

# 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

A network diagram is centered on the slide. It features a large, light-gray circle at the bottom containing the text "#Dev-Ops" in a bold, dark blue sans-serif font. Above it, a smaller circle contains the text "sli.do" in a bright orange sans-serif font. Both the main text and the URL are positioned within these circles. The entire diagram is set against a background of light gray lines forming a network-like structure, with several smaller, empty circles connected to the main nodes by thin gray lines.

# 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?

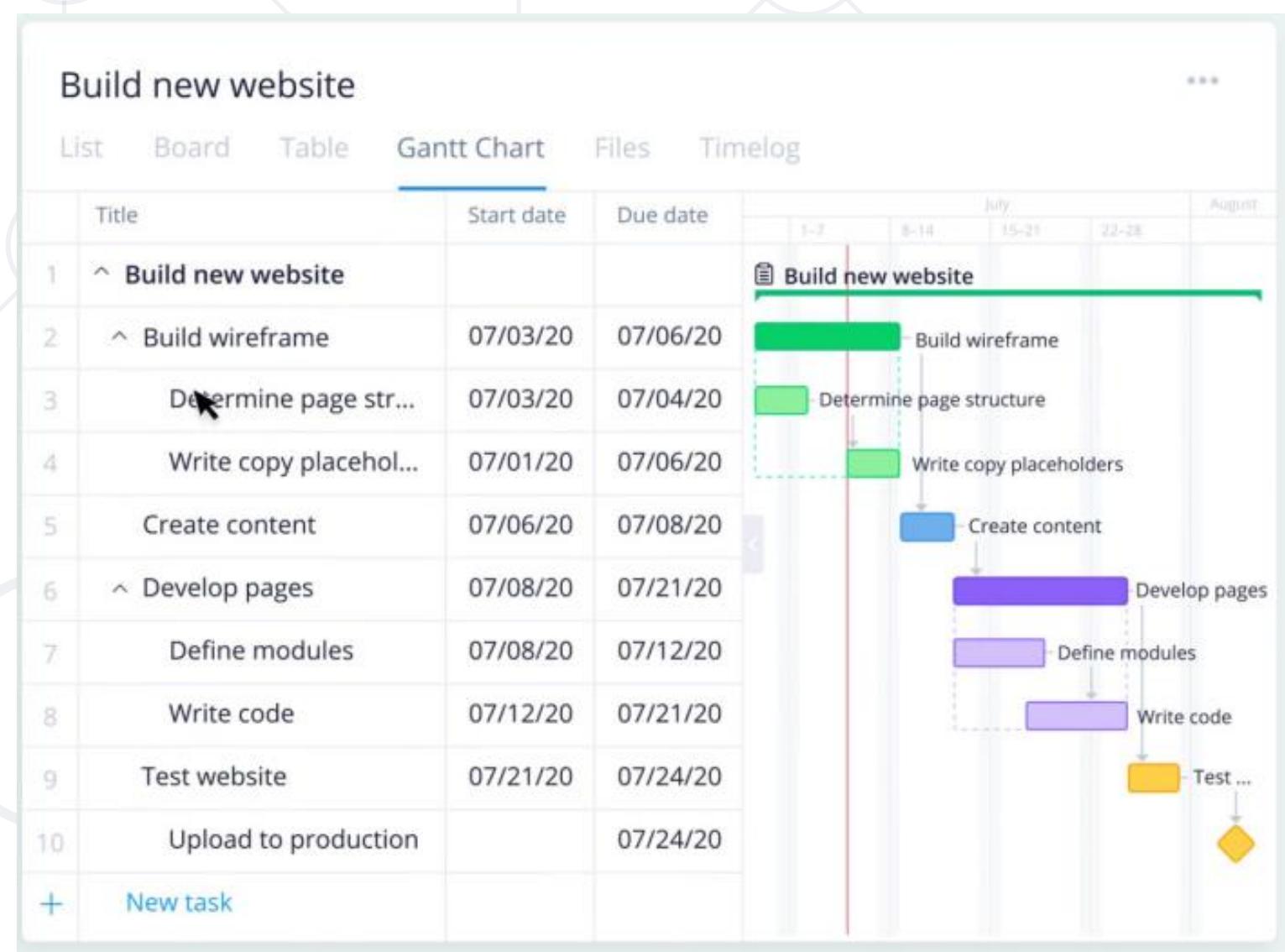
- **Software project management**
  - Management discipline about **planning**, **monitoring** and **controlling** software projects
- **Project planning**
  - Identify the scope, estimate the work, identify tasks and milestones, and create a schedule
- **Project monitoring and control**
  - Monitor 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

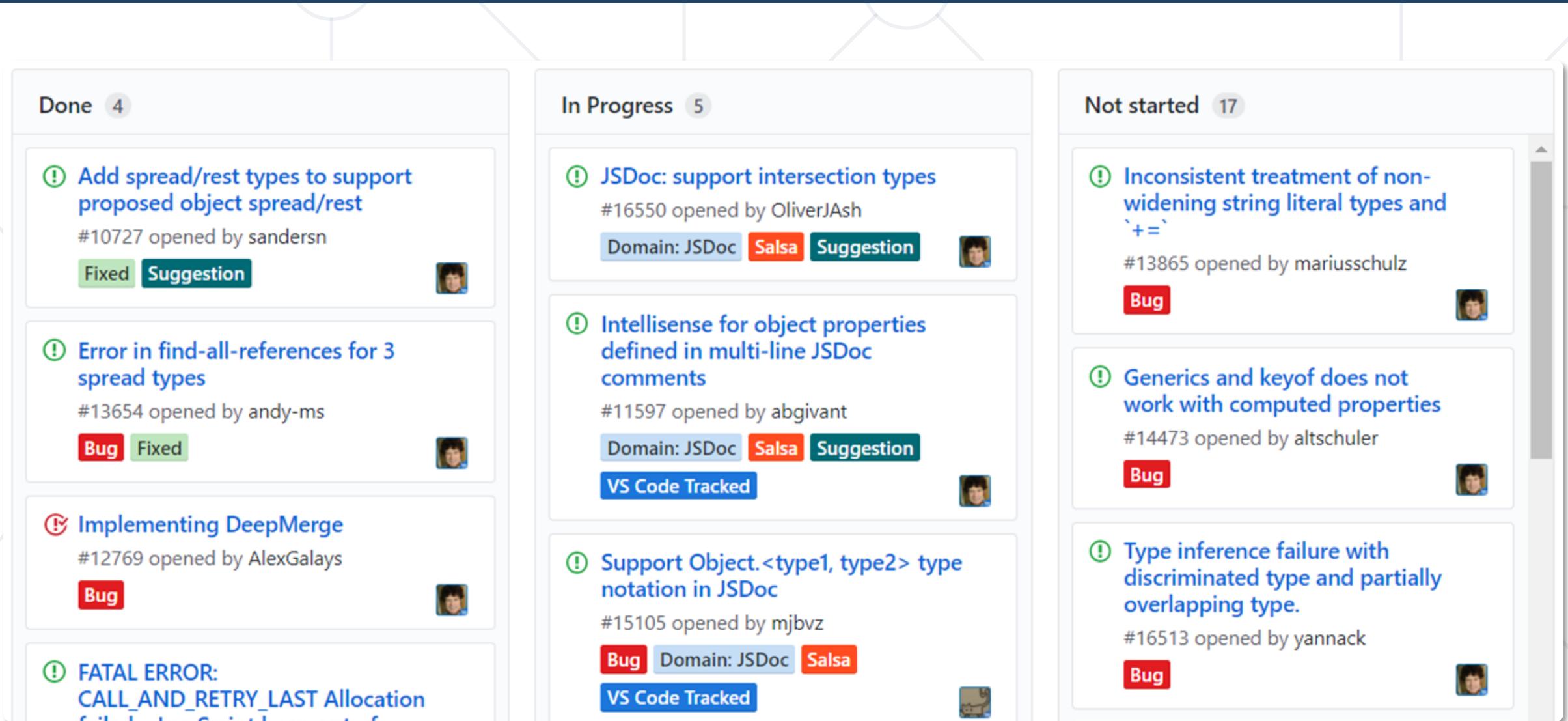
# Issue	+ Create issue	Status	Start date	Due date	...	Mar 2	Mar 9	Mar 16	Mar 23	Mar 30	Apr 6	Apr 13	Apr 20	Apr 27	May	
1 ADR-104 App basics - Android	IN PROGRESS	25/Feb/20	23/Mar/20		Sprint 9	Sprint 10		Sprint 11		Sprint 12		Sprint 13		Sprint 14		
ADR-401 As a user I can log...	IN PROGRESS	s 10/Mar/20	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													
3 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													
4 iOS Team																
1 IOS-543 Social media integration	IN PROGRESS	25/Feb/20	23/Mar/20													

Shark Koala Crocodile Dingo Emu Wo...

# 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 software development issues across three stages: Done, In Progress, and Not started.

- Done (4 items):**
  - Add spread/rest types to support proposed object spread/rest** (#10727 opened by sandersn)  
Status: Fixed, Suggestion
  - Error in find-all-references for 3 spread types** (#13654 opened by andy-ms)  
Status: Bug, Fixed
  - Implementing DeepMerge** (#12769 opened by AlexGalays)  
Status: Bug
  - FATAL ERROR: CALL\_AND\_RETRY\_LAST Allocation** (#16513 opened by yannack)  
Status: 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

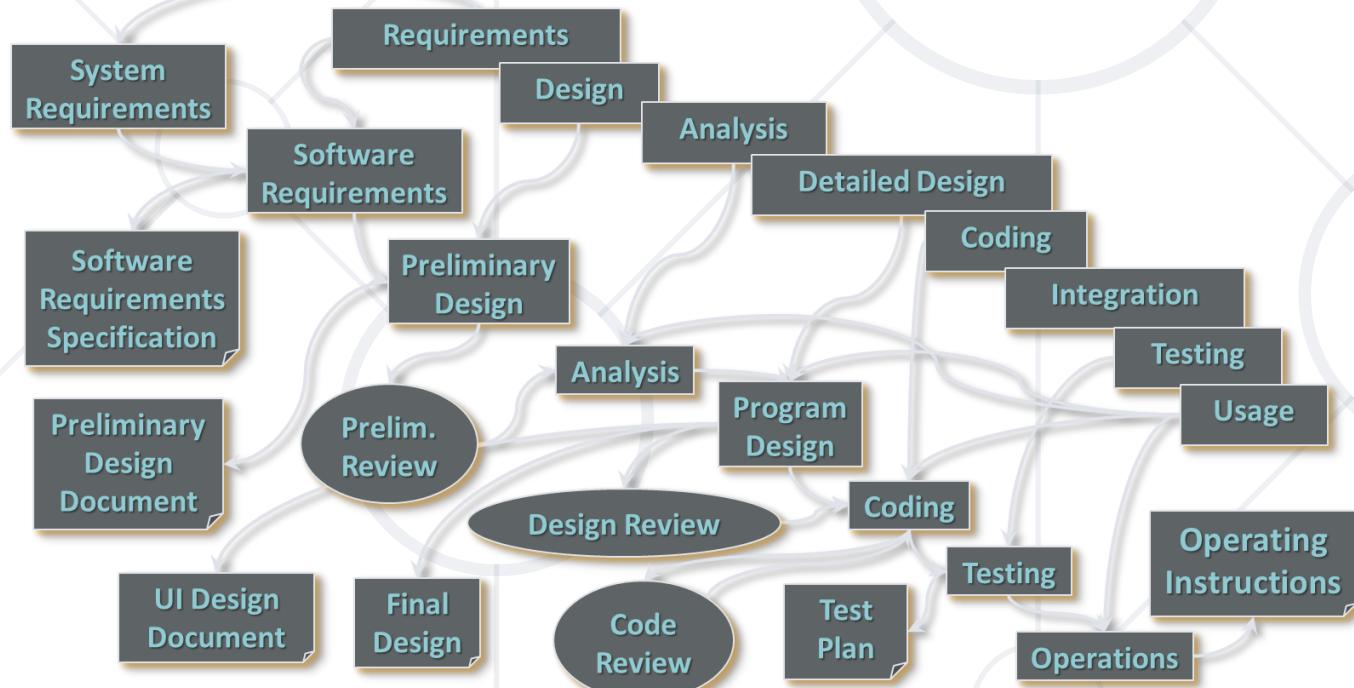
Waterfall, Scrum, Kanban, Extreme Programming

# 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

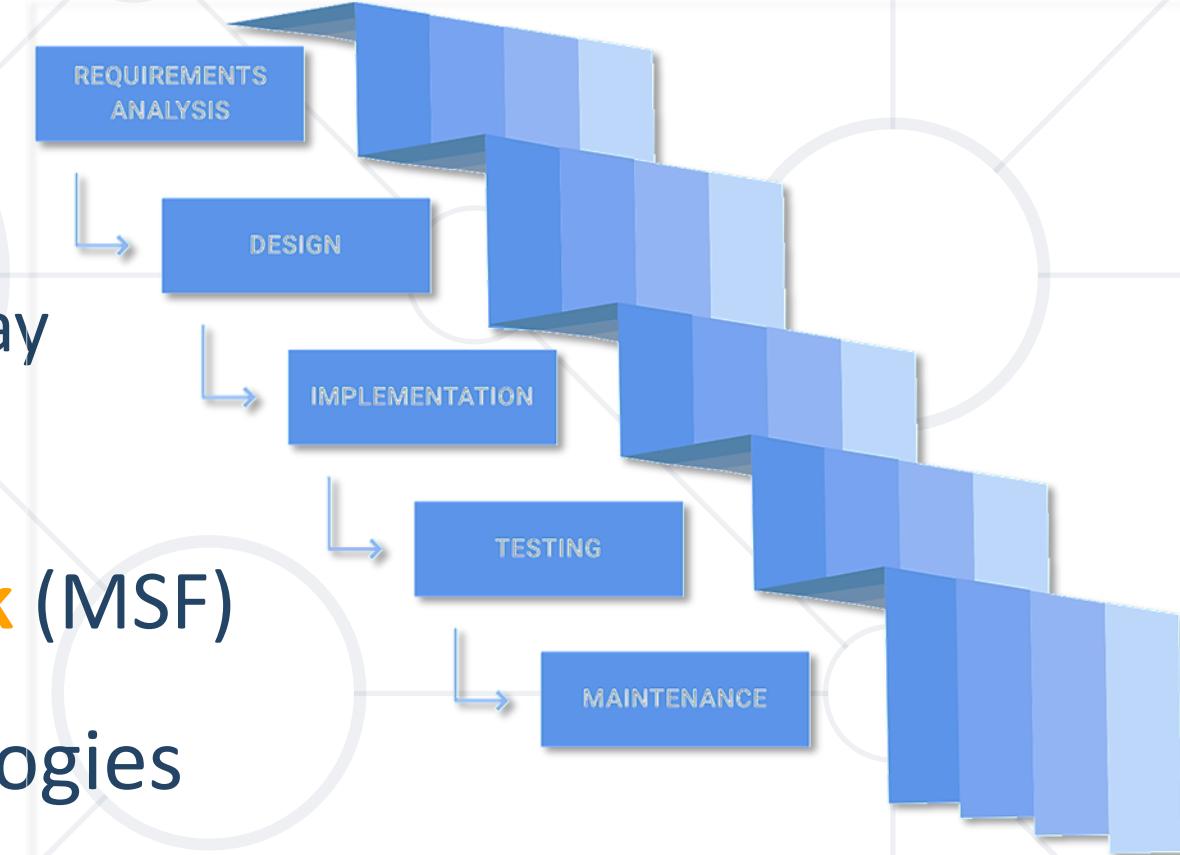
# Heavyweight and Agile Methodologies

- 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

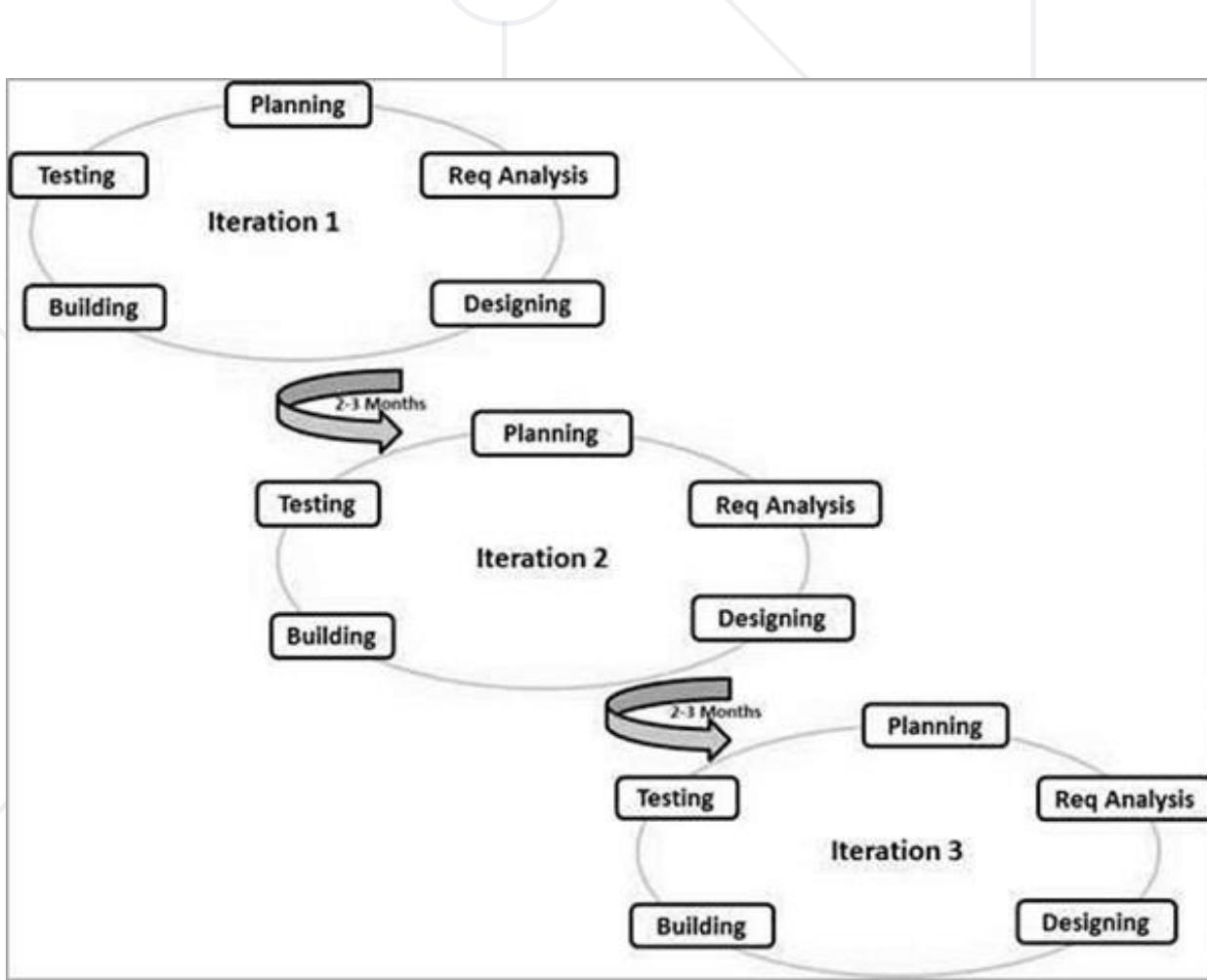
# The Agile Manifesto and Agile Spirit

- 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)



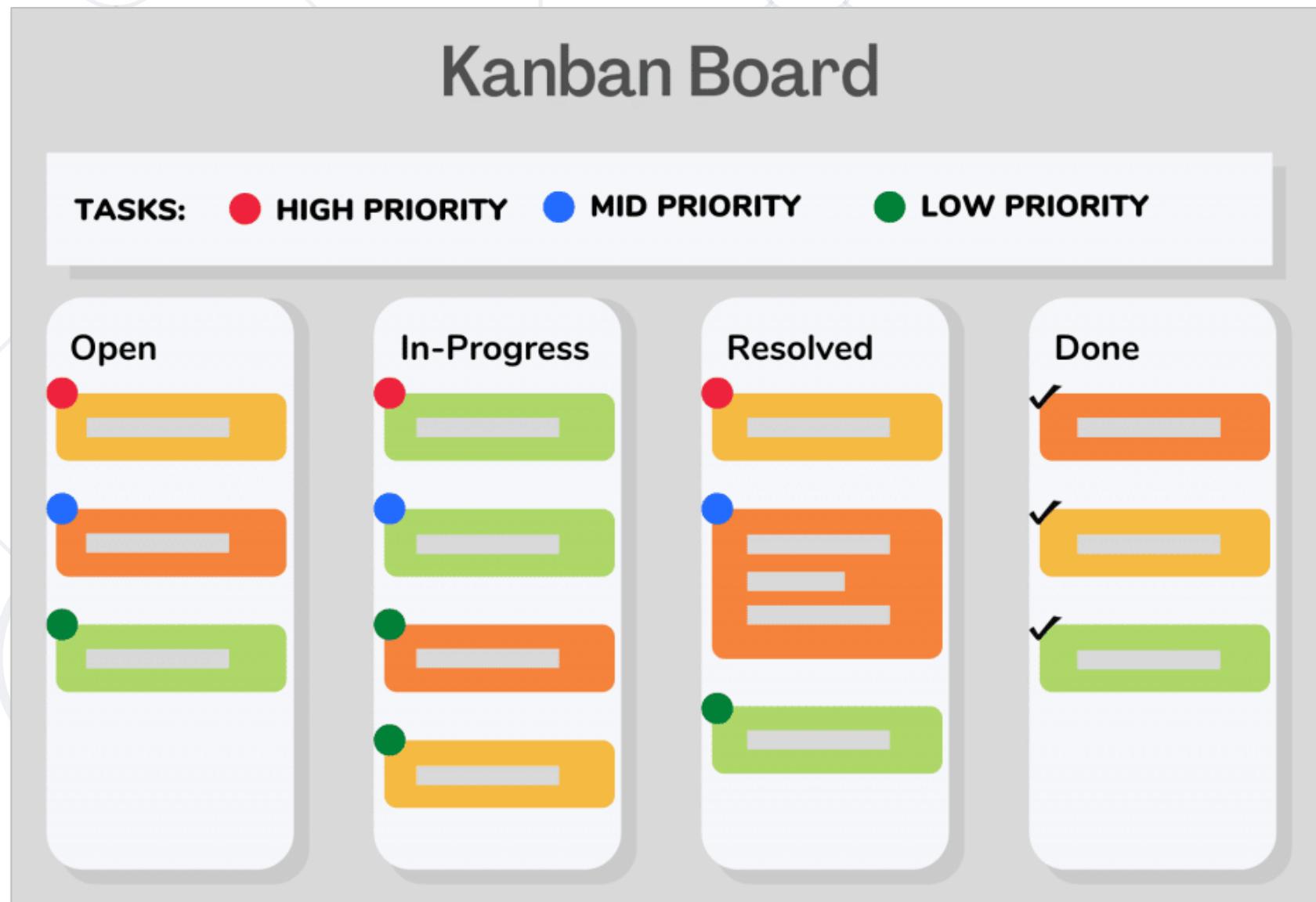


# Kanban

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

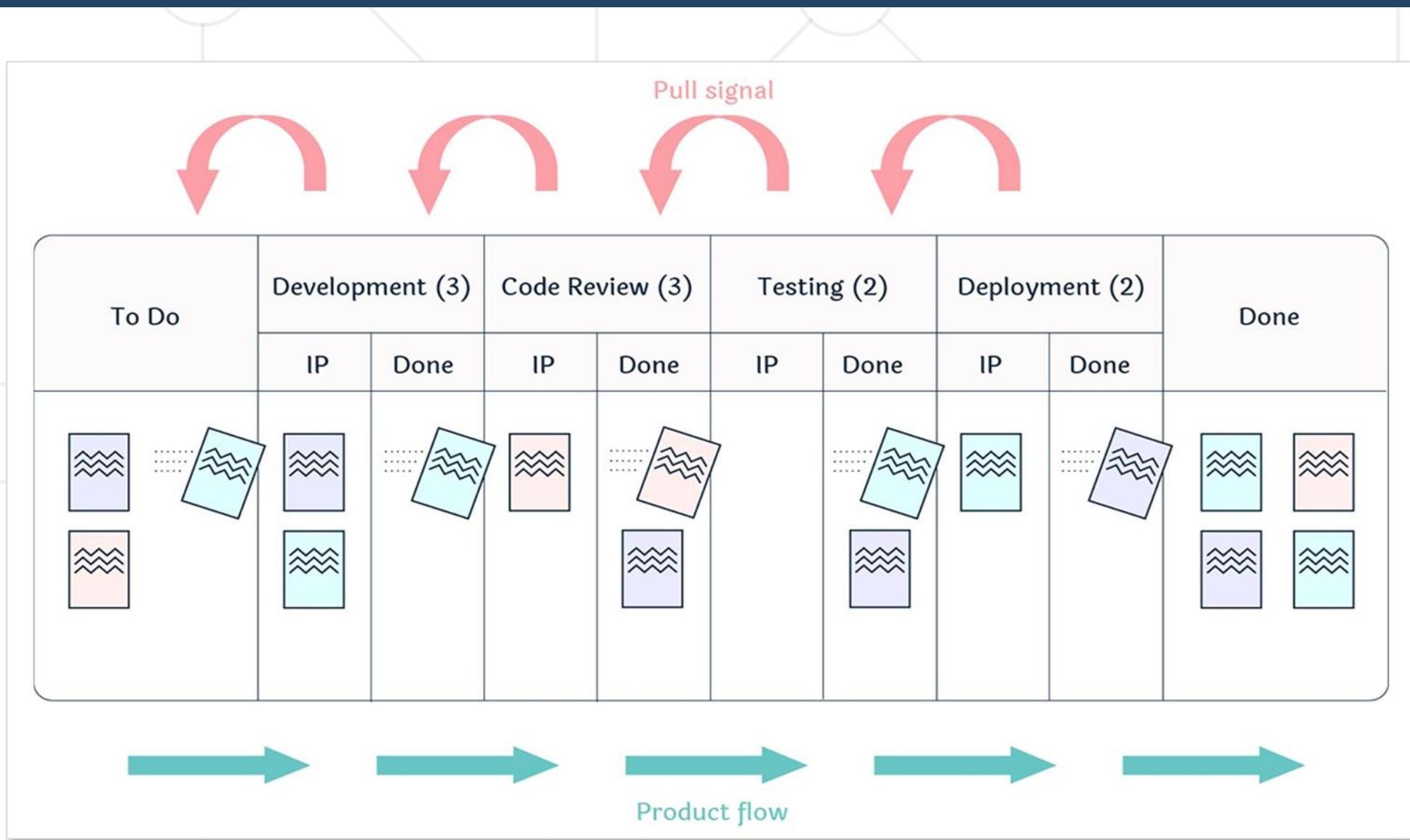
# Kanban Board: Structure



# 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

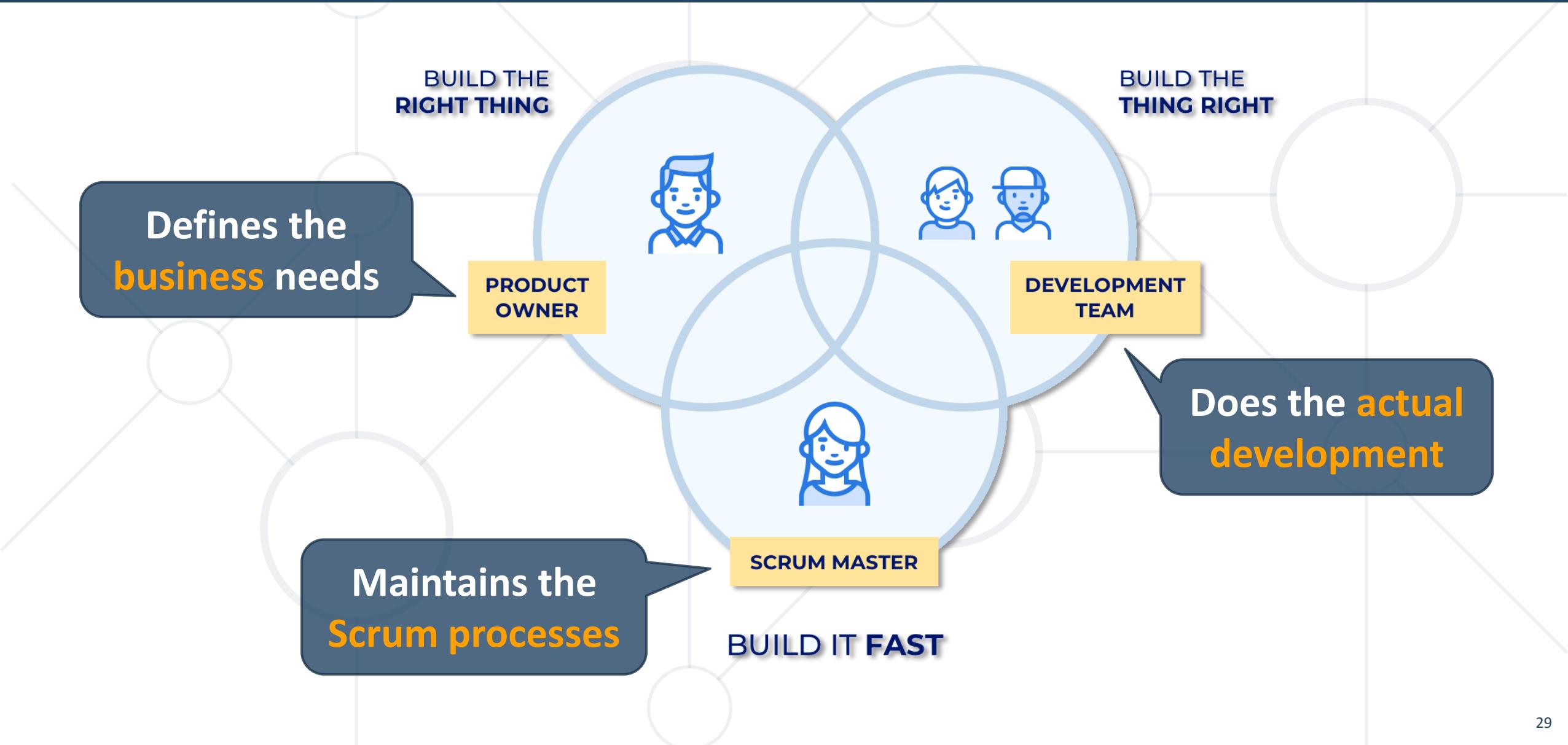


# Scrum

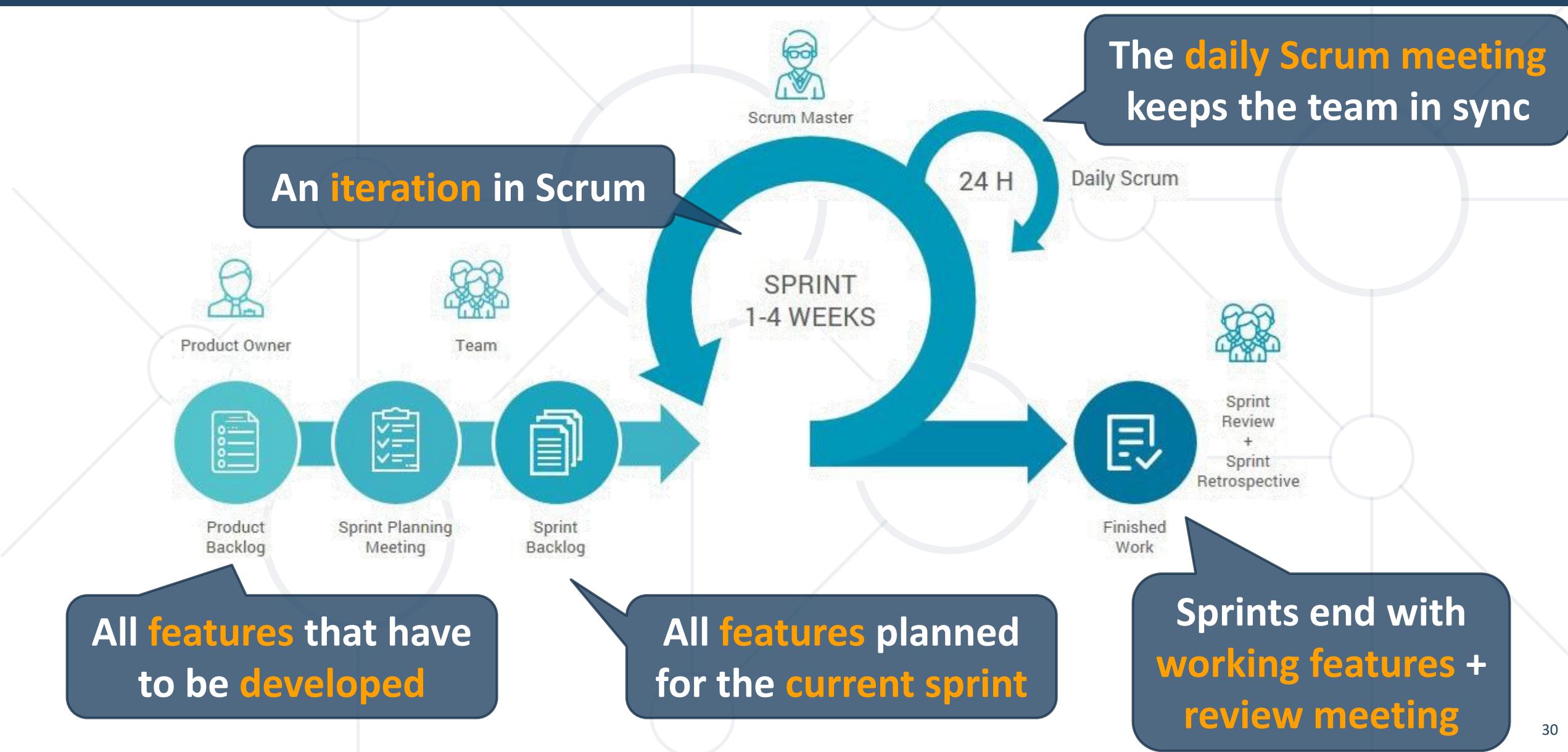
Backlog, Sprints, Daily Scrum, Scrum Roles

- **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**

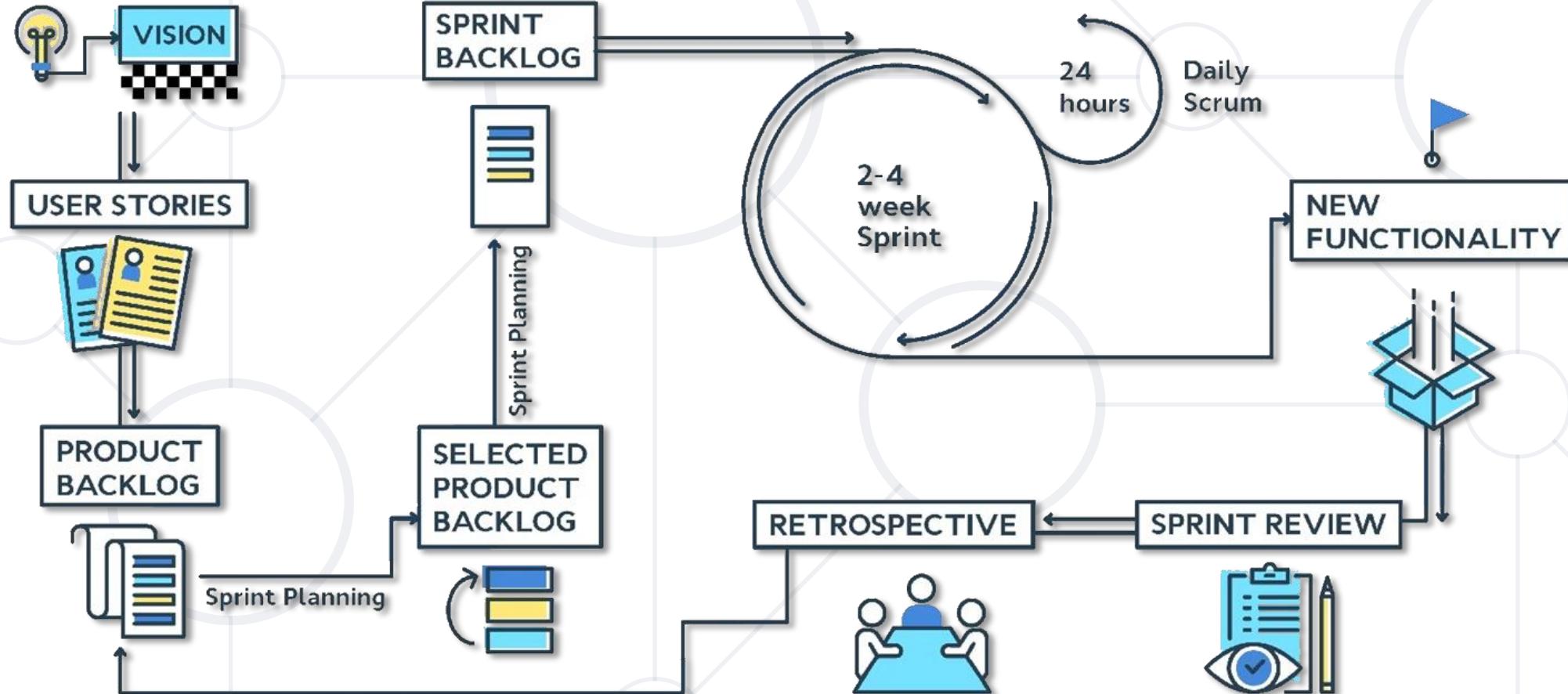
# Scrum Roles



# 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

# Scrumban

- 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 extension in VS Code, showing a GitHub backlog. The backlog lists several issues with their titles, IDs, and assignees.

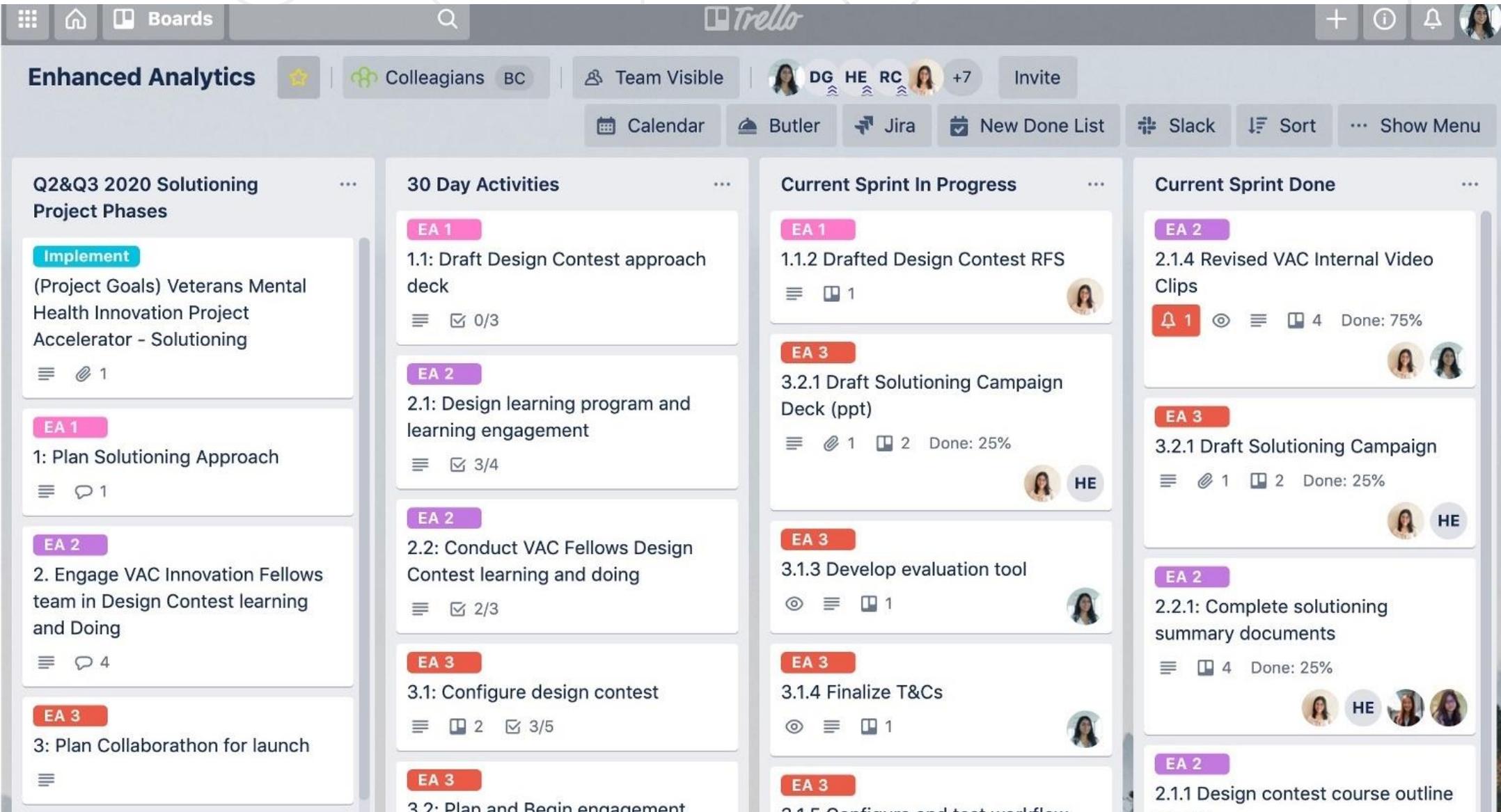
Title	Assignees
23 Git: Prevent running git operations during sync #60630	joamoreno and lszomoru
24 Git: Sync Changes Button Should Not Pull When There Are No Incoming Changes #163934	lszomoru
25 SCM title menu Create Pull Request action is unavailable when in a Remote window #3911	alexro0 and lszomoru
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**

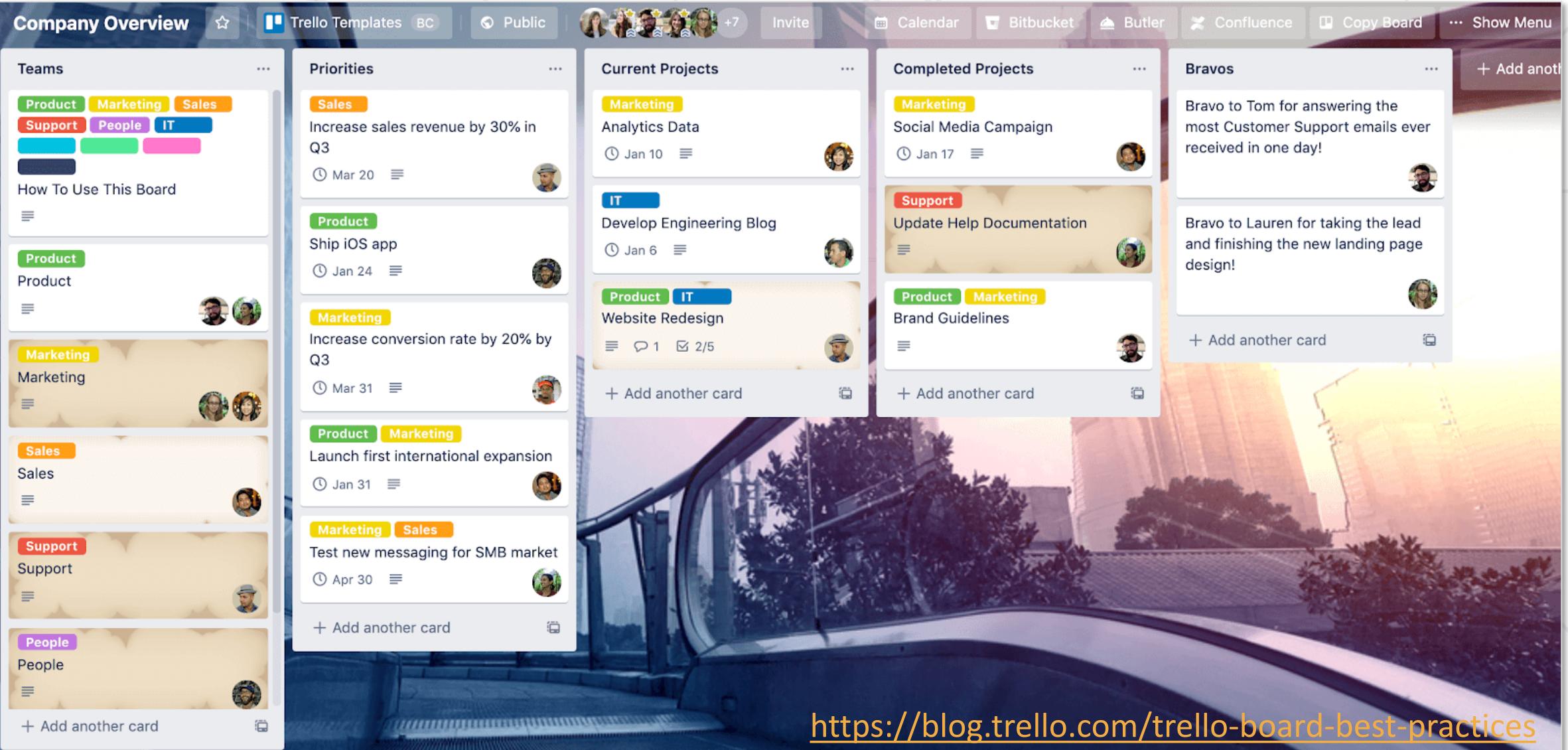
**EA 2**  
2.1.4 Revised VAC Internal Video Clips  
4 Done: 75%

**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



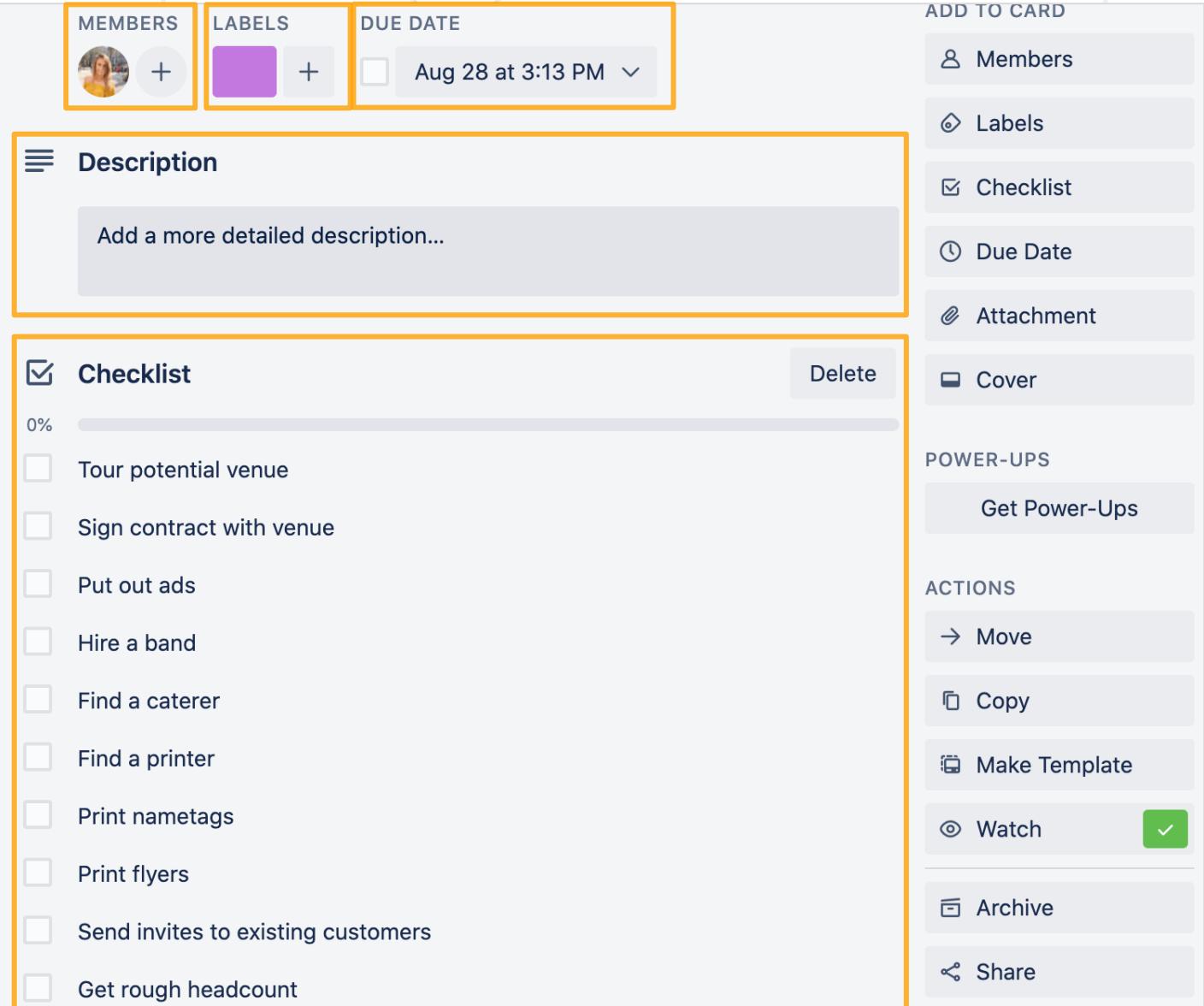
The screenshot shows a Trello board titled "Company Overview". The board is organized into several sections:

- Teams:** Product, Marketing, Sales, Support, People, IT.
- 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, Marketing:** Launch first international expansion (due Jan 31)
  - Marketing, Sales:** 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, IT:** Website Redesign (due Feb 28, progress 2/5)
- Completed Projects:**
  - Marketing:** Social Media Campaign (due Jan 17)
  - Support:** Update Help Documentation
  - Product, Marketing:** 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!

At the bottom of the board, there is a footer with the URL <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 ten items:
  - 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

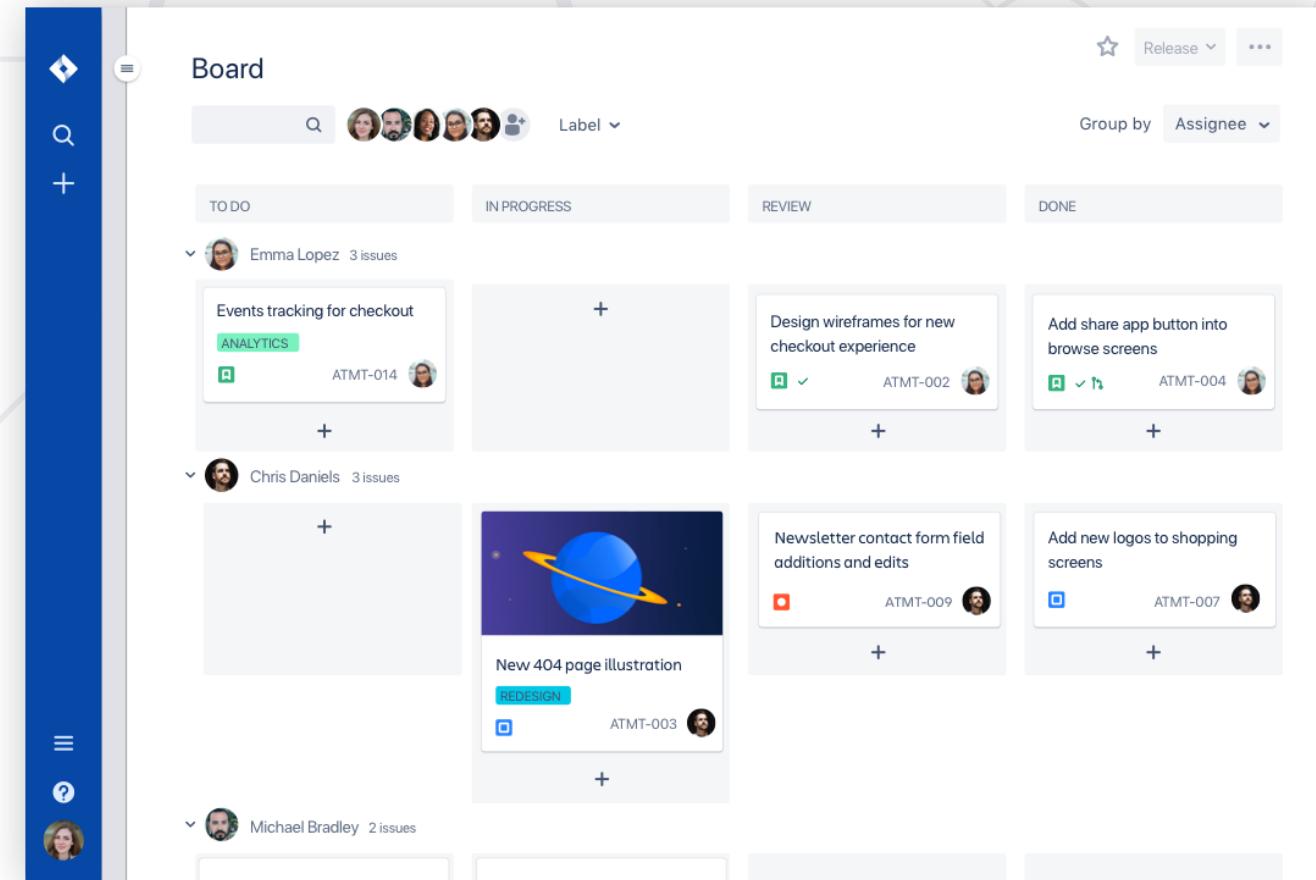
# Issue Tracker Systems

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

- Tools

- Jira

- GitHub Issues



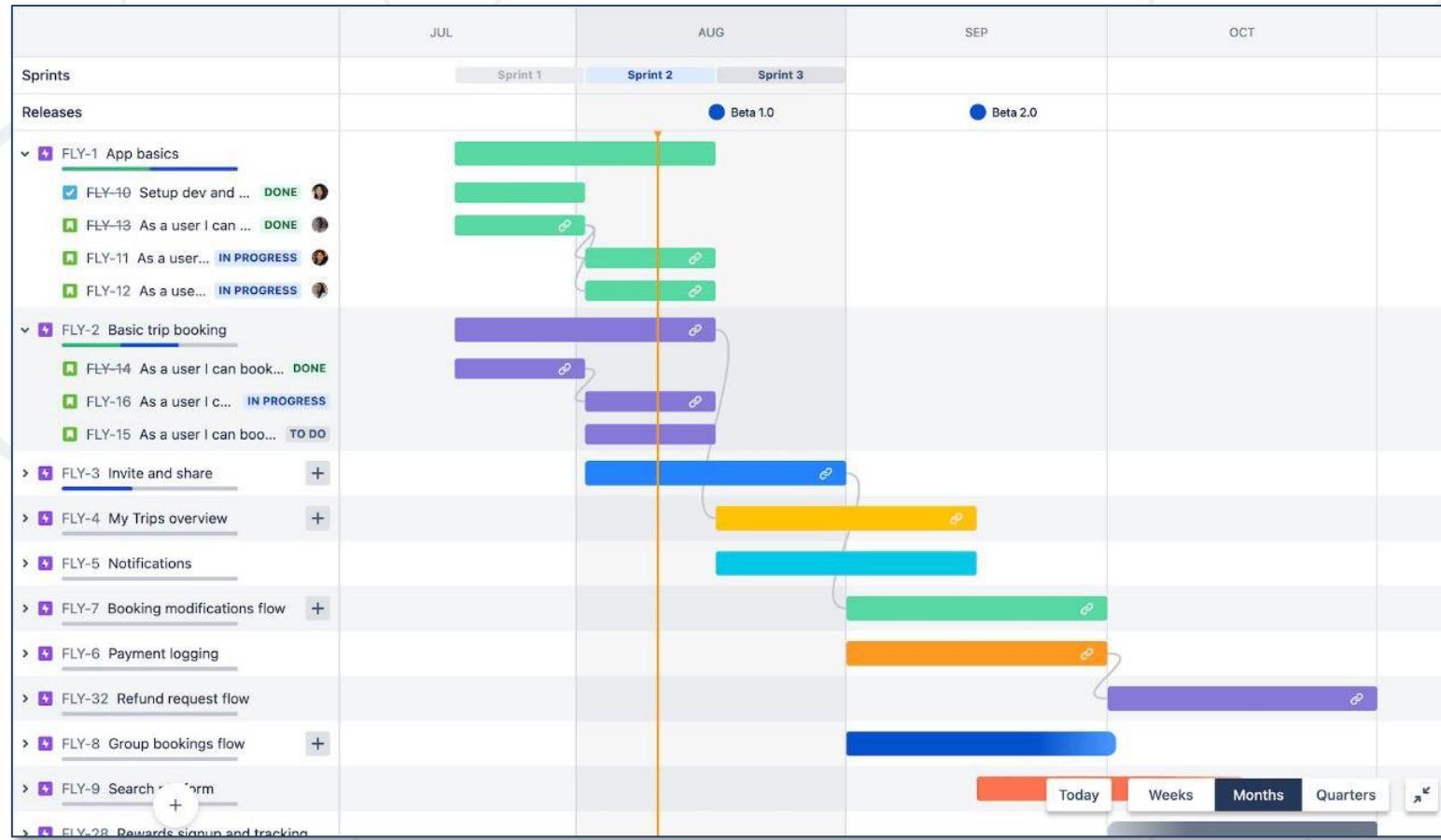
- Widely used **project management** and **issue-tracking tool**
- Primarily designed to **help teams plan, track**, and **manage their work efficiently**
- Provides a **robust set of features** and **capabilities**



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

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

People

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

Dates

Created: 2019-08-22 01:44:53 PM Updated: 24 minutes ago

Agile

Future Sprint: SCRUM Sprint 1 View on Board

+

# 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](#) ([View workflow](#)) Assignee: [Unassigned](#)

Priority: [Medium](#) Resolution: Unresolved Reporter: [Peter Van de Voorde](#)

Labels: None Votes: 0

**Description**  
This is the description.

**Attachments** [...](#)  
[Drop files to attach, or browse.](#)

**Activity**

All [Comments](#) [Work log](#) [History](#) [Activity](#)

There are no comments yet on this issue.

[Comment](#)

[Agile](#) [View on Board](#)

[Quantify TimeSpent](#)  
Data is not available [Compare the free and paid plan](#)

[Explore TEST](#)

48

# 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



Coca-Cola HBC  
Bulgaria



SUPER  
HOSTING  
.BG



# 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>

