

The Application of Network Security Technology in Computer Laboratory based on Cloud Computing

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Abstract: With the flourishing development of science and technology in our country, the universities have also established computer course, wherein, laboratory is the important place for students to learn knowledge, and its management and construction situations directly affect the teaching quality. Introducing cloud computing technology in laboratory construction and management can give full play to its role and advantages to conduct scientific control and management on laboratory thus to enhance the computer teaching level.

1. Introduction

As a kind of distributed computer system mode, cloud computing can integrate different nodes and computer sub-systems into one platform. Wherein, these nodes are not only largely different in geographical location but also have difference in function, therefore, different security measures should be adopted for each node in handling network attack. Different node can be set with special security measures and realize network communication with other nodes to establish unified security strategy for the cloud computing platform. In this way, the network security of each node will be guaranteed, accompanied with network protection between different nodes, the security of the whole cloud computing platform will be guaranteed. Therefore, the cloud computer service providers must guarantee the security of each node thus to guarantee the cloud computing platform to be safe and reliable. In the cloud platform, the nodes in adjacent domains trust with each other, if one of the node is attacked or invaded, other nodes will be threatened accordingly. Therefore, the network supervisor must monitor the security situation of each node of the cloud computing platform timely thus to realize comprehensive control. When one node is attacked, the first thing is to take necessary security measures on the node, and the second thing is to formulate security protection strategy for the nodes in adjacent domains, adjust the security protection measures timely and reduce loss to the largest extent. The network supervisor must know the performances and security statuses of all nodes clearly, and can make adjustment timely in face of emergencies. But in view of manual analysis on network attack, big data is a large challenge, therefore, it is difficult to improve efficiency.

2. Overview on cloud computing technology and its main characteristics

2.1 Main contents of cloud computing technology

Cloud computing technology includes virtual technology, resource storage and management as well as distributed database, which can response to the requirements of the users on data transmission and service through multiple software and hardware resources. Wherein, virtual technology, as the important technology of cloud computing, can conduct cloud-side virtualization on the CPU server, internal storage, storage and I/O interface to enhance the availability of network hardware. But the different virtual systems in the network system architecture are in different operation environments of mutual independence and isolation, which rely on the connection of virtual I/O interface to complete information transmission in different systems.

2.2 Characteristics of cloud computing technology

(1) Recognize the differentiated network requirements. In the usage process of virtual network resources, the users don't need to know the network bandwidth, CPU, internal storage and storage of the computers, while cloud computing can base on differentiated network requirements of the users to divide and distribute the resources in the data resource pool. (2) Provide business service according to the requirements of the users. Based on the cloud platform architecture of the computer laboratory in universities, the users can obtain cloud-side service resources through visiting corresponding client sides or network interfaces, and can require the network system to provide multiple business services. (3) Response to multiple services more rapidly. In the cloud computing system, the network data can be stored to different databases through distributed network nodes. Therefore, in the service response process, the distributed database can also take advantage of parallel computing to release resource thus to satisfy the diversified requirements of the users on resource acquisition and storage.

3. Current informationization construction and management situations of the computer laboratory in universities as well as existing problems

3.1 The informationization construction of computer laboratory in universities lack of policy guidance

At present, the universities all have established basic computer practice or application course for the students with different majors. But the government and university education department fail to coordinate with each other well, the universities have difficulty in raising the fund for computer laboratory construction, which hinders the informationization construction process of computer laboratory. In addition, the teaching departments of some universities fail to cooperate with each other well, which causes lack of unified standard for informationization construction of computer laboratory as well as fund and construction resource waste. Such kind of differentiated and repeated information resource construction can not only provide no help for the teachers in teaching and the students in learning but also can affect the students to accept computer learn and seriously hinder the informationization development of computer laboratory.

3.2 The informationization construction of computer laboratory in universities relies on high cost

Adding computer hardware singly can not effectively improve the computer teaching efficiency in universities, but instead, it will increase the informationization construction cost largely. However, the computer laboratory managers in universities lack of experience in virtual hardware equipment construction, therefore, most computers are not equipped with virtual cloud computing system, and the computer performance can not enhanced effectively as well. Besides, with the increasing in computer laboratory construction cost, the maintenance and updating frequency of various equipment is also accelerating. Under the situation of lack of fund support from the government, it is difficult to complete informationization construction of computer laboratory by relying on the operation capital of universities only.

3.3 The network-based management of computer laboratory in universities face large difficulty

In the network-based management of computer laboratory in universities, the managers mainly take charge of network management system establishment, computer hardware cloud-side virtualization, software procedure installation and deployment as well as daily security management and maintenance for the computer laboratory. Under the situation of facing multiple computer laboratory management tasks, the management departments of universities are difficult to find professional managers to complete the debugging on the computer software and hardware procedures and satisfy the diversified usage demand of the users. What's more, limited by the short opening time of the computer laboratory in universities, related personnel have difficulty in

complete comprehensive examination on the computer laboratory, which will cause threat to computer software and hardware fault.

3.4 Difficulties faced by data storage and service management of the computer laboratory in universities

Firstly, from perspective of information resource flow, the computer network in universities only owns LAN without establish corresponding virtual network and cloud platform, therefore, the students can only obtain the computer resources in computer experiment classes and can not needed information from the cloud side. Secondly, from perspectives of data storage and network service, most universities have no distributed database and can not conduct data information distribution and management by aid of related softwares, which causes decline in computer laboratory management efficiency and quality.

4. Application of cloud computing technology in the construction and management of computer laboratory in universities

4.1 Application architecture of cloud computing in computer laboratory in universities

(1) Firstly, the base layer. It contains a series of software and hardware resources of cloud platform, such as server, internal storage, storage and I/O interface, which exist in the virtual resource management layer of computer network. Wherein, the hardware facilities of cloud computing in the base layer includes cloud computing server, network switch, router and internal storage. All of these network equipment mainly rely on the internet communication platform and I/O interface for different network coordination to complete data information integration and communication. And then they distribute and manage the data resources in the logical resource pool through virtualization of the cloud platform server thus to transmit needed data resources for different users. (2) Secondly, the service and management layer of the cloud computing platform. It is the platform providing multiple services, which involves identity certification, resource management, customer management, computing service, configuration management, data storage, authority management and performance monitoring. This service platform can provide services including customer identity recognition, data resource storage, resource distribution and management from perspectives of user identity, business demand and data demand. For example, the university teachers and students can enter into the identity recognition procedure of the service and management layer through the desktop management system of the computer, and they can obtain needed data information from the cloud computing platform after they obtain corresponding authority and date access authorization. In this process, the monitoring software of the service and management layer will scan and control the various operations of the users to guarantee security of the whole system. (3) Finally, the user application layer. It is the window for connection between the cloud platform and customers, and it mainly exists by the forms of network client side or webpage port, which involves the modules of mainframe application, mainframe inquiry, account number log-in and information retrieval. In the cloud computing user application layer, the users just need to base on corresponding hints to select multiple businesses, and then they will realize connection with the network platform to obtain and store needed data information. While the whole process of data transmission and service acquisition can all be realized by aid of the cloud computing cluster system.

4.2 Scheme for the construction and management of the cloud computing laboratory in universities

This paper conducts research on the network system and desktop system of one certain platform, and proposes the scheme for the construction and management of the cloud computing platform laboratory. It can be seen based on the above analysis that the base layer of the cloud computing platform gives play to the role of server virtualization and data storage in the computer system construction. The desktop system of the platform mainly relies on the base layer and uses the cloud

computing virtualization hardware software to realize identity certification, data storage and network resource management. In the cloud computing laboratory construction process, it is needed to deploy the cloud server, operating system, virtual hardware and application software. Wherein, the cloud server is the integration of multiple servers, which not only contains needed hardware equipment for the computer laboratory but also owns the desktop platform to realize unified management on the system. The managers can maintain the background of the cloud computing server, can virtualize hardware through the cloud platform and optimize the software patch and network information transmission environment. While in the computer laboratory, the student users can adopt the desktop system and rely on the needed software or client side to learn computer procedure and daily computing experiment. These softwares are stored in the cloud side server, under the situation of network data transmission node facing faults, the students can rely on the cloud desktop server to continue the computer experiment.

5. Conclusion

In summary, another important function of the cloud computing platform is data storage, because the platform stores large number of data of all nodes, besides, the cloud computing platform provides open and wide service, therefore, it will suffer from large attack and damage, which requires necessary security protection for data storage.

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