

# Software Development Methodologies

Software Project Management, Development Methodologies, Agile Development, Kanban, Scrum



**SoftUni Team**  
**Technical Trainers**



**Software University**  
<https://softuni.bg>

Have a Question?



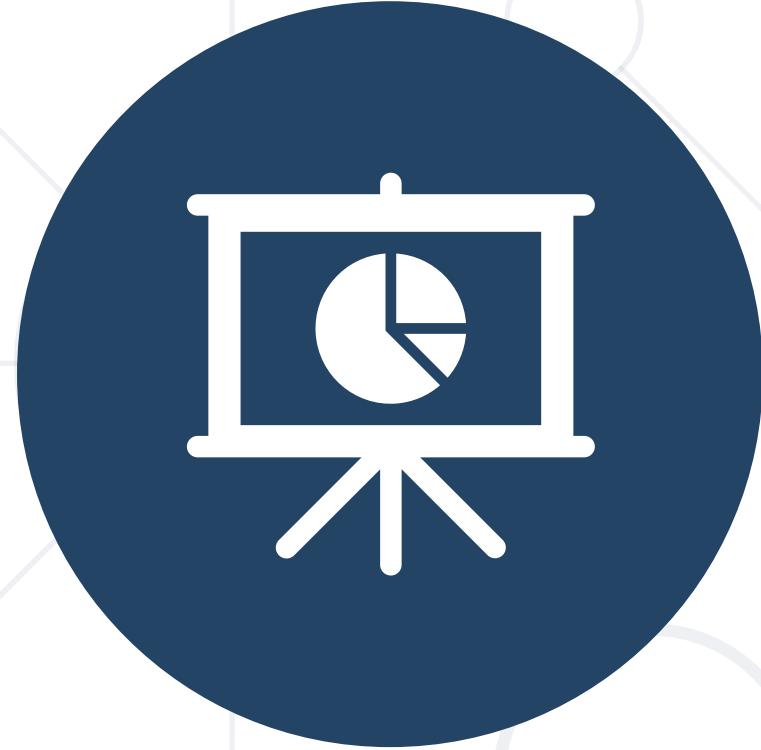
sli.do

#Dev-Ops

# Table of Content

1. Software Project Management
2. Development Methodologies
3. Agile Development Principles
4. Kanban
5. Scrum
6. Scrumban
7. Project Tracking Tools





# Software Project Management

Plan, Monitor and Control Project Development

# What is Project Management?

- **Project management**
  - **Organizing** and **managing** work and resources in order to successfully complete a project
    - "Successfully" == within defined **scope**, **quality**, **time** and **cost** constraints
- **Project**
  - Temporary undertaking that aims to deliver some specific result
- **Project manager**
  - Person who plans, monitors and manages the project
    - Often this is the "**team leader**"



# What is Software Project Management?

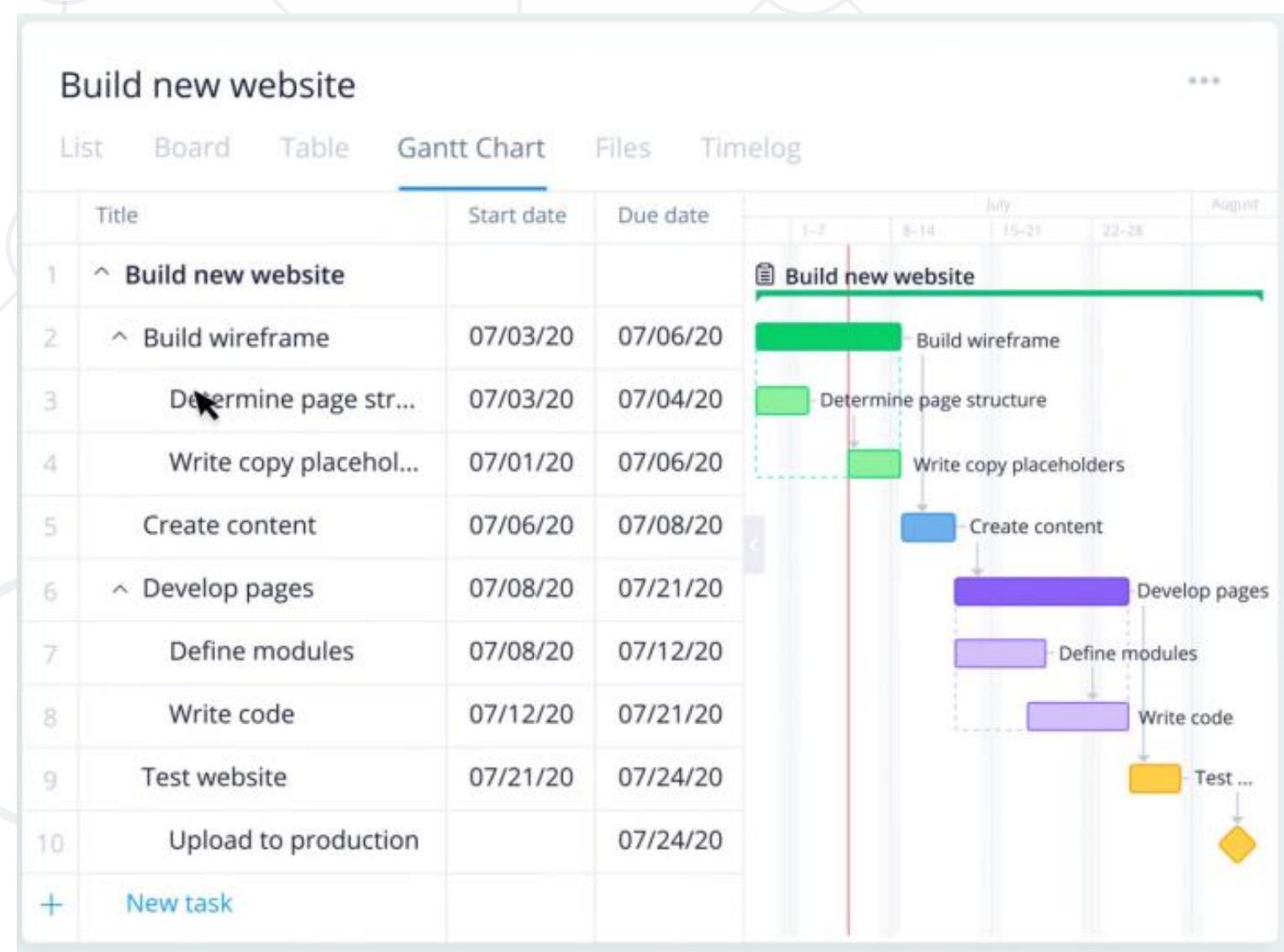
- **Software project management**
  - Management discipline about **planning**, **monitoring** and **controlling** software projects
- **Project planning**
  - Identify the scope, estimate the work, identify tasks and milestones, and create a schedule
- **Project monitoring and control**
  - Monitor the project progress, manage risks, discuss and address issues, problems and delays



# What is a Project Plan?

- The **project plan**
  - A document describing how project work will be organized
    - A chart / diagram / spreadsheet
  - Contains **tasks, resources, schedule, milestones, progress indicators, etc.**
  - Tasks may have **start, end, assigned resources** (team members), **% complete, dependencies, nested tasks, cost**, etc.
  - **Project management tools** (like MS Project, Zoho Projects, Monday.com) simplify **creating** and **monitoring** project plans

# Project Plan – Example



# Project Plan – Example

Jira Your work Projects ▾ Filters ▾ Dashboards ▾ People Plans ▾ Apps Create Search Give feedback Auto-schedule Share Review changes 2

Travel Booking Division

Roadmap Teams Releases

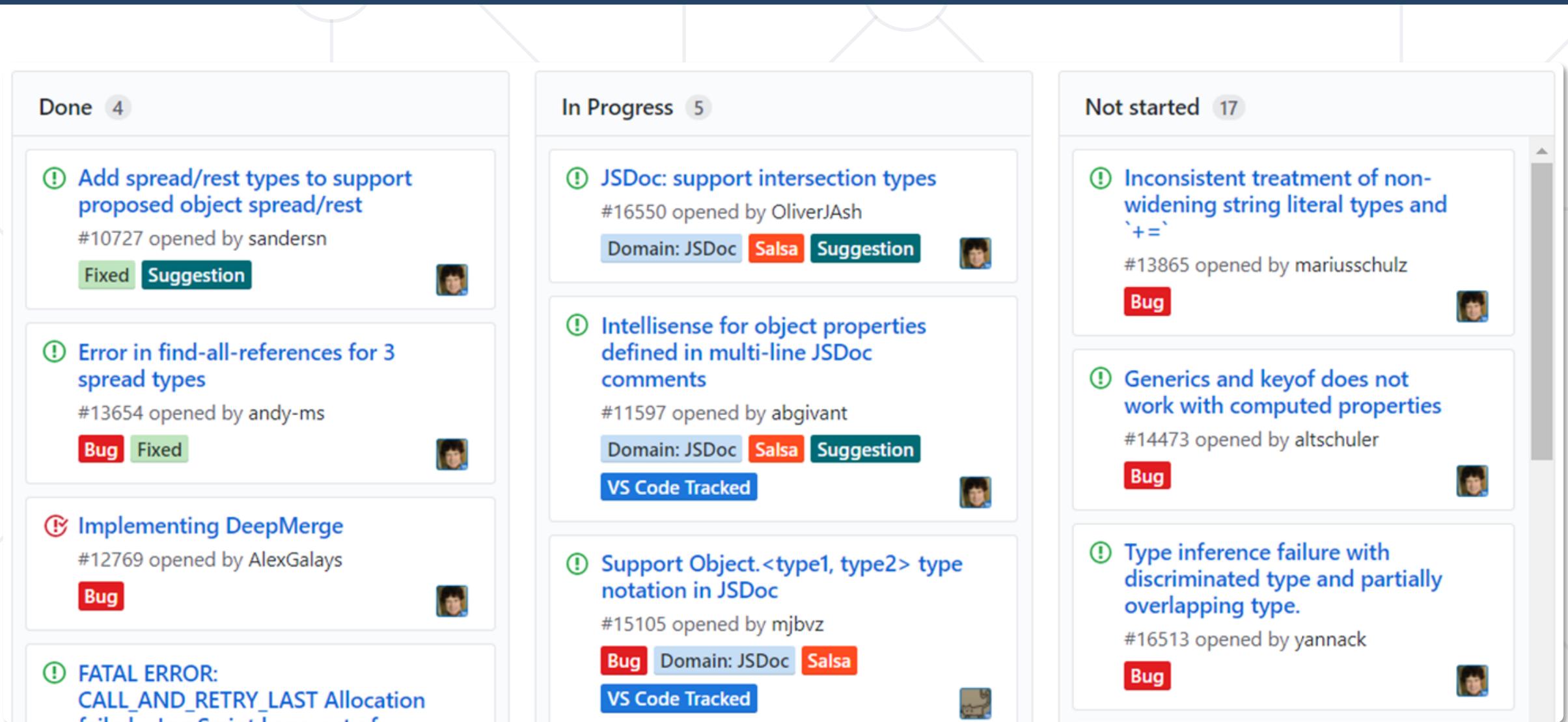
Hierarchy: Epic to Story Filters 3m 1y Fit Custom View settings

SCOPE	FIELDS	Mar 2	Mar 9	Mar 16	Mar 23	Mar 30	Apr 6	Apr 13	Apr 20	Apr 27	May
# Issue	Status Start date Due date										
Android Team	+ Create issue										
1 ADR-104 App basics - Android	IN PROGRESS 25/Feb/20 23/Mar/20	Sprint 9	Sprint 10		Sprint 11		Sprint 12		Sprint 13		Sprint 14
ADR-401 As a user I can log...	IN PROGRESS s 10/Mar/20 s 23/Mar/20										
ADR-402 As a user I access...	IN PROGRESS s 10/Mar/20 s 23/Mar/20										
ADR-403 Implement booking...	DONE s 10/Mar/20 s 23/Mar/20										
2 ADR-105 Invite and share	TO DO 25/Mar/20 20/Apr/20										
ADR-107 Adapt apps to new pa...	TO DO 20/Apr/20 16/May/20										
ADR-424 Adapt Android app...	TO DO 20/Apr/20 04/May/20										
iOS Team		Shark	Koala	Crocodile	Dingo	Emu	Wombat				
1 IOS-543 Social media integration	IN PROGRESS 25/Feb/20 23/Mar/20										

# Agile Project Management and Task Boards

- **Classical project management**
  - Create a plan and execute it
- **Agile project management**
  - Less planning and more flexibility
  - Changes are welcome
- **Task boards** visualize and organize the project tasks / people / progress
  - Typical columns: TODO, Doing, Done
- Examples: [Trello](#), [Asana](#), [GitHub Projects](#), [Azure Boards](#)

# Task Board – Example



The task board illustrates the workflow of several issues across three stages:

- Done (4 items):**
  - ! Add spread/rest types to support proposed object spread/rest  
#10727 opened by sandersn  
**Fixed Suggestion**
  - ! Error in find-all-references for 3 spread types  
#13654 opened by andy-ms  
**Bug Fixed**
  - ! Implementing DeepMerge  
#12769 opened by AlexGalays  
**Bug**
  - ! FATAL ERROR:  
CALL\_AND\_RETRY\_LAST Allocation  
#16513 opened by yannack  
**Bug**
- In Progress (5 items):**
  - ! JSDoc: support intersection types  
#16550 opened by OliverJAsh  
**Domain: JSDoc Salsa Suggestion**
  - ! Intellisense for object properties defined in multi-line JSDoc comments  
#11597 opened by abgivant  
**Domain: JSDoc Salsa Suggestion VS Code Tracked**
  - ! Support Object.<type1, type2> type notation in JSDoc  
#15105 opened by mjbvz  
**Bug Domain: JSDoc Salsa VS Code Tracked**
- Not started (17 items):**
  - ! Inconsistent treatment of non-widening string literal types and `+=`  
#13865 opened by mariusschulz  
**Bug**
  - ! Generics and keyof does not work with computed properties  
#14473 opened by altschuler  
**Bug**
  - ! Type inference failure with discriminated type and partially overlapping type.  
#16513 opened by yannack  
**Bug**



# Live Demo

# Project Taskboard

<https://github.com/microsoft/TypeScript/projects/13>



# Development Methodologies

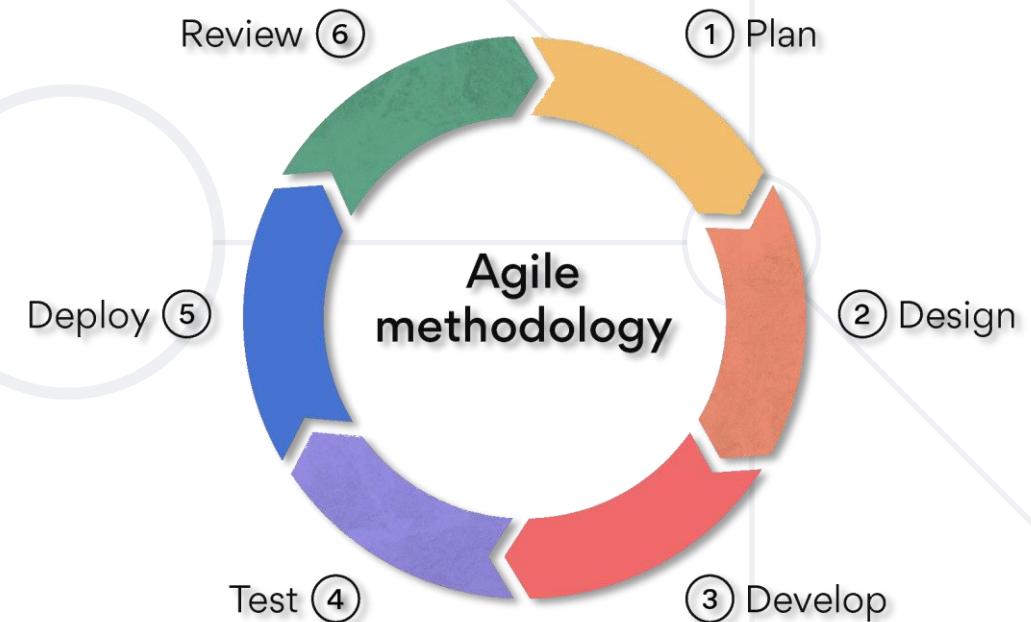
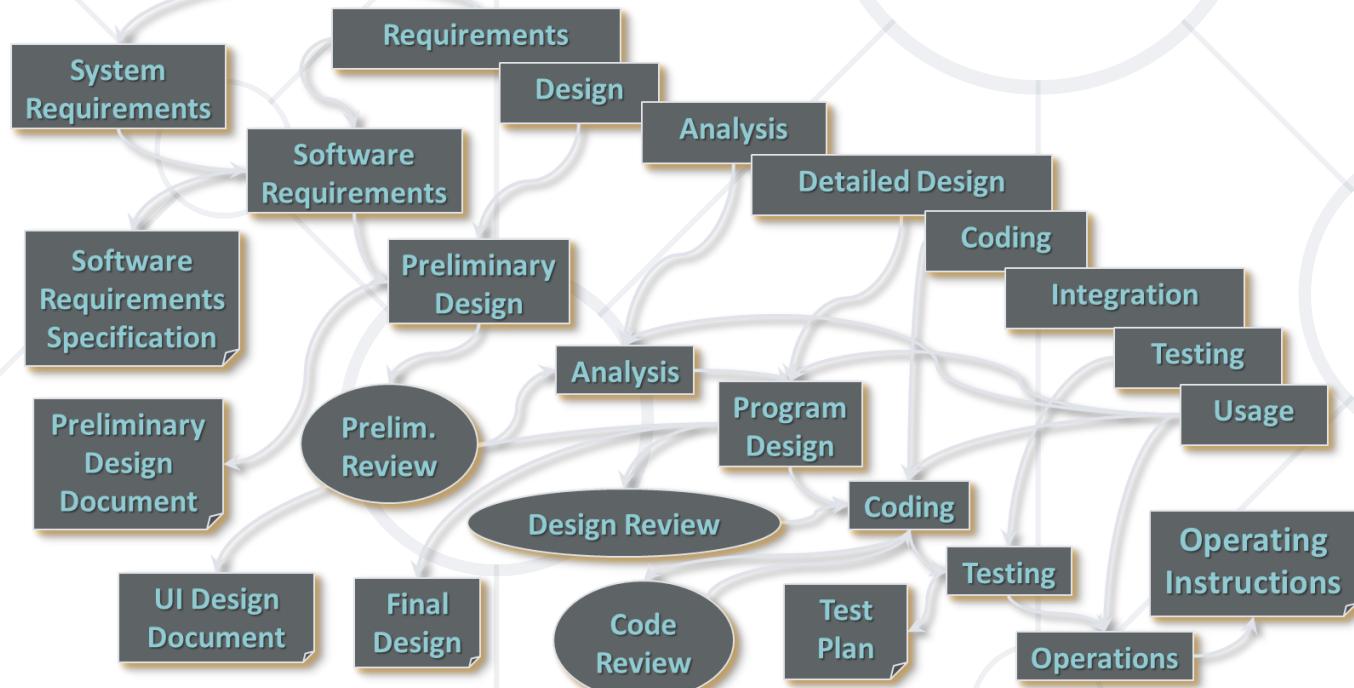
Waterfall, Scrum, Kanban, Extreme Programming

# What is a Development Methodology?

- A set of **practices** and **procedures** for organizing the **development process**
- A systematical, **engineering approach** for organizing and managing software projects
- A set of **principles**, **conventions**, **processes** and **procedures** the organization decides to follow
- A set of **rules** that developers must follow
- **Principles** and **processes** to define how to order tasks, perform monitoring, and control

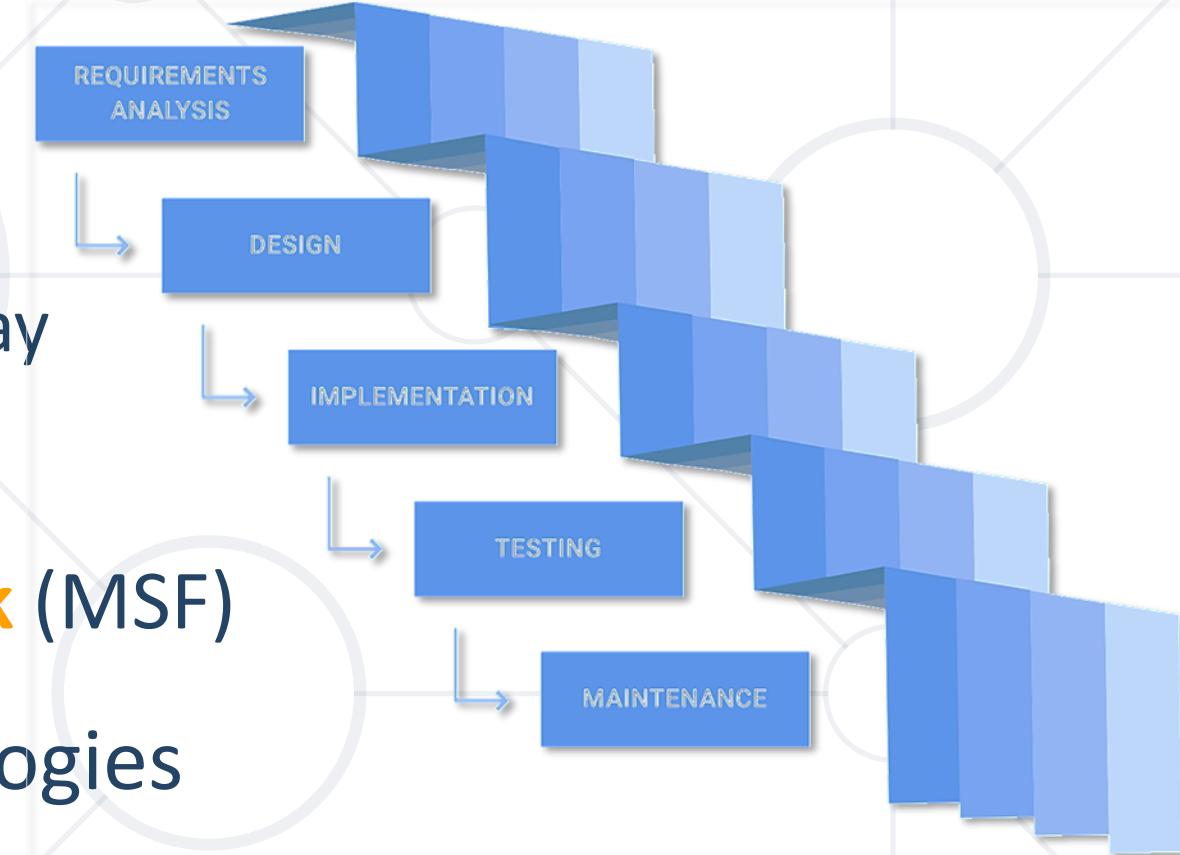
# Heavyweight and Agile Methodologies

- Heavy methodologies rely on formal procedures and documents
  - Lots of documents, diagrams, formal approvals, etc.
- Agile methodologies rely on small iterations and less formalities



# Development Methodologies

- Back in history
  - The "**Waterfall**" process
    - Old-fashioned, rarely used today
  - **Rational Unified Process (RUP)**
  - **Microsoft Solutions Framework (MSF)**
- Modern development methodologies
  - **Agile** development processes
  - **Scrum, Kanban, Lean Development, Scrumban, Hybrid, ...**





# Agile Development

Lightweight, Incremental, Responding to Change

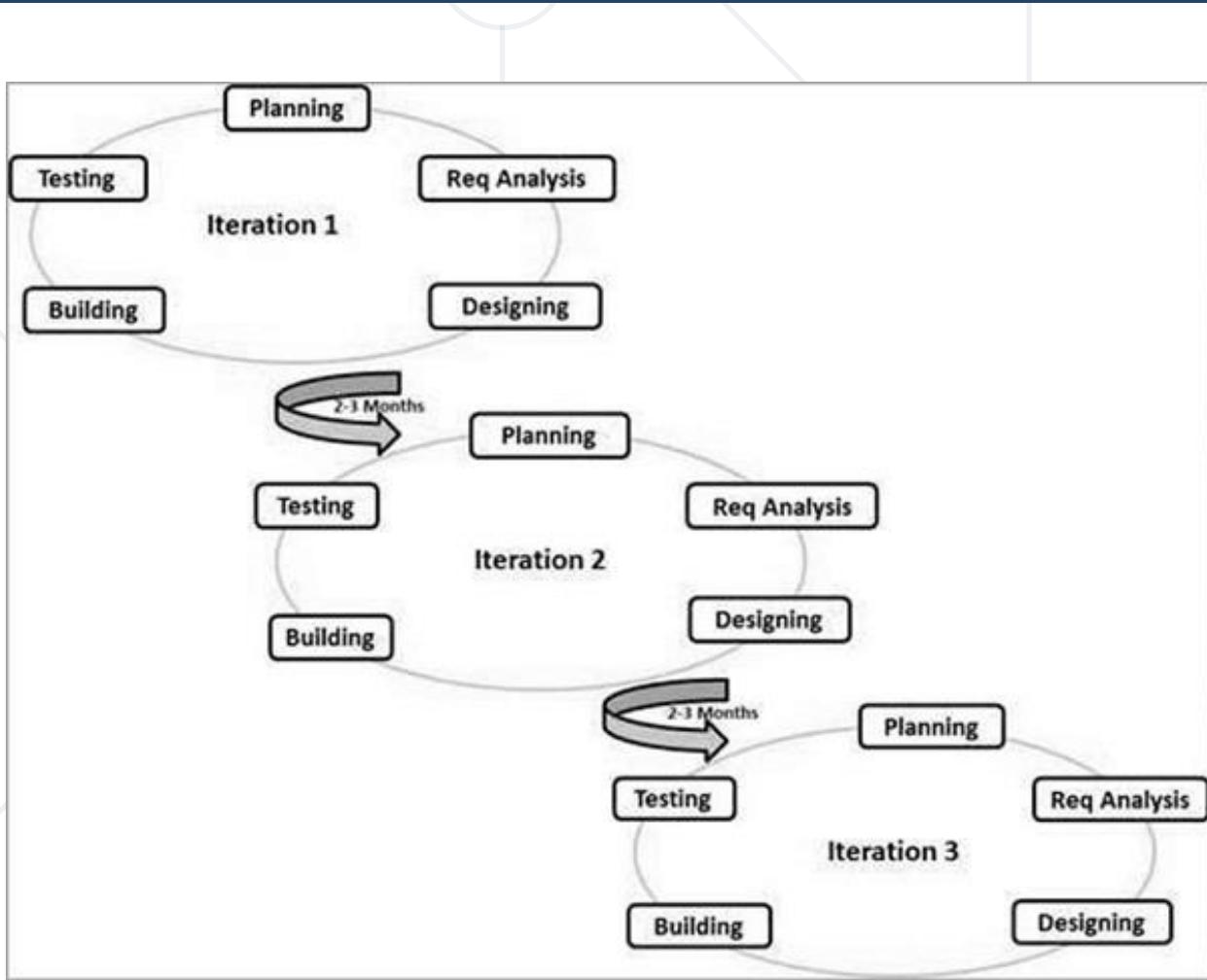
# The Agile Manifesto and Agile Spirit

- The **agile manifesto** (Kent Beck, Martin Fowler, Robert Martin, ...)

"Our highest priority is to satisfy the customer through early and continuous delivery of valuable software"

- The **agile spirit**
  - **Incremental**: working software frequently over heavy documentation
  - **Cooperation**: customer collaboration over contract negotiation
  - **Straightforward**: individuals + interactions over processes + tools
  - **Adaptive**: responding to change over following a plan

# Iterative and Incremental Development

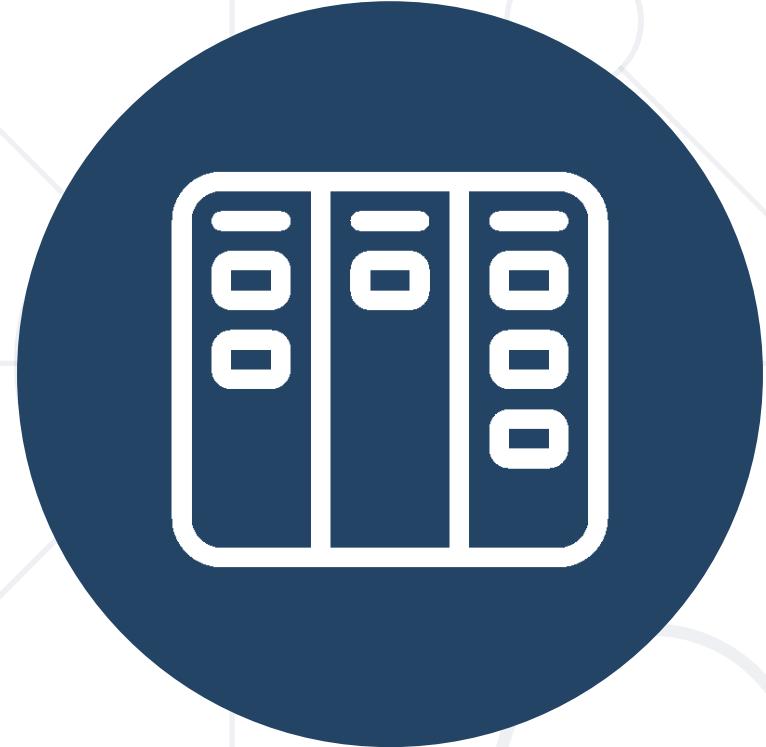


- Agile development relies on **increments** (steps)
  - Small portions of software, developed in iterations
- Each **iteration** goes through own dev lifecycle
  - Requirements → design → code → test → deploy

# Agile Methodologies

- **Scrum**: sprint based, biggest market share
- **Kanban**: task board based
- **Scrumban**: Scrum + Kanban
- **Lean Software Development**
- **XP** (eXtreme Programming)
- **Hybrid** (multiple methods)



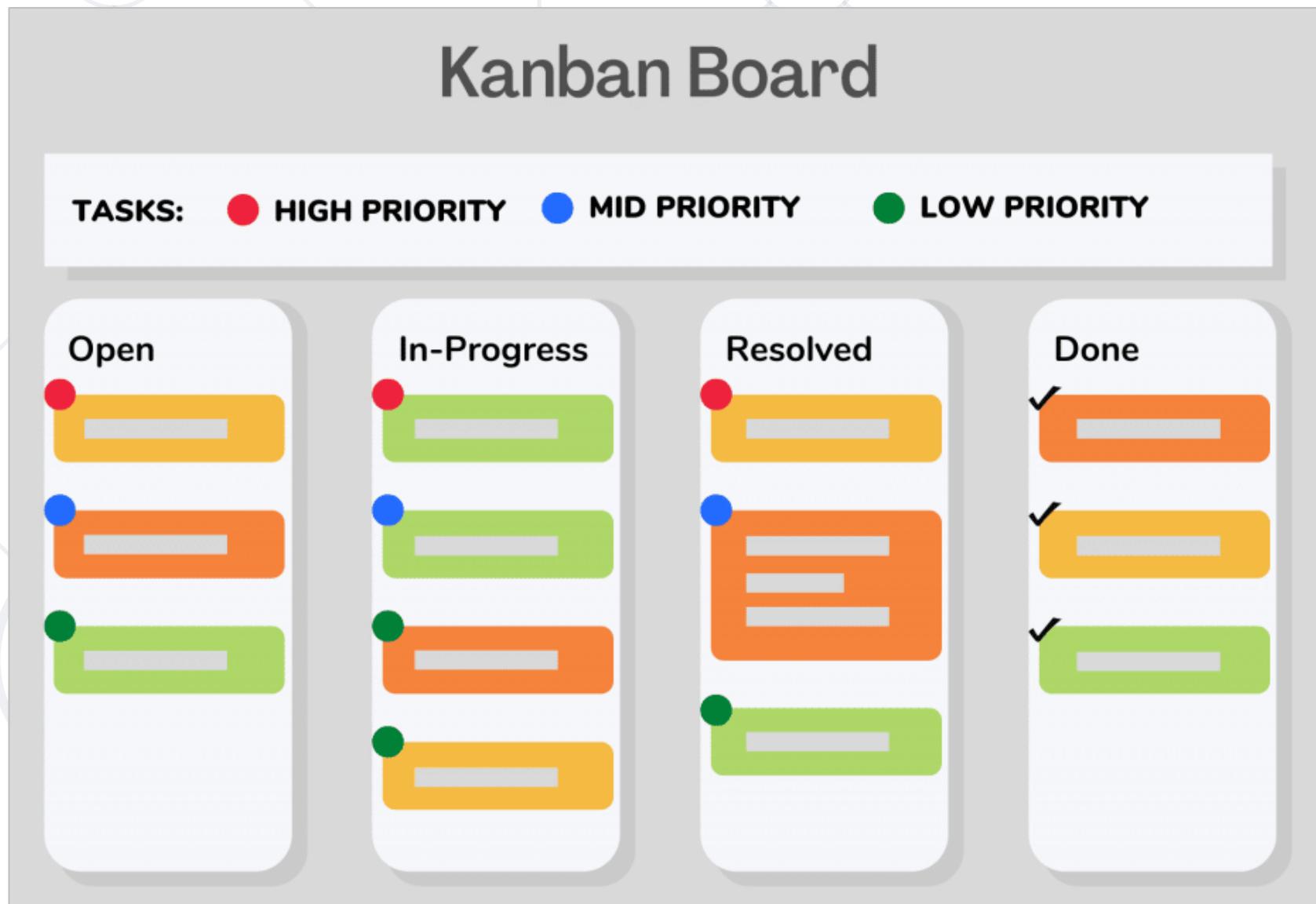


# Kanban

Kanban, Principles, Tasks, Flow, Kanban Boards

- **Kanban**
  - Popular agile project management framework
- **Visualization**
  - Shared Kanban board
- **Flow of tasks**
  - Open → In-Progress → Done
- **Limiting work in progress**
  - Minimize multi-tasking
- **Continuous improvement**
  - Monitor, analyze, improve

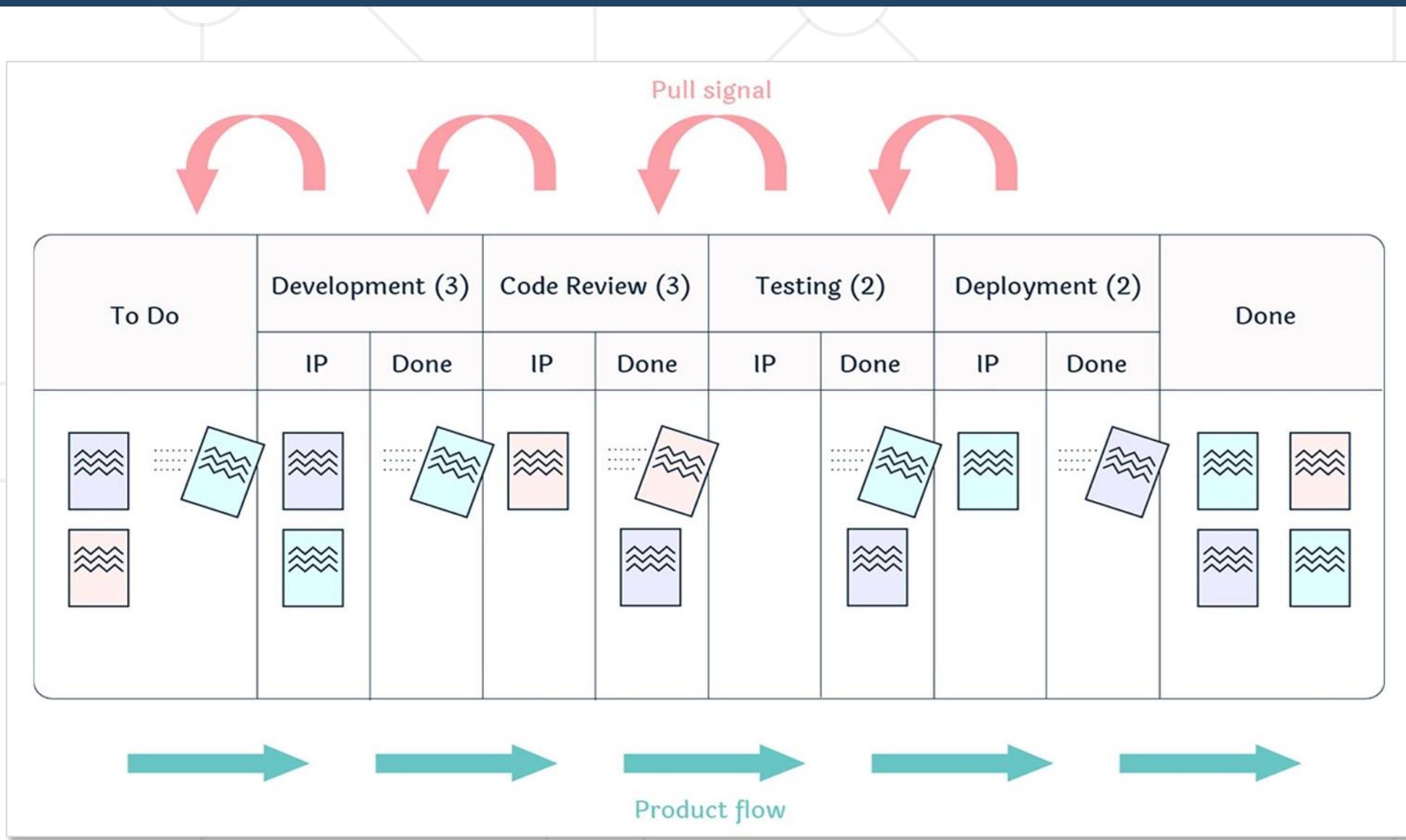
# Kanban Board: Structure



# Kanban Principles

- Start with **what you do** now
  - Respect the **current process**, roles, responsibilities, job titles
- **Visualize the workflow**
  - Use Kanban board
- **Manage workflow**
  - Fast smooth flow
  - **Limit the work-in-progress (WIP) items**
- **Incremental**, evolutionary change

# Kanban in Software Development



# Kanban Methodology

- Most Kanban boards include the following stages
  - Waiting
    - Typically includes the backlog of tasks that are waiting to be opened up
  - In-progress
    - Holds all the tasks that are currently being worked on
  - Completed
    - Holds done tasks
  - Blocked
    - When a task can't be completed or its progress is halted, until it can be picked up again

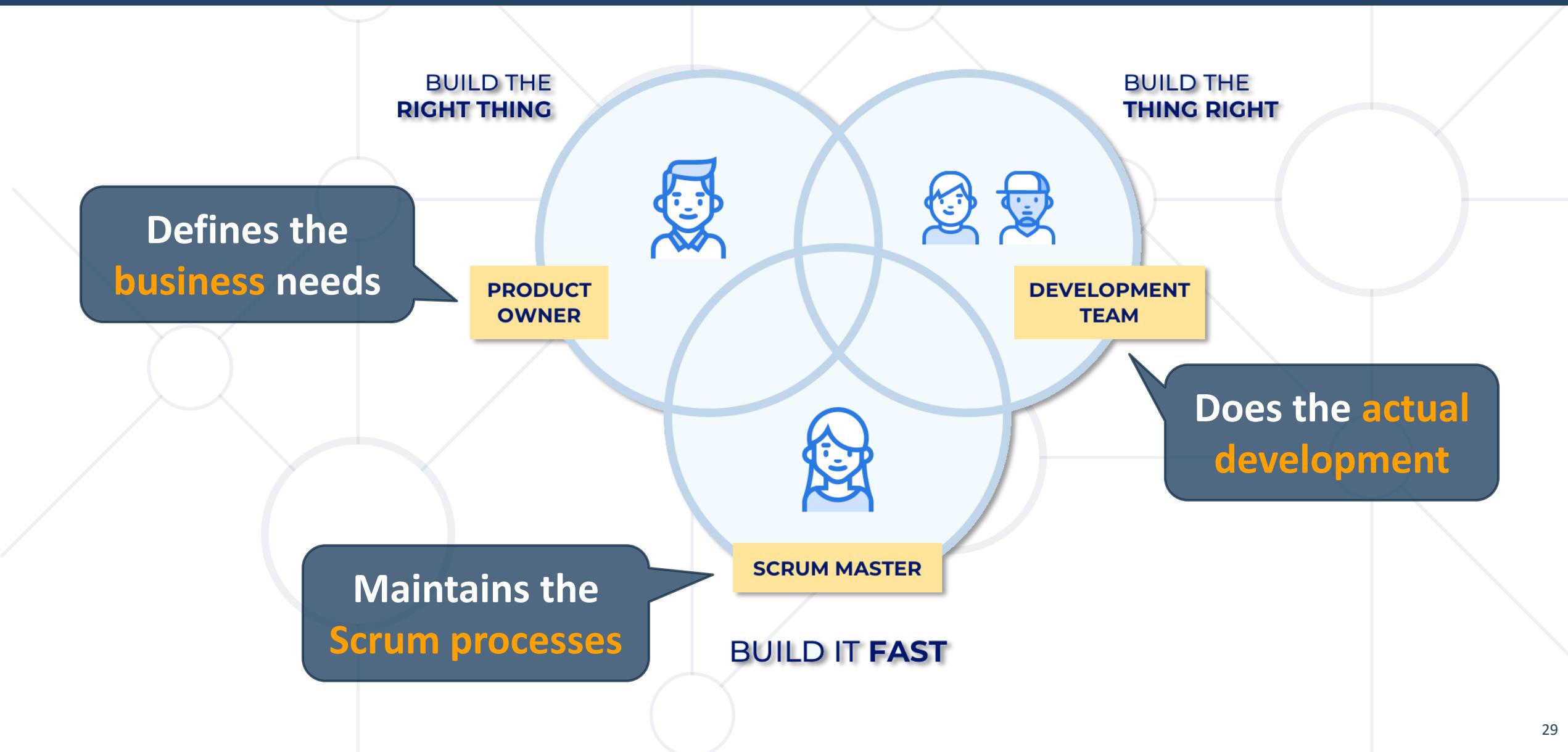


# Scrum

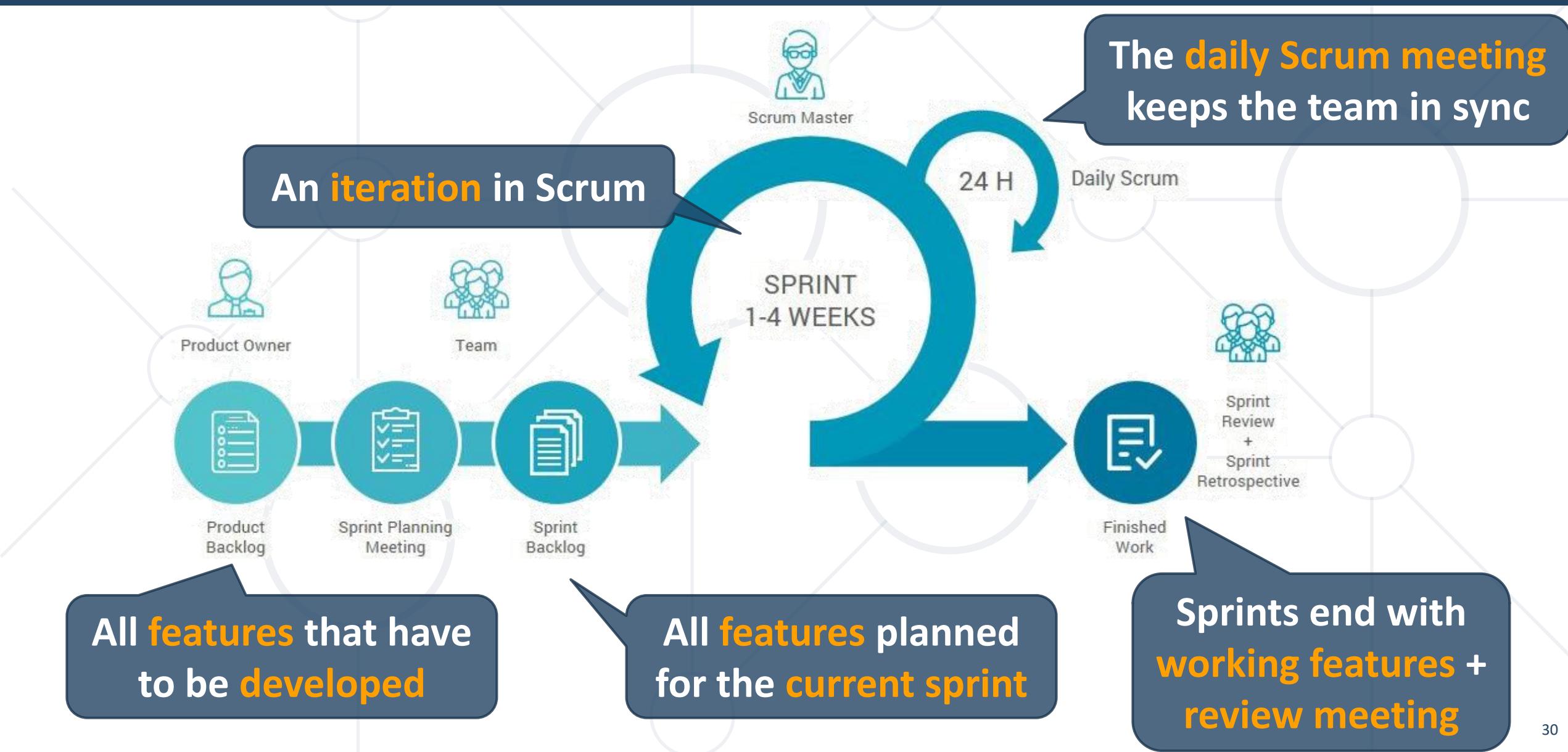
Backlog, Sprints, Daily Scrum, Scrum Roles

- **Scrum**
  - An iterative and incremental **agile software development methodology** for product development
  - Highly popular in the software industry (50%+ market share)
- Product features (user stories) stay in the product "**backlog**"
- Software is developed in iterations, called "**sprints**"
  - At each sprint, a **set of user stories** are implemented
  - A sprint lasts ≈ **1-4 weeks**
  - At the end, the team delivers fully **working features**

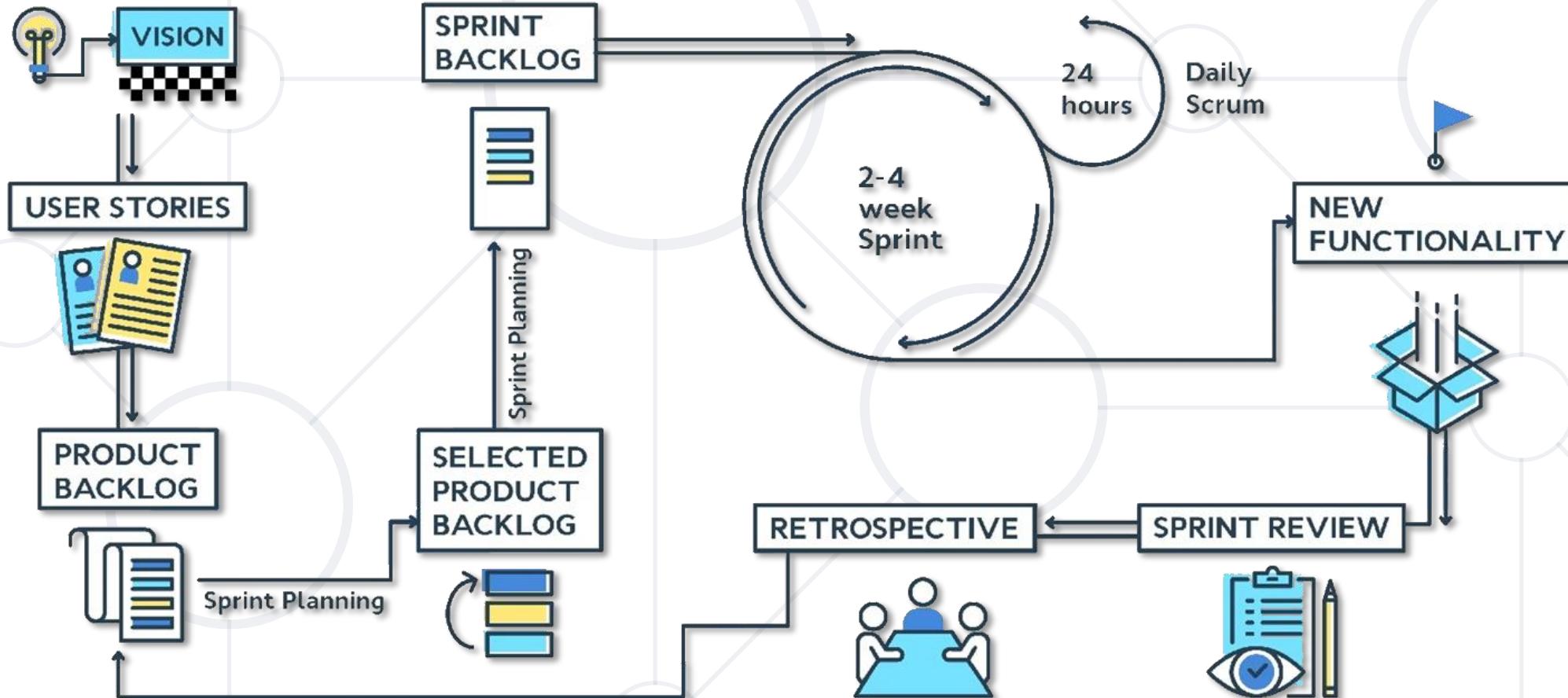
# Scrum Roles



# Scrum Terminology



## SCRUM PROCESS



# Scrum Practices

- **Sprint Planning Meeting**
  - At the beginning of the sprint cycle
  - Establish the Sprint backlog
- **Daily Scrum stand-up meeting**
  - Each day during the sprint
  - Project status from each team member
  - Timeboxed to 15 minutes
- **Sprint Review Meeting**
  - Review the work completed / not completed





# Scrumban

Hybrid between Scrum and Kanban

- A hybrid between **Scrum** and **Kanban**
  - Combines the **structure of Scrum** with the **continuous flow** of work, **flexibility** and **visualization** of Kanban
- Work performed in **short iterations**
- **Limited number** of work-in-progress items
  - Monitored and tracked with Kanban boards
- No sprints
  - Work can be introduced and prioritized at any time
- No team roles
  - More flexibility

# Differences Between Kanban and Scrum

		Kanban	Scrum
Roles	Roles are <b>fluid</b> . Project manager optional.	Roles are <b>predefined</b> . Scrum master required.	
Tasks	Tasks are <b>shared</b> by everyone.	Tasks have <b>assigned</b> owners.	
Timeline	Timelines <b>evolve</b> on an as needed basis (more flexible).	Timelines are <b>timeboxed</b> into sprints.	
Changes	Changes in work items and their priorities can be made <b>at any time</b> .	Changes can only be made <b>between sprints</b> (upon completion of a sprint).	
Productivity	Productivity is measured by the <b>cycle time</b> of the complete project.	Productivity is measured by the <b>story points</b> completed in each sprint.	



# Project Tracking Tools

Task Management Tools/ Issue Tracker Systems

- GitHub Projects
  - A free Kanban board in GitHub
  - Microsoft example



A screenshot of the Microsoft To Do app interface, showing a Kanban board for the "VSCode Git/SCM" project. The board has two columns: "General" and "GitHub". A filter at the top shows 17 items with the status "Done". The list below shows several completed GitHub issues, each with a green circular icon and a link to the issue page.

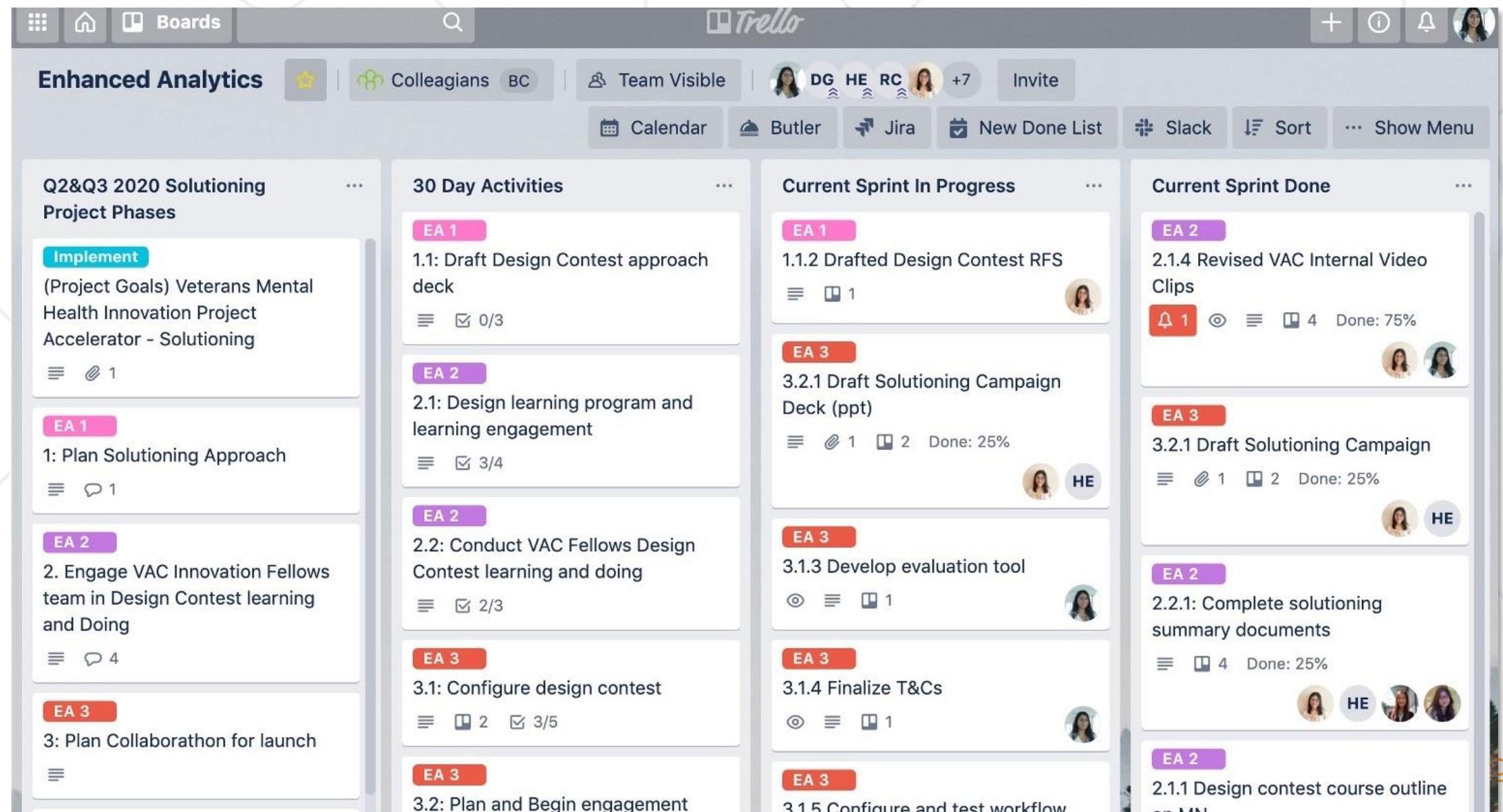
Title	Assignees
23 Git: Prevent running git operations during sync #60630	joamoreno and lszomoru
24 Git: Sync Changes Button Should Not Pull When There Are No Incoming Changes #163934	lszomoru
25 SCM title menu Create Pull Request action is unavailable when in a Remote window #3911	alexr00 and lszomoru
26 Git error (Cannot fast-forward to multiple branches.) when syncing during autofetch #158309	lszomoru
29 [Bug] editor could not be opened if a file have conflict with added by us #153639	lszomoru
31 VS Code does not respect the diff flag in .gitattributes #154815	lszomoru
33 After VSCode is updated, git@github.com: Permission denied (publickey). #149622	lszomoru

# Trello

- Trello
  - The **visual tool** that empowers your team to **manage** any **type** of **project**, **workflow**, or **task tracking**
  - Trello's look and feel are based on the **principles** of a **Kanban board**
  - **Visual tool** made up of **cards** and **columns** to **track progress**
  - Think of **Trello** as a **digital**, **living whiteboard** in **motion**



# Trello – A Simple Kanban Board



**Enhanced Analytics**

**Q2&Q3 2020 Solutioning Project Phases**

**Implement**  
(Project Goals) Veterans Mental Health Innovation Project Accelerator - Solutioning

**EA 1**  
1: Plan Solutioning Approach

**EA 2**  
2. Engage VAC Innovation Fellows team in Design Contest learning and Doing

**EA 3**  
3: Plan Collaboration for launch

**30 Day Activities**

**EA 1**  
1.1: Draft Design Contest approach deck  
0/3

**EA 2**  
2.1: Design learning program and learning engagement  
3/4

**EA 2**  
2.2: Conduct VAC Fellows Design Contest learning and doing  
2/3

**EA 3**  
3.1: Configure design contest  
2/2 3/5

**EA 3**  
3.2: Plan and Begin engagement

**Current Sprint In Progress**

**EA 1**  
1.1.2 Drafted Design Contest RFS  
1

**EA 3**  
3.2.1 Draft Solutioning Campaign Deck (ppt)  
1 2 Done: 25%

**EA 3**  
3.1.3 Develop evaluation tool  
1

**EA 3**  
3.1.4 Finalize T&Cs  
1

**EA 3**  
3.1.5 Configure and test workflow

**Current Sprint Done**

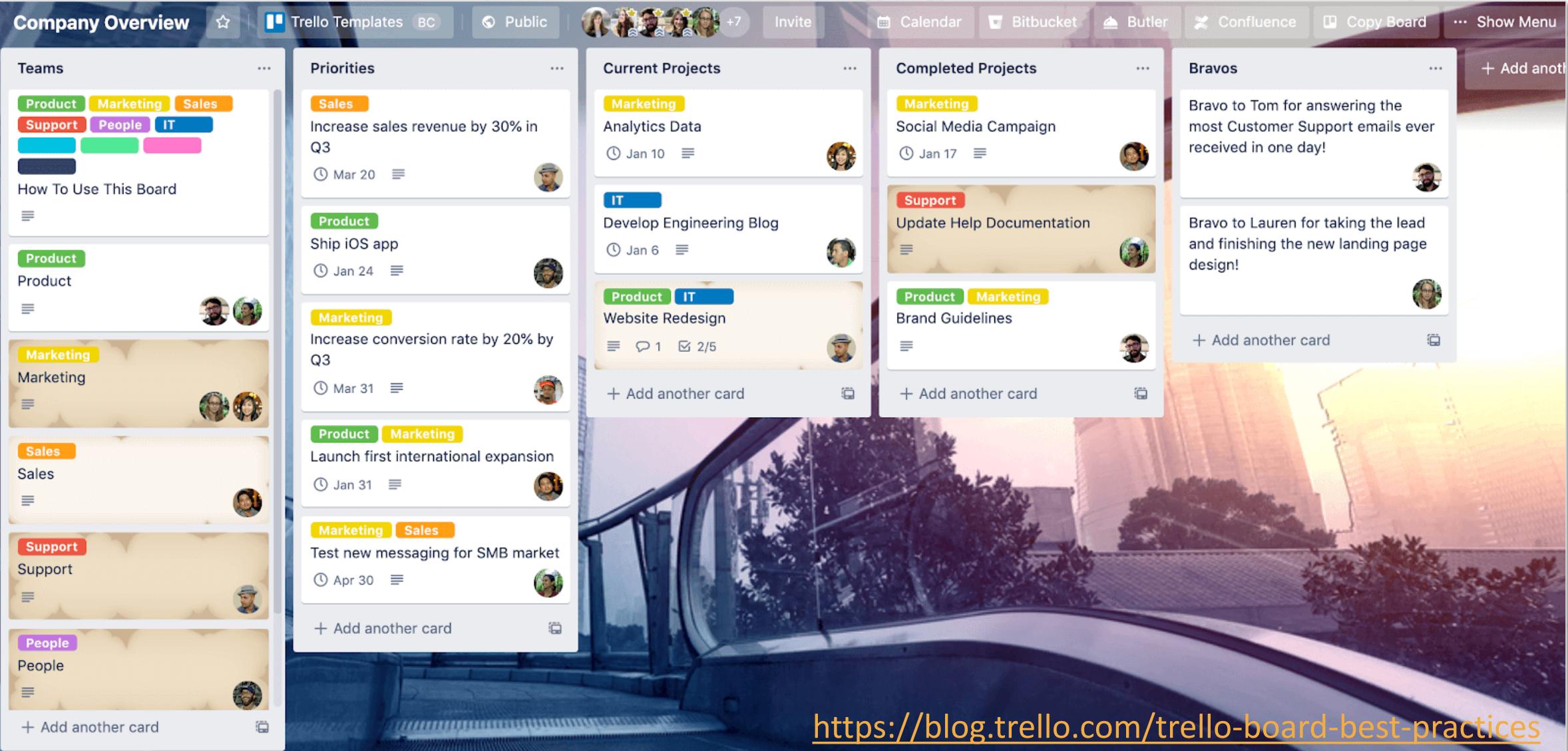
**EA 2**  
2.1.4 Revised VAC Internal Video Clips  
4 Done: 75%

**EA 3**  
3.2.1 Draft Solutioning Campaign  
2 Done: 25%

**EA 2**  
2.2.1: Complete solutioning summary documents  
4 Done: 25%

**EA 2**  
2.1.1 Design contest course outline

# Trello – A Simple Kanban Board



The screenshot shows the Trello Company Overview board. At the top, there are sections for Teams (Product, Marketing, Sales, Support, People, IT), Priorities (Sales, Product, Marketing), Current Projects (Marketing, IT, Product, IT, Product, Marketing), Completed Projects (Marketing, Support, Product, Marketing), and Bravos (two cards: Tom for most Customer Support emails and Lauren for landing page design). Below these are sections for Marketing, Sales, Support, and People, each with a 'Add another card' button. The background features a blurred image of a modern building at sunset.

**Company Overview**

**Teams**

- Product
- Marketing
- Sales
- Support
- People
- IT

How To Use This Board

**Priorities**

- Sales**  
Increase sales revenue by 30% in Q3  
Due Mar 20
- Product**  
Ship iOS app  
Due Jan 24
- Marketing**  
Increase conversion rate by 20% by Q3  
Due Mar 31
- Product**  
Launch first international expansion  
Due Jan 31
- Marketing**  
Test new messaging for SMB market  
Due Apr 30

**Current Projects**

- Marketing**  
Analytics Data  
Due Jan 10
- IT**  
Develop Engineering Blog  
Due Jan 6
- Product**  
Website Redesign  
Due Mar 25  
Comments 1, Progress 2/5

**Completed Projects**

- Marketing**  
Social Media Campaign  
Due Jan 17
- Support**  
Update Help Documentation
- Product**  
Brand Guidelines

**Bravos**

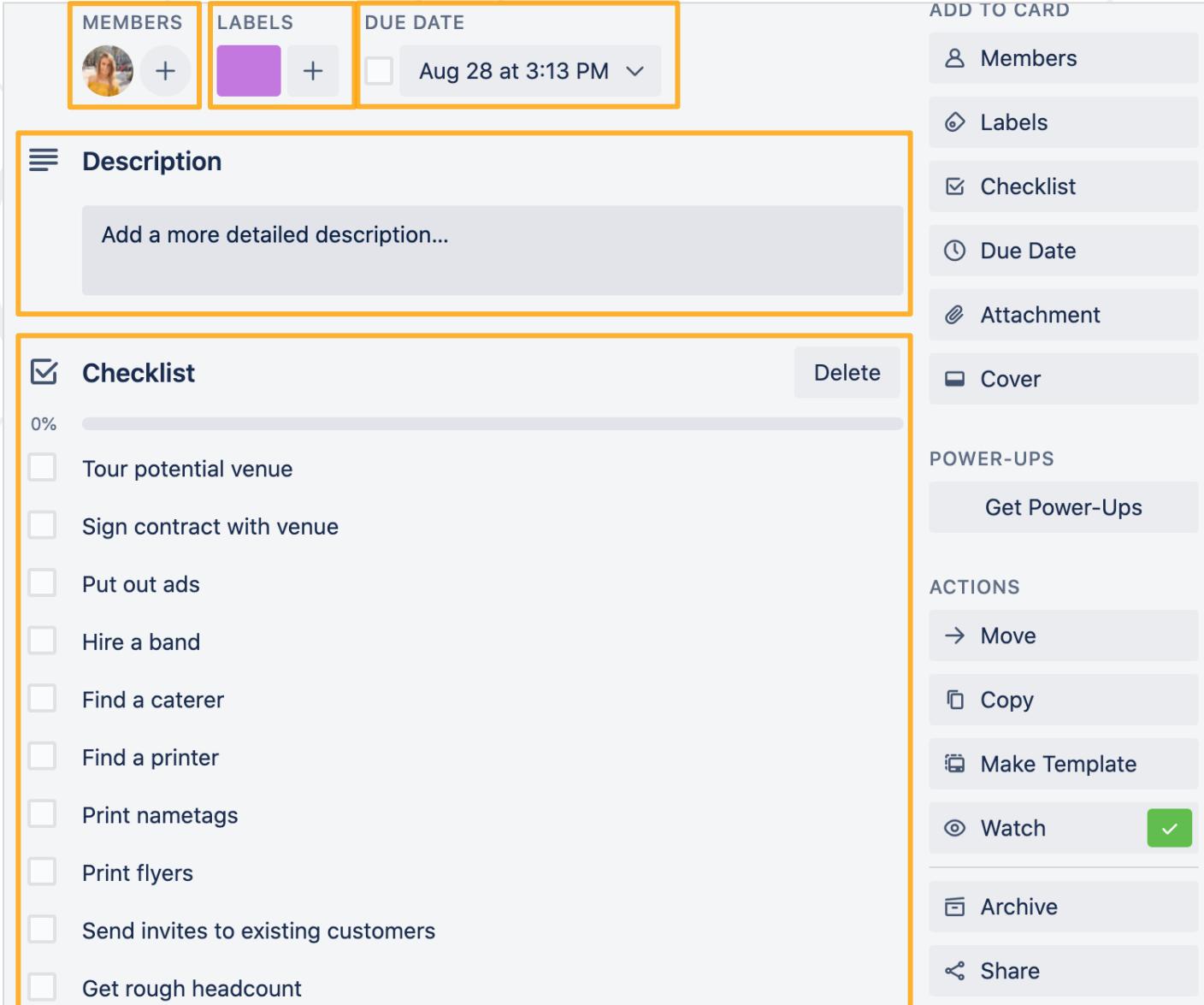
- Bravo to Tom for answering the most Customer Support emails ever received in one day!
- Bravo to Lauren for taking the lead and finishing the new landing page design!

+ Add another card

<https://blog.trello.com/trello-board-best-practices>

# Trello – Example

- A card may have
  - Title
  - Members
  - Labels
  - Due date
  - Description
  - Attachments
  - Tasks checklist
  - Activity
  - Comments



The screenshot shows a Trello card with several fields highlighted by orange boxes:

- Members:** Shows a profile picture and a plus sign.
- Labels:** Shows a purple square and a plus sign.
- DUE DATE:** Shows "Aug 28 at 3:13 PM" with a dropdown arrow.
- Description:** A text input field with placeholder text "Add a more detailed description..."
- Checklist:** A section titled "Checklist" with a progress bar at 0%. It contains a list of tasks:
  - Tour potential venue
  - Sign contract with venue
  - Put out ads
  - Hire a band
  - Find a caterer
  - Find a printer
  - Print nametags
  - Print flyers
  - Send invites to existing customers
  - Get rough headcount

On the right side, there is a sidebar with the following options:

- ADD TO CARD:**
  - Members
  - Labels
  - Checklist
  - Due Date
  - Attachment
  - Cover
- POWER-UPS:** A button "Get Power-Ups".
- ACTIONS:**
  - Move
  - Copy
  - Make Template
  - Watch
  - Archive
  - Share

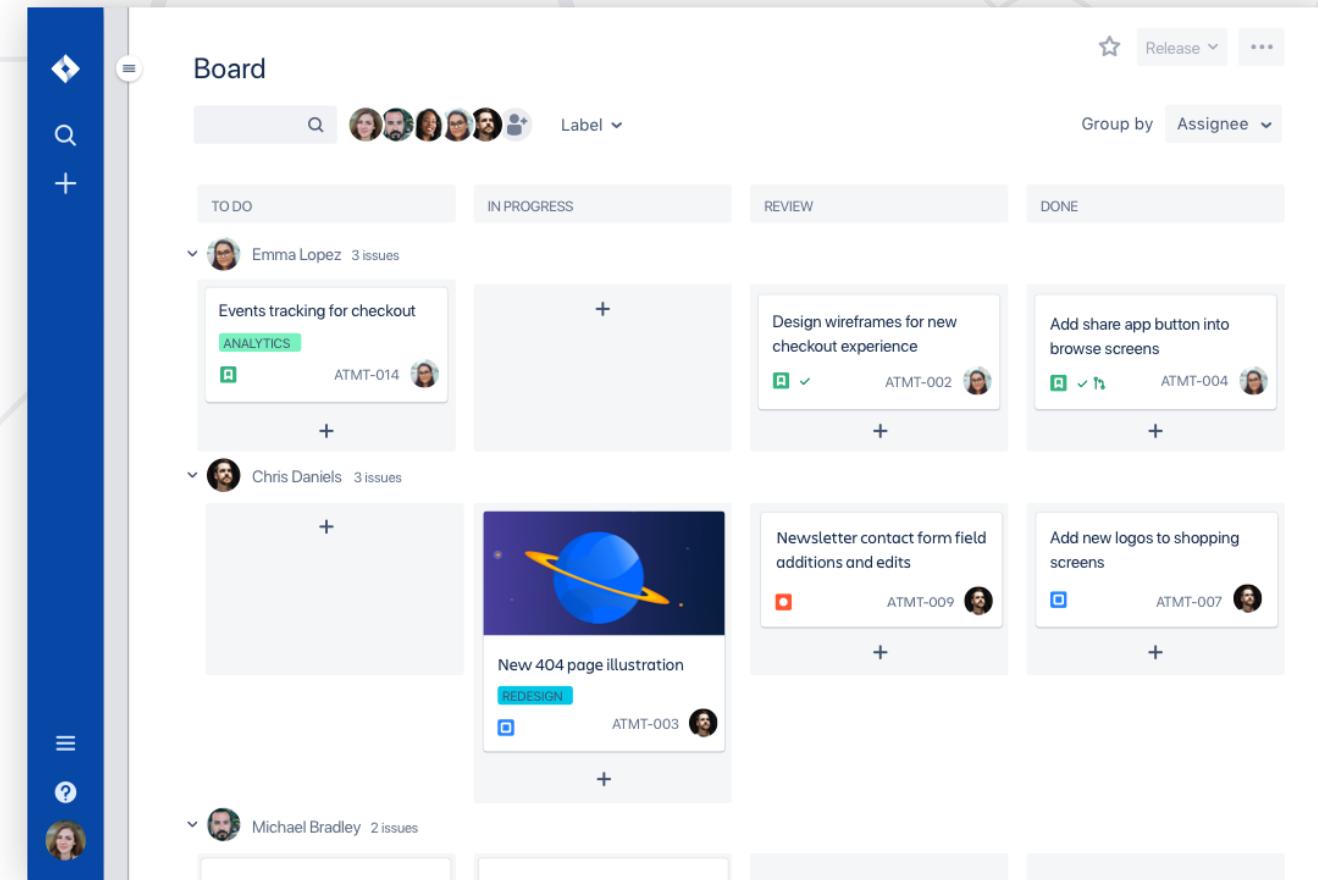
# Issue Tracker Systems

- A tool that allows agents to manage various cases and track their progress during the resolution process, beginning to end

- Tools

- Jira

- GitHub Issues



# Jira

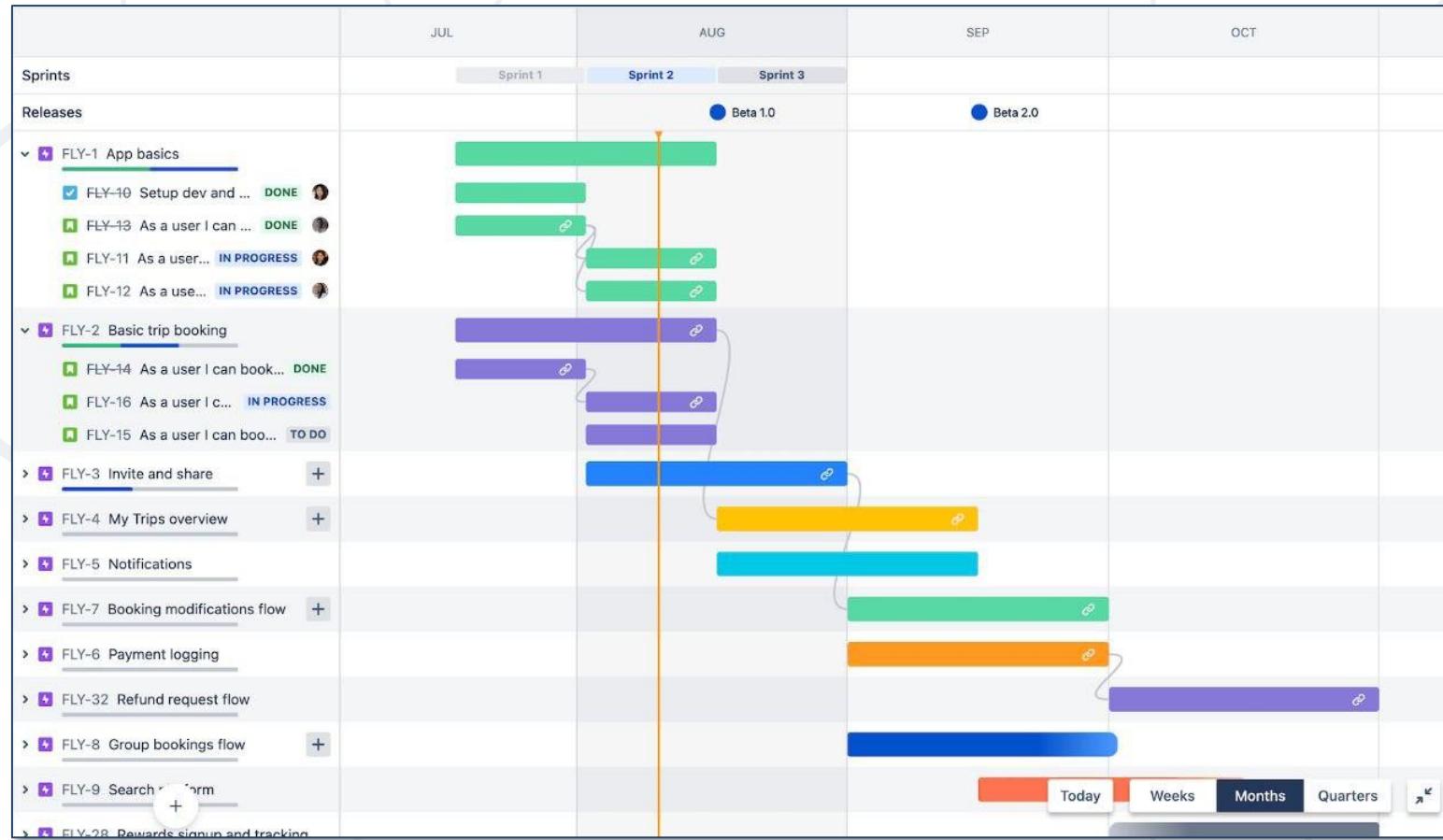
- Widely used **project management** and **issue-tracking tool**
- Primarily designed to **help teams plan, track**, and **manage their work efficiently**
- Provides a **robust set of features** and **capabilities**



Jira Software

# Key features of Jira

- Issue Tracking
- Project Management
- Customization and Extensibility
- Collaboration and Communication
- Integration Ecosystem
- Scalability and Deployment Options



# Main Concepts in Jira

- **Project**
  - A collection of issues and related information
- **Issue**
  - Bugs, features, user stories, tasks, or any other form of work that requires attention and action
- **Work Item**
  - Work item, task, or a unit of work that needs to be tracked, managed, and resolved

# Main Concepts in Jira

## ■ **Workflow**

- Series of steps or statuses through which an issue progresses during its lifecycle
- Typically, it consists of a set of statuses (e.g., Open, In Progress, Resolved, Closed) and transitions between them

# Sample Jira Issue



Jira Dashboards Projects Issues Boards Portfolio Power Apps Insight Assets Create Search ?

SCRUM / SCRUM-4  
Copy&Sync Demo

Edit Comment Assign More To Do Done submitted Admin

Details

Type: Task Priority: Medium Affects Version/s: None Component/s: Demo Labels: SCRUM-Sprint-1 Sprint: SCRUM Sprint 1

Status: TO DO (View Workflow) Resolution: Unresolved Fix Version/s: 2.1.0

People

Assignee: Unassigned Assign to me Reporter: Admin Votes: 0 Watchers: 1 Stop watching this issue

Description

Copy & Sync demo

Elements Checklist

Attachments

Drop files to attach, or browse.

Available Operations

a CLONE COPYST Test Nel Escalate issue to the operations team More Operations

Issue Links Display as graph

Wiki Page

+

# Sample Jira Issue

test / TEST-6

Edit this issue [Submit 2019 is awesome!](#)

[Edit](#) [Comment](#) [Assign](#) [Backlog](#) [Selected for Development](#) [Workflow](#) [Admin](#)

[...](#)

Type:	Bug	Status:	BACKLOG <a href="#">(View workflow)</a>	Assignee:	Unassigned
Priority:	Medium	Resolution:	Unresolved	Reporter:	Peter Van de Voorde
Labels:	None			Votes:	0
<b>Description</b>				Watchers:	<a href="#">1 Stop watching this issue</a>
This is the description.				Created:	15 minutes ago
				Updated:	15 minutes ago
<b>Attachments</b>					
<a href="#">Drop files to attach, or browse.</a>					
<a href="#">...</a>					
<b>Activity</b>					
<a href="#">All</a> <a href="#">Comments</a> <a href="#">Work log</a> <a href="#">History</a> <a href="#">Activity</a>					
There are no comments yet on this issue.					
<a href="#">Comment</a>					
<a href="#">...</a>					
<b>Agile</b>					
<a href="#">View on Board</a>					
<b>Quantify TimeSpent</b>					
Data is not available <a href="#">?</a>					
<a href="#">Compare the free and paid plan</a>					
<a href="#">Explore TEST</a>					

# Summary

- Software **project management** == **organizing** and **managing** work
- Development **methodology** == **heavyweight** and **agile**
- **Agile** development == relies on **increments**, each iteration goes through its **own lifecycle**
- **Kanban** == popular **agile** project **management framework**
- **Scrum** == **agile** software **development methodology** for product development
- **Scrumban** == **hybrid** between **Scrum** and **Kanban**
- Use **task management tools** (Trello, GitHub Projects, Asana)
- Use **issue trackers** for bugs/tickets (GitHub Issues, JIRA)



# Questions?



SoftUni



Software  
University



SoftUni  
Creative



SoftUni  
Digital



SoftUni  
Foundation



SoftUni  
Kids



Finance  
Academy

# SoftUni Diamond Partners



# Trainings @ Software University (SoftUni)



- Software University – High-Quality Education, Profession and Job for Software Developers

- [softuni.bg](http://softuni.bg), [about.softuni.bg](http://about.softuni.bg)

- Software University Foundation

- [softuni.foundation](http://softuni.foundation)

- Software University @ Facebook

- [facebook.com/SoftwareUniversity](https://facebook.com/SoftwareUniversity)



Software  
University



- This course (slides, examples, demos, exercises, homework, documents, videos and other assets) is **copyrighted content**
- Unauthorized copy, reproduction or use is illegal
- © SoftUni – <https://about.softuni.bg/>
- © Software University – <https://softuni.bg>

