

# Real Estate Security using Blockchain

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**Abstract:** Property is an important asset, and the use of blockchain technology can help improve the implementation of work in this sector as well as its characteristics significantly for a smooth and trouble-free work flow to achieve a reliable system. Property sales or property transactions can be carried out using the blockchain. By using blockchain, we can make our property sales transactions safer and faster. At the moment, we can develop a private blockchain for property transactions. Individuals or groups interested in conducting property transactions using the blockchain must join or register with the property transaction blockchain. A registered user can only buy or sell property through the blockchain. Blockchain smart contracts aid in the process of purchasing property. Once the buyer and seller have agreed on the terms (property details) and the buyer wants to proceed with the transaction, the property transaction can be done with the help of a smart contract. A smart contract is a computer programme that runs automatically when specified conditions are met. So when a transaction takes place between a buyer and a seller, the contract between them is generated by a smart contract. The smart contract generated in this way can be used as proof.

**Keywords:** Blockchain, Real Estate, Property, Transaction, Buyer and Seller

## I. INTRODUCTION

Blockchain is a distributed database of records or ledgers of every digital transaction or event that has been performed and shared between the parties involved. Every transaction in the public ledger is verified and confirms the consensus of the majority of system participants. Information, once entered, cannot be deleted. Blockchain holds a definitive and verifiable record of every transaction that has ever been conducted.

Property deals in the real estate business are a time-consuming process that can take months to transfer power from one person to another or from a dealer to a buyer, even in this day and age of technology. Not only will it take more time, but there may be new costs associated with the property sale. In today's world, parties other than buyers and merchandisers can be involved in a real estate sale. Buyers and merchandisers must trust a third party in real estate deals. Third-party involvement in the sale may help to avoid new freights. And buyers and merchandisers are forced to trust this third party in any case. Although we've used the services of a trusted third party, there's no guarantee that fraudulent activity wasn't involved in the property sale. Real estate or real estate deals are an area where numerous fraudulent transactions take place. Numerous frauds involving conditioning have been reported in the past and are still ongoing. The main fraudulent activity in this area is double spending. The seller can, with the help of several third parties, enter into several sales contracts for the same property with several buyers (in most cases, the third party becomes a victim).

Blockchain, as the name suggests, is a chain of blocks that can contain a growing list of records. Information and public databases are represented by a block and a chain. Blockchain is a technology where we store information in a public database. Blockchain is a technology that's decentralized. Originally, the blockchain was created for Bitcoin. Still, it's now used with different technologies and in different areas. We can use blockchain to solve the problems we face in real estate or real estate deals. Blockchain is capable of storing all deals and cannot be manipulated. Blockchain can exclude the gratuitous costs associated with sale intermediaries. The contracts involved in the sale are smart contracts.

## II. LITERATURE SURVEY

**Blockchain in Real Estate:** [1] It focused on how blockchain can be used for land and real estate transactions. The limitations of smart contract technology create a barrier to the extent to which blockchain can be used. In addition, there are uncertainties regarding the rules and regulations affecting digital transactions. Regulators in developed markets have slowly laid the groundwork for the creation and exchange of digital asset tokens. Real-time data and the

immutability of data held on a blockchain ledger would reinforce the role that regulators want to provide, which is clarity and protection for investors. As a result, blockchain could integrate internal and external regulatory compliance operations into a unified platform. Many regulators have begun to consider legislation, but not all have developed a system to accommodate the technology.

**Real Estate Transactions using Blockchain Technology:** [2] It intended to provide an overview of blockchain technology and its possible applications in the real estate market. The focus was on exploring the process of real estate transactions and problems that could be resolved by using smart contracts and blockchain technology. With a qualitative research approach and a case study analysis, a solution was proposed and discussed, along with its benefits and drawbacks. The goal was to, in the process, find the answers to research questions such as: How can real estate transactions benefit from blockchain technology? What would it cost to store the necessary data on the main chain of Ethereum? How could blockchain technology be used for managing the transaction of the down payment? Even though a collaboration of systems and smart contracts could handle almost every aspect of a real estate transaction, there are still legal boundaries to it being legally enforceable. The blockchain technology could contribute to more efficient and transparent systems compared to traditional centralized solutions.

**BlockChain to Prevent Fraudulent Activities: Buying and Selling Property Using BlockChain:** [3] It intended to provide an overview of Blockchain can have umpteen uses, one of them being its use in real estate. Blockchain and real estate go hand in hand. The kind of security and transparency needed in real estate are exceptionally well provided by blockchain. Consider a scenario where you buy a house. The proof that the property is owned by you is the deed or an agreement signed by the government, which is physically present on a piece of paper, and the records maintained by the government in the ledger. The procedure for this is simple: you buy the house, get it registered at the government office, where they note it down in a register or ledger, and you've got yourself a house. If the page on which your name is registered is torn or damaged, you might still own the house, but apart from the deed, there will be no other concrete proof that the house is owned by you. So, you need to hope that you don't lose the deed or that someone doesn't damage or misplace the government ledger. That's the kind of guarantee you have. We propose a system that will help us solve this problem. Suppose you wish to buy or sell property. You can provide the requirements asked for by the smart contract and get yourself a digital deed, which is uploaded as a new block in the chain. A copy of each node will be present on several servers, which helps us maintain integrity in the case of an attack or system failure.

**Blockchain for Real Estate:** [4] We discuss how blockchain technology, like any other emerging technology, is being applied to a wide range of industries. Before implementing or introducing blockchain in any organization, a few questions need to be answered. It needs to be verified if multiple parties share and update data, if it requires any verification, and if the current system is time-sensitive and involves complex intermediaries. Once these questions are answered and a cost-benefit analysis is performed, organizations can adopt blockchain technology. Since real estate deals with complex intermediaries, a time-consuming due diligence process, sensitive data sharing and verification, customer relations and sentiments, and its huge share in a country's economy, implementing blockchain technology for leasing, selling, and purchasing property would have greater benefits compared to any other sector. Smart contracts, together with tokenization, address security, trust, and speed issues and help increase token investments. This opens up the possibility of involving the general public in large real estate projects that were previously restricted to a small group of companies.

### III. EXISTING SYSTEM

The case studies method shows all the facts of interrelated approaches and wonders that define the inquiry a researcher desires to make about a problem Creswell 2003 this chapter discusses the methods used to conduct the research as well as topics essential to the chosen techniques when investigating the Property buying and selling approaches in accra - ghana through this dialogue the statistics series and research evaluation implemented have been illustrated those methods are addressed by thinking about the essential research targets and relevant research questions defined in bankruptcy one the sections encompass research techniques sampling techniques and modes of fact collection case study description mechanism of record analysis ethical attention and obstacles of field work the research approach used includes both qualitative and quantitative techniques the qualitative technique was applied to study the activities and capabilities of the Property buying and selling through institutions consumer necessities from the Property buying and

selling institutions perspective and stakeholders involvement in Property buying and selling activities through the use of semi-structured interviews the quantitative research method has become used to look at the modern system architecture workflow of Property buying and selling regarding statistics verification processing certification and tax clearance the perception of the customers concerning their worries and the level of pride in the registration manner have been statistically analyzed The purpose of selecting these study methods was to gain more expertise in the Property buying and selling procedures through reviewing the prevailing Property buying and selling gadget mainly the workflow this enabled us to draw a comprehensive photo of ways a new Property buying and selling method could be carried out this approach become carried out using purposive and simple random sampling techniques describes the kinds of sampling techniques used and the mode at which data turned into gathered from the field the mode of Facts series on the sphere consists of both number one and secondary statistics.

#### IV. PROBLEM STATEMENT

The current system for selling and buying property is opaque and slow. Maintaining a large amount of registered property is also difficult and necessitates a larger database because human errors and data tampering are common. The main problem with the current system is that it is not secure or transparent, and selling a property to more people means adding more records, which is important and should maintain accuracy. But this method is not good enough for data security.

#### V. PROPOSED SYSTEM

The blockchain application was designed to provide a transparent and convenient process for buying and selling real estate. The frontend module, implemented using HTML, CSS, and JavaScript, created a user-friendly interface for the seller, buyer, and admin. The Solidity contract in the backend ensured that the transactions were secure and transparent. To run the blockchain simulation, Ganache was used, which provided 10 addresses with 100 ethers each for transactions. The simulation was displayed on MetaMask, a browser extension that acted as a wallet interface, allowing users to view their account information. The seed phrase was entered into MetaMask, and the GANACHE account was linked to it. Smart contracts were created and deployed using the Truffle compiler, which verified correct syntax and prepared the contract for implementation. A minimal amount of ether was charged for implementation, debited from the main account on port 8545.

To add a property for sale, the seller needed to be a verified seller with a PAN card and property registration number. The seller was an authorized administrator, and the property added by the seller was verified by the admin panel by checking the property documents. The admin verified ownership after verifying the documents offline. The property was owned by the seller, and the seller could display the property on their home page. When listed for sale, it could be searched for and purchased in the buyer module. The buyer could search for the desired property and make a purchase request. This request would appear in the seller's account. When the buyer bought the property, the amount was paid in ether to the seller, and the property was transferred to the new owner. Ganache ran on its default port, 8545, and provided a secure and efficient way of carrying out these transactions.

Overall, the blockchain application provided a transparent and efficient way of buying and selling real estate, providing security for both buyers and sellers alike.

Module

- **Buyer/Seller Registration:** Buyer/Seller have to register to become a part Real-estate Project.
- **Buyer/Seller Login:** Buyer/Seller have to login themselves to get all functionalities.
- **Registration Data:** All Buyer and Seller Registration data Add in block chain.
- **Upload Property:** Seller Can Upload Property Details. And All related Data Add in Block Chain.
- **View property Details:** Buyer can see All property details that uploaded from seller using Block chain.
- **Buy Property:** Buyer Can Buy that property. Or in case buyer wants to negotiate that property price so buyer send request to seller.

- **Request:** Seller See that request and decide whether accept or reject the request. If accepted then seller send related document of property to buyer and then buyer sign on that document and send to seller again seller can sign on that document and send request to the admin.
- **Admin Login:** Admin have to login themself to get all functionalities.
- **Request for admin:** Admin decide that accept request or not. If accepted all data add in blockchain. And transfer fund amount to buyer.
- **Payment:** Buyer wants pay all Fund Amount. And the data add in blockchain.

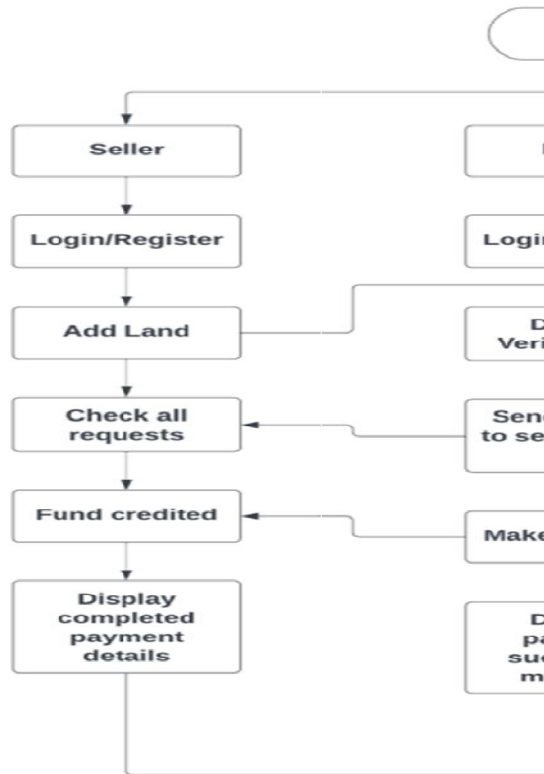


Fig 1 Flowchart

### 5.1 Algorithm

- **RSA (Rivest-Shamir-Adleman):** RSA is a public-key encryption algorithm that is widely used for secure data transmission. It is based on the fact that it is easy to multiply large prime numbers, but it is difficult to factor the product of two prime numbers. RSA is used to encrypt data so that it can only be decrypted by the intended recipient who possesses the private key. In the context of real estate security on a blockchain, RSA can be used to encrypt sensitive data such as personal information, property ownership documents, and transaction details. The data can be encrypted with the public key of the recipient and can only be decrypted with their private key. This ensures that the data is secure and can only be accessed by authorized parties.
- **AES (Advanced Encryption Standard):** AES is a symmetric encryption algorithm that is also commonly used for secure data transmission. It is based on the use of a secret key to encrypt and decrypt data. AES is often used in combination with RSA, where RSA is used to securely exchange the secret key, which is then used to encrypt and decrypt the data. In the context of real estate security on a blockchain, AES can be used to encrypt data such as transaction details and ownership documents. The data can be encrypted with a secret key that is only known to authorized parties, ensuring that the data is secure and cannot be accessed by unauthorized parties. Overall, the use of cryptographic algorithms such as RSA and AES can help enhance real estate security on a blockchain-based platform. By encrypting sensitive data, these algorithms can help prevent unauthorized access and ensure that only authorized parties have access to the data.

## 5.2 Technologies used

- **Smart contract** : The use of a smart contract can enable direct transactions between parties without the involvement of a third party. In our suggested system, the existence of a distributed database to store all the data is necessary for these smart contracts to function effectively. As an illustration, a buyer would first check the information on the property, which might include the date of most recent maintenance, the price, the size, etc. Since this information will be publicly available in the database, accessing it should be simple. Ownership of the property should automatically transfer whenever the buyer meets the requirements imposed by the seller. Not only that automation eliminates the need for a third party, but it will also reduce the transaction time
- **IPFS** : Inspired by the Git and BitTorrent systems, the InterPlanetary File System (IPFS) is a peer-to-peer file system that is distributed among connected computing devices. IPFS combines several technologies, including distributed hash tables (DHTs) and a protocol that is modelled after BitTorrent. Key/value pairs are used to store information in hash tables. The generalised Merkle Directed Acyclic Graph in IPFS, which was modelled after Git, is a data structure for storing versioned file systems. Similar to a blockchain, IPFS does not require trust between its nodes. Through its hash, all information may be identified specifically. The data can't be altered because doing so would change the hash.
- **Truffle**: It is most widely used Ethereum development framework. It comes with a variety of capabilities, including built-in smart contract testing, deployment, and compilation. A local Ethereum blockchain that can be used to deploy and work with smart contracts is called Ganache and is a component of the truffle suite. The transactions and smart contracts are immediately visible in a GUI when mining is done automatically.
- **MetaMask**: MetaMask is a type of Ethereum wallet that bridges the gap between the user interfaces for Ethereum Transactions are a formal action on a blockchain. They are always initiated in MetaMask with a call to the `eth_sendTransaction` method. They can involve a simple sending of ether, may result in sending tokens, creating a new smart contract, or changing state on the blockchain in any number of ways
- **Ethereum**: Ethereum is a decentralised blockchain platform that creates a peer-to-peer network for safely executing and validating smart contract application code. Participants can do business with one another using smart contracts without the need for a reliable central authority. Participants have complete ownership and visibility over transaction data since transaction records are immutable, verifiable, and securely distributed across the network. Ethereum accounts that users have created both send and receive transactions. As a cost of processing transactions on the network, a sender must sign transactions and use Ether, Ethereum native coin.

## VI. FUTURE SCOPE

To further advance real estate security using blockchain, research and development could focus on exploring new applications and use cases for the technology. One area of interest is enhancing the security and privacy of property data, such as transaction history and property ownership information, using decentralized storage solutions. Additionally, the integration of biometric authentication and identity verification systems with blockchain-based platforms could improve the security of real estate transactions and prevent fraudulent activity. Another area of future work could be developing interoperability standards to enable different blockchain networks to communicate with each other, creating a more connected and secure real estate ecosystem. Furthermore, the potential of blockchain-based tokenization of real estate assets could unlock new investment opportunities and enable fractional ownership, while also providing greater transparency and security for investors. Overall, there are many exciting possibilities for blockchain technology in real estate security, and continued research and development could help to unlock its full potential.

## VII. CONCLUSION

The paper presents a link to offer a conceptual framework for blockchain-based property buying and selling platforms. Following a review of various frameworks, as well as some of the more vigorous approaches and concepts employed in these frameworks, they were mapped with a scenario that led to the conceptual framework. The mapping of the scenarios aided us in classifying the major components, which has been useful to our proposed framework. A property buying and selling webapp combined with blockchain technology has the potential to truly revolutionize governance.



After identifying the necessary components, we developed a framework based on fundamental notions that have been employed in both classical and new record keeping systems. property record storage, like today, has a centralized origin. As a result, this centralized storage can be hacked, forged, or misappropriated, while in our framework, we used entirely decentralized blockchain-based solutions. We have also highlighted privacy as a fair consideration. Some of the nodes in the framework are required as part of the decentralized system's characteristics. Only those who are permitted to interact, such as a block generator or a government official or officer, can interact in this system. In terms of methodology, we gathered primary data directly from the stakeholders, including government offices and officers, village officers, and the general public who use this system. We conducted semi structured interviews to assess our framework and obtain feedback from both public and government entities.

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