

# **TOKENIZATION OF REAL ESTATE USING CRYPTOCURRENCY**

**MINOR PROJECT - 2 REPORT  
6TH SEMESTER (2020-2021)**



**JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY, NOIDA  
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## **PROBLEM STATEMENT**

Real estate has nearly always been considered a relatively safe investment. After all, whatever happens in the stock/coin market, people will always need a place to live and work. Yet, real estate transactions also tend to be some of the most complex and expensive, rendering real estate itself relatively illiquid. Below are some the problems identified:

- Growing black market in property dealings, due to which the government is not receiving proper taxes.
- Complete organization is designed with a manual work process, which leads to corruption.
- It requires third parties for the dealings.
- Transaction takes up a lot of time and effort for completion.
- Cost of transaction is high.
- Transparency is not available.
- No track of previous owners, which might lead to disputes.

### **Effect:**

- Record keeping and black market.

## **SOLUTION**

The aim of the project is to make an application dealing with real estate, using blockchain and its database that is run by many users on a decentralized network with trustful protocols thereby making such transactions secure and transparent.

## **ABSTRACT**

Real Estate is by far one of the most trusted investments that people have preferred, being a lucrative investment it provides a steady source of income in the form of lease and rents. Although there are numerous advantages, one of the key downsides of real estate investments is lack of liquidity. Thus, even though global real estate investments amount to about twice of the size of investments in stock markets, the number of investors in the real estate market is significantly lower. Blockchain technology has real potential in addressing the issues of liquidity and transparency, opening the market to even retail investors. Owing to the functionality and flexibility of creating Security Tokens, which are backed by real world assets, real estate can be made liquid with the help of Special Purpose Vehicles. Tokens of ERC 777 standard, which represent fractional ownership of the real estate can be purchased by an investor and these tokens can also be listed on secondary exchanges. The robustness of Smart Contracts can enable the efficient transfer of tokens and seamless distribution of earnings amongst the investors. This work describes Ethereum blockchain-based solutions to make the existing blockchain based solutions to make existing Real Estate investment systems much more efficient using Cryptocurrency.

# CRITICAL ANALYSIS OF RESEARCH PAPERS

Blockchain technology enables broad cost saving potential, opening new avenues for growth by mitigating legacy requirements for intermediated trade-processing thanks to its capacity to establish a single source of truth among untrusting parties.

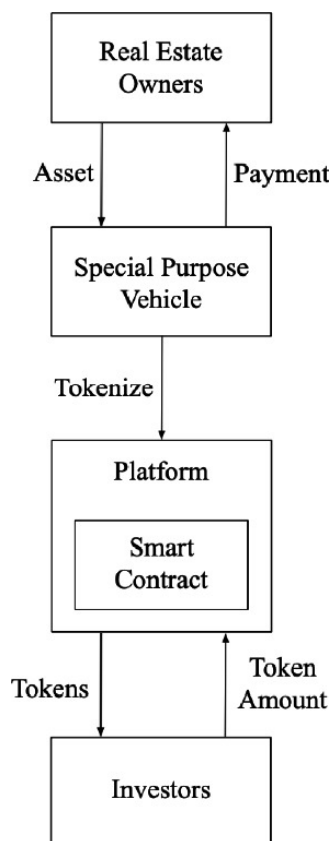
Blockchain and cryptocurrency are seen as a means towards revolutionising modern real estate transactions. Tokenization is an emerging concept in the financial industries by which the exchange of assets is mediated through the use of public blockchain infrastructure.

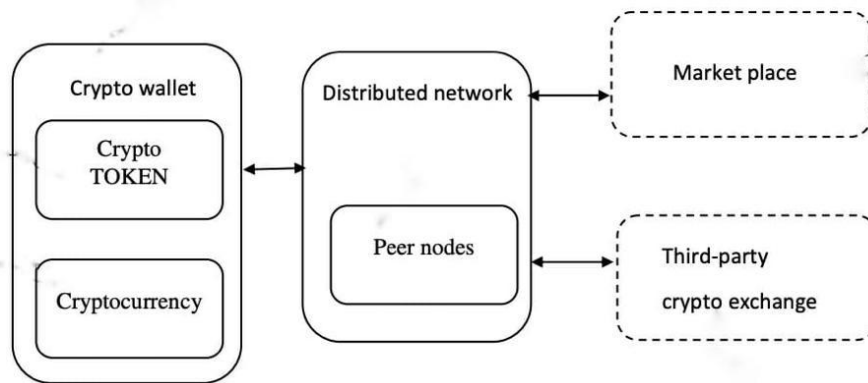
Asset representation methodologies range over a broad array of practices, with the shared aim of representing ownership and the transfer rights of a digital asset, redeemable for the value of the underlying asset through trade on any publicly available exchange on which the digital asset is listed. For the purpose of clarity we follow the general discourse, referring to tokenized assets as digital assets, while blockchain native assets are referred to as virtual assets or cryptocurrencies.

Tokenization is generally defined as the process of representing a given financial asset as a unit on the distributed ledger—a representation maintained by the individual nodes running versions of the blockchain client software. By representing a given asset as a transferable unit on account of blockchain, we can leverage the technical features of the underlying blockchain technology as well cryptocurrency to obtain various benefits:

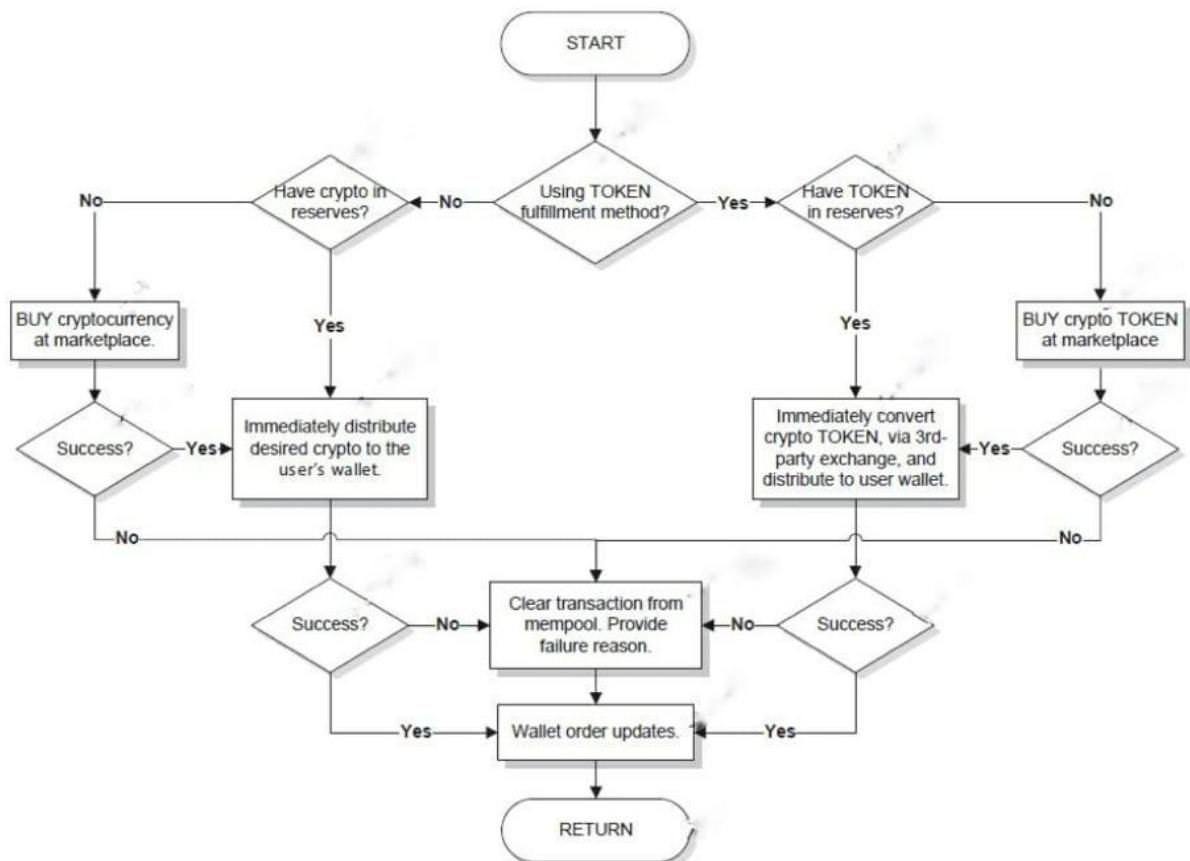
- As the blockchain system is decentralised, the real estate deals will be done with assured security.
- There'll be huge reductions on the cost of transactions as well as time involved for the transaction.
- The Ethereum blockchain provides a suitable foundation for supporting our needs due to its smart contract platform and its broadly applicable set of features and ecosystem-wide consolidation around recognized development standards. This enables seamless interoperability between the host organization and external stakeholders.
- Transaction on Ethereum mainly consists of five elements, namely, From (Sender), To (Receiver), Gas(fees to be paid for performing operations), Data/Input (message), and Value (amount transferred in wallet). A consensus Algorithm is a procedure through which all the peers of the Blockchain network reach a common agreement about the present state of the distributed ledger. Consensus Algorithms hence achieve reliability in the Blockchain network and establish trust between unknown peers in a distributed computing environment. Proof of Work (POW) is a consensus algorithm that aims at solving a costly and time-consuming mathematical puzzle for a new block to be added to the blockchain and at the same time easy for the other nodes to verify.

- Smart Contracts are portions of codes where logic is implemented. Ethereum provides a Turing complete programming language e.g. Solidity that allows creating programs and running them on the blockchain. When users send the transactions, the portion of code is executed. The execution of a smart contract occurs when a miner includes a transaction in a block and it is re-run by every recipient upon arrival. These are open to all other users and once the transactions are completed, they can't be reversed. In this way the merits of blockchain of immutability and cryptographically provided security are further strengthened by the efficacy of smart contracts.
- Cryptocurrency involves cryptography, i.e. the transactions are encrypted at the sender's end and decrypted at the receiver's end, making the transactions safe from third party attacks and mutability vulnerabilities.
- Cryptocurrency easily verifies the transfer of funds using the Hashing Algorithm.

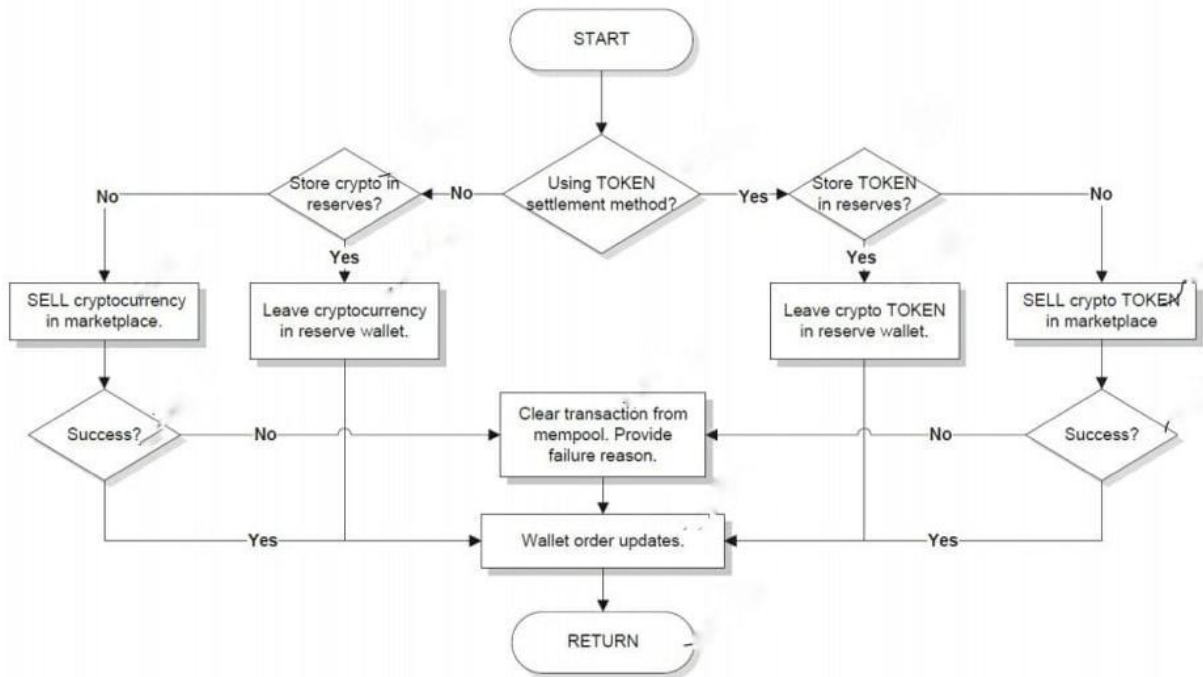




## BUYER'S END



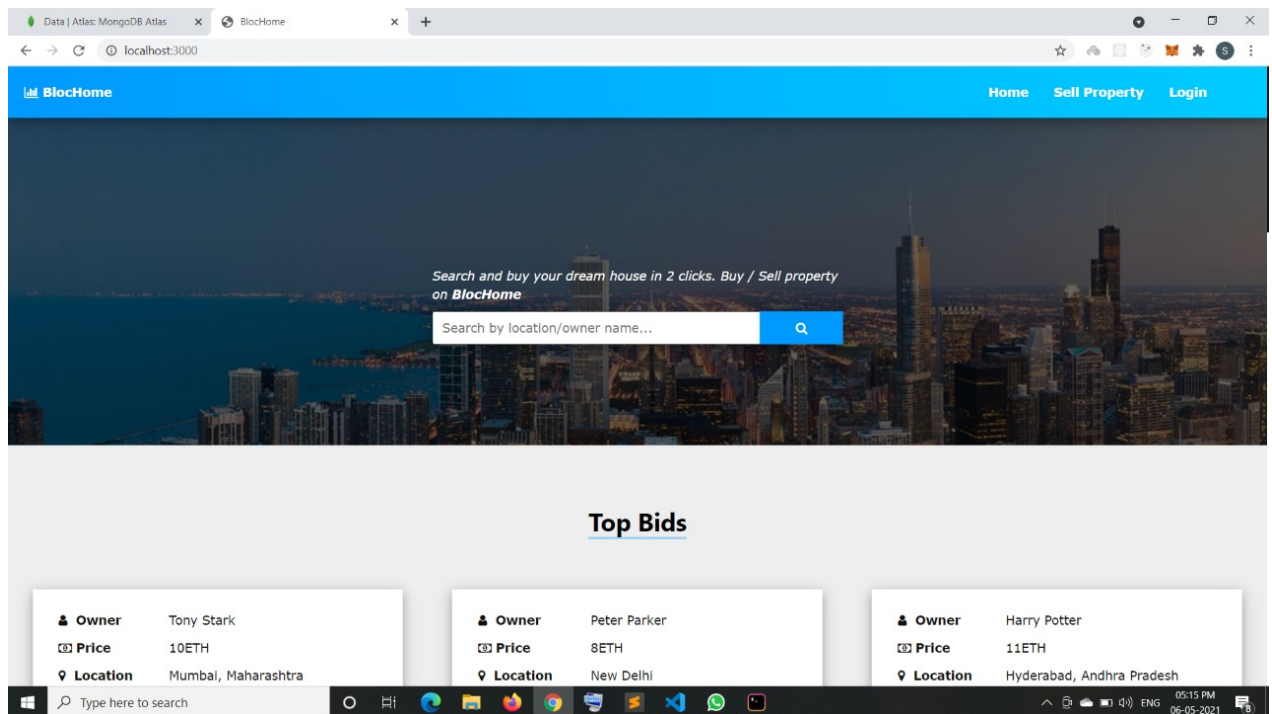
## SELLER'S END



# PROJECT DESIGN

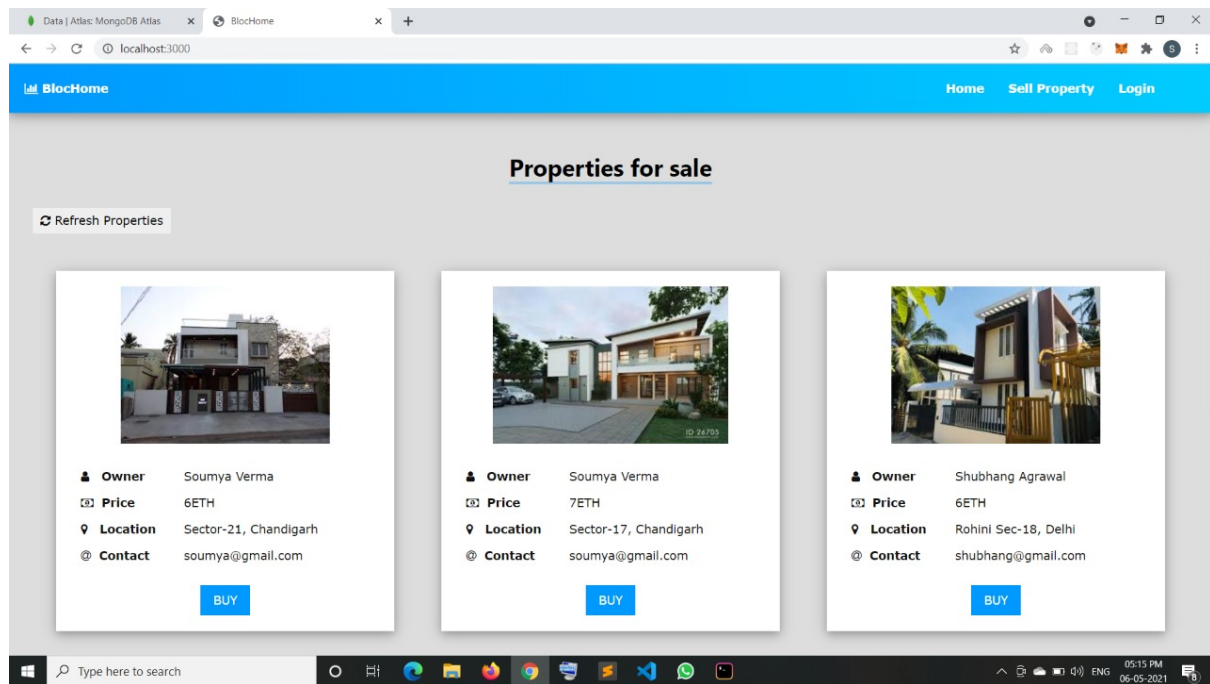
The blockchain embedded website, BlocHome takes us to the Homepage displaying the top bidded properties, login and features to sell property. The purpose of the website is to facilitate end-to-end secure trade between the buyers and sellers. The Blockchain technology has been used to create a decentralised marketplace in order to ensure security of transactions.

The Search option allows the users to search properties on the basis of the property owner's name as well as on the basis of location wherein they want to buy a property.

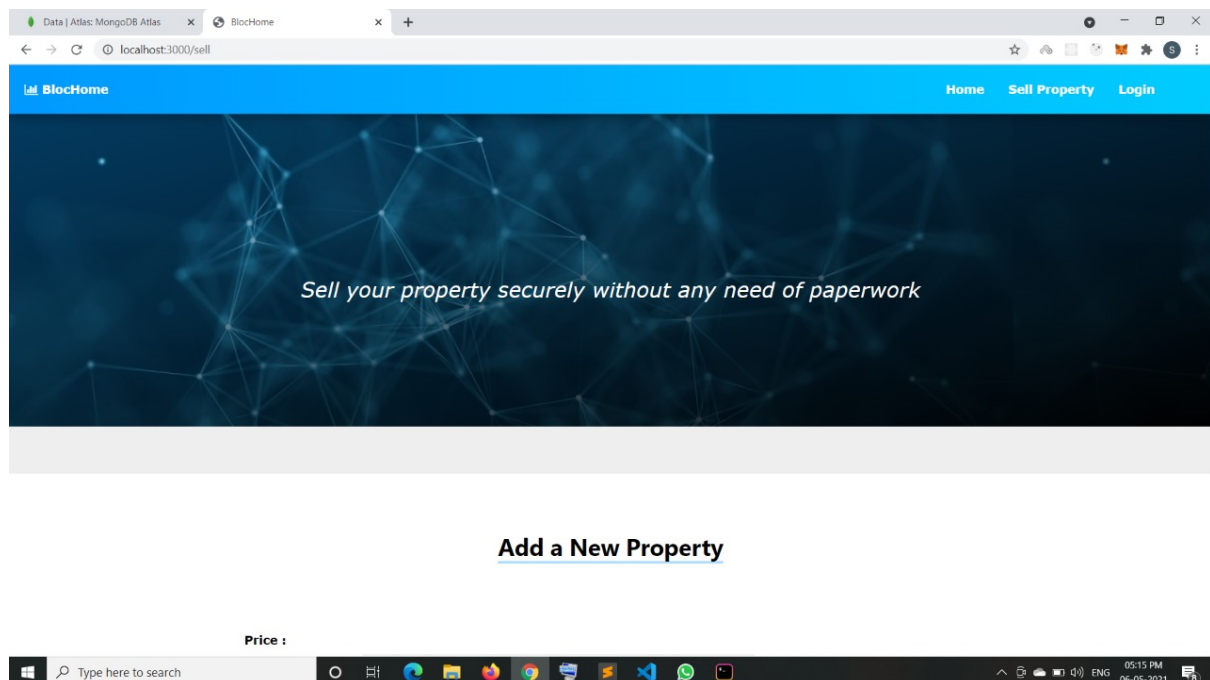




The viewers can view all the properties that have been added to the BlocHome network's marketplace.



There are features to add new properties to the blockchain network.



Addition of a new property will require details like price, location, seller's wallet address and the image of the property.

The screenshot shows a web browser window with the URL `localhost:3000/sell`. The page has a blue header with the logo 'BlochHome' and navigation links 'Home', 'Sell Property', and 'Login'. The main content area is titled 'Add a New Property' and contains a form with the following fields:

- Price :** A text input field.
- Location :** A text input field.
- Wallet Address :** A text input field.
- Add Image :** A file upload section with a 'Choose File' button and the text 'No file chosen'.

At the bottom of the form is a blue button labeled 'Add'. The Windows taskbar at the bottom shows the time as 05:16 PM on 06-05-2021.

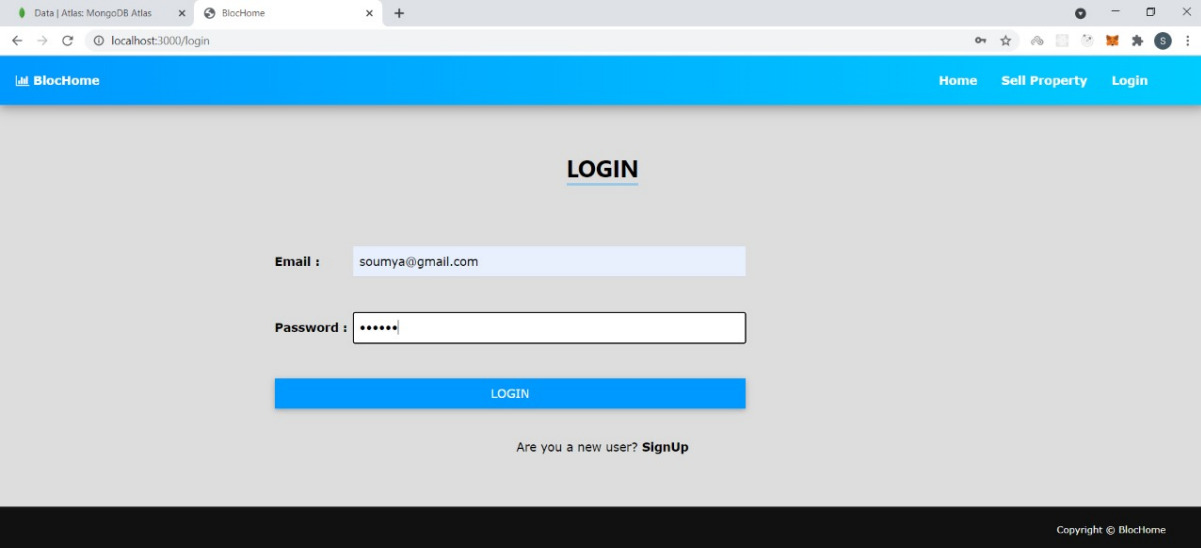
New users can signup to set up a new account using name, email address, password and Wallet Address.

The screenshot shows a web browser window with the URL `localhost:3000/signup`. The page has a blue header with the logo 'BlochHome' and navigation links 'Home', 'Sell Property', and 'Login'. The main content area is titled 'SIGNUP' and contains a form with the following fields:

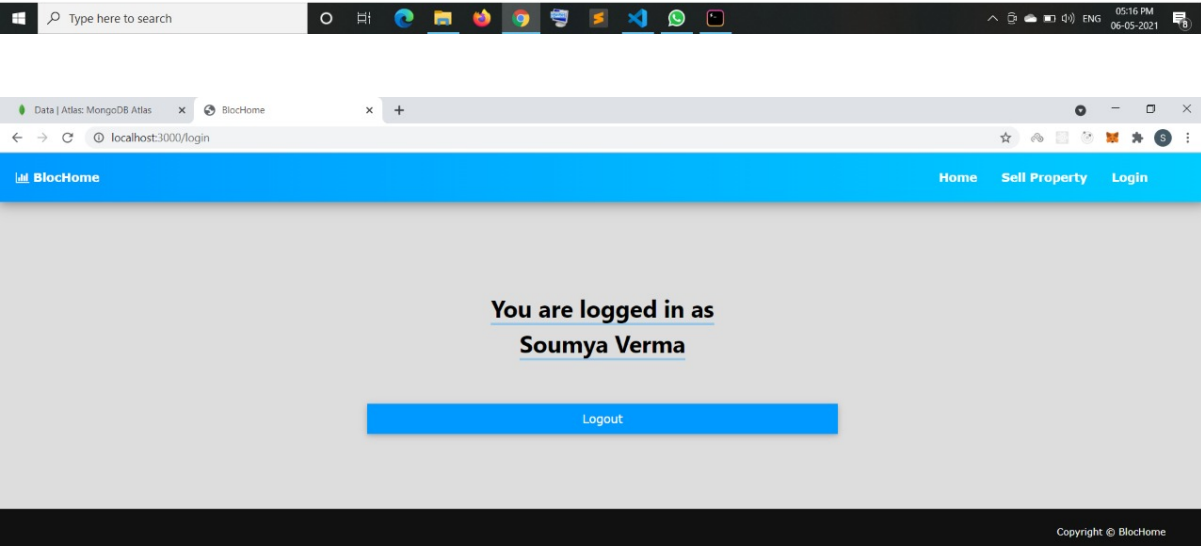
- Name :** A text input field containing 'Soumya Verma'.
- Email :** A text input field containing 'soumya@gmail.com'.
- Password :** A text input field.
- Wallet Address :** A text input field.

At the bottom of the form is a blue button labeled 'SIGNUP'. The Windows taskbar at the bottom shows the time as 05:16 PM on 06-05-2021.

The existing users can simply login and logout in order to access their accounts and trade.

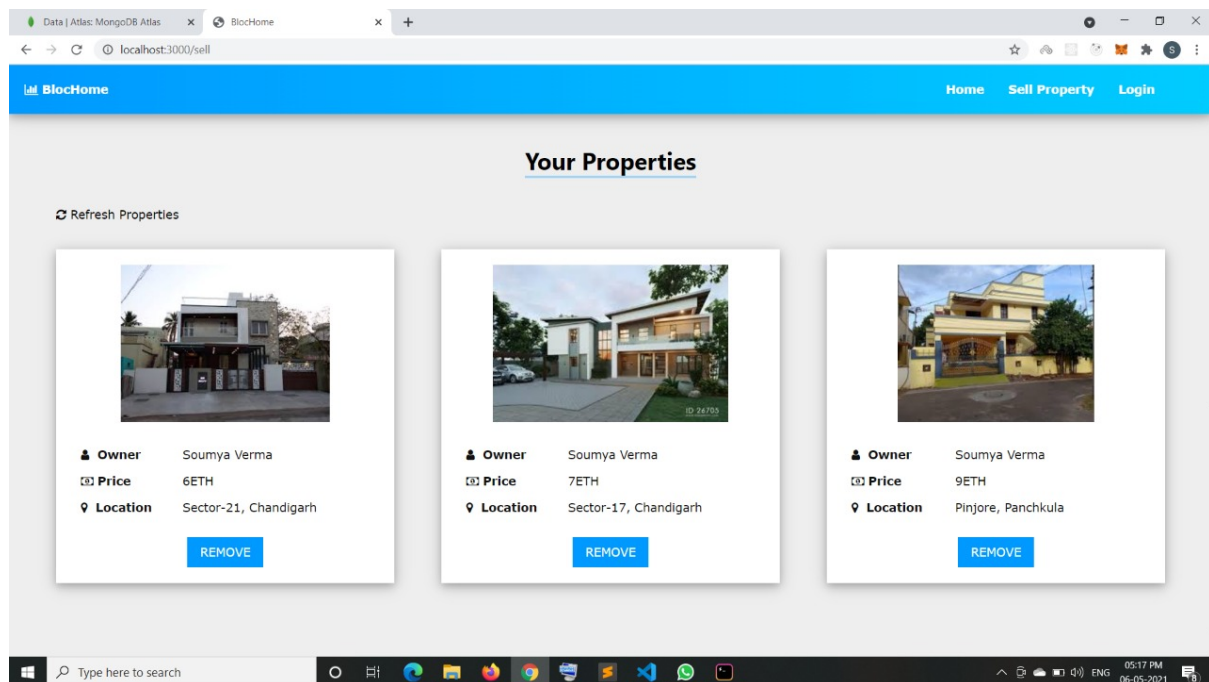


The screenshot shows a web browser window with the URL `localhost:3000/login`. The page has a blue header with the logo "BlochHome" and navigation links "Home", "Sell Property", and "Login". The main content area is titled "LOGIN" and contains a form with two input fields: "Email :" with the value "sourmya@gmail.com" and "Password :" with masked characters "\*\*\*\*\*". Below the password field is a blue "LOGIN" button. At the bottom of the form, it says "Are you a new user? [SignUp](#)". The footer is black with the text "Copyright © BlochHome".



The screenshot shows the same web browser window after a successful login. The page displays "You are logged in as [Soumya Verma](#)". Below this text is a blue "Logout" button. The header and footer remain the same as in the previous screenshot.

The logged in users can preview their properties.

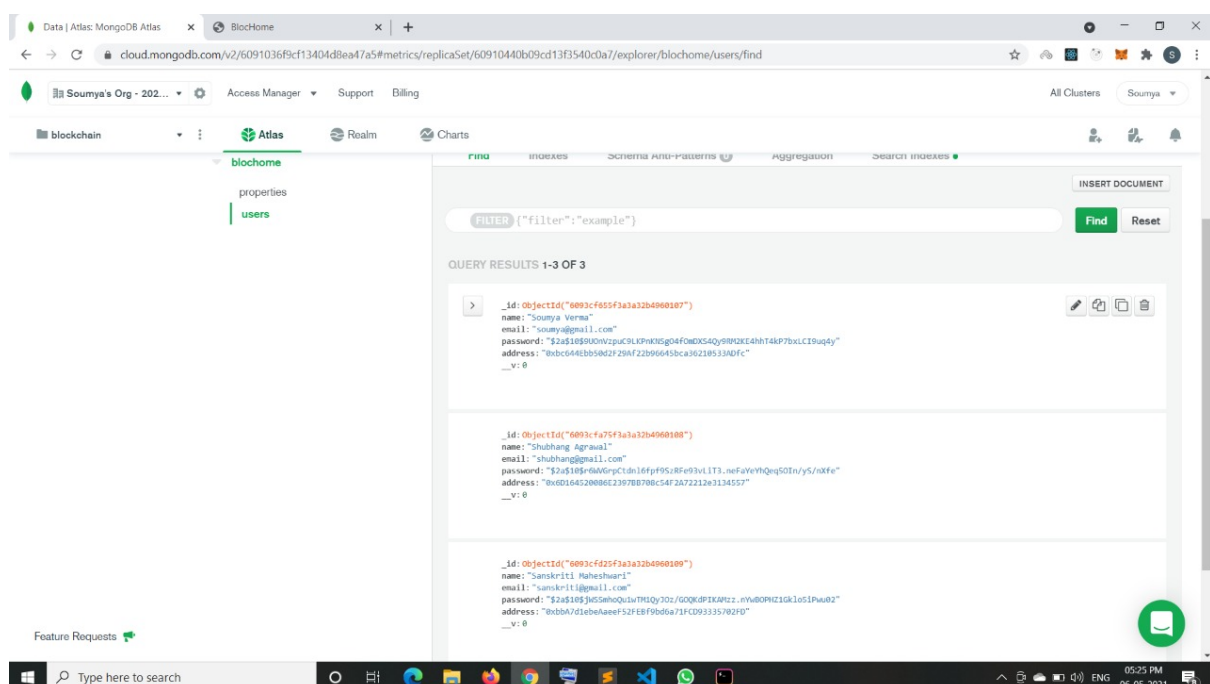
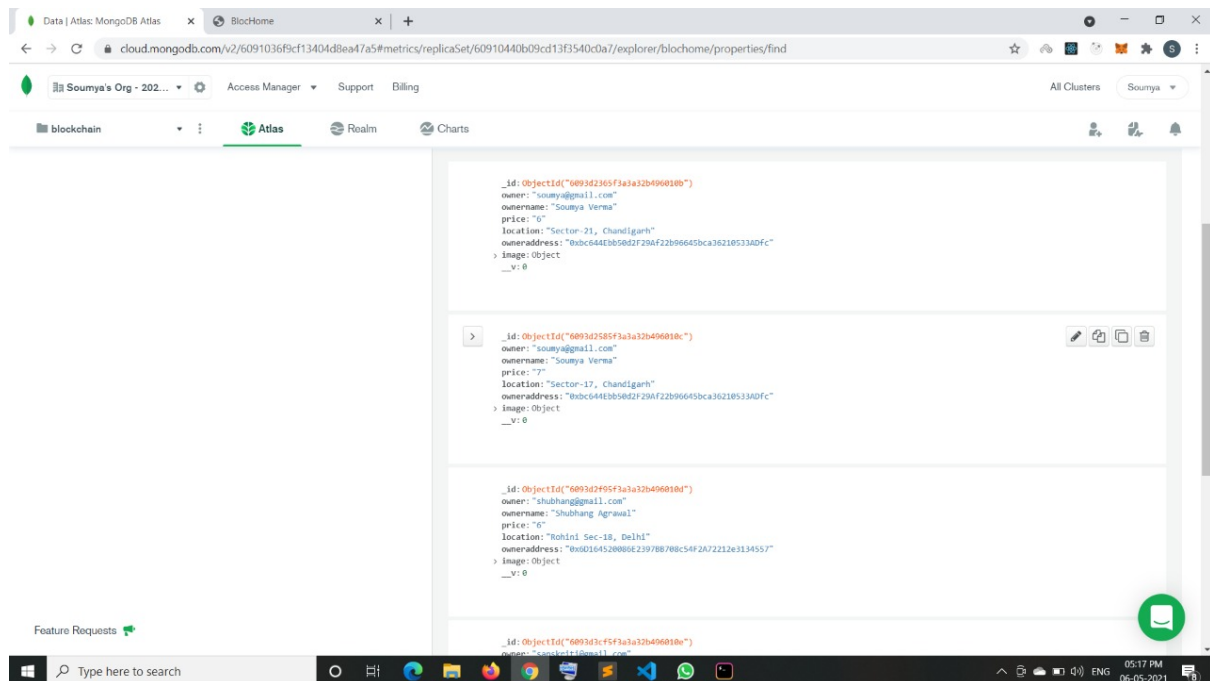


Express is a minimal and flexible Node.js web application framework that provides a robust set of features to develop web and mobile applications. It has been used in the backend development of the BlochHome web application.. It facilitates the rapid development of Node based Web applications. Following are some of the core features of Express framework :

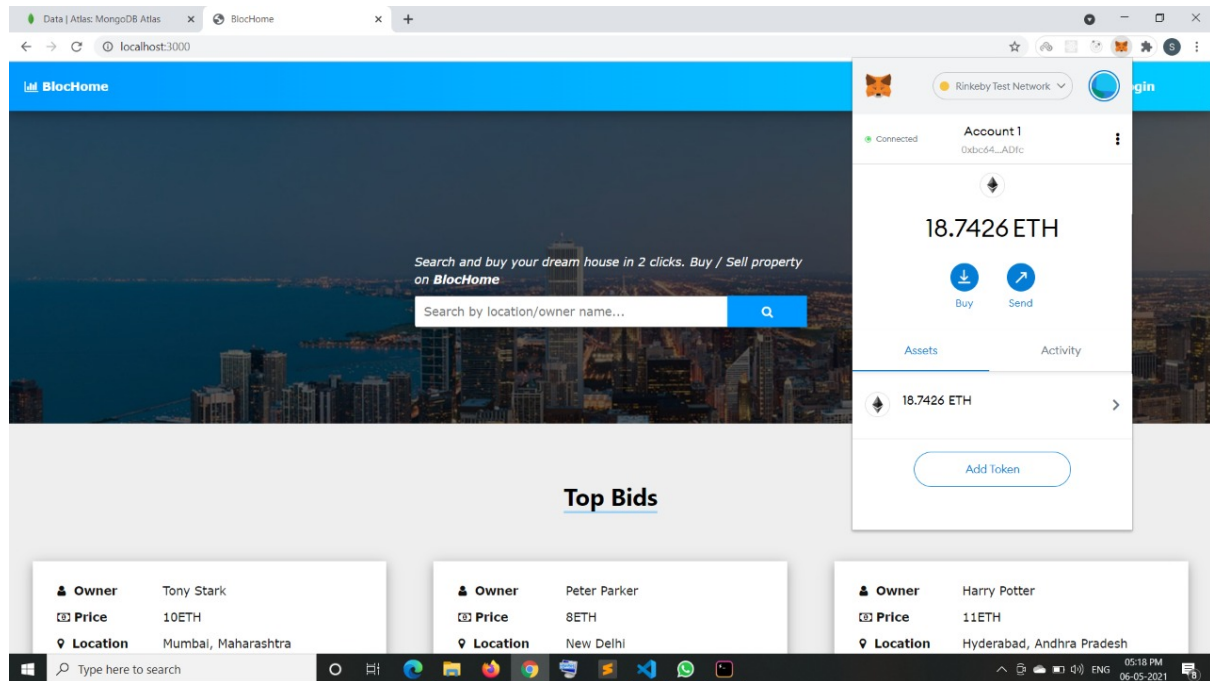
- Allows to set up middlewares to respond to HTTP Requests.
- Defines a routing table which is used to perform different actions based on HTTP Method and URL.
- Allows to dynamically render HTML Pages based on passing arguments to templates.

The core of MongoDB Cloud is MongoDB Atlas, a fully managed cloud database for modern applications. Atlas is the best way to run MongoDB, the leading modern database. MongoDB's document model is the fastest way to innovate, bringing flexibility and ease of use to the database.

Atlas is available on 70+ regions across AWS, GCP, and Azure. Best-in-class automation and proven practices guarantee availability, scalability, and compliance with the most demanding data security and privacy standards.



Metamask is used to buy, sell, swap and display the transactions in blockchain based applications. Available as a browser extension and as a mobile app, MetaMask equips you with a key vault, secure login, token wallet, and token exchange—everything you need to manage your digital assets. We're using the Metmask extension of the browser to display the ethereum balance in the user's account.



# TECHNOLOGIES USED

## Programming Languages:

- HTML
- CSS
- JavaScript
- Solidity - Solidity is an object-oriented programming language for writing smart contracts. It is used for implementing smart contracts on various blockchain platforms, most notably, Ethereum.

## Platforms/Frameworks:

- ExpressJs - used for traditional web sites and back-end API services.
- JavaScript - JavaScript library for building user interfaces or UI components.
- Ethereum - Ethereum is the community-run technology powering the cryptocurrency, ether (ETH) and thousands of decentralized applications.

## Tools:

- VSCode - Visual Studio Code is a source-code editor. We are using this IDE for writing and debugging our Flutter Application.
- Truffle - Truffle is a tool designed to make smart contract development streamlined.
- Ganache - Quickly fire up a personal Ethereum blockchain which you can use to run tests, execute commands, and inspect state while controlling how the chain operates.
- MetaMask - extension for the browser which makes it easy for web applications to communicate with the Ethereum blockchain. In other words, MetaMask is a wallet for your browser.
- Remix - Ethereum IDE-Remix is a Solidity IDE that's used to write, compile and debug Solidity code. Solidity is a high-level, contract-oriented programming language for writing smart contracts. It was influenced by popular languages such as C++, Python and JavaScript.
- MongoDB Cloud - The core of MongoDB Cloud is MongoDB Atlas, a fully managed cloud database for modern applications. Atlas is the best way to run MongoDB, the leading modern database. MongoDB's document model is the fastest way to innovate, bringing flexibility and ease of use to the database.

## REFERENCES

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