

# RESEARCH AND DESIGN OF RURAL INFORMATION SERVICE PLATFORM BASED ON SOA

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**Abstract:** The paper mentioned using SOA framework and the technology of Web Service, aiming at the problem of "Information Isolated Island", specifically for rural information resources, an agricultural information service platform is constructed based on SOA and Web Service. This platform integrates distributed systems and service platforms and it deals with agricultural information by cooperative processing.

**Keywords:** web service, SOA, information integration

## 1. INTRODUCTION

With the development of the global information, there are more and more information resources in Internet. And a lot of information resource systems are developed on the basis of different platform and language, leading to different systems on the heterogeneous platform. With the changing of content, it is difficult to update system once deployed. With more and more duplicated resources on the Internet, these information resources are relatively independent and are not fully utilized, then appears "information isolated islands".

In rural areas in China, problems mentioned above also exist. What is more, agricultural information resources systems are developed by

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*Please use the following format when citing this chapter:*

Zou, J., Yang, L. and Sun, R., 2009, in IFIP International Federation for Information Processing, Volume 295, *Computer and Computing Technologies in Agriculture II, Volume 3*, eds. D. Li, Z. Chunjiang, (Boston: Springer), pp. 1863–1869.

governments at all levels and agricultural institutions and agriculture-related companies. They developed different scale systems, differences in the ability to provide services and the utilization rate of agricultural information resources is not ideal and the sharing of information resources is not enough. To solve above problems, this paper uses Web Service technical and SOA framework for agricultural information system transformation and integration, establishes a unified service platform in rural areas to provide information service. The platform cooperate distributed and different server platforms about agricultural information resources and realizes seamless connectivity on cross-boundary and cross-platform expert system and utilizes information resources more efficiently.

## **2. SOA AND WEB SERVICE USED TO SOLVE THE PROBLEM OF "INFORMATION ISOLATED ISLANDS"**

SOA is the abbreviation of service-oriented architecture. The essence of SOA framework is that all are around business objects or business models, and the "service" is only the form of business models because the uniform form will provide convenient interaction between different suppliers and customers (YUE Kun et al., 2004). SOA is not Web Service, but the Web Service technology applied in the SOA architecture is a practical application of the framework and a very important technology, also the most important and most commonly technology. Web Service can run from all kinds of simple requests to complex business dealings. Once deployed, the other Web Service applications can be found and call the services of other deployments.

Faced with the increasingly serious "information isolated islands", the utilization rate of agricultural information resources is not ideal and many research institutions and universities have made a number of study jobs. Using SOA framework and Web Service technology to solve the problem of "information isolated islands" and realize systems integration such as power, banking, military, hospitals, telecommunications and manufacturing industries.

So far, for solving these problems, SOA framework has been mainly used to provide the whole integration scheme (WANG Yong, 2008; CHEN Si et al., 2007), such as state-owned banks. It focuses on the core business of data management, supporting for banking business innovation and service quality and the improvement of management capacity(XING De-Hai et al., 2007);for the telecommunication industry(CAI Ping et al., 2007) an event-driven enterprise application integration of the telecommunications system structure based on the SOA has been mentioned, and in medical,

establishment of medical data based on XML technology has agreed to share the virtual database so that the medical information system to carry out unified information interactive hospital information system integration.

At present in agricultural areas is also carried out some work on the "Information Isolated Island" such as research, has made some progress. This paper proposes a project based on the SOA (YE Jun et al., 2007) and Web Service features and in order to resolve the current problem of "information isolated island"(WU Zhong, 2005; TONG Heng-jian et al., 2007), by using Web Service technology for cross-boundary and cross-platform system of information resources to integrate the information service platform in rural areas.

### 3. SERVICE PLATFORM ARCHITECTURE

#### 3.1 Platform Overview

The information service platform is based on existing information systems and expert systems of agricultural areas, and other agricultural information resources. To solve the problem that the use of information systems is not ideal, and even the problem of "information isolated island", it provides a unified access to agricultural resources unified platform that provides information integration, coordination, automatically updated data and information evaluation.

#### 3.2 Platform architecture and work principle

The platform contains resources layer, packing layer, information layer, data management layer and performance layer. Platform architecture is shown in Fig.1.

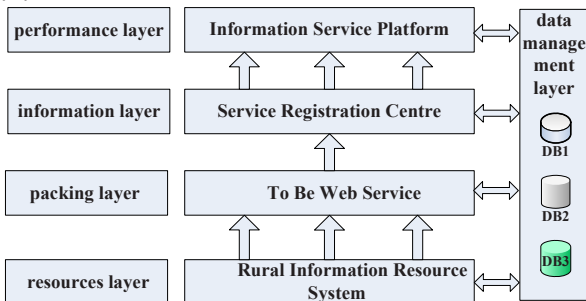


Fig.1: The architecture of service platform

Resources layer of the bottom of the platform includes agricultural information systems and agricultural expert systems resources which implemented by all kinds of technology, which provide relevant information and business, is achieved by the Web Service features and is the main source, is also the platform for all business functions of the sources, as the important support for the packing resources of the system , through the relevant standards on information and Web Service; after all of the processes are packed into the Web Service, all of the Web Service information are registered in the information layer, the Web Service in information layer are used by the performance layer, displayed on the platform, at the same time, relevant information saved in the database. Data management layer services into the data management to better support the operation of the system.

#### **4. INFORMATION RESOURCES INTEGRATION TECHNOLOGY**

Resources layer includes many systems which are developed based on different languages and different platforms, how to transform these heterogeneous remote system resources to a certain standard manner and publish, become the key of platform, so the key problem of this platform is how to pack the resources into services in packing layer. Solving this problem, it will provide great convenience for integrating system in resources layer.

Through analyzing the resources of the various information and expert systems, most of these are using the ASP, ASP.NET and JSP, such as technology development, the clustering of these systems, classify the resources into resources which can directly be Web Service and resources which can not directly be Web Service. Resources which can directly be Web Service include MVC model based on the J2EE platform, ASP.NET and other systems belong to resources which can not directly be Web Service. In recent years most of new developed systems are based on the MVC model.

As for resources which can directly be Web Service in the development project, information platforms in the rural areas called development of packing and norms. The system uses axis to develop Web Service. For information systems in J2EE platform, in addition to the JSP pages from the whole packing works as a JAR packages, such as new project fise, packed into fise.jar. Fise project will use all the jar kits and fise.jar tomcat at the same time copy of the directory \webapps\axis\WEB-INF\lib, in the tomcat directory \webapps\axis\WEB-INF, the file server-config.wsdd needs to join in the document issued by the information shown as follows.

```
<service name="NewsManager" provider="java:RPC">
```

```
<parameter name="allowedMethods" value="*" />  
<parameter name="className" value="com.fise.bl.NewsManager" />  
<beanMapping languageSpecificType="java:com.fise.News"  
  qname="ns:News" xmlns:ns="urn:BeanService" />  
</service>
```

That is, resources which can directly be Web Service can be published into Web Service. For system developed(LIU Ying-Dan et al., 2003)by ASP.NET, create a new Web Service in the new web applications, and in Web Service in writing to publish into the interface function, as long as in the function added [WebMethod] that this can published function into a Web Service.

As for resources which can not directly be Web Service, because all the web of information resources are based http protocol to communicate and to html files as its content structure, the platform communicate with resources which can not directly be Web Service using the way of simulating http messaging and html documents, through the process of compiling procedure and publishing into Web Service. Specific process is shown in Fig.2.

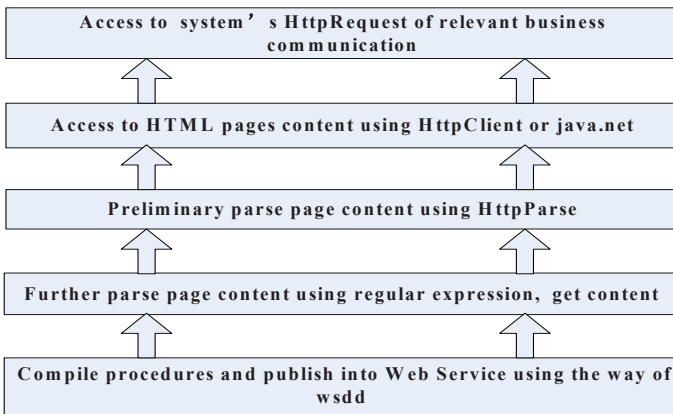


Fig.2: Packing resources which can not directly be Web Service

At this point, we have most contents of the information system packed into Web Service, analyzing the publish way of Web Service, we abandon the way of publication to jws, this way must know the source code of business; adopt a more flexible, dynamic, only need the class document after compiling the source code, which can be published by the wsdd way to publish into Web Service. All of the Web Services are published, registered in register center, using of JUDDI register center, called by information platform.

## 5. INFORMATION SERVICE PLATFORM FOR PRACTICAL APPLICATIONS

Research in rural information service platform on the basis of key technologies, selects rice planting, cultivation industry in cows, pigs and fish several other business themes, while the selected topic group in the two new agricultural expert systems, seven famous agricultural information systems and expert systems as the resources of platform, according to the research of key technologies referred to in the packing technology, the resources of the packing layer pack and publish into Web Service, which are called by the performance layer, the initial realization of a rural information service platform which can provide business information to the user's query, picture presentation, diseases and insect pests of judging and processing and administration of veterinary drugs. As shown in Fig.3 for rice cultivation of the page.



Fig.3: Rice cultivation pages

## 6. CONCLUSION

Based on SOA and Web Service study, in this paper, we propose a thought which integrates heterogeneous systems and resolving the problem of "information isolated islands" in rural areas, and the initial realization of a rural information service platform to verify the feasibility of this idea. Because this platform uses the SOA framework and Web Service technology, the platform inherited a lot of Web Service application features, such as good encapsulation, loosely coupling, scalability, cross-platform and cross-language ability and fault isolation and so on. To a certain extent, the agricultural information platform solves the problem of "information isolated islands" of agricultural information system and the low utilization rate of agricultural information resources.

## ACKNOWLEDGEMENTS

The research presented in this paper was partly carried out in the Institute of Geographic Sciences and Natural Resources Research, CAS and Supported by National Key Technology R&D Program (2006BAD10A0504). The authors are grateful to the experts of Institute of Geographic Sciences and Natural Resources Research, CAS for useful comments during the review process.

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