

# Research on Security Management and Preventive Measures of Library Computer Network System

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**Abstract:** With the development of computer technology and digital technology, many libraries have applied digital technology in China, which is likely to cause security management problems. This paper analyzes the problems in security management of library computer network system. Moreover, in view of the cause of the problems, some preventive measures for safety management of library computer network system are proposed combined with the actual situation.

## 1. Introduction

In library security management, the invasion of the Trojan horse virus can give rise to the leakage of internal data in a library[1]. Aimed at the problems in security management of library computer network system, a series of targeted preventive measures are put forward to guarantee the reliability and stability of library computer network operation[2].

## 2. Problems in security management of library computer network system

### 2.1 Problems in computer network system

The problems of computer network system can be divided into hardware and software, as shown in Table 1.

Table 1 Problems in computer network system

Major problems	Expression of problems
Hardware problems	Many libraries use D1 level computers, which threat the security
Software problems	System software aging, identity authentication risk, Web service vulnerability, and DNS service vulnerability

Combined with Table 1, the problems of computer network system can be divided into two aspects: hardware and software. Hardware problems are mainly the aging of computers[3]. Software problems involve several aspects. As for identity authentication risk, the host login and service system login of many libraries adopt fixed passwords. There may be storage records that can be repeatedly used in the database[4].

### 2.2 Problems in personnel management

The problem of personnel security management may threat a library computer network system. The computer room of a library should be far from strong vibration, noise and radiation, and equipped with the anti-seismic and fire protection functions. In the meantime, many computer system

management and maintenance personnel lack professional knowledge. The imperfect management system fails to provide safety management education to readers or training to relevant personnel. As a result, faults or holes of the library computer system cannot be solved in a timely manner.

### 3. Preventive measures for safety problems in library computer system

#### 3.1 security management of computer system

##### 3.1.1 Network system

For program BUG, technical personnel are required to monitor the possible BUG in a program at any time. In normal operation of the system, any possible BUG should be prevented and corrected in time. If the library cannot handle the BUG independently, it needs to contact with the developer to solve it as soon as possible. For computer viruses, management personnel should deeply understand virus and the progress of the anti-virus field to improve the virus database.

As for power supply, the whole management system should conform to the relevant regulations in Technical Requirements for Computer Site in China, and meet the power distribution requirements. The uninterrupted power UPS should be set in each terminal of computers in the library to ensure the data integrity. In view of the management factors of the service system, the monitoring of server running state should be strengthened so as to avoid the external malicious intrusion. In the meantime, it is necessary to repair the antivirus software and system bug at regular intervals. Taking a library in China as an example, in network security management, the library has taken a series of measures for the working hierarchy of interconnect equipment, as shown in Table 2.

Table 2 Working hierarchy of interconnect equipment

Physical layer	concentrator, repeater
Network layer	Routers, network bridge
Data chain layer	Interchanger, network bridge
transport layer	Firewall, gateway

Combined with Table 2, the library has taken a series of measures aimed at the four aspects. For the operating software in the network layer, some measures, such as authentication, access control, firewall, password, bug patch, and intrusion detection, are adopted.

##### 3.1.2 LAN

At present, LANs of many libraries realize network management through use Windows NT and some other management systems. The security management of these LANs can be divided into three aspects: (1) Login: A variety of verification methods should be adopted to complete the verification. Library network security managers should set corresponding accounts and passwords combined with their job category. Meanwhile, a public account should be set for readers and temporary network users. The specific use of authority should be in accordance with relevant regulations. (2) File servers: File servers occupy an important position in network system. The management of file servers should be enhanced, and each operation server should be encrypted. The personnel should operate according to library safety management regulations. (3) Permission and attribute: In view of the different reading ranges, the picture and file directory should be strictly controlled to prevent from leaking confidential documents or tampering important data[2].

##### 3.1.3 Service management

In service management, information channels and network exports should be encrypted to ensure that the network information transmission process is encrypted. The security state of transmission channel needs to be checked in advance. Network information monitoring devices, firewalls and security proxy servers can play a role in this aspect. In order to prevent the illegal external supply and

the possible theft of the internal staffs, two different encryption methods should be adopted, such as FIP and e-mail.

### 3.1.4 Back recovery

In library digital information system, backup recovery system can provide the last guarantee for the safety of related data. The main aspects of backup recovery system are shown in Table 3.

Table 3 Backup recovery system

Main aspects	Specific contents
System recovery	Recover the platform of library information system to its working state, including database system recovery and operating system recovery
Application recovery	Recover the service provided by the application system and the service function
Data recovery	Recover the database system and guarantee the security of information and data through backup mechanism

Combined with Table 3, the three aspects should reasonably set to guarantee the rapid recovery of the library information system after being attacked.

### 3.2 Improvement of security management organization

Security management organization is mainly improved in two aspects, as shown in Table 4.

Table 4 Security management organization

Main aspects	Main contents
Reader and staff management	Strictly select and examine the technical personnel of the library, provide training to technical personnel, and implement professional assessment system; Carry out service push activities and student entry training activities, and strengthen the propaganda of safety management
Security management personnel management	Divide the responsibilities of the hardware system security posts and the software system security posts

According to Table 4, in terms of reader and staff management, relevant personnel can be organized to participate in training classes, so that all staff members can have high moral quality, technological level, safety awareness and political awareness. As for professional assessment, the qualified or unqualified personnel should be rewarded or criticized. For the personnel in charge of hardware facility safety, we need to divide the management and configuration planning of computer equipment, the planning and design of the computer room, and the installation and integration of the server operation system. As for the job responsibilities of software system and network, the normal startup work of network system, system authority, equipment and adjustment work should be divided.

## 4. Conclusions

To sum up, the problems of computer network system and the personnel management in libraries and task hierarchy of interconnected equipment can be solved through a series of measures such as authentication, access control, firewalls, passwords, BUG patches, and intrusion detection. In the

meantime, the safety management system should be perfected to improve the stability and reliability of the library computer network system and enhance the quality of service provided by the library.

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