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Solution of the security of company intranet

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ABSTRACT

These years, with the rapid development of Internet and its wide application, the process of information has been accelerated. Due to the universal access to Internet technology and its deep development, the security of company Intranet has received more and more attention. This essay analyzes the potential security risks that the company Intranet may have (such as, vulnerable host machine or sensitive data which could be leaked) and proposes a series of effective solutions of the security of company Intranet. The main security strategies in the solutions include the control of access right, the encipherment protection for communication data, the security screening procedure, the virus defense method, and the oracle secure backup and management, which have been testified by evidence and examples. It is clear that these security measures can effectively protect the integration, security and controllability of Internet data, which can well solve the security problem of company Intranet. Finally, based on the security risk assessment of Dalian Ouke Internet Company, the essay offers a detailed design for its Intranet and solves its security problem completely, which effectively protects the company's data, promotes its competence, reduces its cost on the security of company Intranet and highly increases its competitive ability in the industry.

KEYWORDS

Security problem of company Intranet; Security risk assessment; Solution of security problems; Security and reliability.

INTRODUCTION

Along with the rapid development of Internet and its universal access, the Internet security management has experienced a tremendous change, which has become an inevitable security protection method for the Internet security. More and more people begin to choose the network management system as network security measures. However, due to China's vast territory and its large population, the distribution of computers and network resources are unbalanced. The network security management is a kind of comprehensive technique, which requires the research results from the information security, network management, distributed computing and artificial intelligence to support it. The concept of cloud computing first appeared in 2007, and the effective computing power and infinite storage capacity is the largest advantage of cloud computing. VPN, anti-virus software, intrusion detection/defense devices, firewall and various network devices are a heavy fiscal burden for small or medium companies. This essay conducts research on the advantages and feasibility of application of cloud computing in network security management system. On the basis of comprehensive evidence, to apply the cloud computing into network security management system can reduce its downsides by the effective computing power and infinite storage capacity of cloud computing[1]. Through practical tests, the network security management system integrated by cloud computing can make great progress on the improvement of network security, the sharing of educational resources and the reduction of management cost, and can also benefit the large-scale promotion of network security techniques. This essay analyzes the potential security risks that the company Intranet may have (such as, vulnerable host machine or sensitive data which could be leaked) and proposes a series of effective solutions of the security of company Intranet.

THE STATUS QUO OF NETWORK SECURITY OF MIDDLE AND SMALL-SIZED COMPANIES

Like large companies, middle and small-sized companies widely use the information techniques, especially network techniques, to increase their competence[2]. Nowadays, China's network speed is unsatisfactory. Because the network and servers cannot bear the centralized access, schools applied network security management system usually establish several redirection servers of learning center, most of which adopt the B/S mode, and its entire structure is shown in Figure 1. the central server of learning center is established in the main campus and servers of teaching resources are established by other learning centers. All background servers store learning resources, including document resources and video resources, which are freely usable to users. So far, as for the effectiveness of the application of the system, this operational mode has two apparent shortages[3]: (1) learning resources in educational system is substantial, but China's recent network speed is inadequate to transit a large amount of data. Therefore, some resources on servers of the platform cannot be synchronous with other servers because of network transmission, which leads to imperfect learning resources on the servers, or no latest information. Learners often can gain the latest knowledge in time; (2) this composite mode requires students to register many times, because the accounts of different servers are not sharable, which means the account on this server cannot learn and download the resources on other servers. Students have to re-register an account when they change their servers, which is highly inconvenient. This essay proposes a new education platform which makes a full use of cloud computing advantages. Resources on each central server are all stored in the "cloud", and the distance education platform offers the auto scan function and smart selection of the optimal path for data transmission. Servers can be the backup for each other, and can shift from each other. So if one serve breaks down, the platform system can shift to the other nearest server automatically, and users cannot detect this process. This design allow student not to register many times when they use different servers. They can register only once in the platform and they can use all resources on all servers, to achieve in sharing learning resources in the largest degree; at the same time, the reliability of the entire platform system has been greatly increased. The system uses the design of modularization with a clear and brief logical structure[4]. Because the integration of cloud computing greatly improves the capacity of servers in the system, and can automatically adjust system methods and interfaces according to students' actual conditions, which has a high flexibility and practicability. According to methods above, we conducted the risk assessment of these five factors in a local area network. It is shown in the TABLE 1.

TABLE 1 : Risk assessment

Expert	Natural factors	Physical damages	System disable	Backup data lost	Information leakage
W1=0.3	0.1	0.1	0.3	0.7	0.7
W2=0.15	0.1	0.2	0.3	0.7	0.6
W3=0.2	0.1	0.2	0.2	0.6	0.6
W4=0.2	0.1	0.1	0.6	0.7	0.7
W5=0.15	0.2	0.1	0.7	0.7	0.7
$F = \sum WC$	0.1	0.135	0.3	0.491	0.476
P= Frequency (average per year)	2	8	14	1	5
The magnitude of risk	0.2	1.080	0.42	0.42	2.38

NETWORK SECURITY ANALYSIS OF MIDDLE-SIZED AND SMALL COMPANIES

In order to be competitive and to increase production efficiency, the middle-sized and small companies should effectively respond to the market needs. As is mentioned above, there are three levels according to the features of services offered by cloud computing[5]. The lowest level offers the most basic hardware support, such as central processing unit (CPU), memory bank and hardpan, all of which are called “infrastructure hardware”.

Because the design of the configuration module is extracted from the operational module, the processing requirements is similar to the operational module and would not change the service state; the last level is the requirement of educational resources, which would change the operational service state. For example, when an user submit a requirement of learning video, the working process management module will be activated and the platform will distribute system resources to maintain the life cycle of this learning video. The usage of workflow engine and rule engine can smoothly deal with various requirements and arrange the better application services to support them for scheduling resources.

By using the background server and database management system to manage data automatically, schools give up the labor management; the maintenance and update of the entire system are completed by the professional service providers. Learning does not need self-maintenance and self-management; the application of cloud computing depends on the Internet. The submission of all students’ requirements and the data transmission are achieved by the Internet, so the security of data in the transmission is hard to be guaranteed. The security demand of distance education platform is lower than that of commercial system, especially that of financial system, but confidential data, such as personal information of teachers’ and students’, examination questions, especially answers of examination papers and teaching document, cannot make public at random[6]. All this requires the design of new distance education platform should ensure the security of all these sensitive data.

The first type is the isolation of database, the independence among users’ databases, with one account correspondent to one database. This kind of isolation is the most thorough and has the highest data security, but its only shortage is its high capital investment. The second type is the isolation of data mode and the sharing of database, which means the entire education platform uses only one database and each account has an independent mode; each users has the abstract isolation of logic data, but not the actual physical isolation. One database can support several users, which can greatly reduce the cost of the system. Because the abstract isolation and logic relation are relatively complex, the difficulty of management is higher. The third type is the sharing of the data mode and database, and the entire education platform only has one database. Therefore, the number of developer’s code in the aspect of security and reliability would increase greatly, and data on the platform is vulnerable to lose. After taking the cost and security of the system comprehensively, this essay adopts the second type for the isolation, which has lower cost and satisfactory security, and meets China’s demands towards distance education. During the development of the system, users’ data is separated from the system. After the operation of the system platform, if users’ data can stay synchronous and update synchronously with data storage position, which means new data are stored in new position, the private data will be protected. When the system is under creation and runs database, the system will encrypt the database in the regular encryption way. Sometimes, it will conduct slight alternatives on the original system function to update the storage position in the running system, which means to download the resources on the previous servers to one’s mobile hard disk. The users have the right to transfer all document to any database as their wishes[7]. After the data transmission, the original database server loses the access right to private data. It is essential to establish a perfect anti-virus system between the host machine and the servers. The configuration of devices is shown in the Figure 1.

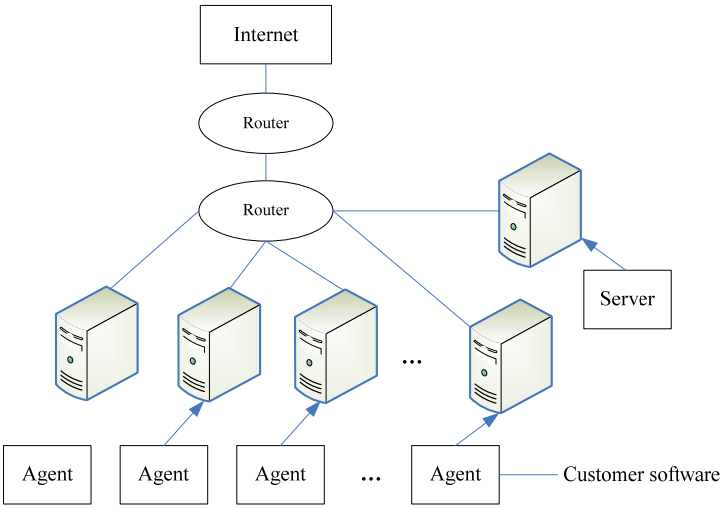

Figure 1 : Anti-virus system structure (server editon)

The data security requirements are based on the distance education platform on the basis of cloud computing. By using the background server and database management system to manage data automatically, schools give up the labor

management; the maintenance and update of the entire system are completed by the professional service providers. Learning does not need self-maintenance and self-management; the application of cloud computing depends on the Internet. The submission of all students' requirements and the data transmission are achieved by the Internet, so the security of data in the transmission is hard to be guaranteed. The security demand of distance education platform is lower than that of commercial system, especially that of financial system, but confidential data, such as personal information of teachers' and students', examination questions, especially answers of examination papers and teaching document, cannot make public at random. All this requires the design of new distance education platform should ensure the security of all these sensitive data.

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Most only encrypt the system user identities, while the system data information is not encrypted, taking into account the fact that the database management system has its own set of data security access mechanism. Because the database management right of distance education system is in the hands of system operators, it is necessary for certain private data to be encrypted, to avoid illegal theft and exposure. This essay proposes a new cloud storage and application to protect the security of data. The device configuration is shown in Figure 2.

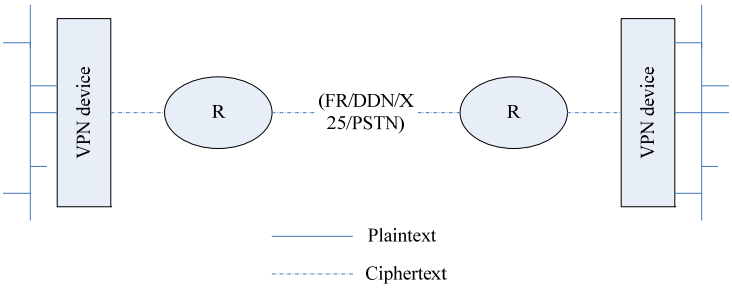

Figure 2 : Schematic diagram of VPN device configuration

NETWORK SECURITY SOLUTIONS

Network security system is usually made up of firewalls, intrusion detection software (IDS), intrusion prevention software (IPS), vulnerability scanning, security auditing, anti-virus software and flow monitor software. Nowadays, China's network speed is unsatisfactory. Because the network and servers cannot bear the centralized access, schools applied network security management system usually establish several redirection servers of learning center, most of which adopt the B/S mode, and its entire structure is shown in Figure 1. The central server of learning center is established in the main campus and servers of teaching resources are established by other learning centers. All background servers store learning resources, including document resources and video resources, which are freely usable to users. So far, as for the effectiveness of the application of the system, this operational mode has two apparent shortages: (1) learning resources in educational system is substantial, but China's recent network speed is inadequate to transit a large amount of data. Therefore, some resources on servers of the platform cannot be synchronous with other servers because of network transmission, which leads to imperfect learning resources on the servers, or no latest information. Learners often can gain the latest knowledge in time; (2) this composite mode requires students to register many times, because the accounts of different servers are not sharable, which means the account on this server cannot learn and download the resources on other servers. Students have to re-register an account when they change their servers, which is highly inconvenient. This essay proposes a new education platform which makes a full use of cloud computing advantages. Resources on each central server are all stored in the "cloud", and the distance education platform offers the auto scan function and smart selection of the optimal path for data transmission. Servers can be the backup for each other, and can shift from each other. So if one serve breaks down, the platform system can shift to the other nearest server automatically, and users cannot detect this process. This design allow student not to register many times when they use different servers. They can register only once in the platform and they can use all resources on all servers, to achieve in sharing learning resources in the largest degree; at the same time, the reliability of the entire platform system has been greatly increased. The system uses the design of modularization with a clear and brief logical structure.

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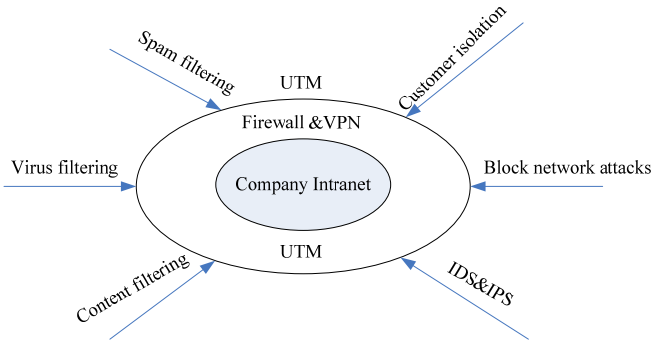

Figure 3 : Schematic diagram of network security system for SMEs

This essay adopts the three-dimensional and multi-layered security architecture. Combining with the network characteristics of SMEs, we use the UTM overall security network architecture plan. As is shown in the Figure 3, the entire structure of the distance education platform in this design contains base layer, service layer and application layer, with 5 modules, including data processing, monitoring, processing, decision-making and basic module. The database in the base layer of the platform system needs hardware, software, virtual and other technologies to ensure the reliability and stability of the underlying repository. The base layer offers infrastructural support for the server and application layer, for example to provide computer processing power and storage capabilities. It can be said that the base layer is like the energy library of the platform. Because the system processing module is on the application layer, the core of the platform is the application layer. The processing module can be classified as sub modules like Consolidated supervision, assign permissions, business processes, the system automatically register and document processing, information collection and search module. The application layer mainly provides interactive interfaces for students and other programs. The service layer provides various services of the platform system, including File transfer services and data query service. The detailed network architecture diagram is shown in Figure 4.

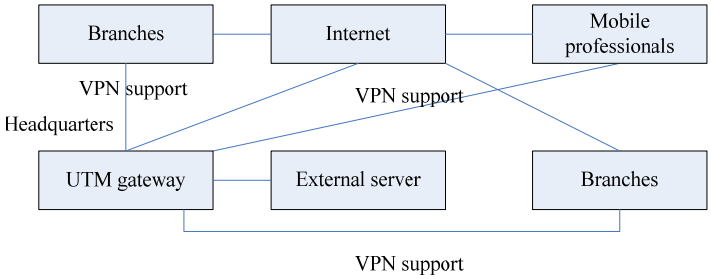

Figure 4 : Network security architecture based on UTM

CONCLUSION

This essay analyzes the potential security risks that the company Intranet may have (such as, vulnerable host machine or sensitive data which could be leaked) and proposes a series of effective solutions of the security of company Intranet. The main security strategies in the solutions include the control of access right, the encipherment protection for communication data, the security screening procedure, the virus defense method, and the oracle secure backup and management, which have been testified by evidence and examples. It is clear that these security measures can effectively protect the integration, security and controllability of Internet data, which can well solve the security problem of company Intranet. Finally, based on the security risk assessment of Dalian Ouke Internet Company, the essay offers a detailed design for its Intranet and solves its security problem completely, which effectively protects the company's data and promotes its competence.

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