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Research on the sharing platform of high-quality resources in cloud computing environment

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ABSTRACT

The introduction of cloud computing can realize the resource sharing and managing between different educational institutions. Through the cloud, every educational institution can implement the management of the platform. When one institution gets access to or modify the resources, other educational institutions on the platform are able to see the updated information in time. The application of cloud computing is of great significance for the educational industry which requests higher and higher in the sharing of information resources. The paper analyzes the existing researches on high-quality resources sharing at abroad and home, and illustrates that the countries but China the mainly focused on exploring the open course resources as well as studying educational resources sharing platform in cloud computing environment through the cooperation of the school and enterprise. While researches in China mainly focused on the opening of national excellent courses, and most researches on the application of cloud computing in the sharing educational resources are still in the theoretical research stage. And the existing few practical applications are the constructed by using public cloud platform; On the basis of analyzing the research status of sharing high quality resources at home and abroad, this study introduces the sharing platform design of high-quality resources in cloud computing environment. Firstly a sharing earning model is established based on cloud computing,. Then design the sharing platform of high quality resources of The Principle and Application of Data in cloud environment and analyze the design idea of platform. And the architecture and functional structure are designed. Finally Sina App Engine is chosen to build the platform of sharing high-quality resources in cloud computing environment.

KEYWORDS

Cloud computing; High-quality resources; Sharing platform; Sina app engine.



INTRODUCTION

In this era of information, informational resources are an important guarantee for social and economic development, and the sharing of information resources has become the important foundation of economic development^[1]. In the age of information, using information technology to promote education reform is a global problem. And with the development of science and technology and information, information technology plays a more and more important role in modern education, and the application of information technology in education is wider and wider^[2]. Introducing cloud computing can achieve the cooperation and sharing of high quality resources between different educational institutions, having important significance to the development of education industry. This paper makes research on the design and application of sharing platform of high-quality resources in cloud computing environment at educational industry.

EXISTING RESEARCHES OF HIGH-QUALITY RESOURCES SHARING

With the education developing into the direction of information, the introduction of the cloud computing in education resources sharing not only reduces the waste of resources, but also promotes the developing fairness and equality of education. Along with the continuous expansion of Information resource and network resource and the continuous construction of open courses, education institutions in every countries are active in constructing open course resources which leads to greatly sharing of resources; With the development of information technology, resource sharing model has changed from the original releasing model to sharing model; as for the technology of resource sharing, cloud computing technology has been paid great importance to. And many experts and scholars are devoted to studying the application of cloud computing in high-quality resources sharing, which aims to build an interactive and open sharing platform of high-quality resources.

Researches in counties besides China

In the construction of sharing the high-quality education resources in the countries besides China, the focus is the development of open course resources. With the continuous development of cloud computing technology, experts and scholars begin to pay attention to the application of cloud computing in sharing high-quality resources and some governments have vigorously promote the cloud computing in education. Cooperation between educational institutions and business organizations has been increasingly frequent. In 2007, Google and IBM implemented researches of cloud computing in the colleges and universities of United States, and provided required resources and technical support for the colleges and universities. In 2008, the IBM company can provide free services and computing for the students of the whole state. In 2011, Yahoo Corp. University of Washington, University of Michigan and other teaching institutions jointly conducted study on calculation of Hadoop cluster. And with the development of the research, 12 teaching institutions have participated in the study until now.

Researches in China

The educational organizations in China have been committed to the research of high-quality resource sharing, and mainly of the construction of national excellent opening courses to promote the resources sharing^[3]. So far, there are 14348 recourses of online national excellent undergraduate courses, and 5924 higher vocational courses. The national basic educational recourses net which is built mainly be National Center for Educational Technology has more than sixty thousands sharing resources including videos, texts and animations. And up to now, it owns 1150000 registered users, and the download times have been up to 14310000. But because the site does not build platform for the users to communicate, the user give feedbacks on the problems in the resources and resource developers cannot understand the thoughts of the users. Therefore an open environment of sharing resources is not exactly formed^[4].

China also attaches great importance to the application of cloud computing in education, and uses the cloud computing technology as the technologic tool for constructing the public service sharing platform of high-quality education resources, making the sharing of resources be able to cover the entire country, so that to promote the balanced development of educational resources. But with the development of information technology, cloud computing technology has aroused the interest of many experts and scholars in China. TABLE1 shows, from 2008 to 2013, the number of articles, which obtained from National Knowledge Infrastructure of China (CNKI) through the accurate search, about the application of cloud computing in education and teaching. It can be seen from TABLE1 that the number of academic paper has increased from 2 in 2008 to 475 in 2013. And as shown in Figure 1, according to the statistic of CNKI, the academic attention on application of cloud computing in education has appeared a gradually increasing trend from the beginning of 2008. And researches of cloud computing in education show an obviously rising trend, which indicates cloud computing has great research value and practical significance in educational; resources sharing^[5]. And through the analysis of the references, it can be found that many experts and scholars in China mainly made theoretical researches in extending the concept of cloud computing and high-quality resources sharing with little study the practical construction and application of sharing platform of high-quality resources. And the researches on the application are about existing Google, Baidu public cloud platform^[6-7].

TABLE 1 : The related researching situation from 2008 to 2013

Serial Number	Year	Number of Articles
1	2008	2
2	2009	26
3	2010	111
4	2011	184
5	2012	282
6	2013	475

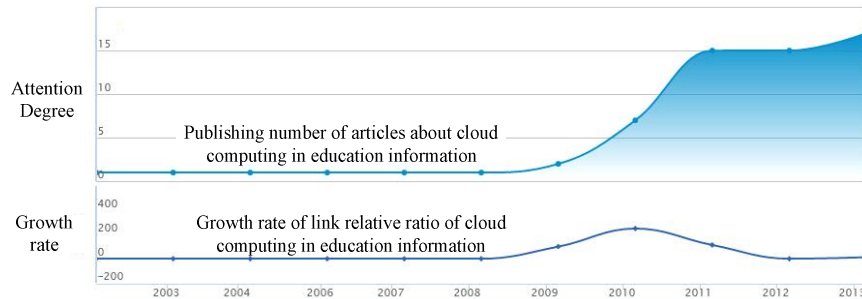


Figure 1 : Academic attention on the application of cloud computing in education from CNKI

INTRODUCTION OF SHARING LEARNING MODE BASED ON CLOUD COMPUTING

With the development of information technology and the increasing learning resources, the requirements of users to the network sharing information are characterized by being new, more, fast, convenient, and so on. And with the continuous development of cloud computing technology, the traditional learning mode is constantly changing, and the users prefer the sharing resources learning which is flexible, and easy to expand. This study, with the aid of the computer auxiliary teaching system and cloud computing auxiliary system, carries out the learning forms of sharing and collaboration, making full use of the users' individual intelligence. A sharing learning mode is establish based on cloud computing, as shown in Figure 2. In the mode, activities of sharing learning are in the cloud computing environment and the sharing learning activities of students can be divided into three stages: (1) Prepare to share; (2) Interact as the core of sharing; (3) Self-examine on sharing. Through the introduction of cloud computing, the interaction between the teacher and the students, the teacher and the teacher, the student and the student and the users and resources can be realized. Therefore the exploration on various modes of learning style will be promoted.

The application of cloud computing in sharing learning makes the sharing platform of high-quality based on cloud computing be characterized by the following points:

(1)The infrastructures of cloud computing are provided by commercial institutions who will continue to improve the using ratio of resources to improve the efficiency of the system. While educational institutions can enjoy this high efficient and economic environment only by paying a fee which is much lower than that spending on the software and hardware facilities by the educational institutions in order to accomplish the teaching task. Besides, there are some public cloud which provides cloud service for free, being economic and efficient.

(2)Through the sharing platform of the cloud computing, users can share their high-quality resources, and learn and exchange the resources provided by other users, which makes the idea of sharing and shared building continuously develop. And the sharing resources have been continuously increased, and the development of collaborative learning and remote collaborative learning between educational institutions has been promoted.

(3)The operation of sharing platform of cloud computing is very simple. Users can enjoy the resources and service without knowing the details of cloud computing and they can get acquire the resources and enjoy the service only through the Internet, which is convenient and flexible.

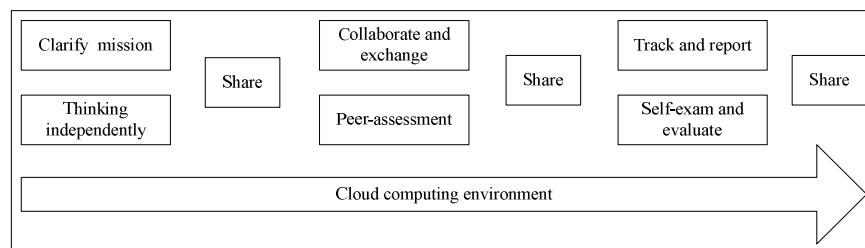


Figure 2 : Sharing learning mode based on cloud computing

DESIGN OF THE SHARING PLATFORM OF HIGH-QUALITY RESOURCES BASED ON CLOUD COMPUTING

Designing idea

The designing idea of the sharing platform of high-quality resources based on cloud computing guides the whole designing process. So the designing idea must combine the theoretical study on the platform of cloud computing and also should reflect the thoughts in preparing stage. This study, taking *The Principle and Application of Data* as an example, designs the sharing platform of high-quality resources based on cloud computing and the details of the designing ideas are as followings:

(1) The sharing platform of high-quality resources in *The Principle and Application of Data* in cloud computing environment needs to be characterized by sharing environment of sharing construction. Teachers and students can communicate on the course, and share the resources so that to ensure the utilization of resources, and improve the speed of the user getting access to information. The openness and sharing of the resources are important parts of the designing idea of high quality sharing platform based on the cloud computing. And only by ensuring the openness and sharing of resources, can the flexibility of resources be reflected.

(2) The sharing platform of high-quality resources in *The Principle and Application of Data* is based on cloud computing. Storing resources in cloud stresses the high efficiency of the service. Educational institutions do not need to put too much cost on hardware facilities. Cloud service providers emphasize the service and high efficiency, which fully reflects the economic characteristics of high efficiency.

(3) In sharing platform of the high-quality resources in *The Principle Application of Data*, users between students and teachers, students and students, teachers and teachers, users and resources can interact with each other, fully embodying the characteristics of collaborative learning. Such learning interaction and cooperation way, can promote the hybrid learning mode of multiple models. And the diversification of education can be realized dealing with different personalities of the users.

The architecture of sharing platform of high-quality resources in cloud computing environment

The architecture of sharing platform of high-quality resources design by this research is based on B/S structure which has a characteristic of use the browser instead of complex applications. The extra processes are put in end of the server in such structure^[8]. But the disadvantage of B/S structure is that it cannot be applied to the applications which have complicated demands and large number of interaction. Based on this problem, this study makes the improvement in the structure of the traditional B/S. With the advantages of PaaS, the architecture of sharing platform of high-quality resources in *The Principle Application of Data* under cloud computing environment is designed in the pater as shown in Figure 3. The platform consists of three layers, namely the presentation layer, business layer and data layer. Users firstly make interaction on presentation layer, through the browser which after obtaining signal, will sends corresponding request information to cloud computing service. Then the information is delivered to the business layer for processing application logic of the business. Finally complete the data will be stored and managed on data layer.

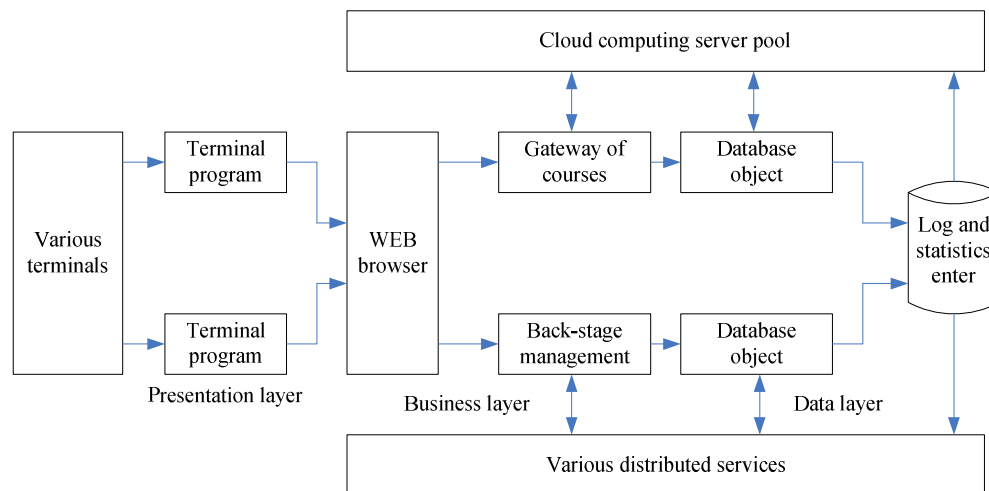


Figure 3 : The architecture of sharing platform of high-quality resources based on cloud computing

Design of the functional structure of sharing platform of high-quality resources in cloud computing environment

The sharing platform of high-quality resources is for all courses in colleges and universities and can be divided into philosophy, literature, history, engineering, science, education, as well as a comprehensive course according to the first level

of disciplines. The paper designs the functional structure for every courses of each classification. Figure 4 is the function structure design of sharing platform of high-quality resources in *The Principle Application of Data* in cloud computing environment. The function structure is build up based on the design thought of opening and sharing resources, collaborative learning as well as efficient service. The function structure of sharing platform of high-quality resources in *The Principle Application of Data* can be divided into two parts: one is the gateway of the courses and the other one is backstage management. The gateway of the courses can be divided into 7 modules: terms searching, popular tags, article recommending, subject column, resource sharing, transmitting, and learning forum. And the backstage management is divided into content management and routine management

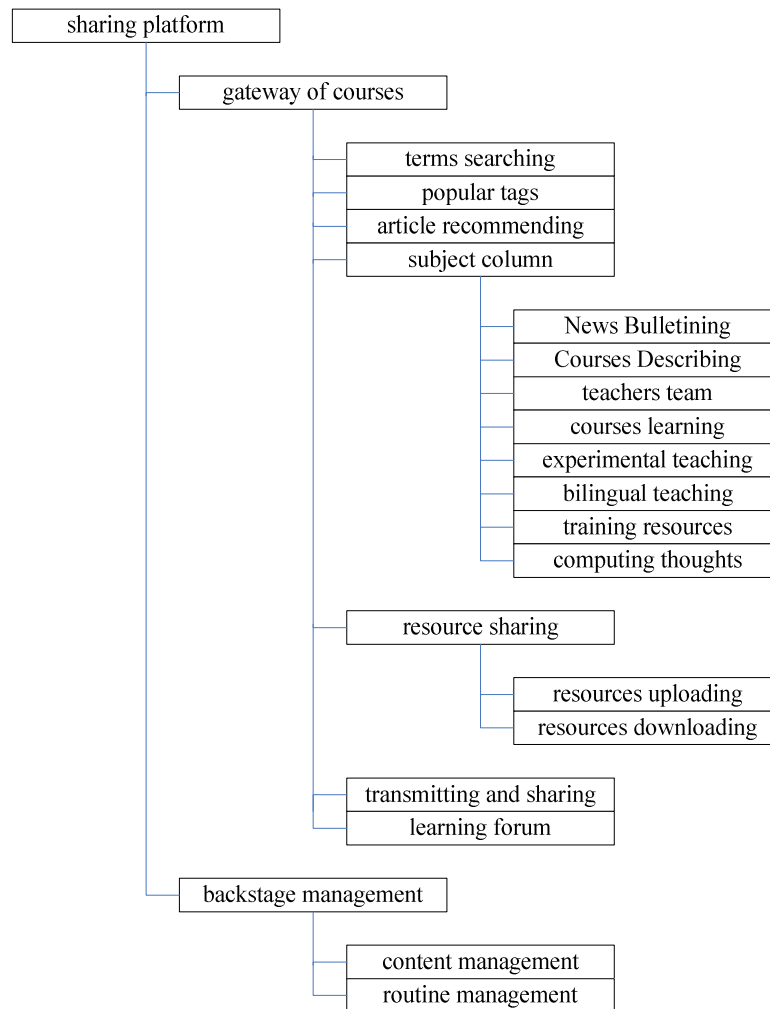


Figure 4 : Functional system of sharing platform of high-quality resources in cloud computing environment

The selection of cloud platform

There are two ways to establish the sharing platform of high-quality resources: (1)construct cloud computing platform in laboratory, (2) Cooperate with the cloud providers, and build sharing platform of high-quality resources with cloud computing by using public cloud. The amount of resources of the self-constructed laboratory cloud computing platform will be insufficient, which can not meet the needs of all people. That is its limitations. This study uses public cloud to build sharing platform of high-quality resource with cloud computing. And the selected public cloud is SAE (Sina App Engine). Sina App Engine is the computing center which uses Web Service Pool, and synchronization calculation based on of PHP and HTTP technology, as shown in TABLE 2 which analyzes the function of Sina App Engine. Sina App Engine is characterized by being convenient, fast, efficient, and it charges for needs. Users do not need to invest a lot, making it efficient and economic. Sina App Engine can fully meet the needs of the researches and development of the developers, and can provide an, fast, convenient, transparent, controllable, stable, serviceable and open cloud computing platform for users.

To build sharing platform of high-quality resource by using Sina App Engine, first needs to apply for an account of Sina App Engine. And then use the Subversion software to arrange resources. After creating the application, initialize the Subversion repository. By updating the code, adding new code, uploading resources and other operations, the files and directories can be managed, and the service content of cloud platform can also be modified and managed.

TABLE 2 : Analysis of the function of sina app engine

Sina App Engine	
Cloud computing model	PaaS
Supporting languages	PHP, Java, Python
Supporting databases	MySQL Maximum 5GB
App number owned by each account	10
Storage limitation of one app	Each App allows building 5 Storage domains, and one domain is 5G.
Size of the code	The code size of each account cannot be bigger than 10M, and the total code size of each App cannot be bigger than 50M.
Budding domain	Need to apply separately and put on record.
Free limit	The limitation is finished by using virtual money “cloud pea” for each service. Users will received 2000 cloud peas by real-name identification.
Charging standard beyond free level	1 Yuan=100 cloud peas

Developing environment of the platform

The developing environment select in this study is the Linux operating system, Mozilla Firefox browser, MySQL5.5.27 database, PHP5.3.2 language as shown in TABLE 3. PHP accounts for a large proportion at the present stage of the development of Web. Because PHP can be connected with a lot of databases, and its combination of with MySQL is most efficient. MySQL has the advantages of fast speed, small volume, low cost and has high stability and open source. So using PHP+MySQL to combine with is very extensive.

TABLE 3 : The operating environment of the platform

The operating environment of the network platform	
Linux operating system fedora 16	open resources, stable, safe
Mozilla Firefox browser	high speed, high safety
Apache2.2.1 server	widely used
MySQL 5.5.27 database	easy to operate, high performance, practical
PHP5.3.2 language	High speed, easy to transfer
Other auxiliary tools	
Photoshop CS3	very functional, practical
Dreamweaver	practical

CONCLUSION

With the development of society, the globalization of economy, and the development of information technology, the informationization degree of the society is higher and higher. The present research analyzed the former researches of sharing high-quality resources and make out the design of sharing platform of high-quality resources in cloud computing environment based on the analysis of the former researches. First, establish a shared learning model based on cloud computing, and then sharing design the sharing platform o high-quality resources in *The Principle and Application of Data* in cloud computing environment. Analyze the designing ideas of the platform and make design of the architecture and functional system. The public cloud SAE is selected to construct the sharing platform of high-quality resources with cloud computing. Besides, the paper introduces the operating environment of the platform.

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