Computer Network Security Research under Cloud Computing Environment

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Abstract. Cloud computing is a new trend of the Internet which has changed the users habits on the computer and transformed more users' work environments from desktop to Web. This paper introduces the concepts of cloud computing and its features and network security implications of cloud computing and its security status and discusses network security issues in cloud computing environments and puts forward proposals and advice to enhance network security.

1. Concept and Features of Cloud Computing

Cloud computing is a kind of service model based on the Internet to provide available, fast and convenient network access and users need to pay a certain little money according to the usage and they will be able to enter the configurable, virtualized computing resources. Users don't need to put a great deal of effort to manage resources and they also don't need to interact with the cloud computing service providers too much to reduce the costs to the largest extent. The basic principle of cloud computing is that it makes the calculation distributed on a large number of distributed computers, rather than on the local computer or remote server and the operation of the enterprise data center will be more similar to the Internet which enables the enterprise to switch to the needed resources and have access to the computer and storage system based on the requirements [1].

Cloud computing has the following features:

①Great Scale. With great computing capacity, cloud computing has sufficient ability to make substantial servers operate at the same time;

② High reliability. Cloud computing with the complex network frame ensures the high reliability of service;

③ High universality. As for different demand, cloud computing can have different applications;

④High extensibility. The super models of cloud computing make it doomed to have a scalable dynamic characteristics, so it can meet needs of users from different quantities and areas;

⑤Virtuality. Users only need to provide usable IP, it have access to network service;

⑥Low cost. Cloud computing has automatic and centralized management mode and users can enjoy quick and efficient network services with very low cost [2].

Network security under cloud computing environment refers to making data existing in the network environment with confidentiality, integrity and availability through management and technologies of double protection. But because of the openness, internationalism and freedom of the Internet, it reduces the original security effectiveness of computer network, which becomes vulnerable to human malicious attacks. Therefore, additional precautions need to be added to improve the security of computer network.

2. Implications of computer security under cloud computing environment

With the increasing popularity and application of computer technologies, quantity of network service and function of information getting, calculation, storage and application have been recognized by people. Emergence of cloud computing, as a new computer technology, not only provides people with convenience but also new security matters.

Significance of network computer safety under cloud computing environment.

(1) Network security under cloud computing environment has a very high standards for themselves but for user terminal equipment, the requirements are relatively low which can improve utilization rate and users can achieve the transfer and sharing of data after accessing to cloud computing environment. Different devices can share network data and it provides a great deal of storage space and computing power. Network security in the cloud computing environment can create protection measures for the security of network information system data to protect the data information of users' terminal equipment and avoid accidents or human threats, destruction, change, and disclosure. Strengthening the security settings' confidentiality and integrity of the network information system in the cloud computing environment is crucial.

(2) Computer network security in the cloud computing environment can test and monitor system software on the network at any time and if there are dangerous program threating systems, it can transmit information directly to the server for specific analysis and treatment to guarantee the security of user data.

3. Related security matters under cloud computing environment

3.1 Current status analysis of network security under cloud computing environment

Nowadays, cloud computing is developed in booming in China and with the popularity of computers, more and more people learn to use cloud computing to access to the shared recourses. Among various network information, it can be easy to cover the users' private information so the potential security troubles can't be sneezed at.

(1) Passive position and network trap

Operation of cloud computing needs the cooperation of cloud services providers and their customers. As a user, he not only enjoys the convenience provided by networks but also restricted by the service provider directly at the same time. According to modern science and technologies, computer network still presents a single directional supply trend. Once service providers suspend the service after a technical fault occurs, the user can only passively wait for. In addition, there are a lot of false addresses and false identification in the network and all of these traps also make users struggled.

(2) Illegal Hackers

In modern society, part of hackers evolve into the illegal hackers who use high-tech computer technologies to damage uses' computer system and steal user information. Resources stored in the cloud computing group has great appeal for illegal hackers. Therefore, it's urgent to strengthen the computer network security barrier systems [3].

3.2 Security hidden dangers analysis of computer network under cloud computing environment

(1) Technology level remains to be improved

For common users, data stored in cloud environment can't be obtained and dealt with upon the circumstance of interrupted network to cause the interrupted service even the more serious outcome like interruption and failure of calculation. In addition, it also involves the security matters at technical level and can't screen the fault address and identifications effectively.

(2) Full confidentiality can't be implemented

Cloud computing is not completely confidential in computer network security resulting in the appearance of some hacking cloud computing environment phenomenon. In addition, there are a lot

of network virus attacking cloud computing environment deliberately. The main reason of these is the unsafety of user equipment.

(3) Regulatory loopholes in the law

At present, as for computer network security management, there has not issued clear and effective laws, regulations and protection measures, sanctions in China which is the reason to cause network security events in cloud computing environments emerge in endlessly. Enhanced network security awareness, improved laws and regulations of network security and strict enforcement of infringement of online privacy can guarantee the security of cloud computing environments from the legal level.

4. Specific measures to strengthen the computer network safety

4.1 Enhance the precautionary awareness of computer network safety

Strengthening network security in cloud computing should enhance precautionary awareness and from the authentication part of the system to ensure network security as well as the running base [4].Identity certification is an effective measure to prevent hacker or the third unclear identity user for invasion. Through the concrete measures to put computer network security prevention consciousness into practice and highly protect computer network data and information confidentiality, integrity and consistency, it can avoid non-authorized users' access to data and information and their spread and prevent appeared unnecessary dangers and effects through strict monitoring [5]. In real application, in the case of using the network, users should avoid the use of information and data operations when using the network system or in a public computer and it should not use the same password in the procedure of cloud data storage [6]. In addition, user should carry out regular data recovery operations to prevent the related matters like file loss or cannot be restored when the ports of cloud computing suffer from attacks in the future use.

4.2 Development of application research of computer network security technologies under cloud computing environment

Strengthening network security in cloud should invest more in safety technology and research. For computers users, users' security precautionary measures are the use of firewalls and other security measures. Such kind of protection should speed up the process of development and updating which can be achieved by a number of protection technology and means like such as multilevel virtual professional protection, authentication authorization mechanism to ensure the effectiveness and safety of technical structure in the use of computer networks and provide protection for computer network security under the cloud computing [7]. You can also take digital signatures for authentication to guarantee the network security and it also has a high degree of reliability and security in practical application.

4.3 Strengthen the security of network server under cloud computing

Strengthening the network server safety is also a way to enhance the security of computer network. Interception and preparedness for unknown data and information can effectively prevent the invasion of unsafe data and information system and it can protect web information safety through the installation of protection programs. Servers plays a buffer role in the security of computer networks through largely hiding network, saving a public IP network and monitoring and operation of the Website information which is another effective way to upgrade computer networks cloud computing security. In addition, as for cloud computing service providers, decentralized management can solve the user management work problems and heave workload and through the routing management and stepping, it allows each level of management to be monitored and detected, which can effectively upgrade computer networks cloud computing security and promote better development of computer network security.

5. Conclusion

Cloud computing is a newly emerged technology and is an innovation but also a challenge for IT industry. Cloud computing has been spread into several fields and realizes the commercialization

quickly. But the application of cloud computing also asks for higher demand for network safety. All kinds of safety matters need to be settled and standard cloud computing network safety system need to be built and the related laws and regulations need to be improved. Therefore, network safety under cloud computing has a long way to go. Only the safe and reliable cloud computing environment can serve better for the informational world.

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