SMART INDIA HACKATHON 2024

Title: Decentralized Work Order Management DApp

Team Name: Collide & Conquer

Ministry/Organization: Government College / Public Sector

Team Leader: Nipun Yadav

Institute Name: Netaji Subhas University of Technology

Theme: Blockchain

Problem Statement: Decentralized Work Order Management DApp

This presentation outlines a decentralized application (DApp) for managing work orders within a government college. The system aims to improve efficiency and transparency while ensuring the authenticity of all documents and processes.

Lack of Transparency

Need for Decentralization

Traditional methods lack transparency, leading to inefficiencies and potential for fraud in procurement procedures.

A decentralized solution is needed to streamline work order management, enhance security, and increase trust in the system.

Need for the Solution

1 **Transparency in Bidding**

All vendors must be able to see real-time bid information to ensure a fair and transparent bidding process.

2 **Authenticity & Tamper-Proof Records**

Blockchain's immutability and resistance to mutants ensure tamper-proof, authentic work orders and bids, processing only valid, unalterable documents.

3 **Scalable System**

The solution needs to be scalable to accommodate the large volume of work orders and vendors within a government college.

4 **Security & Trust**

The use of blockchain technology ensures the integrity of all data and transactions, building trust and security into the system.

Technologies Used-

React.js

- Client-side routing provides a user-friendly and responsive interface which enables seamless transitions between pages without needing to reload, enhancing the user experience for vendors and authorities.

Motoko Language

DApps and Canisters for Data Persistence:

- Motoko is used for building the **backend logic** of the DApp.
- **Canisters** ensure **data persistence** and stability, storing work orders and bids securely across the blockchain.
- The system supports stable data storage, even after power outages or system resets.

HTML, CSS, JavaScript

- **HTML & CSS** create the structure and visual design, providing a simple yet intuitive interface.
- **JavaScript** handles basic logic such as dynamic updates, data manipulation, and interaction with the backend canisters and blockchain.

ICP Hosting

The system is hosted locally on **Internet Computer Protocol (ICP)**, a decentralized cloud hosting environment that guarantees **scalability** and **security**.

- ICP allows decentralized hosting, eliminating single points of failure and increasing accessibility.

Proposed Solution

Decentralized Application

A DApp will be developed for managing work orders, enabling efficient collaboration and communication.

Transparent Bidding System

Vendors can view and bid on listed work orders, with the lowest bid being prioritized for selection.

Sign Protocol for Authenticity

The Sign Protocol will be used to verify the authenticity of work orders, bids, and certificates, ensuring data integrity.

Hosted on the Internet Computer Protocol (ICP)

It offers a decentralized and secure environment for data storage.

System Architecture

1

Frontend

React.js manages the user interface, providing seamless navigation and user interaction.

2

Backend

Motoko language powers the backend, using canisters for secure and persistent storage of data.

3

Blockchain Integration

Sign Protocol ensures all actions—like order creation, bid submission, and auction results—are verifiable on-chain

4

Auction System

Vendors submit bids through a transparent auction system, which is powered by the **Avail P2P network** for scala

5

ICP Hosting

Decentralized hosting on ICP ensures scalability, availability, and security.

User Flow

User Roles ——— **1**

The system includes two main user roles: the Organization which manages work orders, verifies bid and Vendors who Registers, views orders, and submits bids.

2 ——— **Work Order Listing**

The Organization creates and manages work orders, specifying the required services or tasks.

Vendor Bidding ——— **3**

Vendors view open work orders and submit their bids through the system.

4 ——— **Bid Verification**

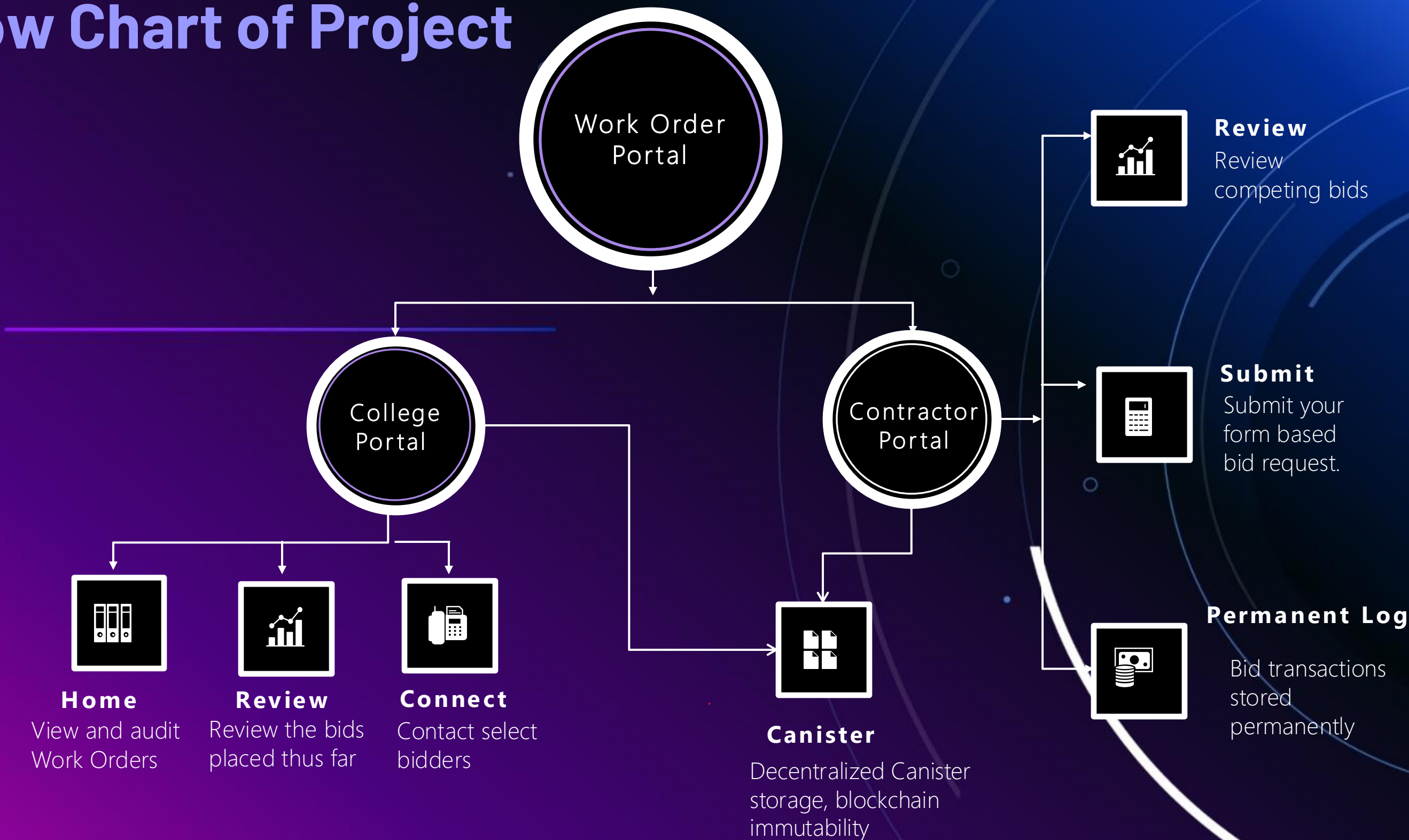All bids are visible to both vendors and the authority, ensuring transparency and fairness.

Work Order Finalization ——— **5**

The lowest bid is prioritized, and the work order is finalized after approval, immutably stored on the blockchain.

Flow Chart of Project

Business Model

Customer Segments

The target audience includes government institutions like colleges needing transparent procurement processes and vendors seeking work opportunities.

Value Proposition

The system offers a transparent, secure, and efficient solution with a fair, transparent bidding system for managing work orders.

Revenue Streams

The platform generates revenue by charging vendors a commission per contract, for customization, integration, and ongoing support and maintenance. This ensures a performance-based model aligned with vendor success.
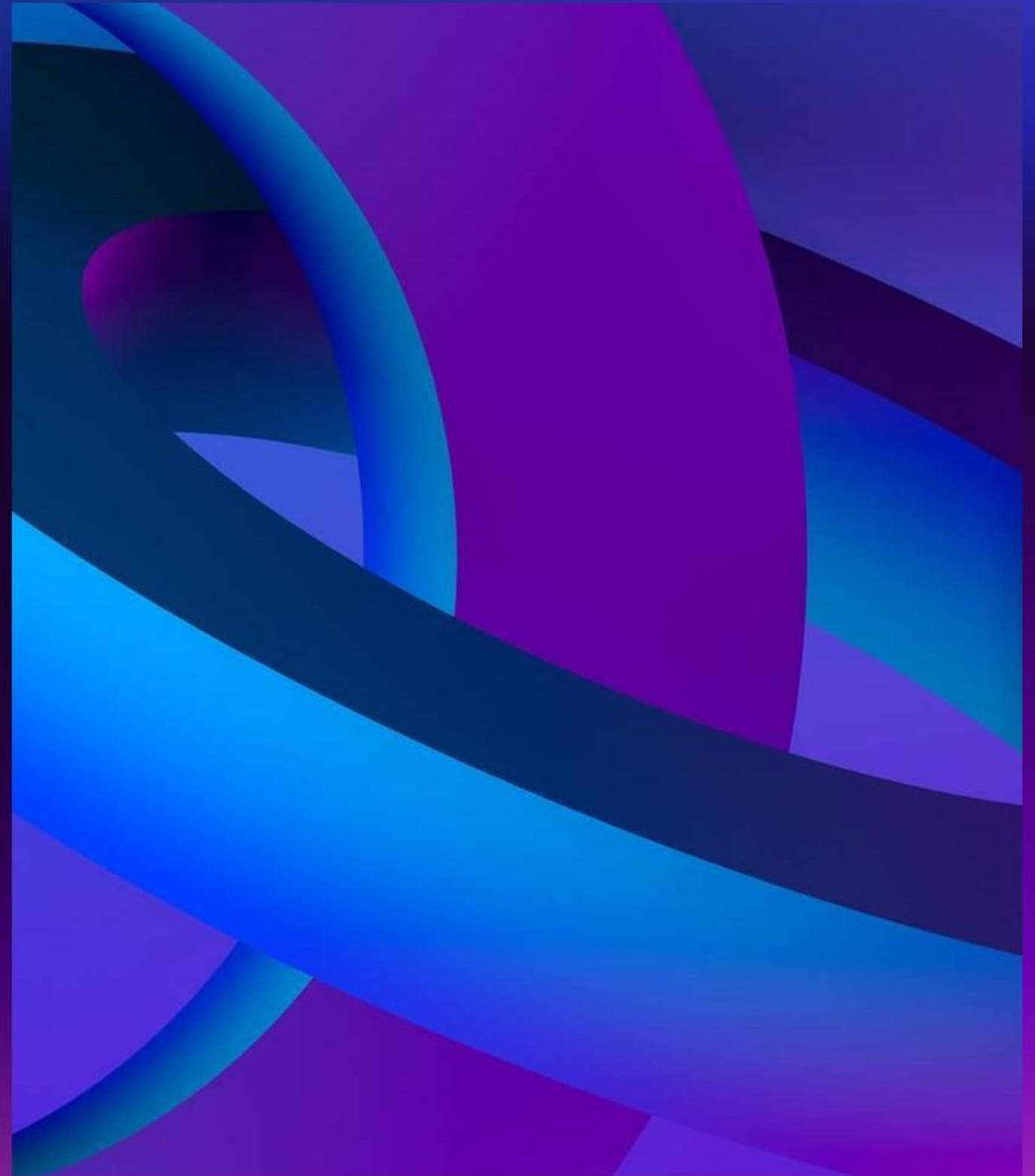
Customer Retention

Ongoing support, updates, and a user-friendly interface will ensure long-term adoption and customer satisfaction.

Conclusion

The **Work Order Management DApp** ensures transparency, scalability, and security for government procurement processes.
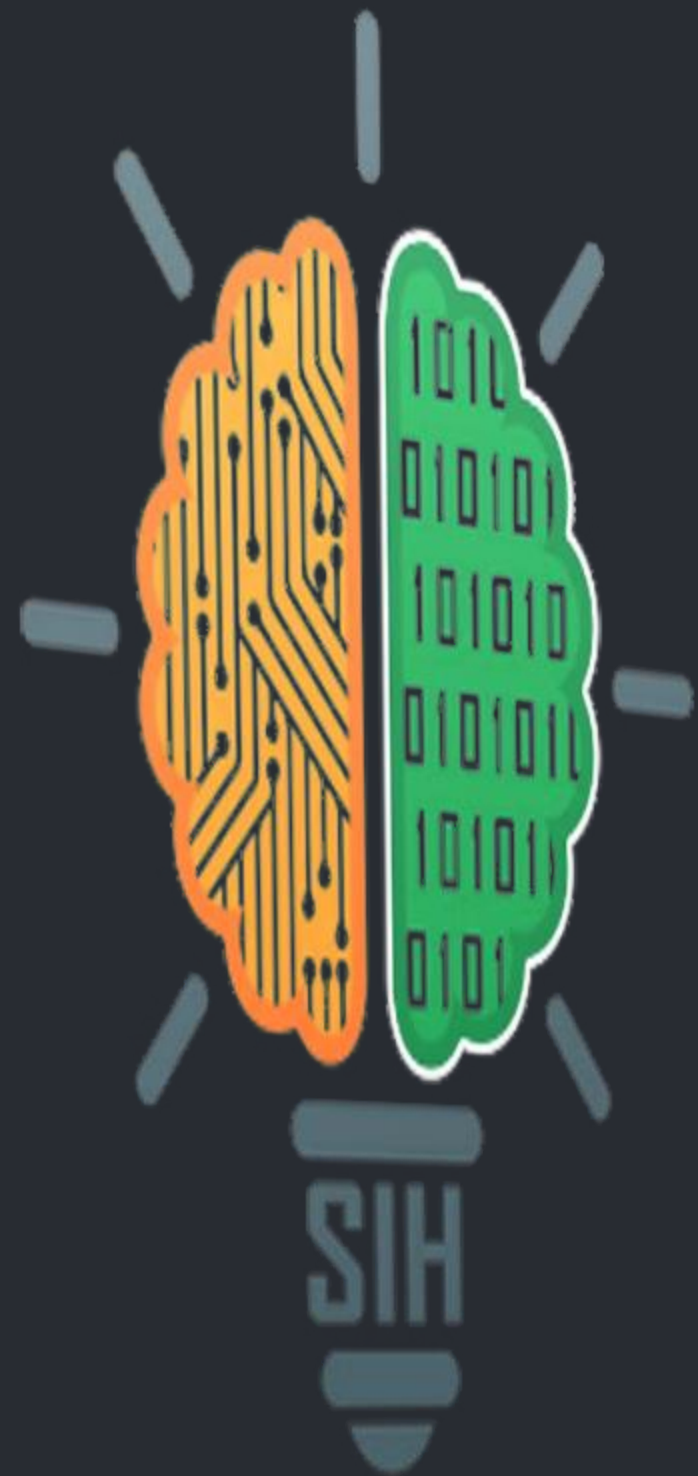
- It leverages **React.js, Motoko, and ICP** to create a seamless user experience with tamper-proof records, enabling fair competition for vendors and trustworthy management for authorities.

- With strong compliance measures and a sustainable business model, this solution is poised to revolutionize how public institutions manage work orders.

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