**Agile Code Board: An Integrated Task, Planning, and Brainstorming Tool for Agile Teams**

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**Abstract**

Software development life cycles heavily rely on Agile methodologies because of their benefits for team work coordination and their iterative approach and complete project administration. The paper examines Agile Code Board as a real-time project management tool which supports Agile teams to map work tasks while executing tasks during each sprint. The system contains multiple accessible work areas which allow role-based permissions and supports task observation together with immediate team brainstorming and program planning at the sprint level. Task/unit sprints have a drag-and-drop Kanban board function in addition to a Miro-style collaborative whiteboard which developers can use alongside their calendar view of deadlines and milestones and their filterable table of invaluable tasks and their cross-team collaboration system which uses a SAFe-like program board. The development of Agile Code Board occurred through Next.js and Hono frameworks along with authentication from Appwrite and collaboration provided by Liveblocks. The system establishes distinct parameters to enable smooth collaboration growth between participants. The research details the system framework along with development practices and specifies how the framework strengthens agile workflow coordination within current collaborative software environments.

**Keywords:** Agile Management, Project Collaboration, Real-Time Synchronization, Kanban Board, Program Board, Task Tracking, Next.js, Hono, Appwrite, Liveblocks, Brainstorming Tool, Workspace Management, Agile Code Board.

**1. Introduction** Agile method popularity within software development has led to an increasing market demand for tools which enable real-time groupwork and effective task planning visualization along with task management capabilities. Agile team collaboration faces major transportation barriers for standard project management solutions during both cross-team planning activities and the execution of multifaceted creation processes. Most contemporary software tools feature multiple project tracking systems yet nearly all of these solutions lack live team collaboration and clear agile programming visibility together with easy-to-use agile task management capabilities.

Agile Code Board emerged to handle these difficulties by offering an entire web-based solution which unites project planning and team management with real-time task tracking and brainstorming capabilities. Agile Code Board strengthens both team productivity and project communication through its combination of Kanban and program boards and time management features alongside interactive whiteboarding functionality. Agile project management solutions function as modular modules and scalable units which provide enhanced practicality to agile software development teams.

**1.1 Need for a Developer-Centric Agile Collaboration Platform**

Agile Code Board functions as a real-time collaboration platform aimed at developers to establish smooth planning and execution while managing team processes in Agile methodology. The Agile Code Board exists to supply development teams with tools for workplace creation and management and task assignment and tracking in addition to real-time collaboration and visual sprint planning for multiple teams from one central platform. A single consolidated platform containing Agile process elements within Agile Code Board delivers enhanced team communication thus increasing productivity and end-to-end development process support.

**1.2 Platform Overview**

The integration of Agile Code Board with agile practices through its features allows all project elements to interact smoothly including Kanban task management and strategic dashboards and planning calendars and real-time brainstorming features that enhance program sprint capabilities. The system architecture utilizes Next.js for its front-end component to achieve a colorful and quick user interface while using Hono as its backend system along with Appwrite for managing users and databases alongside file authentication to ensure security. The Liveblocks system provides real-time features including synchronized whiteboards alongside presence features through its platform. The elastic Agile workspace system controls data access and manipulation through its security features which solve distributed team management needs yet lacks role-based permission definitions.

**1.3 Core Features of Agile Code Board**

Agile Code Board operates with a developer-friendly interface that allows developers to navigate through its modular architectural structure for extensive Agile-focused features.

The dashboard feature of Workspace-Based shows project-related analytics along with total tasks numbers and active project counts and member workspace interaction data.

**Kanban Task Management:**

Agile Code Board utilizes interactive drag-and-drop functionality that lets you shift tasks between stages from Backlog all the way to To Do and continuing with In Progress and In Review before reaching the final stage of Done.

**Real-Time Brainstorming Tool:**

The ideation whiteboard platform in Miro style operates with Liveblocks to enable team collaboration when creating sticky notes and visual diagrams and mouse movement simultaneously

**Sprint Planning on the Program Board:**

The SAFe Program Board delivers feature-level visualization of many Sprints and Teams while using color codes for planning and dependency tracking.

**Calendar and Table Views:**

The system features a scheduling view of monthly deadlines and it includes a feature to automatically sort individual tasks according to their status and assignee information as well as due dates.

**Role-Based Member Management:**

Inviting Members and Roles Admins - Role (Admin or Member) - Level of access and responsibility

**2. Literature Review**

Many Agile project management software tools currently exist because Agile methodologies have spread throughout the software industry to boost team productivity and delivery speed and enhance collaboration. The main limitation of Jira Trello along with Asana lies in their inability to provide real time collaboration and cross-team planning as well as integrated brainstorming features needed by Agile development teams working at speed. Business implementations encounter two major challenges because they are either too large and cumbersome for small teams or they do not adapt well to present-day development methodologies.

Research on agile tooling demonstrates that visual management of tasks requires successful sprint planning together with perfect team communication methods. The combination of task views which follow Kanban principles combined with scheduling calendars and role-based team collaboration provides essential aspects for your team members. Real-time collaborative whiteboarding with feature mapping produces better planning outcomes for distributed teams according to conducted research whereas Miro and SAFe Program Boards display their content statically.

Agile Code Board completes the missing features in current solutions with its one unified modular system that integratessequential task management alongside immediate team interaction and sprint-level scheduling and workspace functionality. The system aims to eliminate workflow configuration complexities while providing necessary software development requirements of visibility and flexible interaction and adaptable functions.

**2.1 Existing Project Management Tools and Their Limitations**

### The market contains numerous exceptional product management SaaS solutions that include Jira, Trello and Asana among others. Project managers encounter important limitations in these advanced tools that reduce effectiveness in user connection and project success outcomes. The majority of available applications function with static templates to handle tasks yet struggle to accommodate various teams that adopt agile working methods. Poor role based access control in these tools makes team member permission and task management challenging according to individual responsibilities and roles.

### Team member interactions require consistency throughout projects with multiple dependencies and across growing teams because these applications provide limited collaboration tools such as file attachments and comment sections. Your team will gain limited reporting features from these tools but they lack essential insights for measuring team performance and project dependencies as well as sprint progress among other aspects. Pay-to-use features in these platforms are either restricted by usage limits or cost too much for small business teams that are startups.

### The Agile Code Board provides an answer to these service limitations through its capability to deliver dynamic Kanban boards alongside sophisticated access control and advanced task management features and real-time project analysis capabilities.

### The platform enhances team collaboration by providing a workspace system which helps members view project relationships and generates superior visibility about team performance tracking. Agile Code Board provides cost-effective Pricing Plans that grant teams across all scales from startups to established enterprises access to its premium capabilities.

### 2.2 Role of Mobile Platforms in Project Management

Modern project Management relies on mobility as its primary weapon because workers are able to access tasks from any place thus making project management focus on mobile interference. The system enables users to modify tasks while working with team members to observe project advancement in addition to deadline management. The system delivers maximum power for distant teams and distributed teams allowing members to remain effective and coordinated with each other.

Present-day mobile project management applications gained tremendous popularity because developers use Flutter as the cross-platform framework for building applications which run on Android and iOS from one unified codebase. Agile Code Board Mobile deploys Flutter as its development platform to deliver the same high-quality user interface between mobiles and desktops to a wider audience. Flutter platform delivers efficient development speed through its robust framework and standard widgets and plugins that allow agile code board to keep work on UI design equilibrium and API performance optimization.

**2.3 Integration of Real-Time Communication in Project Management**

Project management solutions by tradition operate with a major drawback because they provide no platform for employee communication with staff members and managers and other stakeholders. The lack of instant response which characterizes asynchronous communication tools like emails and task comments makes it difficult for agile teams to discover necessary solutions or reach necessary decisions without the collaborative energy needed to reach decisions quickly. Tools that enable live communication through video conferencing and live chat together with shared work environments proved exceptional for building efficient collaboration practices which speed up decision-making processes. Through its screen-sharing and live video functions stakeholders can remotely attend joint team meetings for active task discussions. Agile Code Board achieves collaborative communication through the implementation of WebSockets for real-time data delivery which drives agile decision processes and member alignment throughout projects.

**2.4 Integration of Real-Time Communication in Project Management**

Traditional project management tools represent a major shortcoming because they do not establish immediate time communications among complete project teams. Task-related emails together with comments are useful but lack the instant collaborative strength that agile teams require to swiftly address problems and make quick decisions. Real-time communication functions such as video conferencing with live chat and collaborative spaces speed up both decision-making processes and efficient collaboration.Traditional project management tools face an essential constraint because they do not support real-time interaction between team members as well as stakeholders and managers. Team members struggle to resolve problems and make urgent decisions through asynchronous communication methods consisting of emails and task comments. The performance of collaboration requires real-time communication tools including video conferences and live chats and collaborative work sessions for efficient team decisions.

**Agile Code Board addresses this limitation by integrating real-time communication features directly into the platform. The tool includes live chat, task comments, and virtual brainstorming sessions, enabling team members to interact instantly during project development. Additionally, the integration of live video and screen sharing capabilities allows stakeholders to attend meetings and discuss tasks in real time, enhancing communication and teamwork. Powered by technologies like WebSockets for real-time data exchange, Agile Code Board ensures seamless communication and collaboration, empowering teams to make agile decisions and stay in sync throughout the project lifecycle.**

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**3.Proposed Work**

Agile Code Board establishes itself as a purpose-built collaboration platform with modular component design for agile project management. The system operates based on the client-server design model while using separation of concern principles to divide itself into frontend client-side and backend server-side layers together with storage database components. Each layer exists to optimize performance together with scalability as well as offering real-time collaboration features that help achieve top project tracking functions with maximum team productivity results.

The frontend development section utilizes Next.js for its SSR (Server Side Rendering) and performance enhancement attributes. This user interface system works well with all ShadCN UI components to deliver an up-to-date interface which users can easily access.

**The following fundamental design and development characteristics form the basis of development:**

Dashboard-style navigation in a clean, responsive layout.

The application enables UI access according to different roles where Admins have greater features than Members who have more features than Guest users.

Three main component systems exist for tasks alongside project and workspace sections in the dynamic interface.

Users can work in real time on brainstorm boards due to Liveblocks integration.

• For smooth transitions and polished user experience, Framer Motion and Tailwind CSS.

The system uses Hono for backend development because it provides a zero-configuration high-performance web framework to build APIs. The backend system exposes secure RESTful endpoints to the frontend through its RESTful architectural design. The system ensures secure client-server communications through HTTPS in combination with token authentication from Appwrite security.

The modular design of Agile Code Board establishes itself as a purpose-built collaboration platform where users work within defined roles to manage agile projects. Agile Code Board uses a client-server design with 3 separate portions that manage different tasks. The frontend exists for clients while the backend resides on servers and a database functions as the storage platform. An implementation system with different layers exists to maximize performance and scalability and real-time collaboration features which deliver optimal project tracking and team productivity.

The Frontend section operates through Next.js programming language which implements advanced SSR features along with performance enhancements. The system acquires compatibility with every ShadCN UI element to create a current and user-friendly user interface.

Important principles that guided the design and development actions are:

Dashboard-style navigation in a clean, responsive layout.

The system implements user interface access based on roles for all three user categories: Admin, Members and Guests.

The application deploys dynamic and reusable components that function between tasks and projects as well as workspace operations.

The application allows real-time collaboration on brainstorm boards through Liveblocks integration.

• For smooth transitions and polished user experience, Framer Motion and Tailwind CSS.

The application deploys Hono as its API development infrastructure because it operates without configuration requirements while delivering high performance. The RESTful architecture within the backend services functions as secure end-points to serve the frontend applications. The security implementation of all client-server interactions depends on HTTPS combined with Appwrite security token authentication.

**Result:**

Agile Code Board combines different core modules with the purpose of delivering collaboration features and project tracking capabilities and real-time team interactions. The modules aimed at solving project management tool limitations to meet requirements for developers and project managers as well as team leads. Below are the major components organized into a list.

**4.1 User Authentication and Role Management :**The system operates secured logins by allowing users to sign in through email/password or Google or GitHub authentication through Appwrite. A workspace contains users who can be assigned admin roles or member roles which determine their system privilege levels.

A screenshot of a login form

AI-generated content may be incorrect.

**Fig. 4.1. Login Screen**

**Features:**

* Remote log-in & sign-up screens.
* Validation of email and password

**4.2 Workspace and Project Module**

Users have the ability to form various workspaces which they can both control and swap between. Each workspace possesses its independent projects and epics and tasks that enable teams to classify and log their work.

A screenshot of a computer

AI-generated content may be incorrect.

**Fig. 4.2. Dashboard Screen**

**Features:**

* Creating and Managing Workspaces

Users will be able to establish a fresh workspace using dedicated fields to assign custom names as well as upload images to help identify the workspace throughout various teams.

* Switch Between Workspaces

Users can benefit from both workspace separation and increased focus through the interface implementation of an on-page dropdown or sidebar that enables instant workspace switching.

* Workspace-based Project Nesting

The work space functionality permits users to establish numerous projects each which promotes client-based or departmental or product-based organizational strategies.

**4.3 Task Management System**

Users can create tasks and apply editing functions and filtering options and delete tasks from the complete module while viewing tasks through Kanban Board, Calendar View, and Table View backed by assignee, deadline, and status selectors.

A screenshot of a computer

AI-generated content may be incorrect.

**Fig. 4.3. Kanban Board**

**Features:**

**Entering, Modifying and Removing Tasks:**

The system provides users an easy method to update pending tasks and add new ones or delete redundant data.

**Multiple Task Views:**

Tasks navigate through three Kanban Board columns they must traverse (To Do, In Progress, Done) based on their current state.

**Calendar View:**

Due dating your tasks allows you to use visual displays for better time management. Under Table View users obtain structured task viewing that allows them to sort their tasks and achieve complete task visibility.

**Task Filtering and Sorting:**

Both status options and assignee names and projects together with due dates serve as categories that enable effortless task retrieval.

**4.4 Program Board**The software planning board uses SAFe methodology to display tasks and features with associated dependencies and blockers for each sprint within multiple teams.

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AI-generated content may be incorrect.

**Fig. 4.4.Program Dashboard**

**Features:**

**SAFe-Inspired Layout:**

This displays project features and tasks between multiple teams and sprints while following the requirements of the Scaled Agile Framework (SAFe).

**Sprint-Wise Breakdown:**

A defined sprint distribution system within the planning board allows teams to see planned tasks as well as their current and completed work for every iteration.

**Cross Team Planning Team Lanes:**

One row exists for every team to coordinate planning activities between teams working together in release trains or bigger initiatives.

**4.5 Real-Time Collaboration**Through its connection to Liveblocks the brainstorming tool allows multiple users to work simultaneously on whiteboards in real time – this works perfectly for sprint planning and wireframing sessions and backlog grooming processes.A screenshot of a computer

AI-generated content may be incorrect.

**Fig. 4.5. Brain Stroming Feature**

**Features:**

**Interactive Brainstorming Whiteboard**

The platform provides a communal workspace for drafting sticky notes, shapes, text and drawings which help teams brainstorm ideas in real-time.

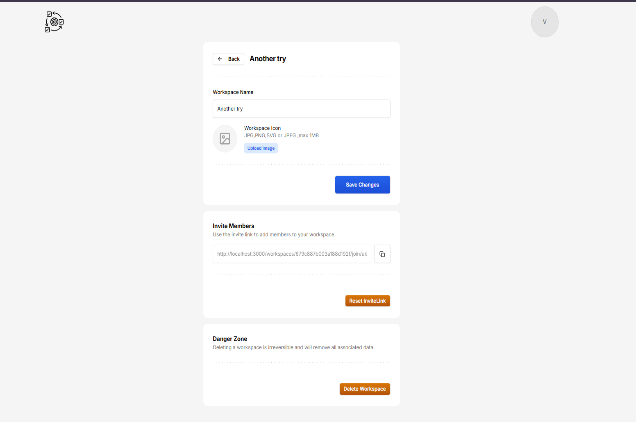
**Live Multi-User Editing:**

All users can simultaneously edit the board while different participants observe their cursor movements which automatically trigger updates (tariff the page requires no manual refresh).

**User Presence Indicators:**

The board shows current users who can be tracked through real-time cursors along with user labels.

**4.6 Settings and Members Management**Space administrators have the ability to conduct various changes in workspaces such as renaming them and updating images; they also maintain invite links' accessibility. Members in the workspace can receive promotional or demotional or removal decisions as admins monitor their activities within the workspace.



**Fig. 4.6. Settings and Members**

**Features:**

**Edit Workspace Name & Image:**

The workspace image together with its title receive updates from admins in order to enhance both branding and identification within the workspace environment.

**Invite Link Generation:**

Administration tools enable members to generate secure joining links which direct new team members toward specific workspaces easily.

**Settings —** Role-Based Access to Settings

Workspace settings viewing as well as updating is only available to Admins and they also have authority to handle member role management.

**4.7 Notification System**Platform notifications display status updates together with project news and deadline information and member invitation alerts.

**5. Conclusion and Future Work**

**5.1 Conclusion**

Our research covered the total creation process that resulted in developing Agile Code Board as an optimized collaborative solution which addresses requirements of developers and project managers and agile teams. Built using Next. js, ShadCN, Appwrite, Hono, and Liveblocks, helping facilitate tasks, collab in workspaces, plan at the program-level, and ideate in real-time.Agile Code Board, a solution for agile project tracking, is built with key modules like workspace/project management, task lifecycle handling, role-based access control, real-time brainstorming tools, and a Program Board inspired by SAFe, which provides a strong foundation for the agile process.This solution also provides several views including Kanban, Calendar and Table, as well as deadline filters, task dependencies, and member control in a given workspace, resulting in a user-friendly, scalable collaboration experience.

According to early assessment conducted between development teams the platform demonstrates an intuitive interface that delivers robust functionality across its system. Enterprise-level deployment becomes possible through third-party tool connectivity which results from secure backend systems interacting with application-building approaches and modular design methods.

**5.2 Future Work**

Further development of Agile Code Board includes the following planned features that lead to an advanced agile collaboration platform: Task assignments and optimal deadline recommendations and duration solutions emerge from team pattern analysis using artificial intelligence within the system. Project advancement visualization joins sprint speed views which combine team work distribution data and performance metrics through linked graphical interfaces. The system lets users create boards that clients and stakeholders view only while showing top-level progress metrics that conceal specific operational data from sight. Your company will maintain workflow continuity after connecting Agile Code Board to GitHub and Slack and JIRA along with Google Calendar integration. • Implement multi-language support, and dark-light theme toggle. The first version of Agile Code Board began as a task management tool before new functionalities evolved into an agile collaboration platform that developed to meet modern distributed software development teams.

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