



Real estate transaction scheme based on blockchain

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Abstract. As one of the emerging technologies, blockchain technology has become one of the most discussed applications at present. Its main characteristics are decentralization, distributed storage and intamperability. In view of the fact that multiple third-party trust centers are involved in the traditional real estate transaction process, this series of third-party trust centers will bring more time and money costs and tedious procedures to the real estate transaction, this paper proposes a real estate transaction scheme based on blockchain to realize fast and secure transactions. The real estate transaction framework is built on the basis of blockchain technology, and the potential attack risk is fully considered. At the same time, the real estate is designed for satisfaction score. This paper provides a safe, reliable and efficient solution for real estate transaction.

Keywords: blockchain; Real estate transactions; Digital signature;

1 Introduction

The traditional real estate transaction process requires third-party trust institutions^[1]. For example, banks are required as third-party trust institutions for loans, the Housing and Urban Rural Development Bureau is required as the trust center for online signature filing of real estate transactions, regulatory departments are required as third-party trust institutions for real estate transaction funds, and certain agents are required as third-party trust institutions for real estate registration. In the traditional process of real estate transactions, multiple trips to third-party trust institutions are required, which brings complex procedures and high time and money costs to real estate transactions. The physical and mental exhaustion of the transaction personnel has led to a poor processing experience. This is the opposite of policies that benefit the people, such as "running at most once", "not running at all once", "reducing processing time", "providing convenient services", and "improving the business environment". Moreover, in the long-term process of real estate transactions, there may be the problem of forged materials, which may make real estate transactions unreliable^[2].

With the rise of blockchain technology, blockchain has the technical characteristics of decentralization, point-to-point transmission, distributed data storage, consensus

mechanism and untamper, which can break the traditional trust mechanism of multiple third-party institutions. Regulators build a blockchain + real estate trading system, where any two users can conduct mutual trust and recognition and directly trade without the participation of a third party^[3]. To solve the above problems, this paper proposes a real estate transaction scheme based on blockchain, which can reduce the time and money cost in the process of real estate transaction, solve the problem of inter-department data trust, realize the rapid and safe real estate transaction between both parties, and improve users' satisfaction with government services^[4].

2 The Application of Blockchain in Real Estate Trading

2.1 Traditional real estate transactions

In the traditional real estate transaction mode, the third-party platform manages the information of the demander, the seller, the real estate agent and the real estate transaction information. Generally, the transaction platform is built in a centralized way, and the two sides of the real estate transaction complete the transaction on the platform^[5].

As the real estate transaction market continues to be hot, the transaction volume of real estate continues to increase, the demand side and the seller side become more and more, and the transaction is very scattered^[6]. If the transaction of real estate continues to adopt the centralized transaction model, it is prone to single point of failure, which requires more third-party trust institutions for management, more time and money costs, high maintenance costs and less audience^[7].

2.2 Real estate transactions based on blockchain

Blockchain adopts the way of distributed ledger, which has the characteristics of decentralization^[8], data traceability and data tamper-proof. Transaction information is stored in a chain data structure, and each blockchain node can query all transaction information. Due to the decentralized characteristics of blockchain, the use of blockchain in real estate transactions can solve the problem of high centralized operation and maintenance costs and prevent the problem of real estate transaction fraud, so as to avoid irreparable losses^[9]. At the same time, if malicious attackers launch attacks on the server of the trading platform, the trading information may be deleted or altered, resulting in untrustworthy trading information. Blockchain adopts distributed and chain-type data storage mode, which greatly reduces the success rate and cost of attackers and effectively prevents malicious attackers from launching attacks on the platform and causing unnecessary losses. For real estate transactions based on blockchain, no centralized trading platform will be established^[10]. Instead, the regulatory authorities will build a blockchain for real estate transactions to realize the traceability of the whole process, and all the data generated in the real estate transaction process will be linked, as shown in Figure 1.

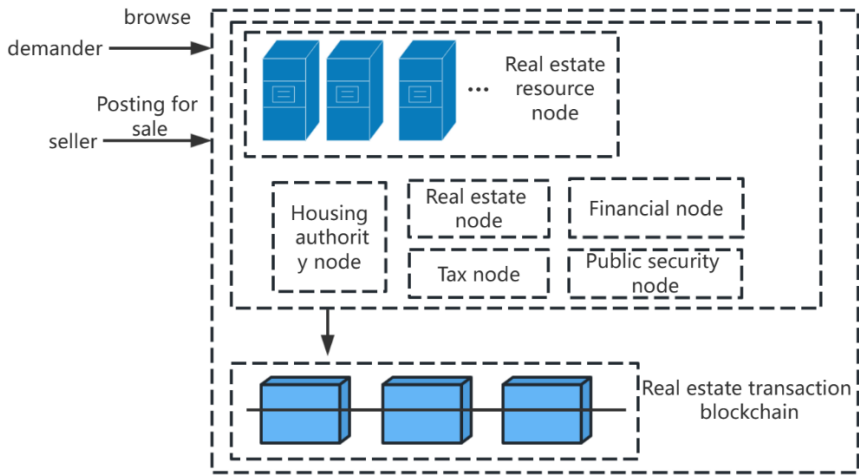


Fig. 1. Real estate transaction model based on blockchain

In Figure 1, the regulatory department builds the real estate transaction system + blockchain, which allows two parties who do not know each other and do not trust each other to conduct real estate transactions. For example, in real estate transactions, the trading system automatically calls various nodes on the blockchain. For example, the housing Bureau node and the real estate node automatically check the real estate data and automatically judge whether the transaction conditions are met. The tax, finance and public security nodes automatically verify the transaction qualifications of both parties. The tax department provides tax payment data, the finance department provides credit data, and the public security department provides household registration data to confirm whether both parties meet the transaction qualifications. The demander and seller of real estate log in to the trading system to view information of real estate resource nodes, browse real estate turnover and transaction price, real estate information, real estate satisfaction score, and conduct real estate transaction and settlement^[11].

3 Real estate transaction design based on blockchain

3.1 Real estate transaction block design

The data stored on the blockchain is open and transparent, and can be viewed by users at each node. Because real estate transaction may cause commercial competition, further may cause malicious attacks by attackers, resulting in the normal node and the attack node to compete for the production rights of the block. Based on this, the demander and seller of real estate need to apply for digital certificates and private keys from the third party's digital certificate issuing authority (CA). In the process of real estate transaction, the transaction result needs to be signed for confirmation, constituting a complete transaction process^[12].

If a complete real estate transaction results in m blocks of data, then a malicious node that wants to forge a new attack chain needs to create k blocks instead of the honest

chain. With the increase of block number m , the success rate of attack chain will be smaller, and the attack of malicious nodes will be more difficult. Thus, a complete real estate transaction can be described using multiple blocks. In this paper, we designed a complete real estate transaction process consisting of 4 transaction blocks, which are shown in Figure 2-5.

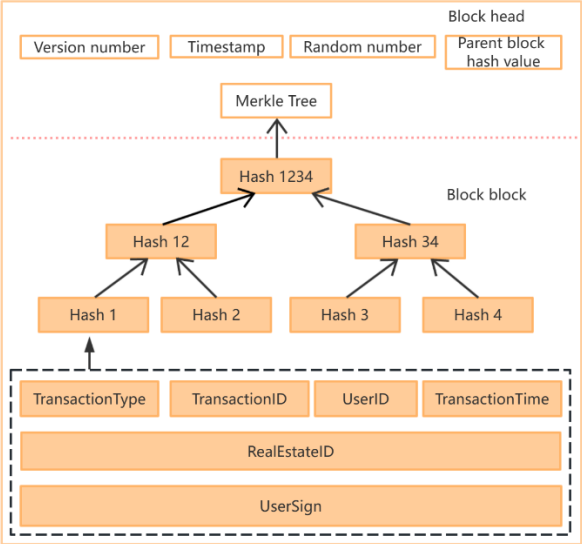


Fig. 2. Real estate demand side browsing record block

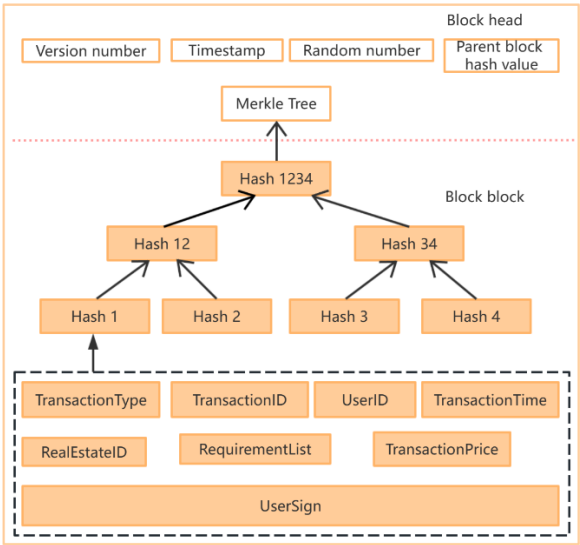


Fig. 3. Demander purchase real estate application block

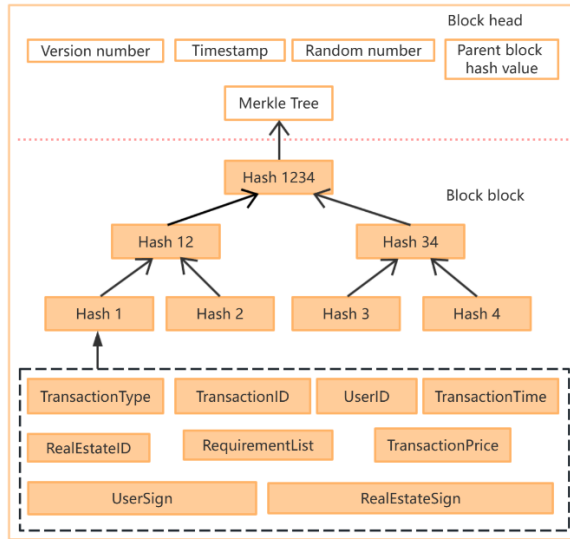


Fig. 4. Real estate transaction success record block

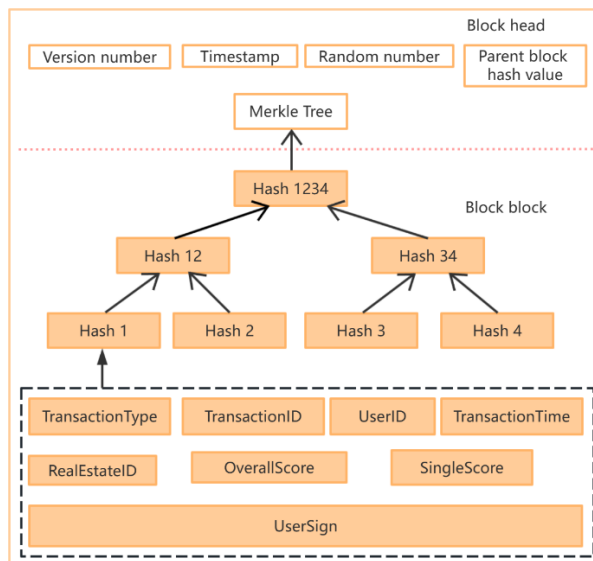


Fig. 5. Real estate satisfaction score block

(1) Real estate demand-side browsing record block: users browse real estate resource node information, view real estate turnover, transaction price, basic information and real estate satisfaction score, and form a browsing block.

(2) Application block for real estate purchase by the real estate demander: according to its own conditions, the real estate demander checks the real estate information and

sale price, determines that the real estate can be purchased by launching a purchase application and submitting the purchase application to the seller.

(3) Record block of successful real estate transaction: the real estate resource node confirms the real estate demand and transaction price, and both parties sign the real estate purchase contract after the confirmation.

(4) The block of real estate demander's satisfaction score on real estate: After the purchase of real estate, the demand-side will score the real estate according to its own region, transportation, living facilities, medical facilities, housing type, floor, building area, interior area, house orientation, neighborhood environment, and other features. After the completion of the scoring, the total score will be calculated according to the weighted total score formula.

- User Certificate ID: Digital certificate ID number of the demand side. Each ID number can be obtained from the CA to verify the user's signature.

- User signature: The recorded hash value needs to be signed by the user using his private key.

- Real estate node ID: Indicates the identity of the real estate resource node. You can query the public key of the real estate node.

- Real estate demand list: existing in TransactionType_2 and TransactionType_3 blocks, the real estate demander browses the real estate resource node, determines the real estate purchase demand based on their own purchase expectations, and forms the demand list.

- Real estate node signature: It exists in the TransactionType_2 and TransactionType_3 blocks to determine the transaction price of real estate.

- Real estate single score: After the demander buys the real estate, the real estate belongs to the region, transportation, living facilities, medical facilities, housing type, floor, building area, area within the set, housing orientation, neighborhood environment, other characteristics of the single score.

- Real estate satisfaction overall score: After the end of the single score, according to the total score weighted formula to calculate the overall score of real estate satisfaction, each user can view the satisfaction score of each real estate, according to their own needs to purchase reference, to provide a real and credible reference for potential users.

4 Conclusion

With the gradual maturity of blockchain technology, it is a hot field to apply blockchain technology to real estate transactions in the future. In this paper, based on the technical characteristics of blockchain, which is immutable and decentralized, we propose a real estate transaction scheme based on blockchain, which can reduce the time and money cost in the transaction process, realize fast and safe transaction, and ensure the credibility and traceability of transaction information. We designed multiple blocks to describe a real estate transaction, which can significantly reduce the success rate of malicious node attacks. Finally, considering the potential demand side, we designed a real estate satisfaction scoring mechanism to help the potential demand side get a real score and provide reference for purchase. With the increasing demand for real estate

transactions, we will continue to pay attention to blockchain technology in the future to promote better integration of blockchain and real estate transactions.

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