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Decentralized Application Using Blockchain for Land Registration

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Abstract :

Blockchain technology is being adopted across a broad variety of sectors, with consequences in practically every field of law. Despite the real estate industry's aversion to adopting new technological advances in the past, there are compelling reasons to employ blockchain in real estate transactions and property management.

One of the most significant advantages of blockchain technology in real estate transactions is the ability to create a more secure ledger system for positions across the capital stack. Tokenization is a more efficient way of trading and tracking interests. This will almost certainly lead to improved connection, single-platform integration, and shorter transaction times. Because hackers would have to spend a large amount of time and money to successfully tamper with the data on a blockchain, it can prevent fraud and virtually totally eliminate it.

There is currently no centralised system for government title certification, and each county and town has its own title registration system and recording offices. Parties must manually and precisely document every property transfer, mortgage, and encumbrance in these systems. Fraud and mismanagement are also possible with paper registrations. Using an immutable blockchain ledger, on the other hand, once accurate transaction data is entered into the blockchain, it may be updated in real time and continually preserved. In a blockchain land registry, any change in property ownership would be recorded in a block with a timestamp.

Introduction

Blockchain, for example, can simplify property management by expediting rental collections and payments, thanks to secure data sharing and smart contracts. By permitting specific activities, such as the release of funds when certain contractual obligations are met, blockchain technology combined with smart contracts may improve transaction efficiency. Smart contract technology can also be used to sign leases and pay rent, with payments and renewals being automated.

Furthermore, blockchain is projected to boost real estate liquidity, which has traditionally been an illiquid asset. Real estate investors would be able to quickly and efficiently sell their commercial real estate positions on the open market.The elimination of the illiquidity discount, which is believed to be as high as 30%, will undoubtedly raise prices. For investors who want to invest directly in real estate, the entry barriers are expected to be reduced as well. Due to greater fractionalization, investors might, for example, invest on a smaller scale and in a far more efficient and cost-effective manner.

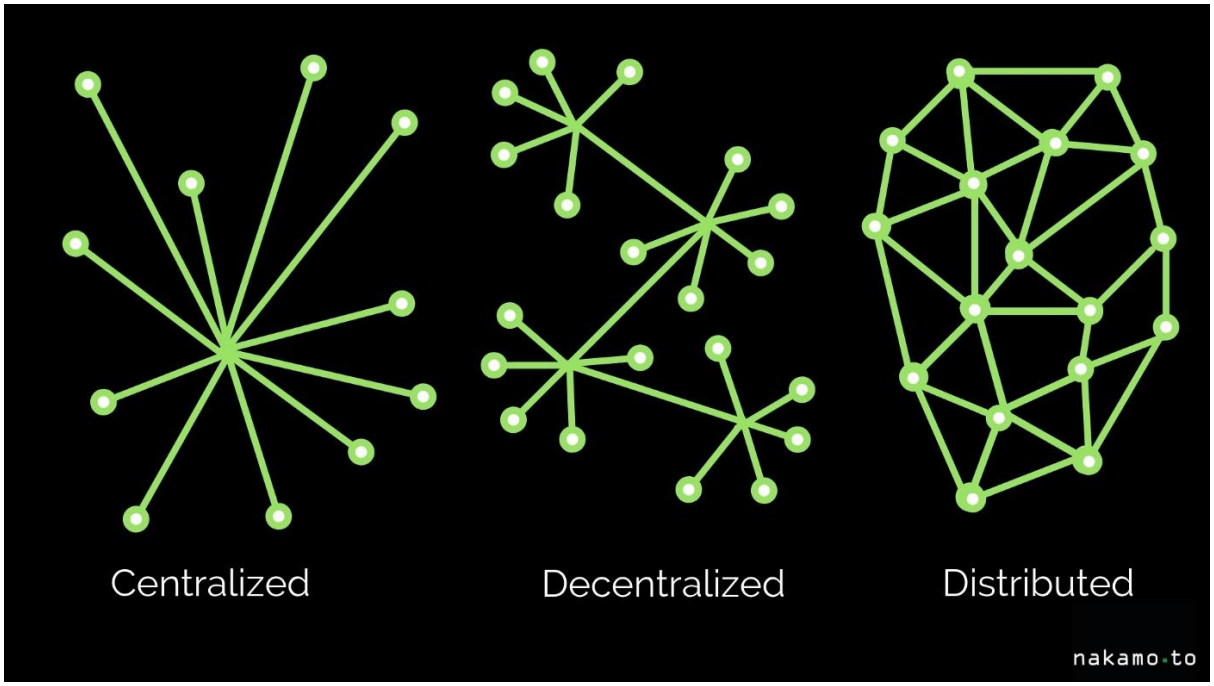
Blockchain would essentially eradicate title fraud in the case of land registration and conveyances.Because blockchain ledgers are immutable and updated in real time, bad information has a much harder time disrupting the chain, and any tampering with recorded data is easily identifiable.

Use cases for blockchain in real estate

The real estate business and blockchain are likely to have a long-term and wide-ranging impact. It is possible to comprehend the unlimited potential use cases by learning about blockchain. Blockchain is a type of database that is based on a digital distributed ledger. Its most distinguishing feature is that it is immutable, which means that data recorded on the ledger cannot be erased, updated, or altered. Any third-party mediator in the real estate business could be replaced by blockchain technology. The use of blockchain to tokenize equity rights in real estate was an early application. Real Estate and Blockchain.

Blockchain technology is being utilised across a wide range of sectors, with consequences in practically every field of law.

Despite the real estate industry's aversion to adopting new technologies in the past, there are compelling reasons to employ blockchain in real estate transactions and property management. The ownership interest registries of each company up and down the capital stack of any real estate project could be replaced by a blockchain-based ledger system with tokenization of equity.



- Centralization and decentralization refer to levels of **control**.

Control is exercised by a single entity in a centralised system (a person or an enterprise, for example). In a decentralised system, there is no single controlling entity. Control is instead dispersed among several different entities.

- Distribution refers to differences of location.

All of the system's components are physically located in the same area in a non-distributed (or co-located) system. Different components of a distributed system are located in different locations.

Bitcoin is a blockchain system that cannot be altered by any one entity (decentralized). It also runs as a peer-to-peer network of independent computers spread across the globe (distributed).

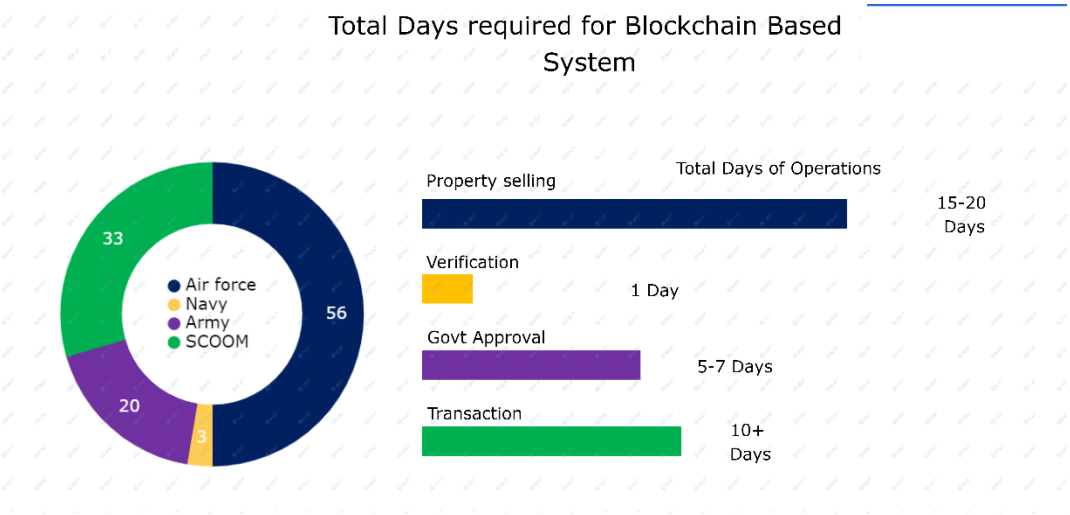
We can now make more sense of debates over how truly decentralised or distributed certain blockchains are.

Private blockchains, in contrast to public blockchains, are often managed by a single organisation, such as an enterprise. Some argue that private blockchains should not be considered blockchains because of this (i.e., they are centralized).

Decentralized blockchains that use a mining consensus technique like proof of work may lose their decentralisation if one miner (or group of miners) becomes more powerful than the rest, posing a 51 percent attack threat.

What are the challenges of blockchain?

In some instances, valuation inefficiencies may benefit the real estate market. Because price may be established in real time when property ownership is tokenized, the market may indicate higher fluctuation in values. It might be claimed that the illiquid nature of real estate assets and the appraisal process have maintained real estate values more constant than other asset categories. Furthermore, several covenants and responsibilities inherent in governing agreements cannot be encoded on a blockchain. The advanced compliance methods required to enforce unique covenants and rights are not yet available in smart contract technology. As a result, the only clauses in contracts that might be enforced using blockchain technology are those that can be objectively proved to have been infringed.



Land Registration Process

New Step 1: The land owner logs into the blockchain-enabled web portal to confirm their identification and guarantee the deal goes smoothly.

New Step 2: Seller directly appoints a real estate agent using the web/app. The agent accepts the offer. A digital contract is created and signed by both parties.

New Step 3: Buyer can check the property ownership via the web/app, avoiding the need to contact the government authority, thus saving time.

New Step 4: Buyer can inspect the land by actual visit.

New Step 5: The registered evaluator can save time by adding the property appraisal to the blockchain for the bank to review and approve. The buyer can be confident that the sale will proceed without any hurdles.

New Step 6: The agent and the bank can directly fetch this information from the blockchain. Property inspection reports can be attached to the web/app.

New Step 7: Blockchain based smart contracts execute the sale and generate a digital contract using the sale information (e.g. buyers details, sale price, agent name, date of sale etc.) and permanently store it on the blockchain. All authorized parties have access to the contract.

New Step 8: The Certificate of Ownership request along with the required documents are available in the web/app. The government authority can verify the status and issue the Certificate of Ownership.

New Step 9: Stamp duty and other charges/taxes are calculated automatically in the web/app. The Certificate of Ownership is created and registered on the blockchain.

Land Registry blockchain will comprise the following functionalities:

1. Register and authenticate actors to the network - Buyer, Seller, Buyers Bank, Sellers Bank, Real Estate Agent, Government Department, Registered Evaluator/Surveyor.
2. Appoint a real estate agent to manage the sale.
3. Register a property for sale.
4. Validate the sellers ownership of the property.
5. Buyers request loan pre approval from their bank.
6. Contract for executing property sale and transfer of ownership.
7. Record property inspection reports including photos and videos.
8. Process payment to the sellers.
9. Process payment to the real estate agent.
10. Record executed sale contract.
11. Process transfer of ownership.
12. Compute stamp duty and other charges/taxes.

13. Record new ownership details with the government authority.

Future Scope

- This system can be implemented as an android as well as ios application in future.
- Biding system can be implemented while buying to provide equal opportunities to buyer and maximum profit to seller.
- Bank can upload the loan agreement on the web/app and digitally signs it and allows access only to the buyer.
- The functionality that enables the buyer digitally signs the loan documents and the bank can process the agents down payment via the web/app.

Results

Blockchain improves property registration process and eliminates delays :

1. This decentralised system has reducedprocessing time from months to few days.
2. Using this web app paperwork and postage eliminated from the purchase process.
3. Using this web app (Online blockchain platform) Fraud rate has been dropped down by 70%-80% because the buyer receives a pending property title, hence the property cannot be resold.
4. Chance of property title not being issued reduces significantly because all documents required by law are added to the blockchain system using this web app.
5. This system reduces manual intervention and realizing real-time property title assignment.
6. Smart contract is the key feature of system which ensures high level of security in the property transaction process.

Conclusion

This project focused on the construction and deployment of fundamental smart contracts for the Land Registration procedure. On the Remix IDE, all of the functionalities deemed to be necessary in the land registration process have been built and tested. This idea could be further developed by building an appropriate web application and combining it with the smart contract and Ethereum Meta Mask application to make it more user friendly and easy to use. Offline land details verification and no provision for land splitting are two big flaws in this concept. The Land Verification and Land Updating Processes can be automated to improve the Land Registration process even more. Land Splitting Case could be included in future versions.

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