

Collabsphere – A Project Management Dashboard

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ABSTRACT:

Modern organizations rely heavily on efficient project coordination, real-time collaboration, and structured task management to maintain productivity in distributed work environments. Traditional project management tools often pose challenges such as fragmented workflows, limited real-time synchronization, restricted customization, or high subscription costs. To address these gaps, *CollabSphere* is developed as a modern, scalable, and web-based project management dashboard that centralizes collaboration, task allocation, and project analytics under a unified platform.

CollabSphere integrates a ReactJS and Tailwind CSS frontend with a Node.js backend and Supabase-based authentication and database management. It streamlines the creation of projects, assignment of tasks, team communication, and visual progress tracking through interactive dashboards. Built upon RESTful architecture and real-time event listeners, the system ensures instant propagation of updates across all connected users.

The platform includes key modules for project creation, task tracking, analytics visualization, user authentication, and role-based access control. Its cloud-based infrastructure enables high scalability, security, and reliability, while its responsive user interface ensures accessibility across devices. By merging modern web technologies with agile practices, CollabSphere enhances transparency, productivity, and accountability in team environments. The solution demonstrates how modular architecture and real-time collaboration tools can significantly improve organizational workflow efficiency in a digital ecosystem.

Keywords: *Project Management, Team Collaboration, Supabase, ReactJS, Task Tracking, RESTful APIs, Analytics Dashboard, Real-Time Synchronization*

INTRODUCTION:

Effective project management is essential in today's fast-paced digital workplace, especially for organizations operating with distributed or hybrid teams. Managing tasks across multiple projects requires seamless communication, real-time visibility, and system-driven accountability. However, many existing tools are overloaded with features, require paid integrations, or fail to synchronize project data across users efficiently.

CollabSphere addresses these challenges by offering a lightweight yet powerful project management dashboard tailored for agile teams. The platform centralizes project planning, task assignment, deadline management, and progress analytics, enabling teams to collaborate without relying on fragmented systems.

Developed using ReactJS, Tailwind CSS, Node.js, and Supabase, the system delivers a responsive UI, secure authentication, and scalable backend

architecture. Real-time data synchronization ensures that any update made by one user is instantly reflected across all connected devices, improving situational awareness and decision-making.

The system aims to simplify project coordination, reduce communication delays, and enhance the visibility of workflows. Through intuitive dashboards, data-driven insights, and secure role-based access, CollabSphere empowers teams to manage complex projects with clarity and efficiency.

LITERATURE REVIEW:

1. Kerzner (2019)

Discussed the growing importance of digital project management tools in scheduling, monitoring, and optimizing workflows. Highlighted the role of dashboards in improving visibility, accountability, and reporting accuracy.

2. Ghobadi & Mathiassen (2016)

Explored knowledge-sharing barriers in software teams. Concluded that effective collaboration requires real-time access to shared data—an idea foundational to CollabSphere.

3. Hinds & Mortensen (2020)

Studied distributed teams and emphasized the role of shared mental models and synchronized information for effective coordination.

4. Buyya et al. (2018)

Demonstrated how cloud computing enhances scalability, data integrity, and accessibility in collaborative systems. CollabSphere's cloud-first design aligns with these findings.

5. Supabase (2024)

Provides secure authentication, role-based access, and real-time database synchronization, forming the backbone of CollabSphere's data management architecture.

6. ReactJS Documentation (2024)

Highlighted the benefits of reusable UI components, virtual DOM rendering, and SPA architecture, shaping CollabSphere's frontend design.

7. Tailwind CSS (2024)

Detailed a utility-first design approach that improves responsiveness, accessibility, and rapid interface development.

8. Asana & Trello Research Papers

Discussed limitations of commercial project management tools—such as high learning curve, excessive integrations, and limited customization—motivating the need for systems like CollabSphere.

9. Agile Methodology Studies

Showed that agile workflows require flexible dashboards, sprint tracking, and continuous updates—features incorporated into CollabSphere's design.

10. ClickUp & Jira Usability Evaluations

Revealed gaps in real-time synchronization and affordability for small teams. CollabSphere resolves these with open-source frameworks and free-tier backend services.

SYSTEM ARCHITECTURE:

CollabSphere follows a modular, multi-layered architecture ensuring scalability, real-time responsiveness, and secure data flow across components. The system consists of four core layers:

1. Presentation Layer

Developed using **ReactJS + Tailwind CSS**, this layer provides:

- Interactive dashboards
- Project and task management UI
- Role-based views for Admin, Manager, and Members
- Responsive design for desktop and mobile

The presentation layer communicates with backend APIs using HTTPS requests and receives real-time updates from Supabase listeners.

2. Application Logic Layer

Implemented using **Node.js + Express.js**, this layer handles:

- Business logic
- Authentication and session verification
- Task and project workflows
- Data validation
- Analytics computation

RESTful APIs ensure secure and standardized communication between frontend and backend.

3. Database Layer

Powered by **Supabase (PostgreSQL)**, this layer manages:

- Users
- Projects
- Tasks
- Activity logs
- Role-based access

Supabase's real-time listeners enable instant updates across all dashboards.

4. Integration & Real-Time Synchronization Layer

Responsible for:

- JWT authentication
- WebSocket-like real-time updates
- API integration
- Data consistency across clients

This layer ensures that every change in data is immediately visible to all team members, enabling coordinated teamwork.

WORKING OF THE SYSTEM:

CollabSphere operates through a structured workflow that simplifies project management:

1. User Registration & Authentication

- Users register through email-password authentication (Supabase Auth).
- JWT tokens manage secure sessions.
- Role-based redirection: Admin → Admin Dashboard, Members → Task Board.

2. Project Creation & Initialization

- Admin/Manager creates new projects by entering details like title, description, deadlines.
- The system stores project metadata in Supabase.
- All assigned team members get instant visibility.

3. Task Assignment & Tracking

- Tasks include title, priority, assignee, and deadlines.
- Status transitions: **To Do** → **In Progress** → **Completed**.
- Supabase triggers real-time synchronization across all clients.

4. Collaboration & Activity Logging

- Team members can view assigned tasks, comment, and update progress.
- Every action is logged in an activity table for accountability.

5. Analytics & Dashboard Visualization

- The system computes:
 - completion rates
 - overdue tasks
 - active tasks
 - project progress
- Visualized using charts (Recharts/Chart.js).

6. Admin-Level Operations

Admins can:

- Manage users
- Track team performance
- Review system logs
- Deactivate accounts

7. Notifications & Alerts

- Deadline warnings
- Task updates
- Project modification alerts

8. Cloud Deployment

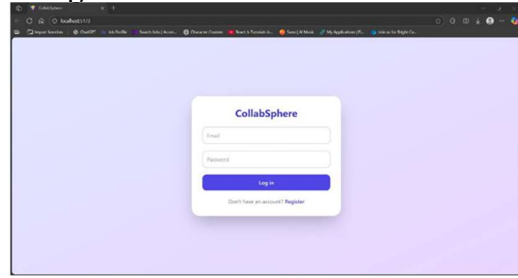
- Frontend hosted on Vercel/Netlify
 - Backend + DB hosted on Supabase Cloud
- Ensures high availability and zero downtime.

SYSTEM SCREENS:

1. Login & Registration Screen

2. Admin Dashboard
3. Project Management Interface
4. Task Board (Kanban-style)
5. Analytics Dashboard
6. Team Collaboration Screen
7. User Profile Settings
8. Admin Management Panel

2.Registration Screen



3.Project Management Interface

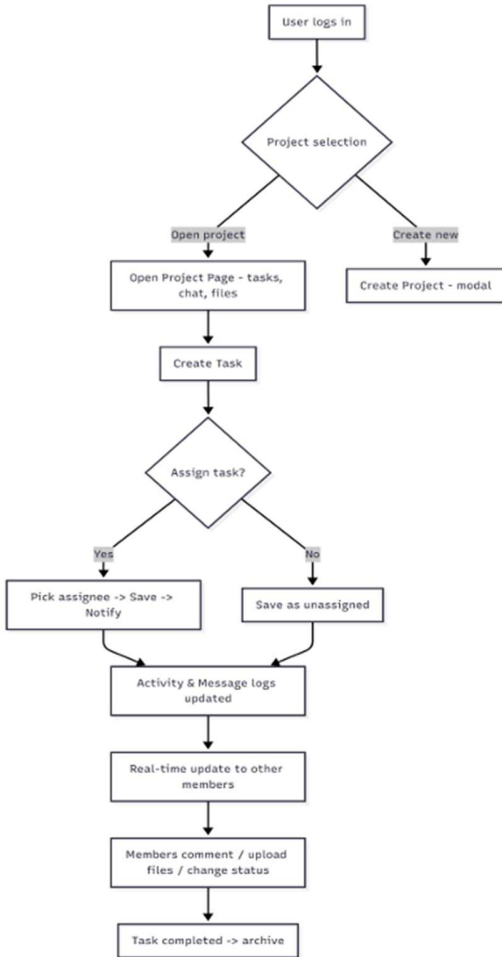
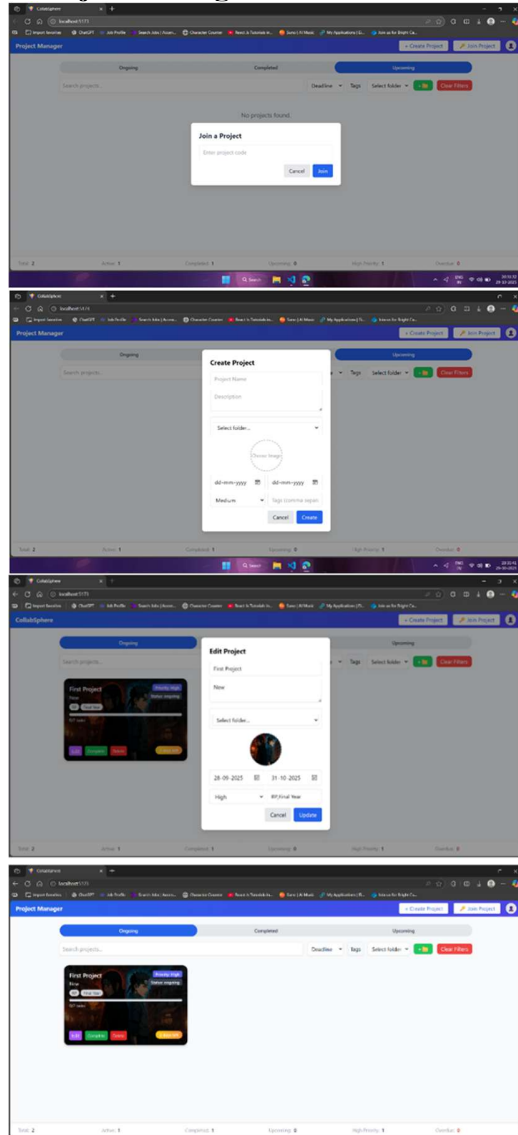
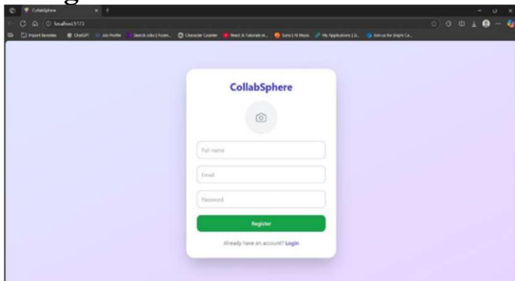
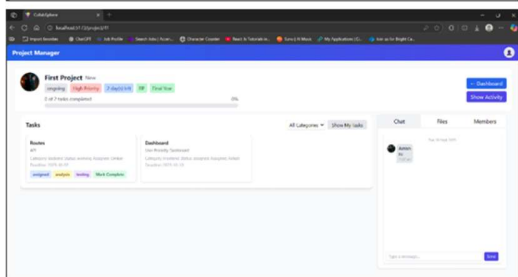
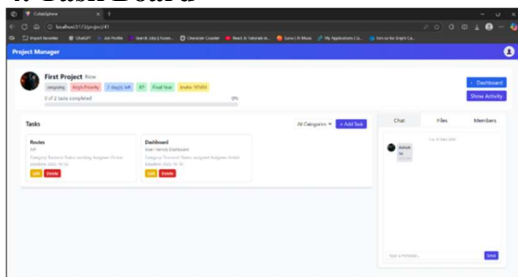


Figure 1 – Flow of CollabSphere.

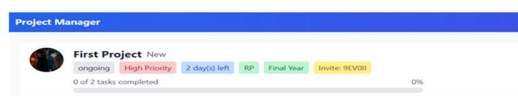
1.Login



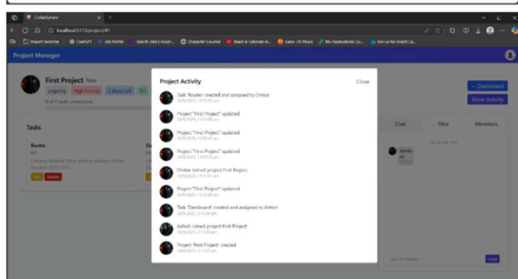
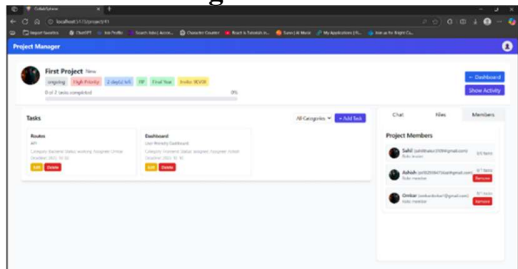
4. Task Board



5. Analytics Dashboard



6. Admin Management Panel



APPLICATIONS

1. Software development teams
2. Academic project groups
3. Startup and business task coordination
4. Freelance and client project tracking
5. Remote and hybrid workplace collaboration

6. NGO and volunteer task management

ADVANTAGES

1. Real-time task and project synchronization
2. Secure Supabase-based authentication
3. Lightweight and responsive UI
4. Cloud-hosted architecture with high scalability
5. Integrated analytics for productivity insights
6. No paid add-ons or dependencies
7. Easy adoption with minimal learning curve

LIMITATIONS

1. Requires stable Internet for real-time updates
2. Supabase free-tier limits may affect large teams
3. No built-in video conferencing
4. Complex enterprise-level reporting not included
5. Limited offline functionality

CONCLUSION:

CollabSphere successfully demonstrates how modern web technologies, cloud infrastructure, and real-time synchronization can transform digital collaboration and project management. The system integrates task tracking, analytics visualization, and secure authentication within a unified, intuitive dashboard—enabling teams to work efficiently across distributed environments.

Its scalable architecture, modular design, and role-based access make it suitable for academic projects, SMEs, and professional teams. Future enhancements—such as chat integration, mobile app version, automated sprint planning, and AI-based productivity insights—can further elevate the platform into a comprehensive project lifecycle management solution.

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