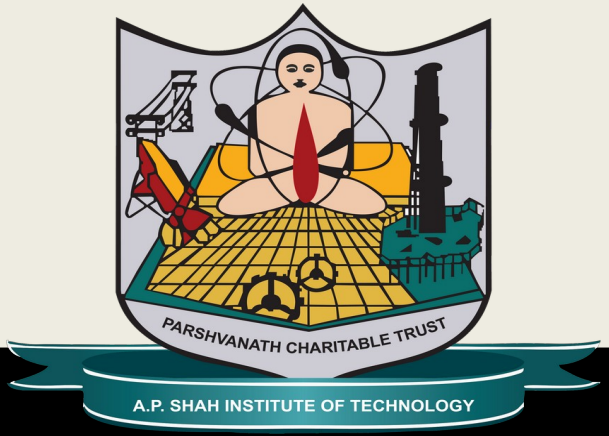

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UNIVERSITY OF MUMBAI

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A Project Report on

A Comprehensive Blockchain Based Framework for Bloodbanks

Submitted in partial fulfillment of the degree of

Bachelor of Engineering(Sem-8) in
INFORMATION TECHNOLOGY By

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Under the Guidance of
Prof. Kiran Deshpande

1.Project Conception and Initiation

1.1 Abstract

- Our system intends at enhancing the existing blood supply management systems. Due to the several limitations which existing blood management systems possess like scarcity of data on blood bags, inability to display real-time updates, and the trust factor, we urge on an innovative web framework based on Blockchain technology using a distributed ledger structure which would serve complete transparency and security to the framework.
- Blockchain offers the opportunity to maintain a transparent management system, particularly since data cannot be falsified and tampered with. This proposal is to allow hospitals that are far from the blood banks to accrue blood supply in emergencies.

1.2 Objectives

- Security and Traceability.

Blockchain is a distributed ledger data structure so all the nodes will be having a copy of the blockchain. This architecture makes this system incredibly secure and tamper-proof because if anyone tampers with a single block then the whole chain will become invalid and we can verify from other nodes.

- Transparency.

Being a decentralized platform, one of the most beneficial advantages of blockchain is transparency. All the nodes will have a copy of the blockchain which makes it easy to verify the donor history from each node in the blockchain.

- Availability

Along with the other things it is necessary that people should know the availability of blood bags. Lack of proper updates can be detrimental for patients. As blockchain is a decentralized and distributed platform it will be simple to check the availability of blood concerning blood banks

1.3 Literature Review

In today’s era of a globalized supply chain of goods and services, the supply chain has now involved various actors and entities from different parts of the globe who have never seen each other and may not trust the genuineness of either one or multiple parties/actors. With such complex issues in hand, the main concerns are the lack of transparency and traceability[1].This is where Blockchain technologies can help us create more efficient and effective supply chains with the above concerns minimized or even completely diminished in some cases. Blockchain Technology has been accepted and adopted in past years throughout the technological globe. A blockchain is a form of database storage that is non-centralized, reliable, and difficult to use for fraudulent purposes[2].Ethereum is explained as a Next-Generation Smart Contract and Decentralized Application Platform that was created by a cryptocurrency researcher and programmer named Vitalik Buterin [3]. It uses a Blockchain-based distributed computing platform with a Turing complete scripting language that enables the processing of smart-contracts on blockchain. It is also now used in healthcare industry to protect patient privacy, procure untampered history.

1.4 Problem Definition

- Existing blood management systems in India function as information management systems that lack dynamic updates of blood usage and detailed blood trail information, starting from donation to consumption.
- The most beneficial medical methodology is Blood Transfusion which saves many lives and improves health, but it can be the case where several patients requiring exchange of blood, don’t get handy access to safe blood. Ensuring blood safety and availability must be a key component of healthcare policy of every country. For this to happen smoothly the coordination between blood banks and hospitals should be in a proper manner.
- To overcome all these problems, the need is to have a decentralized platform for all the entities in the blood ecosystem which should be able to portray the true availability and create transparency through the whole system where hospital can keep the track of available blood and donors can also check the status of donated blood.

1.6 Technology stack

- Ethereum Blockchain (Ganache)
- Solidity (smart contracts)
- Truffle framework (to compile and deploy smart contracts)
- npm, reactjs, web3.js (web framework)
- Metamask (cryptocurrency wallet)

1.5 Scope

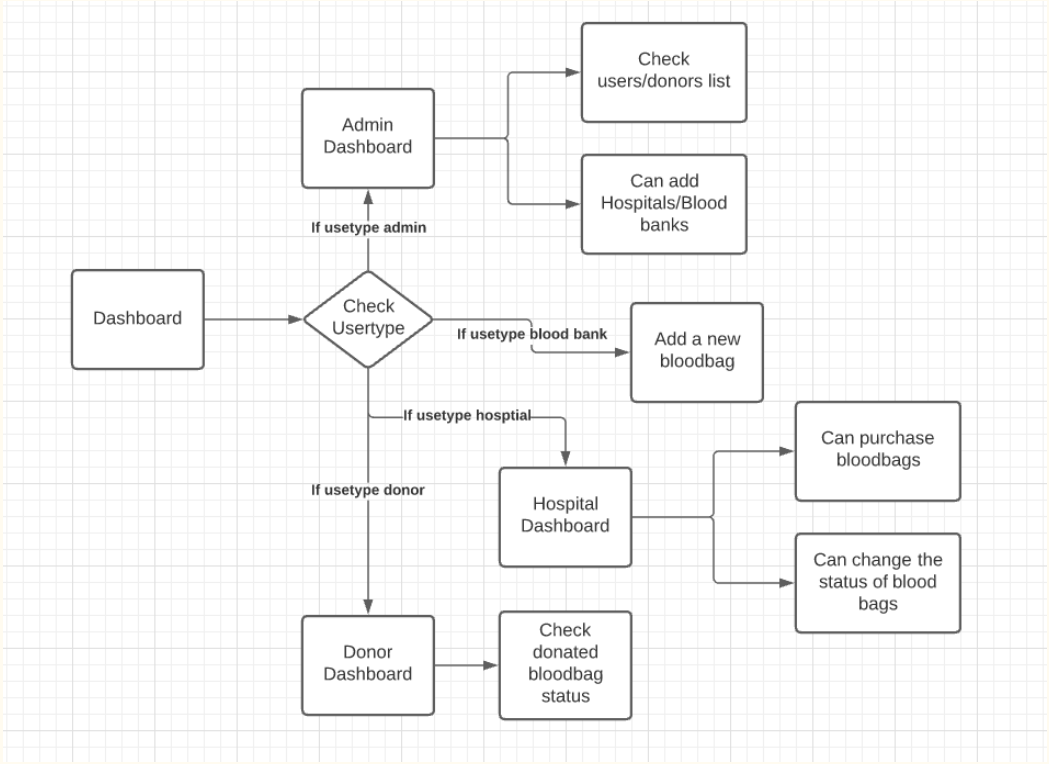
- The proposed system, brings more transparency to the blood donation process by tracking the blood trail and also helps to curb unwarranted wastage of blood by providing a unified platform for the exchange of blood and its derivatives between blood banks.
- Proposed system, can be applied in areas where political interference and chances of data tampering for personal benefits are high. Due to presence of web application, system becomes more user friendly and can be reached to more population.

1.7 Benefits for environment & Society

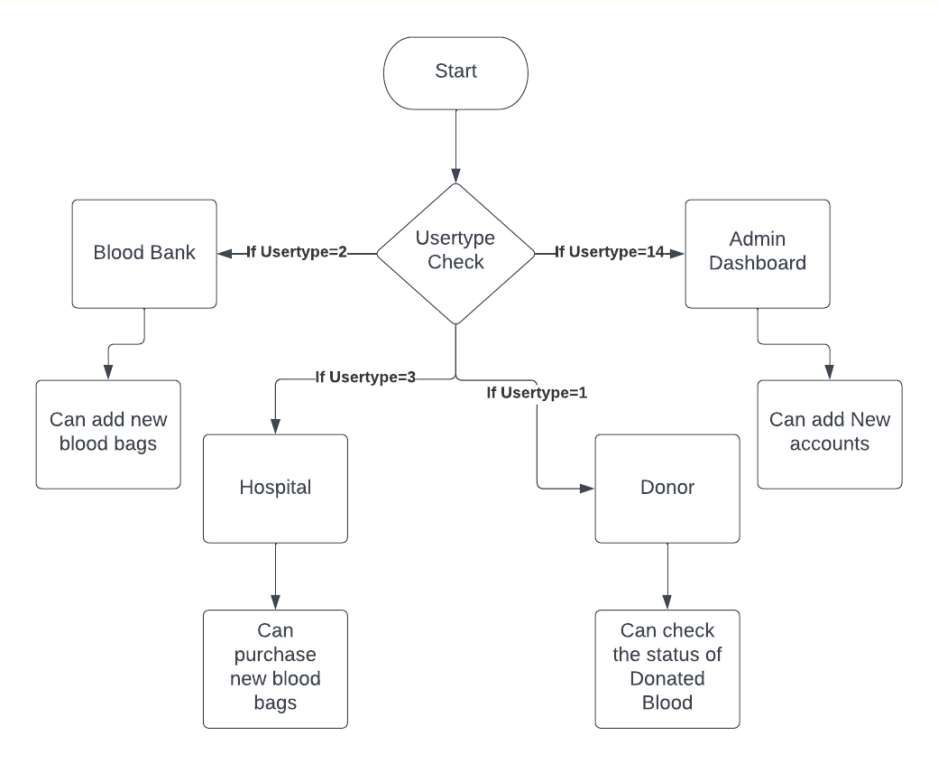
- This can be achieved by the different entities in the chain; verifying the quality/expiry of blood from the blockchain that provides the trust factor that is required.
- The donor details could also be verified by the collection centers to ensure unsafe donors are excluded. As a fallout, all the stakeholders will be able to know the availability of blood in different blood banks

2. Project Design

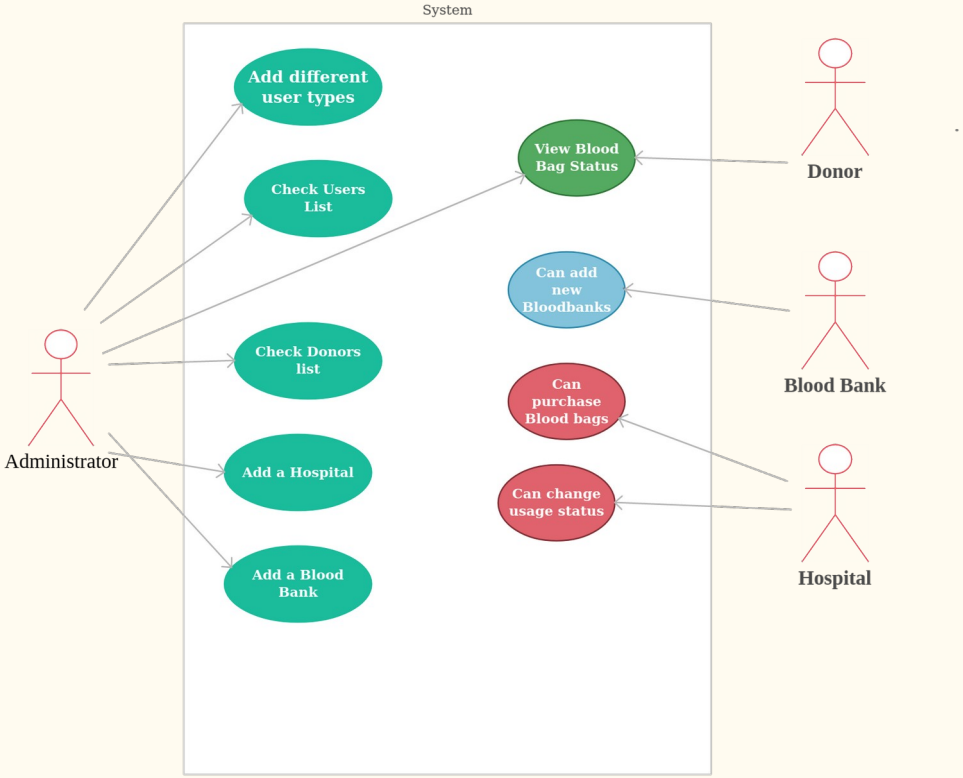
2.1 Proposed System



2.2 Design(Flow Of Modules)



2.3 Use Case Diagram

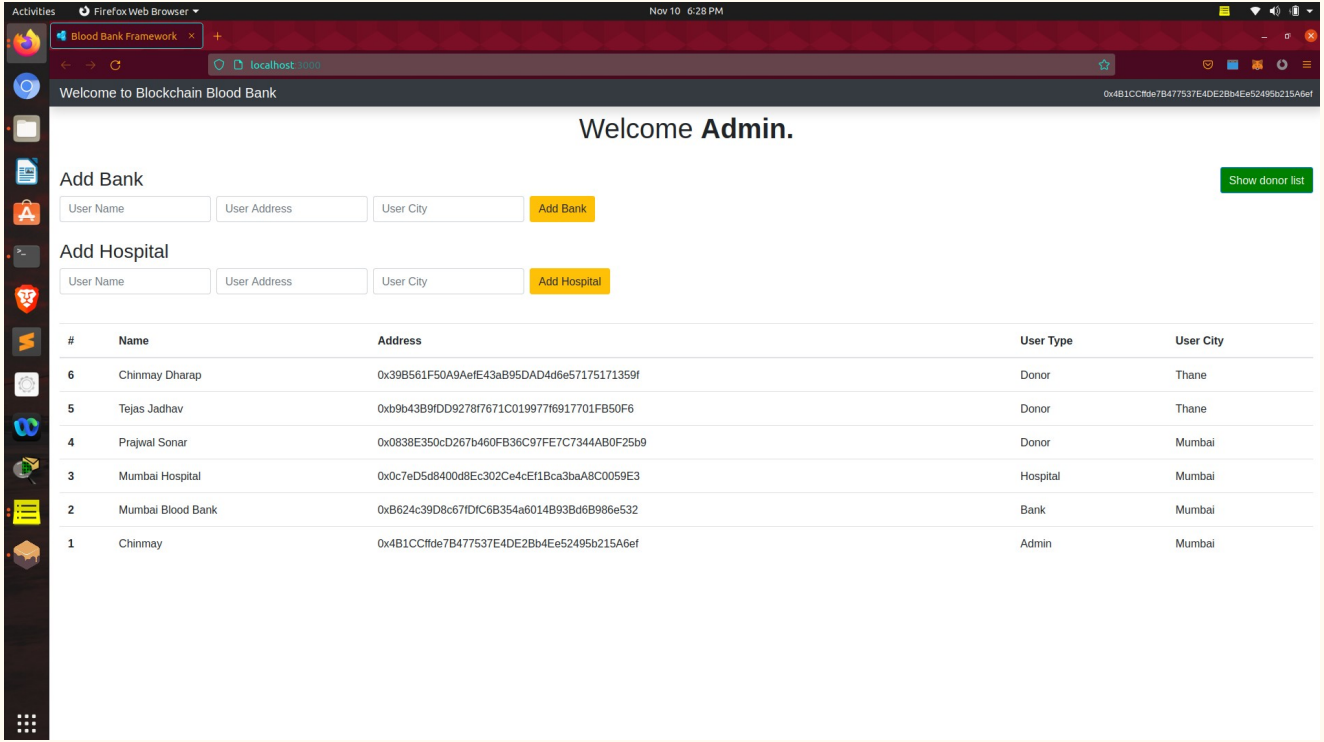


2.3 Description Of Use Case

- There are 4 major actors in our framework i.e Administrator, Bloodbank, Hospital and Donor.
- Administrator has the authority to add new accounts of Blood Banks and Hospital.
- Hospital can purchase new blood bags and can also change the status of the usage of blood. Blood Banks can add new blood bags with their details.

3. Implementation

3.1 Implementation



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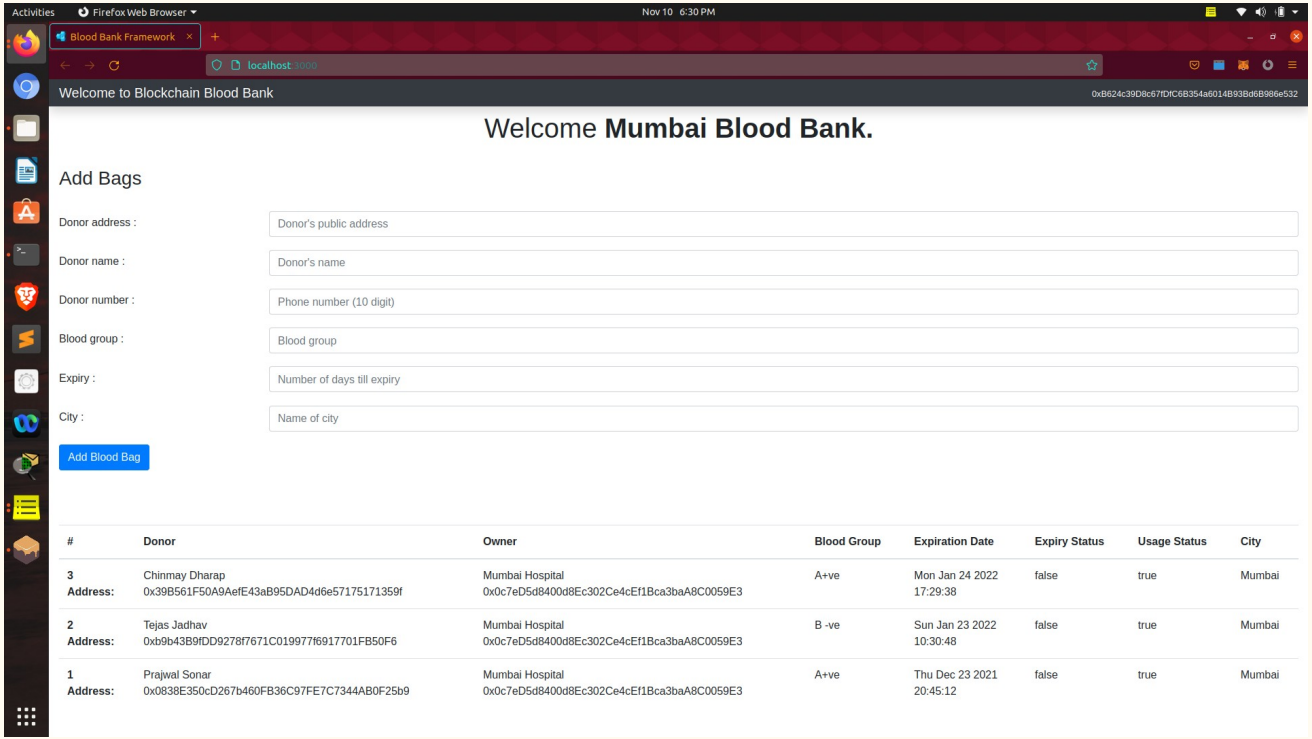

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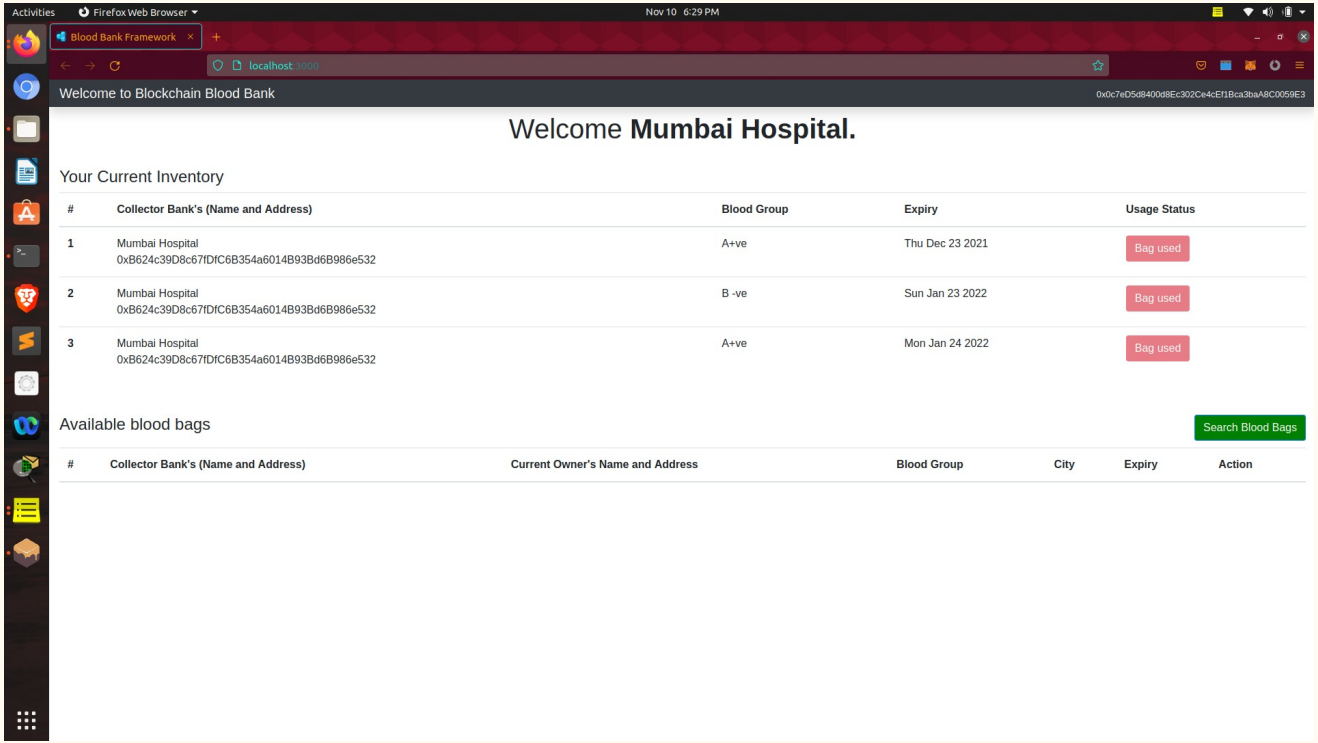
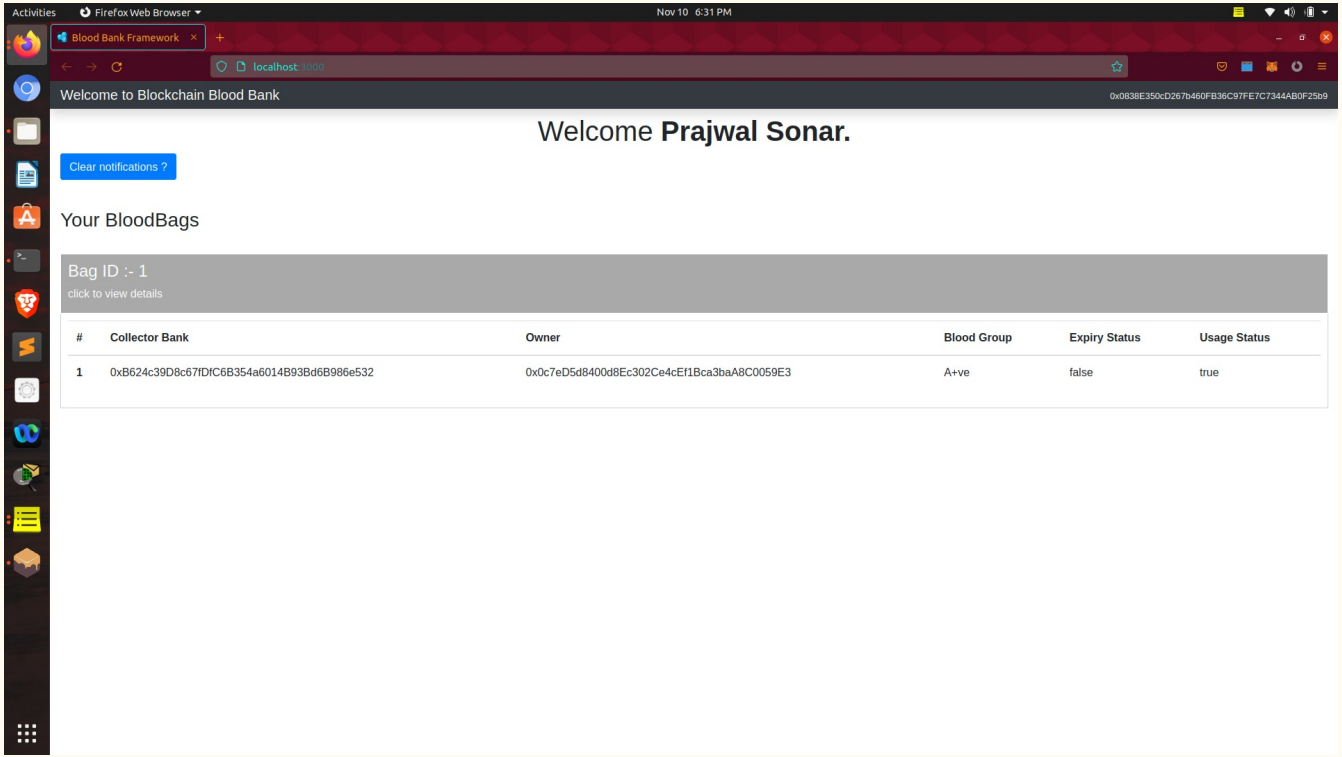


3.1 Implementation



4. Testing

5. Result

6. Conclusion and Future Scope

Conclusion and Future Scope

- Thus we have made a web based framework for blood banks which uses blockchain in backend to store the data of blood donations. This is a centralized platform for the blood ecosystem so that it can solve the issue of improper co-ordination in demand and supply and create no misunderstandings between blood banks and hospitals. It also helps donors to check the blood bag’s usage and expiry status. The platform proposed will help avoiding any kind of interference in blood donation drives for personal benefits.
- The system that has been proposed will help in avoiding the unwarranted wastage of blood by offering a unified platform for the exchange of blood and its derivatives between blood banks which brings more transparency to the process of blood donation by tracking the blood trail. It can be beneficial in the areas where political interference and chances of data tampering for personal benefits are high.

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Thank You