

Computer Network Security in Cloud Computing Environment

Yanmei Yang¹, Ya Wang^{1,2,*}

¹Suqian Xinxu Internet Co., Ltd., Suqian, 223800, China

²Shanghai Urban Construction Vocational College, Shanghai, 201415, China

Abstract

In the process of rapid popularization and development of network information technology in China, new network environments have begun to emerge, especially in the cloud computing environment. Network forms have changed, service types are diversified, application and delivery models are very complex, and computer networks need to follow the cloud. The demand for computing provides dynamic and easy-to-expand virtualized resources. However, in the actual application of such virtualized resources, security risks often occur, which seriously affect the computer network security under the cloud computing environment. This analysis is aimed at Cloud computing also studies the security problems faced by computer networks in the cloud computing environment, and proposes several technical measures for network security protection, aiming to provide help for enhancing the computer network security in the cloud computing environment.

Keywords

Cloud computing environment; Computer; Network security.

1. Introduction

In the field of computer network security management under the cloud computing environment, advanced technical protection measures and management protection measures should be actively used to build a technical talent team with certain network security protection capabilities and professional knowledge. With the support of the first-built talent team, Enhance the degree of professionalization of overall security protection, and fundamentally eliminate network security problems in the cloud computing environment [1].

For cloud computing, it is mainly to use the Internet as the foundation to create a convenient and efficient service model, so that users can use the network system to invest very little cost, maximize the optimal configuration and sharing of resources, and improve network resources. Utilization effect and efficiency, in essence, cloud computing itself does not require user involvement or excessive management, and little interaction with service providers can reduce application costs and development costs, and cloud computing is in the application process It has a certain degree of reliability, mainly because of the powerful functions of the relevant system during the application period. The big data storage system can store a large amount of data information, and data errors rarely occur. At the same time, the cloud computing application period has a strong scale. Compared with the computing performance, the technology is capable of large-scale operation in multiple platform fields, and the data information stored and processed is richer. In addition, the technology application period has a high degree of sharing characteristics, which can combine the diversified needs of various users to share massive data resources and data information online, reducing costs and ensuring the good use of technology [2].

2. Current Status

(1) Hidden dangers of data and information security

During the operation of a computer network system, the use of cloud computing technology will generate massive amounts of data and information. In an open network environment, the transmission of data and information is easy to bury potential safety hazards. First, the method used in cloud computing is distributed computing. During the process of network transmission and exchange, it is easy to cause data information to be attacked, and even tampering and theft may occur. Secondly, in the link of data information inspection and correction, usually, cloud computing will directly calculate and process the data after receiving the data. The lack of a more complete and comprehensive inspection mechanism and verification mechanism can easily lead to the phenomenon of data information forgery or the problem of invalidity will not only reduce the accuracy of calculation, but also waste of resources [3].

(2) The hidden dangers of the virtualized environment

The cloud computing services and platforms used in computer networks belong to virtualization technology. In a virtualized environment, security risks are prone to appear. On the one hand, during the application of virtualization technology, all computer network data information will be integrated and analyzed to form a relatively large resource sharing pool. Although it can improve the convenience of user operations, it is prone to leakage of private data and information. On the other hand, the hypervisor has many hidden security problems. Although the cloud computing application effect can be enhanced during the system upgrade, once it is cracked by other illegal attackers, it will cause serious security consequences [4].

3. Measures

(1) Improve the safety management system

The construction of a security management system can provide a basic guarantee for computer network security control and protection under the cloud computing environment. Therefore, in the process of security protection, it is necessary to strengthen the improvement and establishment of the work system. First, improve the corresponding security operation management mechanism, analyze the hierarchical characteristics of each service resource in cloud computing, and clearly divide the responsibilities of users and cloud computing providers. For users, before choosing to use cloud computing systems, conduct a comprehensive investigation Study the service quality and security control level and service agreement of service providers, set up a security management system through a variety of authentication methods, adopt encryption measures and key measures to prevent security problems, and also need to stage system viruses and vulnerabilities The cloud computing service provider needs to ensure that the platform system is updated frequently, patch vulnerabilities in real time and dynamically, strictly control the operating security of the background management software, and reduce the cost of user software applications. At the same time, the safety level is maintained. Secondly, it is recommended that relevant national departments formulate legal systems in the application of cloud computing technology, use legal forms to regulate and restrict the security management behavior of cloud computing applications, clarify the accountability mechanism after security issues occur, and strengthen service provider level Security management efforts, regular risk assessment and risk rating of cloud computing technology application in medium-sized, small and large-scale enterprises, timely detection of hidden risks and factors affecting the safe operation of the system, so as to facilitate the effective implementation of security control work.

(2) Actively use advanced safety protection technology

Security protection technology is an effective control measure and basic guarantee for the safety of computer network operation in the cloud computing environment. Only the standardized and reasonable use of advanced protection technology can effectively maintain the security of the overall computer network in the cloud computing environment. The main protective technical measures are as follows.

Identity authentication technology. There is a certain difference between the application of identity authentication technology and the traditional simple password setting form. It emphasizes the use of more advanced biometric technology to enhance the application effect of identity authentication security technology, for example, set according to the characteristics of cloud computing services in computer network systems Fingerprint recognition technology systems, iris recognition technology systems, face recognition technology systems, etc., through effective recognition technology support, promptly discover unsafe factors and hidden dangers, and deal with and maintain the overall system security level in an orderly manner.

Adopt cloud data encryption technology. In the field of related computer network security protection, China has begun to widely use cloud data encryption technology, involving database encryption technical measures, database security agent technical measures, and access security agent technical measures. First, in the process of using cloud encrypted database technology, you should ensure that the database system has a certain encryption function, and the data engine in it is well protected. Whether it is data writing operations to files or data storage and extraction operations, it should be encrypted in advance Processing, especially in the link of file reading, should be decrypted before allowing the operation. If decryption cannot be performed, the performance and security level of the database system should be enhanced from the root cause. Secondly, in the process of applying database security agent technology, actively introduce encryption gateways and set them at the exit and entrance of the database system. All data information can be input into the database system after being encrypted. The operation of information reading adopts the form of decryption processing. The application of this type of encryption technology can provide a unified secondary authentication and authentication service for the operation of the database system, and prevent cloud computing service providers from accessing users' data information. Finally, the use of cloud access security proxy technology is mainly to set up a cloud access security proxy encryption gateway at the exit of the enterprise or personal computer network, and the outgoing data information is uniformly encrypted, and the incoming data information is uniformly decrypted. With certain general characteristics, can use distributed encryption processing methods to enhance the comprehensive effect of security protection. It is worth mentioning that in order to prevent the difficulty of searching data and information after encryption, or the problem of format compatibility, do not use algorithms with too strong encryption strength as much as possible to avoid hidden problems of convenience in operation. In addition, in the process of security management, it is also necessary to focus on the security of the computer network communication process, and discover potential safety hazards or deficiencies in the entire communication process in time. According to the operating requirements and operating environment of the computer network system, it is necessary to ensure that the network is normal and stable. Set up link encryption technology, node encryption technology, and endpoint encryption technology when the operation is affected to maintain the security level of communication.

Comprehensive technical measures. The operation security of computer networks in the cloud computing environment should focus on the use of comprehensive security technical measures. First, actively use advanced firewall technology, introduce virtual firewalls and physical firewall systems with high application effects at home and abroad, and combine the two firewalls with each other. Integration to ensure that all levels of network traffic can be monitored comprehensively, and to maintain the data and information security of each level of

the system. Secondly, the advanced security reinforcement technology of the hypervisor is adopted. At present, the functions of the hypervisor are continuously increasing during the application period, which makes the number of codes begin to increase. It is easy to increase the incidence of security vulnerabilities. Therefore, it is necessary to use advanced technology to perform security reinforcement processing on it. The lightweight system retains the core functions and removes the amount of code, effectively enhancing the safety performance of the overall system operation. Finally, using virtual security software management software, in the computer network virtual environment of the cloud computing environment, set up a distributed virtual host to deny attack mode, introduce virtual security management software, and create a more complete cloud computing with the help of software. Virtualization environments at all levels, network security hidden danger response plan plans, enhance the security reinforcement effect at the virtual level, prevent the impact of network attacks, and enable virtual machine equipment to operate in a safe and stable state.

(3) Improve the professional level of safety management and protection

The degree of professionalization of personnel directly affects the effectiveness of computer network security protection and management. Therefore, in the management of computer network security in a cloud computing environment, attention should be paid to the professional level and degree of relevant personnel. Talents with rich experience in computer network security management and cloud platform security management are required to have a certain sense of responsibility, and can easily enhance the security of computer systems and network systems in the cloud computing environment. Secondly, for existing security management personnel, training should also be adopted to enhance the degree of professionalism, and a complete training plan should be formulated in daily work, so that each security manager can master the security management measures of the cloud computing network platform. Advanced technology effectively maintains the operational safety effect of the overall system. Finally, improve the responsibility system, clarify the responsibilities and norms of each person's computer network security management and control work in the field of daily work, and ensure the security of all computer networks from the root level.

4. Impact

The cloud computing model can greatly reduce the cost of education information system construction. For schools, the cost of building a computing center through investment is relatively high, and it is difficult to match the rapid growth of educational information systems and the diversified requirements of services. The cloud computing model provides a suitable reference plan for schools. The related tasks of the data center and network center of educational institutions can be completed by using cloud computing services. The V6 infrastructure provided by cloud computing "can save costs" without having to invest in expensive Hardware equipment "burdens frequent maintenance and upgrades." As the development and improvement of the grid cloud computing model, cloud computing provides a stronger management mechanism, automatic deployment, and high-level virtualization, which will maximize resource sharing and collaborative work in the network virtual environment. The impact of cloud computing on the education field is mainly manifested in the following four aspects [5].

(1) It can save the purchase and maintenance cost of hardware equipment such as computer network switching for the school

At present, all levels of universities, middle schools and primary schools are equipped with many computers and network equipment. In order to meet more and more computing needs, schools must purchase and update computers and network equipment frequently. The inherent characteristics of cloud computing make it easier to enter schools than other new technologies.

If you use cloud computing services, most of the computing tasks are done by the cloud, and the school only needs to connect the computer to the Internet. Cloud computing has low requirements for user equipment. This feature determines that cloud computing will be popular in schools and can save schools a lot of computer network exchange and other hardware equipment purchase and maintenance costs.

(2) Cloud computing can provide schools with economical application software customization services

Software as a service is a type of service provided by cloud computing. It provides software as an online service, such as GoogleApps and ZohoOffice. After schools access such cloud computing services, they no longer need to spend a lot of money to purchase commercial software licenses. Some commonly used application software, office software, email systems and other cloud services have already been provided, with low fees, and some even free. The local computer as the client only needs to run the graphical Linux operating system and Firefox browser to enjoy cloud services, without worrying about whether the application software is the latest version, which greatly reduces the school's investment in maintaining and upgrading the operating system and application software cost of. Linux and Firefox are both open software software, you can get a free license.

(3) Cloud computing can provide schools with reliable and safe data storage centers

Due to the increasing investment in the construction of educational information resources, major schools have accumulated a large amount of educational information resources. In the Internet era where viruses and hackers are rampant, the security and reliability of data storage are becoming more and more important. How to store these information resources reliably and safely has also brought challenges to schools. The problem of information security is particularly prominent in schools with a shortage of professionals. Cloud computing can provide schools with reliable and safe data storage centers. The school uses cloud computing services to store data in the cloud, and the cloud computing service provider provides professional, efficient, and safe data storage. Therefore, there is no need to worry about the invasion of viruses and hackers and the data loss caused by hardware damage.

(4) Cloud computing makes the co-construction and sharing of educational information resources more convenient

At present, educational administrative institutions, schools, and educational enterprises at all levels in our country have built many educational information resources, and are still building more educational information resources. Since educational information resources can be stored on the cloud, the sharing of educational information resources will be more convenient and faster. Various educational institutions or information resource construction personnel can also use the powerful collaborative work capabilities provided by cloud computing to realize the joint construction of educational information resources.

5. Conclusion

To sum up, in recent years, in the cloud computing environment, during the operation of computer network systems, some data security issues and virtualized environment security issues often occur, which seriously affect the stability and reliability of computer network operations, and even There will also be privacy leakage. Therefore, in the cloud computing environment, we should focus on computer network security management and protection, actively use advanced security protection technology, formulate a sound security management system, and build a high-quality talent team.

Acknowledgments

This work was supported by the teaching research project of Shanghai Urban Construction Vocational College (No. cjyy202018) and the fifteenth batch of "Six Talent Peaks" high-level talent project of Jiangsu Province (No. SZCY-022).

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