Innovative Research on the Direction of Network Information Based on Cloud Computing Technology

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Abstract. Cloud computing is equivalent to a comprehensive technology of multiple independent network technologies, which includes a variety of computing and software and hardware technologies, and is an innovative technology of deep integration of various technologies. Cloud computing is widely used in network services, not only to provide technical support for cross-border integration, high-tech, emerging industries, but also to change the way ordinary people live. This paper mainly starts with the solution of network security problems brought by cloud computing, studies the role of cloud computing technology in the field of network information security and the future innovation trend and direction. The aim is to improve the security of key technologies in network transmission or storage and provide a relatively stable network environment for users.

Keywords: Cloud Computing, Network Information, Innovation

1. Introduction
Cloud computing involves a variety of network technologies, such as distributed computing, parallel computing, network storage, virtualization and so on. The birth of cloud computing has brought a great impact on the academic and industrial circles, but there are many different definitions of cloud computing. One of the widely accepted is that cloud computing is a computing model that can obtain computing resources on demand by means of network convenience, and ensure the feasibility of computing. However, because cloud computing is a self-service, it has network access, resource sharing and other problems, so there will be different forms of deployment mode, and then improper operation and external attack resources will lead to network information security problems [¹]. Therefore, it is of great practical significance to study the application of cloud computing in information network. The application of cloud computing technology brings a great change to the Internet industry, which provides a broad development space for the development of various industries under the economic market. At the same time, a large number of data sets suddenly emerging on the network are all stored on cloud devices. Once the cloud that stores information is invaded by illegal
people or the cloud is destroyed, a large number of data sets will be damaged, and data scrambling, loss and other phenomena appear. At the same time, when the user carries on the data transmission on the mutually beneficial network, the data is often stolen because the security measures are not in place. On the one hand, it inhibits the sustainable development of Internet technology in the market. On the other hand, it brings great security hidden trouble to users, because firewall has relative limitations in the practical application of preventing network security. Therefore, the following will be combined with cloud computing technology, key network information security linkage technology innovation research.

2. Cloud computing concept
Cloud computing is the product of the times under the current social big data environment. It can search the corresponding data resources in the computer database according to the requirements of the users and obtain certain access rights. Cloud computing integrates storage technology, programming technology, virtualization technology, transmission technology and management technology to achieve the collection, analysis, processing, computing and other services of information resources [2]. The service mode of cloud computing is divided into infrastructure service, platform service and software service according to the user's demand level, which can maximize the service scope of cloud computing. In general, cloud computing needs to follow certain standards and protocols in the process of running, combine equipment with software, and increase the service form of cloud computing, but the service of cloud computing is paid. Figure 1 shows the cloud computing network service structure.

![Cloud computing network service structure](image)

Figure 1. Cloud computing network service structure

3. Key technologies for cloud computing
3.1. Identity authentication
Identity authentication can provide security for network storage by virtue of its gate defense function. In general, it mainly relies on several technologies [3], (1) Password check. It means that the user must enter the password when applying the network, and only after the password verification passes, can the user judge whether the user has access rights. (2) Smart IC card. It refers to the transmission of user information into the smart card, and then the user can read the information in the card when the user is authenticated, and then judge the identity of the user. (3) Kerberos. By means of key k, the user's personal password is stored and authorized by the server. At the same time, the user can only apply the network through identity authentication.

3.2. Data encryption
The core of data encryption is to present plaintext in the form of cipher-text. During this period, both the key and the corresponding algorithm should be applied, and the data decryption is opposite to the
encryption process. That is, the converted cipher-text is re-transformed into plaintext before encryption. At present, there are two kinds of methods used in data encryption: symmetric algorithm and asymmetric algorithm. The former requires both the data sender and the data receiver to have access rights.

3.3. Data backup
In order to realize the normal use of data and to prevent the problem of data loss, data backup technology should be introduced to deal with it. At the same time, in order to expand the data storage space, snapshot technology can be introduced, and this technology can be applied to a variety of physical devices, but also to ensure the security of data storage.

4. The role of network information innovation in cloud computing technology
At present, in the face of increasingly severe network information security challenges, strengthening the application of information security technology under the background of cloud computing will produce extremely important value for network technology in the future. First of all, with the advantage of network information security technology, it can ensure the security of cloud computing platform, improve the security degree of user information, and maintain the safe and orderly operation of cloud computing platform to meet the needs of users' daily data information interaction, storage, processing and so on. Secondly, through the application of network information security technology, we can meet the application needs of users more comprehensively, so as to realize the expansion of deeper business, and protect and monitor the corresponding information data operations [4]. Avoid the possibility of data loss and damage, promote the quality of service. Finally, network information security technology can enhance the flexibility of services, simplify the operation process of users, make cloud computing platform always run in a secure network environment, and improve the efficiency of service supervision and control.

4.1. Building security linkage model
Based on the analysis of cloud computing level, the construction of security linkage model is mainly realized by combining the firewall resistance technology and illegal intrusion detection technology of the intranet, which can effectively improve the ability of the network to resist external interference and its own defense function [5]. In the process of designing the security linkage model, the corresponding model is constructed by combining various technologies according to the ability of cloud computing to process data. The model structure diagram is shown in figure 2.

![Figure 2. Information security linkage model of cloud computing network](image)

4.2. Design security linkage protocol
Based on the security linkage model constructed above, the following design reasonable security
linkage protocol combined with the functions provided by the model runtime. First, the open linkage interface is used to provide security protection for the network [6]. Once it is found that the information transmitted in the network contains abnormal signals or signs of illegal intrusion in the entry port, and the linkage interface through the external network is immediately turned into open, and the linkage verification platform is effectively associated with the external defense mechanism and the security information database. According to the requirements of the network information transmission standard protocol and the function of cloud computing analysis data, the MIB database is used to standardize the dynamic model.

4.3. Linkage information mapping method
In order to match the data IP address of a specific security event and adapt to the application rules of the linkage protocol, it is necessary to establish a certain connection between the key information in the network and the external network.

5. Research on improving information security strategy in cloud computing environment

5.1. Strengthening information security technology input
In the context of cloud computing, the enhancement of information security is based on information security technology. Therefore, it is necessary to pay more attention to information security, increase the research and development of security protection system, agent service, applications degree and so on, constantly adjust and optimize the operating system of computer, and enhance the defense function of computer system itself and the sensitivity to external interference. The computer system can automatically identify strange information, check it, and use anti-virus software and other defensive means to clear strange information if necessary, so as to prevent the invasion of foreign information in time and effectively and ensure the security of computer system.

5.2. Innovative information security technologies
In the cloud computing environment, there are many factors affecting information security, which need to optimize the computer system, minimize the security risks caused by the system itself, and analyze the potential security risks in the external environment. Find the corresponding prevention and solution. In general, information security protection technology mainly includes encryption technology, intelligent firewall technology and anti-virus technology. However, the complexity of the Internet environment makes a variety of malicious programs and viruses continue to breed, its means of invasion of computer systems are also constantly changing, so it is necessary to use new defense means to appear security risks. Some studies have found that the attack means at this stage have developed in many directions, such as denial of service, Trojan horse and so on. These means are all comprehensive and need to be solved by more perfect and advanced information security technology. Therefore, it is very important to study information security technology and develop more efficient and practical defense means to deal with diversified information risks.

5.3. Enhance users' awareness of prevention
With the enhancement of users' awareness of prevention, users can protect the corresponding information resources to a certain extent from their own point of view. For example, the real name authentication of user identity can be used only under the condition of user identity confirmation can the system be accessed, so that the information security coefficient can be further enhanced. At the
same time, relevant departments should also strengthen the supervision of information network dissemination and take necessary means to monitor and check network data in real time, so as to effectively prevent the spread and spread of bad information. And can timely discover the malicious information program in the network information, give timely clearance.

6. Innovation trend of cloud computing technology in network information security technology

6.1. Integration of artificial intelligence into network information security
Because of the successful application of cloud computing, the demand for data processing is explosive, so it is urgent to improve the computing, processing and storage capacity of data. Therefore, after many ups and downs, artificial intelligence technology has once again become the focus of technology. With the advantage of deep learning algorithm of artificial intelligence technology, it can help cloud computing platform to establish active security protection, active defense and strategy configuration. Thus, the application of network information security technology is more scientific, more targeted, and the future development of artificial intelligence.

6.2. The idea of network security protection is changing
With the development of network information age, adaptive security concept is widely respected, its core is to carry out continuous analysis of malicious events, user behavior, timely monitoring of malicious behavior in the network system, and to adjust and repair the existing vulnerabilities and security policies, so as to make a complete investigation and evidence collection of events. At the same time, this comprehensive network information security monitoring method can also rely on the security assessment of users to achieve magical prediction function, thus evolving from the adaptive security framework, which mainly covers adaptive defense ability, detection ability, backtracking ability and prediction ability.

6.3. Innovative technology-driven security capability
The development of network information technology under the change of the times will have a powerful role in promoting cloud computing and radiate vitality under the drive of technology. From the point of view of network information security technology, cloud computing can not only realize the sharing and storage of data in different places, but also realize the deployment of security defense technology on the cloud, so that cloud security has the characteristics of changing and changing, so that cloud computing platform security protection ability can be improved, and network information security is more flexible. In addition, with the help of artificial intelligence and other technologies, the mass data processing quality of cloud computing is improved, and the rules are explored from structured, unstructured, semi-structured data, so that the data analysis of cloud computing is constantly in-depth and accurate.

6.4. Evolution of network information security management concept
At the 2018 RSA Conference, the future trend prediction of network security has become a hot topic, especially in the field of cloud computing security, and emphasizes that the focus of security protection will shift to detection and prevention. And digital ecosystems will also drive the next generation of security. In the concept of network information security management, it will change from traditional passive protection to active detection, and timely predict, discover and deal with the normal network attack, so that the network attack can be prevented, controlled and dealt with, and its
harmfulness can be minimized. Moreover, in the efficiency of network information security protection, we should give full play to the adaptive security protection framework, so as to promote the development of automation security in cloud computing platform, so that the applicable protection becomes a reality.

7. Conclusion
In a word, the development of the times will promote the innovation of information technology, and the network information security is still facing a severe situation under the cloud environment. Therefore, in the network information security technology level, we should deeply analyze the related factors that endanger the network information security, take targeted protective measures to ensure the network information security, and ensure the network information security under the cloud computing environment.

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