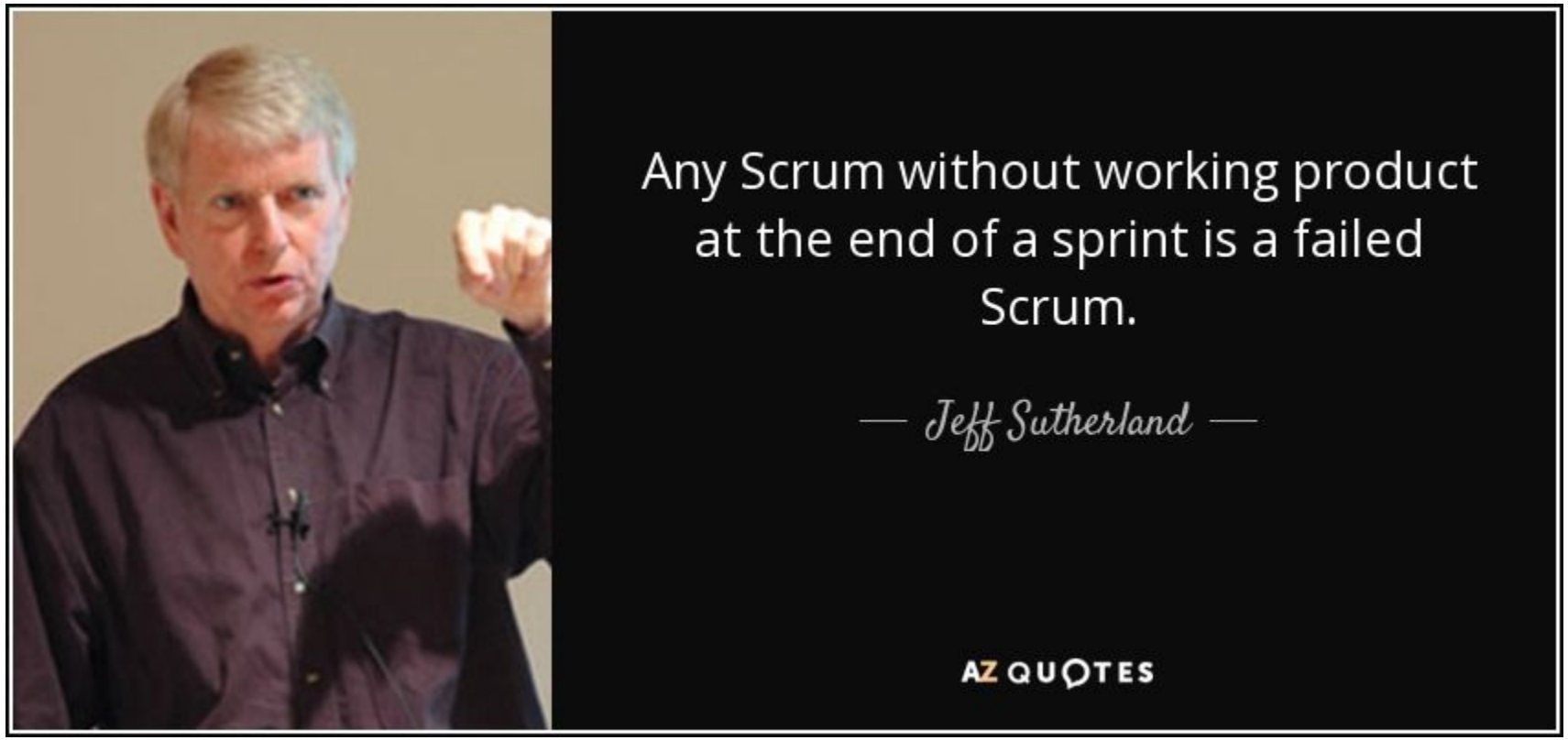
Kanban or Scrum?

Lean Software Development



Courtesy of the IEEE Computer Society

The Quote of the Day



On-Site Challenge (II)

Readings

- Software Engineering: A Practitioner's Approach, Roger Pressman and Bruce Maxim, 9th Edition, September 2019, Chapters 2 and 3.
- Scrum: The Art of Doing Twice the Work in Half the Time Hardcover, Jeff Sutherland, J.J. Sutherland, September 2014, Chapters 2, 3 and 4.