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Application research of resource-sharing platform based on cloud computing

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ABSTRACT

Resource-sharing based on network platform is an extremely important platform for utilizing all sorts of resources, and the state has put a lot of efforts into corresponding construction, as is testified by mushrooming resource-sharing platforms of different types belong to major colleges and universities, enterprises and government departments, which, however, are of old design concepts, leading to problems of being closed and uneven distribution etc in most cases of resource-sharing, and utilization rate of resource is affected to a large extent. Cloud computing, which originally attracted worldwide attention as a business mode, whose rapid development proposes new workable solution for existing methods of platform design: platform construction based on cloud computing will realize more resource-sharing to a possible extent, also, with high scalability and good characteristics of remote interaction management. In the mode of cloud computing, storage, access and sharing of resource are extremely stable and reliable, maximizing resource-sharing by means of its powerful computing capacity. This new type of resource-sharing platform can stimulate most effective use on the part of users. Through introducing basic concepts of cloud computing and resource-sharing platform, this paper then analyzed application value and status of cloud computing in constructing resource-sharing platform, laying certain theoretical basis for constructing relatively complete resource-sharing platform by perfecting design ideas and combining with existing cloud computing platform.

KEYWORDS

Network platform, Design ideas, Cloud computing and resource-sharing platform.



INTRODUCTION

Resource-sharing is defined as uploading open-source onto certain platform where all users with authority can share, and it generally can be understood from two aspects: one, upload existing resources owned by oneself and share them with other people for maximizing corresponding use. Reasonable allocation of resources are needed in order that users can get resources satisfying their needs and the use of existing resources can be maximized, whether it be between different departments, regions or time and space: all kinds of resource demands can be satisfied under existing limited conditions; two, exploration of resource, satisfy resource demand of user to possible extent through the development of new technology, method and resource, and enlarge the depth and scope of resource-sharing platform by taking advantage of cloud computing, network technology and other modern devices, satisfying users' demands of different levels. And technology of cloud computing, deployment of whose globalization continues to be perfected, also provides new direction for developing resource-sharing platform, for instance, user only needs to access resources through either free mode or paid model, without any requirements of professional knowledge and technical ones. Besides, as businesses provided by cloud computing have good flexibility, resource-sharing platforms belong to major colleges and universities, enterprises and government departments can adapt to the ever-changing market.

THEORETICAL BASIS

Definition of cloud computing

The mode of cloud computing is charged on a pay-per-use basis, and provided network access is reliable, convenient and demand-satisfying oriented: resources are provided in a fast and accurate way within the configurable computing resources pool, requiring only a small amount of management work, or, the interaction with service provider is very few. The characteristics of cloud computing are mainly manifested in safe and reliable data storage capacity, extremely low-level of client-demand, ultra-high capability of flexible variation and immense computing power. Cloud computing is commonly divided into three categories: infrastructure cloud, platform cloud and application cloud, and their features are shown in TABLE 1:

TABLE 1 : Classification of cloud computing

Category	Service Mode	Flexibility of Movement	Degree of difficulty
Infrastructure Cloud	Close to the original capacity of computing and calculation	High	Difficult
Platform Cloud	Managed environment of application development	Middle	Moderate
Application cloud	Application of specific functionality	Low	Easy

As the core technology of cloud computing, distributed mass data storage technology is capable of having good applications and playing great roles in constructing resource-sharing platform. Cloud computing guarantees the reliability of data by surplus storage method, and data in cloud computing is rightly stored in a distributed way^[2]. Figure 1 is the common cloud computing architecture:

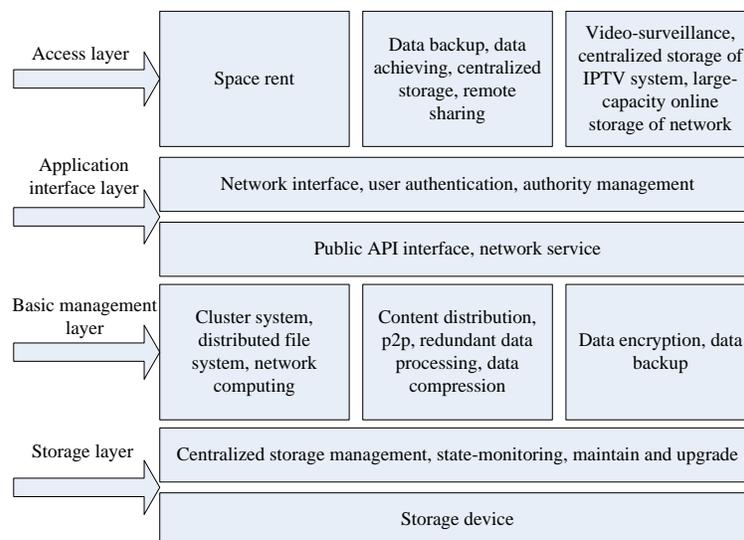


Figure 1 : Cloud storage architecture

In consideration of extremely large scale cloud computing resources, which corresponds to huge numbers of servers distributed here and there, it presents a big challenge for established resource-sharing platform as how to effectively manage these servers operating hundreds of applications and guarantee no interruption occurring to provided services. Then, it is necessary to adopt platform management technology in order to successfully accomplish collaborative operation between large number of services, as a kind of technology belonging to cloud computing technology, it can not only be used for convenient management of business, but fast maintenance and recovery with respect to system failures, and means of realizing this reliable operation of system lies in ultra level of automation and intelligence^[4]. Application of cloud computing technology rightly provides new direction and opportunity for establishing resource-sharing platform, and it's to be expected that resource-sharing platform based on cloud computing will play important roles in the future.

Current situation of resource-sharing platform

Resource-sharing realized through cloud computing is an innovative mode of remote sharing, which not only fully improves utility time of resource, but also maximizing using time of user. It differs from previous layout patterns, realizing resource-sharing in the real sense, and specific mode of resource-sharing platform is shown in Figure 2:

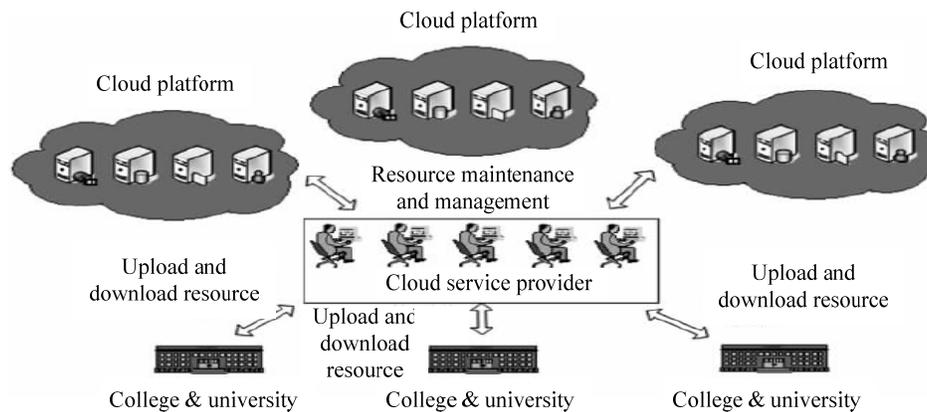


Figure 2 : Diagram of resource platform's overall deployment

Our country has always been treating resource-sharing as a key development object, and it is especially the case with education departments, where “school link”, “information course” and other resource-sharing platforms of teaching are developed. Statistics show that, data storage of shared educational resources in our country has amounted to a super-large scale of 21TB by the end of 2011. However, current situation also reflects such problem as unable to achieve communication and feedback from the user part, while on the part of resource developer, there is no possible way of getting familiar with users' opinions: these educational resource sharing platforms by far are en-closed type development environment. But the State has clearly determined cloud computing technology as the technical means of developing resource-sharing platform.

It may be said that, even though digitization process of domestic resource-sharing platform has gained fast development in recent years, with very significant achievements as well, problems, however, can't be addressed properly, which are mainly manifested in low utilization rate infrastructure and a great waste of resources in terms of hardware equipment that can't be shared, as well as resource-sharing platform established with massive investment of material and financial resources whose utilization rate is only about 50%, resulting in a tremendous waste^[7]. For shared object of existing resource-sharing platform is limited to internal user, unable to achieve sharing in the real sense, which directly leads to a large number of repetitive construction of hardware equipment and so on, in addition, management and maintenance teams in charge of corresponding resource-sharing platforms are not professional, as they are all done by internal maintenance staff, which leads to the fact that many problems can't be adequately solved and lots of loopholes with respect to work of resource transmission, analysis and storage etc, in general, it is unable to promote the development of resource-sharing platform and bring its real roles into play.

And then there are following problems in respect of platform construction based on cloud computing, development and promotion of high quality resource-sharing platform faced with changing:

- (1) Do a good job of fundamental analysis, finding out the problems and difficulties according to status quo at home and abroad;
- (2) Establish good corresponding external environment and make preparation for the development of platform;
- (3) Propose excellent theoretical support of platform architecture in combination of cloud computing's features;
- (4) Perfect design ideas, determine feasibility of design and complete the validation of architecture, finally, unify design functions;
- (5) Accomplish the construction of platform, including specific implementation of user interface and function;
- (6) Conduct vigorous promotion in combination of cloud computing, realize the application of resource-sharing platform and its corresponding value.

CONSTRUCTION SCHEME OF RESOURCE-SHARING PLATFORM BASED ON CLOUD COMPUTING

Design ideas

Construction process of the whole platform always centers on design ideas set in advance, which is a complete framework of theoretical research. Central content of design ideas is the realization and application of platform's function of sharing, upon which construction of the whole platform should be centered, also, with features of flexibility and convenience. Personalized and diversified resource platform shall be developed for promoting diversified means of communication and interaction, so as to let communication and learning between teacher and student, different enterprises and remote users through high-quality resource-sharing platform be realized.

After determining design ideas, it's of necessity to validate it with lowest cost as soon as possible, judging whether problems that might exist can be solved in later period, and whether there is any lack of necessary resource(s) or other places needing assistance. Then, economic cost shall be analyzed for considering how to construct most convenient resource-sharing platform of strong operability with fewest cost.

We can find out from above analysis that, technology of cloud computing can maximize and improve utilization rate of resource-sharing platform's infrastructure, improving sharing degree and minimizing duplication of resources. What all-time sharing of resource requires is only embracing network, for cross-platform support of cloud computing can provide support for terminal equipment.

Cloud computing platform

To better verify the practicability of this platform theoretically, we build an experimental platform though Hadoop technology of cloud computing, and its basic composition structure is shown in Figure 3:

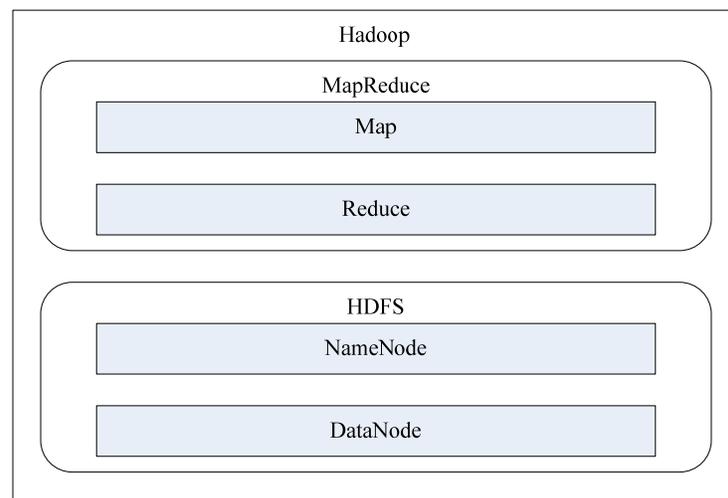


Figure 3 : Diagram of basic composition

Hadoop technology plays fundamental role in constructing cloud computing platform, providing good conditions for conducting research activities of resource-sharing platform in later period. And the building of whole experimental platform required only a few simple computers, without any need of additional capital investment. But from another point of perspective, as there are lots of limitations, it's impossible to accomplish experiment of distributed application in real sense.

While cloud computing platform built on the Hadoop technology of public cloud service platform differs from what's mentioned above; it can accomplish all data calculation and program operation in the cloud, being a practical and convenient resource-sharing platform. This feature saves the need of building cloud computing platform for some public institutions, who can achieve the objective of resource-sharing directly, for instance, educational institutions only need to upload teaching resources onto platform in order to develop corresponding sharing of teaching resources and so on.

At present, common public cloud service platforms include google cloud, Baidu cloud and 360 cloud, and they are all with character of high resource utilization rate and low cost. And customer can get corresponding service of resource-sharing, without the need of ordering customized hardware and software.

Overall design framework

Design scheme of resource-sharing platform is mainly achieved through modulation and separated layer, i.e., accomplish resource presentation, data treatment and business handling in three layers, which is specifically shown in Figure 4:

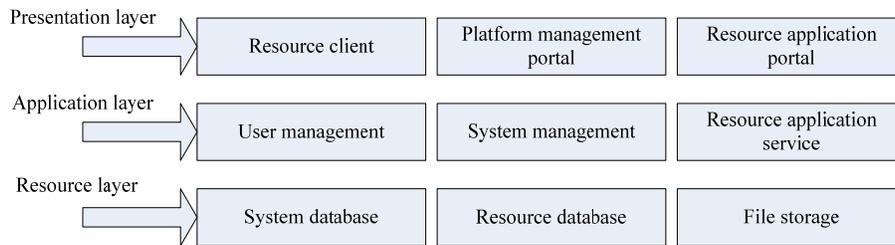


Figure 4 : Resource sharing platform architecture

Among which, resource layer is to accomplish the storage of all kinds of data and resources, in the process of design, the general method is to store resource data, catalog data and system data separately, in order to guarantee good security of data and resource, in addition, this also enables user flexibly choose storage system for accomplishing different deployment work.

Application layer is to connect resource layer and presentation layer, accessing resource layer and feeding result of data treatment back to present layer, while, in respect of service command coming from presentation layer, application layer also returns corresponding result, thus realizing the processing of resource and management business. And these logic resources include user management, data management, resource database management, retrieval management and other kinds of application service.

Function of presentation layer is mainly to present information content of resource stored in platform, providing interfaces of management service, too, which are shown in Figure 3 as three kinds. Presentation object of resource application portal is ultimate user, with a series of service provided as well; resource platform management portal makes it convenient for administrator to manage and control platform and resource; resource application platform is to provide such service as of browse, search and download to client through desktop client^[9].

In conclusion, we then make introduction of how to build resource-sharing platform with respect to educational resources, and the design idea is shown in Figure 5; by means of this kind of cloud computing platform, teachers and students can release and process information resource before accomplishing information-sharing and feedback of customer problems, at the same time, they can complete the whole teaching work in combination of previous ways of classroom communication, forming good teaching environment through interactive cooperation with resource-sharing platform, and encouraging students to be willing to accomplish learning tasks and mutual communication on resource-sharing platform based on rich teaching resources.

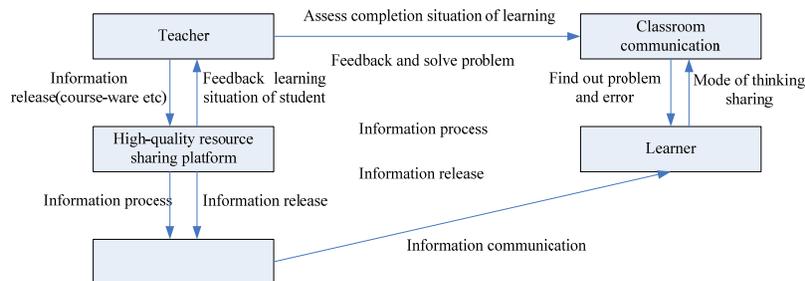


Figure 5 : Design idea of educational resource sharing platform under the circumstance of cloud computing

CONCLUSION

Rapid changes in modern computer technology brings about fast development of cloud computing and enlargement of application degree, providing new hot directions for construction of resource-sharing platform: it not only has substantially improved utilization rate of resource-sharing platform, but brings about infinite longing about future network service of information. But we also know that, adoption of cloud computing platform requires the third party to conduct verification work of security and accuracy, therefore, when any problem occurs to certain link of third party's work and results in omission or missing of resource data, there will be great security risks. Then resource-sharing platform confronts with a long lasting problem, namely, security, which will have far-reaching consequence on the ability and effect of platform, a problem that has to be fully considered in following theoretical research. We can find out from results of study and research that, resource-sharing platform based on cloud computing has obvious advantage over other platform architecture, which lays a foundation for further development of this platform in the future. The scheme of platform architecture designed by this study can effectively save resource, and improve promotion of application area, besides, it is more close to real life and learning of customers, capable of letting them personally feel advantages brought about by reformation of information technology.

Though research of platform construction is still at the initial stage currently, we can confidently believe that, ultra-powerful computing and processing capability and storage capability of cloud computing will accelerate the realization of most essential meaning of resource-sharing platform, moreover, it can also be said that, besides excellent performance in teaching resource sharing platform, cloud computing will also be widely used in all sort of industries, including enterprise, and making more and more people have an experience of its benefits.

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