Computer Network Information Security Protection Based on Virtual Private Network

Baohui Shi
School of Computer and Communication, Beijing Information Technology College
Address:A1 Hongsongyuan Beili, Dongba, Chaoyang District, Beijing
Postcode: 100015
Mail Box: shibh@126.com

Abstract. In order to better realize the protection and management of computer network information security, the virtual private network technology introduced has played an important role. This paper summarizes the characteristics and common techniques of virtual private network technology, analyzes the specific application of virtual private network technology in the field of network information security technology, and summarizes the application effect, so as to provide reference for similar research.

1. Introduction
In practical operation, if computer technology has great problems in security, it will lead to the disclosure of a large number of private information and bring serious losses to people's life and work. The Virtual Private Network (VPN) can ensure the connection between any two nodes in the Virtual Network and the safe transmission of their information data. VPN technology is the core technology in virtual network. When used in combination with the characteristics of computer network, it can create greater value and promote the safe transmission of information and data. Therefore, in order to make the computer technology can develop for a long time, the role of virtual private network technology in the computer can not be ignored, in the computer technology is also necessary.

2. Overview of Virtual Private Network Technology

2.1 Technical Features
Virtual private network technology is a kind of computer technology that can protect the safe operation of network. It can ensure the security of network user information and has strong security in computer network information management, storage and other aspects. Taking VPN technology as an example, this technology can provide good support for data transmission through Extranet and Internet, and the addition of new nodes is more convenient. Meanwhile, it supports multiple types of transmission media and has strong adaptability for audio, video, text and other data transmission. In terms of financial management, the simplified characteristics of network technology universities can be used to reduce the workload of staff, and the computer can safely handle a large amount of information in the virtual private network technology environment. In the electronic library of colleges and universities, the virtual private network technology is also used to classify and manage the types of books, and the electronic library is rationally arranged, which improves the working efficiency of the library and correspondingly reduces the working difficulty. In the entire operation process of virtual private network technology, simple, simple, the use of a wide range of people, people can quickly grasp; The application of virtual private network technology enables users to seamlessly extend their network
management functions from LAN to public network, and at the same time, part of the secondary network management tasks are handed over to service providers, which not only improves the efficiency of network management, but also reduces the overall network risk.

2.2 Technical Types

2.2.1 Tunnel technology
Tunnel technology refers to a technology that realizes data transmission in the network through the use of Internet infrastructure. It is the most core technology in virtual network. On the basis of strict compliance with the encryption protocol, the tunneling technology organizes the data information into packets and transmits them to the network through the infrastructure such as the router. In this process, it will be encrypted again to ensure the security of the data information. It should be noted that a completely smooth network channel does not exist, so when using tunneling technology, staff must strengthen management, to avoid data loss, theft and other problems, to provide security for computer network information.

2.2.2 Identity authentication technology
In virtual private network technology, identity authentication is also a very important technology, which can be used to confirm the identity of the operation, and give the corresponding permission. Generally, users can be confirmed by information secret authentication technology, trust object authentication technology and biometric authentication technology. For example, the current authentication technology is widely used, including the purchase of train tickets and alipay authorization authentication, both of which need to pass real-name authentication before they can be put into practical application. At the same time. People can also connect to the banking system through Alipay to ensure the security of the user's operating system.

2.2.3 Encryption technology
Information encryption technology mainly refers to the use of physical or mathematical methods to effectively protect the information data in the transmission process, to avoid information leakage, which is a relatively important virtual private network technology. Moreover, this technology has the characteristics of openness, especially at present, many network users will be attacked by hackers, and even information leakage will be caused due to the hacker's illegal invasion, which will also cause serious damage to the interests of users. At the same time, in order to effectively deal with these problems, it is necessary to use some information encryption technology to protect the information data more effectively, to avoid the possible information leakage to the greatest extent, so as to ensure the security of user information.

2.2.4 Key management technology
Key management technology is an effective virtual private network technology, which has been fully applied in the current network information security center. In this technology, it mainly includes ISAKMP and SKIP, which can not only guarantee the security of user data and information, but also provide security guarantee for Internet communication. SKIP technology generally plays its role through the Diffie security protocol, so that the relevant key does not need to be disclosed to users during the propagation process, thus avoiding problems such as password leakage. But different ISAKMP technology, using the public key, any user can know the key in the system and in the process of practical application of the technology, users also need to strengthen their safety consciousness, and to effectively regulate their own behavior, effectively solve the problems of it, in the greatest degree to reduce the adverse impact.

3. Specific Application of Virtual Private Network Technology in Network Information Security

3.1 VPN Technology
The establishment of the connection framework within the enterprise. VPN in the operation of the
process, help enterprise internal related departments, in case of a need to change the data, can be timely with each relevant department through the data transmission channels of communication in a timely and effective manner, can quickly solve the problem within the system and improving the overall performance, the safety of the operation for the enterprise provides a good technical support. Help enterprises effectively manage employees and systems in various fields. Within the enterprise, it can effectively communicate and manage personnel in various departments and fields, and control the overall operation in a controllable range, so as to build a reliable and safe protection mode for the system and effectively protect the operation mechanism and common property of the whole company.

3.2 IP Seec VPN Technology
Protocol security, known as IPSec for short, is a public framework that provides a protocol security protection for the entire network computer system. This technology is also being used on a large scale in virtual private networks. Under this system, several types of subsystems were built: the first was the familiar ESP protocol system. ESP systems are used in a variety of applications and provide excellent security features. The other type is the end-to-end system, which helps solve some key errors more likely to occur in the process of data transmission and effectively improves the reliability and security of the overall system operation. In the process of whole IPSec research, found that one of the main application level contains such three types, the first is SRe - to - Site, is what is called a network to the network or the point-to-point communication mode, different corporate sector can establish different data network communication and contact each other, in the way each connection entrance tunnel can also set up their own data. The second is the terminal to terminal mode mentioned above, which has strong protection against some problems in the process of data transmission. Throughout the whole IPSec model, mainly as a protective of user terminal, to prevent the violation of the terminal is in the process of using the Internet, the transmission mode and is subdivided into the tunnel and transfer mode, different mode is applied to different situations and field, according to different transfer objects in different ways, and put forward the corresponding requirement for different use.

3.3 MPLS Multi-protocol Label Switching Technology
MPLS refers to a kind of multi-protocol label switching technology in virtual private network technology, which is generally used in some technical fields such as unlimited broadband in the home, so as to help the data can be transferred efficiently over a wider range. Usually MPLS application is run by the aid of a broadband router, to look for the connections of warehousing, the transmission of data, at the same time built a series of data network, see son some key data for effective transmission, through some interface for effective data transmission, with the aid of the function of MPLS, can more quickly with the help of virtual apply network technology for transmission, thus the stability of the overall data operation environment.

First, a hierarchical service provider is constructed among routers by using CR-LDP, the routing restricted label distribution protocol, and VPN technologies of the second and third layers are included in LSP. Secondly, the router is used to ensure the smooth completion of VPN information communication, that is, the PE router is used to realize the edge connection of the backbone network, so as to provide guarantee for the smooth realization of wireless private network data communication. For concrete practice, build a VPN in PE router, published data, and turn the published data can be directly connected to the CE equipment, through the key identification of relevant CE devices, and will be published data were allocated to the CE devices, finally, mark all the required address forwarding table of interface, with the support of LDP protocol, will have an ID tag data link table sent to other VPN interface, thus, complete the VPN data transfer.

4. Virtual Private Network Technology Application Computer Network Information Security Effect

4.1 Contact the Enterprise Branch
Under the condition of the rapid economic development, the enterprise also continuously expand new economic model for the development of the market distribution of enterprises more and more widely,
for large enterprises under the division between the management is very important, before the business
development of the subsidiaries of only at the time of month summary to master, but the efficiency of
the information is invalid. Today, the use of virtual private network technology, can ensure the security
of data exchange between enterprises, so that large enterprises at the same time to understand the
company's operating conditions in various places, so as to better guide the market operation,
strengthen the connection between branch and the total enterprise.

4.2 Reduce Enterprise Costs
Enterprises using the network information technology and the market staff for communication,
strengthen the connection between the enterprise and employees, at the same time, also let more
intimate relations between employee and enterprise headquarters, let employees can communicate
directly with the headquarters of the enterprise information, changed the traditional hierarchy
phenomenon between enterprises, improve the staff's working efficiency, let staff information will be
further protected, also cut the cost of the enterprise. For the development of the enterprise has a good
role in promoting.

4.3 Establish Broad Cooperation
With the continuous development of network information technology, virtual private network
technology, compared with the previous network environment, can make the trust between network
users more and more high. In business development, economic cooperation is distributed in different
markets. If each partner wants to negotiate business, face-to-face negotiation will consume a lot of
time, energy and financial resources, because economic and business cooperation negotiation involves
a large number of participants and costs are higher. But in the use of virtual private network
technology, each partner can use LAN, network face-to-face business negotiation, which not only
saves time, manpower, material resources, financial resources, but also can improve the efficiency of
business negotiation, open, transparent mode between enterprises to further improve the efficiency of
cooperation.

5. Conclusion
In today's society with the continuous development of network technology, the development of
computer technology is faster and faster, and people's thinking and living habits are also changing with
the development of computer technology. And the security problem of computer communication
network always exists, which brings great influence to people's life. In order to ensure the safe
operation of the computer, virtual private network technology is adopted to further enhance the
security of the computer system itself and ensure the security of the computer communication network
by strictly authenticating the user information and encrypting the data transmitted by the user.

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