

# Land Registry Using Blockchain Framework

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**ABSTRACT** - The land is a highly valued, immovable asset. Transferring ownership of land properties in India and maintaining proper records has become a challenging task. As the ownership changes very frequently keeping proper documentation is a daunting task. Due to the presence of fraud, incomplete registry, and double transactions, it is very difficult to trace back through time. Using blockchain will remove the middle man in the system and also will reduce corruption and increase the speed of the process. A land registry is a simple decentralized application built using the concepts of blockchain. We can use this system as a substitute to bypass existing system flows. This project proposes a secure record-keeping mechanism to create records of physical assets in immutable blockchain-based liquid asset tokens.

**Key Words:** Blockchain, Ethereum, Smart Contract, Land Registration, Metamask, Liquid asset storage Asset as Token

## I. INTRODUCTION

Each country has strict rules and regulations regarding property ownership by its citizens. Transaction procedures differ depending on the type of property, whether the property is owned by one person or by multiple owners. Due to strict laws in different countries, the current scenario is not suitable for addressing various issues such as recording immutable property, handling fraudulent transactions, etc. Ownership verification always includes official document verification against historical records.

Proof of ownership requires a previous owner's warranty card, a deed of title by inheritance, or a waiver asserting the current owner's title to a particular portion of the property. In some states, all information related to ownership transfer is in a centralized database, and many still follow traditional paperwork practices.

The outbreak of the CoViD-19 (coronavirus disease) pandemic has caused great disruption not only

in people's lives, but also in all major sectors, from private to public. People have been instructed to stay safe at home and not leave until needed. In such a scenario, it is risky for people to go to the registry office to complete all the manual procedures to obtain title if they want to purchase a property. In these cases, the quality of transparency and certainty of blockchain technology[1] will help solve the outdated ways of transferring land ownership. In the proposed land registration system [2], there is no need to travel as all steps from land purchase to sale are carried out through a blockchain environment through its own smart device. To use the distributed storage system provided by the blockchain backbone, the Ethereum Distributed Execution Platform [3] provides a secure virtual environment for executing logic on data shared by multiple nodes.

## II. BLOCKCHAIN

Blockchain is an immutable, distributed ledger that has the ability to keep records of data regarding the transactions and the assets on the network. As a result increasingly more costs can be traded and tracked on a blockchain network. Blockchain technology, also known as Distributed Ledger Technology (DLT), describes a span where decentralized databases were used for employ records among entities via a peer-to-peer network. An algorithm ensures that the replication is occurred on every nodes in the network.

Assets are described in blockchain through the use of tokens. They include tangible (a car, a land, cash) or intangible assets (Intellectual property, copyright, and patents).blockchain-based assets can be traded in a decentralized manner, which can increase liquidity and reduce transaction costs. Since blockchain transactions are recorded on a decentralized ledger, they are also transparent and tamper-proof, which can reduce the likelihood of fraud.

### III. TECHNOLOGIES

#### 3.1 Ethereum

Blockchain technology provides developers with the ability to develop and share business, financial, and entertainment applications. A decentralized blockchain platform is a platform that establishes a peer-to-peer community for executing and verifying utility codes, also known as smart contracts [14]. Smart contracts allow members to transact with each other without relying on any central authority. Each member has access to transparent, verifiable, and immutable transaction statistics, giving them full control over and visibility into transaction data. Ethereum users pay costs to utilize dApps. Transactions are sent through and obtained by Ethereum accounts [14]. To signal transactions, a sender spends Ether, the local cryptocurrency of Ethereum, as a value of processing the transaction at the community.

#### 3.2 Ethereum Smart Contract

The Ethereum blockchain is used to execute "smart contracts", which consist of code (functionality) and data (state) and are stored at specific addresses on the Ethereum network.

Smart contracts is a type of Ethereum account which have a balance and has the capability of sending payments over a network. They are not controlled by a user, instead they run as a code when deployed to the network. They can define rules as well as they can act as contracts. Smart contracts have the functionality of a regular contract. Operations with them are irreversible and cannot be reverted.

#### 3.3 Metamask

Metamask is a program that allows user to connect Ethereum blockchains using a cryptocurrency wallet. It gives users access to their Ethereum wallets through a mobile application. Metamask is also obtainable as a browser extension for Chrome, Firefox, etc. and can be downloaded from the respective web stores. Metamask also enables users to interact with DApps, such as decentralized exchanges, gaming platforms, and other applications.

#### 3.4 Ganache

Ganache is a platform that enables users to develop and deploy your apps a test it in a secure and deterministic way. It is based on Ethereum and corda. It allows you to perform all the thought processes of your application in deterministic environment.

#### How Blockchain works?

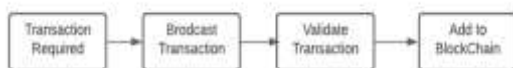


Fig 1. Blockchain Transaction Process

Ganache provides a graphical user interface that displays the current state of the blockchain, including accounts, transactions, and other relevant information. Developers can use this interface to create accounts, view balances, and interact with smart contracts.

### IV. METHODOLOGY

The main goal of implementing land registries using blockchain is to protect land transactions from attackers and simplify record keeping. The proposed solution also tracks double spends for scenarios involving multiple sales of the same land to different customers. With very little paperwork and record-keeping effort, less time is required to complete a land transaction.

#### Registration of users and property

- Register on the platform first. Clicking the submit button redirects the user to the login page.
- To login, user must provide their private key.
- To register a property, select the 'Land Registration' tab in the toolbar and enter all details related to the property and its owner. After the form is submitted, the government agency will review your application.

#### Validation from government authority

- At this stage, the government agency has the authority to verify the user's land information and approve or reject the user's application.
- Land registration requires the user to upload legal documents for the land so that the government and purchasers can verify it. If rejected, the user must submit a new app and other users may not be able to purchase it. And if approved, landowners will have the opportunity to sell their land.

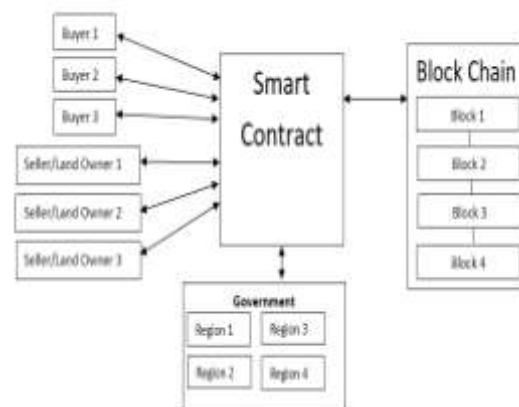
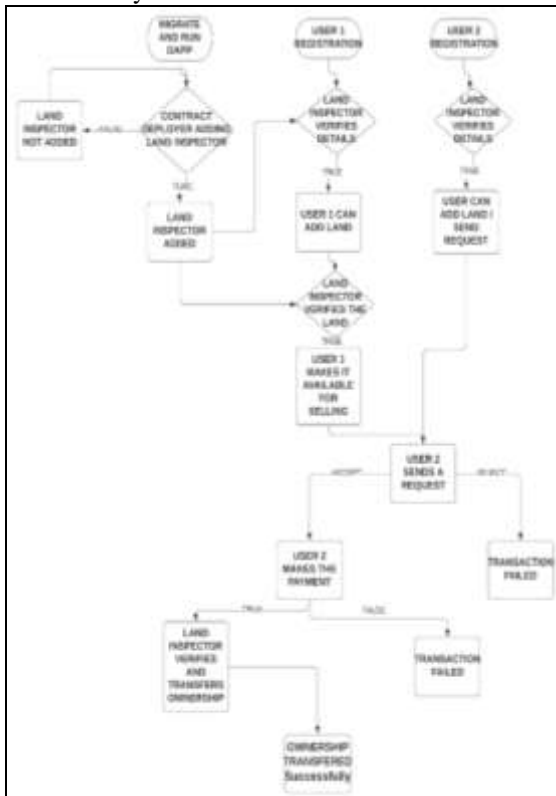


Fig 2. Smart Contract

### Transaction between both the parties

This step includes several steps. There are no intermediaries between them and no central authority is required to check the transaction progress. A land owner may sell the entire land without a partial transaction. The steps required are: -

- Landowners can make their land available to other users if approved by the government.
- When the land is available for purchase, the buyer goes to the Dashboard, searches for the property in the Available Properties section, and sends a purchase request to the land owner.
- Landowners plan whether to allow the purchase of land after reviewing buyer requests and communicating with them. You can accept or reject the request.
- The landlord verifies the requester's address, and if the address is correct, the seller accepts the request.
- If the request is approved, the buyer may purchase the property. If approved, the property amount will be deducted from the buyer's account and the money will be transferred to the land owner's account.
- You can view your profile and check your wallet. After a successful transaction, the ownership of the previous land owner is removed from the property inventory.



Flowchart 1: Process Flowchart

### V. RESULTS

The entire process is carried out in the form of a smart contract that guarantees immutability, security and digitization of the process. No one in the middle can tamper with the data and reliability is maintained throughout the process. There is no human error here. There will be less paper work and most importantly everything will be transparent. Chances of fraud are reduced. Public domains are available when land ownership is in doubt.

### VI. CONCLUSIONS

Land registration combined with blockchain technology could truly revolutionize governance. After identifying the necessary components, the work focused on creating a basic smart contract and kick-starting the land registration process. Any functionality required during the registration process must be implemented and tested in the Remix IDE. There is significant potential to further develop this project by developing suitable web applications and integrating them with smart contracts and Ethereum Metamask applications to make them more convenient and easier to use. The biggest drawback of this project is the offline verification of land information, and this process can be further improved by automating the land verification process and land renewal process.

Additional features such as land donation and land inheritance may be introduced in further studies. Additionally, the system relies heavily on government-held citizenship data, which could disrupt the process if the data cannot be traced. There are also some assumptions that the data about landowners are correct and true, so they are not confirmed.

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