The Application of Cloud Computing in Government Management

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Abstract. Nowadays, the realization of government functions has been more and more inseparable from the network, at the same time, the public also hope the government to provide more and more convenient and fast related services, interactive functions can also advance with The Times. At the same time, the government wants to make public services more efficient. In the context of big data and cloud computing, the openness and sharing of government-owned data has an extremely important impact on the society. In the process of government management, the traditional management way already can't adapt to the needs of a large number of data exchange, but now the government management slightly to the research of innovative technology still lags behind, the rise of cloud computing provides a new way for the government management innovation, this article to introduce the cloud computing government management for research purposes, to provide a new way for the government management reform.

Keywords: Government Management, Cloud Computing, Resource Sharing, Electronic Government Affairs

1. Introduction

The current mainstream view of government management innovation is that it refers to a series of new changes in administrative functions, administrative modes, administrative styles, government policies and regulations, and administrative systems caused by changes in administrative environment and tasks. Connotation of the government management innovation is a major factor in cultivating and sets up the government management mode innovation, refers to the government in the process of providing social management and public service, efforts to create a peer in decision science, administration according to law, power and responsibility, strengthening service, pay attention to performance, effective supervision as the main characteristics of the friendly administrative interface, make the
public satisfied. With the rapid development of information technology and the continuous advancement of the transformation of government functions, China's e-government construction has also entered a new stage of vigorous development. By comparing the concept and technology of cloud computing e-government and traditional e-government, we know that cloud computing will bring more infinite possibilities to government management. The development of government management based on cloud computing has brought new opportunities for the transformation of traditional government management, and also provided dynamic support and technical support for the innovation of government management. The improvement of management mode is one of the main ways to improve government management, e-government is an innovation shortcut of government management mode, and the innovation of e-government management mode is to use modern information technology to further improve work efficiency and improve the ability to serve the public.

In the face of increasing current data information resources, cloud computing has a huge advantage in large data operations: 1) Simple [1]: the user at any time and at any place, use any terminal can be server sends the request to the clouds, like his own money in the bank to use when you can choose at any ATM withdrawals. 2) Virtualization [2]: cloud computing technology virtualizes various hardware resources such as storage, processor, network, etc., so that users can use any terminal at any location to conveniently and quickly use the application services they want. 3) High reliability [3]: more advanced fault-tolerant mechanism is applied, and the unified management of resources also improves its security and reliability. 4) Universality: cloud computing does not correspond to specific applications, and different applications can be constructed under this platform. 5) High scalability [4]: the scale of the platform can be dynamically expanded to meet the growing needs of applications and users in the future. 6) On-demand service: resources of the platform can be purchased on demand, just like tap water and electricity. 7) Extremely cheap: the excellent universality greatly improves the utilization rate of resources compared with the traditional system, and thus has a lower cost advantage [5].

In the information age, the government holds over 80% of the data and is the owner of the wealth in the data age [6]. However, only when data standards and formats are unified and Shared can the efficiency of data be fully exerted. The development of network technology has prompted the government to form a unified and Shared data platform. The sharing degree of information resources is getting higher and higher, and the utilization rate of data is greatly increased. Government agencies, factories and mining enterprises, social organizations, ordinary people and other subjects are connected as a whole through the network in the collection and application of data, and the ability of information communication is enhanced. The unified and Shared data platform has led to the transformation of the tools of government governance, and the command-and-control action strategy has been replaced by negotiation and consultation. Optimization of government governance tools, innovation, make the information provided by the previous government mode to each people-centered, work system from the past to countries as the center to citizens as the center, more in the governance body to participate in the activities of the public governance, improve the transparency of the public decision-making, improve the governance body of government policy feedback, people will be more and more trust in government. Big data promotes the performance of data with its unique sharing concept, which is also the embodiment of the innovation of government governance tools [7-8].

2. Method
2.1 Cloud Computing Technology

Cloud computing has become a well-known technical term, and different organizations have given their own definitions of cloud computing from their own perspectives [9]. The national institute of standards and technology (NIST) defines cloud computing as a model that enables users to access, on demand, a pool of Shared resources over the Internet, including networks, servers, storage, etc., managed and configured by service providers. Resource scheduling has many similarities and some differences between grid computing and cloud computing. Similarities of environmental resources is through the data center in the maintenance and management, the difference is in the grid computing resources to users is a real physical resources, and transparent to the user in the cloud computing resources are virtual machine resources, these virtual resources also need through specific scheduling strategy and scheduling algorithm mapping to the real physical resources.

Resource scheduling in cloud computing is mainly a decision-making process of how to allocate resources to users at a certain time point or time period. The basic model of cloud computing resource problem can be expressed as:

\[ Q = [T, V, R] \]

Among them, \( T = \{v_1, v_2, \ldots, v_j, \ldots, v_m\} \) is the set of tasks waiting to be scheduled submitted by users, including \( n \) independent tasks, \( t_i = \{i = 1, 2, \ldots, n\} \) represents the sub-task of \( i \); \( V = \{v_1, v_2, \ldots, v_j, \ldots, v_m\} \) for virtual resource collection, including \( m \), virtual machine resources \( V_j = \{1, 2, \ldots, n\} \) said the first \( j \) virtual resources. \( R \) represents the mapping relationship between sub-task set \( T \) and virtual resource set \( V \), whose matrix is expressed as:

\[
R = \begin{bmatrix}
    r_{11} & r_{12} & \cdots & r_{1m} \\
    r_{21} & r_{22} & \cdots & r_{2m} \\
    \vdots & \vdots & \ddots & \vdots \\
    r_{m1} & r_{m2} & \cdots & r_{mm}
\end{bmatrix}
\]  

Where, \( r_{ij} \) represents the mapping relationship between \( t_i \) and \( v_j \). When \( r_{ij} = 1 \), it means that task set \( T \) has a sub-task \( t_i \) assigned to execute on \( v_j \); otherwise, \( r_{ij} = 0 \) means that task \( t_i \) is not assigned to execute on sub-task \( v_j \).

Cloud computing provides a common service, behind the service is a large-scale interconnection and collaboration of hardware and software system environment. The telecommunications research institute of the ministry of industry and information technology of China believes that cloud computing is a way to organize and call information and communication resources through the network, and can carry out large-scale computing. Baidu baike gave a narrow definition of cloud computing is a kind of cloud network, at any time to obtain the required hardware and software resources, as well as dynamic expansion of the use mode. It can also be seen from different perspectives that its main characteristics are resource virtualization and servitization. From an
industrial perspective, cloud computing pushes network computing systems and applications to a new stage of development and becomes an integrated service model integrating hardware, software and information services in the information industry. From the perspective of users, cloud computing is a transparent service model that can be used on demand. From the perspective of service providers, cloud computing is an open, multi-user Shared centralized information infrastructure [10].

2.2 Electronic Government Affairs

There are many explanations for the basic concept of e-government, such as: e-government is e-government, network government and government information management. After years of development, e-government is no longer a simple “government Internet project” image. As a systematic engineering, e-government has the following three characteristics: first, e-government is an integrated system that includes software, hardware and other IT technologies. The software part mainly consists of application system, database management system, information transmission system and user management system that meet the business needs. The hardware part mainly consists of IT equipment, external access network and internal data exchange network. Second, e-government is a collaborative system dealing with the related affairs between government functional institutions and departments. It not only deals with the internal affairs of government agencies, but also deals with the business coordination and other management affairs among government departments. Third, e-government is a management system that continuously promotes business restructuring and process reengineering of government organizations. By breaking the limits of time and space, government agencies continue to provide quality, comprehensive, standardized and high standard management and service to the society. Therefore, e-government is the full use of computer, network and other information technology means, to achieve the government related organizational restructuring, business process optimization, break the isolation of business departments, forming a streamlined, efficient, clean and fair government operation mode. Figure 1 shows the cloud services provided to users by these three cloud computing service models [11].

![Figure 1. Cloud Computing Service Model.](image)

3. Application of Cloud Computing in Government Management
(1) Sharing of E-Government Data Based on Cloud Computing

In the era of big data, data has gradually become an important resource in the process of continuous collection and processing. Under the trend of increasing openness and sharing of various kinds of data, "open and Shared" as the core mode of thinking has gradually entered the public view, which is not only reflected in the economic field, but also in various government departments. The overall architecture of government cloud can be divided into three parts from the perspective of users, including infrastructure layer IaaS, platform layer PaaS and application layer SaaS. Each layer in the structure is in an independent state with different services. The overall structure of government cloud is shown in Table 1.

|                | SaaS       | PaaS                | IaaS          |
|----------------|------------|---------------------|---------------|
|                 | The Presentation Layer | The Virtualization Layer |
| User Service    | Operation Management      | The Physical Layer  |
|                 | The Middle Layer          |                       |

The data held by the government reveals the mystery. From the traditional government information disclosure to the data opening to meet the public demand, and then to the data interface opening, any social institution or individual can use the data for their own use. Free data improves the degree of social openness and sharing.

The Chinese government holds more than 80% of the data resources and is the owner of the wealth in the data era. However, due to the restriction of technology and system, data lack of liquidity and cannot fully reflect its value. If these data are open and Shared, the economic and social value it creates is self-evident. Big data "forces" the government to publicly share data, and meanwhile, "forces" the government to constantly rebuild the consciousness of open sharing.

(2) Full Sample Analysis of E-Government Based on Cloud Computing

With the extensive and in-depth development of big data, it has changed the way of thinking of human beings with a "big" beyond imagination. The traditional method of problem solving, sampling analysis, has been subjected to a violent impact.

In practical applications, the data of "whole sample analysis" to be able to handle the data approximation, and even to the overall number of samples, the object of study to expand into the original data, through the comprehensive analysis and processing, the connection between the depth of mining data, the regularity of the relationship, compared with traditional data processing methods, this way of analysis of sufficient attention to detail, the research conclusion is more objective and accurate. In the global cloud computing market, PaaS has developed into the most promising technology field with the most attention from the industry. As shown in figure 2, the global cloud computing market is growing steadily. Among them, the PaaS market has been growing steadily, accounting for 11.4% of the entire cloud computing industry chain, with a growth rate of 21.45%. It is expected that the compound annual growth rate will remain above 20% in the next few years, and the development of
the PaaS industry has ushered in a period of great opportunities.

![Global Cloud Computing Market Size](image_url)

**Figure 2.** Global Cloud Computing Market Size

In government management modernization, the government management gradually in history, replaced by governance theory, more social main body and individuals involved in the management activities, both quantity and structure are significant to expand, in the big data technology, driven by the government process reengineering prompted flattening mode of governance to become a reality, various main participation management can realize the purpose of, and visible, government governance reform without large data of strong support.

(3) The Relationship Between “Data Center” and “Multiple Governance Bodies” of E-Government Based on Cloud Computing

Government instead of the government management has become the new theoretical paradigm, the shift of dissecting the management to the management network, the transfer of vertical management structure to flat management structure, the subject of more involved in the government governance activities, the government no longer dominant, but boss governance activities, pluralistic governance body coordinator; Pluralistic subjects play a central role through participating in the deliberation and administration of state affairs and form a benign interaction with the government.

At present, with the rapid development of information technology, mobile phones and other convenient communication carriers make everyone become the generator and user of data, and everyone can speak and have a voice. For example, a friend posted on weibo will attract a large number of clicks, which will attract wide attention. It will even become the guide of a government governance activity, and the data center will become the center of the governance body.

Therefore, to realize the modernization of government governance, it is necessary to make full use of the data network platform, continuously tap the data potential, and let each governance body make its own voice and improve the governance capacity of the government.

4. Conclusion

Throughout the domestic and foreign research and application of theory analysis, the construction of
e-government system adopt cloud computing related technical advantages brought by the undisputed, obvious, but we also know that each local government can't rotte, combined with the actual situation of their comprehensive consideration is needed to build cloud computing the ways, methods of e-government platform. E-government cloud platform is the primary choice of e-government at home and abroad, and the development of cloud computing has also promoted the development of related information industries. Especially in the current environment with greater economic downward pressure, the transformation and development of e-government should be promoted first. “The road is tortuous, the future is bright”. Although we in the construction and development of grass-roots government cloud platform of e-government will encounter many problems in the process, but the development of any new transaction which is not a “pain and pleasure”, the implementation of e-government cloud platform must be able to help us as soon as possible to build a highly effective, open, transparent service-oriented grass-roots government, eventually converge into a national a service-oriented government. In the future, to improve the management mode of e-government platform based on cloud computing, the following two aspects should be clarified in the research. Second, how to promote the cross-regional cooperation and use of regional e-government cloud platform, and finally form a national e-government cloud platform.

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