

Research on the Construction of Computer Network Security System in Middle School Campus Network

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Abstract: In order to improve the security of high school campus networks, this paper introduces the goal, system composition, and function of the network security of high school campus networks, and puts forward a series of strategies, including the establishment of network security protection system, data backup and recovery mechanism, and strengthening network security management and training. Through these strategies, the safety and stable operation of the campus network can be ensured, the quality of education can be improved, and school's development can be promoted.

Keywords: Network security; Physical security; Software security

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1. Introduction

The requirements for network security have been increasing with the continuous development of computer technology. Various factors need to be considered in the process of building a high school campus network, such as the scale of the school network, the level of school development, and the impact on students and teachers^[1-4]. In the process of campus network construction in middle schools, it is necessary to focus on the overall planning of the campus network, and the specific needs and functions of the network system. Besides, factors like security awareness, security system, network environment, and network management should also be considered. Moreover, it is also necessary to pay attention to the cultivation of information protection awareness and fully consider the needs of students and teachers as well as the campus network environment^[5]. In addition, it is necessary to formulate corresponding security measures and management systems according to relevant regulations and standards and improve the security of the school network system. The information security of students and teachers and the stability of the network environment can only be ensured with a proper network security system.

2. Construction of computer network security system for middle school campus network

2.1. Purpose of constructing a network safety system

The goal of constructing a campus network security system is to ensure the safe and stable operation of the campus network^[6-8], which includes the following aspects: preventing unauthorized access and attacks, ensuring network security and stability, preventing viruses and dissemination of malware, safeguarding important data.

2.2. System framework

The computer network security system of the high school campus network consists of four parts, specifically the security management platform + security operation and maintenance platform, organization chart, security management, and technical support (**Figure 1**).



Figure 1. Composition of the computer network security system of the middle school campus network

2.3. System functions

2.3.1. Intrusion Detection System

The Intrusion Detection System (IDS) is an important part of network security management. With an IDS,

malicious activities can be detected in time, thereby reducing the risk of computer damage. Besides, security risks in the network can also be found and eliminated through an intrusion detection technology. IDS is divided into artificial, automatic, and intelligent. Manual intrusion detection refers to carrying out intrusion detection through a computer system and to check the loopholes and hidden dangers in the information management of computer systems; automated intrusion detection refers to the use of automatic control technology in computer systems for intrusion detection. In order to better apply automatic intrusion detection technology, it is necessary to use artificial intelligence for effective detection, analysis, and control.

2.3.2. System defense

System defense is used to block attacks by preventing access to the computer information systems. Therefore, the application of defense technologies must be strengthened to protect the normal operation of computer information systems. To improve the defense system, the IDS needs to be improved. Analyzing and researching network attacks is a very important prevent and defend against information system security problems. There are a few methods that are used to attack networks: computer worms, remote code execution, and URL encoding. These methods of attacks are usually executed on software. Therefore, it is necessary to strengthen the management of these attack methods and monitor them in real time to ensure the normal operation of the network information system^[9]; secondly, network functions of the computer information system should be important. Only by improving the level of network security management and ensuring the normal operation of the network information system can the security of the computer information system be ensured. Besides, it is necessary to further improve the system functions to enhance the quality of the defense system.

2.3.3. Antivirus detection and management

The management of computer viruses is crucial because computer viruses are concealed to a certain degree, so it is necessary to detect viruses in time when monitoring computer viruses. At present, domestic computer viruses are mainly divided into four categories: Web viruses, e-mail viruses, Trojan horse, and other forms of worms. To deal with these four viruses, a virus control software can be installed in the infected computer. This software should detect the virus in time and eliminate it. The computer systems should be monitored and inspected regularly for such viruses. If a virus is found, the website should not just be deleted, but it is necessary to clean up the system after understanding the characteristics of the virus. The protection technologies used for these four types of viruses are different. Because computer viruses spread easily, it is necessary to adopt special management software and technology to prevent and restrict computer viruses in a timely manner. Besides, it is also necessary to update the software and related rules in time to effectively prevent the spread of viruses^[10].

2.3.4. Network monitoring

Network monitoring mainly refers to the maintenance and detection of computers to ensure network security. However, the monitored object is not limited to the computer itself, but also involves other equipment. Therefore, network monitoring technology requires the integration of information equipment and data and network management. Taking the monitoring of information equipment as an example, the following methods can be used. First, the respective environments and operating conditions of network equipment and computers is analyzed to understand the network operation status. The analysis software can intuitively reflect whether the information equipment in the entire network environment is normal by recording the start-up time and operating status of each network device. If there is an abnormal device or the system needs to be adjusted, it needs to be monitored in real time through network monitoring

technology, and the fault should be dealt with in time. Secondly, use the automatic control system to intelligently monitor the network system, which can effectively ensure the safe operation of the computer system and record network operation data and status. Lastly, network data security inspections and security assessments should be conducted regularly to ensure the scientificity, rationality, and effectiveness of the risk control and monitoring methods.

3. Security policy of campus network system

In the process of campus network construction, it is necessary to formulate corresponding security policies, including physical security, information security, system security, data security, etc. It is also necessary to plan the campus network system so as to optimize the entire campus network system. When formulating a network system security plan, it is necessary to consider all aspects of the campus network system and formulate corresponding protection measures. Besides, it is necessary to focus on the security of information, so as to ensure the smooth operation of the network system. At the same time, it is also necessary to pay attention to the maintenance of the campus network system, especially the maintenance of the operating system and software. Only in this way can the computer network system be more stable and secure.

3.1. Physical security

During the construction of the campus network, the physical security of the campus network system needs to be considered, and certain principles must be followed throughout the construction process. The campus network system mainly consists of computer systems, switches, routers and other equipment. When designing a computer, it is necessary to ensure that these devices can operate normally and can be monitored and maintained at any time to avoid problems. When in use, two aspects of the network system need to be considered, which is the hardware and software. The hardware aspect mainly includes the computer room, the facilities in the computer room, and the placement of equipment. Through reasonable planning and design of these factors, the stability of the entire campus network system can be ensured. When planning the installation of hardware, it is necessary to ensure that the devices can work in coordination with each other. Only in this way can the safe and stable operation of the entire campus network system be ensured. The software mainly includes virus removal, data backup, and access control. Through the reasonable planning and design of software, the destructive effect of various viruses on computer network systems can be reduced. In addition, it is necessary to maintain, manage, and improve the quality of the computer network environment by controlling the temperature, humidity, and lighting in the computer room. Only in this way can the entire computer room and the computer network environment be more secure and stable.

3.2. Software security

In the process of building a high school campus network, software security is a very important aspect. When designing software security, it is necessary to fully consider its security and integrity. First of all, it is necessary to use data encryption to better protect the users' data; secondly, it is necessary to strengthen the authentication technology so that users can log in to the software through effective identity authentication methods. In addition, there is a need to strengthen the use of ports in terms of network connection and access. Effective use of ports can effectively prevent hackers and viruses from damaging the system. When designing system software, it is necessary to determine the corresponding security strategy based on specific requirements. In terms of network connection and access, it is necessary to make full use of software security mechanisms to ensure that both connection and access are safe and reliable.

3.3. Network security preventive measures

In the process of campus network construction in middle schools, it is necessary to focus on preventive measures and continuously improve the network security management system. By formulating a sound network security management system, the normal operation of the computer network security system can be ensured. Besides, it is necessary to continuously upgrade the software of the to ensure network security. In addition, during the construction of the campus network, it is necessary to strengthen the maintenance of the computer network system, so problems can be detected and resolved in time, and security problems can be avoided. In addition, it is also necessary to continuously improve the information protection awareness of the staff, so that they strictly abide by relevant laws, regulations, and operating norms. Moreover, it is necessary to pay attention to the cultivation of information protection awareness of students and teachers, so that the information protection and information security of students and teachers can be improved. In addition, it is necessary to continuously strengthen the security management of the campus network to improve the quality of the campus network.

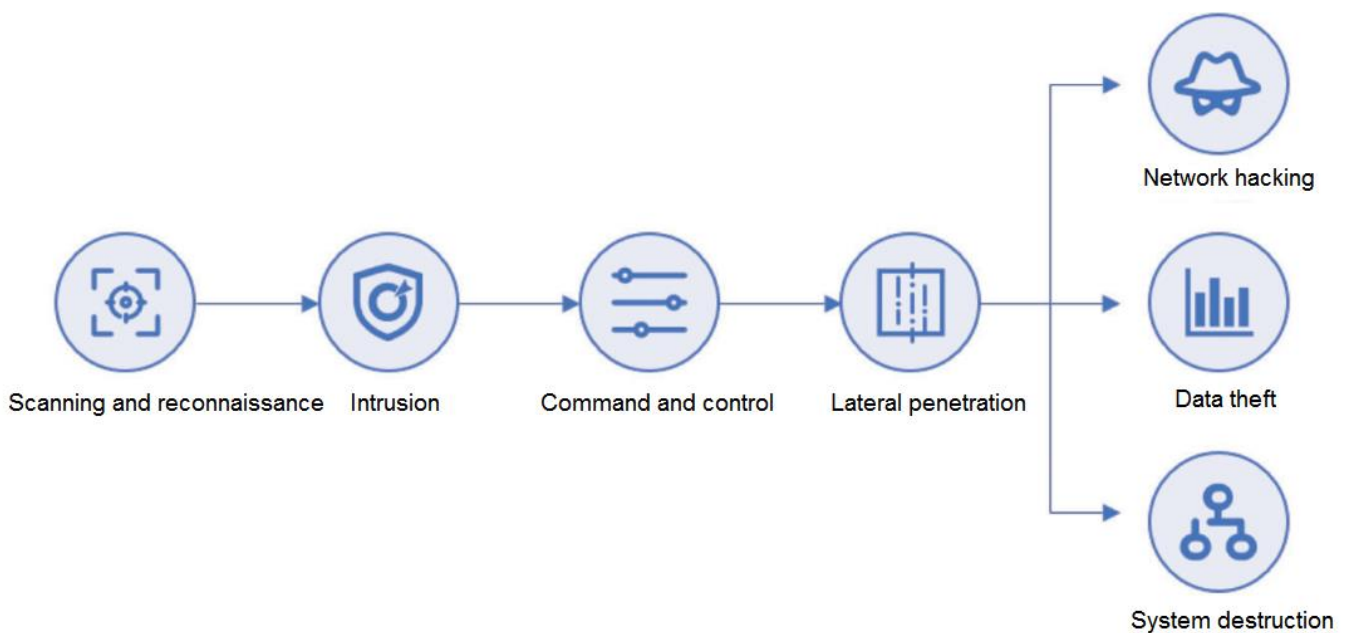


Figure 2. Network security technology protection system

3.4. Improving users' information security awareness

In the process of campus network construction, it is necessary to improve network security awareness and implement security precautions. Only in this way can users' awareness towards information security can be improved, and users will know how to use computer network systems correctly. Thematic activities can be carried out to cultivate the students' and teachers' awareness towards information security, so that students and teachers can understand the importance of network security and learn to use computer network systems correctly. In addition, it is necessary to pay attention to the prevention of network viruses during the construction of the middle school campus network. Computer viruses can be prevented by strengthening the construction of network security system like establishing firewalls and installing anti-virus software.

4. Conclusion

The construction of computer network security systems in middle school campus network is one of the important tasks informationization of schools. During the construction process, we need to focus on

preventing and responding to various network security threats, establish a comprehensive network security protection system, strengthen data backup and recovery mechanisms, and at the same time strengthen network security management and training and improve the network security awareness of teachers and students. Only in this way can we guarantee the safe and stable operation of the campus network and provide strong support for the school's education and management.

Disclosure statement

The author declares no conflict of interest.

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