Research and Design of Enterprise Data Resource System Architecture

Yuanhu Pan[a, *]
Department of Informatics, Beijing University of Technology, Beijing 100000, China;
[a]1072432463@qq.com

Abstract: The emergence of a new generation of information infrastructure, information technology and software technology platforms has provided a revolutionary driving force for the transformation of modern enterprise organizations, business process changes and service model innovation. Based on the theory of cloud computing and service computing theory, a collaborative, shared smart enterprise collaborative innovation cloud computing ecosystem environment and enterprise cloud service computing architecture model are proposed for SMEs. The service theory and system architecture of the data resource system are described in detail.

Keywords: Smart Enterprise, Cloud Computing Ecosystem, Data Resource System.

1. Introduction

With the development of the Internet, the construction of enterprise information has become overwhelming, but the informationization of most small and medium-sized enterprises is yet to be guided. In addition, it is difficult for SMEs to own their own innovative factories. Therefore, a collaborative and shared smart enterprise collaborative innovation cloud computing ecosystem and enterprise cloud service computing architecture model are proposed. This model can be adapted to most SMEs, accelerate the informationization process of small and medium-sized enterprises and improve the innovation capabilities of SMEs.

The article makes an in-depth analysis of the status quo of informationization construction of small and medium-sized enterprises, and proposes a cloud computing ecosystem and enterprise cloud service computing architecture design suitable for most small and medium-sized enterprises. Including personalized cloud services provided by SaaS layer, such as online innovation consulting services, customer relationship management services, project management services; PaaS layer development environment services and basic business service models; IaaS layer computing, storage, and network resource services. Finally, the service theory and system architecture of data resource system are introduced in detail.

2. Status Quo of Informatization Construction of SMEs

2.1 Financial support

Regardless of the era, what kind of economic system, SMEs want to survive and develop, will inevitably need a certain financing support. The "financing bottleneck" has become a common problem for cash-oriented SMEs, which hinders the development of SMEs and technological progress.

2.2 Technical innovation

It is very difficult for SMEs to have their own core technology, and it is difficult to survive by relying on traditional closed-door vehicles. It is very difficult to build a technology innovation platform of your own.

2.3 Trade aspects

SMEs have weaker ability to obtain domestic and foreign industry development status, adapt to large market environment, seek partners, improve brand competitiveness, and expand sales channels.

2.4 Human resources

It is difficult to establish human resources training, evaluation of professional abilities, and creation of corporate think tanks.

2.5 Enterprise Informationization

SMEs are in urgent need of information services related to national, provincial and municipal policy information, scientific and technological information, market information, technical inquiry, new technologies, new processes, new materials, and new products, but are limited to various subjective and objective conditions. Many SMEs Unable to obtain information through effective channels and be passive in the ever-changing market competition environment. In addition, the lack of integration between SME business and information technology, lack of informatization planning, SME informatization capabilities and lack of resources are also highlighted.

Therefore, a collaborative and shared smart enterprise collaborative innovation cloud computing ecosystem and enterprise cloud service computing architecture model are proposed. This model can be adapted to most SMEs, accelerate the informationization process of small and medium-sized enterprises and improve the innovation capabilities of SMEs.

3. Cloud computing ecosystem and enterprise cloud service computing architecture model

3.1 Frame mode

A framework is a reusable design of a part or the whole of an application software system. It is composed of a set of abstract components and interactions among component instances. Using the IoC mechanism and AOP technology provided by Spring to integrate Webwork and Hibernate, the view, controller and model are completely separated, and the business logic layer and the persistent access layer are independent. The construction relationship model of the three framework technologies is shown in Figure 1:

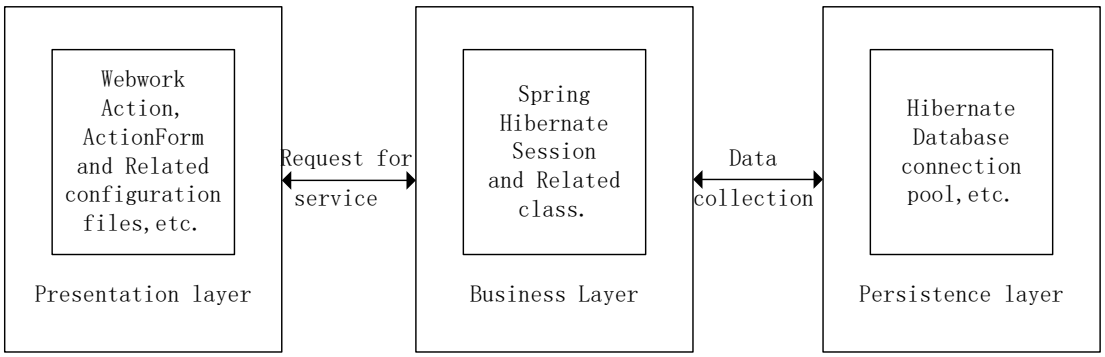

Figure 1. The construction relationship model of the three framework technologies

The enterprise cloud service computing architecture model adopts a hierarchical framework model, which can give full play to the advantages of Spring, Hibernate, and Webwork frameworks, reduce the coupling of various layers, and is conducive to system flexibility, scalability, and maintainability.

3.2 Cloud computing ecosystem

The purpose of the cloud computing eco-environment is to achieve a data resource system with more business-driven value, and to achieve better services for the business in a less costly manner.

The cloud computing eco-environment is based on the MVC framework design pattern and component technology as a means to design a complete, advanced, mature, scalable, and extensible system design architecture. The hierarchical structure of the system is divided into five layers, which are information access, presentation logic, business processing logic, data persistence, and data resources. Specific data access process shown in Figure 2:

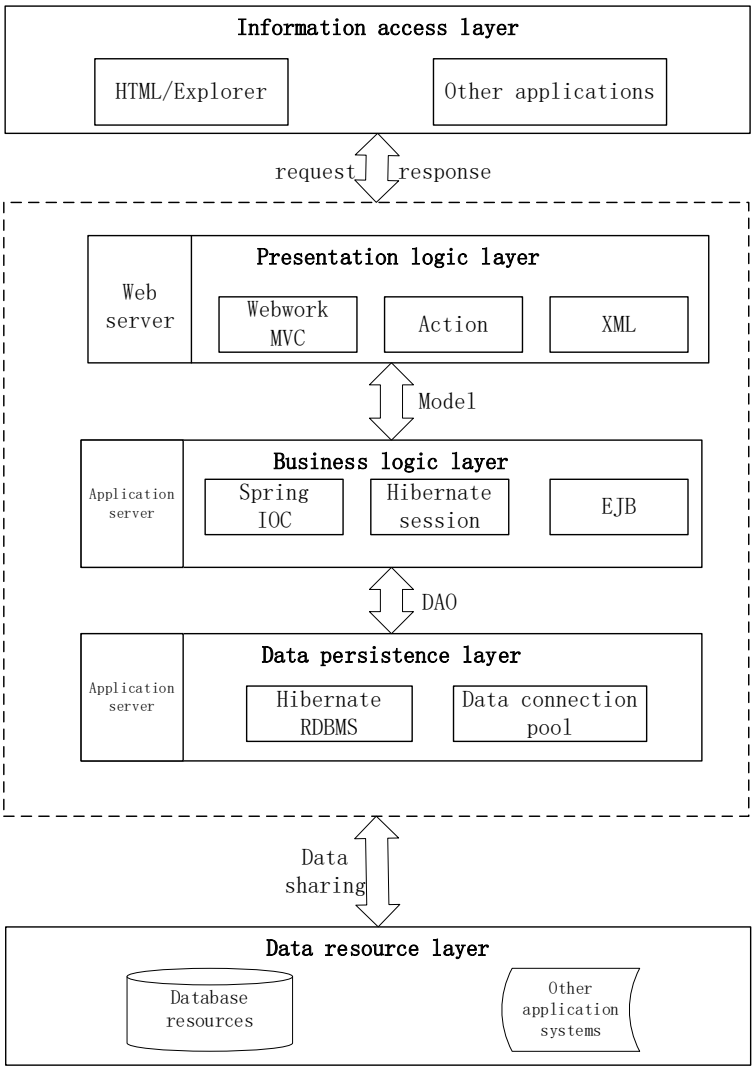

Figure 2. Specific data access process

3.3 Data Resource System

The data resource center is the main part of the cloud computing eco-environment. It uses a common interface to organize various types of big data platforms and data resources together to form a large pool of virtual data resources. "A complete data resource system mainly involves five kinds of Type of platform and a data sorting department. System architecture shown in Figure 3:

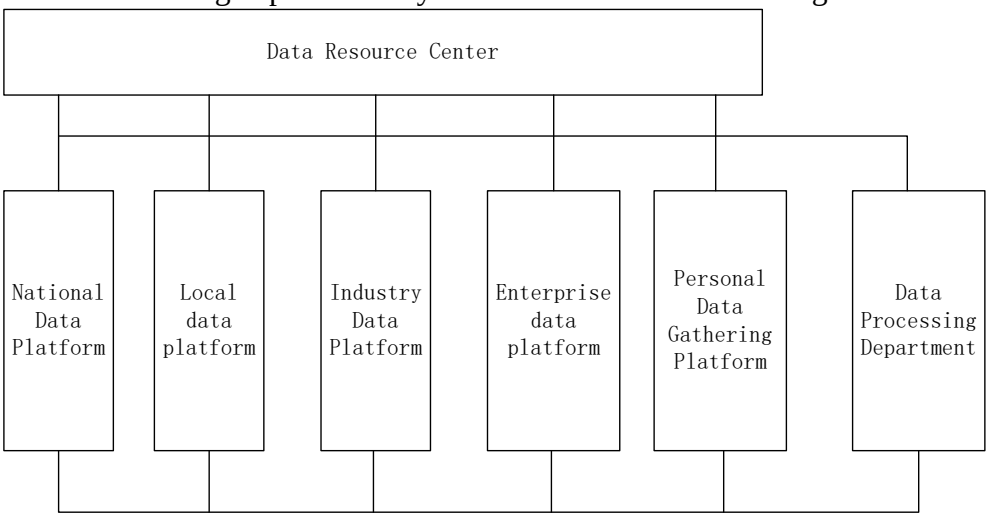

Figure 3. System architecture

The national data platform "is used to gather and open data from the central government, especially data from various functional departments directly managed by the central government".

The local data platform "is used to integrate the big data public platforms of different local governments, so that local governments can achieve data resource sharing and ensure that the whole society can obtain the data of local governments to the greatest extent" as much as possible.

Industry data platform "Used to organize and integrate those data associations that have open data willingness to industry associations! Alliances, intermediaries, etc."

The enterprise data platform "is used to organize and integrate open data resources" such as Eli Lilly Merck and Pfize pharmaceutical companies ACRG pharmaceutical genome database! Thomson Reuters Integrity's comprehensive database of biomedical information "These corporate data are highly open, often highly targeted and with high data quality."

Personal data aggregation platform "As the public can inject data from the big data sharing platform, it can also inject data into it.

Therefore, data collection, noise reduction, and storage must be performed. Analysis and visualization aim at full life cycle management and build a set of standards that are suitable for data sharing and exchange. The data sorting department mainly focuses on different data platforms and various types of data in the data resource center, establishes a data exchange and directory system under the guidance of the technical support center, and clearly identifies the names, formats, modes, and units of information that can be shared. Factors such as sharing conditions, updating methods, updating time limits, etc. and diversification of data diversified by the government and the general public are standardized, formatted, and redundant in order to facilitate data storage, management, and use.

The five-tier system structure is convenient and flexible for system maintenance and management. Separating the user access layer from the actually accessed data resource library enables the user to control the access to the database by strengthening the allocation of rights. In this way, effective management of data resources can effectively prevent malicious attacks by illegal users.

4. Conclusions

To sum up, the data resource center is one of the important components of the cloud computing ecosystem of small and medium-sized enterprises. According to the design of the data resource system architecture and the description of the cloud computing ecosystem and the enterprise cloud service computing architecture model, this paper provides a theoretical basis for the implementation of the data resource system of the smart enterprise. After the system is implemented, it can bring about rapid development for the information construction of small and medium-sized enterprises, improve the innovation capability of small and medium-sized enterprises, and make the development of small and medium-sized enterprises better.

References

[1] Liu Guoping，Zheng Yanbing. Research on SME Cloud Service Solution and Key Technologies [C]//Proceedings of the 2013 Annual Meeting of the Information Communication Network Technology Committee of the China Communications Society，2013.

[2] Zhang Danyang,Cao Weizhuo,Xue Zhiyun. Alibaba Cloud Implements Spark's Distributed Computing [J]. Fujian Computer，2015(2);23-24.

[3] Zhang Xiaojuan,Yi Mingwei. Enterprise Integration Architecture and Implementation Based on Cloud Computing and SOA [J]. Computer System Application, 2011,20(9):1-6.

[4] Wu J Q，Wang T. Research and Application of SOA and Cloud Computing Model[C] Enterprise Systems Conference. IEEE, 2014:294-299.

[5] Zhao Xiangpeng. Modeling and Analysis of Web Service Composition [D]. Beijing University，2008.

[6] Armbrust, Michael, Fox, et al. Above the Clouds: A Berkeley View of Cloud Computing [J].Eecs Department University of California Berkeley, 2009, 53(4):50-58.