PCS26-18 - ENHANCED SECURITY AND BLOCKCHAIN BASED ONLINE MEETING PLATFORM
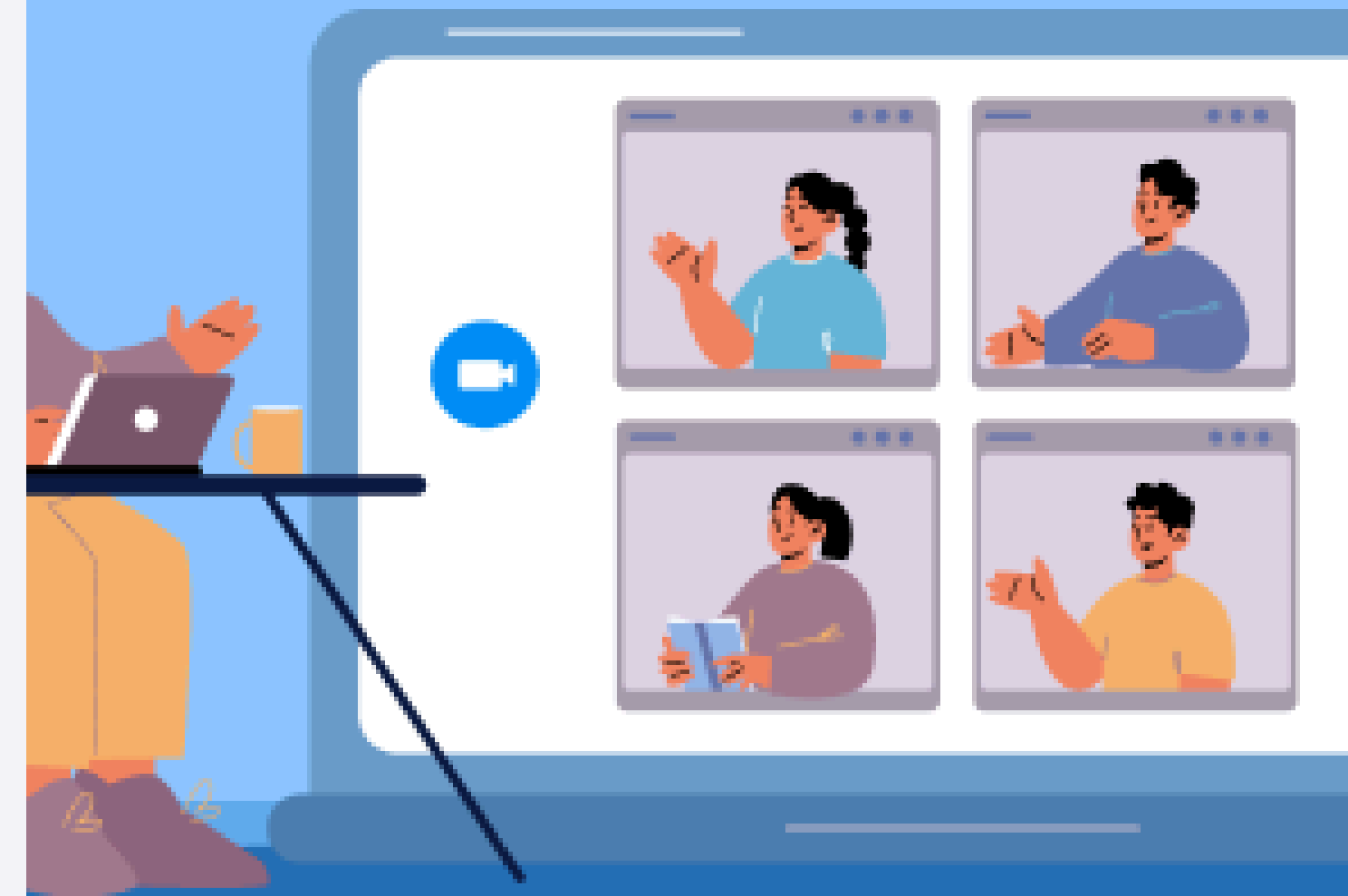
The online meeting system is designed to secure confidential communications between various stakeholders of institutes, organizations, members, and officials. The solution aims to enhance privacy by utilizing both web-based and blockchain-based technologies. Real-time video and audio communication will be enabled ensuring end-to-end encryption.

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Project Abstract

Overview

- The online meeting system is designed to secure confidential communications between various stakeholders of institutes, organizations, members, and officials.
- The solution aims to enhance privacy by utilizing both web-based and blockchain-based technologies.
- Real-time video and audio communication will be enabled, ensuring end-to-end encryption.
- The frontend will be developed using modern technologies for a seamless user interface.

Key Objectives

- Enhance privacy by utilizing both web-based and blockchain-based technologies.
- Provide a secure platform for confidential communication while protecting sensitive data and meeting recordings.
- Use blockchain-based identity verification for secure authentication.
- Automate key processes such as meeting scheduling, access control, and logging using smart contracts.
- Ensure accountability and transparency through tamper-proof records.

Approach

- Integrate web and blockchain technologies to ensure scalability and security.
- Utilize decentralized storage to protect sensitive data and meeting recordings.
- Implement robust security measures, including end-to-end encryption of communication and decentralized storage.
- Leverage public APIs for streamlined scheduling.
- Offer additional functionalities such as voting systems, screen sharing, chat, and meeting transcription to enhance user engagement.
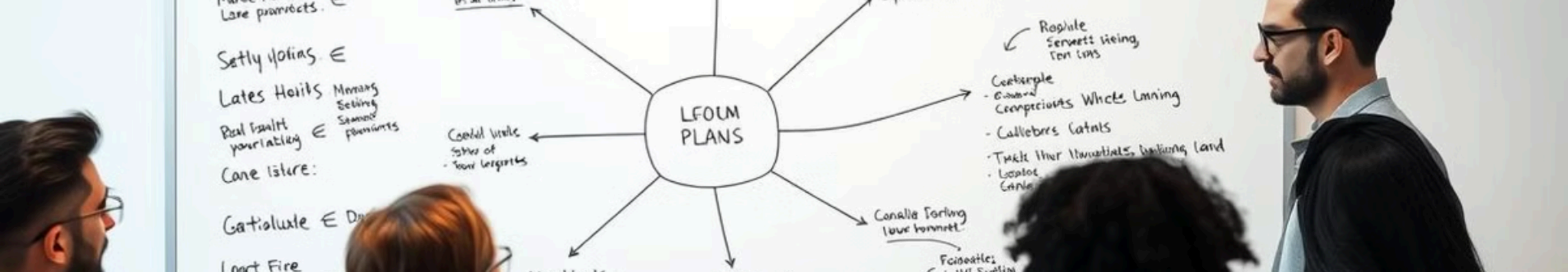
Project Goals and Objectives

1 To develop a decentralized online meeting platform that leverages blockchain technology to enhance security and privacy.

2 To implement a system for secure, immutable logging of meeting data and actions, ensuring transparency and accountability.

3 To provide end-to-end encryption for all meeting communications, including video, audio, and file sharing.

4 To create a role-based access control mechanism that utilizes blockchain-based identity verification for secure authentication.

5 To enable decentralized storage for meeting recordings and files using platforms like IPFS, ensuring data integrity and availability.

6 To ensure the system is scalable, user-friendly, and adaptable to a wide range of use cases and industries.

Alignment with UN Sustainable Development Goals (SDGs)

SDG 8: Decent Work and Economic Growth

A secure online meeting platform enables safe remote work and protects digital communications, fostering global employment opportunities and economic growth.

SDG 9: Industry, Innovation, and Infrastructure

A secure online meeting platform strengthens digital infrastructure, fosters innovation, and builds resilient, trustworthy communication networks.

SDG 16: Peace, Justice, and Strong Institutions

A secure online meeting platform fosters trust, transparency, and digital rights, supporting strong institutions and equitable access to communication.
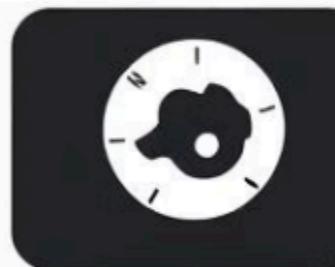
SDG 17: Partnerships for the Goals

A secure online meeting platform promotes safe collaboration and equitable access, supporting global partnerships for sustainable development.

Methodology and Approach

1 **Server and Database Setup**

Set up a server environment for node.js (React.js) and initialize a database (MongoDB) for creating schemas.

2 **Secure Authentication and Blockchain Integration**

Implement secure registration, login, and logout using OAuth and leverage Solana blockchain for secure identity verification to reinforce RBAC

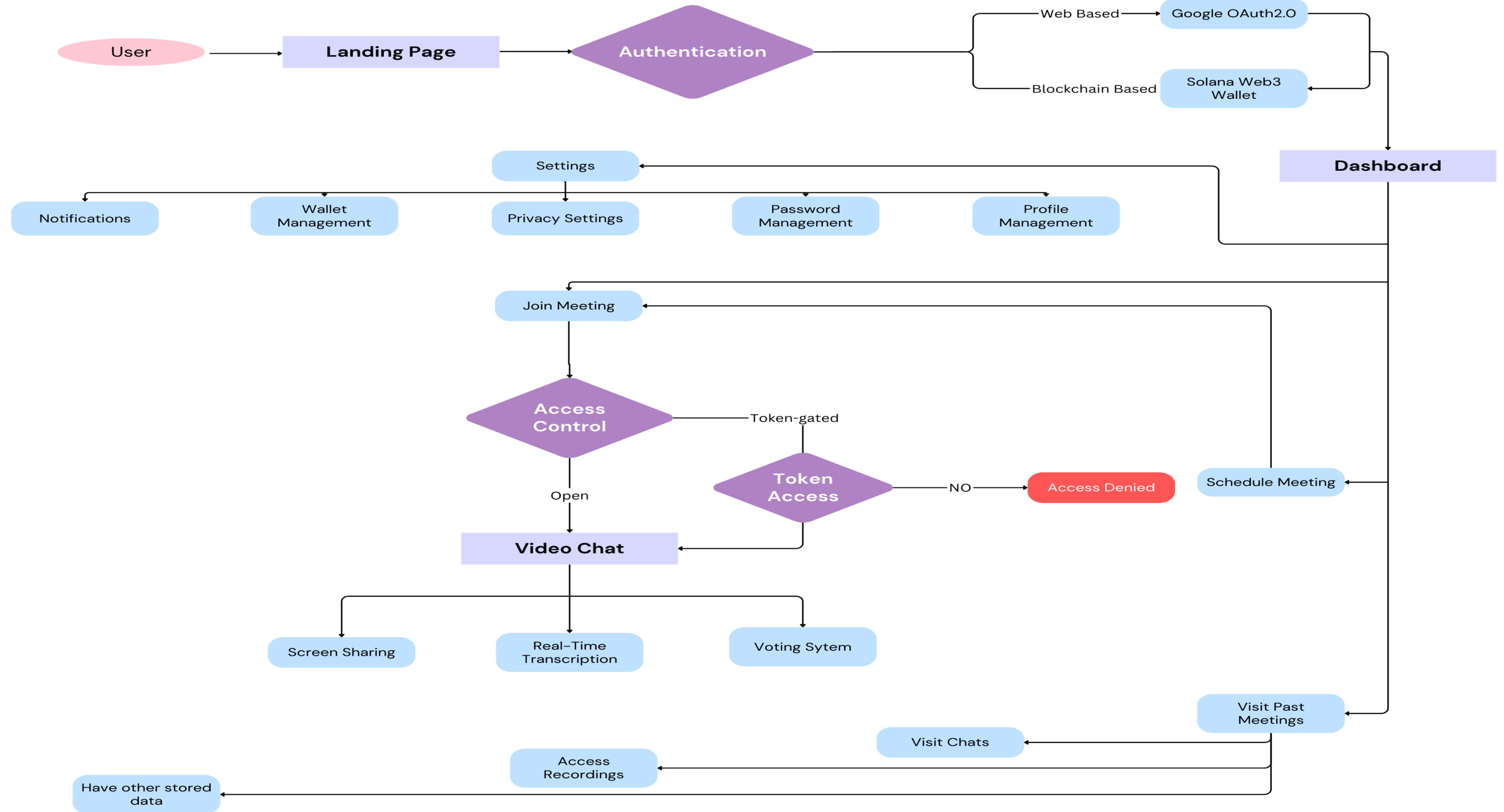**3** **Real-Time Communication and Meeting Management**

Integrate WebRTC for real-time communication, with participant management, screen sharing, chat, and voting polls.

4 **Data Security, Interface, and Deployment**

Implement SRTP and IPFS for storage, user-friendly meeting interfaces, and extensive testing before live deployment.

Flowchart

User → Landing Page → Authentication

Authentication:
- Web Based → Google OAuth2.O
- Blockchain Based → Solana Web3 Wallet

Google OAuth2.O / Solana Web3 Wallet → Dashboard

Settings:
- Notifications
- Wallet Management
- Privacy Settings
- Password Management
- Profile Management

Dashboard → Join Meeting / Schedule Meeting / Visit Past Meetings

Join Meeting → Access Control
- Token-gated → Token Access
  - NO → Access Denied
- Open → Video Chat

Token Access → Video Chat

Video Chat:
- Screen Sharing
- Real–Time Transcription
- Voting Sytem

**Visit Past Meetings** → Visit Chats → Access Recordings → Have other stored data

Expected Outcomes and Impact

Enhanced Security and Privacy

The platform ensures secure, end-to-end encrypted communication for all participants, safeguarding data integrity. With blockchain-based identity verification, it protects sensitive discussions and data from unauthorized access.
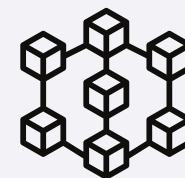
Efficient Meeting Management

Automated scheduling and role-based access control simplify organizing and managing meetings effectively. Comprehensive participant management saves time and boosts operational efficiency for seamless meeting experiences.
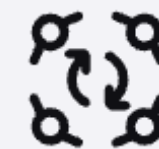
Increased User Trust and Adaptability

Decentralized storage and advanced security measures foster trust and data ownership among users. The platform's adaptability makes it ideal for high-stakes, confidential meetings across diverse sectors.

Key Project Deliverables

Web-based Platform

A secure, user-friendly, web-based meeting platform integrating blockchain technology, decentralized storage, and advanced communication tools for scalable, adaptable use across industries.

Patent Draft Submission

A detailed patent draft showcasing the platform's unique integration of blockchain, decentralized storage, role-based access control, and real-time communication features with novel methodologies and architecture.

Patent Filing and Approval Process

The project involves patent filing to secure intellectual property rights, ensuring legal ownership and exclusivity over the platform's innovative technology and methods.
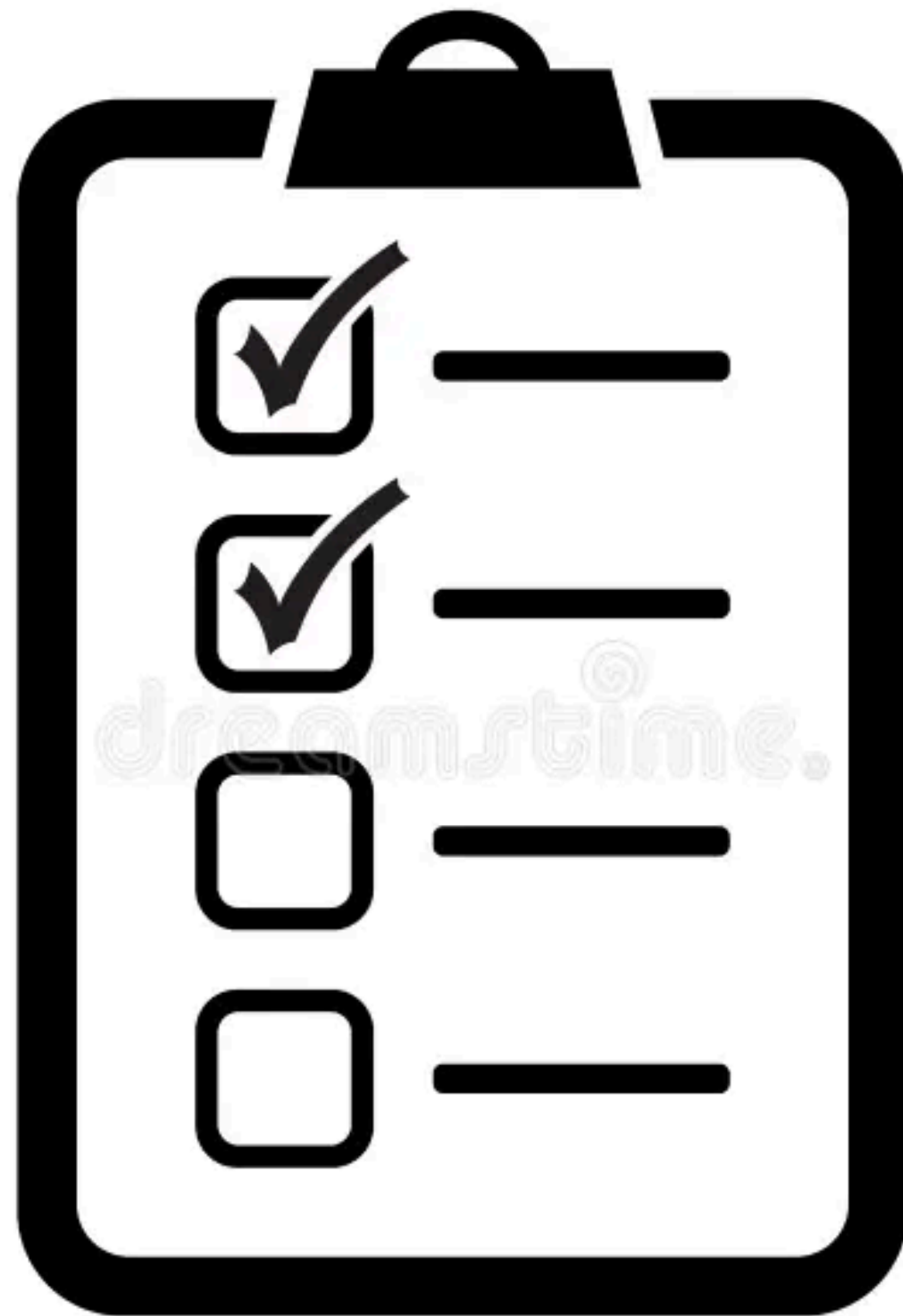
Next Steps and Conclusion

Progress in implementation

Backend implementation has already started, next steps include making progress in backend such as integrating blockchain and API endpoints generation.

Also, the implementation of user interactive frontend will be the next steps towards completion.

Conclusion

The patent draft, SRS has been completed. Implementation has begun. The patent draft has been submitted on KIET ERP (Link). Finalised techstack, ER Diagram and literarture review were presented in the last presentation.