Project Overview

Capstone Project Name/Idea: BloodLedger 🩸🏥

Brief Project Description:

BloodLedger is a decentralised Blood Donation Management System in Solana where healthcare professionals can have real-time access to blood inventory data (e.g., blood types and their availability) with tokenized incentives for donors. The goals are to help shortage by boosting donor engagement with a recognition system, enhance security by protecting sensitive donor and patient data using encrypted storage in solana blockchain, and to ensure timely access to blood supplies.

Key features are real-time inventory management where it provides updates on blood types quantities, per location and date, to hospitals and blood banks; use of smart-contracts to make more transparent and verifiable key processes such as matching between donor and recipient; tokenized incentives to promote blood donations; encrypted patient and donor data and an immutable ledger that tracks every blood donation to provide clear transparency in the process.

Reason for Choosing this Project:

I have always been deeply passionate about biology and medicine, and the opportunity to merge these two interests with technology is truly my biggest dream. The potential of decentralised systems technology to revolutionize healthcare and drive innovative solutions makes this fusion incredibly exciting and impactful.

More specifically, this project addresses blood shortages, helping to ensure that public health organizations, hospitals and bank donors have quick access to emergencies and an efficient management of blood inventory. Plus, the token incentive system increases donor retention and participation, contributing to a more robust blood supply. Eventually this project has the potential to scale globally, especially where blood supply chain management is inadequate.

Go-to-Market Strategy

Target Audience:

1. Patients in need of blood transfusions

   User Demographics: all age groups (from newborns to the elderly). Individuals with blood disorders, undergoing surgery, cancer patients, trauma victims, and so on.

   Needs: access to timely blood transfusions; transparency in blood supply tracking, ensuring the right blood type is available when needed and assurance of the blood's safety and quality, free from errors in matching.

2. Blood Donors

   User Demographics: age from 18 to 65, both genders, health-conscious individuals not taking certain types of medication nor with specific health conditions that can impact the safety of the donated blood to the recipient.

   Needs: recognition and incentives for their contributions; assurance that their donations are being used effectively and ethically; and a simple, transparent donation process with updates on their donations' impact.

3. Healthcare organizations

   User Demographics: Public and private hospitals, blood banks, trauma care units, emergency clinics, surgery centers and other healthcare providers.

   Needs: real-time tracking of blood donations and inventory management; efficient process to reduce administrative overhead and access to an organized and transparent blood supply system that can be audited for quality assurance.

Value Proposition:

For patients in need, the BloodLedger blockchain project ensures a timely access to available blood when needed, plus a transparent and safe patient data encryption system.

For blood donors, it provides a system that acknowledges donor's contributions by providing notifications every time their blood is used to help/save a patient and by awarding tokens, plus it protects the donors private information.

For healthcare organizations, the project ensures error and waste reduction and operational efficiency by automating blood tracking, matching and inventory management.

Marketing and Distribution:

Organize or participate in local/remote events, blood donation drives, and healthcare conferences to promote the project directly to potential users and partners and do a partnership with existing donor networks and healthcare organizations to create a BloodLedger community, fostering peer support and shared experiences.

Use digital platforms like Reddit, Twitter/X, Discord, LinkedIn, Facebook, Instagram and TikTok to reach potential donors and healthcare professionals.

Competitive Landscape:

After research, I found a similar project named *BloodChain* that focuses on tracking blood donations and primarily uses private blockchain like Hyperledger.

Another one is *BloodBlock - A Blood Donor Chain*, an ethereum-based dApp to know whether the blood donated reaches the needed and also donate blood as per request. Nonetheless, this project seems abandoned on Github with no updates in the last 6 years.

I didn't find any similar project in the Solana blockchain, so the added value of the BloodLedger project is that it will possibly be the first Solana Blood Donation Management system.

Unlike projects that merely track donations, BloodLedger introduces a robust token system, offering tangible incentives for donors, making it more appealing to a broader donor base and driving sustained engagement.

Technical Details

Tech Stack:

- Blockchain Platform: Solana
- Smart Contract Development: Rust + Anchor
- Frontend Development: Typescript + React
- Backend Development: Node.js
- Continuous Integration and Deployment (CI/CD): GitHub

Smart Contract Development:

Programming language will be Rust with the Anchor framework.
The testing is going to be divided in three parts:

1. Automated tests will involve unit tests in Rust and integration tests - in Typescript or Rust, depending further down the project;
2. User testing with deployment to Devnet;
3. Security audit by third party.