ISSN: 2710-0723 DOI: 10.29500/FSD.202105_1(2).0004

Research on the Construction of after Sales Service Platform Based on Block Chain Technology

Yu Lei[1], Zejiong Zhou[1, a, *]

[1]School of Accounting, Anhui University of Finance and Economics, 233030, Anhui, China

[a]Corresponding Author: aczzj123456@163.com

Abstract

By understanding the core technologies such as asymmetric encryption, distributed storage, timestamp and consensus mechanism of block chain, this paper creates the trust by relying on technology and applies it to after-sales service platform. At the same time, we use the characteristics of block chain technology, such as decentralization, openness, transparency, security independence, and marks on the chain, to achieve the accuracy, security and authenticity of after-sales service, hoping to bring some enlightenment to the construction of after-sales service platform in China.

Keywords

Block chain technology; Consensus layer; After-sales service platform.

1. Introduction

According to the data of the State Administration of market supervision and administration, in 2020, China's market supervision departments accepted 6.93 million complaints, including 1.209 million after-sales service complaints, accounting for 17.4%. Compared with 2019, the year-on-year growth is as high as 175.5%. It can be seen that after-sales service problems emerge in endlessly, which seriously hit consumer confidence and disrupted the order of market transactions.

In recent years, the rapid development of block chain technology has attracted the attention of the country and various fields. In October 2019, in the conference on the future development of the block chain held by the Central Committee of the Communist Party of China, general secretary Xi Jinping repeatedly mentioned block chain as one of the rapidly developing technologies, which has great advantages in industrial transformation. Since 2016, countries have begun to actively try to apply block chain technology, making great breakthroughs in terms of transaction, payment and settlement. Relying on the core technology, block chain can build a transparent platform for both sides of the transaction to trust each other. This paper proposes to use this platform to deal with after-sales service matters and solve the difficulties faced by the current after-sales service platform.

2. Technology and Architecture of Block Chain

According to the architecture, the block chain can be divided into six parts: data layer, network layer, consensus layer, incentive layer, contract layer and application layer. But the core technology of the block chain is concentrated in the first three levels, so this paper simply divides the block chain into data, network and consensus levels, and introduces the block chain technology through the superposition of levels.

2.1. Data Layer

(1) Hash function. Hash function is used to convert arbitrary length string into fixed length output. When a transaction occurs in the market, we input the transaction records into the hash

ISSN: 2710-0723 DOI: 10.29500/FSD.202105_1(2).0004

function to get a fixed length string with unique correspondence. Even if the transaction record changes slightly, different hash values can still be obtained, and the change of hash value is irregular.

(2) Asymmetric encryption. Because of the unique correspondence of the hash value, we use it as the digital signature of the transaction. But the hash function is a public function, anyone can use the hash function value to forge a signature, so how to reflect the digital signature is the signature of the payer becomes very important. Using asymmetric encryption method to encrypt the hash function and taking the encrypted result as the signature can solve this problem. Asymmetric encryption, as the name suggests, is to distinguish the encryption and decryption keys. The encryption key is called the private key. The private key can only be owned by the encryptor and cannot be disclosed. Input the private key into a formula to get the public key and make it public, so that the public can decrypt by using the public key [1]. When the hash value after decryption is exactly the same as the hash value of the received information, it indicates that the signature is the signature of the payer of the transaction, thus completing the distinguishing feature.

(3) Block and chain structure. After the birth of bitcoin, block chain came into being. Block chain is block and chain structure. Block is to divide the general ledger into sub ledgers. Each sub ledger is a block generated in chronological order. The former block becomes the parent block of the latter block, and the latter block is the sub block of the former block, and so on. Chain structure is to add a part on top of each block, called block head, to record the hash value of the parent block. The specific operation process is to package the block head of the parent block, the basic information and transaction records of the block, calculate the hash value after packaging, and then record the value in the block head of the next block. Each block operates in this way, and finally forms a block chain [2].

2.2. Network Layer

After the transaction is completed in the market, it is usually accounted by the government, banks and other centralized institutions, but the centralized institutions are easy to be attacked, such as destroying the server, network, etc. when the centralized institutions are destroyed, the whole monetary system will be paralyzed. Combined with the disadvantages of the above centralized institutions, the block chain uses P2P network to let each node have an account book and participate in the after-sales service process, which solves the after-sales service task without the participation of centralized Institutions [3].

In the P2P network, many people are running bitcoin programs. We call them nodes. Each node continuously monitors and receives transactions, verifies whether the transactions are accurate through data layer technology, and then puts them into the transaction pool (the container where the information received by each node at a certain time is temporarily put) to start a new round of propagation [4]. There are multiple transactions broadcast in P2P network at the same time. Due to the delay of network propagation, the transaction pools of different nodes are not necessarily the same at the same time. The block extracts a node according to the way of pow consensus, takes its transaction pool as the next block and propagates the whole network at the same time. After other unselected nodes accept the new block, they first verify the accuracy of the transaction records of the new block, and then delete the records that coincide with their own transaction pool, waiting for the next opportunity to be selected.

P2P network is a person to person network. After joining this network, without the participation of decentralized institutions, each node can view all transactions in this network, and record transactions to its own account book through peer-to-peer transmission. In this network, all people are equal, and each node can become the so-called center. When a node receives the transaction information, it will send the information to the neighboring nodes, and

ISSN: 2710-0723 DOI: 10.29500/FSD.202105_1(2).0004

the neighboring nodes will send the information to the neighboring nodes. Through the P2P network, the information will instantly spread all over the world.

2.3. Consensus Level

Based on the content of the second part, we can understand that the bookkeeping right is obtained according to the pow consensus reached by all bookkeeping nodes. The pow mode requires the accounting node to do an extra job to compete for the accounting right. This job is to synthesize a string of the hash value of the parent block, the transaction in the transaction pool and a random array into a hash function. The result of the hash function is a string of new characters. Only when the new string is less than a specified value can the extra work be completed successfully and the bookkeeping right be obtained at the same time. This extra work is very difficult. Instead of just taking a pen and paper calculation, you can get the answer. Instead, you need to traverse the random number from 0 and keep trying. The random number is at most 32 bits. If you still can't find a suitable value to make it less than the specified value after traversing the 32 bits, you need to change the transaction information in the transaction pool and try the random number again. One bookkeeping node takes the lead in finding the random number, that is, publishing it to the whole network. Other nodes will verify whether the random number meets the standard and whether the transaction record is accurate. After verification, they will recognize the block and take the block as the parent block to restart the next round of bookkeeping right competition. Due to the uncertainty of the extra work, the generation time of each block is not necessarily, some need 2 or 3 minutes, some need 20 minutes, but on average, a new block can be generated every 10 minutes [5].

Because the process of searching for random numbers is very boring, we also call this process "mining", and the accounting node fighting for the bookkeeping right is also called "miner", and the way fighting for the bookkeeping right is called pow (proof of work). If a node wants to get more bookkeeping rights, the only way is to get speed advantage by replacing more advanced equipment. According to our understanding, in order to improve the computing speed, miners constantly upgrade their computing equipment and start to use the CPU of traditional computers. As the computing power becomes higher and higher, they use GPU to mine and now upgrade to professional mining machine. Why are miners willing to upgrade their equipment and buy multiple excavators?

It turns out that when the miner successfully finds the random number and the new block made by himself is added to the block chain by the network node, the miner will be rewarded with 12.5 bitcoins and transaction fees from the bitcoin network, and the bitcoin will be converted into real currency. This is a very high income and an incentive measure for the miner, that is, the fourth incentive layer of the block chain. Huge economic benefits greatly stimulate the development of mining equipment, and the upgrading of mining equipment leads to the improvement of the computing power of the whole network. In order to maintain the limited time, bitcoin network adjusts the difficulty by adjusting the specified value in the extra work every two weeks, so that an average block is generated every 10 minutes [6].

3. Application of Block Chain Technology in after Sales Service Platform

The application of block chain technology runs through after-sales logistics, evaluation and other links. For example, when there is a problem with the goods received by the buyer, he will rely on the after-sales service certificate to protect his rights. But the traditional electronic voucher uses centralized storage method, once the server is damaged, the voucher will be lost, so it is very easy to cause disputes. After the introduction of block chain technology, electronic vouchers are generated in the whole process of commodity transaction, which is open, transparent and tamperable. When there is a problem with the purchased goods, the buyer only needs to submit an application, and the manufacturer, the seller, the supervision and other

ISSN: 2710-0723 DOI: 10.29500/FSD.202105_1(2).0004

departments will obtain valid certificates on the chain, making the after-sales service evidence open and the process clear.

3.1. Asymmetric Encryption Increases the Difficulty of Tampering with Data

In the after-sales service platform, the server is often controlled by the seller. In order to maximize their own interests, the seller may choose to tamper with the after-sales service certificate. When the block chain is introduced into the after-sales service platform, the correspondence of hash function and the identifiability of asymmetric encryption can discover whether the information has been tampered in real time, and each node can terminate the tampering process and void the tampering result in time after verification error. At the same time, even slight tampering will make the hash value abnormal, which will lead to the chain structure of the next block and the previous block can not maintain the consistency of information, and the chain will break. Therefore, as long as the transaction content is recorded in the block and added to the main chain, the possibility of tampering is minimal. At the same time, the technology can also be applied to the logistics link of after-sales service, through cryptography + digital signature to locate the recipient, to avoid false claim, wrong claim, recipient information disclosure and other problems [7].

3.2. Distributed Storage Reduces Information Asymmetry

Most of the current commodity transactions are under the premise of asymmetric information, and the after-sales service platform holds a monopoly position on information, so it also has greater authority in the transaction. They use their authority to disclose consumer privacy or authorize malicious use at will. When the block chain technology is applied, different from the previous centralized mode, the block chain uses the P2P network to realize the distributed structure. After the commodity transaction and the whole network broadcast, other nodes can verify the amount and quantity of the transaction and other information, and enter the chain after verification. At the same time, other nodes update the transaction content and voucher in real time [8]. When the transaction information through the whole network to see, check, remember three steps, has maximally stifled the information asymmetry, to the after-sales platform malicious use of consumer information to create opportunities.

3.3. Consensus Mechanism to Improve the Credibility of Evaluation

The consensus mechanism of block chain improves the credibility of commodity evaluation. The reason why the traditional commodity evaluation is not credible is because of the advertising promotion and malicious swipe orders, and the merchants exchange money for praise, which seriously damages the market order. Distributed storage and consensus mechanism make consumers automatically participate in the construction process of the platform. In order to get the reward, consumers are more willing to make a real evaluation of the goods on the chain and participate in the governance of the platform. At the same time, the block chain realizes the automatic ranking of commodity credit, and matches the traffic according to the ranking. This also saves the promotion cost for more sellers and promotes the formation of a good service environment.

3.4. Time Stamp Technology Is Convenient for External Supervision

Traditional external supervision needs to do a lot of repetitive work, and it is impossible to ensure that every project is covered by supervision due to objective reasons. The application of block chain technology is also helpful to market supervision, which simplifies the supervision process and improves the supervision efficiency. Of course, the improvement of regulatory quality is the integration of various technologies of block chain, not just relying on timestamp technology. It is on the basis that data is not easy to tamper with and information is transparent that supervision can save a lot of manpower and material resources, reduce costs and achieve

ISSN: 2710-0723 DOI: 10.29500/FSD.202105_1(2).0004

better supervision effect. On the basis of these, time stamp technology derives the characteristics of traceability. Its technical advantage is to add time dimension to each transaction and arrange it in order to facilitate the real-time and transparent supervision of the market.

4. Conclusions

Relying on the core technology, the block chain can build a transparent platform for both sides of the transaction to trust each other. This paper uses the platform to deal with after-sales service matters, so as to solve the difficulties faced by the current after-sales service platform. Firstly, we divide the block chain into six parts according to the architecture, namely data layer, network layer, consensus layer, incentive layer, contract layer and application layer, and introduce the first three levels of the core technology of block chain in detail. Then, the management measures of applying block chain technology to after-sales service platform are proposed, that is, asymmetric encryption increases the difficulty of tampering data, distributed storage reduces information asymmetry, consensus mechanism improves evaluation credibility, and timestamp technology facilitates external supervision.

Acknowledgments

This work is supported by the project of National College Students' innovation and entrepreneurship training program "Research on the construction of after sales service platform based on block chain technology" (202010378075).

References

[1] Luo Yiming. Research on customer participation in after sales service co construction of B2C platform based on block chain application. Southeast University, (2019).

[2] Zhang Yunqi, Feng Yi. Research on E-commerce credit ecological governance based on block chain. Journal of Central University of Finance and economics, (2019)No.5,p.102-108 + 128.

[3] Ding Ning. Research on interface management of enterprise service system based on block chain application. Southeast University, (2019).

[4] Yuan Bo, Qiu Wangjie, Fan Wenjie. After sales service certificate public service platform based on block chain. Information Engineering, Vol.5 (2019)No.6,p. 4-14.

[5] Chen Yajun. Research on online verification of product authenticity based on block chain technology . Henan University of technology, (2019).

[6] Wei Chunhua, Ding Wanlu. Construction of credit guarantee mechanism of accounting information system based on blockchain technology. Finance and accounting communication, (2019)No.25,p.105-109

[7] Wang Ye, Li Huiyu. Construction of e-commerce credit based on block chain. Journal of Tianjin Vocational College of Commerce, Vol.6 (2018)No.6,p.53-57.

[8] Yang Xingshou. Research on credit and trust mechanism in e-commerce environment. University of international business and economics,(2016).