

Distributed Libraries Management System Based on Web Service and Multi-agent

Zhongxiao Hao¹, Xilong Qu², Yingchun Liu²

1. School of Information Science & Electrical Engineering, Hebei University of Engineering, Handan, China

2. Department of Computer Science and Technology, Hunan Institute of Engineering, Xiangtan, China

1. h_z_xiao@sina.com, 2. quxilong@sina.com

Abstract: With the merging and increased enrollment, more and more universities own several campuses and distributed library. Therefore, how to achieve the centralized management of all distributed libraries, is a typical realistic problem. Based on actual needs, the advantages and disadvantages of the various techniques of solving distributed problems are analyzed. By using the web service and multi-agent technology to resolve a number of distributed libraries centralized management. The approach is meaningful for the persons committing to the development work of distributed management.

Keywords: libraries management; distributed system; web service; multi-agent

1 Introduction

Book information is one of most valuable spiritual wealth for mankind, and the libraries in colleges and universities are the places concentrating the books, along with the development of the society, books are no longer simple books, it has become covered with a broader scope, CD-ROMs, electronic documents all belong to the scope of library management, therefore, a simple hand-book management is no longer meeting the needs of the times.

In the information times and internet environment, the libraries' should become the center of information including of the information. With the development of technology of internet and computer software, some libraries management based on web or c/s architecture come to appear. However, some universities are amalgamated by several colleges and institutes, and before amalgamation, every colleges and institutes have their own libraries, and all of the libraries are not in the same place. How to manage these distributed libraries becomes a difficult and heat problem. In this paper, we compare all of the technologies for solving distributed libraries management. Finally, we design and realize a distributed libraries system based on the technology of web service.

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2 The difficult problem in distributed libraries' management

When the libraries' management becomes from man-hand management to computer management, the work efficiency become to enhance. At first, the databases only storage books, howbeit, all of the data formats are different. Moreover, the running interfaces are DOS interface and run based on C/S architecture. Of course, although these system is very backward, they are advanced comparing with man-hand. With the development of internet, the libraries management based on web technology come to appear. CGI (Common Gate Interface) , ASP(Active Server Pages), JSP(Java Server Pages) and PHP (Hypertext Preprocessor) are 4 kinds of popular technologies based on web and B/S architecture. But, how to realize the dynamic and distributed management, these 4 kinds of technologies aren't qualified. To realize dynamic and distributed libraries management, which kind of technologies will adopt, it is a difficult and practical problem.

3 Technology selection

All of the library information databases are heterogeneous, distributed, and varied forms, with the development; it becomes necessary and urgent to integrate the heterogeneous library information database. The main difficult is as follows:

Firstly, the library databases are distributed in the

different region and isolated each other. Secondly, they are not designed by a uniform style, and the data model, data structure are different. Thirdly, these resources are maintained and managed by different university and research institutes.

The traditional methods for integration of heterogeneous and distributed library information databases are COM, DCOM, CORBA and EJB and so on. The comparison result of main parameters among these technologies is shown as Table.1:

Table.1 the performance comparison among DCOM, CORBA and EJB

	DCOM	CORBA	EJB
cross-language operation	strong	strong	weak
cross-platform operation	very weak	strong	strong
networked communication	strong	strong	strong
public service components	very weak	strong	strong
transaction Processing	weak	strong	strong
event Service	strong	strong	strong
security services	strong	strong	strong
fault Tolerance	very weak	strong	weak
product maturity	strong	strong	very weak
support from developers	very strong	strong	strong
scalability	strong	strong	strong
difficulty in development	difficult	very difficult	difficult

From the Table.1, we can find all of the technologies have their advantage and disadvantages. In fact, these technologies are outdated with the emergence of the web service technology. Web service has the incomparable advantages beyond COM, DCOM, CORBA and EJB.

Firstly, with web service, the communication protocol can be HTTP or SMTP, and they are public protocol not private protocol, and they are internet protocol accepted by public. So, it is very easy to realize integration of heterogeneous and distributed library information databases.

Secondly, with web service, the release and discovery of service is based on UDDI, and the description of service is based on WSDL. UDDI is an integration contents service of industry standard, it is very convenience to find and release service. WSDL is based on XML, and it can describe the service clearly and easily.

Thirdly, with web service, the service datum traversing between heterogeneous and distributed library information databases is based on XML, and XML can

run over all kinds of platform and can traverse firewall easily. The main reason is that XML is a standard and commune language.

Fourthly, with web service, the communication protocol is based on SOAP, and SOAP is a light traversing protocol for XML, and it can be realized with every traversing protocol.

So, web service was adopted to realize the integration of heterogeneous and distributed library information databases.

4 Multi-agent

In fact, so far, there is not a fixed definition for the technology of agent. Agent is a software entity connecting with the other related agents and can implements spontaneous in specific environment. The main traits of the agent are as follows: Firstly, it is autonomous, namely, it can complete most of the task without manual intervention. Secondly, the agents can interact each other. Thirdly, the agent can sense the changes from the environment, and make real-time response. Fourthly, the

process of the agent is continuous. Fifth, the agent is self-adaptive, it can adapt the environment by study mechanism. Moreover, it can bring its own contexts and migrate to other environment to implement.

With the continuous development of computer hardware technology and network technology, especially the rapid development of internet technology, the coverage of the software and application areas is expanding, and it makes the complexity of the system grow rapidly, in particular, the distributed traits of the software system become even more obvious. So, the increasing complexity, dynamic and distribution put forward higher requirements of the capacity of software system.

With Multi-Agent technology, it can improve the ability of the whole software system by task decomposition and coordination. Of course, with the cooperation of various agents, it can overcome the defaults only by single agent. So, in this paper, the technology of web service and multi-agent is adopted.

5 Resolving approach

The resolving approach of distributed library system based on web service and multi-agent is shown as follows:

The user enters into the system by its username and password, and the user discriminating agent will discriminate its access power. When the users want to access the distributed and heterogeneous library information database, the users send the library information require firstly, then the resource require agent analyzes the require. In the bottom layer, all of the heterogeneous and distributed library information databases are registered in UDDI register center by register agent, to the user, all of the heterogeneous and distributed library information databases are web services, the resource return agent get the library information according to the require and send the result to the users. The user enters into the system by its username and password, and the user discriminating agent will discriminate its access power. When the users want to access the distributed and heterogeneous library information database, the users send the library information require firstly, then the resource require agent analyzes the require. In the bottom layer, all of the heterogeneous and distributed library information databases are registered in UDDI center.

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5 Conclusion

In this paper, we analyze the problem in distributed library management, and point out the defect of the traditional distributed technologies. A resolving approach for distributed library management system based on web service and Multi-Agent is presented. From the running interface, it proves that the approach is feasible and steady. The approach is meaningful for the persons committing to the development work of distributed management.

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