**oftswitch for IP video conferencing**

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Video conferencing is through terminals and networks. IP network broadcast participants can participate in discussions on the same topic. They can not only hear the speaker's voice but also the speaker's image and background. They can also exchange information about the topic. Data, text, graphics and other information, so participants can get a lot of information than the conference call, with the development of VLSI and computer technology, computer interaction, network distribution and multimedia information Synchronization as one of the multimedia conference television systems has broken through the traditional boundaries of computers, communications, television, etc., providing people with new interactive services.

Video conferencing provides real-time communication between multiple users at different locations, including high-quality voice with participant image information and other media information. When there are more than two terminals in a public address system, a multipoint control unit (MCU) is usually required. All terminals are connected to an MCU, which is responsible for selecting or appropriately mixing the signals sent by each user, while controlling and managing the signaling and optional channels. Typical applications for video conferencing include meetings between remote participants, writing documents, displaying items (such as a new product), comments and contract negotiations (may require both parties to shun private discussions or invite experts to make suggestions), distance learning and training , telemedicine and remote goods auctions. Different from the singularity requirements of traditional voice services, video conferencing puts higher requirements on communication systems, such as support for integration, interactivity, and synchronization. As one of the core devices for voice service, data service and video service call, control and service provision in the next generation network, the softswitch device has attracted people's attention. Softswitch not only inherits traditional voice services, but also supports IP video conferencing.

Softswitch requires the separation of call control functions from the media gateway (transport layer), through software for connection control, translation and routing, gateway management, call control, bandwidth management, signaling, security, and generation of call detail records. , separate control and business offerings. Softswitches provide the same functionality as circuit switching in a packet switched network. Therefore, softswitches are also known as call agents or call servers.

Softswitch is business-independent and is a technology that provides telecommunications services based on factory public broadcasting. In circuit-switched networks, call control, service provisioning, and switching fabrics are all concentrated in one system; the main design idea of softswitch is that services, control and transmission, and access are separated, and entities connect and communicate through standard protocols. The ability to provide services more flexibly, that is, softswitch is a software-based distributed switching/control platform that separates the call control function from the gateway, thereby facilitating the introduction of multiple services on the network.

I. Introduction to IP Video Conference

1. Standards for IP video conferencing

In order to solve the intercommunication problem between different vendors' products and establish a global unified video conferencing standard, the International Telecommunication Union (ITU) Telecommunication Standardization Sector (ITU-T) has formulated a series of standards for video conferencing since 1990. Thus formed a complete standard system for video conferencing. At present, the establishment of the video conferencing system can be carried out according to the two major ITU-T framework recommendations H.323 and H.320.

The H.320 standard introduced in 1990 is the first generation video conferencing standard, mainly applicable to narrowband ISDN (N-ISDN) networks and non-dial-dedicated private networks. It centrally defines video conferencing on ISDN and video conferencing at a rate of 56 kbps to 2 Mbps. It is also the most mature technology and system in development today.

H.323, introduced in 1996, defines video conferencing framework recommendations on the LAN, intranet, and the Internet. It enables systems of different vendors that conform to the standard to communicate with each other on the LAN, which is a new direction for the development of video conferencing. H.323 defines the devices, procedures, and protocols for video communication over a LAN. H.323 uses the Internet Protocol-compatible IETFRTP/RTCP standard and plans to use various Packet Switched Network (PSN) protocols, including TCP/IP and Novell SPX/IPX protocols. The H.323 protocol is the standard for IP video conferencing.

In the early stage, because the IP protocol is not very common, based on ISDN lines, the products that conform to the H.320 protocol account for the majority. With the universal application of IP protocols and the rapid development of the Internet in the past few years, especially for the foresight of broadband networks, it is in line with H. Since 2000, the products of the .323 protocol have risen sharply in the overall market. With the continuous improvement and improvement of IP technology and the formulation of international standards, the application range of IP video services will gradually expand, and applications based on the H.323 platform will become increasingly widespread.

The H.323 standard covers audio, video, and data communications over packet-switched networks, addressing issues such as call and session control, multimedia and bandwidth control in point-to-point and multipoint video conferencing. H.323 references the T.120 protocol to handle data exchange.

In the H.323 recommendation, the image codec formats used are H.261, H.263, and H263+. H.263 and H.263+ are able to provide a larger compression rate for images and provide better image quality than H.261 at low bit rates, making them more suitable for IP network applications.

The audio coding format must be compatible with G.711 speech coding, or you can choose to use G.722, G.723.1, G.728, G.729 or MPEG-1 speech coding standards.

The IP-based video conferencing system uses packet switching technology because packet switching does not guarantee order and fixed delays, so there is no guarantee of fixed delay and bandwidth. In order to better solve the service quality of real-time communication, protocols such as UDP/IP, RTP, RTCP, and RSVP are adopted.

H.323 has the following main advantages. The H.323 protocol is designed to run on a common network architecture with network independence. The H.323 protocol provides network bandwidth management capabilities that limit the number of concurrent H.323 connections in the network and the total amount of bandwidth available to H.323 applications. H.323 provides a means of connecting video conferencing based on circuit switching or ISDN. H.323 supports multipoint conferencing and multipoint conferencing multicast. H.323 implements interoperability of multimedia products and applications from different vendors.

2. Comparison of IP video conferencing system and traditional video conferencing system

In the past, the traditional video conferencing system was based on the H.320 protocol of the dedicated line, and a video conferencing system requiring fixed routing and QoS guarantee. Mainly using ISDN or E1 access. Although the quality of the image and sound is ideal, the price of the client device and the MCU (multipoint control unit) is relatively expensive, which is difficult for small businesses and individual users.

Since the H.320 protocol and the H.323 protocol (IP Video Conferencing System Protocol) have basically the same compression protocol on video and audio, H.323 video conferencing (IP video conferencing system) and H. The quality of 320 video conferences is basically the same.

For a desktop H.320 video conference accessed by ISDN, the user terminal needs to be bundled with a fixed ISDN lease line and cannot be moved. In addition, if a conference is held across provinces and cities, the user still has to pay a long distance fee, which is not only It brings inconvenience to the user and increases the burden on the user. The H.323 video conferencing system (IP video conferencing system) does not have the above problem, because for Internet users, there is no long-distance problem, and as long as the H.323 video conferencing user has a client installed on the microcomputer. Software, compression card and camera, and access to the Internet, after successfully registering with Gatekeeper, you can use MCU (multi-point control unit) to hold meetings anytime, anywhere, very flexible and convenient. On the one hand, it saves a lot of investment costs and maintenance costs for users, and greatly improves the efficiency of information communication of enterprises; on the other hand, it attracts users for operators and expands new value-added services.

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3. The composition of the IP video conferencing system

According to H.323 recommendations, an IP video conferencing system consists of a conference terminal (Termial), a gateway, a gatekeeper, an IP network, and a multipoint controller (MCU).

A terminal is a client that provides one-way or two-way real-time communication. All terminals support voice communication and optionally support video and data communication.

The gateway is used to implement connections to non-H.323 terminals.

The gatekeeper performs functions to protect the integrity of the data network, including address translation, access control, and bandwidth management.

High-speed IP network: With the increasing demand for Internet by home users and higher requirements for information exchange, high-speed IP networks will be rapidly developed. At present, users can obtain access bandwidth of 10M or even 100M by re-laying Category 5 lines. Can fully support the conference TV business. Using VLAN switches instead of hubs, supporting IGMP routers, transmitting images through Frame Relay and ATM networks, and ensuring bandwidth can better ensure the transmission quality of conference TV.

The multipoint controller is used to support network conferences between three or more points, consisting of the necessary multipoint controller (MC) and zero or more multipoint processors (MP). The MC determines the audio and video processing capabilities of all terminals and controls the conference resources. MP mixes, exchanges, and processes audio, video, and data streams.