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Collaborative Sharing Model of Basic Information of Sustainable Electronic Agriculture Based on Blockchain

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Abstract: At present, there is relatively little research on the collaborative sharing of basic agricultural information logistics in electronic agriculture. In view of the problems of information asymmetry, uncoordination, and difficulty in establishing an effective trust mechanism among internal users of the basic cooperative information sharing system of electronic agricultural basic logistics, no effective solutions have been proposed yet solution. This paper designs and implements the Ethereum blockchain big data sharing prototype system. The realization method of shared logistics for blockchain collaboration is proposed. Based on scholars' research on sharing economy, shared logistics and blockchain, a method of applying blockchain to shared logistics is proposed. On the basis of shared logistics to realize the recycling of temporarily idle resources, using the characteristics of blockchain permanent, non-tampering and decentralization, to solve the problem of trust transactions in the process of sharing logistics resources, and using the shared logistics information platform as a medium, A new method of shared logistics under blockchain collaboration. Build a service operation mode for the shared logistics information platform. Since warehousing and transportation are the two most important factors that affect logistics costs, the service mode of the platform is mainly for shared warehousing and shared transportation. The storage and transportation resources are integrated and reused through the information platform to achieve the purpose of reducing logistics costs. This article proposes the communication and aggregation mode of consumer information reviews, and combines the shortcomings of existing online review information to propose measures for its quality control and prospects for future technologies. Experimental results show that when the number of operation and maintenance nodes is 20, 50, and 100, respectively, as the number of file partitions increases, and as the number of nodes increases, the number of file partitions that can be backed up increases, reaching the lowest threshold.

1. Introduction

Based on the blockchain-based sustainable e-agriculture basic shared logistics information platform research, from the theoretical innovation perspective to study the coupling of blockchain technology and shared logistics. Through the application of blockchain technology, information technology, Internet + and smart sharing mode, from the perspective of user needs, integrate logistics resources and build a shared logistics information platform. To study the development direction of the logistics industry under the new model, the research on the sharing model is of great research significance for the era of smart logistics.

Due to the importance of big data blockchain research, many research teams have started to study big data blockchain and achieved good results. For example, Engelenburg transparently reflects all blockchain transactions on the public network, leading to the disclosure of transaction privacy Problem, it is proposed to use the Hawk protocol based on smart contracts, which encrypts the communication between the two parties of the contract to ensure the absolute security of the information [1]. David aimed at the security breach caused by the collection and control of personal data by third parties, leading to the leakage of user privacy, and proposed a distributed personal data management system based on blockchain to ensure that users own and control private data. This article designed an automated access control protocol to verify the data storage and query of the mobile terminal, ensuring that personal data is not randomly accessed by applications [2]. Leopold made an in-depth discussion on the future impact of the audit industry based on big data analysis and blockchain technology, and based on the existing theoretical framework to study how to incorporate blockchain into future audit procedures [3].

In the research of logistics information sharing in the electronics industry, the use of the blockchain method is a good method that can solve many problems. Therefore, it is widely used in the research of logistics information sharing in the electronics industry [4]. For example, Suveen Angraal can use the logistics platform to different users on the blockchain are integrated together to obtain greater synergy in the logistics process. The important role of logistics information platform based on cloud computing in resource integration is studied. Through the analysis of system function design, a cloud model to accelerate the construction of logistics information and regional economic development is provided [5].

In this paper, through the research on the collaborative sharing of basic information of sustainable e-agriculture and the sharing model of logistics industry based on the sharing economy, the concept of sustainable e-agriculture shared logistics information platform is proposed. Warehousing and transportation logistics functions realize the recycling of logistics resources, and further use blockchain technology to combine blockchain with platforms to accelerate the circulation of sustainable electronic agricultural logistics information, reduce social costs, improve resource utilization efficiency, and achieve Trust and security of platform operation. Through sharing to achieve optimal configuration, greatly improve the efficiency of the logistics system and reduce the logistics costs of sustainable electronic agricultural logistics service providers and even the entire society. By means of lease, recycling, exchange and recycling, we will create a resource sharing value for sustainable electronic agricultural logistics service providers. The implementation results show that when the number of operation and maintenance nodes is 20, 50, and 100, respectively, as the number of nodes increases, the number of file blocks that can be backed up increases.

2. Proposed Method

2.1. Design of Blockchain-based Sustainable Electronic Agriculture Basic Shared Logistics Information Platform

This paper takes the sharing of logistics information technology on the basis of sustainable electronic agriculture as a means to create value for idle resources in the logistics industry. The platform is mainly for small and medium-sized enterprises in the society and individual retail customers with low informatization. Through the functions of resource integration, information processing and information release, it provides a platform for user transactions to achieve shared logistics [6]. Based on the analysis of the business model of e-agriculture, this paper combines the business functions of the e-agriculture platform from the platform project function, business logic, architecture model, database, smart contract and other aspects to provide detailed design for participating users to provide a decentralized A shared logistics information platform for sustainable electronic agriculture.

2.1.1. Functional Requirements

The sustainable electronic agricultural basic shared logistics information system provides a platform for supply and demand parties to share logistics resources and realize transactions. As the most important participants of the platform, service providers and service demanders analyze the main functions of the platform from the perspective of service providers and service demanders [7].

(1) Role management of e-agriculture supplier

The role management of e-agriculture suppliers is a system that provides relevant identity information to service providers participating in the sustainable shared logistics information platform of e-agriculture. Including registration, verification, login and other relevant personal information. Users use the platform for registration. During the registration process, relevant information is reviewed according to the role of the service provider (vehicle source, warehouse source). After the platform is approved, the user can successfully register as the service provider of the platform [8-9]. After logging in with the user name and password at the time of registration, personal information can be improved and modified.

(2) Supply information release search

The information release search system is the most basic functional system to realize shared logistics. The service provider publishes idle logistics resources to the platform for sharing according to the standardized format of the platform. In order to ensure the authenticity of the shared logistics resources, the service provider needs to upload the detailed information of the logistics resources and relevant picture certificates when releasing the logistics resources. For the platform to supervise and review, the supplier can also use the platform's search function to find a suitable source of supply according to its own needs, and improve the matching efficiency through active publishing and online search [10].

(3) Electronic agricultural order management

The order system of the electronic agricultural supply demand side mainly receives orders submitted by the demand side. After the supplier starts to take orders, the order system will record the detailed status of the shared logistics resources, including location, driving track, time, At the same time, the order system will provide the service side with detailed geographic location, demand information, demand side communication information [11].

(4) Payment management

The payment system is mainly for the service party to settle the fees. The system uses the order system to obtain the order fee, and triggers the smart contract directly after the transaction is

completed, and pays the order fee from the contract account to the service party.

2.1.2. Functional Analysis of Service Demand Side

Service providers include those who have service needs for warehousing and transportation resources, and are generally divided into five systems: supplier role management, information release search, order management, payment management, and evaluation.

(1) Demand-side role management

Similar to the function of the service provider, the role management of the demand side is a function related to the management of personal information by the service demand side, including registration, login, and personal information management. Compared with the service provider, the user can log in directly after the user has successfully registered on the demand side, without the need for auditing by the system administrator. After logging in with the user name and password at the time of registration, users can modify and perfect their personal information [12].

(2) Demand information release search

According to the demand of their own goods, the demand side can conduct online search on shared vehicle resources or shared storage resources, and use the platform's intelligent matching function to provide a recommendation function for the user's search. At the same time, the demand side can also send its own cargo information to the platform. According to their own demand for transportation or warehousing resources, provide logistics sources with a source of supply [13].

(3) Electronic agricultural order management

The electronic agricultural order system is a key system to realize shared logistics. The system involves all functions related to orders. Including functions such as creating orders, submitting orders, and querying orders. Both parties can create an order online and submit an order online when they reach a transaction agreement. After submitting the order, the demand side needs to pay the prepayment to the contract account according to the prepayment amount of the order. At this time, the service side performs logistics according to the demand side order. Resource arrangement [14-15]. Inquiry orders provide the demand side with the function of querying historical orders. The demand side can query the details of the orders of historical transactions in the shared logistics information platform.

(4) Payment management

The payment system involves functions related to payment. The bottom layer of the module uses blockchain technology and writes decentralized smart contracts. During the creation of orders, the demand side pays the prepayment to the contract account, which is controlled by computer code. When both parties confirm that the transaction is completed After the account is automatically triggered, the funds of the contract account will be automatically transferred to the account of the service side. If the transaction fails, the amount in the contract account will be returned to the demand side account [16].

(5) Evaluation management

The use of blockchain technology in the underlying shared logistics information platform of the sustainable electronic agriculture foundation has the characteristics of decentralization and non-tampering. Through the evaluation system, the service quality of the service party during the transaction can be evaluated. The characteristics of decentralization and non-tampering also ensure that the evaluation of unmanned intervention ensures the authenticity of the evaluation content and provides reference for subsequent traders [17].

2.1.3. Business Logic

The sustainable e-agriculture basic shared logistics information platform is a decentralized

service platform based on blockchain technology. According to the platform's business processes, the platform's business logic is mainly from the business oriented logistics resource sharing and decentralized payment process-oriented objects. The process is analyzed [18].

The business logic flow chart of the e-agriculture sharing platform is shown in Figure 1 below.

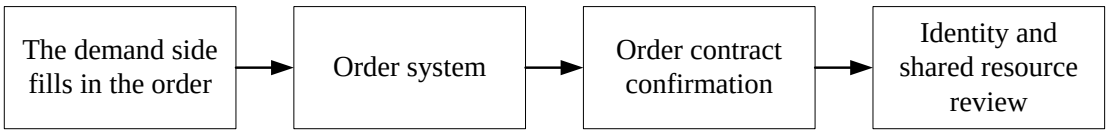

Figure 1. Logic flow chart of e-agriculture sharing business

(1) Business logic of electronic agricultural shared resources

In the process of sharing logistics resources, the online logistics information platform is operated through two methods: online publishing and searching and matching. The main business logic to achieve logistics resource sharing is as follows.

The supplier and the demander use the platform to register and log in. To ensure the security of the transaction, the supplier needs to conduct an online review of their identity and shared resources [19]. Take the demand-side online search matching as an example. The supplier uploads the temporarily idle transportation or storage resources according to the standardized format provided by the platform to form a resource database. The demand side seeks the logistics resources that meet the needs in the platform according to its own logistics needs. After the supply and demand match is successful, the two parties reach a transaction agreement to initiate the order demand. The system sends the order demand of the demand side to the supply side, and the supply side starts the order taking operation. After the order starts, the demand side, supply side and platform operator of the platform can display the real-time status of the order through tracking and positioning [20]. After the user's needs are completed, you can complete the entire logistics resource sharing process by clicking on the order to complete.

(2) Decentralized order business logic

By writing a warehousing smart contract and a transportation smart contract, the contract is deployed to the Ethereum network, and the order information in the contract is decentralized. Recording with the shipping order to achieve the non-tampering of the order and the decentralization of the transaction between the two parties [21].

After the order is confirmed, the demand side pays the prepayment required by the order to the smart contract account. The contract account can store the prepayment without human intervention, and can trigger the corresponding operation according to the order situation.

Settlement. If the order is not confirmed successfully, the prepayment stored in the smart contract account will be returned to the payment account of the demand side. If the order confirmation is successful, the contract execution will be triggered to transfer the prepayment to the supplier's blockchain account.

2.2. Blockchain's Sustainable Electronic Agriculture Basic Shared Logistics Information Platform Architecture

In the process of collaborative research on blockchain and shared logistics, this paper proposes an architecture model diagram based on blockchain technology. The model diagram is divided into four layers: user layer, business layer, network layer and data layer. Through the four-layer model, the collaborative interaction of various links in the process of shared logistics will be described. The specific content is as follows [22]. The detailed organizational function structure of the platform is shown in Figure 2 below.

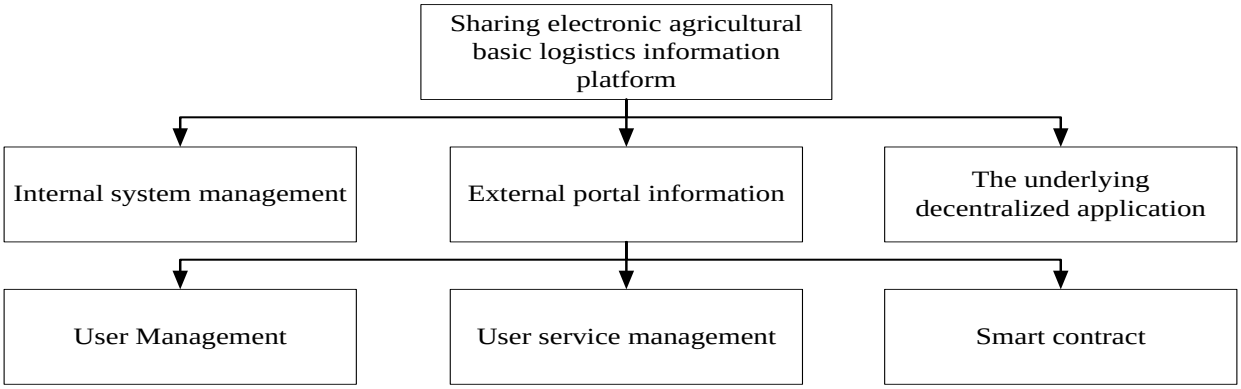

Figure 2. Organizational functional structure diagram of the electronic agricultural shared logistics information platform

2.2.1. User Level of Electronic Agriculture

The user layer is the subject that describes the participation in the shared logistics activities of e-agriculture. It contains many participating subjects and organizations, and the subjects and organizations are connected through logistics, information flow, capital flow, and business flow to form a user-themed network structure. It is mainly divided into: supply side, demand side and other supporters, of which the supply side and demand side are the starting point to realize the sharing of logistics resources, there is no obvious role restriction between the two, and they can be converted between each other [23-24]. Each user assumes a different identity in the platform to interact with the platform and provide different logistics resources. In the user layer, users who participate in the platform can make a point-to-point connection, and solve the trust problem of the connection process through the point-to-point network of the underlying blockchain to achieve a win-win cooperation between users.

2.2.2. Electronic Agriculture Business Layer

The e-agriculture business layer is to describe the sharing process of logistics resources. Recycling the temporarily stored logistics resources requires the logistics information platform to act as a bridge. Build an information platform to integrate information resources, human resources and logistics resources. Users of the participating platforms can achieve supply and demand matching through active publishing and online search in the platform according to their needs [25]. After the two parties reach a transaction agreement, a peer-to-peer payment channel is established through the support of the underlying blockchain technology to realize the decentralization of the transaction process. For other users participating in the logistics resource sharing process, in this business activity, according to the function of the information platform, they provide coordinated support in the realization of shared logistics activities in terms of information, policies, insurance, etc., and promote the process of resource sharing

2.2.3. Network Layer

The network layer is the transmission and exchange of data carrying the platform, mainly including P2 network, propagation mechanism and verification mechanism. Through a distributed peer-to-peer network model, network users use cryptography to digitally sign transactions and publish them to the blockchain network during the transaction process, and broadcast the entire network after the transaction is verified. This process cannot be tampered with and is safe and

transparent, ensuring the integrity and authenticity of the entire transaction process and solving the trust problem in the shared logistics process [26].

2.2.4. Data Storage Layer

Part of the data storage layer is the composition of the blockchain data structure, and the other part is the database that stores the data resources of the shared logistics information platform. The basic data layer of the blockchain mainly includes data blocks, digital signatures, chain structures, Merkel trees, hash functions, and public key encryption. These related data encryption technologies ensure the security of data storage. The storage part of the database department collects, maintains and updates data such as users, resources, and orders in the process of shared logistics.

2.3. Functional Modules of the Sustainable Electronic Agriculture Basic Collaborative Information Platform System

The shared logistics information platform is divided into three subsystems, including: external information portal system, internal system management and the underlying decentralized application system. The external information portal system is mainly for front-end users, including displaying platform portal information and industry dynamics, realizing user registration, review and login functions. The purpose of the platform is to realize the integration and sharing of idle logistics resources, through the user's temporary idle warehouse source , Vehicle source and cargo source and other information release or user online search function to achieve information matching and sharing transactions [27]. Internal system management is to face the platform system administrator, and realize the stable operation of the platform through the maintenance of background information by the administrator. The administrator maintains and audits the user information of the stationed platform according to the authority to ensure the authenticity of the user information, integrates and maintains the platform's logistics resources in the process of sharing logistics resources, and monitors the order status during the resource sharing process. At the bottom of the platform, through the introduction of blockchain technology, a decentralized application platform is constructed, important information generated during the transaction process is written into the blockchain using smart contracts, and the consensus mechanism is used throughout the network to jointly maintain and achieve decentralized transaction payment process [28-29].

3. Experiments

3.1. Ethereum and IPFS Network Construction

This article mainly introduces the construction of Ethereum private chain and smart contract development environment, and the application of IPFS. As a decentralized blockchain platform that can run smart contracts, Ethereum provides blockchain node clients based on various languages. This article uses The ethereum client node (referred to as Geth for short) based on go language. Since the prototype is deployed on multiple operating systems such as windows, ubuntu and mac, for different types of system platforms, the compilation and basic functions are introduced as follows:

(1) Windows: Since installing c language on Microsoft systems is relatively cumbersome, it is recommended to download Geth compiled directly from the official website, and I will not elaborate here;

(2) Linux system: download the source code, then enter the directory, run the make all command

to compile;

(3) Mac system: It is recommended to install through Homebrew, or you can download the source code to compile it yourself; after completing the node installation, you need to configure the blockchain initialization parameters, otherwise the node will link to the Ethereum main chain after operation, affecting the normal operation of the private chain and initiating The block refers to the configuration of the node corresponding to the blockchain, which is embodied as a json format file.

3.2. Experimental Data Collection

The application layer adopts Bootstrap, Html5 and other front-end technologies to adapt to the web browser and mobile terminal, and displays different services as visual applications. The service layer uses Laravel and web3.js to wrap various contract function functions into different service interfaces. The contract layer is based on the Solidity language to develop smart contracts that contain the business logic of each module. The blockchain uses Ethereum go-ethereum nodes. The routing layer uses the IPFS interplanetary file system, and the data storage layer uses mysql, mongoDB and Alibaba Cloud-based ftp-based database server. The stored data set comes from various sensor data collected by SD-WSN and Intel Edison Board development kit.

3.3. Experimental Background Management Module

The background management model includes three functions: BIZi node management, blockchain node management, and platform database management. The organization or alliance administrator responsible for maintaining the blockchain network is responsible. It does not participate in direct transactions, and only performs system operation and maintenance related management configuration. BIZi node management is responsible for the addition, deletion, and update of operation and maintenance network nodes. The blockchain node management is mainly to avoid more than 51% computing power attacks caused by malicious mining. Therefore, the sharing alliance jointly stipulates the list of nodes with mining rights. The platform database management function is managed by each institution or individual deploying the platform. Since the blockchain cannot be tampered with, a local database can be used to participate in the blockchain data cache to improve access efficiency. When acquiring data, it is also possible to access the downloaded data set using a local database through a web application interface. The management information is recorded on the contract, and the blockchain guarantees its non-tampering and security.

4. Discussion

4.1. Research and Analysis of Unstructured Data Storage and Platform Smart Contract of Electronic Agricultural Collaborative Information System

Structured data first defines the structure, and then fills in the data, but unstructured data first exists in the data, and then adjusts the generated structure. Common voices, pictures, videos, etc. are encoded according to specific application formats, and the amount of data is very large and cannot be converted into structured data is unstructured data. It is mainly stored by NoSQL database tools. The following analysis of four types of non-relational databases provides references for unstructured data sources, as shown in Table 1 below:

As shown in Table 1 above, the key-value database is more suitable for application scenarios where the database changes rapidly and the size of the database is predictable, such as communication data and real-time Internet of Things experimental data collection. Column databases are suitable for storing distributed data that requires random, real-time access, such as

data from various nodes in artificial intelligence experiments. The document database is suitable for storing semi-structured data with indexes, such as various network logs and logs of different experimental devices. The graph database is suitable for data with graphical relationships, such as social relationships, public transportation vehicle trajectories, and network maps.

Table 1. Analysis of non-relational databases applicable to the mainstream of electronic agricultural information sharing

Classification	Mainstream database	Performance	Expandability	Complexity
Key-Value	Redis,Riak	9.6	8.5	0
Cloumn	HBase,Cassandra	8.9	9.3	2.3
Document	CouchDB,MongoDB	8.5	4.7	1.4
Graph	Neo4J,OrientDB	5.8	5.4	7.6

* Evaluation level out of 10

Background management includes the basic system configuration to run the platform, recording the information necessary for the operation and maintenance of the platform; the current blockchain smart contract maturity varies greatly, and smart contracts, as an important component of blockchain programmable, affect Development cycle and security, so the research and analysis of smart contracts on each platform is shown in Table 2 below:

Table 2. Analysis of mainstream smart contracts

Blockchain	Programming language	Development tool maturity	Development difficulty
Ethereum	Solidity,Serpent,LLL	8.6	5.9
EOS	C++	6.3	2.6
BCOS	Java	5.3	1.6
Neo	Java,Python,C#	2.3	9.6
Fabric	Go,java,NodeJS	8.3	4.3

As shown in Table 2 above, Ethereum and Fabric can provide more mature smart contract development tools, which are suitable for interactive scenarios where the business logic is more complex and security requirements are high. The Neo platform is compatible with conventional languages, has low development difficulty, and low learning cost. It is suitable for simple business logic sample development.

4.2. BIZi Reliable Connection Collaborative Information Sharing Model Analysis

In this collaborative information sharing model, BIZi operation and maintenance nodes are mainly added for data backup. Users add files to the P2P network through IPFS to obtain corresponding hash addresses. When writing to the shared blockchain network, the nodes of the BIZi network use IPFS to obtain file blocks, Zigzag encode each block according to the number of its own nodes, and distribute and store it in the operation and maintenance network for data backup. A network list of operation and maintenance nodes is recorded on the district chain. After each file is backed up, the offset matrix and operation and maintenance node numbers are recorded on the chain for persistence. Analyzing from the fault tolerance rate, when the number of operation and maintenance nodes is 20, 50, and 100, respectively, as the number of file blocks increases, the number of node failures that the BIZi storage solution can tolerate is shown in Figure 3 below.

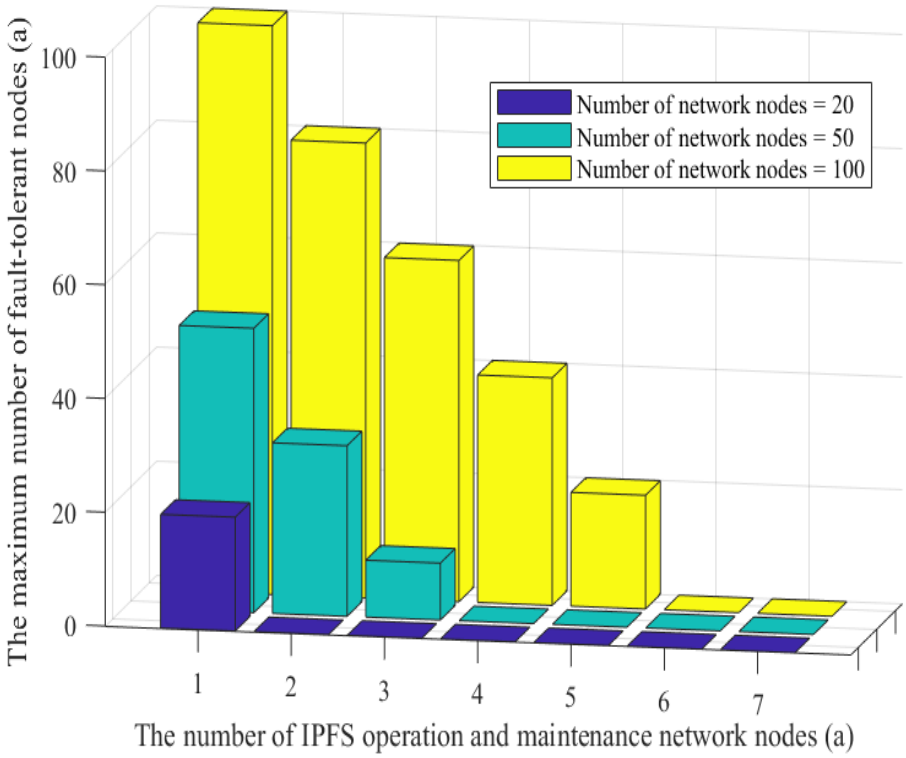

Figure 3. The BIZi scheme tolerates changes in the number of nodes

As shown in Figure 3 above, as the number of file partitions increases, the fault-tolerance rate of the scheme is higher, and the storage efficiency is better. That is, this solution can provide better backup results than large files for small files, and as the number of nodes increases, the larger the number of file blocks that can be backed up, the longer the distance to reach the minimum threshold. For the same number of fault tolerance, the storage space required by the original backup solution is compared with the BIZi solution as follows, assuming that the file is divided

The number of data blocks is O, the size of each block is M, and the number of operation and maintenance nodes is N. Because the average size of the word document per page is about 20k, the size of the image is about 1 ~ 10M when it is recorded in the picture. Therefore, M = 1 ~ 10, N = 20, 50, 100, the BIZi algorithm on the left, and the traditional algorithm on the right. The comparison of small file storage capacity for N> O is shown in Figure 4 below.

As shown in Figure 4 above, in terms of scalability, when it is necessary to add operation and maintenance nodes to improve data reliability and reduce the amount of data backup, only three steps are required: add the new node to the IPFS network to obtain the node address; The node address is written into the contract, stored by the blockchain, and the operation and maintenance node list is updated; the number of operation and maintenance nodes is modified; through three steps, when new files need to be backed up, the N + 1 number is directly used to calculate the three scenarios That's it. Node replacement only needs to migrate the old node file to the new node server, and then modify the new address corresponding to the operation and maintenance list on the blockchain.

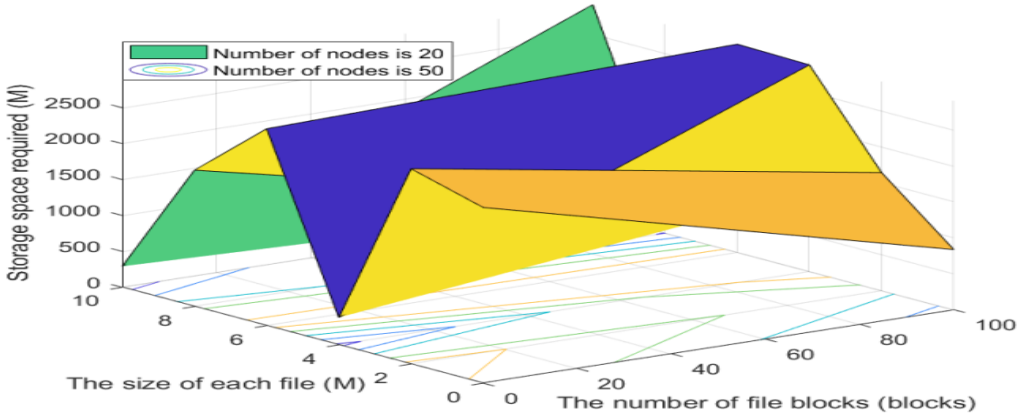

Figure 4. Storage space comparison when the number of nodes is 100

4.3. Analysis of Electronic Agricultural Business Information Sharing Model

The consumption review information sharing model studied in this paper is also a branch of e-commerce information sharing model. In many studies, we can know that the exchange of information shows a trend of integration. Currently, there are product information, sales information, and consumer reviews on various websites, all of which belong to the category of e-commerce information.

4.3.1. Impact and Extent of Online Consumer Reviews on Other Consumers

The behavior of online consumers is comprehensively affected by the various kinds of information they receive, and the information will interact. Online consumption evaluation is often the same as online advertising, which will affect consumers' decision-making to a certain extent. This article believes that consumers' consumption evaluation will be better than traditional advertising. The experimental results are shown in the following figure 5.

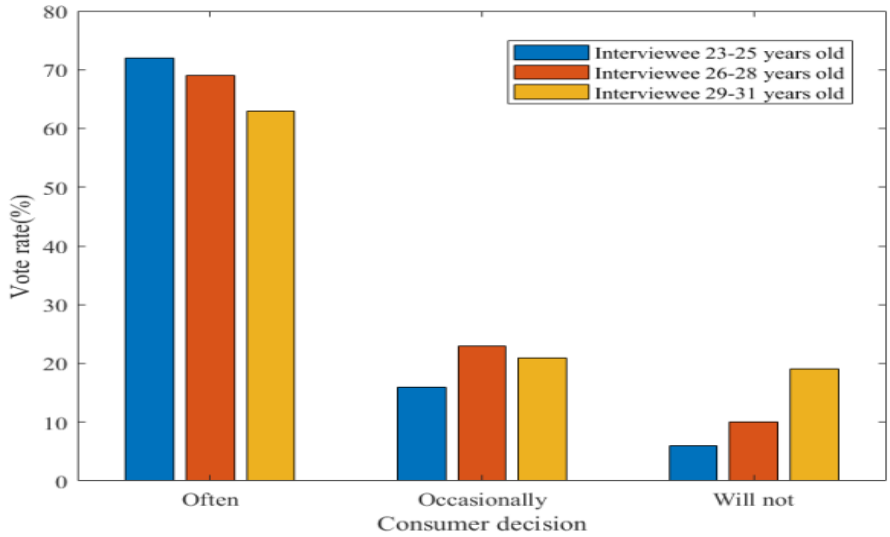

Figure 5. Survey of whether consumers will browse the website community

As shown in Figure 5 above, we can see that the consumption behavior of modern consumers is

mostly from a rational point of view, their behavior is not blind, they will more or less refer to the evaluation of other consumers to obtain their own needs Information. From this we can draw two conclusions: users tend to search for products in online community forums. When consumers are interested in a certain product, they will query the information of the product through an online forum in order to fully obtain the product information. Consumers are both spokespersons of information evaluation and recipients of information. When consumers choose products, their consumption decisions will be affected to some extent by these information.

4.3.2. Process Analysis of Consumer Reviews

Shareability. The social space in which people live requires people to communicate and interact in it. Information exchange is one of the contents. Before the purchase, more than 80% of the users will post relevant comments in the online community. Of course, the difference is that different consumers have different comments. The experimental results are shown in Figure 6 below.

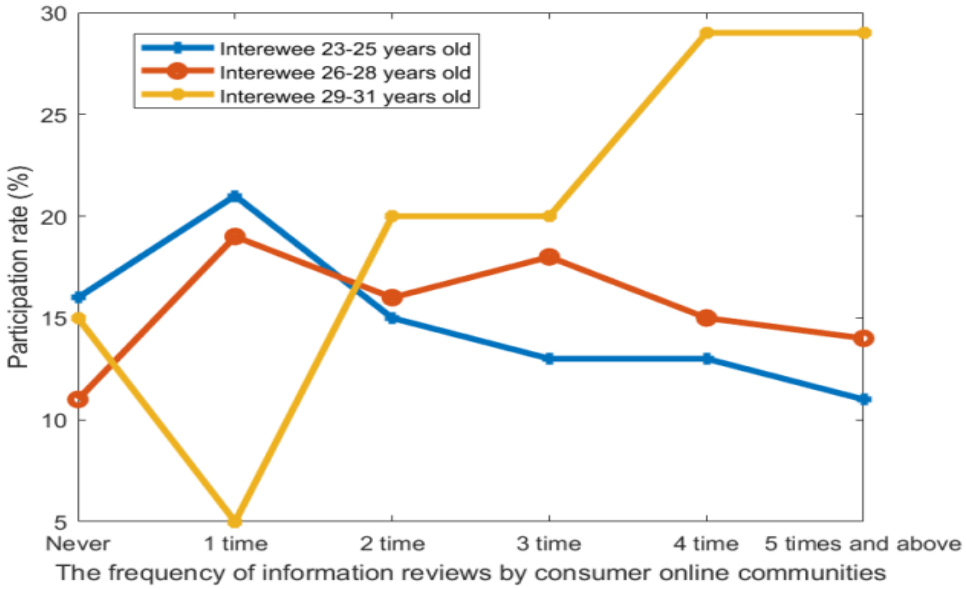

Figure 6. Netizens posted comments in the community one month after purchasing goods

As shown in Figure 6 above, in the traditional exchange of information, the publisher of the information is often some more authoritative institutions and departments. The general public here is more of a role as a receiver of information. This type of information exchange is very limited. We can see that after consumers purchase products, the frequency of information reviews in the online community is higher, which makes the sharing of information reviews stronger.

5. Conclusion

Based on the research of the above model and sharing mechanism, this paper designs and implements a prototype of a big data electronic agricultural collaborative information sharing system based on the Ethereum blockchain, using SD-WSN and Intel Edison sensor kits and other equipment for data collection, according to different Data types are stored in MySQL, MongoDB, Alibaba Cloud, ftp server, etc. as data sources, which constitute the data storage layer. Write the data information and access method to the IPFS file system according to the specific data description file format. The blockchain layer is composed of the Ethereum private chain, adopts

asymmetric encryption technology to ensure data security, and the pow algorithm implements information exchange consensus.

The system prototype provides users with functions such as data management and intelligent data service customization for different fields, and performs performance tests on the blockchain consensus speed and IPFS file transfer speed. By comparing the reference frequency and download frequency of a typical big data sharing platform, it shows that the platform can fully meet the sharing needs in performance and is scalable. All interactive information flows are recorded on the blockchain, which can be connected by data through transactions , Control, and service customization provide a transparent, credible, open, and equal interactive environment.

Consumer information screening is difficult and time-consuming. With the development of the Internet and the advent of the WEB2.0 era, various websites have sprung up. Faced with a wide variety of online stores with various contents, consumers search for the required product information through search engines The amount of information searched is too large, and part of the information obtained is not related to the information that consumers themselves need, and it takes a lot of time to check and filter.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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