Application of Blockchain Technology Based on Trust to Publisher Platform

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Abstract. In today's copyright-based issues, there is a lack of trust between authors and publishers, journals, and readers. Many times a third party is required to do notarization or proof. This article focuses on blockchain technology as the key to a trusted publishing platform, with blockchains in Mining, Block, Hash, Digital Signature, and Private Key Other aspects of the composition of the publishing platform as the main basic technology. From the author to the publisher and publishers to the authors to discuss the structure and function distribution of the platform, and to explore it, to provide room for the future development of publishing houses.

1. Introduction
With the continuous development of society, blockchain technology has been rising in recent years. Most blockchain technologies are used in finance, bonds, and large enterprises. However, with the continuous improvement of the Internet and the gradual increase in coverage of blockchain technology, everyone has gradually paid attention to knowledge and copyright, publishers have become more and more inclined to self-media, and the electronic publications of publishers have also increased. The issue of intellectual property rights between authors and publishers is also becoming more and more serious. Reliance on blockchain technology can allow authors and publishers to trust each other and solve such problems without relying on third parties. Blockchain organizes data in blocks. All transaction records of the entire network are stored in the unique blockchain of the entire network in the form of transaction tickets.

2. The Need for Trust
There is no need to trust the system. In the blockchain network, constraints are generated by some algorithms. It is impossible to arbitrarily deceive the system. Otherwise, it will be rejected and suppressed by other nodes so that it does not need to rely on the authority to trust it enough. With the increase in the number of participants in the traditional network, security is getting worse and worse, but the blockchain network, each participant does not need to trust anyone, and as the nodes continue to increase, the resulting data base is also more The larger it is, the easier it is to change one of the data, making the data more secure.

In recent years, with the continuous coverage of mobile networks, more and more people have traded and transmitted works through mobile networks in electronic publications. However, some authors and publishers do not trust each other. The author will write more than one draft. The author fears that the publisher will not pay the royalties after the draft has been submitted, or will reject the author's submissions on various grounds and publish their works in the journal. Make users more and more approached to "centralize" or find trust as a third party to guarantee, but this will generate
additional costs and increase the burden of pointing. With the gradual emergence of distributed blockchain, blockchain technology can gradually replace the process that previously required third parties to conduct transactions, making transactions simple and reducing additional expenses. So now there are still some deficiencies in the press, such as from the media, that needs to be improved. One is that publishers have received more drafts, so publishers generally cannot deal with these issues in a timely manner. They will find third parties to help solve the problems, which will increase the cost and efficiency. Second, there are loopholes in the safe haven principle. Some self-media can avoid liability for infringement, making the author's rights protection process more difficult. So to solve these problems, you can store data through the blockchain and combine mining, block, hash, digital signature, private key with blockchain and other technologies to solve these problems.

The application of the de-trusted blockchain technology to the publishing platform can prevent a person from using the same amount of money in different places because once the node receives the transaction information; it uses the public key along the blockchain. Check to see if the block it detects is generated. The black team sees whether the transaction is reused. Although multiple tickets can be broadcast in random order, they must be in a certain order when they are finally added to the block. Hash value is used as the timestamp block between blocks, which determines the retrospective of the source of funds for any transaction.

3. The Link between Blockchain and Publishing House
The rapid development of blockchain technology has attracted more and more research and investment. Some of the magazines with relatively high international status and high prestige, such as The Economist, Forbes Magazine, Harvard Business Weekly, etc., all reported on the district fast chain. They all agreed that blockchain technology will generate Great influence. I think that blockchain technology is going into millions of households and getting closer to our lives. Decentralized blockchain technology, decentralized trust books, open consensus, non-defamiliar modification, and time stamping help improve the security of the network, providing more for both commodity trading and economic transactions. More protection.

3.1. Signing Mechanism and Copyright Trading
A digital signature is a mathematical mechanism that allows people to prove ownership. The sender uses its own private and public keys to verify two points. One is to verify the integrity of the message through the private and public keys. The other is to verify that the message is sent by the sender's signature. The data and information in all processes of the blockchain are open and transparent. Each transaction is visible to each node, but nodes and nodes do not need to trust each other. Therefore, no identity is required between nodes. All information is anonymous. When the author sends an article to a publisher, a hash of the message can be generated and encrypted with his own private key. The encrypted digest is sent to the publisher as a digital signature along with the written article. Society. The publisher first uses the same hash function as the author to calculate the message digest from the received original message, and then uses the author's public key to decrypt the digital signature attached to the message if the two digests are identical. Then the receiver can confirm that the digital signature is the sender's. On the contrary, publishing houses are also the same for authors. With regard to the publisher's blockchain, an alliance chain can be established between the public and private chains. The authors of the media can use the public chain to intervene freely in the network according to the system and without any control, freely work in the publishing house. Internally there can be a private chain that preserves the blockchain's trustworthiness while allowing public links so that publishers and authors can trade copyrights.

3.2. Traceability and Copyright Contracts
The blockchain adopts the classic one-way hashing algorithm\(^2\) in cryptography, which can convert the input arbitrary length of content into a fixed-length digital or alphanumeric output. At the same time, the blockchain has irreversibility, and the newly generated blocks can be sorted in chronological order. If someone wants to tamper with the information of the blockchain, it is easy to trace, because if a single node is used by a person in mind to modify the data, it is cannot affect the database of other
nodes, unless it can control more than half of the nodes to modify at the same time, this situation is almost impossible to happen, and the modified node will lead to the exclusion of other nodes, thus inhibiting the production and implementation of related illegal activities.

In the blockchain, transactions that have already been generated cannot be modified and will be recorded in chronological order. Each transaction in the blockchain can use cryptography to make two adjacent blocks form a serial mode. Therefore, the transaction data in the blockchain can be found in the past and present through cryptographic knowledge. At the same time, it can quickly verify the integrity of large-scale data by using a hash-binary tree. In the Bitcoin network, the Merkle tree is used to summarize all transaction information in a block, and ultimately generates a unified hash of all transaction information in that block. Any change in the transaction information in a block will make Merkle Tree change

4. Blockchain Publishing Platform Based Architecture

4.1. The Basic Principle of Blockchain

The block and blockchain composition is shown in Figure 1.

![Figure 1. Press block and blockchain](image1)

A blockchain is composed of multiple blocks. A block has, in general, seven basic attributes: index, hash, previous hash, tempstamp, difficulty, nonce, data.

Blockchains generally form blocks through mining. So-called mining is the person who trades, performs mathematical calculations for the network, confirms transactions and improves network security, and constantly calculates complex cryptography problems provided by software. In order to ensure the transaction, the miners can also calculate the transaction fee to create a new bitcoin. The publishers and authors can use Bitcoin to trade. Compared to the currencies of various countries, Bitcoin is a currency that all countries recognize and circulate, and the range of transactions is relatively large.

![Figure 2. Temporary blockchain](image2)

As shown in Figure 2, if the previous block, such as block 2, receives three or three subsequent temporary blocks of block three, block four, block, but these temporary blocks are all legal, so they
will be Block 2 branches up and down until the blockchain with the maximum workload of block 4, block 7 and block 9 appears. This chain will be left behind, and the others will be lost and lost. Nodes on the block move back to the last remaining chain and continue working.

The application of blockchain technology based on de-trusts is a peer-to-peer network in the publishing house. Each node can be intertwined with each other to organize the entire system. Building such a system can allow each author to spread the transaction of other users, but the specific information will not be displayed. This eliminates the need for third-party guarantees.

4.2. Blockchain Technology Architecture and Implementation Steps

As shown in Figure 3, the blockchain is mainly divided into data layer, network layer, consensus layer, incentive layer, and application layer. Publishers can save the author's data in multiple ways at the data layer, and sign the agreement with the author; author and publication. Clubs can spread the signed agreement through the network layer; when the agreement between the author and the publisher satisfies the previous agreement, they can conduct the transaction through the consensus layer; the publishing company publishes the electronic publication through the incentive layer; and finally it passes the application. The layer completes the bookkeeping function of the publishing house.

The implementation of this blockchain requires the Windows 10 operating system. The related configuration is Intel Dual-Core 2.5G processor, programming language Python 3.6, 8G memory, 2.60GHz dual-core CPU, the specific steps are as follows:

1. Create a block class, record this block in the form of a dictionary and return
2. Define the miner's mining method. The required parameters are the block number, previous id, transaction information
3. Customize the thread class, create a blockchain object, the container of the block, and then fill the container with 6 miners (here six examples)
4. Store the blocks generated in each stage, if the currently generated block is the first block, create a block
5. Get the last block, randomly generate a transaction information, transaction information is json string
6. If it is a creation block, first define a block with a block class, set the instance properties of the created object
7. If it is not a Genesis block, start six miners first and begin mining
8. Get a new block and find the block that meets the criteria. Take out the first dug-out block first, find the block that was mined by the miner with the shortest time, find the storage, and empty the result list.

![Figure 3. Blockchain technology architecture](image-url)
4.3. Blockchain Implementation Results

According to the compiled blockchain code, the results shown in Figure 4 can be seen as the fastest and most difficult for the first miner, and the latter are all screened in the same way to form a block. The experiment mainly selected 20 blocks; the heaviest result is Figure 5, because the layout restrictions are not shown here.

5. Blockchain Technology Challenges

Finally, compared to other programs, blockchains require more storage space and more computing power. Because blockchains need to be encrypted, there is a certain delay. This requires a lot of energy to maintain it. Blockchains can be implemented for a single publisher system, but if all publishers are faced together, globally distributed blockchains such as Ethereum will not be used.
6. Conclusion
Block chain technology is a new distributed technology, which is different from the large data cloud computing technology which has been developed in recent years. It is the underlying infrastructure of the new generation of Internet. The change of publishers means an opportunity for protection and fairness, which is given to every intellectual worker. The publishing platform for trust, with the support of technology such as trust, has made great progress in the field of media since the convergence and sharing of knowledge. This article mainly uses block chain technology to solve the problem of distrust between authors and publishers, and provides better room for development of publishing houses in the future. Although the block chain is facing a lot of challenges, I believe that in the future development, the block chain will serve people better, and finally the block chain through the entire publishing industry.

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8. References
[1] Yuan Yong, Wang Feiyue. Blockchain: The State of the Art and Future Trends [J], Acta Automatica Sinica 2016 (4):481-494.
[2] Dong Zejie. Authentication Mechanism Based on Hash Algorithm in Electronic Commerce [D], Hefei University of Technology, 2002
[3] Xibin Xi, Lu Chao, Cao Wangzhang et al. A Preliminary Study of Block Chain based Automated Demand Response System [J], Proceedings of the CSEE.2017(7):1-13
[4] Lin Xiaochi, Hu Yeqianwen. A summary of Blockchain Technology [J], Research on financial market.2016 (02).
[5] Swan M. Blockchain: Blueprint for a New Economy. 2015