Information Security Problems and Solutions in Cloud Era

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Abstract. Era of cloud computing, data and personal information into gold on the "cloud" has great value, at present for the cloud of the era of corporate and personal data leakage, network attacks and other security events are occurring, this article mainly discusses the cloud age how to ensure the security of enterprise and personal data, the information security how from passive defense to conduct surveillance and response, etc are analyzed and explored.

Keywords: Cloud Era, Information Security, Security Measures

1. Introduction to Cloud Computing

1.1. Concept
Cloud computing is a kind of distributed computing technology, which is an Internet-based computing method. It automatically divides the huge data calculation into countless smaller subroutines, and then sends the results back to the user after the huge system composed of multiple servers searches, calculates and analyzes. In a broad sense, cloud computing is a highly integrated technology. Network carrier and virtualization technology are the foundation of cloud computing, providing services through the construction of the basic platform.

Fig1. Cloud computing
1.2 Characteristics

1) Large-scale
   Super-large scale is the advantage of cloud computing, cloud computing services can provide users with unprecedented computing power; by consolidating and managing these huge clusters of computers, cloud computing centers can empower users with unprecedented computing and storage power [1].

2) Universality
   The same "cloud" is not specific to specific applications, it can support different applications at the same time and construct a variety of applications. Abstraction Cloud computing has good terminal support. Users can obtain the application services provided by cloud computing at any location and using various computers.

3) Abstraction
   We can achieve the operations we need only through the network, even including supercomputing tasks [2].

4) High scalability
   The scale of "cloud" can be dynamically scaled and adjusted to meet the growing needs of applications and users [3].

5) High reliability
   Cloud computing requires high reliability. At the hardware and software level, measures such as fault tolerance of multiple copies of data, heartbeat detection and interchangeability of computing nodes are adopted to ensure high reliability of services. At the facility level, redundancy design is also adopted in energy, refrigeration and network connection to further ensure reliability of services [4].

6) Perfect operation and maintenance mechanism
   On the "cloud" side, there are specialized data centers that manage information and store data for users.

2. Information Security in the Cloud Era

While cloud computing technology has greatly promoted the development of computer technology, the multi-tenancy, distribution, and dependence on network and service providers of cloud computing have created new challenges for security issues. Cloud computing security risks mainly include:

1) Virtualization security issues
   For the security of virtualization, the virtual machine is built on the physical machine, so to ensure the security of the virtual machine, the first thing is to ensure the security of the physical machine; When the physical machine is destroyed, the virtual machine built on the physical machine may be destroyed; If the network system on the physical machine is destroyed, the communication between the physical machine and the virtual machine will not be able to be realized, and the virtual machine will be damaged [5].

2) Security problem of data concentration
   The user's data storage, processing, network transmission and so on are related to the cloud computing system. Data in the process of transmission, vulnerable to hacker or virus attacks, resulting in the loss of users. In the process of data storage, the virtuality and distribution of cloud computing also make the data face the risk of multi-user access rights, backup, data service blocking, destruction and so on.

3) Cloud platform availability issues
   Users' data and business applications are in the problem system of cloud platform under attack, and their business processes are challenged to rely on cloud platform service continuity, SLA and IT processes, security policies, event processing and analysis, etc. In addition, when a system failure occurs, the rapid recovery of user data also becomes an important issue.

4) User rights management
In the context of cloud computing, user rights management is also a key issue. Under normal circumstances, legitimate users browse, download, update and other operations on the data through audit, and their operations on the data are different with different permissions. But in the abnormal situation, hackers attack the computer system to obtain higher user rights, which poses a great threat to the security of data and information.

3. Conclusions Solutions to the Information Security Problems in the Cloud Age

In view of the above problems, managers should take corresponding measures to analyze and solve security problems, so as to ensure information security in the cloud era.

1) Virtualization Security Issues

First of all, we need to ensure the security of the physical host. The deployment of the device needs to take into account the high reliability of support, such as dual-machine hot standby, configuration synchronization, link bundling and hardware Bypass, to achieve basic security protection in the case of high traffic convergence [6]. At the same time, the technology for virtualization includes virtual machine (VM) technology, Hypervisor and other management modules, these new attack layers, can use the virtual image file encryption storage and integrity check, VM isolation and reinforcement, VM access control, virtualization vulnerability check, VM process monitoring, VM security migration and other methods.

2) Security problem of data concentration

We can verify the user's identity through the logical isolation of user data virtualization, login with identity authentication and access control management, so as to ensure the integrity and availability of data. Through data authentication technology, the identity of both parties is verified, so as to ensure the authenticity and non repudiation of data [7]. Through these means, we can solve the security problem of data set.

3) Cloud platform availability issues

The application of cloud computing is mainly realized through Web browser. Therefore, in cloud computing, for application security, it is especially important to pay attention to the security of Web application. To ensure the application security of SaaS, it is necessary to formulate and follow the safety development life cycle specification and process suitable for SaaS mode at the beginning of the application design and development, and consider the application security from the overall life cycle [8]. The protective measures that can be adopted include access control, configuration reinforcement, application layer firewall deployment, etc.

4) User rights management

For the problem of user rights management, we can avoid system vulnerabilities and prevent hackers' illegal intrusion by means of multiple verification. For example, by setting corresponding security measures, real-time monitoring of users' permissions can be carried out [9-10]. For the addition, deletion and modification of sensitive data, multiple authentication is needed to prevent illegal visitors from stealing and destroying information data and ensure data security.

To sum up, the cloud era of information security is important to cloud computing and big data technology, technical personnel to strengthen information security analysis, and take corresponding measures, also can make use of advanced artificial intelligence technology to security analysis and processing, security problem by passive defense to active monitoring and treatment.

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