Chapter 18
Security Framework and Correlative Techniques of Next Generation Network

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Abstract Along with the development of the information network technology in the modern times, the next generation network (NGN) based on the soft-switch technology has become the mainstream network platform with a gradual step. Especially, its diversified server-side is an innovative development of the network technology. In this paper, a discussion is mainly conducted based on the characteristics including service characteristics of the next generation network, and then the construction of the NGN security framework is introduced, and finally the three core technologies of the NGN are emphatically analyzed.

Keywords Next generation network · Security framework · Soft-switch technology

18.1 Introduction

Along with the rapid development of the telecommunications industry in the modern times, next generation network (NGN) based on the soft-switch technology has changed into a completely new network platform with a gradual step [1].

Multimedia is innovatively added in its functions, and also its server-side tends to be diversified.

In operation, the security of the network system is very important, and especially the secured construction of the hierarchical network architecture is the foundation for the realization of the secured network communication.

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In the mean time, broadband technology, and other core technologies are required to provide supports for the effective construction of the NGN, mature soft-switch technology.

18.2 Review of Next Generation Network

As an open network platform, NGN has the ability to independently control transmit information, and simultaneously owns a good network service quality [2]. Multimedia service is added in the service form of NGN [3], and also the unified communication of the IP technology is realized by the speech technology based on the soft-switch technology.

As a comprehensive network platform, NGN provides a variety of businesses for the traditional network server-side. In the comprehensive network platform of speech, multimedia, and data transmission, a well-improved network system with high frequency is constructed [4]. What is more, the price and cost of the local calls are reduced by NGN to a certain extent, and also this plays a very important role in the realization of cost-effective and well-improved network service.

As a brand new network platform, NGN owns obvious characteristics in the technical research and development and service functions. Also, the diversified network service is realized by multimedia technology based on the soft-switch technology.

18.2.1 NGN Characteristics

Based on the soft-switch technology, NGN has attained an innovative development in both network construction and network structure, thus making the traditional network platform further enriched and improved.

18.2.1.1 Openness of Network Construction

Based on the soft-switch technology, the network construction of NGN makes the individual control of the functional modules realized, and also the interface protocols of all functional modules are standardized [5]. And then, in the construction of an open network platform, NGN is with a powerful security performance in contrast to the traditional IP.

18.2.1.2 Protocol-Oriented Standards of Packet Based Network

NGN is to make the traditional IP network standardized through a protocol of standards [6]. In NGN, three traditional network platforms are standardized and

synchronized for management. Also, based on the standardization of the IP protocol, the facilitation of network is realized.

18.2.1.3 Dynamic Innovation of Network Technology

The technical research and development of the NGN is under a state of dynamic innovation. Especially, the gradually matured soft-switch technology has promoted the service form of the NGN more diversified. In business services, the flexibility of the NGN makes the network forms under an independent individual control more effective. At the same time, the development of the NGN technology owns a broader space [7].

18.2.2 Service Characteristics of NGN

The service form of the NGN tends to be diversified, and especially the construction of a multimedia service platform has enriched the service functions of the Internet.

18.2.2.1 Openness of Service Platform

The service functions of the NGN are mainly based on standardized data interface ends, and provide a secured and effective network service for user side. In an open service platform, the service efficiency of network business becomes much higher and higher.

18.2.2.2 Media-Oriented Service

Based on the soft-switch technology, the multimedia services platforms are realized by the NGN, and subsequently the traditional single network services are richened [8]. At the same time, based on a multimedia services platform, the usages of network for users tend to be more diversified.

18.2.2.3 Virtualization of Service Platform

In the virtual service platform of the NGN, virtualization is implemented based on valid individual identity information, and subsequently it is easier to implement virtualization on number business.

18.2.2.4 Intelligence of Service Flow

Intelligence service model is one of the characteristics of NGN business development. The all server-sides of business are effectively integrated by NGN, and then intelligent business services can be provided for all data interface ends.

18.3 Security Framework of Next Generation Network

NGN is a network platform that is centered at data transmission, and also its secured network framework is a foundation for realizing its good business, especially the security of hierarchical network framework. The hierarchical network security system is mainly based on the soft-switch technology in contrast to intranet and extranet.

Based on the complexity of the hierarchical network environment, the construction of security framework is required to be based on the volume of business on server-side, and also a reasonable service window is required to be set on the server-side of extranet. Moreover, a firewall can be set at port, for the purpose of shielding and intercepting the external interference information. The security and protection of the data interface end of hierarchical network plays a critical role. In data interface end, it is necessary to make recognition on the identity of user-end, and then users are allowed to enter the network service area. In the mean time, for the diversification business services, it is necessary to set reasonable business authorization, and it is especially to set a perfect access restriction for the handling of "sensitive business". In the construction of the security system of hierarchical network, the secured protection on the identity information of users is also a key part of framework architecture. The data processing end in the hierarchical network system, it is necessary to set an effective control layer, and then carry out verification on request data.

In the construction of the security framework system, the construction of the security of the carrying network is the most important, and can play a direct effect on the handling of NGN network business. NGN, in the construction of carrying network system, is still based on the traditional IP technology. Therefore, it features openness for the construction of carrying network. In general, the IP protocol normal form is applied in the construction of carrying network, so as to ensure the running environment of carrying network. Based on IP protocol, the attacks from hackers or viruses can be effectively prevented, and thus the running efficiency of network is improved. Besides, the network business of NGN tends to be diversified. In the construction of the carrying network security system, the control on the security of network nodes is also very important. In the control on the security of network nodes, it is necessary to control the network faults that are caused by a single node. Also, NGN is based on the diversification of business. Therefore, for the setting of nodes, it is necessary to set network nodes at multiple levels.

Besides, the setting of effective basic nodes can help maintain the security of the whole network nodes.

The security construction of the data control layer of NGN is also very important. In the network operation based on the soft-switch technology, it is necessary to control network and especially ensure the security of operation equipments. This is the key to the construction of the data control layer. A non-level network authorization mechanism is applied in the equipments at all nodes, and then data is effectively and independently controlled, and then data is independently processed, ultimately achieving the purpose of business services.

The security construction of the business handling layer of NGN plays a direct influence on the effectiveness of services. Therefore, based on the soft-switch technology, independent control at different level is implemented, making an isolation state formed between network information and lines. With the growing popularity of the Internet, the effectiveness of information communication is the core of NGN. It is necessary to make a confirmation on NGN information and especially the affects of fake or theft information sources on network security. In the soft-switch environment, business information is processed in network, and also the risks of information business are controlled with the form of network segments. That is, the effective separation between NGN and Internet is a foundation for realizing the construction of NGN security framework.

18.4 Analysis on NGN Core Technology

NGN, as a brand new open network platform, is necessary to be supported by core technologies in the construction of network system. And it is especially necessary to be based on the application of the soft-switch technology, making the innovative development of NGN realized.

18.4.1 Soft-Switch Technology

The soft-switch technology, as a brand new technology, is necessary to give consideration to the communication between itself and the traditional network in the process of applying NGN.

Moreover, the soft-switch technology is in the control center of NGN, making the independent processing of the call and media control based on a hierarchical network realized.

The soft-switch technology is still in a developing state. Therefore, the improvement of its functions and system are necessary to be based on standardized protocols and API, and then an open network structure system can be constructed.

Therefore, the soft-switch technology is the core of the next generation network, and this plays a very important role in the construction of the NGN security system.

In the process of constructing the soft-switch system, its core is mainly the construction based on three concepts, and especially the creation based on an open interface is an important aspect of the soft-switch technology.

18.4.1.1 Creation of Open Business Interface

The business model of the soft-switch technology is mainly based on server and AIPI, and is aiming at providing a diversified business service for user-side.

However, the intelligence of service interface based on the soft-switch technology makes the services of business more secured and effective.

18.4.1.2 Completeness of Access Protocol

The soft-switch technology supports the access of multiple protocols. In such a way, it is easy to manage the equipments on the access side, and simultaneously the data process on the access side can become sound, thus ensuring the effectiveness of information.

In this case, the realization of diversified functions of NGN plays a very important role.

18.4.1.3 Construction of Network Interworking

In the construction of the functions of the next generation network, the network interworking plays a critical role.

However, the soft-switch technology, based on the form of hierarchical network, makes network interworking realized.

18.4.2 Optical Fiber Transmission Technology

In the next generation network, importance is attached to the high efficiency and capacity of data transmission.

Therefore, in the realization of the functions of the next generation network, it is necessary to be based on optical fiber transmission technology, so as to realize the high efficiency of data transmission.

In the mean time, importance is also attached to the flexibility of business processing and high-efficient transmission performance.

It is also necessary to be based on optical switching, and then the intelligence of networking can be realized. Furthermore, with the continuous development of the telecommunications industry, the transmission technology of the next generation network is continuously improved.

18.4.3 Broadband Technology

Based on the development of the 3G network, the construction of the functions of the next generation network is required to be based on broadband connection technology, and the effectiveness of the next generation network can be realized.

The broadband technology of the next generation network is mainly based on Ethernet, so as to realize the high-speed digital transmission on user-side.

18.5 Conclusion

The next generation network, as a brand new open platform, makes its business processing diversified based on the soft-switch technology and broadband connection technology, etc. Especially the media-orientation of NGN business makes the forms of network service enriched. This is an innovative development in contrast to the development of network beyond all doubts.

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