Research on the architecture of E-government sharing platform

Gang Li[12,a], Qingpu Zhang[2,b], Wei Wang[1,b], Ming Jiang[3,b]

[1]Shandong Computer Science Center, Shandong Provincial Key Laboratory of computer Network, Jinan, 250014, China

[2]School of Management, Harbin Institute of Technology, Harbin, 150000, China

[3]United Daily, Jinan, 250000, China

[a]email:15905315685@126.com, [b]email:15866767305@163.com

Keywords: E-government; Sharing platform; Architecture

Abstract. At present, the resources integration and sharing efficiency between the government systems is not high in China. The phenomenon of repeated system development is common, which results in a tremendous waste of resources and cannot be adapt well to the information exchange, sharing and unified management of the current government systems. Aiming at the unified management of government information resources and according to the actual shared requirement of government information resources, this paper studied the overall structure of the e-government sharing platform for the achievements of business collaboration between inter departments and the solution of “information isolated island" phenomenon between different heterogeneous systems of various government departments. The overall structure designed by this paper will provide technical support for realizing the cross-platform, cross-application, cross-system, cross-regional resource data interoperability and resource information sharing in government systems.

Introduction

The core of information construction is interoperability and mutual flow of information. However, in the course of the e-government construction of Chinese government departments, some issues exist, such as no overall planning or uniform standards, lacking of data communication mechanisms and that the various departments act of one's own free will. There is a serious phenomenon of “information isolated island", which makes the whole information of citizens, organizations and related activities be separated and stored in different departments and regions. When the citizens carry out activities, on one hand, it is difficult for the government to establish the overall information system for an activity and implement effective governance timely. On the other hand, it is also very difficult to mobilize the decentralized government resources in various departments in all regions and provide effective public services for citizens, enterprises and social organizations effectively. For enhancing the capacity of e-government service technique and providing technical support for the sharing and business collaboration of e-government information resources, this paper discussed how to build a complete and unified sharing platform with government infrastructure characteristics and multiplexing capability[1].

Construction requirement

The construction of e-government sharing platform must be necessary. At the operational level, it is reflected in:

Requirement for resources catalog. Due to the different resources application scenarios and using depth of each government business department, in some cases, we only need to query the e-government information resources through the catalog, which is the requirement of information resource catalog service as well. When the resource requirement side shares or uses information resources of other departments, they need to find and locate the resources through the catalog. Resource provider also needs to register, publish and maintain the resources through the catalog.

Requirement for sharing basic information resources. Each business department's shared requirement for four basic information resources (demographic, legal, geographic and macroeconomic) is the most common. Many business departments need business resources and, at the same time, are also inseparable from the business support for basis information resources, such as the registration of legal persons in the business administration, it not only requires the business data of quality supervision and other departments, but also the basic information on the legal person who applies for registration

Requirement for sharing information resources of cross-level departments. In the business of all streets and departments, such as in the business process of the disabled person's registration, minimal assurance personnel's identification, emergency command and leadership in decision-making, the requirement for cross-level and cross-department e-government information resources is particularly urgent. Also in the process of gradually application development for the enterprise, such as residents, government affairs handling, community services, home care applications and so on, they all need to provide data exchange and sharing services and support cross-level and cross-department business collaborative for practical application as the e-government infrastructure shared and exchange platform[2].

Platform system structure

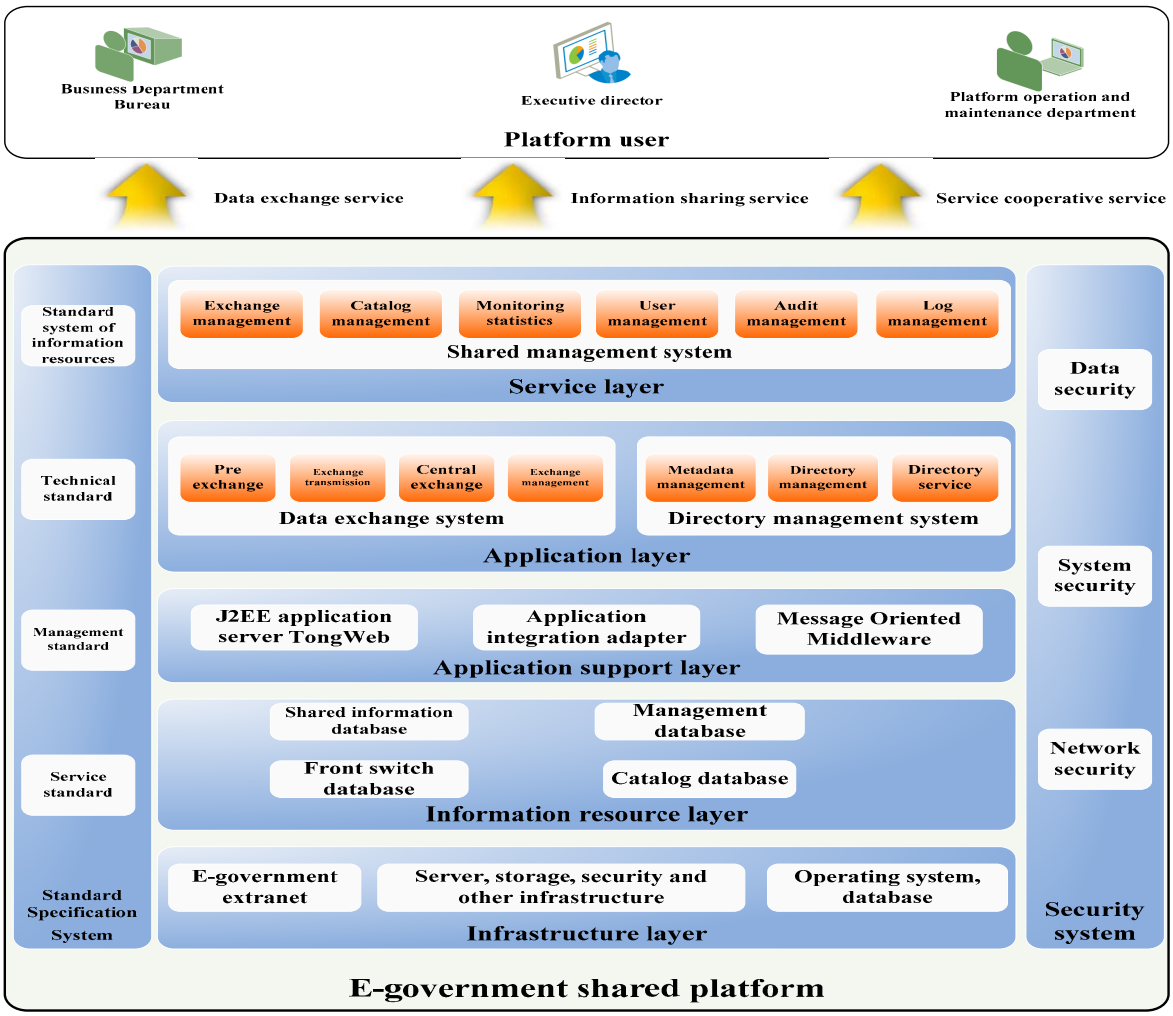

Fig.1 Structure of e-government sharing platform

The e-government sharing platform structure designed by this paper is divided into six parts: infrastructure layer, data layer, application support layer, application service layer, standard system and security system, as shown in Figure 1:

Infrastructure layer. This layer consists of network, soft and hardware of IT infrastructure

environment which are required to run the platform, generally including network infrastructure (such as network links and routers and switches), security infrastructure (such as firewall and encryption machine), servers, storage devices, operating system and other system software.

Information resources layer. This layer consists of logical components of all kinds of data resources required to run the platform. It provides the persistent storage and data maintenance mechanism of all kinds of running data and business data. It also provides the data support for upper applications, containing pre-exchange database, management database, catalog database and shared information database.

- Pre-exchange database

Refers specifically to the information deployed in the various pre-exchange nodes (including the central node) that is used to store the data records or data files waiting for exchange.

- Management database

Refers specifically to all kinds of management information database in the process of the platform operation, such as the exchange management information, catalog management information, user information, log information, service information, portal contents management information and so on.

- Catalog database

Refers specifically to the catalog information database corresponding to various resources involved in the platform. Resources needed catalog management are generally resource information required to run the platform or provide services, such as agencies, users, all kinds of government information resources, exchange resources, shared data etc.

- Shared information database

Refers specifically to a variety of basic information database and thematic information database which the platform uses to provide external shared services, such as population information database, spatial geographic information database etc.

Application support layer. Application support layer between application layer and information resource layer plays a key role in connecting the whole structure. Application support layer mainly includes three kinds of middleware products. Among them, the JAVA EE application server provides the basic running environment support for all kinds of Java application systems. The application integrated adapter and message middleware are the core products of data exchange system.

Application layer. Application layer is composed of two core systems, including data exchange subsystem and catalog management system.

- Data exchange subsystem

Supporting the exchange and shared services at the data resource level.

- Catalog management system

Supporting the information positioning services for all kinds of data resources (including users, data, applications, services and IT resources) required for the platform to run.

Service layer. Service layer is made of shared management systems. It provides a unified portal for users to access the system's interactive interface, and realizes the unified management of the exchange, catalogs, users, logs, monitors and audit.

Standard system. The construction of the e-government information resource shared system standards firstly need to develop a planning for shared standard specification system, and under the guidance of the planning, sort out the standard system from four aspects, including the information resources standards system, technical standards, management standards and service standards.

Security system. From the points of technology and management view, the security system establishes the security system. The goal is the whole monitoring and well documented through two kinds of means, including software and hardware [3].

Platform technology architecture

Corresponding to the e-government sharing platform structure diagram, the technical structure of the e-government sharing platform designed by this paper is divided into the data exchange system, catalog management system, shared management system, standardization system, security system and other content.

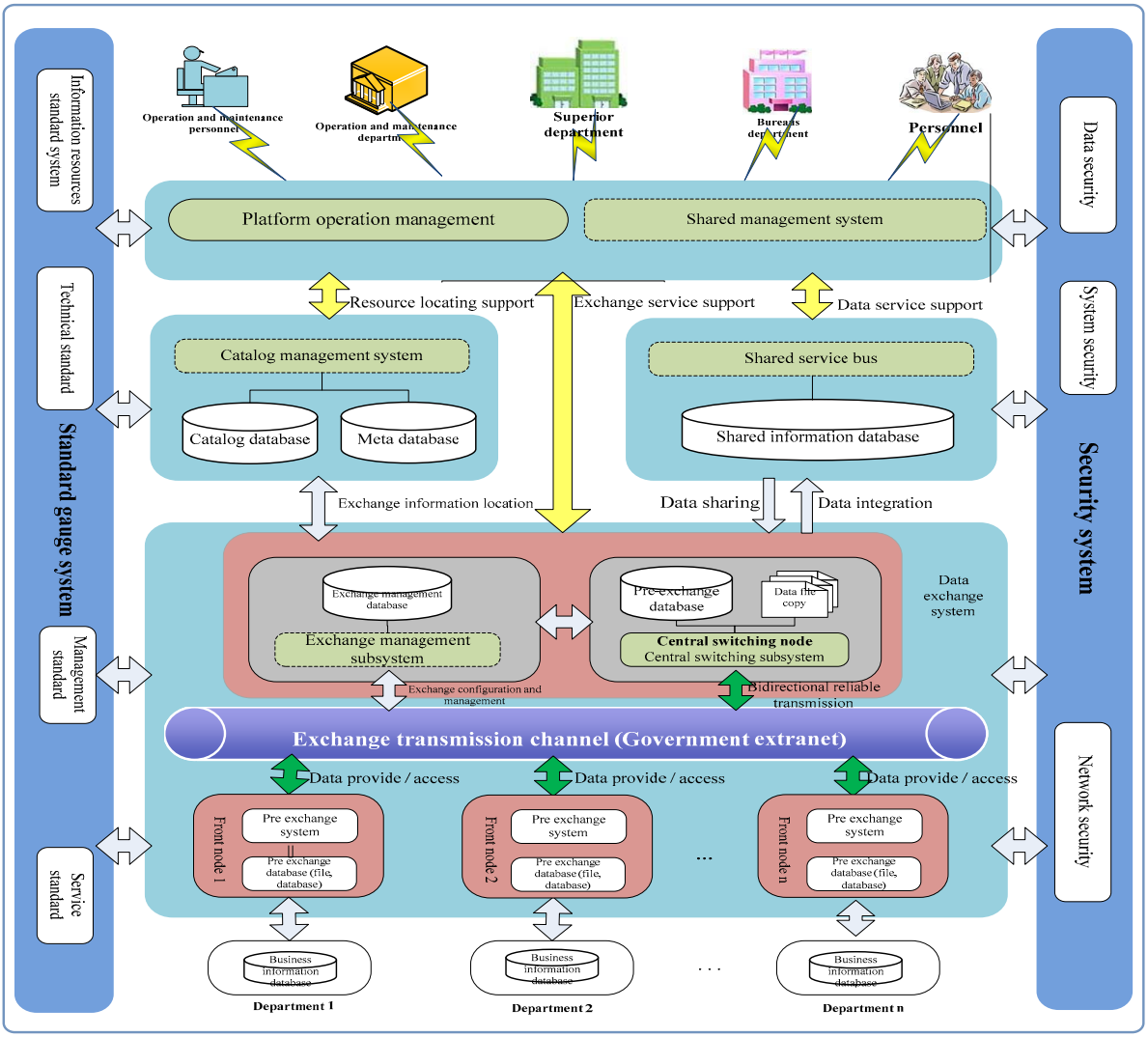

Fig. 2 Technical structure of the e-government sharing platform

The system architecture is a "3-Dimensional" expression of the hierarchical structure of the platform's overall structure, and mainly vividly shows the logical structure of the platform construction and interactive relationship between various components from the technical implementation perspective. As shown in Figure 2, the construction content of the e-government sharing platform can be summarized as five main components:

(1) Data exchange system, mainly completes the management of data collection and distribution among the various committees.

(2) Catalog management system, is used for the organization, storage and management of government information resource catalog content. Through release, query, positioning and management mechanism of metadata information, it realizes the sharing of government information resource catalog content.

(3) Shared management system, mainly achieves the sharing of application, examination and approval and online communication of the implementation process, and then forms the project implementation materials to provide the function of the information management to achieve efficient office automation.

(4) Standard specification system is the comprehensive planning content of the comprehensive construction of technical standards and management norms, which is on the basis of the relevant national policies, technical standards and other guidance, and combines with the characteristics of local data integration business. It also reflects the standardization of information construction.

(5) Security system uses the technology and management tools to establish an effective management system and ensure the information security and system security.

Platform deployment architecture is as follows.

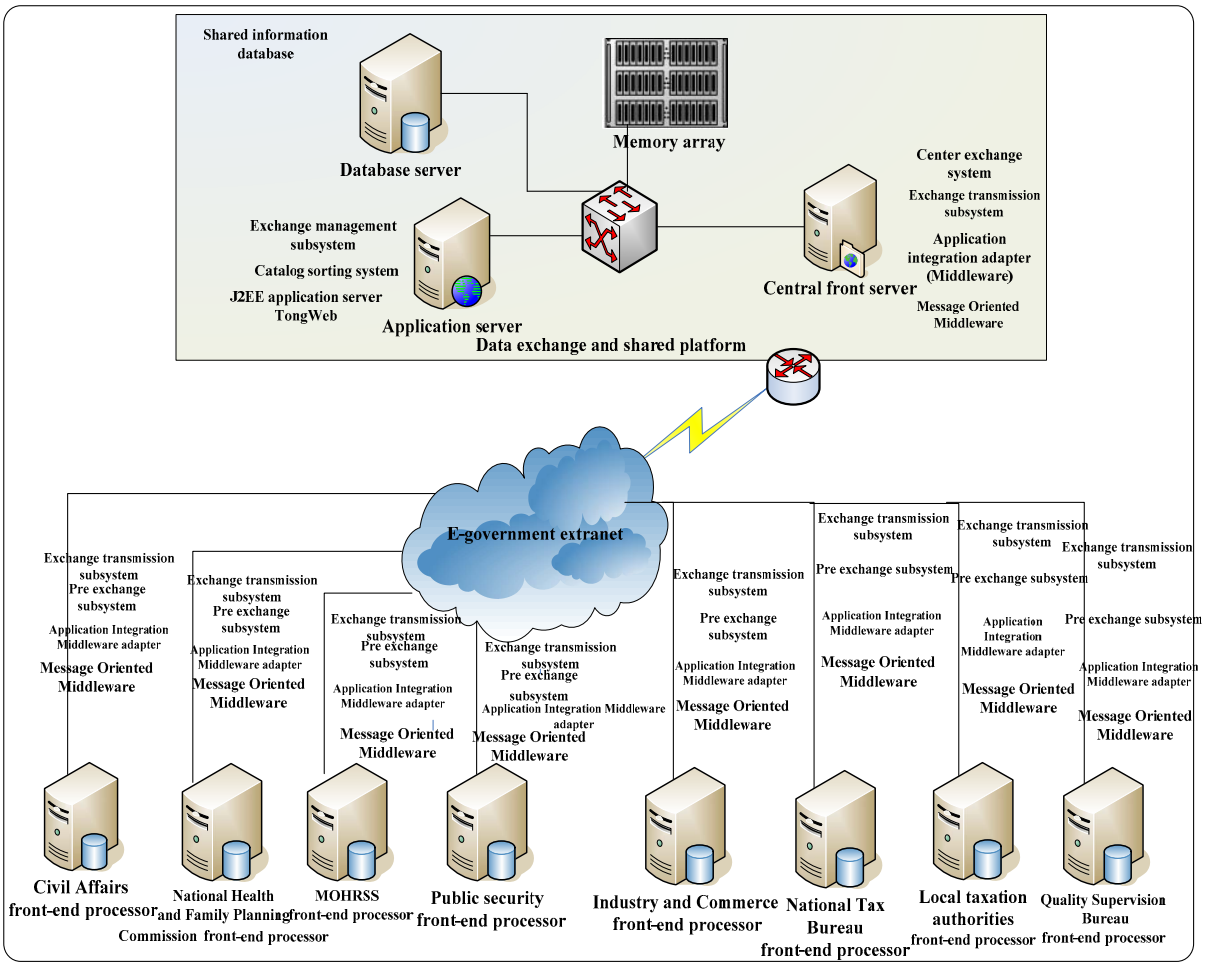

Fig. 3 Data exchange platform deployment diagram

Departments' technical personnel put the business data needed to be exchanged on the front-end processor in different ways (artificial, bridging and interface return). The exchange front-end subsystem deployed in the department's front-end processor extracts the data (files and data base) to be exchanged into the pre-exchange database through the corresponding adapter component, and carries out the basic data conversion and processing.

The exchange front-end subsystem deployed in the department's front-end processor is responsible for transmitting the data to be exchanged from the pre-exchange database to the central node (or specified node), and converging to the pre-exchange database. The exchange center integrates (format conversion, cleaning and alignment) and processes the converged business data of departments and then stores in the shared/exchange information database; the shared management system packages the data in the shared information database, forming various data services (such as query and comparison), and then releases on the portal platform.

Platform users request to call various service functions based on data sharing through the platform portal to obtain the required information. One is that the exchange center compares the data in bulk based on shared information database. On the other hand, according to the departments' shared requirement, the exchange center obtains the reference data from the shared information database and shares with the required departments; from the exchange center to the department pre-

exchange center, according to the predetermined exchange rules, the exchange center transmits the required data to required department front node by the data exchange subsystem, and required departments receive and store the returned data through exchange front-end subsystem into department front information database or file system. Departments' technical personnel then provides the shared data returned to the business system through a certain way (artificial and bridging), so as to complete business data exchange [4,5].

This paper got the platform technical structure through the design of platform system structure and then got deployment architecture of the platform. After the design of overall structure, the platform will provide a good technical support for the overall e-government construction.

Conclusions

In this paper, the overall architecture of the e-government sharing platform was studied. On one hand, it can provide the construction basis for the interconnection of the government information resources. On the other hand, it also can provide effective technical support for improving the efficiency of the department, assisting to lead the scientific decision-making and strengthening the comprehensive supervision of the government, and it plays a key role in the construction of service-oriented government.

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