Research on the Structure of Financial Cloud Platform of People’s Armed Police

Shi-Yao WANG¹,a, Jian-Guang ZHANG²,b, Nan-Feng CAI³,c

¹Logistics University of PAP, Tianjin, China
²Department of Logistics Support, Logistics University of PAP, Tianjin, China
³The third detachment on duty of the Shanghai general team, Shanghai, China

634618316@qq.com, b jianjian_10000@163.com, c 947783694@qq.com

Keywords: Finance of PAP; Financial Cloud; Platform Architecture.

Abstract. As a revolutionary emerging technology, the financial cloud integrates the advantages of cloud computing involved providing service on demand, mass storage and low cost and the advantages of financial sharing service model included efficient business process, centralized information and serving the overall strategy. The financial cloud can provide new model for the financial information transformation of PAP. Based on the theoretical basis of cloud computing and financial sharing services, this paper puts forward the definition of the financial cloud of the armed police, and explains the practical value of constructing the financial cloud from the two aspects of necessity and feasibility. The basic architecture of the financial cloud of PAP includes cloud data center, R&D and information security center, online sharing business platform and service terminal. The system composition, function, business process and correlation of each part of the financial cloud are designed preliminarily. Finally the paper analyzes the advantages of the financial cloud model synthetically and forecasts the prospect of the financial cloud.

The Theoretical Basis of the Study on the Financial Cloud of PAP

Cloud computing is a combination of traditional computer technologies and network technologies such as network computing, utility computing, parallel computing, virtualization, network storage, hot standby redundancy and load balancing. It provides diverse services that that covers three levels of “hardware + operating system / development tool + application software” in the traditional computer architecture, including computing power, storage space, virtual operating system application server, distributed storage service, computing framework and so on. [1]. With the advantages of on-demand service, low cost, mass storage and powerful computing power, cloud computing has greatly reduced the investment in hardware and software of enterprises and organizations and achieved economies of scale. In the public service, telecommunication industry, manufacturing and other industries, it has been gradually promoted.

With the help of modern information technology, financial sharing service promotes the specialization, re-integrates the core elements of personnel, technology and management in different regions and different departments, re-processes the financial business with high repeatability and easy standardization, and integrates financial services with economies of scale and strategic management attributes into a shared service center for processing. It achieves efficient operation, reduces costs, improves service quality, and integrates resources to serve strategic goals. [2].

Financial Cloud is a product of the combination of cloud computing and financial sharing services. ZTE, Inspur, UFIDA and other enterprises took the lead in putting forward the solution of financial cloud system to help large state-owned enterprises, manufacturing enterprises, banks and investment groups set up a financial cloud and achieved initial success. The sharing financial cloud has become the future trend of the group’s financial management development, and it also provides new ideas and development paths for the financial informationization of PAP.

Based on the existing research foundation of financial cloud, the Armed Police Finance Cloud can be defined as: financial service processing platform of PAP established by the collaborative
cloud computing technology of the financial sharing service concept, reengineering the financial processes, combining data sharing, accounting reimbursement, financial management, fund management, internal control, audit work and combat decision-making[3], thus reducing the overall operating costs, improving the quality of financial services, strengthening management accounting and effectively improving the quality and effectiveness of financial security.

The Practical Value of the Study on the Financial Cloud of PAP

Analysis on the Necessity of Constructing the Financial Cloud of PAP

With the steady progress in the informatization of PAP, the data centers for storing various departments such as finance and finance were gradually established at all levels, from headquarters to the general corps and detachments. The financial information system of the armed police was fully popularized and some contradictions were exposed.

First, traditional infrastructure construction is an extensive phase of low scale and poor service capabilities. According to the standards of data center scales issued by the Ministry of Industry and Information Technology, data centers of both the headquarters and the corps and detachments are small and medium-sized data centers, lacking rapid and flexible expansion capabilities and automated rapid deployment capabilities and are unable to cope with unexpected high loads.

Second, the financial information system upgrade cannot meet the actual needs. Since 2005, the armed police version of the military and financial system was fully popularized by the Armed Police Force, the system was upgraded twice in 2008 and 2015. It includes many subsystems such as salary, military insurance, and provident fund loan management, but the integration of various subsystems is not yet high. The function is relatively single, especially it cannot meet the needs of rapid and convenient protection in the emergency situation, and poor convergence with other logistics systems.

Third, the financial services of all units are isolated from each other and the connectivity is less interactive. From the network point of view, all levels of data centers are built in their own local area networks, access to three levels of network, relatively independent and isolated from each other. From the standard point of view, the data sources are complex, and the standards are not uniform, which cannot meet the needs of batch processing and analysis. From the perspective of maintenance, the data centers and financial information systems of the current corps and detachment-level units are managed, operated and maintained by the affiliated units' communications departments, and the maintenance and support capabilities of remote units are poor.

As a new service model, financial cloud provides a new development path for the construction of financial information of PAP. The integration of chimney isolated financial system architecture into a unified and shared architecture can avoid the shortcomings of traditional data center, financial information system, and accelerate the overall improvement of financial information level.

Feasibility Analysis of Building a Large-scale Private Cloud of Armed Police Finance

The feasibility of building a large private cloud of armed police financial affairs is reflected in three aspects: it is compatible with the mission characteristics of PAP, in line with the development trend of the financial management system of PAP and has the benefit of economies of scale.

First, it is compatible with the decentralized, diversified and confidential nature of PAP [4]. Armed police units are deployed scattered, with multiple points, long lines, and wide coverage. The financial cloud protection model can optimize the traditional financial security procedures, and centralize the operation and management of equipment and data. At the same time, due to the various tasks carried out by the armed police forces involving the security and stability of the country, the PAP cannot rely on the public cloud and should build a private internal cloud.

Second, it is consistent with the development trend of the financial management system of PAP. From January 1, 2018, the armed police force will be centralized and unified by the Central Military Commission. The financial management system of the armed police will also be reformed accordingly. It will gradually be incorporated into the financial management system of the People's
Liberation Army to achieve centralized management of financial resources. This is in line with the concept of financial cloud sharing services. To achieve orderly docking and data sharing among all units of financial information systems, unified data processing and standardized processing are required, and cloud computing can realize that from the source of data collection.

Third, building a large-scale private cloud of armed police has economies of scale. On the one hand, the entire budgetary unit of PAP has a large total budget involved each year and possesses the scale of building a large-scale private cloud. On the other hand, through the establishment of the Finance Cloud, the hardware and software investment, human resources and management costs are to saved, reducing the long-term fiscal spending.

System Architecture of Armed Police Financial Cloud Platform

Currently recognized cloud computing architecture is divided into three levels: infrastructure layer, platform layer and software service layer [5]. Based on the concept of three layers, Cloud data Center, R&D and Information Security Center, and the online service platform were jointly established in the Finance Cloud overall structure of PAP. At the same time, the service terminals were complemented and the overall structure of the large financial private cloud was completed.

Cloud Data Center Based on IaaS

Infrastructure as a service (IaaS) refers to the cloud computing data center to provide users with computing power, storage capabilities and network capabilities and other IT infrastructure services, the core technology lies in virtualization. Through IaaS, the finance department can rely solely on the cloud data center to complete the accounting of financial data storage, does not need to invest a lot of money to purchase basic infrastructure. Figure 2 describes the cloud data center architecture from three perspectives:

First, data sources and processing. The cloud data center receives the real-time financial information stream, including image data, tabular data and text data through the transmission of the online shared service information platform, and then further processes the data for standardization, unification and modular storage. Relying on distributed cloud storage technology, we can solve the storage problem of massive ticket images, access the original document image, track and transfer the ticket at any time, and realize the paperless image of the ticket image. [6].

The second is the function of the cloud data center. The financial information of all units is completed through standardized processing in the cloud data center, and the “three-counter” management of the budget, accounting, and final accounts is conducted in an integrated manner. The cloud data center gives full play to the effectiveness of financial sharing services, integrates full-calibre budget management, centralized fund payment, and automatic generation and finalization functions, and provides the original data and data model calculation results for management accounting decisions and audit internal control.
The third is docking with other systems. Through the specific transmission and encryption protocols, the financial cloud data center connect with command system and other logistics systems in an orderly manner, achieving logistical support integration and providing information support for integrated operational decision-making.

Figure 2. Cloud Data Center Architecture.

Research and Development of Operation and Maintenance and Information Security Center Based on PaaS

PaaS is positioned to provide users with a complete set of supporting platforms for developing, running, and operating application software through the Internet. The platform has dedicated IT technical engineers to regulate and control systems, process data, perform backups, and ensure data security. Based on the PaaS service concept, the function of R&D and information security center is to provide various services such as operation and maintenance, R&D and update, security and confidentiality through the LAN to the cloud data center, online sharing service platform, and the service terminal of PAP, as shown in Figure 3.

The operation and maintenance function is embodied in that: through the local area network, technical personnel of several operation and maintenance and information security centers of the entire armed police unit are linked into a technical network, and technical forces are allocated on an as-needed basis to break geographical restrictions and technical barriers to achieve real-time mobility of technical capabilities.

The R&D update function is reflected in the following: R&D personnel use cloud data centers for big data analysis to obtain the most up-to-date information on financial services, timely access to changes in basic unit needs and problems, and targeted vulnerabilities and R&D of new functions. Demand - R&D's fast path shortens the software update cycle, updating itself in a timely manner.

The security and confidentiality function is embodied in: The Center has concentrated technical talents and strengths, and can correct the vulnerabilities of the current version in a timely manner, improve security and reliability to a certain extent. However, at the same time, the integration of centralized data storage makes it more difficult to maintain confidentiality, and it is necessary to load more powerful data security protection systems on servers at all levels. Firewalls, digital signatures, intrusion detection technologies and other technical means should be used to ensure the security, confidentiality, and integrity of financial information under the network environment.

Figure 3. R&D and Information Security Center Functions.
Online Shared Service Information Platform Based on SaaS

Software-as-a-service means that the manufacturer deploys the application software in its own data center. The user only needs to pay a certain rental fee according to the actual needs, and can lease the necessary application software services to the manufacturer through the Internet. The maintenance of the entire system is the responsibility of the manufacturer.

The concept of SaaS into the unified planning and construction of the armed police financial information system, relying on the armed police LAN, the establishment of the Armed Police Force Logistics Department unified financial leadership unified financial information processing platform, so that financial management from stand-alone to network. Online sharing business platform is located between the terminal and the cloud data center, play a role in convergence. The information collected by the terminal is stored in the cloud data center through the online shared service platform to realize the sharing and sharing of information resources so as to facilitate the implementation of auditing and internal control.

The online sharing business information platform consists of five parts: information collection platform, budget management platform, settlement reimbursement platform, accounting platform and fund management platform [7]. The economic business process is shown in Figure 4. After the economic business occurs, the image information such as the original voucher is input by the information collecting platform and is checked through the accounting platform through the approval process of the settlement reimbursement platform. Accounting platform triggers the fund management platform for payment payments. The budget management platform manages the entire business of the economy, plans in advance, controls in events, and adjusts afterwards. The five platforms are interconnected, integrating functions, simplifying business processes, and achieving efficient, paperless and informatized financial business processing.

![Figure 4. Online Sharing Business Platform Business Processes.](image)

Supporting Construction of Service Terminal

The service terminal is a window for information exchange between online and offline. Financial personnel need only one terminal and access authority that can connect to the Armed Police LAN to complete business activities such as information collection, settlement reimbursement, accounting, fund management and budget management, and store the information in the cloud. The client terminal adopts a low-power thin client, and the shared computing, storage and network resource pools created in the background through virtualization improve the resource utilization rate and reduce the terminal maintenance cost.

Terminal supports the construction of both operating systems and hardware devices.

The cloud operating system has two functions of data entry and extraction. It can input image data such as original documents through the data entry function and upload it to the online business sharing platform to record the actual occurrence of each business. Through the data extraction function, the superior department and the auditing unit Access various business-related vouchers and documents from the financial sharing information platform, and approve and review the subordinate departments and audited units.
Supporting the construction of hardware equipment is mainly the use of scanning equipment such as high-speed scanners invoices and other original vouchers, statements and audio and video and other accounting information, the whole image and conversion integration process to generate electronic images, re-use of intelligent identification system, data transfer Sense system and network communication system to realize the intelligent identification, location, tracking, access, transmission, conversion, preliminary processing and management of the image data.

An important aspect of service terminal construction is the construction of mobile terminals. When the financial department guarantees emergency and other emergency tasks such as emergency handling, it communicates with the financial sharing information platform through various types of mobile terminals such as on-board and hand-held, and timely reports the demand, adjusts the budget, requests funds, and uploads accounting data to provide fast, flexible and efficient financial support for informationized combat.

Conclusion

The financial cloud combines the dual advantages of cloud computing and financial sharing services and has broad application prospect in the Armed Police Force. To study the necessity and feasibility of building a financial cloud for the armed police provides a solid foundation for the research on the financial cloud system architecture of PAP. This article has carried on the preliminary discussion to the overall structure of the Financial Cloud of PAP and the functional relationship among various components, enriched the finance cloud theory and provided the train of thought and development path for the financial information construction of PAP. However, the study has not involved the financial cloud security mechanism, the collaboration with management accounting, financial cloud and other logistics information docking and so on, which will be the main direction of future research.

Acknowledgements

Fund: College-Army Management Accounting Framework and Methodology (WHL201707)
Military-civilian integrated logistics support status assessment and policy recommendations (14GJ003-258)

References