

Research on Computer Network Security under the Background of Big Data Era

Guannan Wang

Dongchang College of Liaocheng University, Liaocheng, Shandong, 252000, China

Keywords: Big Data, Network Security, Cloud Computing

Abstract: in the era of big data, the network development information of human society has been continuously improved and enriched. With the vigorous promotion of all walks of life, the capability of database technology has brought great convenience to the country and even the whole country with its super cloud computing capability and extensive data sharing. However, big data also poses many potential threats to the safe operation of computer network systems when it brings efficient, convenient and large-capacity information services to computer networks. A large amount of data and information spread rapidly in the network, so the demand for information security is getting higher and higher. In the era of big data, china needs to attach great importance to the security of computer network information. According to the characteristics of big data and network information, we need to develop a complete computer network information security management plan. This paper introduces the influence of big data era on network security, analyzes the main problems of computer in the field of network security in the era of big data, and puts forward the measures to improve the level of network security in the era of big data.

1. Introduction

The rapid development of computer technology has brought more convenient internet technology and database technology to the society. The current network capacity and interactivity have been difficult to carry massive network data [1]. In order to meet people's increasing demands in business, communication and network communication, big data came into being. With the advent of the internet era, computer information technology has been popularized and popularized. The improvement of information storage technology has promoted the arrival of the big data era, and big data has been accepted and recognized by more authoritative people and industries [2]. In the era of big data, data information has become an important part of social politics, economy and life. These data information are widely transmitted and shared in computer networks. Big data has penetrated into all aspects of social production and life. The transmission and sharing of data and information in the computer network have improved the operation efficiency of the computer network [3]. In this case, the way people look at the world and make industry decisions depends more on implementation data. The data age can provide more information on the development of the times for human beings, update the idea of keeping pace with the times, and facilitate the communication between human beings [4]. However, when big data brings efficient, convenient and huge capacity information services to computer networks, it also poses many potential threats to the safe operation of computer network systems.

The speed of china's social and economic development continues to accelerate. Network information platforms have become a vehicle for people to communicate and exchange. In the era of big data, computer network security has become more important [5]. The widespread use of big data in various industries not only helps improve work efficiency in various fields, but also brings challenges to the protection technology of computer network information security. A large amount of data information spreads rapidly on the network, so the requirements for information security are getting higher and higher [6]. It is necessary to continuously improve the level of computer network security protection and establish a more efficient information protection system to meet the requirements for network information security in the context of the big data era. The outbreak of data has brought new challenges to computer network information security [7]. In the era of big

data, china needs to attach great importance to the security of computer network information, and based on the characteristics of big data and network information, develop a complete computer network information security management program. A complete analysis of computer network security technology can greatly improve the quality of computer network security in the era of big data [8]. This article introduces the impact of the era of big data on network security prevention. It also analyzes the main problems of computers in the field of network security in the era of big data, and proposes measures to improve the level of network security of computers in the era of big data.

2. Internet Security in Big Data Era

2.1 Poor Awareness of Network Security

Under the error guidance of great convenience, people seriously lack attention to network security. Today's computer system is equipped with a relatively perfect security environment, but the network users themselves have low security awareness. Computer networks are characterized by openness under a wide range of application requirements, which makes computer network systems vulnerable to external attacks and leads to a decrease in security. According to different program security vulnerabilities and settings, viruses are everywhere. Changing forms of network viruses, with their strong infectivity and adaptability, gradually damage our network environment with weak effect in daily life [9]. In the era of big data, the adverse impact of information theft on personal life will be accompanied by the continuous expansion of public sharing networks. Big data can be extended to different fields and integrated into various industries, sensing data on the basis of sharing and exchanging data information, and making accurate pre-judgment based on the obtained data, providing major reference for industry decision-making. Deep-level big data is not only a storage medium for information, but also a unified collection of multiple data types.

Big data refers to the integration of massive single data into diversified data information, which has the characteristics of low cost, fast transmission and unstructured. In order to implement the decision-making of the decision-making level, a management level that manages the daily work and an execution and maintenance level that is responsible for executing safety plans and decisions are needed. This forms a hierarchical information security organization under the direct leadership of the chief information officer. the security organization includes an organizational decision-making layer, a management control layer and an execution and maintenance layer as shown in fig. 1.

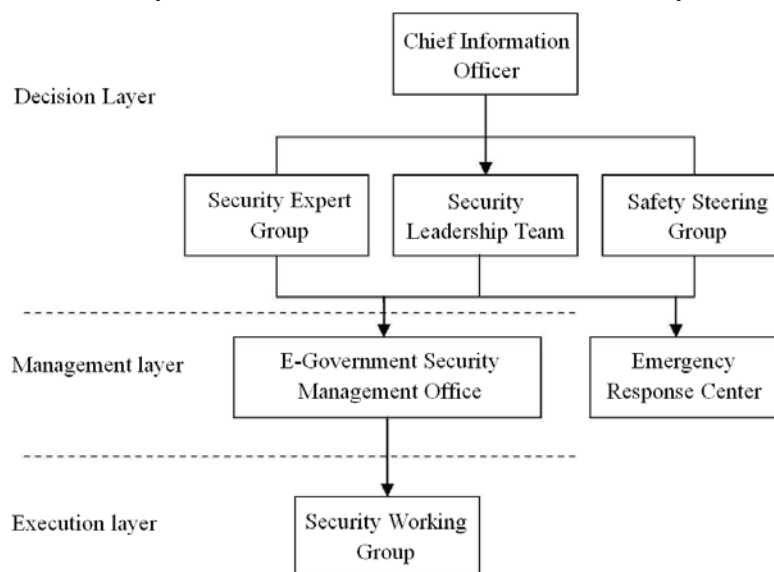


Fig.1 Hierarchical Information Security Organization

2.2 The Supervision of Network Security is Not in Place

In addition to the need for all aspects of society to pay attention to the network security environment, the most advanced is the need for the network regulatory department to do an

effective and scientific security management program. In the era of big data, it is of practical significance to strengthen the level of network information security, especially the importance of current information and data for production and life is gradually prominent, especially the importance of strengthening the computer network information security. Computer users in daily life use all security matters are delivered to all kinds of anti-virus software, but do not have a basic understanding of network security, lack of computer maintenance and management. There are many security problems involved in computer network. The computer network protection project needs to be established under the condition of comprehensively grasping and considering many security risks. With the development of computer technology and the convenience it provides, computer technology is playing a more and more important role in all walks of life. The main ways leading to information leakage and destruction are illegal theft, illegal interception, system failure and virus attacks. Finally, the availability and integrity of information are destroyed, which easily threatens the economic development in many fields in the real social economy.

3. Internet Security Precautions in Big Data Era

The source of the computer network security problem is the technical loophole. Therefore, the protection of the network security environment requires the timely response of science and technology under the continuous improvement of the supervision of the whole society. For the prevention of network security, the most basic is the daily supervision of computer network security by users and network environment managers. Good operation is an important means of protecting computer network information security, and it is also an external help for the computer system to function. The new technology of computer network information generated under the background of big data and the rapid and extensive use of computer networks have led to the diversification of factors affecting computer network information security. The contents of data and information are diverse, mainly for communication methods, including pictures and videos, etc. At the same time, there are differences with traditional single data results [10]. Users of computer network information lack the awareness of security protection, and negligence may cause the problem of disclosing users' security passwords or other security information during operation. This inappropriate operation mode is just created by the destruction of illegal elements. In the process of controlling the authority, it is necessary to correctly verify the user's access authority and prohibit irrelevant personnel from entering and applying information on the Internet.

The system security evaluation should consider the security analysis of the existing system, mainly checking whether the target software has known penetration changes, and needs a simple, flexible and complete model. The shortest distance between mobile nodes, the shortest distance between mobile nodes and the average network distance are analyzed. With the increase of social relations among nodes, the shortest path between nodes and the average distance of the whole network are decreasing, as shown in Figure 1.

Table 1 Analysis of Mobile Social Network Structure

Network	Number of nodes	Number of relationships	Network density	Central potential
Encounter information	177	238	0.731	0.241
Mutual information	172	234	0.594	0.246
Weighted summation	163	246	0.585	0.227

With the continuous improvement of computer crime means, relevant laws must be formulated, relevant computer forensics tools must be independently developed, and people's awareness of information security must be improved, so that the increasing number of computer crimes and cyber crimes will receive due sanctions. By comparing the promotion values of different rules, we can measure whether the rule is meaningful and judge the significance of the rule. The calculation formula is as follows:

$$W = \alpha(\beta(\frac{E_{i-current}^2}{E_{i-init}^2}) + (1 - \beta)\frac{d_i}{d_{max}})) \quad (1)$$

Determine and calculate inspection statistics. In the hypothesis test of the proportion of two computer crime samples, the statistics used are:

$$E_{ch} = lE_{elec}(\frac{N}{k} - 1) + lE_{DA}\frac{N}{k} + lE_{elec} + l\xi_{amp}d_{toBS}^4 \quad (2)$$

Based on the frequent itemsets of crimes, the association rules between items are further studied. At this stage, if the rule is:

$$E_{non-CH} = lE_{elec} + l\xi_{fs}d_{toCH}^2 \quad (3)$$

Computer information network is widely used in various fields and industries. It has obvious characteristics of openness and produces a large amount of big data that can generate benefits. The openness of computer information network will inevitably attract illegal use by criminals. In the computer crime network model, a linear regression curve is calculated according to the stepwise multiple linear regression equation, as shown in Figure 2.

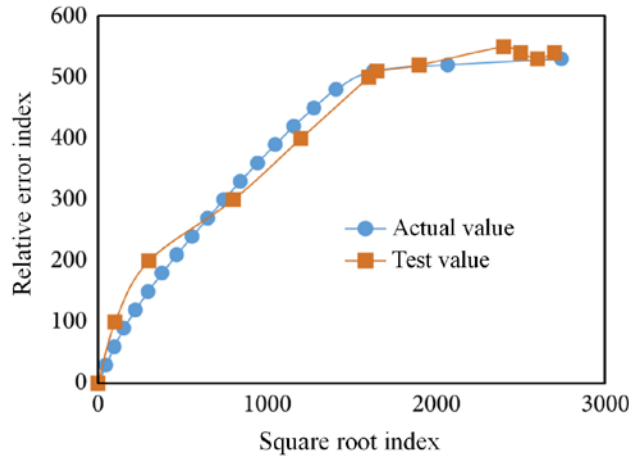


Fig.2 Relationship between Actual Values and Calculated Values of Stepwise Linear Regression

Under the background of the big data era, the update rate of China's computer network technology is amazing, which brings difficulties to the security prevention and management of information data. The development of computer technology from the original wired transmission, after hard disk transmission, now has more developed unlimited transmission technology. Wireless transmission technology not only brings people convenient access to computer networks, but also hides certain security threats. The imperfect system is the root cause of the network information security problem. First of all, users lack of maintenance and repair of computer network systems, which results in the destruction of network information [11]. An act of malicious destruction of network information, including active attacks and passive attacks. When dealing with various matters with the help of the network, network users should be very sensitive to threat signals in the network environment, be familiar with a series of network security problems that may arise in the era of big data, and strengthen the supervision of network data, especially personal private information. In order to effectively ensure the computer network information security, we must formulate a special information security protection mechanism to reflect the authority and persuasion of the law.

4. Conclusion

In the era of big data, the importance of computer network has been highlighted and its application scope has become wider and wider. In the era of big data, it is of great practical significance to carry out computer network information security protection. Only by enhancing the

technical level and strengthening the relevant safety awareness can the potential network information leakage be effectively avoided. While the progress of computer network technology brings us convenience in life, there are also some threats that are difficult to eliminate. Only by establishing and strengthening network security technology and a complete network security guarantee system can we have a place in the future era of data analysis. Because the defense of computer network security is a relatively systematic work, and has strong dynamic and complexity, so we need to study and improve the current technology, so as to build a multi-level and all-round defense system. In the era of big data, when users use computer networks, subjective awareness has a certain impact on network security. If users have a high awareness of security precautions, many hidden dangers can be eliminated naturally. In the background of big data era, the larger the scale of information, the closer the information connection between different platforms, and the higher the technical requirements of data information on computer network security.

References

- [1] Kang Houcai. Computer Network Security Prevention in the Big Data Era [J]. Information and Computer Science (Theoretical Edition), 2016 (7): 24-25.
- [2] Lai Jishun. Computer Network Security Against Big Data [J]. Information Technology and Informatization, 2014 (6): 86-87.
- [3] Du Yu. Computer network security and preventive measures in the era of big data [J]. Electronic Technology and Software Engineering, 2018 (13): 202-203.
- [4] Zhao Lihua. Computer Network Security and Preventive Measures in the Big Data Era [J]. Network Security Technology and Application, 2019 (6): 49-50.
- [5] Suo Shiheng. Computer Network Security Analysis in the Big Data Era [J]. Information and Computers, 2019 (9): 202-203.
- [6] Leng Peng. Computer Network Security and Preventive Measures in the Big Data Era [J]. Scientist, 2016 (14): 50-51.
- [7] Wu Canbo. Research on Computer Network Security Technology in the Big Data Era [J]. Communications World, 2019 (7): 38-39.
- [8] Zou Yang. Research on computer network information security in the era of big data [J]. Computer Knowledge and Technology: Academic Exchange, 2016, 12 (6): 19-20.
- [9] Liu Mengfei. Computer network information security risks and protection measures under the background of big data [J]. Modern Industrial Economy and Information Technology, 2017 (21): 59-61.
- [10] Ding Hongtao. Discussion on Computer Network Information Security in Big Data Environment [J]. Modern Industrial Economy and Informationization, 2016, 6 (11): 93-94.
- [11] Liu Lei, Dong Chao. Application and Operation of Computer Network Security Prevention under the Background of Big Data Era [J]. Network Security Technology and Application, 2019 (6): 51-53.