A New Mode of Army Equipment Support

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Abstract. Firstly, it points out the problems in the mode of providing equipment for the Army, then analyzes the characteristics and advantages of cloud computing, constructs a cloud platform technology structure suitable for the Army, and combines the leading ideas of military and civilian integration to improve the supply system in a timely and efficient manner. It provides ideas for improving the construction of Army equipment and equipment support.

Keywords: cloud computing, equipment support mode, mode

1. Introduction
At present, there are still many shortcomings in the construction of the Army's equipment and equipment support. The main manifestation is that the functional uses are simple and overlapping, and the problems of individual battles and repeated construction are outstanding. The centralized control integration is weak, and the benefits are improved and the ability transformation is limited. Data mining is relatively weak, deep integration and intelligent application are not in-depth enough; The technical standards are uneven, and the integration of blocks and systems is difficult. It is supplemented by information integration, analysis and processing technologies such as big data and the Internet of Things, innovating support models, optimizing support mechanisms, meeting transition needs, and providing material support and institutional support for the comprehensive construction of a new type of army.

2. Current Status of Safeguards
Army equipment equipment support is the collective name for organizing the implementation of various activities such as the collection, storage, distribution, and supply of army equipment and equipment. The existing support model is shown in Figure 1. Under the new adjustment of the establishment system, the business process for the support of the Army's equipment and equipment is under the three-level organizational structure of "Army, War Zone Army, and Army". Run the serial guarantee mechanism based on "step by step application, unified financing, step-by-step supply, distributed storage". This paper focuses on the analysis of the financing and supply of two links.
2.1. Financing

The Army equipment Department organized a centralized fundraising once a year. The military business department first organizes the annual final accounts of equipment and equipment, which includes information on annual equipment revenue and expenditure and equipment inventory at the end of the year, and formulates an equipment application plan in conjunction with the equipment maintenance plan for the next year.

In turn, the demand for troops is summarized by the group army and the theater army to the army equipment management department. In addition to the needs of the subordinate units, the equipment management departments at all levels must also combine the inventory balances of the units at the corresponding level to aggregate the needs of the units at the corresponding level. In the process of raising funds, information is reported layer by layer, aggregated step by level, and is inefficient and inaccurate. At the same time, under the current circumstances, the Army equipment department can only select a certain range of manufacturers, and there is a lack of standard evaluation feedback mechanisms for manufacturers. The consequence of the current mode of financing is inefficient work and poor economic performance.

2.2. Supply

Equipment and equipment supply refers to the distribution and supply of equipment and equipment to the troops. The current supply model adopts the form of unified ordering and progressive distribution, that is, according to the distribution plan, the equipment is distributed step by step according to the "Army-War Zone Army-Force". It can be seen that the current Army equipment support information system integration has long deployment cycles, difficulties in operation and maintenance, inefficient use of information resources, and inability to adapt to the new equipment support system. There is a gap between the construction of a powerful modern new army strategy and it urgently needs to change the status quo.

3. Cloud Computing

Cloud computing is currently one of the cutting-edge technologies in the field of information[1] This new type of computing model has features such as super-large scale, virtualization, high reliability, universality, high scalability, and on-demand services[2]. It uses the network to form a shared virtual resource pool with scattered computing and storage, application operation platform, software, etc., and provides services to users in a dynamic on-demand and measurable manner[3].

Scholars at home and abroad have carried out many researches on cloud based information integration. Documentation[4-6] The application integration problems of infrastructure as a service layer, platform as a service layer, software as a service layer in cloud integration are studied. Documentation[5-7] Based on cloud computing technology, the railway information sharing platform has been established, and research has been carried out on key technologies such as cloud-based platform architecture, shared information storage, service retrieval and security mechanisms.
Documentation\cite{8} The data center construction under cloud computing conditions is studied, which effectively improves the efficiency of big data management. Documentation\cite{9} The virtual architecture of processing and manufacturing resources in cloud manufacturing environment is designed, and the key problems of semantic modeling, virtualization mapping, selection and optimization of processing and manufacturing resources are studied. Documentation [10] An integrated framework of equipment information based on cloud computing is designed. Documentation [11] The distributed sea battlefield command and control system architecture is designed with cloud computing technology.

From the existing research, it can be seen that cloud computing has been successfully applied in the areas of e-government, manufacturing, supply chain, etc., which has provided experience for cloud-based equipment support systems, and has also proved that cloud-related technologies are applied in equipment support systems. Feasibility. However, some scholars have explored the integrated architecture of equipment support information system based on cloud computing, but the military characteristics of equipment support are not strong. And lack of cloud computing conditions equipment support application service build and service call, governance and deployment of application integration key issues.

To this end, this paper takes cloud computing as an opportunity, based on reference to the previous successful experience, combined with the characteristics of equipment support, put forward a cloud-based equipment support model.

4. Cloud Platform Architecture Design

Compared with the traditional computing model, cloud computing has the advantages of "shared resource pool, wide-area network access, rapid flexibility, and measurable services", which can better solve the problem of low data sharing and low infrastructure utilization in the military. Its logical architecture is shown in Figure 2.
The architecture is divided into five levels, from the bottom up: infrastructure and state perception layer, basic service layer, support service layer, service management layer and application service layer. The following analysis combines the functions of each layer.

1. The infrastructure and state perception layer integrates a variety of underlying resources, in addition to conventional data center computing resources, storage resources, and network resources. It also includes intelligent sensing methods such as radio frequency identification, sensor acquisition, and bus data acquisition through integrated applications of Internet of Things technology, and records in real time various data such as equipment technology status, equipment operating parameters, and management and support activities. The data is automatically transferred and stored to the "cloud" end through the technique of automatic reading and information transmission.

In view of the outstanding problems such as the low degree of automation of collection records and the incomplete coverage of information types that are common in equipment support, this layer can provide solutions in hardware and technology, not only fundamentally solving the problem of information islands. It can also improve the self-perception of the technical status and support information in every link of equipment and equipment, and provide accurate, comprehensive, effective and timely raw data accumulation for accurate on-demand security and wartime security decision-making.

2. The design of the basic service layer draws on the mature basic cloud platform architecture and is divided into two levels, IaaS and PaaS, to provide a fast, safe and flexible cloud computing environment for the entire cloud platform system.

In the IaaS layer, the cloud operating system was first introduced, the decentralized, independent resources were unified and virtualized into a larger logical resource pool, and the external abstraction was standardized and tenant oriented infrastructure services. Tenants could customize resource services as needed. Based on the cloud operating system, the IaaS layer mainly implements resource pool management, encapsulates the virtualized resource pool resources, provides the PaaS layer in the form of services, and provides flexible and scalable business continuity guarantees.

PaaS layer is a distributed platform service. PaaS layer provides data services in the form of RESTful API and SDK. It can meet the requirements of the equipment management business for data quality, prepare for subsequent data analysis and application, and implement data applications. "From the business, There is a return to business ", which greatly enhances the application value of equipment management data. The PaaS layer is mainly divided into database services, large data engines, and data management basic software.

The database service takes data application as the core, and realizes data services such as processing, synchronization, integration, and distribution of encapsulated data, and runs through the entire life cycle of data. Among them, the data processing synchronization function mainly includes data quality management, relationship model construction, etc.. Combined with the data abstraction rules of equipment support, the structured and unstructured equipment information is consolidated, pooled, and effectively processed. Establish the corresponding data management model, realize the depth of data resources integration, solve the common problem of data management of equipment business, and provide an open architecture to solve personality problems; The integrated distribution function of data mainly includes delivery and collaborative services. According to the specific needs of equipment management tasks, data distribution can be transmitted to the corresponding equipment management business scenario.

The data engine and data management basic software are based on database services. According to the characteristics and requirements of various links of equipment protection, we use data mining and machine learning technologies to use correlation analysis, machine learning models, and data blood analysis. It provides information support for large data decisions instead of empirical ones, and is conducive to data-based data mining research such as equipment support decisions and equipment consumption analysis. It provides data guarantee for Chengjian's system to achieve precise management of equipment.
(3) Support service layer: The support service layer belongs to the business application characteristics of the logical framework. Its function is similar to that of the software factory, and it mainly provides a reusable basic business module for the equipment information management system. This layer abstracts reusable basic services by analyzing the business process of decomposing equipment. It mainly includes unified permission management, equipment application stores, geographic information services, instant messaging, cross-domain access agents, real-time data acquisition, real-time online management of resources, image recognition, video services, and index analysis. The support service layer publishes these services as RESTful or SDK, providing the superior application layer with a standard call, which can improve the efficiency of equipment information management and effectively shorten the equipment business software development cycle.

(4) Service management: The main operating equipment guarantees various functions of basic services, including service registration, deployment, search, matching, combination, and invocation. It mainly provides an integrated development environment, a development library, and an operating platform for business middleware, supports the rapid development of online and offline tools, speeds up the development cycle and efficiency, and integrates development, testing, deployment, and operation. Avoid traditional middleware development process costs and structural bottlenecks, greatly reduce time and economic costs.

(5) The application service layer mainly includes a comprehensive office system based on a cloud platform and a basic unit information system, providing basic applications such as equipment status monitoring and updating, equipment information management, and equipment situation presentation. At the same time, it provides information management services for equipment financing management, equipment storage management, equipment supply management, etc., and provides information security for the head office to urgently need business work and daily work of basic units.

5. Analysis of New Equipment Model
The realization of the "demand real-time response" goal of the new guarantee model depends on well-informed cloud platforms and efficient logistics networks. Through the connectivity of the cloud platform, on the one hand, it can realize the real-time sharing of equipment resources and information at all levels, and on the other hand, it can attract more high-quality civilian forces for my use.

In terms of equipment financing, business personnel at all levels can easily obtain real-time data and historical statistical analysis data such as inventory and consumption of equipment at the corresponding level and at the lower level through the platform, thus greatly improving the efficiency and management span of applications, allocations, and fundraising. At the same time, the system decision-making model can collect relevant information on the strength, utilization and maintenance plan, equipment consumption and other aspects of the system in real time, dynamically adjust the equipment requirements and inventory standards, and provide support for the scientific decision-making of business personnel. At the same time, adding more local suppliers will increase economic efficiency and guarantee efficiency.

Equipment supply, equipment supply support needs to rely on an efficient logistics network. It is necessary to streamline unnecessary supply levels and links through process reorganization, and reduce delays and waste caused by reverse storage and storage, disassembly and packaging; It is also necessary to give full play to the advantages of local logistics in terms of cost and efficiency, and improve the efficiency of security.

5.1. Financing
Equipment and equipment financing refers to the activities of the equipment and equipment management department to obtain equipment and equipment through procurement, self-control, and solicitation. There is a certain scrap rate for the repair of faulty equipment, so it is necessary to supplement the scrapped equipment through financing; Second, with the increase in the equipment strength of the troops, it is also necessary to increase the inventory configuration through financing. Under the new model, the Army Equipment Management Department of the War Zone organizes the
financing of the Army's main battle equipment repairable equipment in the war zone. The fundraising work is generally carried out at the end of each year. The amount of fundraising is the sum of the number of equipment that can not be repaired in the current year and the amount of inventory configuration that needs to be increased due to changes in equipment strength and other factors. After the financing plan is approved, the theater signs an order contract with the manufacturer; The production cycle is generally 6-12 months. After completion, the manufacturer delivers the theater support center for acceptance.

5.2. Application and Supply
Equipment supply refers to the distribution and supply of equipment and equipment to the troops. The application and supply link is the key link to realize the concept of "demand real-time response" in the new safeguard mode.

For expensive and infrequently consumed equipment, the theater warehouse can be responsible for storage and supply troops in real time as needed; For equipment with a general price and frequent consumption, it can be mainly stored in the troops and applied to the War Zone Army on a regular basis. The amount of application is the difference between the stock allocation standard and the stock surplus; At the same time, if there is a shortage of repairable equipment that is generally and frequently consumed during the application cycle, priority may be given to the transfer of equipment from the nearest troops in the same theater to meet their needs. Both types of equipment can be delivered directly to the supply and transported directly from the theater security center to the troops 'support points. Expensive and infrequently consumed equipment distribution volume is small, time-sensitive requirements are high, and it is appropriate to use the transportation power of local logistics companies to carry out distribution; The equipment that is generally priced and often consumed is distributed in large quantities and has a strong periodicity, and can be borne by the military's established transportation forces.

6. Concluding Remarks
We will master the actual needs of the Army's equipment and equipment support in the new era, combine the characteristics of equipment and equipment support, use the advantages of cloud elastic services and low costs, and build a cloud-based cloud support model for the Army's equipment and equipment, and improve the operating mechanism of the Army's equipment and equipment support. It is of great significance to study the optimization of equipment management and to promote the overall improvement of equipment support capability of the Army. This paper only analyzes the support mode of equipment based on cloud computing. The next step is to study the specific design of each stage.

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