# Secure asset transaction using blockchain

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**Abstract** -- The current property exchange methodology includes a lot of susceptibilities and people use it to delude the common people and the government. Using blockchain, this project utilises majority consensus to implement secure asset transactions. The main objective behind the implementation of asset transaction using blockchain is to secure property transactions from vulnerabilities and to easily maintain records. The proposed solution aims at avoiding scenarios related to the same property being sold multiple times to different clients. Since very little documentation and record-keeping effort are required, the time required for performing a transaction is also less. The asset transaction will consist of n nodes which will be responsible for verifying a transaction and adding new blocks to the blockchain. The proposed implementation of the secure asset transaction using blockchain thus offers a reduction in manual effort spent in record keeping.

Index Terms— Asset transaction, Blockchain, IPFS, Smart Contract.

## 1. Introduction

Asset transaction in India as well as in many parts of the world is a very slow and tedious process[1]. There are also many intermediaries involved in the process of property transactions. Our aim with this project is to implement blockchain to develop a system that not only speeds up the process of property transaction, but also make it easier for various parties involved in an agreement to transfer the asset ownership from seller to a new buyer, by creating a distributed system that stores all the details of the transactions made during the process of property exchange.

BLOCKCHAIN TECHNOLOGY: Blockchain technology offers a shared record-keeping which is designed to be difficult to tamper with. Blockchain technology functions through decentralised peer-to-peer platforms, building a firewall against the spread of corrupted information and boosting resistance to fraud[2]. Blockchain technology has impacted the real estate industry in a variety of ways, by offering a new avenue for buyers and sellers to interact with one another. Through the use of blockchain technology, real estate transactions could be made cheaper by eliminating middlemen.

Removing the MiddleMan with Machine Consensus: A peer-to-peer network of computers running the blockchain protocol validate the transactions by consensus instead of a single trusted third party validating them through their servers with authority[3]. By formalising consensus rules for validating transactions on the P2P network, the blockchain protocol facilitates management and auto enforcement of transactions between participants.

Smart Contracts: Smart contracts run when certain conditions are met within a blockchain. Contracts run automatically when certain conditions are met. They appear as a contractual agreement but should not be confused with legal contracts. On a blockchain, smart contracts are simply programs that are triggered by preset conditions. Therefore by making use of smart contracts, various conditions can be put into place and upon whose satisfaction only the transaction can move ahead. Also, the use of smart contracts speeds up the procedure of reflecting the new ownership by updating the record automatically. Simple economic transactions like sending money from A to B can be implemented using smart contracts. In addition to registering ownership and property rights, smart access control can also be used for managing sharing economy services.

## 2. Literature survey

Krishnapriya S et al [4] proposed a seamless, easy to use and hassle-free platform which can be used for making the land registration easy. There are many problems such as involvement of brokers or middlemen, time delays,

etc. This platform will eliminate the problems associated with land registration in India as well as in many parts of the world. Blockchain technology is emerging very rapidly due to the secure features it offers. Hence using blockchain to save the land record transaction is the way to create the immutable records.

[5] Dealt with different possible applications of blockchain like health care, IoT, supply chain etc. along with their security and privacy challenges.

[6] Defined the protocol of Ethereum. A node can be implemented by the reader on the ethereum network using this protocol. By implementing this protocol, readers can join a decentralised, secure, and social operating system that is built on the Ethereum network.

[7] The consensus algorithms that are used in Blockchain provides the valuable computation thus allowing the transaction by means and verification and validation. These algorithms might be required to compute more which requires a huge amount of computing power. These algorithms work the best when the blocks in the network are limited in number

[8] With smart contracts, Blockchain can be used to provide a decentralised/ distributed environment where multiple parties can interact with each other without any trusted third party.

IPFS [9] is a distributed storage system that allows users to access files, websites, applications, and data. All the file logs collected from the IPFS are embedded in the blockchain as transactions.

## 3. Proposed system

The aim behind this project is to make the process of asset transactions efficient, transparent and also decrease the cases of fraud and malpractices in the process. This system simulates the process of buying and selling a property, using blockchain and smart contract technology. A smart contract is defined which includes identifying the roles that are involved in our asset transaction and the different components and transactions in the agreement process.

## 4. Objectives

a. To transform core CRE (Commercial Real Estate) operations of property transactions like purchase, sale and management transactions from the traditional approach to the blockchain technology.

b. Accelerating the Process: This platform can be used to create a distributed database where anybody can record and access information without having to rely on a central authority.

c. Reducing Fraud Cases:
In a blockchain asset transaction platform, you can upload the title documents onto the blockchain network and other parties can verify them as needed. Blockchain can prove the ownership of the property and prevent forgery of documents by keeping an immutable record of transactions.

d. Bringing Efficiency with Smart Contracts:
Smart contracts improve efficiency by automating verified transactions. As an owner or buyer, one can create a decentralized, digital ID using this blockchain platform. Using the blockchain platform, ownership transfers would be more seamless and quicker than using traditional methods.

e. To avoid the same property being sold twice by a user.

## 5. Modelling

Smart Contracts are the fundamental building blocks on which the system is based. All the traditional processes pertaining to asset transactions have been replicated using smart contracts. These contracts trigger all events related to asset transactions. Smart contracts will be used to automate the transaction. Each block will consist of a block number`, hash of previous block, Property details, cost. These contracts, written in Solidity, have been

tested and compiled on Remix IDE.

Web3.js acts as the connecting link between the web application and blockchain. Ganache, which is a testing environment, is used to set up a private blockchain which is used to test smart contracts where one can develop applications, deploy contracts, run tests and perform other tasks without any cost.

Following is the list of platforms used throughout the process -

a. Truffle: It is a framework used for deploying the contracts, truffle automatically provides the structure for storing the contracts and migrations folders for connecting it with mainnet and testnet

b. Metamask: Metamask is a crypto wallet- it allows users to store and transact Ethereum. It allows users to access their Ethereum wallet through a browser extension or mobile app, which can then be used to interact with decentralized applications.

c. Remix IDE: Remix IDE (Integrated Development Environment) is a web application that can be used to write, debug, and deploy Ethereum Smart Contracts[10].

d. Ganache: Ganache is a testing environment which is used for testing the functionality of smart contracts and provides a private blockchain. It is used to test the smart contracts as it provides 10 accounts with fake ether.

## 6. Result

The owner will upload all the details about the property along with its document. The listed property will be verified by an Admin. Once the documents are verified, the buyers will be able to see the displayed properties. The buyer can request to access the documents and after approval by the owner a transaction will happen.

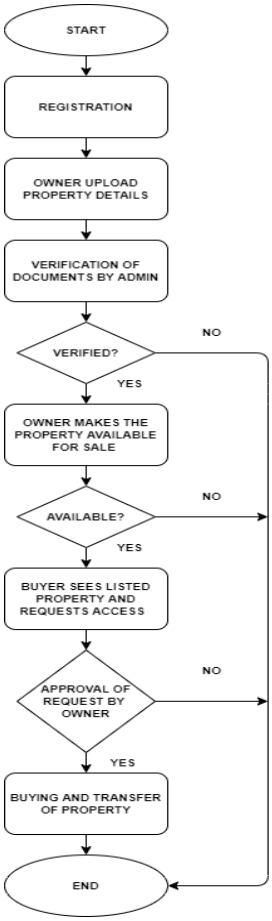


**Fig 1:** flow chart of asset transaction using blockchain

The skeleton of the project in detail will be along these lines:

Step 1: User registration

Buyer and owner both have to register on the web app. Users will register to the platform using their credentials. Once registered, the user will be redirected to the login page where they'll login using their registered Metamask account address. A user, say Pavitra, registers themselves into the webapp using a unique Metamask account address. The Metamask account consists of digital currency which is used for transactions and gas fees.

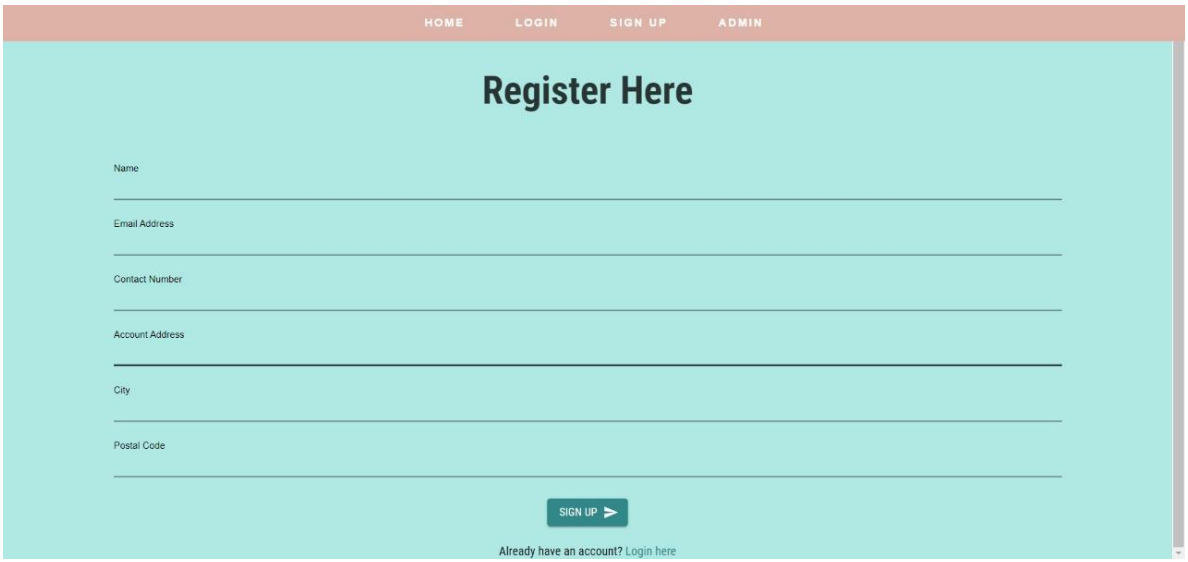


**Fig 2:** Registration page

Step 2: Property listing

After the user gets registered, they have the option to either list properties or purchase properties. Once the property gets listed, every consequent action along with the property detail will get recorded on the Blockchain nodes. If an owner logs in, they'll be asked to list out all the details pertaining to their property like name, description, price in ether, PId etc. Also, documents and images of the property have to be uploaded for verification. All these details will be stored in the Blockchain ledger.


**Fig 3:** Listing of property

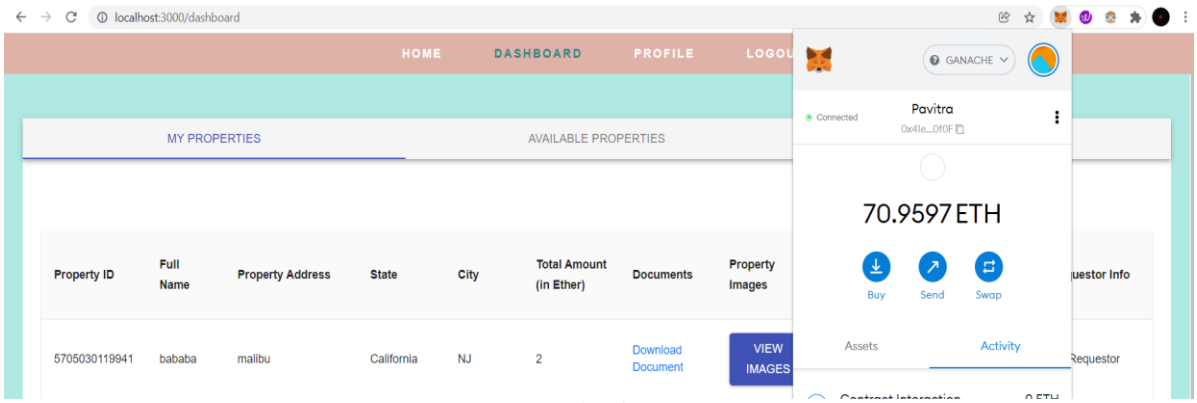


**Fig 4:** Listed property

Step 3: Admin Verification

An admin account will verify the property details/documents. If there is no discrepancy, the admin gives a go ahead to the owner to list the property for sale. If the property gets rejected by the admin for some reason, the property will not be visible in the 'Available property' section. The listed property gets loaded onto the blockchain irrespective of its status.

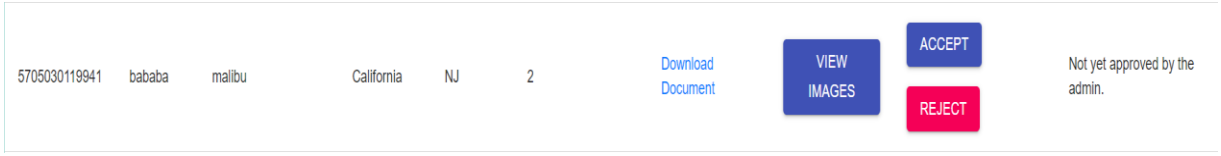


**Fig 5:** Before admin approval

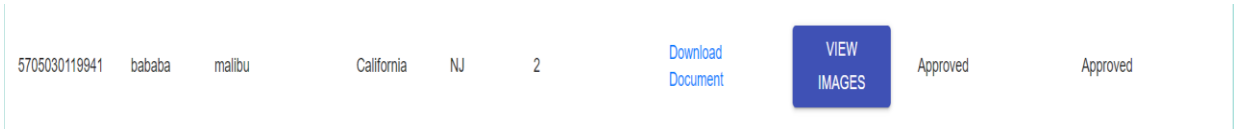


**Fig 6:** After Admin approval

Step 4: Request to purchase

Once verified by the Admin, the owner makes the property available for sale. The logged in buyer will be able to see all the listed properties and accordingly make a request.

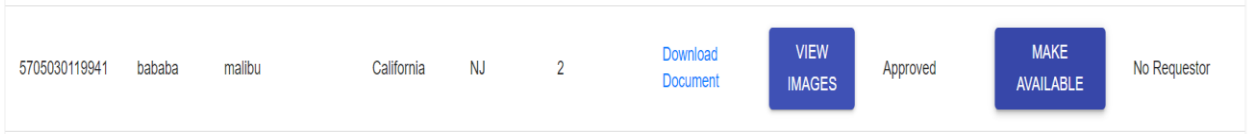


**Fig 7:** Making property visible for buyers

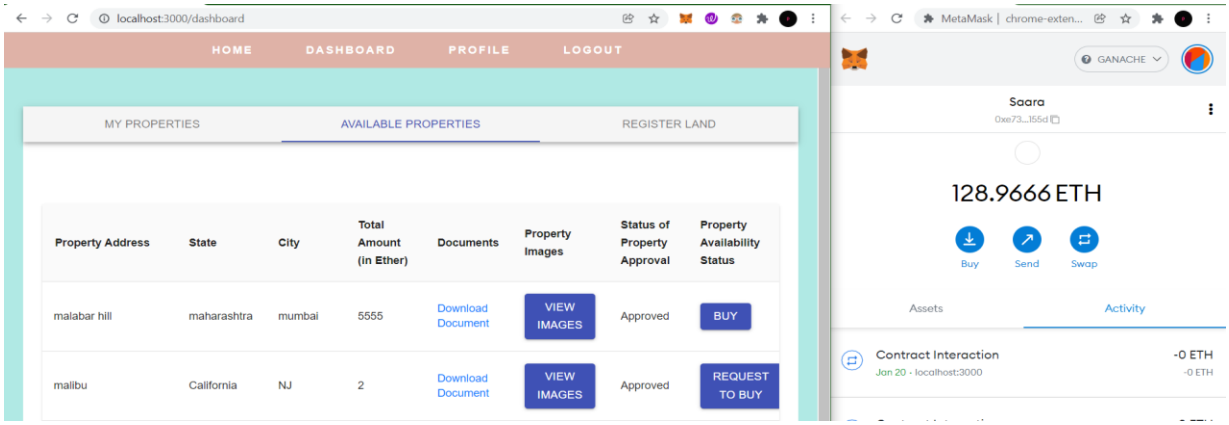


**Fig 8:**` Property is visible in the 'Available Properties' section of the dashboard.

Step 5: Ownership transfer

The owner has the choice whether to accept a request or not. If the request goes ahead, the buyer will send the required ether to the owner and subsequently the ownership will get transferred. As shown in fig 6.10, the property is now transferred to the buyers 'My Properties' tab from the owners 'My Properties' tab.

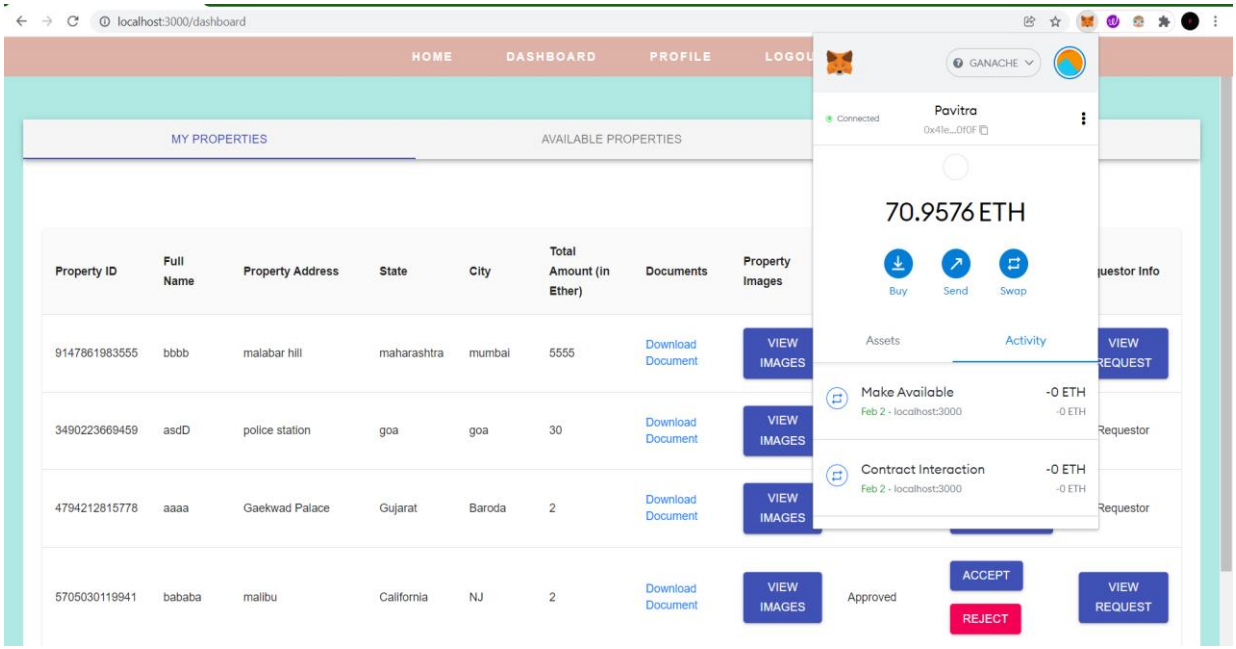


**Fig 9:** Acceptance/Rejection of request by owner

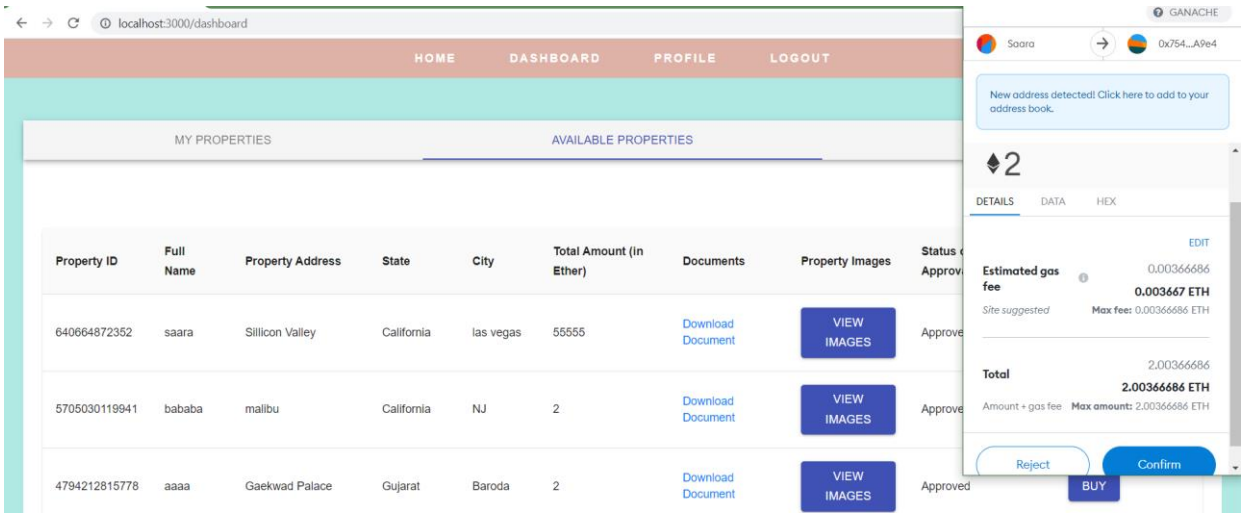


**Fig 10:** Payment

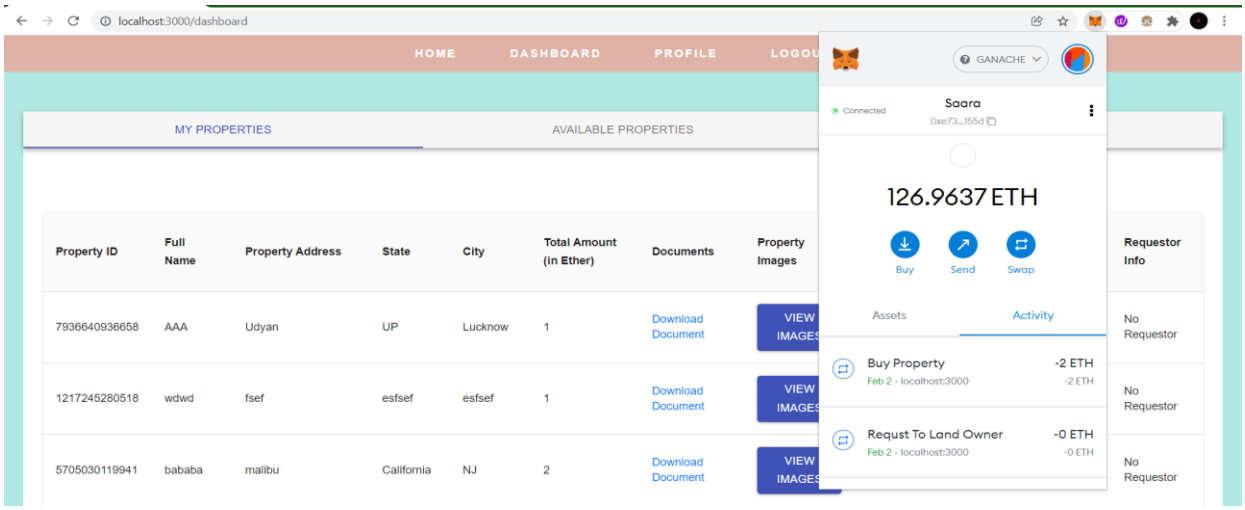


**Fig 11:** Ownership transfer

## 7. Conclusion

The traditional system is prone to various types of tampering at every stage and indirectly affects the costing in the form of paper resources, storage requirements of vast record keeping, and security issues of these records. The system is also time-consuming and requires much time in the verification and updating process that give rise to bribery and chances of selling the same piece of property simultaneously to more than one buyer increases.

Blockchain technology has the potential to counter all these issues. The proposed system is very economical, as it requires very less human resources and is more reliable. If this system is upgraded further and integrated with useful APIs then it will lead to faster transactions and eventually ease the entire process, thus making the system more hassle free and convenient.

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