Application of Blockchain Technology in the Field of Network and Information Security

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Abstract. In essence, blockchain refers to a database with core removed. It can support multi-party cooperation in different fields through special electronic technology and data management mode. Blockchain technology can be considered as the security field of encryption. It can solve the related problems of network and information security. However, China's blockchain technology is not mature enough in many aspects. Many technologies are still in the process of research. This paper analyzes the application of blockchain technology in network and information security.

Keywords: Blockchain, Information Security, Application

1. Introduction
Under the background of the computer age, network and information security has always been an important issue of academic concern. Many scholars have been studying the protection of network information security. They studied various network security issues, such as attack defense, data protection, privacy protection, identity authentication and crash repair[1].

Finally, with unremitting efforts, people invented blockchain technology. Blockchain technology is a new network security protection technology, however, it is not an innovative technology. It is an integrated technology across many disciplines. Its application scope involves mathematics, computer science, cryptography and other fields.

2. Simple discussion on the core technology of blockchain
In recent years, blockchain technology has been widely concerned. Scholars found that its main core technology consists of six parts. They are consensus mechanism, data storage, network protocol, encryption algorithm, privacy protection and intelligent convention (see Table 1).

2.1. Consensus mechanism
This mechanism refers to a way for groups and organization members to reach consensus. Generally speaking, blockchain is also called distributed accounting technology. It has no central point to direct multi-party collaboration[2]. Therefore, it must have a consensus mechanism to solve the problem of synchronous data input. The consensus mechanism generally includes all kinds of proof of rights and
interests and all kinds of algorithms.

2.2. Data storage technology
Blockchain can be divided into many blocks. Each block records all transaction information during its creation. Each block is interconnected. A whole of them is called a linked list. However, some people also divide the blockchain into block head and block body. The block head mainly stores multiple eigenvalues of the block. The block mainly contains various transaction data.

2.3. Identification of network protocol
Blockchain also includes network layer. Its network layer generally adopts P2P protocol. Many nodes share resources. Blockchain can be called the provider of resources, and it can also be called the receiver of resources. Generally speaking, different blockchain systems always contain special network protocols.

2.4. Encryption algorithm
Blockchain contains two main cryptography algorithms. They are hash algorithm and asymmetric encryption algorithm. In short, a hash algorithm can change a long string into a short string. This way can speed up the operation of the computer. Asymmetric encryption technology mainly includes public key and private key. Their functions are to decrypt public resources and private resources[3].

2.5. Privacy protection technology
Although the data in the blockchain is public, the real identity of the publisher cannot be obtained. Blockchain can turn the real identity of the publisher into a string of code. Other people cannot know the real identity of the publisher by querying the code. So, the personal privacy protection measures of blockchain are very comprehensive.

2.6. Smart contract
Generally speaking, smart contract is also a kind of protocol. It is a special expression of the agreement. Its advantage is that it can use the algorithm of the program to execute the contract instead of the user. It is also an important reason for blockchain deletion center.

2.7. Cross chain
Blockchain contains various chains. These chains are characterized by a high degree of isomerization. This structure makes each blockchain network become an independent network. The data information of the two blockchains cannot be transmitted to each other[4]. The generation of cross chain can make data exchange between two blockchains. It improves the expansibility of blockchain.

2.8. Slice Division
The specific meaning of sharding is to divide a large database into small and easy to manage parts. It can improve the comprehensive performance of database. According to the above description, we know that the essence of blockchain is a large database. We can integrate the idea of fragmentation into the management of blockchain. This way can make the management of blockchain easier. In addition, the traditional blockchain management is the unified management of the whole system[5]. This kind of management mode increases the work pressure of managers. After the internal problems of the system appear, it is difficult to find the specific reasons directly. Split management can not only reduce the way people work, but also help technicians to solve any problems in the system quickly.
Table 1. Application of blockchain technology in the field of network and information security

| Core technology          | Main meaning                                                                 |
|-------------------------|------------------------------------------------------------------------------|
| Common mechanism        | Solve the problem of synchronous data input                                  |
| Data storage            | Collection of transaction information                                        |
| Network protocol        | The use of P2P network protocol                                              |
| Encryption algorithm    | Decoding of resources                                                        |
| Privacy protection      | Concealment of the identity of the publisher                                |
| Smart contract          | Special expression of agreement                                              |
| Cross chain transmission| Chain analysis of network system                                             |
| Management Division     | Hierarchical management of blockchain                                         |

3. Application of blockchain technology in the field of network and information security

3.1. To support secure DNS structure
To be sure, it is difficult to modify the transaction in the blockchain after it is determined. Because blockchain has no central block, DNS structure is its main special form of server. Blockchain can support secure DNS structure. Therefore, transactions in the blockchain are very secure. A secure DNS structure can also guarantee the personal information and data of users in the blockchain. It can also reduce the probability of network virus attacks. At present, DDoS attacks are often caused by attacks on blockchain like networks.

3.2. It can mitigate DDoS attacks
DDoS attacks can be called distributed denial of service attacks. It can be regarded as an electronic virus. It can consume the resources of the target website through a large number of legal operations. It can make the attacked object unable to provide normal network services. Because the network in blockchain is a distributed network, it can effectively attack DDoS. On the basis of preventing virus attack, edge computing device protection is also an important part of block protection.

3.3. Protection of edge computing equipment
The network architecture and network environment of edge computing are very large and complex. In order to effectively protect them, network isolation equipment will cause great work pressure. Blockchain technology can be a good link for this kind of work pressure. It can protect computing devices by simple user operation. Generally speaking, edge computing equipment is an important external bookkeeping equipment. Its existence guarantees the electronic system's fast calculation ability and unique analysis ability. The damage of edge computing equipment will lead to the collapse of network system and the damage of user's operating environment. It will affect the safety protection measures of data in the system.

3.4. Data security
Generally speaking, the encryption technology of blockchain data is unique. The distributed accounting method can replace the traditional file signature method. It can prevent attackers from falsifying and stealing data. If the data is tampered, the blockchain can judge the authenticity of the data through a unique way of judgment. If you are not sure whether the data has been tampered with, blockchain can analyze the data call out through unique technology. In the data system of blockchain, the data security protection is relatively excellent.

3.5. Repair of crash
The data of blockchain is distributed. A lot of data is distributed on different nodes. Traditional database data will be stored in the central location. Blockchain has no central location. It can make many complete copies of users' data. If the operation of the source file crashes, the blockchain system will immediately call up the copy file. As we all know, the electronic system is not very stable.
Sometimes it will crash. This phenomenon is a disaster that people want to avoid. Every system crash will lead to the loss or damage of files inside the system[6]. On the basis of copying the complete copy, the blockchain system can also repair the crashed system itself. Files in the system have specific protection measures. It will not disappear because of the system crash.

4. Conclusion
The application of blockchain technology can solve many problems of network and information security. However, it is still a new technology. Its stability and economy are immature. How to realize the efficient and economic operation of blockchain technology is a new topic that people need to study. However, we can find that blockchain technology is worth exploring and learning through specific theory and practice. Although it is an integrated technology, its role in information security protection is unique.

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