Design and Implementation of Regional Mobile Government Collaborative Cloud Platform based on Big Data

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Abstract. The widespread and rapid development of wireless communications and mobile devices has made government service methods different from before. The government is also constantly improving its service methods to provide better services to citizens and the government. This is precisely the case, with the development of e-government, the concept of "mobile government" came into being. It has gradually become the focus of the development of "e-government" and has attracted much attention, setting off a wave of mobile government development in the world. How to build a regional mobile government cloud platform in the context of big data and how to apply it to government affairs based on big data analysis to improve government management and social services is a new topic facing governments at all levels in the Internet era. Therefore, based on the media subsystem, this paper designs the mobile government cloud platform and the government affairs transaction process framework, and realizes the multi-departmental collaborative work under the cloud platform. Finally, based on the big data algorithm, the optimization of government processing and decision-making government is optimized.

Keywords: Big data, regional mobile government, collaborative cloud platform.

1. Introduction

Since the beginning of the 21st century, all aspects of social life have undergone profound changes driven by Internet technology, big data technology, and mobile communications.The "Internet + Big Data" model is deeply rooted in all walks of life, and the level of informationization in society is deepening.Especially with the rapid development of mobile communication and mobile internet technology, it has brought profound changes to related industries and completely changed people's lives.

Since being frequently mentioned in 2012, the concept of big data has drawn eager attention at home and abroad.Big data thinking is increasingly penetrating all areas of social life, and the government's use of big data is becoming wider and wider, from the original information query to modern social governance, crisis management and government affairs.With the continuous development of mobile communication and mobile internet technologies, the use of mobile terminals represented by mobile phones has become more and more widespread and used.The way people live, work, and do things change."Government + Mobile Internet" is the only way for the government to further deepen the "distribution service" and further establish a service-oriented government. It is also the future development direction of e-government.Mobile government affairs, as the name suggests, is "government + mobile", the English name is MobileGovernment[1].This is a new way of government governance and provision of government services. With the latest technology and products, and relying on mobile terminals in hand, the government can improve the efficiency of government governance and provide a means to externally enrich government services.At present, this method has been widely used in various aspects of government agencies, various enterprises and institutions, various social organizations, and daily activities of citizens.

In recent years, the number of government cloud platforms has been studied, and a basic system has been formed. However, the number of research literatures on the construction of local government cloud platforms is very small.The research of this paper is mainly carried out around the construction of the government-level cloud platform at the regional level, so it has certain innovation.On this basis, this paper proposes a big data algorithm based on the optimization of government government

decision-making, and has a certain practical guiding significance for the future expansion of regional cloud business.

2. Design of Mobile Government Cloud Platform

2.1 The Design of the Macro Architecture

The entire terminal display platform built by the Institute adopts a three-tier architecture, including a running support layer, a data layer, and a service application layer.The running support layer consists of two parts: the standard system and the operating environment system. This layer serves as the cornerstone of the entire platform throughout the system.The standard system includes data specifications, service specifications and application specifications; the operating environment system includes network systems, computer storage systems, and security systems[2].The data layer includes multi-temporal, multi-scale, multi-type government information data and industry thematic data.The service application layer refers to applications such as browsing, analyzing, and searching for services.On the tablet terminal device, the data is displayed on the user in the form of a service, and the user can access various data services on demand by using the terminal platform, and then apply various types of information services through the application system.

4G or higher network broadband creates the conditions for new business in mobile office.The IP Multimedia Subsystem (IMS), which is a 4G standard, is a technical architecture that implements communication networks and Internet convergence including 4G networks.The architecture uses the Conference Initiation Protocol (SIP) internally, which has good support for multiple services in the mobile office, especially video services.In addition, IMS supports access to Office Automation (OA) services.At present, OA is no longer limited to fixed office forms. It has begun to transfer to mobile devices such as portable computers, mobile phones, PDAs, etc., and can also access government government systems through WAP mobile phones or GPRS wireless access[3].A variety of services, rapid and flexible service creation, and the ability to provide multimedia services will become a new direction for the development of mobile office systems.IMS provides a good network architecture support for mobile office.The service-oriented architecture is based on the standard description language XML, which provides a fast implementation of new mobile office services and interoperability between different types of systems.Combined with these new technologies, people have proposed a new mobile office structure model, as shown in Figure 1.

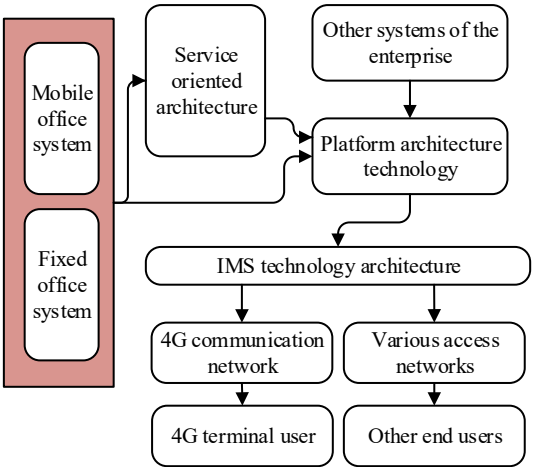

Figure 1. The overall architecture model of mobile government under 4G technology

The architecture of this study is from the bottom to the top for various access devices, various access networks, IMS technology architecture, and government government systems[4].The IMS architecture combines fixed and mobile networks, as well as 4G networks with high transmission bandwidth.The government government system requires development, cross-platform, scalability, and good integration of the government system with other systems.

2.2 Process Design of Mobile Government Affairs

Due to the attractiveness of mobile interaction and the rapid development of ubiquitous computing technology, governments, citizens, civil servants, other social organizations and visitors will pass their mobile phones, portable computers, vehicle terminals, and other mobile terminals.Access mobile communication networks and wireless internet networks anytime, anywhere, and seek out the various services that you need.In the future, mobile information terminals and wireless networks will be no less than the scale and impact of current computers and networks.These provide new opportunities for further improving government management, improving public service levels and efficiency, and building more responsive, efficient, transparent and accountable governments.It also helps to bridge the digital divide, provide universal service and agile services to the public, and achieve the “4A” goal of mobile government.Even anyone can access any content he can access at any time, anywhere.

Mobile government uses mobile communication technology and wireless interconnection technology to strengthen local management, streamline and optimize government processes, and make scientific decisions.This will better realize the government's public affairs management and service functions, making the government affairs more intensive and convenient[5].The traditional way of dealing with government affairs is to focus on the functions of various government departments and to improve the face-to-face government services for the public. The government, the public and social organizations generally need to understand the functions, authorities and specific division of labor of government departments.In this way, it can be handled by various government departments one by one according to the process of resolving affairs. This transaction processing method is complicated and there are many approval procedures.The process of mobile government is centered on the needs of the society. The government takes "government is the service" as the starting point, helping the public, government, social organizations, etc. to quickly and efficiently solve various affairs and coordinate various relationships.The transaction process under the mobile government mode mainly includes the process of generating mobile service requirements, the integration process of government departments' knowledge and resources, and the process of connecting the government affairs platform with related services, as shown in Figure 2.In the traditional government service hall, when the public handles business, the service program can be optimized by means of the mobile government platform in the background.

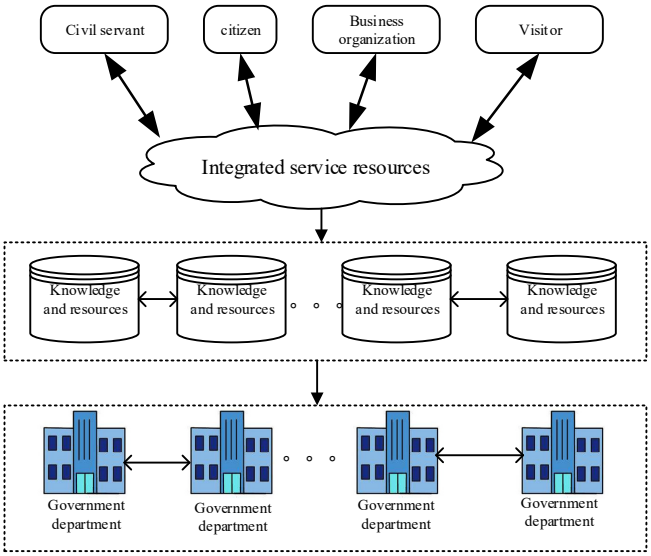

Figure 2. Flow chart of the transaction processing of the mobile government platform

3. Implementation of Multi-department Collaborative Workflow under Cloud Platform

Collaboration is the e-government development strategy proposed by China in the "National Informatization Development Strategy".In view of the development of China's e-government in the

direction of government affairs cloud, this paper studies the government collaborative work flow under the government cloud environment.The government collaborative work flow not only includes the characteristics of the collaborative services of various departments under the government cloud environment, but also the characteristics of the government service public service process[6].According to the above characteristics, this chapter focuses on the service process resource storage and security access control issues in the government cloud environment, and divides the collaborative workflow into two parts: information sharing and dynamic access control.

3.1 Government Affairs Cloud Information Sharing Model

In the process of government cloud information sharing research, this paper builds a service center in the government cloud to help the government cloud realize the sharing of public service process information.The service center mainly consists of a service instance, a process instance registry, and an instance shared resource.A service instance is created by a service component during the application for public service.The process instance registry is responsible for recording the location information of the service service shared files generated by the service participating department during the service process.It mainly includes the location of the service center and the department location where the file is generated (the file stored by the file generation department is a backup of the service shared file.An instance shared resource provides a service sharing file generated for a specific service instance in a service process for a service participating department.This file will be used as a shared resource for the service instance for subsequent service departments.Among them, the process instance registry structure is as follows:

$$\begin{Bmatrix} Instance\_Id, Local\_Address, Department\_Address, \\ User\_Id, Department\_Id, Node\_id \end{Bmatrix}$$

Instance_id is the service instance number, indicating which service instance the current registration information corresponds to;*Loacal_Adress* represents the service center address, where you can find shared resources for service instances in the service center.The service node corresponds to the service department location in the department_adress table service instance.The address records the source of the shared resources of the service center, and also plays the role of backup service resources, as long as the registry structure is not damaged, the service instance shared resources can be retrieved;*user_I* represents the user who generated the service share file;Department_id records the generation department of the service shared resource;*Node_id* records the node number generated by the service share file in the entire service instance[7].

The above structure provides structural support for public service process information sharing under the government cloud environment.Based on this structure, this paper studies the information sharing model under the government cloud environment.In this model, the service center provides a service interface to the reference architecture.Each department in the government cloud can access the service through the service interface, and obtain service instance information and service process sharing resources of the service center.Thereby achieving public service process information sharing and cross-departmental information interaction under the government cloud environment[8].The model is shown in Figure 3.

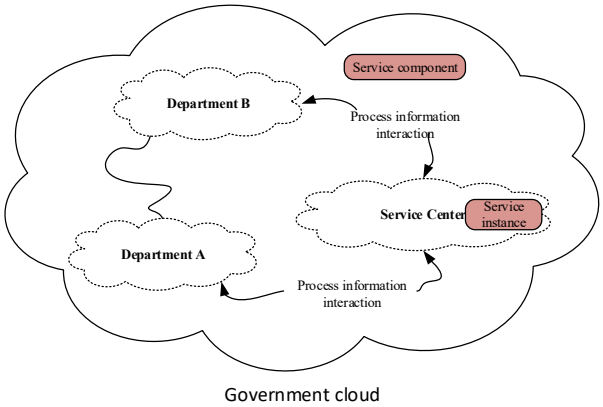

Figure 3. Flow chart of process information sharing under the government cloud environment

The model is a public service process information sharing model under the government cloud environment.Among them, Department A and Department B are the departmental virtual resource pools of the government cloud based on departmental functions;The service center is a virtual process information sharing resource pool for the government affairs cloud to store public service process information.In the process of accepting the user service request and creating a service instance for the government cloud, the government will store the service instance information instantiated by the service component into the service center.Then, according to the service template corresponding to the service instance, the service participating department provides the basic service.When the service process node invokes the basic service of the A department, the department A will access the service center by the service interface and obtain the corresponding service process information.Then, the process information is placed in the virtual resource pool of department A, and department-level services are provided according to the process information;When the service ends, department A will call the service interface again to transmit its service result back to the service center and overwrite the original service flow information in the service center.At this time, if a new process service file is generated in the department A service process, department A also needs to call the service interface to upload the service file to the service center, and add a shared resource record in the service center process instance registry.On this basis, when the service process node invokes the basic service of department B, department B can obtain the latest service flow information of the service center according to the service interface.And will also get the newly generated process sharing resources of department A, and then provide services in the virtual resource pool;After the service is completed, update the corresponding service process information of the service center and add new service sharing resources.In the process, the service center took full advantage of the shared resource pool.Department A and Department B broke the boundary of the virtual resource pool under the government cloud environment through the service center, realized the information exchange between departments, and enhanced the synergy of the government process.

3.2 Dynamic Access Control

Dynamic Access Control The government cloud integrates the previously dispersed and independent government functions into a unified cloud platform, enabling all government department members to have access to the shared resources pool of government services.Thereby, the information sharing promotion department can work synergistically and strengthen the government's “one-stop” service capability.Therefore, the government cloud collaboration requires not only information sharing and interoperability between departments.Moreover, this also requires the security of shared resources and the orderliness of the service process when providing services to various departments.

Because the department process information is shared among departments, each department user has the right to access the process information sharing resource pool, which is very likely to cause department users to illegally access the service instance.In order to ensure the process information security in the process of public service, this paper studies the dynamic access control under the government cloud environment based on the information sharing of government affairs cloud

process.The user role, status attribute, and user instance set are unified to jointly restrict access control rights of department users.Its department user rights are shown in Figure 4.

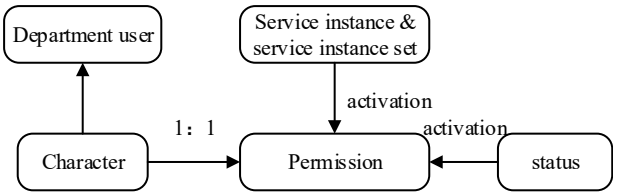

Figure 4. Department authority map

Each department in the government cloud is assigned a specific role and its access to the service center is assigned based on the role.However, the role permissions of department users are not fully activated, and they depend on the activation of the status attribute and the user instance set.Only when the status attribute is valid, department users can access the process shared resources of the service center within the scope specified by the user instance set.Otherwise, department users will not have access to the service center process shared resources.

4. Big Data-based Decision Making under Mobile Cloud Platform

The focus of the government's introduction of big data technology to assist decision-making processes is to use data to discover new decision-making grounds.The famous economist Simon said that no matter what level of decision-making the decision makers have, they can't make absolute and rational decisions in the decision-making process, but the decision-making of bounded rationality.The rationality of decision makers is influenced by the source of the information they possess and the information itself, and on the other hand by their own processing power.Simon's view clearly shows the importance of data to decision makers' rational decision making, indicating that accurate and effective data is the basis for correct decision making.

Big data has obvious process orientation for the optimization of government affairs.That is, under the experience intervention, through the collection, collation, mining and utilization of data to form a digital platform, the use of digital platform for rich information optimization and corrective decision-making scheme,at the same time, it supervises the decision-making process, which promotes the democratization of decision-making construction, the scientificization of decision-making schemes, the effectiveness of decision-making scheme implementation and the standardization of decision-making effect evaluation.See Figure 5 for details.

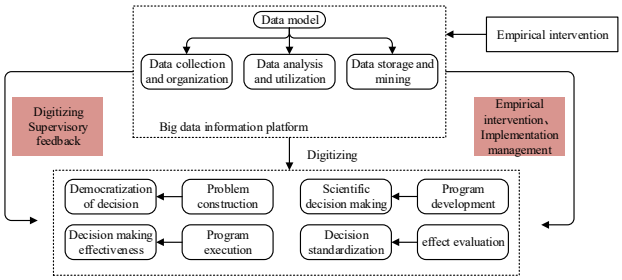

Figure 5. The mechanism of big data optimization government decision-making

Big data and cloud computing technologies have broadly expanded the way governments access decision-making information and provide new types of decision-making tools. Massive real-time data not only enriches decision-making information, but also allows the government to continuously adjust the details of decision-making implementation in the decision-making process to ensure smooth and effective policy implementation.

5. Conclusion

Based on the media subsystem, this paper completed the design of the regional mobile government platform and realized the collaborative work of different government departments under the cloud platform.Finally, this paper will provide an analytical framework and theoretical system for the application of big data in decision-making.Big data can have a significant impact on the core elements of government's government thinking, decision-making, decision-making methods, decision-making methods and decision-making outcomes. Existing research has begun to pay attention to these effects.However, more attention is paid to the necessity of big data optimization government government mechanism, insufficient discussion on the feasibility, effectiveness and application of optimization, and lack of case analysis of big data optimization government government affairs. This paper attempts to make up for these shortcomings. The role of throwing bricks to attract jade.Considering that big data has the characteristics of objectivity, comprehensiveness, scientificity and efficiency of resource acquisition, the next step is to explore the necessity of optimization by analyzing the opportunities and challenges faced by government affairs in the context of big data.It demonstrates its effectiveness by solving the key problems of big data optimization government government affairs, and demonstrates its applicability by exploring the practical path of big data optimization government affairs.

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References

[1]. De reuver, Mark; Stein, Stefan; Hampe, J. Felix. From eParticipation to mobile participation: Designing a service platform and business model for mobile participation[J].Information Polity, 2013, 18(1): 57-73.

[2]. Ochara, Nixon Muganda; Mawela, Tendani. Enabling social sustainability of e-participation through mobile technology[J].Information Technology for Development, 2015, 21(2): 205-228.

[3]. Sareen, Mamta; Punia, Devendra Kumar; Chanana, Lovneesh. Exploring factors affecting use of mobile government services in India[J].Problems and Perspectives in Management, 2013, 11(4): 86-93.

[4]. Walravens, Nils. Mobile city applications for Brussels citizens: Smart City trends, challenges and a reality check[J].Telematics and Informatics, 2015, 32(2): 282-299.

[5]. Wang, Changlin. Antecedents and consequences of perceived value in Mobile Government continuance use: An empirical research in China[J].Computers in Human Behavior, 2014, 34(1): 140-147.

[6]. Janssen, Marijn; Estevez, Elsa. Lean government and platform-based governance—Doing more with less[J].Government Information Quarterly, 2013, 30(1): 1-8.

[7]. Lorenzi, David, et al. Enhancing the government service experience through QR codes on mobile platforms[J].Government Information Quarterly, 2014, 31(1): 6-16.

[8]. Nica, Elvira; Potcovaru, Ana-Madalina. Effective m-government services and increased citizen participation: Flexible and personalized ways of interacting with public administrations [J]. Journal of Self-Governance and Management Economics, 2015, 3(2): 92-97.