Research and Application of Soft Switching Technology in Power Dispatching Communication Network

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Abstract: Softswitch is the development direction of next-generation networks, which can better achieve network convergence and service convergence. Soft switching technology has gradually replaced circuit switching technology has become an inevitable trend. This paper analyzes the meaning of softswitch technology and the problems existing in China's electric power dispatching network, and elaborates the specific application of softswitch in the electric power dispatching communication private network, and hopes to provide some inspiration for the research in this field.

1. Introduction

In today's era, people's living standards are increasing day by day, and the demand for electricity is gradually becoming personalized and diversified. The power system must use soft switching technology reasonably to improve the quality of communication in the power system. At the same time as the level of science and technology continues to improve, communication technology has also developed and upgraded, and has become an important tool on which all fields of society depend. The emergence of soft switching technology improves the convergence of the network, facilitates the development and application of third parties, and achieves effective call control. The functions of softswitch technology will inevitably be expanded. The softswitch system is gradually realizing intelligent communication, which will further promote the further development of modern power systems. The power communication network has similar technical characteristics to the operator network. The timely introduction of soft switching technology enables the same network to provide multiple services and applications, and makes the development and deployment of new services very convenient to provide a complete user security system, thereby optimizing communications The network construction of the private network simplifies the operation and maintenance management, fully meets the communication needs for voice and video transmission in the production and dispatching of the power grid, and improves the support of the power communication network to improve service quality.

2. Softswitch Technology Overview

2.1 Concept of Softswitch Technology

The concept of softswitch originated in the United States at the time. In the enterprise network environment, users used Ethernet-based telephones. The system did not need to lay a separate network. It can be managed and maintained only by sharing with the LAN. Network system. Softswitch technology can also be called as call server control technology, which refers to the separation of call control functions in the media transmission layer, the control of power systems through software
control, and the connection between call control and call transmission, so as to better realize software programmable control function. This technology is an evolution of network technology. It does not depend on network transmission. It can independently allocate resources, complete call control tasks, and provide users with information about changes in the power system. This technology on the network technology platform can well solve the technical problems of PSIN telephones and ensure that voice and video can be fully integrated.

Softswitch technology can carry out physical functions to a certain extent and provide users with corresponding connection and call control function services. This technical function is an important part of network calling and control. Therefore, a new dispatching system is formed based on the characteristics of the power dispatching system's own development, which is soft switching technology. The key to applying soft switching technology to the power dispatching system is to use this technology to properly develop and develop IP telephone voice services, breaking the traditional single voice function of the power system. From another aspect, it can be found that it is very difficult to implement this technology well. For example, it is difficult to integrate soft switching technology with power dispatch. Therefore, the promotion and application of soft switching technology in power dispatching systems is the key to increasing the overall operating efficiency of the system.

2.2 Softswitch system structure and function analysis

2.2.1 Softswitch Architecture

Softswitch architecture is divided into control layer, switch layer, business layer and access layer. These functional layers are completely separated and use some network components with open interfaces to construct each functional layer. Therefore, the softswitch system is a collection of network components with open interface protocols.

![Network structure diagram based on softswitch](image)

Specifically, the access layer provides various user terminals, converts the information to be transmitted into a format that can be carried on the IP network, provides a broadband transmission channel for various data streams and media, and transmits the data to the destination through routing. The transport layer implements its functions based on packet switching technology, which is the core supporting technology of soft switching. The control layer devices are called softswitch devices, softswitches, or media gateway controllers. They are mainly used to control access layer devices to complete calls and continue their functions of controlling services. The business layer uses various resources at the bottom to provide users with a variety of network services and resources, and it has an open interface to access services provided by third parties. Among them, the communication between control layer devices uses NPS, the communication between control layer devices and access layer gateway devices uses ISPNI, and the communication between control layer devices and smart terminals...
uses FTP protocol.

2.2.2 Functional Analysis of Softswitch System

Access layer and function. In the softswitch system, the components of the access layer are mainly the signaling gateway, wireless access gateway, relay gateway, and user access gateway. The access layer can connect the network terminal equipment and the external network to the core network, and can realize the centralized reception and delivery of services.

Control layer and function. In the control layer, softswitch equipment is its core structure, and its main function is call control. Simply put, it is allocating network switching resources. At the same time, the required resources need to be provided to the business layer in the power system. From this perspective, the call control layer can comprehensively control the entire process of multimedia industry calls from establishment to release.

Business layers and functions. The components of the business layer mainly include a policy server, a service control point, an application server, and an AAA server. The function of the business layer is to create, provide, and execute network services. In addition, the softswitch system can effectively implement all the services provided by the intelligent network and other value-added services.

Transport layers and functions. The transport layer refers to ATM switches and IP routers. The main function of this layer is to build an effective channel for the transmission of voice and video, and can give full play to the functions and functions of the media gateway. The function of the media gateway is the IP network endpoint and the SIP client terminal. The transport layer device is an interface part, which can realize the connection between the packet network and the external network.

3. Problems in China’s Power Dispatching Communications

The problems in China’s power dispatching communications include the following.

3.1 Network communication equipment is not advanced. In the current operation of China’s electric power enterprises, the dispatching switches at all levels operate independently, without forming a unified and overall dispatching network. This situation is not conducive to the dispatching of the power system, and has certain implications for the development of China’s electric power enterprises. Obstruction. In addition, there is a shortage of dispatch phones in enterprises. As the number of phones increases due to the development of the enterprise, it is difficult for dispatch phones to implement technical communication and instruction transmission, which cannot meet the needs of communication.
3.2 Communication reliability is relatively low. In current power companies, communications are limited by equipment, technology, and funding. In the operation of the power system, communication is more important. Public network communication is the main form. The communication host and lines are outside the control range, which will cause data leakage or interception. The troubleshooting and maintenance work is also complicated, which brings inconvenience to daily work. There are some problems in the design of the traditional power communication system, such as limited functions, difficult signaling intercommunication, incompatible in various network transmission media, etc., which brings great trouble to the communication work.

3.3 The utilization efficiency of the network is relatively low. During the operation of the communication system, the utilization efficiency of the network is relatively low, involving multiple devices, information needs different conversion equipment in different media, some information and data are difficult to effectively transmit, and the maintenance cost of the communication network is relatively high.

4. The value and application of soft switching technology in power communication

In order to realize the communication between optical fiber and microwave in power communication system, we must rely on soft switching technology. Through the application of this technology, not only can the waste of resources be reduced, but also a better connection between network communication systems can be guaranteed.

4.1 Convergence of new and old networks. From an economic point of view, compared with circuit switches, softswitches are easy to receive due to the use of an open platform, and the cost of softswitches is low. Its cost-effectiveness is increased by 20% every year. It can be seen that softswitches have great advantages on the economic side. From the perspective of users, the new
network of softswitch completely broke the monopoly situation of suppliers. Users can freely choose to buy products from various manufacturers at various levels and build their own networks based on cost performance. In addition, in power communication, the application of soft switching technology has achieved a technological breakthrough in power communication. Through this technology, power companies can achieve the integration of multiple communication systems, concentrate multiple communication functions on the same platform, and increase information. The transmission volume and security provide high-quality communication services for the development of power companies, improve the effectiveness of information transmission, and promote the development process of enterprises.

4.2 Realize the function of network interconnection. In the scope of power communication, it includes power protection data networks, information management networks, telephone exchange networks, and power grid automation data collection. In power communication, the application of softswitch technology can provide effective interfaces for various signaling protocols, realize signaling interworking between networks, allow computer networks and telephone networks to support each other, and provide users with more convenient and effective services. The application of soft switching technology in the power communication network can better achieve the intercommunication between the networks in the system and provide more transmission media for it. At the same time, softswitch plays an important role in the connection of computer networks and telephone networks. It can provide interfaces for multiple signaling protocols, and computer networks can effectively manage and cope with the telephone network. At the same time, it also plays an important role in the process of network Internet management and implementation.

4.3 Realize the integration and management of power dispatching network information. In the power dispatching network system, the main forms of information transmission are data and audio. In power communication systems, the application of softswitch technology can effectively solve the problem of different transmission media caused by the large number of network media and independent operation. In this way, the information of the entire network can be processed through one medium and equipment, effectively avoiding waste of equipment and resources, and achieving convergence and intercommunication of different media networks. After the soft switching technology is gradually applied to power communication, the transmission of video information will gradually be used as an important part of the system. The main application of softswitch technology is an open program interface, and its actual cost is not high. Therefore, it will soon become the key technology used by customer service centers in the future, and to a certain extent, provide high-quality services for electric power communications.

4.4 Effectively extend network services. Soft switching technology is a prerequisite for information conversion. There are some differences between the unified optical fiber network and the microwave network in different media networks. In power communication networks, there are also many transmission media on the network, and they are independent of each other. Only through the unification of different media can different media be able to realize the transmission and conversion of information in the same server. Softswitch's application program interface is open, can provide new business support, and can develop some value-added services for power companies, providing users with better services. The emergence of power system call centers has combined soft switching technology, which can effectively save the time and energy of users and staff through online communication, and has a good role in promoting the development of power services. In addition, the application of soft switching technology can also promote the internal work and communication of power companies. Staff can use equipment to conduct video conferences and related technical exchanges, improve work efficiency, save time, and break space and geographical restrictions.
5. Application of Soft Switching Technology in Power Dispatching Exchange System

5.1 Scheduling switch networking scheme. Based on the SDH transmission network, in the process of establishing a power dispatching exchange system, it can achieve the function of indirectly or directly connecting the IP / SDH network with visual dispatching and IP telephones. In addition, on the premise that the interrupt board 2M = IP helps, the purpose of connecting the PBX and IP can be achieved. All power system dispatching switches have a relay board 2M-IP, which can guarantee a smooth connection between SED PBX and IP networks. This is of great significance for ensuring the smooth call and permission work in the network and promotes better power dispatching.

![Scheduling networking scheme](image)

5.2 Standby dispatch communication system scheme. In the development process of the power system, the data information of free voice and video communication can be used between the above components, and the purpose of voice data communication can also be achieved by using dispatch switches and IP phones. In the case of converging Ethernet SDH equipment, voice communication and call control can be performed between the dispatching switch and the IP dispatching console, and the SDH equipment Ethernet converging board can be used as a system backup device, so that it can conform to the use of a dispatching junction system. With the continuous development and application of electronic information technology, more and more emphasis is placed on soft switching technology. More and more manufacturing equipment manufacturers have started to add voice, graphics, and data to the system, thereby forming the NGN next-generation network model and utilizing distributed Network to achieve the purpose of effectively transmitting and carrying data, voice, and images.

5.3 The plan for accessing the IP dispatch phone of the substation. In the dispatching process of most power systems, the traditional method is to connect the dispatching switch and the PCM extension circuit. Due to the continuous advancement of science and technology, the more efficient way to connect power dispatching systems and IP phones is the Base-T interface. Under the premise of SBH network and IP network, establish and connect substation switches and IP telephone department dispatch terminals. SDH can be used to provide MSTP to ensure that all IP devices within the area can be connected smoothly, ensure that they can fully meet actual performance requirements, and promote power The development and progress of the dispatch exchange system.
6. Conclusion
This article mainly studies the practical application of softswitch technology in power communication networks and recognizes its important role. The use of soft switching technology in the power dispatching system is mainly based on IP network technology, using IP telephone expansion functions and IP multimedia dispatching consoles to achieve the purpose of successfully completing system power dispatching, and displaying the working status through actual operating conditions. Power dispatching soft switching technology based on IP network technology can have relatively stable and good performance, and can also increase the quality of service of the voice system to a certain extent.

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