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Research article

Performance management algorithm of financial shared service center based on Internet of Things public cloud privacy protection

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Abstract: The Internet of Things (IoT) refers to the use of various communication technologies to achieve the interconnection of everything in cyberspace, and to achieve smart home and intelligent transportation, thus generating unprecedented amounts of data. In the financial sharing center, all businesses can extract effective data from these massive databases for analysis, and use data analysis tools to collect business, financial, human, process, knowledge and social data. At present, various types of IT (Internet Technology) systems have been widely used in financial sharing centers. However, a large number of sensitive data have also been generated. In order to protect these sensitive data, there is a high requirement for the personal information of IT system operation and financial sharing center personnel. In order to protect user data privacy, the optimal and most effective use of IT systems is an important issue that must be considered in privacy management. At present, there are many algorithms to protect data and privacy, but the effect is not ideal. Considering the balance between privacy issues, this paper proposed a K-means clustering algorithm based on IoT public cloud privacy protection technology to analyze the performance management of financial sharing center. The research results showed that before the improvement, the average number of employees who were dissatisfied with the post training ability and information platform construction ability of the financial sharing center was 57.9 and 57.8% respectively, more than half of them. After the improvement of IoT based public cloud privacy protection, the average number of employees dissatisfied with the post training ability and information platform construction ability of the

financial sharing center was 5 and 3.9%, far less than the data prior to the improvement. It showed that IoT public cloud privacy protection was conducive to the performance management of the financial sharing center, and the relationship between the two was positive.

Keywords: financial sharing center; Internet of Things; public cloud privacy protection; performance management

1. Introduction

The establishment of financial shared service center and the implementation of scientific management system are an important part of the financial management process, which plays a role in management decision-making and business support. The financial sharing center is a sharing service platform that is highly efficient, flexible and oriented to the digital transformation of enterprises. At the same time, there are also some problems and challenges in the efficiency and cost control of the financial sharing center.

As business and data demands increase at the level of the financial sharing center, corresponding safeguards may need to be added in some aspects. In order to improve the capabilities of the financial sharing center in all aspects and ensure better service and control capabilities, enterprises have begun to transfer resources to other business platforms. In some enterprises, the financial sharing center also needs to deploy intelligent monitoring equipment and assume security responsibilities. Therefore, the public cloud must be used to solve these problems, so as to improve security protection capabilities.

Based on this, this paper scientifically analyzes the performance management of the financial sharing center based on the K-means clustering algorithm of IoT public cloud privacy protection, so as to determine the relationship between the two.

2. Related works

With the implementation of China's "Belt and Road" initiative, China's independent innovation strategy and the "13th Five Year Plan", the total economic volume has continued to grow, and the scale of fiscal revenue has continued to expand, resulting in many financial sharing centers. Based on the financial sharing service model, Jiang Sai elaborated on the preprocessing process of big data collection, clarification and storage, and built a simulation process framework of big data audit under the service model [1]. As an effective means to achieve the goals of the financial sharing center, performance appraisal plays a very important role. Therefore, Xie adopted the method of case analysis and research to analyze according to the traditional thinking of asking questions, analyzing problems and solving problems [2]. Li's research was to use the financial sharing service model to provide reference for big data audit in the context of the COVID-19 epidemic [3]. However, the above studies are all theoretical analysis of financial shared service center, lacking of research on privacy protection. Therefore, a scientific method is needed for verification.

In view of the above problems, the financial shared service center based on IoT public cloud privacy protection has begun to attract attention, and this method has been studied. Among them, with the continuous development of big data, IoT, cloud computing and other information

technologies, financial sharing has developed very rapidly. Huang Yuting discussed and analyzed the feasibility of the construction of the management accounting system under the financial sharing mode on the basis of theory [4]. Yao studied and analyzed that the application of IoT technology could improve the efficiency of financial accounting management, thus realizing the informatization of financial management [5]. In the cloud-based building information model platform, the environment and localized data are integrated, thus forming IoT method. In order to improve work efficiency, comfort and entertainment, IoT has been increasingly applied to a variety of products (such as wearable devices and smart homes). However, the research on the integration of these two technologies (building information model and Internet of Things) is still insufficient, and only focuses on the automatic transmission of sensor information to the building information model. Therefore, Cao reviewed the use of the building information model based on structural health monitoring and IoT, and considered the economic application [6]. Composite beams, including concrete slabs connected with steel members through shear connectors, are very common in modern structures such as high-rise buildings and bridges. Ma used the hybrid extreme machine learning-Grey Wolf optimizer to determine the general behavior of composite beams. He developed two models (Elm and Gray Wolf Optimizer) and a hybrid algorithm (Gray Wolf Optimizer-Elm) and compared mean square regression parameters by determining coefficients and roots. It was found that the Grey Wolf Optimizer-Elm could determine the general behavior of composite beams more quickly and accurately, and the error percentage was the smallest, which indicated that the mixed model of Grey Wolf Optimizer-Elm, Buel Mu and the model of Grey Wolf Optimizer were more reliable [7]. Steel-concrete composite floor system is one of the most important components in building structure, and the problems caused by fire directly damage its performance. The purpose of Morasaei Armin's research was to predict two main structural characteristics of steel-concrete composite floor system by using analytical intelligence technology, and to predict the shear and tensile responses of these composite floor systems at high temperature by using two intelligent methods, namely Elm (Extreme Learning Machine)-PSO (Particle Swarm Optimization) and ELM-GWO (Grey Wolf Optimizer). The results showed that ELM-GWO technology provided the best prediction of splitting tensile load and estimation of slip value [8]. Tajziehchi studied the application of genetic algorithm in seismic control and optimization, and proposed a new method to select the best accelerometer and calibrate it by using binary genetic algorithm and natural number, so as to obtain the average response spectrum site earthquake with good matching with the target spectrum and short distance [9]. The above research not only explains the applicability of IoT in the financial sharing center, but also provides a theoretical basis for the application of IoT public cloud privacy protection in the performance management algorithm of the financial sharing center.

3. Construction of IoT public cloud privacy protection and financial sharing center

3.1. Development of IoT

With the digitalization of communication and computing, they have entered every aspect of daily life. A new type of network IoT came into being. IoT is a global and ubiquitous network. Based on a large number of micro devices, it takes the new generation of Internet as the backbone, and combines traditional and new industrial applications. At the same time, the rise of IoT has laid a solid foundation for the ultimate realization of pervasive computing environment. IoT has become a new

wave of information technology and economy in the world after computers, the Internet and mobile communication networks, which has brought great opportunities and challenges for people in the rapid information age.

IoT is one of the most influential technologies in the 21st century and has a broad application prospect, as shown in Figure 1.

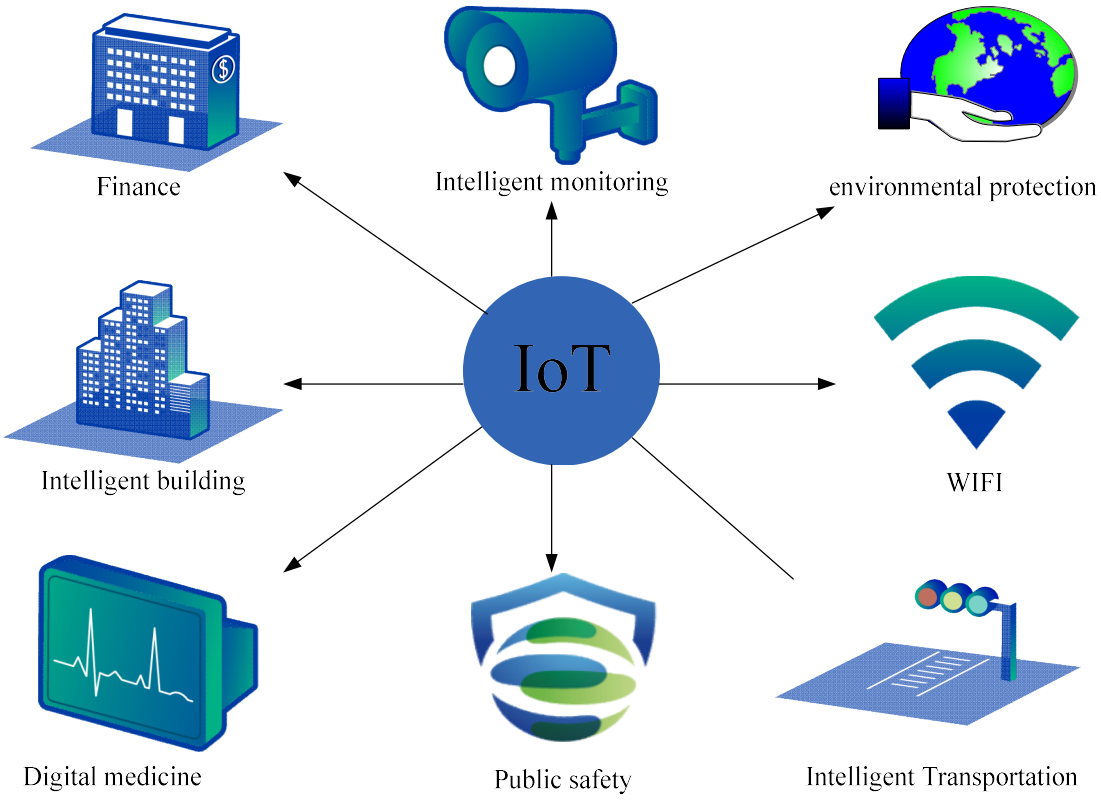


Figure 1. Application fields of IoT.

3.1. Privacy protection of the IoT

In the practical application of IoT, privacy protection is an important issue that needs to be urgently addressed [10]. On the one hand, IoT provides people with more means of information collection and monitoring, greatly improving their ability to obtain and process information. However, on the other hand, users' personal information is also greatly threatened. Therefore, building privacy protection algorithms for IoT is an urgent need for the development of IoT and a key supporting technology for the design, deployment, and application of financial sharing centers [11].

From the perspective of privacy protection objects in financial sharing centers, the IoT privacy protection algorithm needs to address the following key technical issues:

1) Data privacy protection issues. In general, privacy related to individuals is stored, transmitted, and managed in the form of data in IoT. Therefore, it is necessary to use privacy protection algorithms targeting data to address key data protection issues in the data-centric IoT.

2) Location privacy protection issues. Compared to traditional IP addresses, traditional security measures based on IP addresses typically focus on IP addresses due to the leakage of user location

information caused by IoT labels and other information. Therefore, how to use security protection algorithms for privacy protection in IoT environment is an urgent problem to be solved in the development of IoT.

3) Identity privacy protection issues. How to effectively prevent user information leakage is also the key to ensuring the privacy and security of IoT.

In recent years, people have proposed multiple privacy protection technologies, including homomorphic privacy technology, information hiding technology, and unintentional information transmission. Although there is a certain theoretical foundation, its practical application is not yet mature.

3.3. Construction of performance evaluation model based on K-means algorithm under IoT public cloud privacy protection

K-means is a clustering algorithm, which can divide the data set into several clusters. The similarity of data in each cluster is high, and the similarity between clusters is low. In terms of cloud privacy protection, the k-means can improve cloud privacy in the following ways:

1) Data encryption: Before uploading the data to the cloud, the data can be encrypted, so that only those who have the key can decrypt it. This can prevent data from being stolen or tampered with during transmission.

2) Data aggregation: The encrypted data is aggregated in the cloud and divided into several clusters. In this way, the cloud cannot get the original data, but only get the aggregated results, thus protecting the data privacy.

3) Model migration: After clustering the data, the clustering model can be migrated to the local area for use, thus avoiding the risk of data being abused in the cloud. At the same time, because the model only contains clustering results, the original data cannot be leaked.

In a word, the k-means algorithm can improve cloud privacy through data encryption, data aggregation and model migration, so that users' data can be better protected.

The K-means clustering algorithm sets the number of clusters of input variables by L. l samples are randomly selected as initial centroids. The Euclidean distance calculation formula is used to distribute the sampling points at the nearest centroid to achieve classification. This paper establishes a performance evaluation index system based on K-means. The K-means clustering algorithm is used to conduct specific performance evaluation, thus realizing the performance classification of financial sharing centers [12,13].

3.3.1. Construction process

Through the collection and processing of data from the financial sharing center of X Group, the processed data is taken as the input data set A, which is divided into five grades: excellent, good, average, bad and very poor, so that the output number of clusters is $l = 5$. The clustering algorithm is used for clustering, and finally a clustering result is obtained [14]. The process is shown in Figure 2.

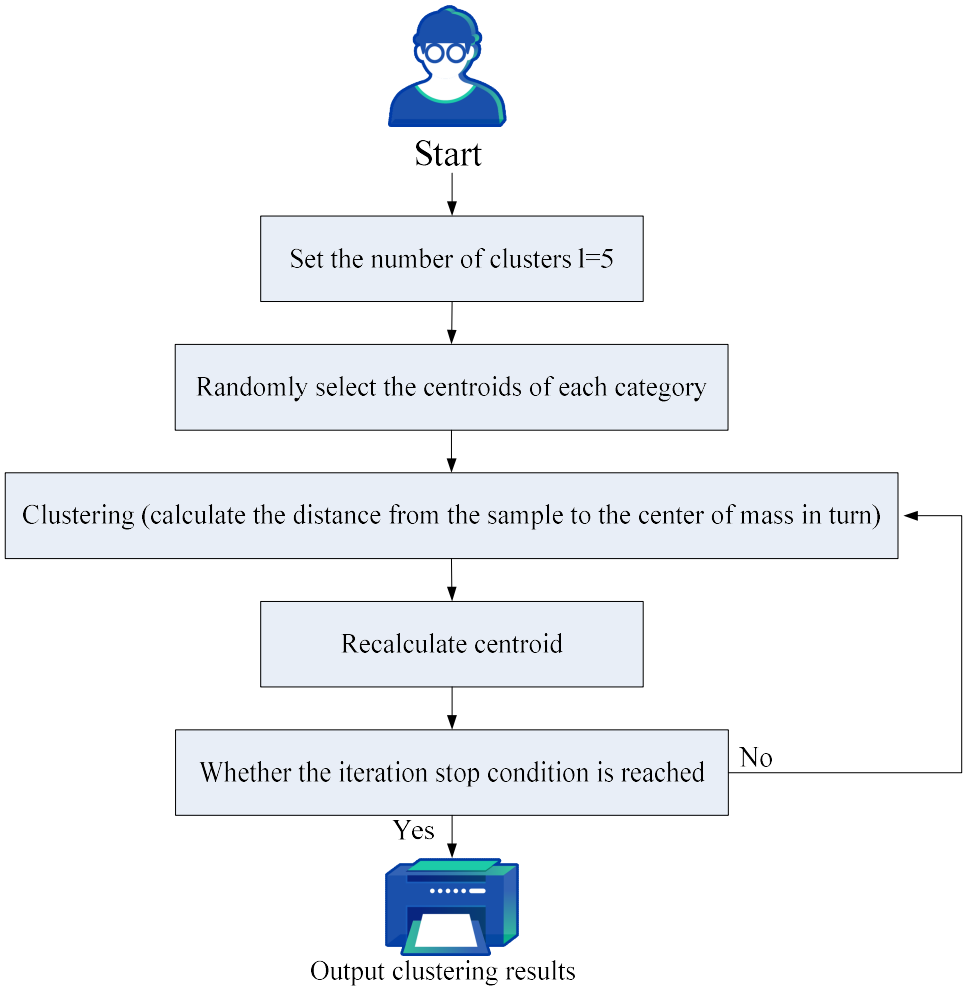


Figure 2. Running process of the K-means clustering algorithm.

1) Defining dataset A

The processed data object is taken as A, and the following can be obtained:

$$A = \{a_o | a_o = (a_{o1}, a_{o2}, ..., a_{om},), o = 1, ..., n\} \tag{1}$$

In Formula (1), a_o represents the o-th data in dataset A. m refers to the attribute of each data in the data set, that is, the performance evaluation indicator. n is the total amount of data in dataset A.

2) Setting the number of clusters l

Based on the performance evaluation of the financial sharing center of X Group, this paper divides it into five grades, so that it can get the best result in the future work. Therefore, let $l = 5$. In the output results, the data in the input data set A is divided into five categories [15,16].

3) Initializing the centroids of l groups

There are generally two methods for initializing the centroid of a class. One is a random method. l samples are randomly selected as initial centroids to calculate the distance. The second method is the farthest distance method, which is to randomly select a sample as the first center of mass, and then select a center of mass that is farthest away from the center of mass until l centers of mass are formed. In this paper, the maximum distance method is selected to generate five centroids, making the five centroids V. It can be obtained as follows:

$$V = \left\{ v_o \middle| v_o = \left(v_{o1}, v_{o2}, ..., v_{om}, \right), o = 1, ..., n \right\} \tag{2}$$

The distance from each sample to different centroids is calculated in order. According to the principle of minimum distance, each sample is assigned to the nearest centroid to form 5 groups. In the calculation, the European distance formula is selected as the formula for measuring distance, and its expression is:

$$f_{euc}\left(a_o, a_k\right) = \sqrt{\sum_{l=1}^{n} \left(a_{ol} - a_{ko}\right)^2} \tag{3}$$

4) Updating the centroid of each class

After classifying the five groups, the centroids of each group were updated. In the k-means algorithm, the centroid calculation formula is the average vector of all samples of this group. Among them, the centroid formula of group v_o of category o is as follows:

$$v_o = \frac{1}{m_o} \sum_{a \in v_o} a \tag{4}$$

5) Determining whether the stop conditions are met

In general, the center of mass does not change after repeated iterations. Generally, stop conditions are divided into two types. One is such that, when the number of repetitions reaches a predetermined threshold, the clustering is automatically terminated even if the expected result is not reached. The second type is the critical point ϕ, which specifies the range of centroid change, that is, for the old centroid v_o and the new centroid v_o', when condition $\left| v_o' - v_o \right| < \phi$ is met, the operation would be stopped. If the set termination state is not met, the above step 4) is repeated until the stop state is reached.

3.3.2. Measurement of clustering results

Because the clustering algorithm is unsupervised, there is no uniform standard for judging the clustering effect at present. The contour coefficient is used to measure the clustering effect. This method is expressed by the difference between the minimum average distance between samples and different clusters and the average distance between samples and the same cluster. The calculation results are as follows:

First, the average distance F_{ovo} between sample o and other samples in the same cluster v_o is calculated. The shorter the distance, the more o should be assigned to v_o, which is $x(o) = F_{ovo}$.

Secondly, in the case of defining $y(o) = \min\{F_{ovk}, k \neq o\}$, the average distance F_{ovk} of all samples from the sample o to the different cluster v_k is calculated. The greater the distance, the less likely sample o is to be allocated to other clusters.

Then, the profile coefficient of sample o can be defined with the following formula:

$$d(o) = \frac{y(o) - x(o)}{\max\{y(o), x(o)\}} = \frac{\min\{F_{ovk}, k \neq o\} - F_{ovo}}{\max\{\min\{F_{ovo}, k \neq o\}, F_{ovo}\}} \tag{5}$$

Finally, the average value of the contour coefficient $d(o)$ of all samples is taken as the contour coefficient of the overall sample clustering result. The expression is as follows:

$$D = \frac{1}{m}\sum_{o=1}^{m} d(o) \tag{6}$$

In the above formula, the common distance calculation method is the European distance. The range of profile coefficients is [−1,1]. The more its value tends to 1, the better its model classification results is. It is generally believed that the model has a good clustering effect when the profile coefficient is greater than 0.5. In the case of a profile coefficient less than 0.2, it shows that the model fails to achieve ideal classification results.

3.3.3. Application of model

This paper establishes the relevant data based on the operation and performance management of the financial sharing center. According to the cost, business efficiency, business processing accuracy, training and learning and other data, the performance evaluation indicators of the financial sharing center of X Group have been established. Using clustering algorithm to intelligently classify company performance can overcome the defects of subjectivity and one-sidedness to a certain extent. The performance is objectively evaluated, and the existing problems are improved, thus promoting the healthy development of the financial sharing center and providing more decision-making basis for the development of the company [17,18]. In addition, when new performance evaluation data is

added, the model re-clusters all data and iterates over the new data to achieve dynamic performance evaluation, so as to avoid errors caused by evaluation criteria.

3.4. Business process of financial sharing center

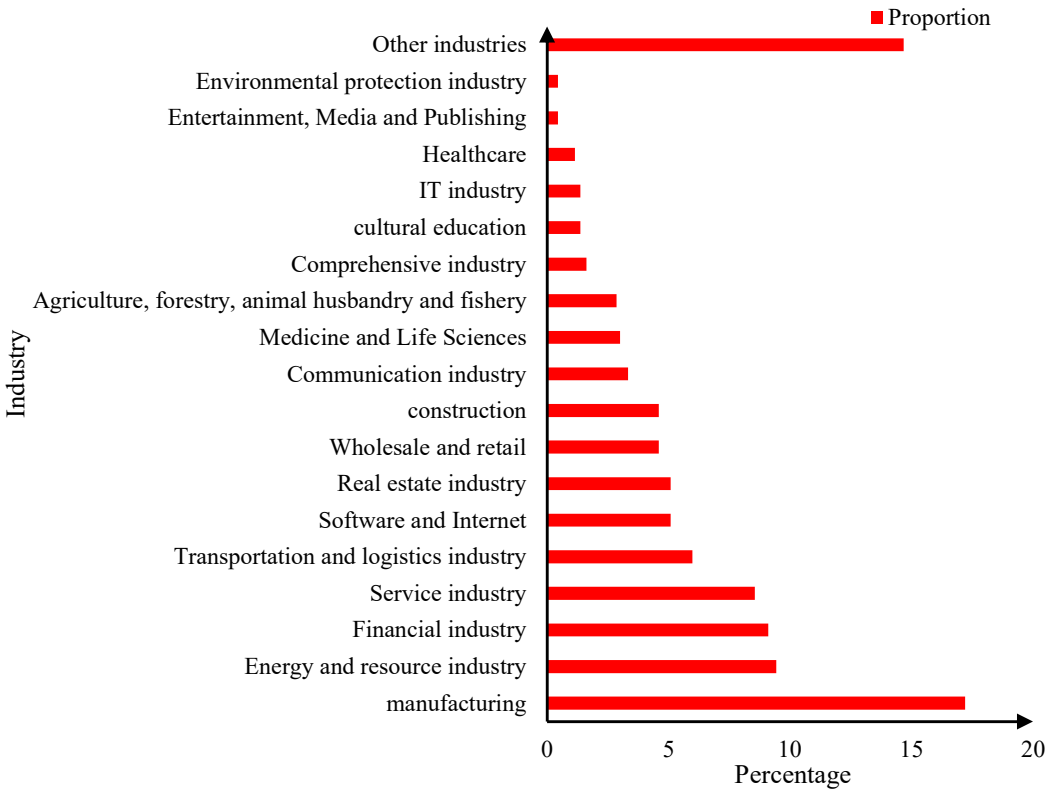
With the rapid development of Chinese enterprises and capital markets, China's financial industry has initially formed a highly efficient, transparent and fair competition market economy system. With the continuous development and improvement of cloud computing, the enterprise financial sharing center has been developed, which provides enterprises with comprehensive financial services. It has improved the profitability and efficiency of the enterprise as a whole, so as to improve profitability and competitiveness [19]. By using the financial system, financial shared services can save costs, improve operational efficiency, which greatly reduces operational costs [20]. There are many imperfections in the traditional financial management model. Therefore, in order to achieve the effect of saving costs, it is necessary to formulate reasonable, effective and scientific assessment methods and standards. The traditional accounting method is such that the accounting personnel get paid for completing the task manually. Now many enterprises have introduced intelligent software in management to improve the management efficiency and management level of enterprises. Therefore, the financial sharing center can not only provide more efficient and automated workflow and organizational structure design, but also save a lot of costs [21]. As the core of the whole system, financial sharing institutions play a vital role. Direct transaction settlement with customers is realized, and all kinds of information and technical support required for enterprise operation are obtained in real time. At the same meanwhile, it provides reliable information for financial analysis. In addition, according to the business requirements, services and other functions for customers are provided, and finally a complete process system is formed. The IoT based public cloud privacy protection effectively solves the problems and risks in the traditional model, and provides important support for improving the company's operational efficiency. By reducing duplication of construction, the delivery time is reduced by improving efficiency. It can also optimize the company's resource utilization efficiency and improve profitability and other related objectives to improve the quality and efficiency of enterprise operations.

4. Experiment on performance management algorithm of financial shared service center based on IoT public cloud platform privacy protection

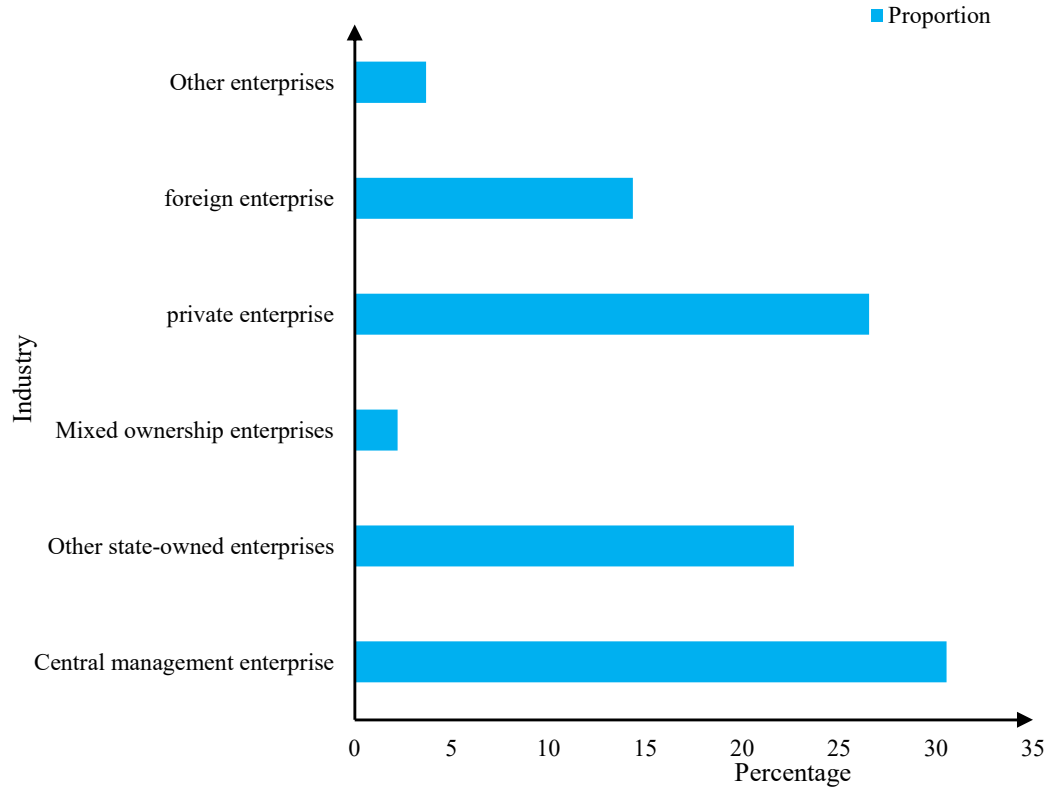
4.1. Development status and trend of financial shared service center

4.1.1. Overall construction status of financial sharing

Through understanding the 2022 Research Report on China's Shared Service Field, this paper made statistics on the industry distribution and enterprise types of implementing FSSC (Financial Shared Service Center), as shown in Figure 3.



(a) Industry distribution



(b) Enterprise type

Figure 3. Industry distribution and types of surveyed enterprises.

It can be seen from Figure 3(a) that most enterprises implementing FSSC were manufacturing industry, energy and resource industry, financial industry and service industry, accounting for 17.2, 9.44, 9.11 and 8.55% respectively. However, the proportion of entertainment media, publishing and environmental protection industries using FSSC was relatively small, only 0.45 and 0.46%. It can be seen from Figure 3(b) that among the enterprises implementing FSSC, central management enterprises, other state-owned enterprises and private enterprises accounted for a large proportion, accounting for 30.54, 22.66 and 26.54% respectively. The proportion of mixed ownership enterprises was small, only 2.22%. It can be seen from Figure 3 that large enterprise groups and transnational enterprises are more inclined to use the FSSC model than SMEs (Small and Medium Enterprises).

4.1.2. Location distribution of financial sharing centers

The site selection of enterprises implementing FSSC was analyzed to make statistics on Beijing, Shanghai, Guangzhou, Shenzhen, Wuhan, Xiamen, Tianjin, Hangzhou, Fujian and Changsha. The results are shown in Figure 4.

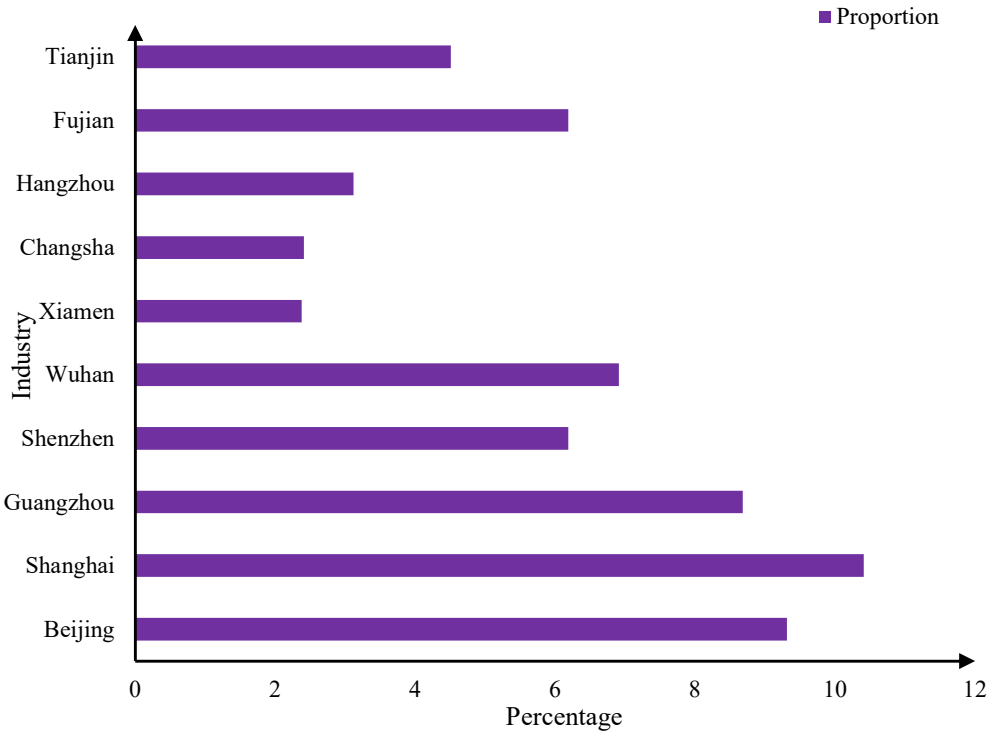


Figure 4. FSSC selected cities.

It can be seen from Figure 4 that Beijing, Shanghai, Guangzhou and Shenzhen were the first choice of FSSC, accounting for 9.31, 10.41, 8.68 and 6.19% respectively. This is because they all have good infrastructure and a large number of universities and talents. There were a lot of financial talents, but the rent, manpower and operating costs were high. Wuhan, Tianjin, Fujian and Hangzhou accounted for 6.91, 4.51, 6.19 and 3.12% respectively. Among them, the proportion of financial service centers opened in Wuhan was higher than that in Shenzhen. The reason is that these places have convenient transportation, increasingly perfect infrastructure, relatively sufficient human resources, and the overall cost is lower than that of first tier cities.

4.2. X Group's existing financial sharing center

4.2.1. Brief introduction of X Group

X Group was founded in 1980, initially focusing on clothing, and later entered into commercial real estate, hotels, investment and other fields. At present, the company has more than 20000 employees, an annual production scale of more than 5 billion yuan, and a brand value of nearly 20 billion yuan. The company has three production bases, dozens of world-class production lines, five brands, more than 40 branches across China's provinces, and more than 4000 branches. Overseas branches are located in South Korea, Britain and Germany. X Company is the only national level industrial tourism demonstration site, provincial backbone enterprise and national top 500 enterprise in China. X Group has its own unique views on operation and management. For example, before selecting a franchise store, the risk should be reduced as much as possible. The character, financial strength and store location of the partners have been carefully investigated on the spot, scientifically analyzed on the market, and finally negotiated with the other party. X Group adheres to the principle of "creating one party together" and pays attention to four "unifications" in chain operation: the unification of management, products, services and image. In addition, X Group has established a sales network all over China and a dynamic and interactive service in China. It can not only provide customers with high-quality products, but also have good after-sales service. In addition to the implementation of "three guarantees", the customer satisfaction is also tracked for problems within the three guarantees period to maximize customer satisfaction. The company's short-term development goal is to develop the main garment industry, expand market share and improve profits. The long-term goal is to build the best textile brand and create a world famous brand.

In January 2017, the X Group FSSC was officially put into operation. One year later, the FSSC has basically covered the businesses of all units, and gradually realized the value added of financial work.

4.2.2. Health of existing financial shared service center

At present, the Group's FSSC is in good condition. However, there is still room for improvement in its operation. Based on the investigation on the operation status of X group's FSSC, this paper investigated and analyzed its operation status. There were 60 valid questionnaires in this survey, including 40 grass-roots employees of the FSSC and 20 financial managers of the enterprise group.

1) Reliability analysis of questionnaire

Reliability analysis tests the internal consistency of the scale, that is, whether each item can independently measure the same content and concept. In this paper, Cronbach's a coefficient test was used to test the internal consistency of the scale. The results are shown in Table 1 (Alpha < 0.6, the reliability of the scale is insufficient; $0.6 \leq$ Alpha < 0.7, the reliability of the scale is high; $0.7 \leq$ Alpha < 0.8, the reliability of the scale is very high).

Table 1. Reliability statistics of the scale.

Number of items	7
Alpha	0.763
Grass roots employees	40
financial executives	20

Table 1 showed that the alpha value was 0.763, indicating that the stability and consistency of the questionnaire data are very good. The questionnaire has very high reliability.

2) Questionnaire validity analysis

This paper used SPSSAU software to study the validity of the questionnaire. The results are shown in Table 2 (KMO (Kaiser Meyer Olkin) < 0.5, it is extremely inappropriate; 0.5 ≤ KMO < 0.6, it is too inappropriate; 0.6 ≤ KMO < 0.7, it is general; 0.7 ≤ KMO < 0.8, it is appropriate; 0.8 ≤ KMO < 0.9, it is very suitable).

Table 2. Sphericity statistics of KMO and Brtlett.

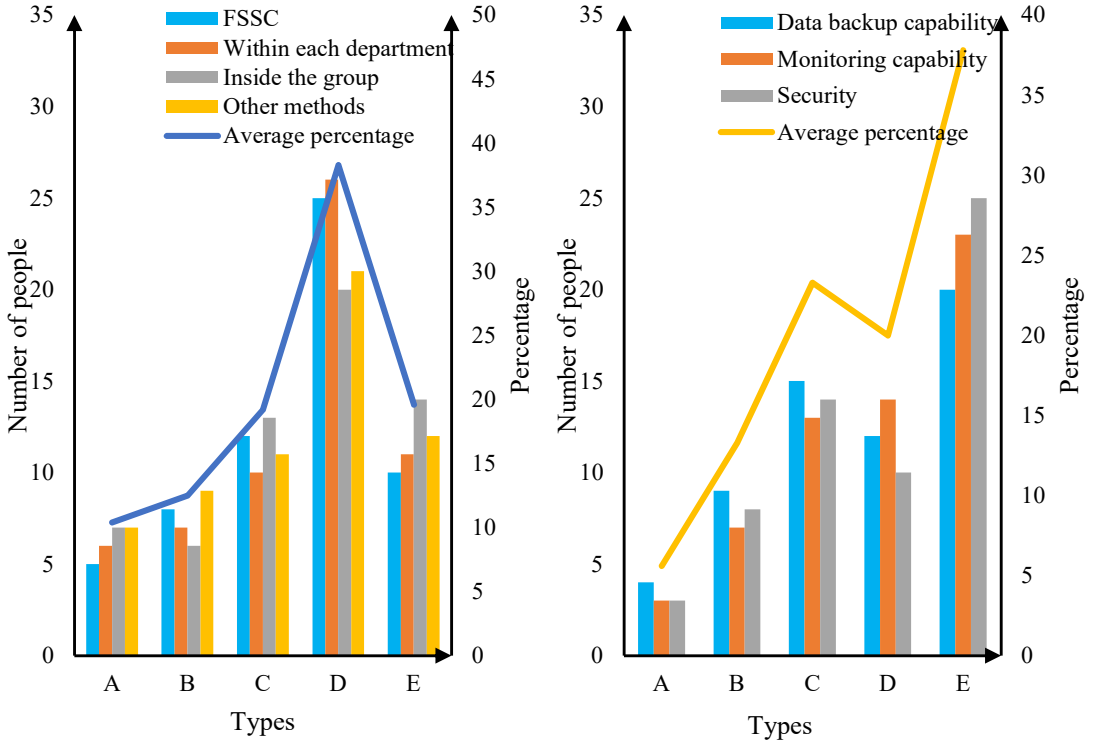
KMO		0.754
Brtlett's Sphericity Test	Approximate chi square	107.221
	Freedom	30
	Significance	0.001

Table 2 showed that the KMO of this questionnaire was 0.754, indicating that the questionnaire data is suitable for factor analysis. At the same time, the results showed that the chi square Vlue of Brtlett's sphericity test was 107.221, P was significantly less than 0.05. It indicates that the relationship between each item is good, which can be used for experimental analysis.

For the existing financial sharing center, this paper can conduct research from two aspects. In terms of personnel management, four training categories can be set up, namely, post training in the financial sharing service center, post training in each department, post training in the group and other training methods. These four training categories were used as the basis to evaluate the results of their respective efficiency. In terms of information platform construction, the data backup ability, information system monitoring ability and information system security of the information system were investigated. The results are shown in Figure 5 (A: excellent, B: good, C: average, D: bad, E: very poor).

It can be seen from Figure 5(a) that the average number of people who thought that the post training ability of the financial sharing center before the improvement was excellent accounted for 10.4%. The average number of good people accounted for 12.5%. The average number of ordinary people accounted for 19.2%. The average number of bad people accounted for 38.3%, and the average number of very poor people accounted for 19.6%. It can be seen from Figure 5(b) that the average number of people who thought that the information platform construction ability of the financial sharing center before the improvement was excellent accounted for 5.6%. The average number of people who thought that the information platform construction ability was good accounted for 13.3%. The average number of people who thought that the number of people who were good

accounted for 23.3%. The average number of people who were bad accounted for 20%. The average number of people who were very poor accounted for 37.8%. It can be seen from the Figure 5 that the average number of dissatisfied people, whether in post training or information platform construction, accounted for 57.9 and 57.8% respectively, more than half, indicating that the financial sharing center before the improvement is not perfect.



(a) Post training before improvement (b) Information system before improvement

Figure 5. X Group staff training and information system capability evaluation.

4.3. Financial sharing center under the privacy protection of the IoT public cloud platform

In the era of rapid development of IoT technology, privacy protection has become a hot topic that people begin to pay attention to. In order to improve the ability to protect customers' privacy, X Group has used a variety of advanced information systems to escort the improvement of the financial sharing service center, which has promoted the development of high-quality and intelligent sharing services.

4.3.1. Image scanning system

In order to quickly solve the difficulties in processing the statement of each subsidiary and branch, X Group has introduced image scanning technology. It can help to complete the declaration and review of remote reimbursement. The main function of the system is to use scanning tools to collect, compress, upload and read images. Before the image system is put into use, employees of all departments of X Group must complete it through the express link, which not only affects the speed

of audit, but also brings some uncertain factors to the actual logistics, such as loss, leakage, etc. The establishment of the image scanner fundamentally solves this problem. The reimbursement applicant can scan and upload various bills. The financial personnel of the FSSC can view the real situation of bills in the information system, which greatly shortens the circulation time. This can not only greatly improve the efficiency of the audit work, but also enable department heads to consult the images of the original vouchers at any time during the approval process, so as to achieve electronic approval and promote the optimization of the business process of the enterprise. At the same time, through the image scanning system, the contract documents can be scanned and uploaded to the client, which facilitates the query and management of contract information. Through the unified standardization of accounting archives of X Group, the Company gradually realized paperless management of accounting archives and other materials, thus effectively ensuring the integrity and security of accounting materials. It also reduces the cost of file management and reduces the workload.

4.3.2. Electronic archives management system

Electronic archives management system is also an important information processing method, which promotes the unified management from "territorial" to "centralized". Under the improved sharing service mode, when implementing unified electronic archives management, the system should pay attention to the classification and scientific management of archives. It is also necessary to strengthen internal control and strengthen training on file management to enhance their professional ethics. Enterprises should also establish a sound accounting file management system. The electronic archives are transmitted rapidly. The electronic archives management system of X Company can effectively centralize the financial archives of all branches and sub branches to the FSSC, which is helpful to improve the management of financial archives. At the same time, Company X has taken special firewall and other security measures to ensure the security of the company's financial information.

4.3.3. Fund management system

Before the improved financial sharing center went online, the existing financial sharing center of X Group was unable to centralize the enterprise's budget, financing, capital settlement and other information, resulting in the unsmooth financial information exchange between each branch and the headquarters. However, the management of the company cannot fully understand the overall capital situation of the enterprise, which is difficult to make correct decisions. The improved financial sharing mode provides X Group with a fund control platform covering all members. The funds in accounts, funds, credit management and other aspects are managed uniformly, so as to effectively realize the effective integration of funds. This improves the use efficiency of funds and ensures the liquidity and confidentiality of funds.

4.3.4. ERP (Enterprise Resource Planning) system

Under the privacy protection environment of the IoT public cloud platform, financial management is gradually developing towards informatization. The application of the ERP system can improve the informatization level of enterprises to a new level. The improved FSSC is based on the

ERP platform, and its core supply chain management concept realizes the integration of enterprise finance and business. ERP is the basis of enterprise accounting and the important basis of enterprise financial statements. The management of the enterprise group can use ERP to monitor the financial and non-financial information of each department in real time.

4.3.5. Electronic reimbursement system

The FSSC improved by X Group provides a unified settlement platform across regions and businesses. The expenditure application mode is adopted to master the declaration of employee expenses, official business expenses, business entertainment expenses, etc. Before business occurs, the amount can be predicted, which facilitates approval and timely adjustment and reduces business risk. With the payroll payment function, invoices and taxes can be automatically calculated. With the electronic reimbursement system, X Group has realized the functions of budgeting in advance, independent application, efficient approval, automatic accounting and settlement, which has effectively solved the problems such as cumbersome traditional bill management, difficulty in identifying the authenticity of invoices, inconsistent approval standards, and opaque reimbursement process, as shown in Figure 6.

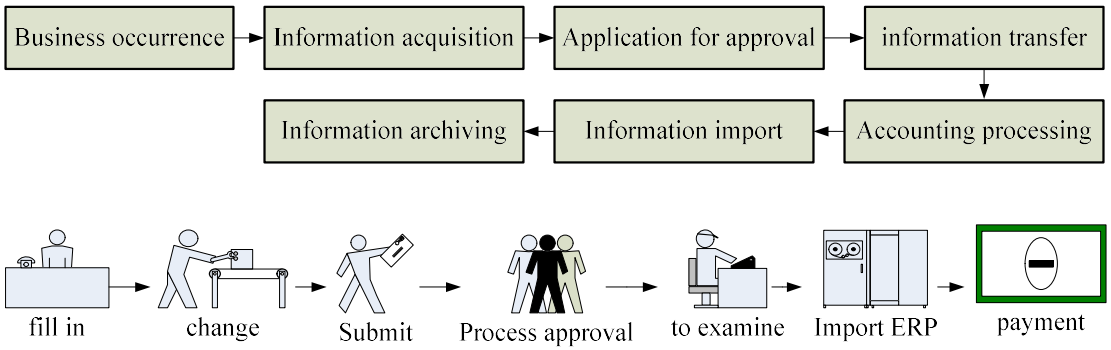


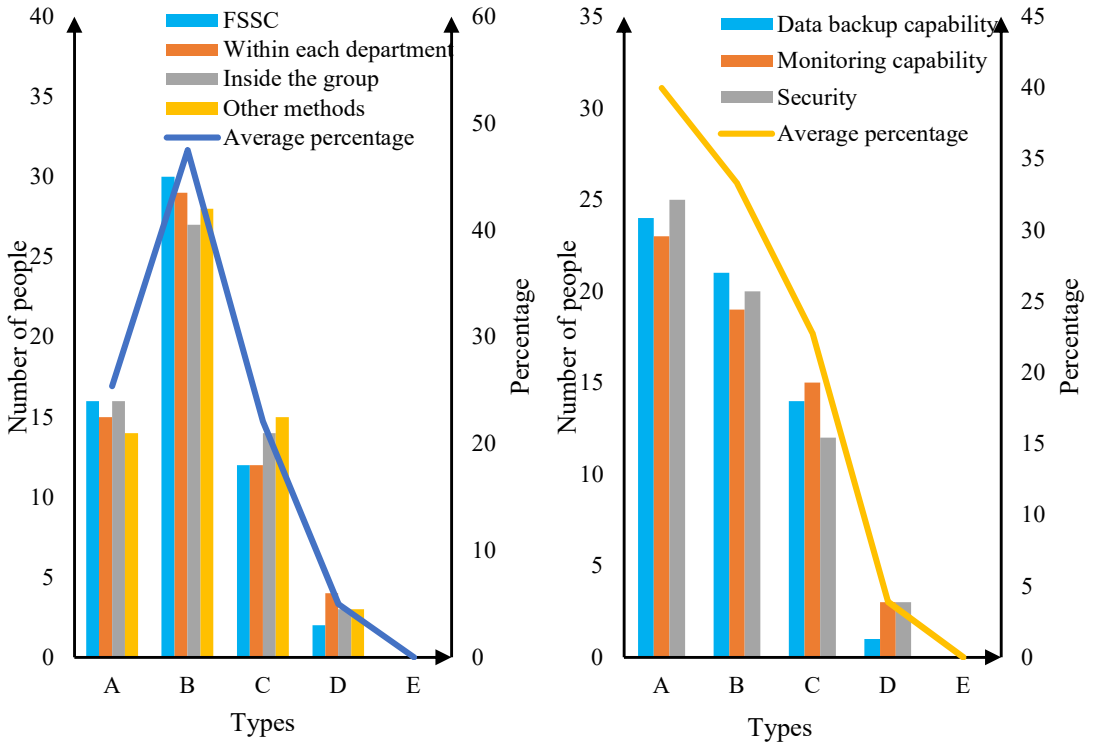
Figure 6. X Group's improved electronic reimbursement system.

4.4. Effect of X Group's implementation of improved financial sharing center

After the improved FSSC has been running for a period of time, its effect is counted through a questionnaire survey. Among them, the number and content of the questionnaire remain unchanged, and the respondents remain unchanged. The results are shown in Figure 7.

It can be seen from Figure 7(a) that the average number of people who thought the post training ability of the improved financial sharing center was excellent was 25.4%. The average number of people who thought the post training ability was good was 47.5%. The average number of people who thought the post training ability was good was 22.1%. The average number of people who thought the post training ability was bad was 5%. The number of people who thought the post training ability was very bad ~~is~~ was 0. It can be seen from Figure 7(b) that the average number of people who thought the information platform construction ability of the improved financial sharing center was excellent accounted for 40%. The average number of good people accounted for 33.3%. The average number of ordinary people accounted for 22.8%. The average number of bad people

accounted for 3.9%, and the number of very poor people was also zero. It can be seen from Figure 7 that the average proportion of dissatisfied people in the improved financial sharing center has dropped dramatically, accounting for only 5 and 3.9% of the average percentage, respectively, in terms of post training ability and information platform construction ability. It shows that IoT based public cloud privacy protection is of great help to the performance management of the financial sharing center.



(a) Post training after improvement (b) Information system after improvement

Figure 7. Improved employee training and information system capability evaluation of X Group.

5. Conclusions

In today's information environment, data has become an important component of enterprise production and operation. Data protection is the most important and critical link in the field of financial sharing. With the rapid development of science and technology, data security has become a problem that cannot be ignored in the contemporary society. On the one hand, data leakage has caused huge losses. On the other hand, the data collection party has collected and processed data without authorization and knowledge for privacy protection and economic interests, which has caused huge losses. Therefore, it is of great significance to build a complete data security management mechanism to reduce the loss of data leakage. In this paper, through the construction of an intelligent contract data flow management system running on the public cloud, the performance evaluation management strategy was implemented for the financial sharing center, and the performance data was extracted and stored by combining the database models in the

intelligent contract data flow management system. This management strategy has realized the control of user permission type during data processing. Furthermore, according to the actual verification results, the algorithm model was divided into three implementation scenarios for research and experiment. Among them, privacy protection calculation was carried out in the public cloud data transmission protocol based on the IoT environment to achieve the confidential transmission of data content. At the same time, the automatic storage of sensitive data information to ensure data security has become the research goal of this paper to reduce unnecessary losses caused by subsequent further applications.

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