

Blockchain based Land Registry Management System

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3 June 2024

Abstract

Land registry management involves storing and managing data related to land ownership transfers, typically using centralized databases maintained by government agencies. The conventional system faces issues such as inefficiency, inaccuracies, and susceptibility to fraud. Blockchain technology offers a transformative solution with its immutable, transparent, and decentralized nature. The proposed system uses non-fungible tokens (NFTs) to represent land assets, providing unique and irreplaceable digital representations for ownership transfer. Integrating NFTs into the land registry system enhances security and efficiency, addressing the challenges of traditional land registry administration.

Technology Used

- Javascript(to develop UI)
- Metamask(cryptocurrency wallet and gateway to blockchain applications)
- Ethereum (blockchain platform for creation of dapps)
- Hardhat (development environment for Ethereum to compile, deploy and test smart contracts)
- Ipfs (decentralised database)
- Solidity (to write smart contracts)

Challenges in the existing land registry process

- The Involvement of middlemen and brokers
- The increasing number of fraud cases
- Time Delays
- Human error/intervention

Why is Blockchain Land Registry Platform a right solution?

- Accelerating the Process
- Reducing Fraud Cases
- Bringing Transparency using Smart Contracts

Input and Output

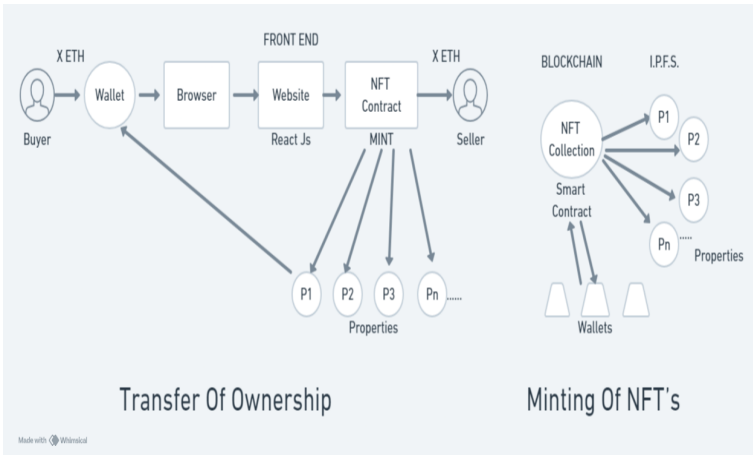
Input -

- Metadata related to land
- Current owner
- Pricing Details
- Request to buy a land

Output -

- Successfully minting an NFT of the property.
- Successful transfer of ownership of land requested.

Architecture Diagram



Property Registration

The screenshot displays a web browser window with the address bar showing 'localhost:3000/register'. The browser's address bar also includes navigation buttons (back, forward, refresh) and a search bar. The page content is a property registration form titled 'Store to IPFS (Add Property)'. The form includes the following fields:

- Name:
- Address:
- Description:
- Image URL:
- ID:
- Purchase Price:
- Type of Residence:
- Bed Rooms:

The browser window also shows a taskbar at the bottom with system icons, including a clock showing 20:25 on 02-06-2024.


Available Properties

Milkow


localhost:3000

YouTube Maps News Gmail


Available Land




67 ETH
3 bds | 3 ba | 456 sqft
saint maria




45 ETH
34 bds | 56 ba | 67 sqft
Bilhaur



899 ETH
3 bds | 3 ba | 456 sqft
kanpur



789 ETH
3 bds | 3 ba | 456 sqft
prayag



789 ETH
3 bds | 3 ba | 456 sqft
saint maria


1 of 4
requires writing to be acknowledged

Hardhat Node

Buyer → One/717...F0512


http://localhost:3000

One/717...F0512 : DEPOSIT EARNST

 5 ETH
\$19,020.75

DETAILS HEX

Estimated fee

 \$0.11

0.00002859 ETH

Max fee: 0.00002859 ETH

Total

\$19,020.86

5.00002859 ETH

Amount + gas fee Max amount: 5.00002859 ETH

Reject Confirm

39°C
Haze

Search

ENG
IN

20:31
02-06-2024

The image shows a web browser window with the address bar displaying 'localhost:3000'. The page content is a real estate listing titled 'Available Land'. The main listing is for '123k1m', which includes '3 bds | 3 ba | 456 sqft prayag'. Below the title is a photograph of a serene lake scene with trees reflecting in the water. To the right of the photo are two buttons: a blue 'Buy' button and a white 'Contact agent' button. Below these buttons is an 'Overview' section with the name 'lamin'. Further down is a 'Facts and features' section with two bullet points: 'Purchase Price : 789' and 'Type of Residence : none'. On the right side of the browser window, a MetaMask wallet interface is open, showing the 'Buyer' profile and a transaction confirmation for 'One717_F0512 : DEPOSIT EARNEST'. The transaction amount is '4 ETH' (approximately \$15,188.32). The interface includes a 'Details' tab, a table showing the 'Estimated fee' (0.00002709 ETH) and 'Total' (4.00002709 ETH), and two buttons at the bottom: 'Reject' and 'Confirm'. The system tray at the bottom of the screen shows the date as '02-05-2024' and the time as '20:46'.

Approval from Inspector

The screenshot displays a web browser window with a single tab titled 'Miklow'. The address bar shows 'localhost:3000'. The page content is titled 'Available Land' and features a property listing for 'plioik'. The listing includes a placeholder image of a tropical beach, the address 'saint maria', and a price of '789 ETH'. Two buttons are visible: 'Approve Inspection' (highlighted in blue) and 'Contact agent'. Below the listing, there is an 'Overview' section with the text 'xyz' and a 'Facts and features' section listing 'Purchase Price : 789' and 'Type of Residence : mansion'. At the bottom of the page, there are two smaller property listings: 'prayer' and 'saint maria', both with '3 bds | 3 ba | 456 sqft'.

Overlaid on the right side of the browser window is a MetaMask transaction confirmation window. It shows the transaction URL 'https://localhost:3000', the transaction ID '0xe7102_F0512', and the status 'UPDATE INSPECTION STATUS'. The estimated fee is '0.00004975 ETH' with a max fee of '0.00004975 ETH'. The total amount is '0.00004975 ETH' with a max amount of '0.00004975 ETH'. The window has 'Reject' and 'Confirm' buttons.

Windows taskbar at the bottom shows the system clock as 20:38 on 02-06-2024, with the temperature at 39°C and weather as 'Haze'.

Approval from Seller

The screenshot shows a web browser window with the address bar displaying 'localhost:3000'. The page content includes a header 'Available Land', a main listing for 'plioik' with details '3 bds | 3 ba | 456 sqft' and 'saint maria', a price of '789 ETH', and buttons for 'Approve & Sell' and 'Contact agent'. Below the main listing is an 'Overview' section with the text 'xyz' and a 'Facts and features' section with two bullet points: 'Purchase Price : 789' and 'Type of Residence : mansion'. A MetaMask transaction confirmation overlay is visible on the right side of the browser window. The overlay shows the transaction details for 'Oxe7717...FO...' on the 'Hardhat Node' network, with the URL 'https://localhost:3000' and the transaction 'Oxe7717...F0512 : APPROVE SALE'. The estimated fee is '0.00004616 ETH' and the total amount is '0.00004616 ETH'. The overlay also includes 'Reject' and 'Confirm' buttons.

Available Land

plioik
3 bds | 3 ba | 456 sqft
saint maria
789 ETH
Approve & Sell Contact agent

Overview
xyz

Facts and features

- Purchase Price : 789
- Type of Residence : mansion

MetaMask

Hardhat Node

Seller → Oxe7717...FO...

https://localhost:3000

Oxe7717...F0512 : APPROVE SALE

Estimated fee **0.00004616 ETH**
Max fee: 0.00004616 ETH

Total **0.00004616 ETH**
Amount + gas fee Max amount: 0.00004616 ETH

Reject Confirm


Successful ownership transfer

Milow x +

localhost:3000

YouTube Maps News Gmail

Available Land



plioik
3 bds | 3 ba | 456 sqft
saint maria

789 ETH

Owned by 0xf39F...2266

Overview
xyz

Facts and features

- Purchase Price : 789
- Type of Residence : mansion
- Bed Rooms : 3

3 bds | 3 ba | 456 sqft
prayerg

3 bds | 3 ba | 456 sqft
saint maria

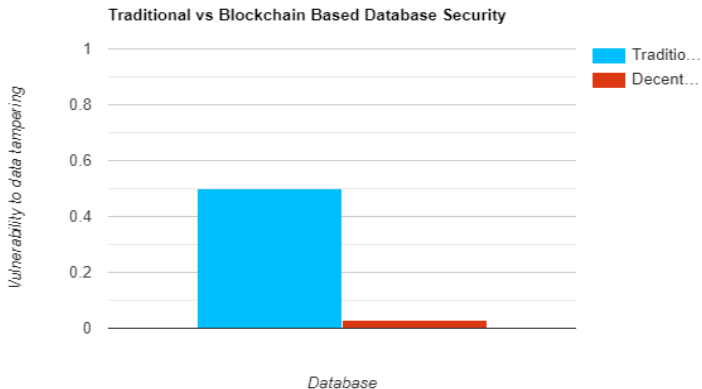
37°C Haze

Search

ENG IN

20:43 02-06-2024

Observation



Conclusion Of the Project

- Improved Transparency
- Efficient Land Transactions
- Reduced Fraud
- Accurate Land Records
- Ease of Access
- Cost Saving

Future Work

- Deployment on mainnet or a private network
- Ownership transfer feature for fractions of a property, enabling multiple owners for a single property.
- Side chaining for scalability.