

# Computer information security and privacy protection technology in the background of big data

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**Abstract.** At present, information technology has been widely used in many fields. Although it has gradually got rid of the restrictions of traditional management mode, more security problems have emerged, which has created a new way for network crime and caused a negative impact on the steady development of society. In order to fully demonstrate the application value of computer technology under the background of big data era, strengthening privacy and protection and control based on information security risks are the main contents of current scientific research and discussion. In this article, therefore, understand the era of big data and information security problems and influencing factors of the computer, according to the accumulated experience of technological innovation in recent years, the key analysis certificate authority system, credit mechanism, comprehensive protection, these three aspects of the privacy protection technology, and from the perspective of the current computer technology application, this paper puts forward the effective protective measures.

**Key words:** Big data; The computer; Information security; Privacy protection; Authentication and authorization system

## 1. Introduction

After entering the 21st century, our social economy and science and technology level is higher and higher, which provides favorable conditions for the innovative application of information technology. After integrating into people's life and work, diversified information technologies not only create more convenient conditions, but also improve the comprehensive level of urban construction and development, and promote the steady progress of the whole society. But look from the background of the era of big data, information security problem of computer technology is very significant, in order to further improve the efficiency of the application of computer, guarantee the security of the information environment, should choose efficient and perfect protection scheme, so the current international scholars to strengthen research on information security and privacy protection technology. In the 1980s, the famous American scholar Toffler put forward the basic concept of big data in his book *The Third Wave*. In essence, big data refers to data sets that cannot be captured, managed and processed with conventional software tools within a certain time scale. New processing modes are needed to obtain information assets with diversified, high growth rate and massive volume. The structure of big data is shown in Figure 1 below:[1.2]

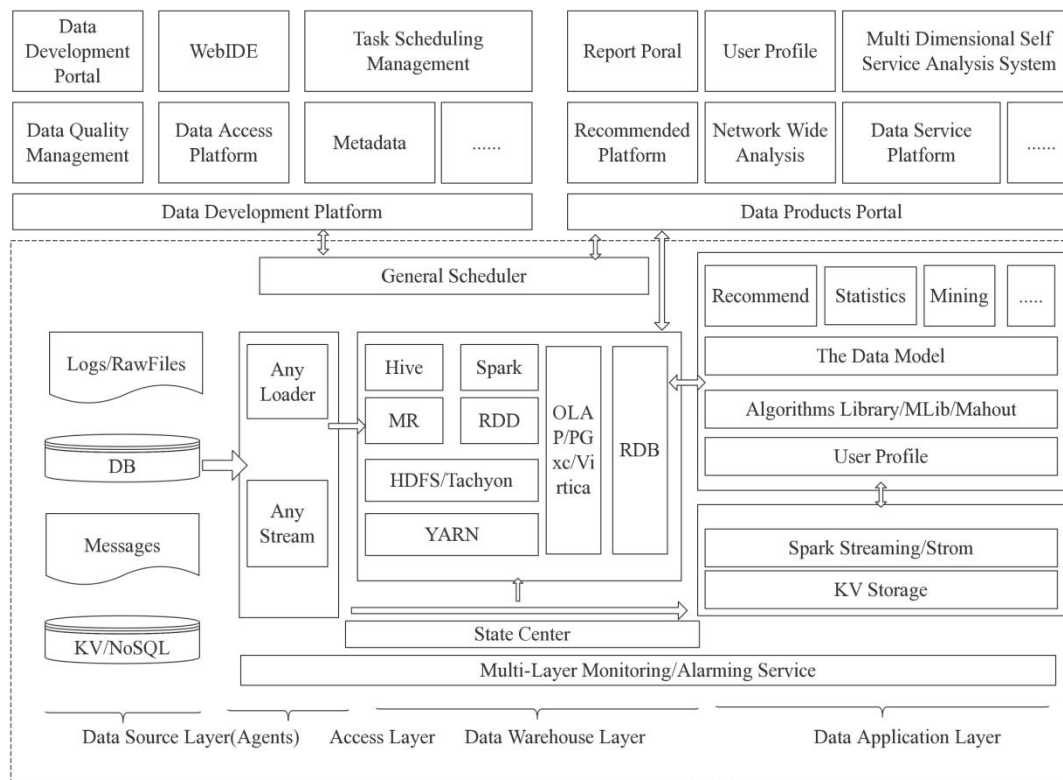


Figure 1 Structure diagram of big data

From the application point of view of each field, the computer information security technology appears the problem. Mainly concentrated in: first, more safety accidents. In the continuous updating of Chinese computer technology and network scale, the corresponding frequency of security accidents occurs faster and faster. According to the practice survey, more than 10,000 new phishing websites are generated every day in China, and 95% of them are generated by machines, which is difficult for traditional antivirus software to accurately identify. At the same time, Internet fraud will combine traditional telephone fraud and computer software to form a new type of Internet fraud. Second, the security basis is relatively weak. Because our computer network technology started late, under the overseas limitation to information industry, our network information industry is in passive state. On the one hand, the hardware as the foundation of computer information security technology, at present, the use of computer chips are need to import, domestic computer equipment industry is still at the primary stage, while in the technical innovation to improve the speed of development in recent years, but most of these core hardware equipment still comes from other developed countries, Domestic computer manufacturers are still in the assembly, foundry technology and other relatively simple low profit link; On the other hand, the phenomenon of attaching importance to technology and neglecting security exists in the computer information security, which is reflected in the low attention to computer information security, and the excessive pursuit of computer technology and application equipment, which leads to the frequent occurrence of security loopholes or hidden dangers in Chinese computer. Finally, computer information security faces challenges. In economic construction and technological innovation, our country attaches great importance to the research and application of computer information security technology, which has an extremely deep influence on social stability, economic innovation and national politics, etc. Therefore, after entering the development trend of economic globalization, the relevant technical ideas are facing brand-new challenges. For example, based on the analysis of the computer system structure diagram shown in Figure 2 below, it can be seen that computer information technology itself has the feature of spreading, and it will spread computer viruses in a large range through the network platform. Therefore, relevant protection schemes and application technologies must take this feature into account. In the context of big data, there are many factors

that affect computer information security, such as natural disasters, open network environment, unscientific application methods, etc., the overall trend of diversification. This paper mainly studies the computer information security and privacy protection technology under the background of big data, in order to provide effective basis for the operation of modern computer systems.[3.4]

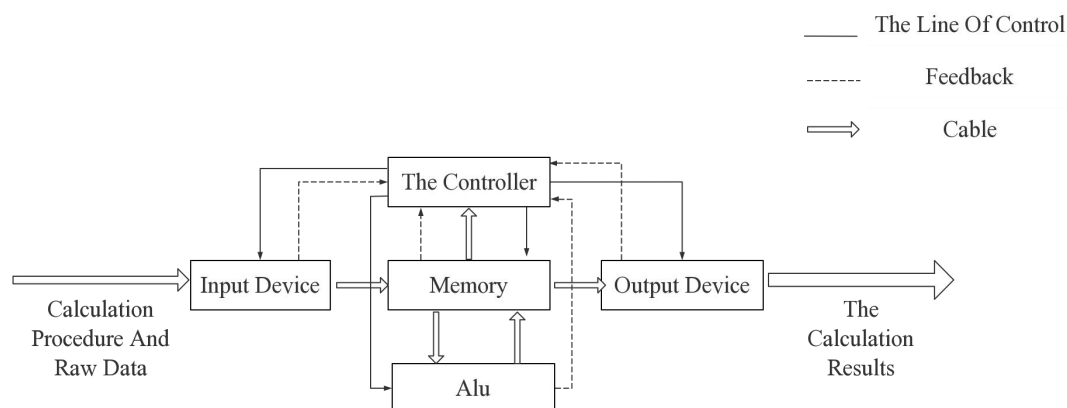


Figure 2 System structure diagram of computer

## 2. Method

### 2.1 Authentication and Authorization system

In the environment of big data, the weather conditions to ensure the security of computer information make it impossible for anyone to inquire or steal information at will, but to build a secure network channel through the authentication and authorization system. According to the structure diagram shown in Figure 3 below, the system design should be designed with standard security protocols, such as SSL protocol. All user computer network nodes have a separate identity, and use authorization technology to control local resources, so as to form a restricted access mode. Authentication is mainly to clear the identity of the user, which involves identity, message, protocol content, only to ensure the standardization and clarity of authentication, can improve computer information security. Specifically, we can start from the following points:[5.6]

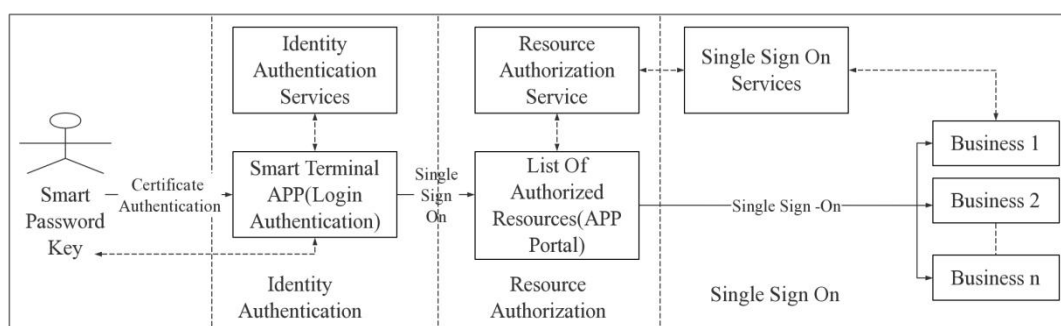


Figure 3 System structure diagram of authentication and authorization

First, message authentication. This function is mainly to verify whether the message is complete, whether to expand the authentication, to ensure that the user to obtain information is issued by the other party criticized, in the process of information spread no changes. The information authentication technology has evolved from the initial authentication of the message itself to time authentication and structure authentication. It can also be authenticated between the sender and the receiver, but no other node can participate in the authentication. Nowadays, common message authentication is divided into two ways. One is real-time authentication, which refers to the information transfer between two nodes. The other is lag authentication, which requires the sender to send information to the server first and wait for the receiver to obtain the information for verification.

Secondly, identity authentication. This kind of authentication is a real-time authentication scheme, one identity ID can only authenticate one user, the most common is App account and password authentication, but as long as the account password can be obtained, non-personal authentication can also be carried out. In the current development of information technology, researchers have put forward new biometric authentication schemes, such as face and fingerprint, to ensure the security of identity to a certain extent. It should be noted that the identity authentication must have a more advanced account authorization, which clearly defines the user's rights in the computer platform. Finally, protocol authentication. Nowadays, the number of Internet protocols is very large, through these protocols can determine whether the computer is in a normal state, thus judging whether the source of information is safe and reliable, to avoid viruses disguised as data files to attack the computer network.

## 2.2 Reputation Mechanism

As a new information protection scheme proposed by scientific researchers in the new era, reputation model has been introduced by Google as a zero-trust system, as shown in Figure 4 below. In essence, the reputation mechanism contains a large number of core contents. In the internal application of computer system, it is necessary to combine the reputation mechanism first, improve the security of data information, and then accurately calculate the reputation value. There are great differences in the calculation methods of different reputation mechanisms. From the current application point of view, the most common reputation calculation methods are additive increment and multiplicative decrease, which can stimulate the computer information security protection work and effectively curb the activities of malicious nodes. Generally speaking, nodes are divided into three types according to their reputation level. The first is good nodes, the second is lazy nodes, and the last is malicious nodes. Different levels of nodes determine the priority of node services and determine whether they can provide high-quality services for users.[7.8]

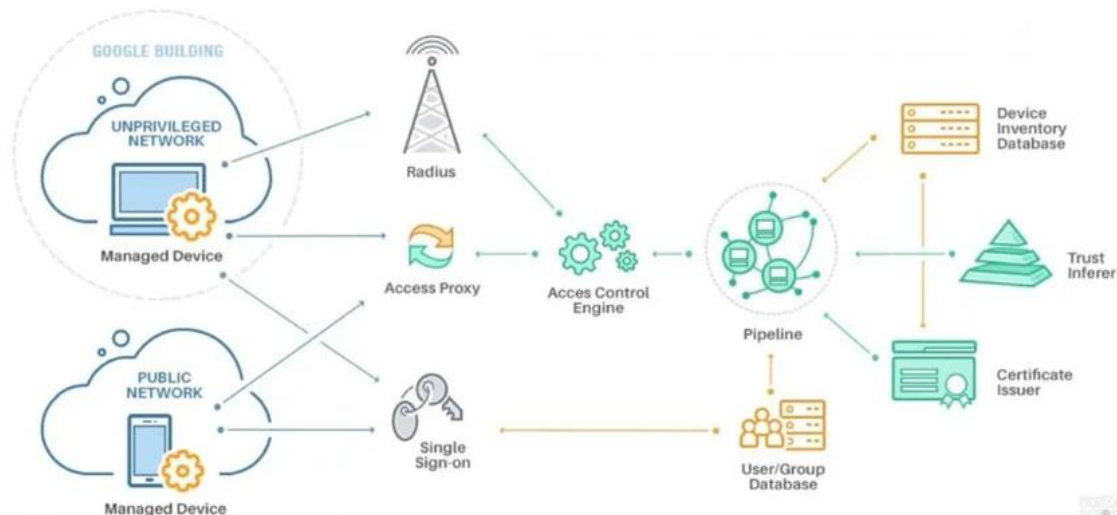


Figure 4 Structure diagram of a zero-trust system

In the calculation of credibility, we should start from the following three aspects: First, trust transmission. Reputation data between two peer nodes will be transmitted through other path nodes. Second, reputation aggregation. There will be multiple non-overlapping recommendation paths between a peer node and another node, which represents the path with the highest reputation and will be ranked in descending order according to the priority level. Finally, reputation selection. In order to further improve the application efficiency of network resources and reduce the load pressure of information flow channels, the node path with high reputation should be preferred to avoid the problem of collusion and fraud among nodes.

### 2.3 Comprehensive protection

To protect the security of computer information, it is necessary to restrict the access to computer information. Combined with the analysis of the comprehensive protection structure diagram of computer information as shown in Figure 5 below, the specific operation involves the following points: First, the computer information should be encrypted to prevent illegal invasion by hackers; Secondly, information backup technology should be used to back up important computer information to the cloud storage. If the information is damaged, it can be directly recovered in the cloud to reduce the possible loss caused by users. Finally, the selection of diversified security software, virus detection and killing technology, intelligent firewall, according to the information analysis of new virus characteristics, timely update the required protection software, regular query system vulnerabilities, improve the comprehensive defense level of computer information.

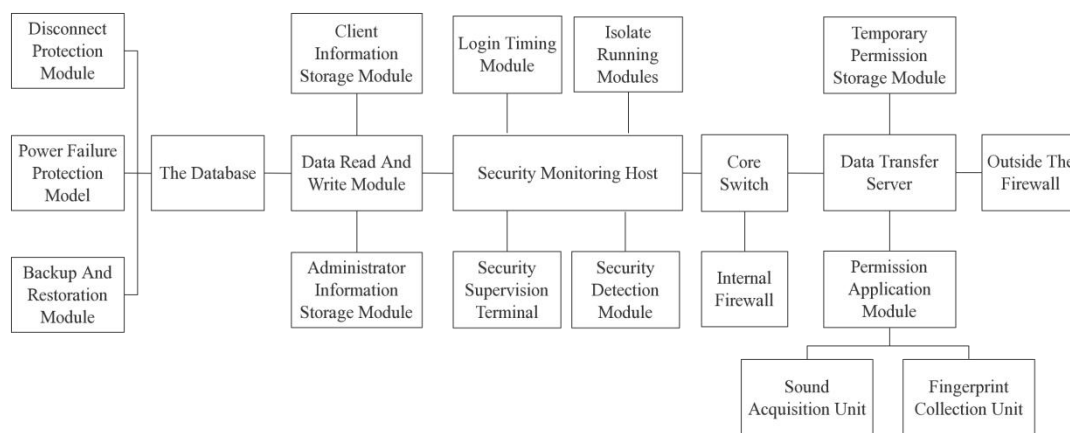


Figure 5 Structure diagram of computer information comprehensive protection

### 3. Result analysis

Based on the analysis of the big data computer body architecture diagram shown in Figure 6 below, it can be seen that in clarifying the various technologies to protect information security and privacy, corresponding protective measures should be made clear, which specifically involve the following points: First of all, users are required to pay attention to their own account security, actively publicize the importance of information security and privacy protection, strengthen the internal control of the computer, improve the ability to crack the password, regularly urge users to modify their account password, reasonably avoid the risk of computer leakage and information theft risk; Secondly, to improve the computer information network firewall level, prevent the computer system from external invasion, fully show the firewall protection ability, to ensure that the computer run more stable and efficient; Finally, to strengthen the real-time monitoring of the network system, the main is to use intrusion detection technology to real-time monitoring of the computer network system, real-time analysis of the potential illegal intrusion problems, and according to the specific problems to put forward effective solutions. For example, in the statistical analysis, using statistical theory to study the running status of the computer system and predict the possible action model can help system users to explore the shallow security risks as soon as possible, and put forward effective solutions and protection countermeasures.

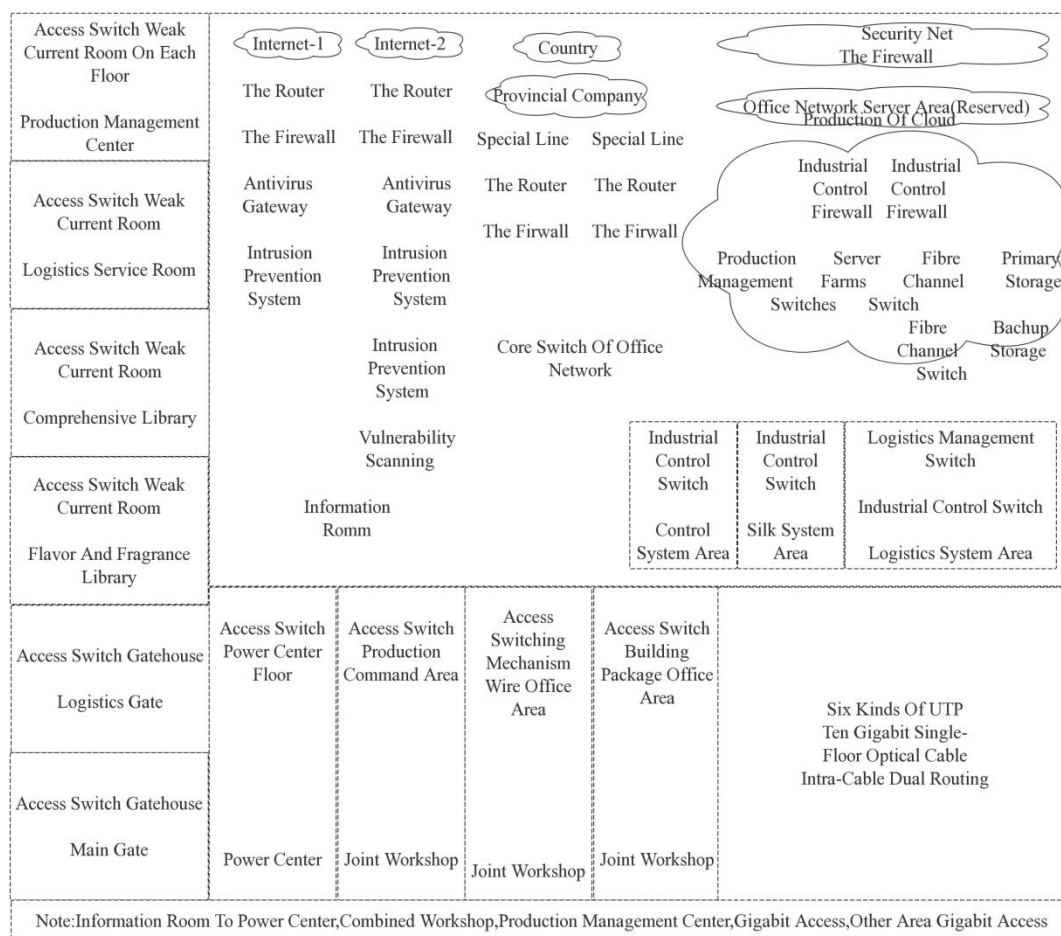


Figure 6 Big data computer system architecture diagram

#### 4. Conclusion

To sum up, because computer information security and privacy protection is a complex and long-term technical problem, so with the continuous maturity of network information technology, the relevant network security protection system is more and more perfect, there will still be different types of network security problems, which directly threaten people's life and work. Therefore, in the context of the era of big data, the extensive use of computer network systems must scientifically coordinate security issues and network performance according to their own requirements, and actively introduce advanced technical theories to strengthen the research efforts of information security and privacy protection technology. At the same time, to strengthen the training of professional and technical personnel, pay attention to specific security problems, formulate solutions, in order to improve the level of computer information security defense, for people's life and work to create a good network environment.[10]

#### Reference

- [1] Hui Gao. Computer Network Information Security and Protection Strategy under the background of big data [J]. Journal of Computer Applications, 2022, 38(9):3.
- [2] Huayong Wang. Application of computer information technology in network security under the background of big data [J]. Heilongjiang Science, 2021, 12(16):2.
- [3] Ping Zhao. Application of Computer technology in information Security in Big Data Environment [J]. Electronic Technology and Software Engineering, 2021(4):2.

- [4] Xiaowei Zhang. Computer network information security and protective measures under the background of big data [J]. Digital Technology and Application, 2021, 39(3):3.
- [5] Yi Yang. Application of computer information technology in network security under the background of big data [J]. Information Recording Materials, 2021, 22(9):2.
- [6] Lingling Ji. Risk and protection measures of computer network information security under the background of big data [J]. IT Manager World, 2021, 24(10):2.
- [7] Ningbo Gong. Computer network information security and protection measures under the background of big data [J]. Digital Communication World, 2021(2):3.
- [8] Jing 'an Yang. Risk and protection measures of computer network information security under the background of big data [J]. Wireless Internet Science and Technology, 2022, 19(2):2.
- [9] Chunwang Lin. Research on the application of big data technology in the field of modern computer information security [J]. Network Security Technology and Application, 2022(5):2.
- [10] Haixiang Yin. Research on Computer Information Security Processing Technology Based on big data [J]. Electronic Technology and Software Engineering, 2022(9):4.