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Retraction

Retracted: The Path of Digital Government and University Asset Intelligence Value-Added Service Driven by Block Chain Technology

Journal of Electrical and Computer Engineering

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Journal of Electrical and Computer Engineering has retracted the article titled "The Path of Digital Government and University Asset Intelligence Value-Added Service Driven by Block Chain Technology" [1] due to concerns that the peer review process has been compromised.

Following an investigation conducted by the Hindawi Research Integrity team [2], significant concerns were identified with the peer reviewers assigned to this article; the investigation has concluded that the peer review process was compromised. We therefore can no longer trust the peer review process, and the article is being retracted with the agreement of the Editorial Board.

The authors do not agree to the retraction.

References

[1] Q. Feng, `R. Mohd Ramli, and Y. Liu, "The Path of Digital Government and University Asset Intelligence Value-Added Service Driven by Block Chain Technology," *Journal of Electrical and Computer Engineering*, vol. 2022, Article ID 3797548, 12 pages, 2022.

[2] L. Ferguson, "Advancing Research Integrity Collaboratively and with Vigour," 2022, https://www.hindawi.com/post/advancing-research-integrity-collaboratively-and-vigour/.

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Research Article

The Path of Digital Government and University Asset Intelligence Value-Added Service Driven by Block Chain Technology

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At present, the government and universities mainly adopted the centralized management mode in the sharing of asset digital resources, which not only had low work efficiency, but also cannot make full use of resources. Block chain technology played an important role in enterprise asset data resource data sharing, but there was less research on asset data sharing services applied to digital government and universities. Therefore, this paper proposed the research on the path of government and university asset value-added service driven by block chain technology, in order to provide reference for improving the utilization rate of state-owned assets and better meeting the needs of users. Based on the research on the problems existing in the digital resource management of relevant government agencies and university departments at home and abroad, combined with the application advantages of block chain technology in relevant fields, this paper analyzed the composition of block chain and the application technical characteristics of value-added services. Starting from the current situation of asset data information management by the government and universities and the needs of users for resources, this paper expounded the important impact of block chain technology on digital government and university asset information management. By analyzing the elements of block chain value-added service, this paper put forward the block chain-driven asset intelligent value-added service mode. In order to track and manage users' transaction information and meet users' demand for resources, the application path of asset intelligent value-added service driven by block chain technology was constructed based on the asset value-added service mode, and combined with the characteristics of users' request for resources, the implementation method of asset intelligent value-added service path was proposed. The experimental results showed that the method proposed in this paper had more advantages than the existing data sharing service system, and can effectively provide technical support for asset value-added services.

1. Introduction

With the development of the digital era, data has not only become an important resource and production factor in various industries, but also provided important support for global economic development and governance. In recent years, western countries have gradually realized digital transformation through the rapid development of information technology. Governments and institutions of various countries have continuously improved the relationship between the government and the public by strengthening the development concept of digital government and adhering to the user demand orientation. Especially in recent years, some governments attach great importance to digital management and transformation, and have achieved some results in many fields [1]. The government, universities, and other institutions have a large number of information resources, especially asset data information. However, affected by the professionalism of resource development and management system, these departments not only lack the ability to manage asset data resources alone, but also generally have low efficiency in the use and management of existing asset data resources. Therefore, the establishment of an efficient asset data resource value-added service model can not only save financial investment for the country, but also avoid the

repeated development of asset data resources and enhance the added value of asset data resource information.

Block chain technology uses a kind of new distributed infrastructure and computing paradigm, which uses block chain of data structures to verify and store data, uses distributed node consensus algorithm to generate and update data, and uses cryptography to ensure the security of data transmission and access. As a new technology, block chain can not only drive the rapid development of related industries, but also has broad development space and application prospects for improving the digital management level of government and universities. Block chain has the technical advantages of decentralization and anonymous use [2]. It can not only solve many problems existing in the process of digital transformation of governments, universities, and other institutions, but also promote the digital management of various industries. As a systematic project, to realize the digital transformation of the government or universities, we must change the management mode of the government and turn the traditional process management of the government or universities into modern data management. Through the process of management of resource information, it mainly follows certain norms and standards. The management of resource information through data focuses on personalization and refinement.

The relevant departments of the government and universities have mastered certain asset information data. Therefore, the digital transformation of the government or universities is not a single use of information means to manage asset information, but to make full use of block chain technology to improve the value-added service function of the government and universities on assets [3]. From the above analysis, it is very important to adopt new technologies and make overall planning and deployment for the digital transformation of the government and universities from a macro perspective. On the basis of improving the asset management system and mechanism, it is necessary to further clarify the path for the government and universities to realize the digital service of asset information, and organically combine the block chain technology with the digital transformation of the government and universities. At present, there is little research on the application of block chain technology to the asset management of government and universities. Therefore, this paper studied the application of block chain from the perspective of asset value-added services of government and universities. By analyzing the value-added service characteristics of block chain technology and its impact on the asset management of the government and universities, this paper proposed to build an asset intelligent value-added service path driven by block chain technology. This study can not only provide a reference for improving the asset management level and efficiency of the government and universities, but also provide ideas for the value-added services and development of existing assets.

2. Related Works

Information resources, including asset information resources, can generate higher value when shared and traded. So, in order to improve the utilization value of resource information, some scholars have carried out a lot of research on data resource sharing methods. Most researches focus on data sharing methods based on cloud services, distributed data sharing, and block chain. [4, 5] The data sharing scheme based on cloud services mainly adopts the cloud center as the data storage and management platform, which can facilitate customers to remotely access the data services provided by the cloud center [6]. Although users do not have to establish and maintain their database, when the cloud center system fails, it may lead to data leakage. Therefore, data privacy and security cannot be guaranteed. Therefore, some scholars began to use distributed systems to solve the problems of cloud center services. The distributed data sharing scheme can store data on multiple different servers [7]. Each network node of the distributed system can perform independent calculation, which can not only complete local calculation tasks, but also complete global calculation tasks in the distributed network environment. Because each node in the distributed network can complete the computing task alone, when a node is invaded by hackers, the data is still stolen, so the user's data security cannot be guaranteed.

Although cloud computing can realize the storage, processing, and distribution of large data, the system based on cloud services usually has the problem of data island, which is not ideal for data driving and analysis. As an emerging technology, block chain can avoid the above problems and get better application in many fields. Using block chain to realize data sharing can better ensure the consistency and security of data. In recent years, data sharing based on block chain at home and abroad is mostly used in the Internet of things, e-government, financial services, intelligent medical treatment, supply chain, and other industries [8, 9]. With the continuous development of digital government and universities, the data resources owned by the government and universities continue to accumulate. Through the sharing of government data, it is of great significance to realize the transformation of government, the development of universities, and the transformation of social demand model. Existing studies have shown that by establishing a data sharing platform based on block chain technology, government agencies can not only provide safe and reliable data resource services, but also effectively reduce management costs and increase the transparency of government agencies to the society.

Based on the in-depth analysis of the operation mechanism of government data resource sharing, some scholars have conducted in-depth research on the government security sharing system driven by block chain technology. Considering the privacy protection, some scholars proposed that the government data sharing system can guarantee the rights and interests of users through the decentralized alliance mechanism [10]. According to the existing research, the data sharing driven by block chain technology can effectively solve the centralization problem of centralized management by using a trusted data sharing platform. Although data sharing based on block chain technology has been well applied in relevant fields and can meet the development needs of some industries, there are still some deficiencies in the block chain system.

With the rapid development of information technology, the resource information of government and colleges and universities is also continuously open and improved to the public. Some scholars have proposed to build a value-added service system for government and university information resources [11, 12], and different social institutions, enterprises, or individuals can use data mining technology to secondary develop and process information resources. In the existing government and university asset management models, most of them adopt centralized management, which not only has some problems in asset procurement budget, instrument utilization, or equipment management, but also is not ideal in the division of responsibilities, information feedback, and work efficiency of relevant departments. According to the existing research, the use of block chain technology can improve the trust and transparency of the government and relevant departments of colleges and universities in the process of asset management. Recording relevant asset transaction information through block chain can not only give full play to the utilization value of existing assets, but also improve the management efficiency.

3. Relevant Concepts

3.1. Asset Data of Government and University. The government and universities are the institutions governing society and cultivating higher talents for society. They have mastered many important data resources, and some non-confidential data can be shared with enterprises or individuals in need through technical means, including asset data. The assets of the government and universities mainly include current assets, long-term investments, fixed assets, intangible assets, and other assets. As the main body, the government and universities can use assets to provide public goods and services to fulfill their responsibilities. The data reflected by the assets are important basic guarantee resources for the government and universities themselves, and important information sources or action basis for other enterprises and individuals in need. For example, in recent years, where does the government invest in the short and long term？ Which parts of fixed assets of the government and universities grow faster？ These asset data are of reference value to some enterprises or individuals, and on the premise that these data can be shared, they have the possibility of appreciation. As the amount of asset data of the government and universities is very large, what data can be shared and what data is needed by society? If only relying on manual centralized statistics and transmission is very inconvenient, and also blocks the possibility of the valuable asset data appreciation. At this time, a safe and convenient technical means is needed to help the government and universities realize the value increase of these asset data. The block chain technology studied in this paper is such a technology.

3.2. Block Chain Theory

3.2.1. Composition of Blocks and Their Links. Block chain is a data structure type that takes blocks as nodes and then links several blocks. As the basic structural unit and main storage structure of block chain, blocks are usually composed of block header and block body. Block is a special data structure used to record transaction information, which can reflect the relevant attributes of transaction information in the block chain [13]. As shown in Figure 1, the basic structure and composition of the block are described.

The newly created block not only records the transaction information within a certain period of time, but also contains the hash value of the previous block. Using this parameter, you can link to the previous block and construct a complete block chain. The generation of new blocks usually requires the hash value of the previous block, the parameters of the new block header, and random numbers. Connecting the blocks of completed transactions with each other can form a complete block chain [14]. Each block contains the hash value of the previous block. Each block can find its previous block through the hash value. Therefore, these related blocks can form a chain. The block chain divides different data information into several blocks, and each block is linked to the previous block in a certain order. Since the whole chain structure contains all complete data, the block chain does not allow tampering with the data information in the block. The structure of block chain is shown in Figure 2.

3.2.2. Block Chain Types and Attributes. As a distributed shared ledger and database, block chain is characterized by decentralization. The block chain adopts a consensus mechanism to enable each node on the chain to realize trusted transactions in a network without mutual trust. Since the use of block chain is not interfered by third-party institutions, it can not only save the verification cost of the server to a certain extent, but also reduce the performance bottleneck caused by the centralized system. All blocks in the block chain record certain transaction information. When a transaction occurs in a block on the block chain, a new block will be generated and the relevant information will be published to all nodes on the chain. After all nodes pass the verification, the block will be linked to the last node of the block chain. Each block node on the block chain stores the hash value information of the previous block. If the block information on a node changes, the hash value stored in its associated node block will change accordingly. If the request of a block to modify the information is not approved by most nodes on the block chain, the block information update fails, so that all block data in the block chain can be protected.

According to different access modes of block chain, block chain can be divided into unlicensed and licensed. Unlicensed block chains are called public chains, while licensed block chains are called license chains [15]. According to the degree of openness, the licensed block chain can be divided into private chain, alliance chain, and hybrid chain, as shown in Table 1.

Among different types of block chains, the public chain has the highest openness. Any user can not only trade on the public chain, but also obtain the data on the block chain. Usually, all nodes in the public chain store copies of the

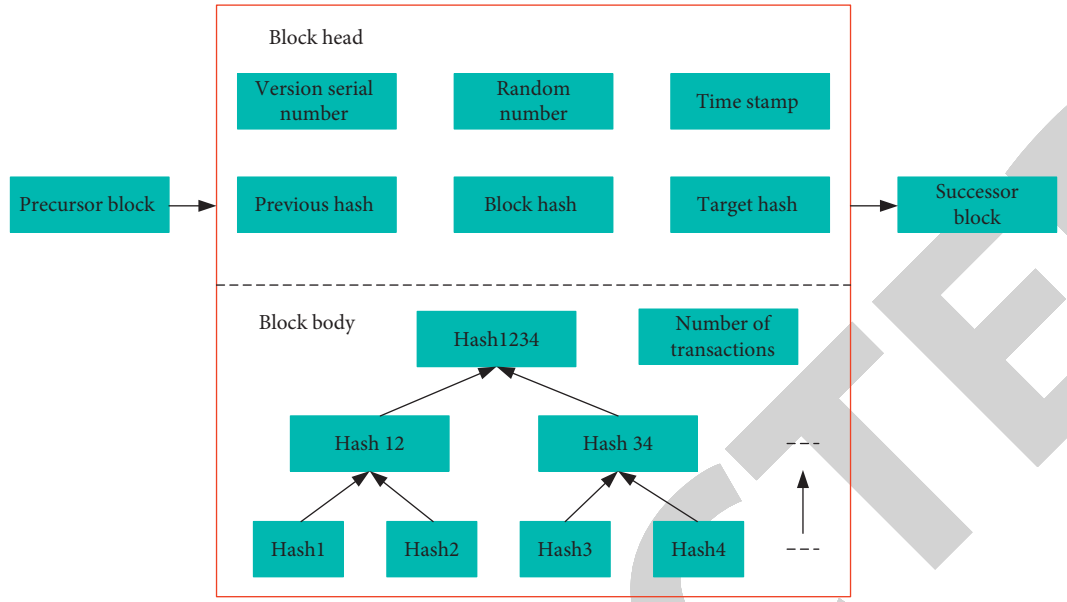

Figure 1: Block internal structure diagram.

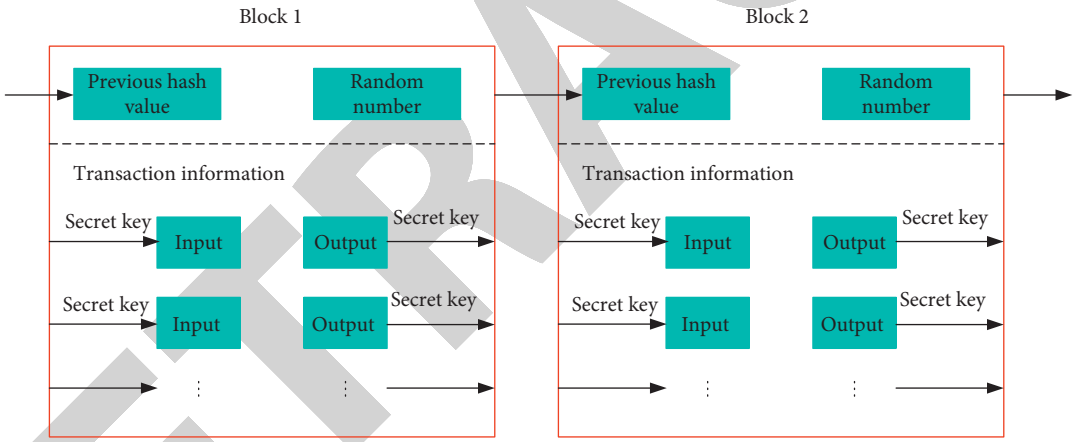

Figure 2: Block chain structure diagram.

Table 1: Block chain classification table.

Type	Main characteristics
Public block chain	Accessible to all users
Private block chain	The user's write operation is authorized by the administrator
Hybrid block chain	The transaction is not open to the public and needs to be opened after verification
Licensed block chain	Nodes can join block chain after being licensed
Alliance block chain	The consensus process is controlled by candidate nodes

ledger. At the same time, because anyone can freely join or launch the system without authorization in the public chain, there are certain regulatory problems in the public chain. So, the public chain is not suitable for asset information resource management of government and universities.

Generally speaking, nodes in the system can only join the licensed block chain after being approved. Private chain and alliance chain belong to licensed block chain. The private chain is usually not open to the public, and its access rights are determined by the system administrator. Among all block chains, private chains have the lowest degree of openness and are similar to centralized databases. Affected by the number of participants and the scope of consensus, compared with other types of block chains, private chains have greater scalability and processing capacity. The alliance chain is usually managed by relevant organizations or institutions. Only relevant members are eligible to join the system, and its openness is generally between the public chain and the private chain. The reading, writing, and bookkeeping of block data on the alliance chain are mainly controlled by the alliance consensus. Organizations in the alliance chain generally have several nodes, and the read-write operation and transaction process of block data on the

alliance chain can only be controlled by the organization [16]. At present, private chain and alliance chain are usually used in the asset information resources management of the government and universities because they have higher security and can protect the data resources of the government and universities from infringement. Secure and reliable data sharing technology is the core of digital government and universities construction. The distributed, consensus and encryption characteristics of block chain technology can promote decentralized and localized decision-making technology, thus helping the government and university administrative departments to break information barriers and break through data islands.

Members in the hybrid block chain can decide the transaction rights of other nodes and which transaction records can be disclosed to the public. The hybrid block chain can be customized according to the needs. It has the characteristics of both private block chain and public block chain. For example, although the hybrid block chain is not completely open to the outside world, it still maintains the characteristics of data security, transparency, and integrity.

3.3. Block Chain Technology Architecture. Block chain-based technology system usually consists of data layer, contract layer, network layer, incentive layer, consensus layer, and application layer, as shown in Figure 3. As the supporting part of the block chain technology system, the data layer and the network layer together serve as the basic network layer. The consistency layer contains the consistency algorithm of each node in the block chain. The incentive layer is used to motivate the block chain, and the contract layer includes relevant algorithms and intelligent contracts. The application layer mainly provides various upper layer applications for the block chain [17].

The data layer belongs to the physical structure of the block chain. The data layer part contains all the underlying data of the block chain, data encryption methods, timestamp, block structure, and other information. Block chain is a data structure formed by connecting each other according to the time sequence of each block. All blocks are formed by encryption methods. The newly generated blocks are usually placed at the end of the block chain, and the transaction information of the blocks cannot be tampered with.

The network layer mainly includes various protocols used in the block chain network. These include the P2P network protocol for building block chain, the communication protocol for transaction broadcasting, and the verification protocol for transaction verification before submitting data to the ledger [18].

According to the P2P protocol, all nodes constituting the block chain network can be organized together, in which the power and task of each node are the same, and the propagation protocol is mainly used to maintain data synchronization. For example, when a node in the block chain makes a transaction, it needs to broadcast relevant information to other nodes. Verification protocol is mainly used to standardize various transaction structures in order to organize different transactions into blocks.

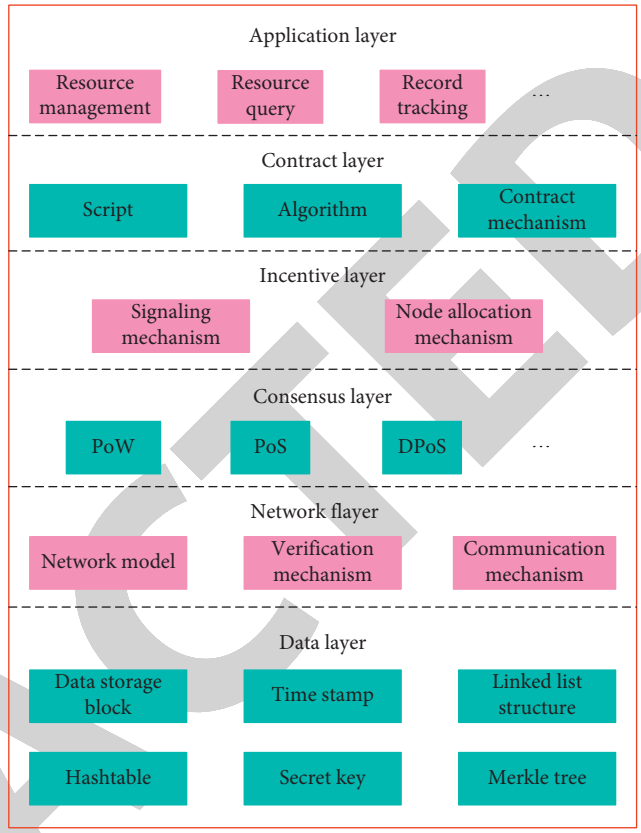

Figure 3: Schematic diagram of block chain application infrastructure system.

The consensus layer is mainly used to encapsulate the consensus algorithm of each node in the block chain network. Consensus generally means that different users reach an agreement on an event. As one of the core elements of block chain technology, the consensus mechanism of block chain stipulates how each node involved in bookkeeping can reach a consensus with each other, so that the whole block chain system can complete various tasks through efficient cooperation and ensure the continuous operation of the system. Generally, block chain can adopt different consensus algorithms according to different application requirements.

The incentive layer mainly adopts a certain incentive mechanism for the block chain, such as mining incentives to encourage all block nodes to participate in bookkeeping, and timely verify the transaction information, so that the block chain ledger information can be continuously updated.

The contract layer mainly encrypts and digitizes the code and stores it in the block chain to protect various algorithms and smart contracts. When certain conditions are met, the non-tamperable trusted data can automatically complete the corresponding operations according to the predetermined rules and contracts, so as to ensure that the users can realize various transactions anonymously.

3.4. Application of Asset Value-Added Services Based on Block Chain Technology. The asset value-added services based on block chain technology are mainly transferred from

traditional asset data collection, processing, and delivery services to asset value-added services such as knowledge discovery, data mining, organization, and information sharing according to the different needs of users. Taking block chain technology as the core and integrating other related technologies, the needs of users are constantly changing for asset data information resources. Through the global, data-based, and intelligent application services provided by block chain technology, users' demand for information can be changed from passive reception to active perception [19]. For example, digital governments and universities can become the organization managers of asset information, and use block chain technology to realize intelligent value-added and accurate services for asset data.

The block chain realizes decentralization, that is, there is neither central node nor central constraint in the block chain system. All transaction records and storage are completed through nodes, and each node has the same status. Because all asset data are stored in chain data structure, the security of relevant asset data can be avoided due to external attacks on the central data, so as to truly realize the distributed storage and information sharing of asset data. As shown in Figure 4, it shows the asset data value-added service application framework based on block chain technology.

The decentralization of block chain technology can change the functional positioning, management, and service mode of the government and various departments of colleges and universities. Using distributed block organization can realize asset data maintenance, resource sharing, and data perception, and solve the problem of diversity of asset information sources. Users can timely obtain the required information through the block chain system, so that the government and universities can change from information pushers to organization managers, so as to avoid users' excessive dependence on the government and University asset managers.

The government and universities manage a large number of data resources related to asset information. If these resources are tampered with, they will cause huge losses. In order to improve the use efficiency of assets and the level of value-added services, data storage must be safely managed, which is the key to the realization of asset intelligent value-added services. With the continuous opening and application of various resources, the premise of intelligent value-added services is to digitize the existing asset resources and meet the needs of different users for relevant asset data resources through digital storage.

For a large number of physical and virtual asset data resources, the block chain system effectively mines asset data through big data analysis and data mining technology, and deeply integrates, associates, and analyzes the corresponding data and user behavior characteristics according to user needs, so as to ensure that users get the access to the required asset data.

For the massive asset data, how to effectively screen and distinguish from the existing resources, fully tap the use value of resources, and improve the efficiency of asset management services of the government and universities is the key to realize the digital asset management level of the

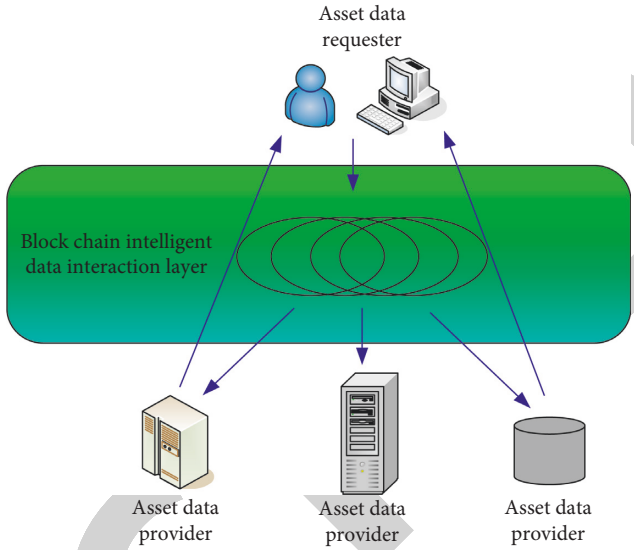

Figure 4: Asset value-added service application framework based on block chain technology.

government and colleges and universities. Due to the time lag and insufficient sharing of asset data resources, users are usually difficult to obtain the required resources, resulting in the decline of the use value of asset data resources. If asset data resources are shared among users or spread and shared, not only the sharing speed is slow, but also the resource utilization is low. As the block chain technology adopts the consensus mechanism, except that the transaction information between nodes is encrypted, all other nodes usually reach a consensus, which can not only effectively ensure the authenticity and effectiveness of transaction records, but also improve the sharing of asset data resources. These make the asset data sharing value-added service of digital government and university more secure, reliable, and convenient.

4. Block Chain Technology Driven Asset Intelligent Value-Added Service Path Construction

4.1. The Impact of Block Chain Technology on Government and University Asset Management. Using traditional data sharing methods is usually difficult to meet the needs of users for asset information, while using block chain technology to manage the existing asset information can ensure the consistency and effectiveness of data. Because the asset management between the government and colleges and universities is an asset transaction activity through the purchase and resource allocation of assets by relevant personnel, the traditional asset management between the government and universities usually has some problems, such as difficult dynamic monitoring and management, not transparent enough and not smooth information, which leads to the arbitrary and disorderly asset management between the government and universities. If the block chain technology is applied to the asset management of the government and universities, the asset information management of the government and universities can be realized

through the distributed data statistics method. Because the collection and flow direction of asset information can not only realize the corresponding data tracking through data monitoring, but also summarize the details of various assets [20]. If the asset information is insufficient, it is necessary to effectively manage and apply the relevant data resources, so as to ensure the authenticity and effectiveness of the asset information during the dynamic management and application of the asset.

Using block chain technology can not only improve the efficiency of asset operation and management, but also enhance the business ability of government and university asset managers. Using the traditional way of resource allocation and asset operation, most of the main assets formed by the government and universities rely on state funding, and these infrastructure or resources lack an effective management system. For example, the loss and depreciation of assets after use are usually difficult to be counted through data, so it is impossible to maintain and increase the value of assets. If block chain technology is applied to the asset management and operation of the government and universities, relevant intelligent calculation methods can be used to obtain the cost of asset loss, repair and depreciation, and optimize the allocation of resources through effective algorithms, so as to improve the efficiency of resource use. In addition, block chain technology can not only simplify the workload of asset managers to a great extent, but also improve the efficiency and effectiveness of asset management.

Block chain technology can not only change the asset accounting method to a certain extent, but also improve the scientific management level of assets. The asset accounting and management of government and universities is the routine work of asset operation. If there is no effective communication and cooperation in the accounting and valuation of assets, it will not only lead to the problem of unclear accounts in the operation and accounting of assets, but also affect the final statistical results of assets [21]. If block chain technology is applied to asset accounting, it can not only be processed quickly through the data information system, but also save a lot of human resource costs. In the past, the government and universities mostly had the problems of unclear property rights and unclear responsibilities in asset management, and the asset operation and management mechanism was not standardized, resulting in the low level and quality of asset management. [22] Block chain technology can apply the data information system to the management of relevant personnel and asset operation, so as to improve the scientific level of asset management.

4.2. Block Chain Driven Asset Intelligent Value-Added Service Mode. At present, the asset value-added service mode of the government and universities generally has the problems of insufficient integration and integration of resource information, limited service scope, and low work efficiency. By driving and constructing the asset value-added service mode of digital government and universities through block chain technology, we can not only reduce the asset operation and service cost of government and universities, but also effectively improve the use value of asset resources and social benefits [23, 24]. Government and university asset data contain a large number of valuable information resources, which can be processed and transformed into commodities through market-oriented business philosophy. Then, we can use social forces to carry out value-added development of asset information resources related to people's livelihood and turn them into high value-added information commodities to meet the needs of different users. The constituent elements and relationships of asset information resource value-added services are shown in Figure 5, including the main body providing services, users and their needs, service mode, and other core elements.

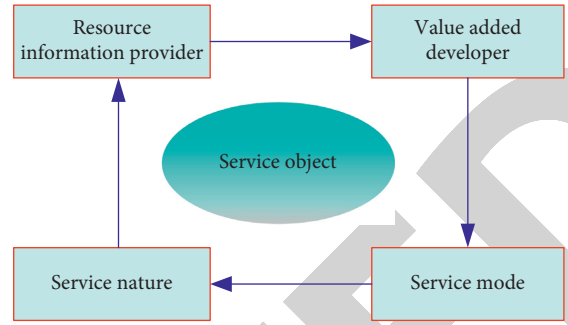

Figure 5: Elements of asset data resource value-added services.

When establishing the value-added service mode of asset information resources of the government and universities, it is necessary to clarify the subject of providing services and the content of services. Generally speaking, as long as the institution has the asset information resources of the government or universities, it can be regarded as the main body of providing services [25]. The relevant departments of government and universities have the right to manage asset information and are the main body of providing asset value-added services. Since most of the asset data provided by the government and universities are original information resources, these original data can be deeply processed and value-added services can be processed according to the needs of users, and the required service contents can be provided to different users.

The asset value-added services provided by the government or universities to users are mainly value-added products formed on the basis of information resource processing. These value-added products include intangible products and tangible products, of which intangible products are mainly provided to users by means of information consultation or inquiry [26]. At present, the information value-added services adopted by the government are mostly asset database and information services.

At present, the government or universities mostly adopt the operation mode of market-oriented value-added services supplemented by public welfare value-added services. In order to improve the ability and efficiency of asset value-added service, the asset value-added service model with the government and universities as the main body can realize the

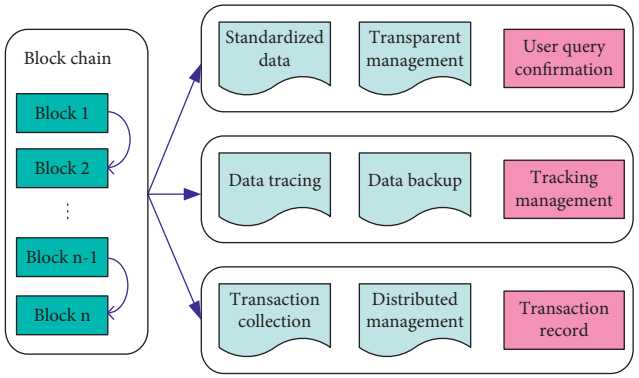

Figure 6: Block chain driven asset value-added service model.

mutual supplement and support of asset information through the cooperation, development, and utilization between the main bodies. As shown in Figure 6, it describes the block chain driven asset value-added service model.

4.3. Block Chain Technology Driven Asset Smart Value-Added Service Path. The asset value-added service model based on block chain technology has certain adaptability and scalability. Using the decentralized nature of block chain, the non-tamperability of data, and the consensus mechanism, we can safely store the asset information resources and user data of government or universities [27]. At the same time, in order to quickly provide relevant asset information resources according to users' needs and realize the interactive communication between asset management departments and users, organically combine asset managers and users, user and demand information and intelligent value-added services, and build an application path of asset intelligent value-added services driven by block chain technology, as shown in Figure 7.

Using the above asset value-added service application path can better track and manage the transaction information of users, so as to effectively grasp the information acquisition, communication, and interaction process of users in the transaction process. The asset information query, data mining and analysis and value-added services driven by block chain technology are not controlled by the background of the asset information management system. The time stamp technology of block chain is used to record the relevant information of users using assets in the whole process. At the same time, the consensus mechanism of block chain can be used to realize the fusion processing of all nodes. By reviewing the authenticity of node records, node transactions and information can be avoided from being tampered with.

The asset value-added service path based on block chain technology can not only ensure the effective storage of information resources and the security of user transactions, but also realize the transformation from traditional knowledge acquisition to value-added services. It is of great significance for users to mine and use asset information.

When asset information resources and customer data are stored on different nodes of the block chain, through the

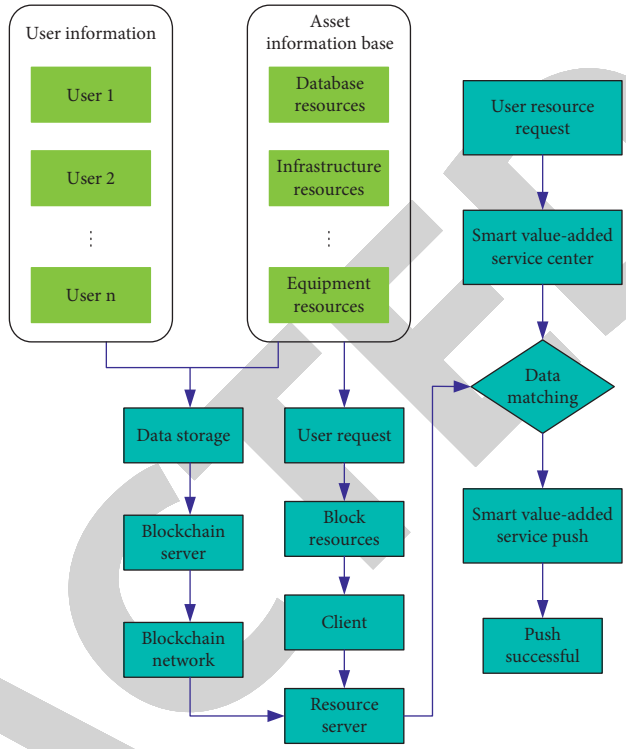

Figure 7: The application path of asset intelligent value-added services driven by block chain technology.

review of the storage node by the block chain, once the node is authorized, it can obtain the approval of the block chain system, and use the propagation mechanism to inform other nodes of the storage request by broadcasting. When the authorized node receives the storage request of the relevant node, it forms the stored information into a block through the consensus mechanism, stamps it with a time stamp, and then adds it to the block chain.

The use of block chain linked storage data structure and encryption method can effectively solve the problems of the government and universities in asset information resource storage security and user data protection. Connect the data block to the block chain network through the block chain system, store the asset information resources and database resources in the block, and send them to the resource server according to the user's resource request.

The block chain system decrypts asset data resources through the block chain private key according to the user's needs for different resources, and provides value-added services to users. The application path of asset smart value-added services of the government and universities is designed based on block chain technology, which not only effectively improves the ability of value-added services, but also can fully meet the personalized needs of users for asset information.

4.4. Implementation Method of Asset Intelligent Value-Added Service Path. When the user makes an asset data request, the requester first publishes the demand information. After receiving the request information, the block chain system

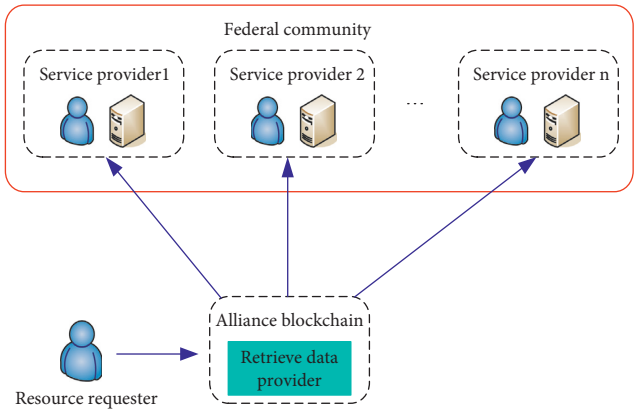

Figure 8: Schematic diagram of asset resource request publishing and asset data forwarding structure.

carries out relevant data processing until the response result is fed back to the user and the data sharing is completed. The implementation process of the asset intelligent value-added service path is shown in Figure 8.

When the user issues an asset data sharing request on the block chain, the block chain system matches the request information with the data stored by all nodes on the chain, and searches out the service subject set $S = \{S_1, S_2, \ldots, S_N\}$ related to the request information. The system forwards the request information to the service provider, and then the data provider in set $S = \{S_1, S_2, \ldots, S_N\}$ responds to the request information, thus forming a federated learning community. By implementing the federal learning algorithm and consensus algorithm, community members select an accounting node to complete the data sharing transaction, and upload the generated blocks to the block chain. Finally, the requester obtains the required shared data by downloading the encrypted block file.

Considering that the request information sent by the user is generally in the form of text, and the data provided by each node on the block chain is also a text type, it is necessary to process the text and convert it into a data type that can be recognized by the computer. In addition, in order to realize data query and matching, it is necessary to build a vector space model (VSM) to convert the text into spatial vectors, and calculate the distance between vectors to represent the similarity between the texts [28]. Among them, the vector is mainly represented by feature items and corresponding weights.

Usually, a text is represented by a set containing multiple feature items, which can be expressed as follows:

$$D = \{d_1, d_2, \ldots, d_N\}, \tag{1}$$

where d_i is the feature item, $1 \le i \le N$.

Since each feature item d_i corresponds to a weight v_i, then the text T can be expressed as follows:

$$T = D\{d_1, v_1; d_2, v_2; \ldots; d_N, v_N\}. \tag{2}$$

Taking the feature item $(d_1, d_2, \ldots, d_N)$ as the coordinate system in VSM and the weight $(v_1, v_2, \ldots, v_N)$ as the corresponding value on each coordinate axis, T can be

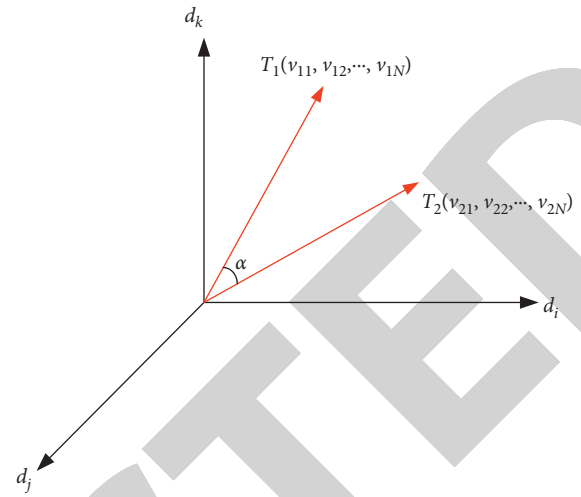

Figure 9: Schematic diagram of vector space model construction.

expressed as a vector in VSM. The constructed VSM is shown in Figure 9.

For two n-dimensional vectors $A(a_1, a_2, \ldots, a_N)$ and $B(b_1, b_2, \ldots, b_N)$, if the similarity between them is $\mathrm{SIM}(A, B)$, the Euclidean distance formula can be used to calculate as follows:

$$\mathrm{SIM}(A, B) = \sqrt{(A - B)(A - B)^T} = \sqrt{\sum_{i=1}^{N} (a_i - b_i)^2}. \tag{3}$$

5. Experiment and Analysis

In order to test the performance and effect of the government and university asset intelligent value-added service model based on block chain technology proposed in this paper, the experiment takes different types of asset information resources as the object, and groups the online access users according to the number. The asset information requests and usage of different users are counted through the asset intelligent value-added service system. In order to test the impact of the number of users on the performance of the block chain system, according to the number of users accessing the system online, it is divided into 10 groups, including 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100.

In order to observe the performance and effect of the asset intelligent value-added service model proposed in this paper, the user's accuracy of the accessed asset information resources is taken as the evaluation index, and its calculation formula is as follows:

$$\mathrm{ACC} = \frac{T_p + T_n}{T_p + F_p + T_n + F_n}, \tag{4}$$

where T_p is the correct number of positive examples. T_n indicates the correct number of negative cases. F_p shows the number of positive cases belonging to error. F_n expresses the number of negative cases belonging to the error.

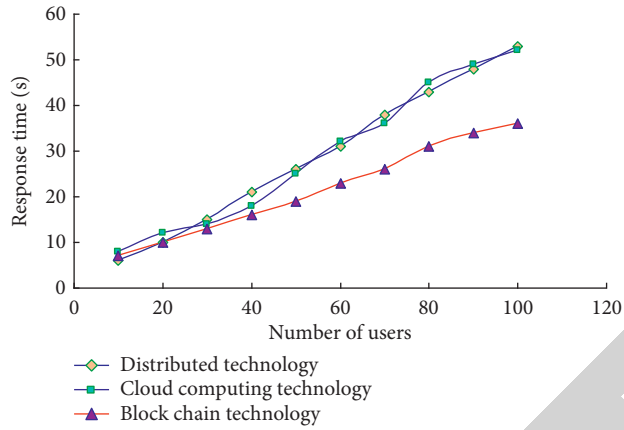

Figure 10: Comparison results of resource request response time obtained by different data sharing methods.

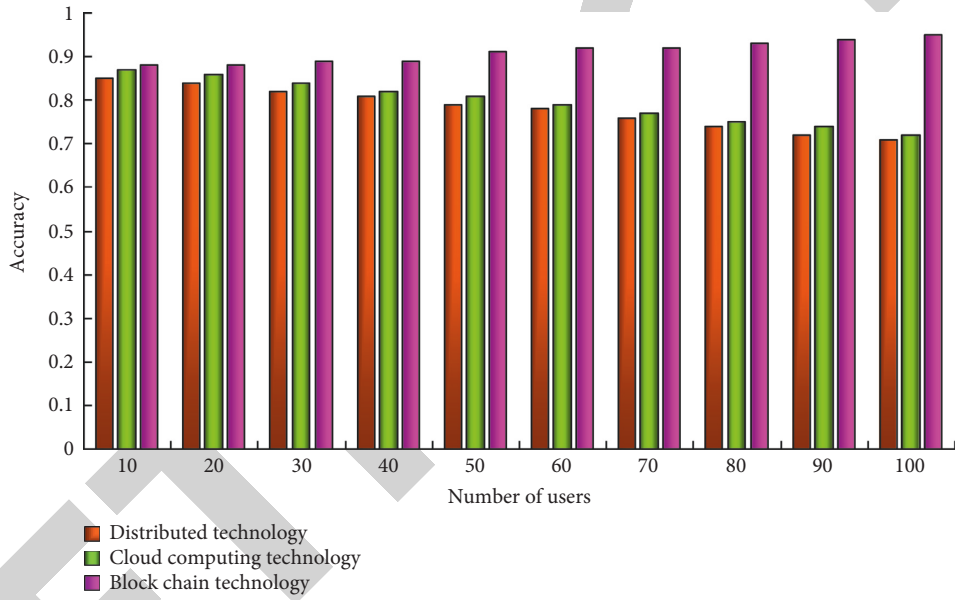

Figure 11: Comparison results of resource request accuracy of different data sharing methods.

In order to reflect the response ability of the block chain system to the user's request, it can be described according to the time interval from the time when the user sends the request to the time when the user receives the system feedback result. Its calculation formula is as follows:

$$R_T = T_S - T_E, \tag{5}$$

where R_T represents the response time of the block chain system. T_S indicates the time when the user sends the resource information request. T_E expresses the time when the user receives the feedback result from the system.

In order to illustrate the advantages of the asset intelligent value-added service model proposed in this paper, it is compared with the distributed system and cloud computing service model, respectively. As shown in Figure 10, it reflects the comparison results of the response time of different user numbers to resource requests under various data sharing service modes.

It can be seen from the comparison results in Figure 10 that as the number of users requesting asset data resources increases, the response time of various data sharing service systems to resource requests increases, but the service response time of block chain technology increases less than that of distributed technology and cloud computing technology.

As shown in Figure 11, it reflects the comparison results of resource request accuracy of different numbers of users under various data sharing service modes.

It can be seen from the comparison results reflected in Figure 11 that as the number of users requesting asset data resources increases, the accuracy of various data sharing service systems for resource requests decreases. However, compared with distributed technology and cloud computing technology, the accuracy of block chain technology for resource requests is higher, and the accuracy of resource requests decreases less with the increase of the number of users.

Through experimental comparison, compared with data sharing service systems such as distributed and cloud computing, the asset intelligent value-added service system driven by block chain technology proposed in this paper has faster response processing ability and higher accuracy to user requests.

6. Conclusion

Aiming at the problems of low efficiency and insufficient utilization of resource information in data resource sharing of existing governments and universities, this paper used the advantages of block chain technology in realizing data sharing and value-added services, and put forward the research on the path of intelligent value-added services of government and university assets driven by block chain technology. By analyzing the composition of block chain and its value-added service technical characteristics, this paper put forward the block chain driven asset intelligent value-added service mode, constructed the application path of asset intelligent value-added service driven by block chain technology, and put forward the implementation method of asset intelligent value-added service path combined with the characteristics of user request. Through experimental comparative analysis, the results showed that compared with the existing data sharing service methods such as distributed technology and cloud computing technology, the asset intelligent value-added service model proposed in this paper had more advantages in meeting the needs of users, and had better performance and effect. The method proposed in this paper can not only provide reference for the application of block chain technology in related fields, but also provide technical support for the development and research of asset value-added services.

Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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