Research on Network Security of Campus Network

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Abstract: Nowadays, network security incidents often occur, such as network worms, denial of service attacks, network fraud and so on. Nowadays, the methods of network security incidents are constantly innovating, resulting in data leakage, destruction and other incidents. Campus network is the basis of daily teaching, scientific research and normal operation of schools. It is of great significance to strengthen the construction of campus network security. Based on this, this paper studies the campus network security.

1. Introduction
With the rapid development of network nowadays, the security of campus network has been paid more and more attention by us. Although our network security technology means are mature now, for the campus network, which is a special network carrier, there are many problems in its management because of the large number of users and the wide coverage of the network. Study and solve.

2. Campus Network Security
According to the scale of the usual campus network design, we can see the campus network topology in Figure 1, which is divided into two parts: server and user. The Internet accessed from outside the campus will pass through the campus firewall, then through the core switch, through the access layer switch, and then connect to the various terminals of the school for use.
3. Current Problems of Campus Network Security

In many universities nowadays, the scale of campus network is very large. How to ensure the normal and safe operation of campus network is an urgent problem for colleges and universities. There are mainly the following problems:

3.1 Computer Virus Invasion

Computer virus is the main threat to the network security of campus network. It can spread through various forms. The harm of computer virus is also enormous. It will affect the transmission of campus network, paralyse the operation of campus network and so on. In many cases, a computer in the
campus network will be infected by virus and other computers in the network will also be infected with virus.

### 3.2 DoS, DDoS attack
Campus network is connected with the external Internet. While using the Internet conveniently, it is very vulnerable to hackers'attacks. DoS and DDoS are used to attack the campus network and servers, which makes the traffic in the campus network increase sharply. This will make the campus network and services not be used normally and eventually lead to the collapse of the entire campus network[1].

### 3.3 Spyware
Some malicious attacks can make use of the "fool-like" spy attack software flooded on the network. Illegal users can carry out unscrupulous attacks on the campus network without any computer technology. This has caused a huge impact on the security of the campus network.

### 3.4 Phishing
Many illegal people set up some counterfeit websites on the network to deceive users and maliciously extract bank accounts and passwords, which will cause irreparable losses to teachers and students of schools. These phishing websites are often set up very similar to regular websites, making it difficult for people to identify them.

### 3.5 Junk mail
Some people on the network, through mass spam, to defraud school teachers and students of clicks, on the one hand, will make teachers and students use computers infected with related viruses, on the other hand, also defraud teachers and students of personal information, and then use these personal information illegally[2].

### 3.6 Broadband abuse
BT, Xunlei and other download software are widely used in the campus network, which occupies the bandwidth resources of the campus network, making the network run slowly and other teachers and students can not use it normally. While users download network resources by downloading software, there are also hidden dangers of introducing external network virus into campus network, which has a great impact on the safe operation of campus network[3].

### 4. Preventive Measures for Network Security of Campus Network

#### 4.1 Reasonable Configuration of Firewall
Based on the research of firewall technology and existing conditions, this paper designs an improved scheme of campus network firewall system, as shown in Figure 3.
(1) According to the situation that the firewall of the campus network may have single-point function, using the design of the dual-computer cluster firewall, its principle is that if the main firewall is ineffective due to the failure, then the backup firewall can be timely repaired and undertake the corresponding work. The two firewalls can easily replace the work, which guarantees the uninterrupted network security protection of the campus network\cite{4}.

(2) In the internal network server, according to the lack of security capability, the server host firewall is set up. Its main responsibility is to refuse unauthorized access. Server host firewall can not be felt by users. It realizes precise access control, guarantees the security of the server and fully escorts the campus internal network server.

(3) According to the different situations of internal users, different VLANs are set up to effectively control unauthorized access of authorized users.

Figure 3 - Topology of Campus Network Firewall Improvement Scheme
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Figure 4 - Campus Network Backbone Network Protection Solution

This is a kind of solution for the backbone network protection of campus network. It mainly includes:
- Remote access: SSL scheme completes remote security access of campus network.
- In-process control: firewalls and IPS find attacks in parallel.
- Post-audit: SecCenter records and outputs reports.

4.2 Intrusion Detection System
We actively introduce Intrusion Detection System (IDS) in the network security of campus network. Its main functions are two aspects. The first is to detect the behavior of unauthorized users and intrusive systems, and the second is to detect the illegal operation of system resources by authorized objects. Intrusion detection is an active means of security protection technology. It can do a good job of accurate protection for internal and external attacks or misoperation. When the network security of campus network is infringed, it can real-time monitor and make corresponding prompts to fully guarantee the network security of campus network.

4.3 Encryption of core data
Network security incidents often occur in campus network, such as obtaining, attacking and tampering with various kinds of information, such as examination results, examination papers, school card funds information and so on. Faced with this situation, we can adopt the means of data encryption, which usually means to change the way information is expressed, and its purpose is to protect the real information. This will make it impossible for unauthorized users to access protected information, we

There are always criminals trying to get information that he should not get through various means. There are many similar information in the campus network, such as the result information of the educational administration network, the examination information of the educational administration, the
examination papers, and even the fund information of the meal card campus card. Public-key and private-key cryptosystems are widely used, that is, private-key cryptosystems for encryption and decryption. Many new technologies have been applied to information encryption. These new technologies will provide the strongest backing force for information security. Figure 4 is the schematic diagram of Guiyang University campus network security solution.

Figure 4 - Guiyang University Campus Network Security Solution

5. Summary
In the network environment of campus network, it is very vulnerable to external attacks, and the means and technology of network destroyers are constantly changing. The network security scheme of campus network designed by us is not unchangeable. On the one hand, we should make some scientific and reasonable adjustments according to the actual situation, on the other hand, we should adapt to the changes of the external environment. When adjusting our campus network security design, only in this way can we ensure the safety and reliability of the campus network.

Reference
[1] Kong Linghao. Brief discussion on the analysis and Countermeasures of campus network security [J]. Network security technology and application, 2018 (05): 56-57.
[2] Li Xiufeng. Research and analysis of network security mechanism in campus network construction [J]. Network security technology and application, 2017 (10): 93-94.
[3] Meng Jingxin. Campus Network Planning and Design [J]. Information and Computer (Theoretical Edition), 2017 (06): 171-173.
[4] He Shuyi. Application of Network Security Technology in Campus Network [J]. Communication World, 2017 (02): 72-73.