

On College Computer Experiment Teaching Based on Cloud Platform

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Abstract. Application of cloud platform technology in college computer experiment teaching to integrate the teaching resources, can help achieve unified storage and management of data relating to computer experiment teaching in colleges, so as to provide a good platform for teachers and students in the teaching and learning process for fast retrieval and use of resources, to facilitate the computer laboratory to monitor the entire experiment process, thus enhancing the effectiveness of computer experiment teaching. This paper describes related concepts of cloud platform, cites main application modes of cloud platform in computer experiment teaching, interprets the computer experiment teaching system on cloud platform, and proposes a design scheme of computer experiment base supported by cloud platform.

Introduction

With the rapid development of computer technology, computer education in colleges and universities begins to direct towards compound talents cultivation, so that experiment teaching has become a very important auxiliary teaching method in teaching. Computer experiment teaching in colleges and universities cannot exist independently from the laboratory building. Since the advent of the Internet era, cloud computing is considered as the third wave, promoting the human way of life and business operation ways to change greatly. Cloud platform mainly refers to the software development platform considered as one of service forms, which is to use software model to provide for the computer users in need. Based on college computer laboratory teaching, the author proposes that on the basis of cloud platform, combing with the current situation of computer laboratory in colleges, establish a more efficient virtual computer experiment platform, so as to raise the overall efficiency of the computer experiment classroom teaching.

Related Concepts of Cloud Platform

Cloud platform, also known as cloud computing, is one of the Internet-based methods of calculation. This method enables shared hardware and software resources and information to be provided for computers and other equipment, with characteristics of dynamic resource distribution, network service subjectification, and service quantization. Based on the network technology, cloud computing platform uses the network to provide dynamic, scalable and virtualized resources. Cloud computing mainly consists of distributed computing, parallel computing, utility computing, network storage and virtualization, and other products resulting from combing with computer and network technology in the traditional sense. Operating mechanism of cloud platform is that many distributed computers together take on complex calculations, and make data center like a network, able to at any time deploy resources to the desired application, and according to demand access to the computer. Cloud computing platform mainly provides application programs, computing platform, computer facilities and other services. And corresponding services include three levels of service, software as service, and platform as service and infrastructure as service. Currently there are mainly three kinds of cloud

platform, private cloud, the resource platform for delivery based on standard service, designated, built and controlled by certain company, distributed in corporate computer center firewall, or a relatively safe managed area; public cloud, mainly using network to provide corresponding computing service pool, provided by computer supplier; and hybrid cloud, provided with features of both public and private clouds.

Cloud computing platform can use network to collect related hardware and software resources, use virtualization technology, and according to user needs efficiently allocate CPU, memory, storer and other hardware resources, to achieve a reasonable distribution and use, development and utilization improvement of computer resources, and other targets. Currently well-known cloud platforms include Elastic Cloud developed by Amazon, Hadoop developed by Apache, Google AppEngine developed by Google and Microsoft Azure developed by Microsoft and so on. China also attaches great importance to cloud computing platform development and related industries construction, and telecom operators have begun to transform towards cloud platform. Domestic Internet giant, Alibaba and Baidu, also released their cloud Ali cloud and Baidu cloud. At the same time, in the field of education, especially higher education, cloud computing platform has been used well. Through the use of server virtualization and cloud desktop remote control and other related technologies in the computer room management of colleges and universities, and creation of cloud desktop platform, we can save computer laboratory hardware cost, and manage computer room more easily. Build virtual training room through cloud platform, all of which correspond to the virtual base image, thus building high-capacity data storage and security mechanism.

Main Application Modes of Cloud Platform in College Computer Experiment Teaching

To be able to fully meet the requirements of creating the computer laboratory in colleges and universities, the cloud computing platform technology is the main program for currently creating college training room. In general, the cloud platform has following three main modes: The first one is infrastructure as service, the most basic form of service on cloud platform, mainly using the virtualization technology to provide for the majority of users with hardware resources including CPU, storer, and network facilities. We can fully virtualize certain server to make it become the virtual host of multiple servers. Of course, each virtual host has relatively independent virtual CPU and virtual storer and other computer hardware resources. Each virtual host can set independent operating system and application software. The most typical cloud platform of infrastructure as service is Amazon EC2 and Hadoop. The second mode is platform as service, mainly built on the infrastructure, which is the specific application on service. Through the cloud platform, arrange operating system, database and software development tools and other corresponding computer software resources. Computer hardware resources, such as underlying CPU and network, are very transparent for the majority of users. Users can directly install their own software running scenarios on cloud platform for better implementation of software development. The most representative cloud platform as service system includes Google AppEngine and Microsoft Azure. The third one is software as service, mainly directly installing various types of application software on infrastructure, thereby users can use relatively simple clients to run the appropriate application software cloud computer platform provides, without the need to install hardware and software. The most typical software as service system includes Salesforce CRM and Google Document.

Analysis on College Computer Experiment Teaching System on Cloud Platform

Currently the most urgent and imperative problem in college computer experiment teaching is the computer experiment environment, which requires to free students and teachers from complex client software, thus converted to the thin client mode. This requires cloud platform to provide virtual cloud environment able to integrate multiple applications and operating systems. Clients can apply in the cloud environment to get all kinds of application-oriented software services based on the needs. In cloud platform virtualized computer experiment teaching, teachers and students can fully use the

teacher computer, student computer or mobile terminals to freely access to the cloud computing platform in the school computer room, laboratory or at any one location on campus and then request to get necessary services, and cloud computing platform are responsible for supplying these services according to specific needs.

Cloud platform-based and service-oriented computer experiment teaching can provide a teaching mode which can fully integrate kinds of resources necessary for computer experiment into the cloud, which is the new exploration for computer experiment teaching in colleges and universities. It has a lot of advantages. Firstly, it can provide a new open, information-based computer experiment teaching platform. Teachers and students can use computer terminals to request specific service on cloud platform. Cloud computer platform can provide the appropriate service according to the demand. It is transparent and not affected by each other between individuals. In any computer laboratory, teachers and students in colleges and universities only need to have a client account and they can use any computer equipment to call their own computer operating system and associated personalization data resources. Secondly, it can provide a relatively simple and maintenance-free new information management platform so as to implement centralized management for all these computers in the college. Whether teaching computer, office computer or management computer, can access to the cloud computing platform, and customize on the basis of demand. Once the personal computer system fails, it can be automatically restored within a minute. Such measure can honestly reduce the workload of the computer administrator. Thirdly, it can create a new information technology platform based on specific data to supervise education platform. Cloud computing platform can achieve “college-school-laboratory” layer-layer management, supervision and guidance. Each laboratory in each college is the basic unit of cloud computing platform management. Through layer-layer management, inspect and collect the effectiveness of and computer experiment teaching. Finally, the cloud computing platform can also implement full integration of business with other cloud applications.

Design Scheme of Computer Experiment Base Supported by Cloud Platform

Three specific application modes of cloud computing platform can be applied to construction programs of various types of laboratory in the computer experiment base. Specifically, network technology and hardware experiment can use the mode of infrastructure as service, software development experiment can use the mode of platform as service, and software application experiment can use the mode of software as service. Specifically, the computer experiment base supported by cloud platform has following three main design schemes: First, it is the network technology and hardware experiment design scheme, mainly including the implementation of experiment to the network operating system, switches and routers, network security and networking technology. The distinctive characteristic of such experiment is the grouped actual operation. Each group will need to use more than one computer hardware experiment devices, and training devices are expensive. Because of the cost, procured hardware devices are often difficult to enable all students in the class to together conduct computer-related experiment, which requires carrying out experiment group by group. Such experiment is well suited for application infrastructure mode. Computer experiment hardware equipment uses the Internet to access to the cloud computing platform and the server cluster can use virtualization technology to generate multiple virtual hosts. During experiment, college students can use the network to access to the cloud computing platform and use virtualization software to get the corresponding virtual host resources. As a result, computer experiment hardware equipment can be operated by use of virtual hosts, and the status of hardware equipment can be retained in the storage device, then to be restored in the next experiment. Secondly, it is software development experiment design scheme, whose main content is to set specific development scenarios, including .Net and Java development scenarios. Because in the experiment of college students, the deployment environment is the same, so the use of platform as service mode can meet main operation requirements of this kind of computer experiment. In a complex cloud computing platform structure,

computer software development scenarios can be set up based on IaaS, mainly including various middleware, Java and .Net development platform, large databases, and other related software. During the computer experiment, college students can use the network to take advantage of development scenarios of cloud computing platform. The third one is software application experiment design scheme, mainly including ERP, OA and CRM and other application software, and arranging these above software on cloud computing platform, enabling college students to use the above software through the client. For this reason, based on three types of application modes of cloud computing platform, create college computer experiment base, able to fully realize sharing of computer hardware resources, thereby enhancing the utilization of computer hardware, and effectively reducing the cost incurred in computer hardware construction process. Software as service and platform as service mode should be based on infrastructure, namely service. Therefore, the above three modes can fully unify deployment of related servers, storage, and experiment equipment, then on the basis of computer experiment teaching requirements, respectively arrange developed scenarios or application software. Currently, colleges and universities can combine with above three schemes to build laboratories for computer major.

Conclusions

In summary, college computer experiment teaching based on cloud platform has been well applied. Current college computer experiment teaching process in China generally adopts the construction method of student computer and teacher computer. This method is likely to cause overload of teacher computer and student computer, and thus easy to produce information island effect, which inevitably affects the effectiveness of computer experiment teaching. Computer experiment teaching based on cloud platform establishes a new cloud or client teaching mode. In this mode, the customer can extract necessary computer experiment resources from the cloud platform based on actual needs, thereby freeing up valuable resources of the client. As a result, teachers and students in colleges and universities can at any time get connected to the cloud platform to obtain corresponding services, thus enhancing the effectiveness of computer experiment teaching.

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