ISSN: 2710-0588

Review of the Application Scenarios of Blockchain Technology

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Abstract

Blockchain is a distributed decentralized data structure that forms data blocks in a chronological manner similar to a chain list, and is not tampered with and fafiable. Therefore, blockchain has the characteristics of decentralization, tamper, transparency, security and so on. With the use of digital cryptocurrencies such as Bitcoin and Ethereic coin and the landing of a large number of decentralized applications, the blockchain technology derived from the blockchain is being actively explored in many industries, and this paper will study the development process, technical characteristics, and application scenarios of the blockchain.

Keywords

Blockchain; Bitcoin; Application Scenarios.

1. Introduction

From a bookkeeping perspective, blockchain is a distributed ledger system; from a protocol perspective, blockchain is a protocol to solve data trust problems; and from an economic perspective, blockchain is an Internet to improve the efficiency of cooperation. Block chain gradually evolved from encrypted digital currency to provide a trusted block chain service credentials, compared with the traditional centralized database, block chain has decentralized, non-tamper with, traceable, multiple maintenance, open and transparent characteristics, so in the distributed data storage, P2P transmission, consensus mechanism, encryption algorithm and smart contract and other traditional technology get good application. This paper will sort out the existing application scenarios of blockchain technology based on its feature analysis.

2. Introduction to Blockchain

2.1. Development Course

The emergence of blockchain began when a person who claimed to be Satoshi Nakamoto designed and conceived a bitcoin paper. As the underlying technical support of Bitcoin, blockchain is the core support of the bitcoin system. In the formation process of Bitcoin, blocks serve as storage units to record all the communication information of each block node for a certain period of time. The blocks are linked through the hash algorithm. The latter block contains the hash value of the previous block. With the expansion of information communication, the blocks are connected successively, and the result formed is called the blockchain.

The essence of blockchain is peer-to-peer distributed ledger technology, which permanently records the history of user operations on the blockchain. Blockchain has the characteristics of sharing, imdata tampering and transparent openness, which can ensure the security of users' data privacy. Blockchain allows untrusted participants to communicate with each other and send status update messages in a secure manner, without third parties or authorized central nodes. In addition, the blockchain technology integrates data storage, point-to-point transmission, consensus mechanism, encryption algorithm and other computer technologies.

ISSN: 2710-0588

Each node maintains a copy of the blockchain, and realizes the consistency of the ledger books through the consensus algorithm.

The development of blockchain has gone through the following three stages: ① blockchain 1.0 is the era of virtual currency represented by Bitcoin, is the public account book of virtual currency transactions; ② blockchain 2.0 is a decentralized database, using smart contracts and currency, widely used in the financial field; ③ blockchain 3.0 advances the blockchain application scenarios to all industries outside the financial industry.

2.2. Characteristics of the Blockchain

2.2.1. Decentralization

In the traditional centralized database system, all nodes jointly recognized nodes as the central node, the central node is responsible for storing all the data information in the network, to provide credit guarantee for the security and reliability of all data information, the rest of the nodes to complete the local information data through communication with the central node synchronization and update.

Therefore, for the centralized database system, attackers often focus on the central node in the network, when the central node security protection system is breached, the attacker can achieve the network data theft and tampering, the system can only through data backup recovery means afterwards data consistency test, the whole system needs to spend a lot of cost to ensure the security of the center node. For block chain network, ledger data by the entire network node common audit, no center node each node local network ledger backup, attack on a single node to modify its local ledger data cannot affect the ledger information in the network, attacked node only need to communicate with other nodes, can complete the ledger information synchronization, with stronger security.

2.2.2. Transparency

Transparency of blockchain is mainly applied in the supply chain. As an issue valued by stakeholders in the supply chain, transparency can ensure that product information can be viewed and obtained in time and reduce the loss caused by information delay. In addition, in the process of product circulation throughout the supply chain, transparency can ensure to track the historical record of the product, reduce the risk of confusion with unknown sources, and thus solve the two important problems of untraceable and irreversible transaction in the supply chain. Blockchain uses the open source technical framework, the underlying technical principles and technical architecture are fully disclosed, and the data on the chain is disclosed to the whole network nodes, so that any user is able to read and use the ledger data freely.

2.2.3. Information Cannot be Tampered with

A transaction data in being packaged as blocks and uploaded to the block chain, need to cut through more than half of the node audit and approval, once the data is successfully recorded, the entire network node will synchronously update the local books, ensure the written block chain data cannot change, unable to deny, to block data tampering also cannot get the consensus of other nodes. To thoroughly grasp a blockchain network, you need to grasp the 51% of the computing power of the entire blockchain, which is basically not feasible in the actual attack process.

2.2.4. Anonymous by Nature

Blockchain technology solves the problem of trust between nodes, transforming the trust between different nodes into the trust in the blockchain system itself, so that the transactions or information exchange of different users can be achieved under complete anonymity. At the same time, the blockchain system uses the encryption algorithm, and the users only need to provide the public key to complete the transactions and signatures, which prevent the

ISSN: 2710-0588

transaction eavesdropping and signature forgery attacks, and ensure the anonymity of the user's identity.

3. Application Scenarios of Blockchain

3.1. Application in Traditional Credit Business

In the whole credit business process, due to the information asymmetry between financial institutions and financing enterprises, the whole credit business is completely under the trust game, and there are a large number of credit risks.

In the pre-loan enterprise qualification examination stage, financial institutions can only analyze and judge the business conditions of the enterprise through the financial statements, trade statements and other data provided by the enterprise, and the authenticity of these data itself completely depends on the credit of the enterprise itself in the financial institutions. For this reason, a large number of small, medium and medium-sized enterprises are difficult to obtain credit endorsement from banks and other financial institutions, and their financing requests are often difficult to be met.

For the supervision stage of in-loan funds, financial institutions need to obtain the capital flow of enterprises in real time to judge whether there is a risk of loan fraud. However, in the actual operation process of enterprises, the capital flow information is often difficult to obtain due to the need of privacy and confidentiality, and it is difficult for financial institutions to realize accurate and reliable in-loan supervision. For the post-loan business handover stage, financial institutions and financing enterprises must spend a lot of manpower and material resources and time costs to complete the business handover work and data archiving work.

The emergence of blockchain technology has brought development opportunities for the traditional credit business. Similar to the credit list, the data sharing within the industry can be realized by building the alliance chain of financial institutions; by building the enterprise credit files, the enterprise credit information is reliable and non-tampered with; quickly distinguish and review the existing information, accelerate the credit process and improve the security of credit business. In addition, all kinds of transaction information of enterprises can be added to the blockchain to reflect the business conditions of enterprises in real time, so as to facilitate financial institutions to realize real-time in-loan review and prevent risks. To complete the transaction data can also be block chain storage, ensure all the transaction of the real and reliable data, also facilitate data integration, subsequent can also expand through the industry different financial institutions trading data exchange communication, through the form of open and transparent platform to get through the information barriers between different financial institutions, realize the business cooperation of different financial institutions and information exchange.

3.2. Application in the Securities Industry

In the actual securities transaction, we can optimize each link of the business process by applying blockchain technology. Due to policy requirements, traditional securities must be approved by the institution to be listed. Generally, the intermediary needs to conduct due diligence investigation on the company to ensure the company's credit status of the company, and then needs to go through the declaration and review process to take a lot of time before being allowed to list. This traditional process of review before issuance leads to a long listing cycle, huge time and capital cost, and many institutional defects, which increase the listing risk of enterprises, and small and medium-sized enterprises with weak risk ability are not friendly enough.

Using the characteristics of distributed decentralized blockchain technology is expected to realize the release of securities before the review, Accelerate the listing efficiency; Using the

ISSN: 2710-0588

blockchain system to optimize and adjust the transaction process, To Give full play to the initiative of each transaction node in the system, Complete all the work independently; Blockchain-based clearing and settlement systems can reduce settlement time to minutes in a more secure way, And ensure the transaction information, Improved the efficiency of securities trading clearing and settlement; In addition, the use of smart contract technology helps to build programmable securities, The trader agrees on the trading mode and resources in advance, Clarify the powers and obligations of both parties and write them into the smart contract, The Smart contract automatically detects the transaction execution status and automatically completes the delivery order if the trigger conditions are met, Not only to greatly simplify the transaction process, More for the future securities market, the whole link of intelligent automation to provide possibilities.

3.3. Application in the Insurance Industry

For the insurance industry, the blockchain technology itself has a convergence point with the insurance industry, and taking the blockchain technology as the underlying technology architecture to solve credit problems is helpful to innovate the existing insurance business model. Insurance operators can apply block chain technology, credit records in the open network, receive entire network supervision, timestamp and encryption algorithm can guarantee the chain of all transaction information records cannot be tampered with, to solve the credit problem, through information barriers between policy-holder and insurance companies, strengthen the trust, prevent fraud cast fraud behavior risk, guarantee policy-holder reasonable appeal, get insurance compensation, reduce management costs.

Therefore, blockchain, as the underlying technical support, can help the Internet to transform into the value Internet through the consensus joint governance of the whole network node and credit, which will become the basic technology structure for the future development of the insurance industry and guide the development and reform of the insurance industry.

3.4. Application in the Internet of Things Field

In the past decade, high and new science and technology have developed rapidly, and the Internet of Things has accelerated its transformation and upgrading through new technologies. Blockchain technology can mainly help the Internet of Things reduce costs and improve security. Among them, the application of blockchain decentralization and encryption technology is applied. The blockchain technology unites with the nodes in the network to share the storage. At the same time, each node can also exchange information, verify its identity, and trade with strangers at the same time. These characteristics all promote the application of blockchain technology in the Internet of Things.

There are many specific aspects of the application of the Internet of Things to blockchain technology, including smart city, smart home, intelligent transportation, government work, food traceability and other fields. Internet of things is the most important thing to form a decentralized network system, so convenient full participation, truly establish connection between things and things, P2P networking way coincides with this, at the same time, need to user privacy, it requires some form of verification and consensus mechanism, the emergence of block chain technology just fit these aspects. A typical case is the decentralized Internet of Things software established by FILAMENT company. By creating a catalog of intelligent devices, the devices in the Internet of Things can safely communicate information, execute intelligent contracts and send micro-transactions. In addition, IBM has announced a partnership with Samsung to develop an ADEPT (decentralized P2P automatic telemetry) system, which uses the underlying bitcoin technology to build a network of distributed devices, namely the decentralized Internet of Things.

ISSN: 2710-0588

3.5. Application in the Government Field

A series of characteristics of blockchain are also applicable to government applications, and they can be well combined in government basic information protection, citizenship identification, government information disclosure, tax supervision, project public bidding and other aspects. The government information system shall be summarized by the subordinate departments to the competent government departments, which shall have the right to call the information of each subordinate department. In this mode, there are serious security vulnerabilities, hackers can break or even tamper with information through the central route.

Applying blockchain technology to government information systems, system security will increase dramatically: all government information will be stored distributed across nodes and encrypted through a hash function. Similarly, blockchain technology also improves the efficiency of citizenship authentication: it can make all the information of everyone's life stored on their own "address" and collected freely, and the blockchain information cannot be tampered with, so citizens do not need to worry about the proof that they get is invalid, which also improves the authenticity of citizens' information. Typical cases are: The Estonian government's "e-residents" program: issuing digital identity cards to the world, "e-residents" can set up digital signatures, verification and encryption of certificates, contracts and other documents online. Once the account is opened, Estonian "electronic residents" can transfer money to any country in the world through an electronic banking, remote-control bank account.

3.6. Applications in the Education Field

The disruptive technological change and wave of innovation model of blockchain in the financial field and other fields also provide valuable practical knowledge in the field of education, and blockchain technology has also been preliminarily developed in its practical application. As early as in 2016, the ministry in the China block chain technology and application development white paper, points out that "block chain system transparent, data tamper-with characteristics, fully applicable to student credit management, entrance employment, academic, qualification, production cooperation, etc., to the healthy development of education employment has important value". The survey has found that many institutions at home and abroad have carried out an active exploration of this issue.

Domestic aspect, represented by moOCs global open education resources movement of further development, because of its large-scale open curriculum resources, world-class university teaching course endorsement, flexible application of personalized and independent selective learning methods, makes students learning mode digital, content diversification, opportunity diversification, decentralization of increasingly diversified features. Abroad, holburton school took the lead in using block chain technology to record students education information, the school co-founder, said the academic certificate stored in the block chain database, can ensure the authenticity of diploma and diploma, at the same time can save manual certificate and review education information time and labor costs, and the cost of the school operating database.

In the exploration journey of "blockchain + education", blockchain is expected to build a more developed and more credible education system, which will continue to move forward in developing the degree certificate system, developing the decentralized education system and building a new ecology of open education resources.

4. Conclusion

This paper starts from the development process and characteristics of block chain technology, analyzes the application scenarios of block chain, the block chain technology more than half of the application scenarios in the economic and financial fields, such as securities industry,

ISSN: 2710-0588

insurance, banking, etc., but there are still application scenarios in other fields, such as in the library, government departments, the Internet of things, medical field, etc. The development of blockchain technology is widely optimistic by the industry, and this increasingly favored trend will continue. These trends may not appear directly in the form of blockchain, but may rise as a derivative of blockchain technology. Blockchain application has shifted from the initial simple digital currency to the wider financial industry, and has penetrated into many fields of society, such as authentication, cross-border payment, file storage, the Internet of Things, etc., among which the financial field is currently the most mature and widely applied field. Blockchain technology, as one of the most popular technologies at present, is worth investing more time and energy in learning and research.

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