Microsoft® Exchange 2000 Server

Exchange 2000 Conferencing Server and H.323

White Paper

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H.323 Support in Exchange 2000 Conferencing Server

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Introduction

Microsoft Exchange 2000 Conferencing Server employs two mechanisms to provide the audio/video stream to videoconferences. IP Multicast is the preferred or default method. H.323, which is also called Unicast, is used in cases where IP Multicast is not available.

Both methods are described in the following sections.

IP Multicast Conferencing

IP Multicast is an extension of the Internet Protocol (IP) that allows for efficient group communications. In a multicast environment, the participant's computer sends a single copy of each network packet to the router. The router identifies the multicast addresses and forwards the multicast packets only to those IP addresses that are listening.

The Exchange IP Multicast Technology provider uses the Session Description Protocol (SDP) for IP Multicast conferencing. A multicast address and a pair of User Datagram Protocol (UDP) ports define the multimedia traffic for the conference. Each multicast client sends one stream of audio/video to the multicast address and listens to the same address.

Advantages:

- A single video/audio stream requires less network bandwidth.
- Every attendee sees video of all other attendees.

Limitations:

- Network routers between all clients and the host conferencing server must be multicast enabled.
- Clients must be multicast capable.
- The network router configuration can create IP Multicast islands, which make it impossible for clients to connect to some conferences.
- IP Multicast conferencing is CPU-intensive on the client because the client performs the audio mixing and receives all the video streams.

Traditional H.323 Conferencing

H.323 is an International Telecommunications Union (ITU) standard that specifies how client computers, equipment, and services for multimedia communicate over networks, such as the Internet, that do not provide a guaranteed quality of service. Different products that use H.323 for audio and video can connect and communicate over the Internet just as people using different types of telephones can communicate using telephone wires.

H.323 is the other common mechanism for providing the audio/video stream to videoconferences. H.323 provides point-to-point video conferencing. Each H.323 client sends audio/video to a central multipoint control unit (MCU). The MCU mixes audio from all the clients and sends the resulting audio stream back. The MCU also switches video between the clients.

Advantages:

- Although the bridge must have H.323 connectivity to the host server, there are no special network requirements between clients and the host server.
- Client CPU usage is low because the MCU mixes audio and switches video.
- The client receives only one audio stream and one video stream.

Limitations:

- An H.323 call requires more network bandwidth than IP Multicast.
- Participants do not see the video of other participants simultaneously.
- The participant who most recently sent audio data, called the *active talker*, is not indicated.

Exchange Conferencing Server and H.323

Exchange Conferencing Server uses IP Multicast whenever possible. It uses H.323 to ensure connectivity between IP Multicast islands and provides connectivity to the millions of H.323 clients already in use. To accomplish this, Exchange Conferencing Server employs a slight variation of the traditional H.323 model.

Instead of using an MCU, Exchange Conferencing Server connects the two call models-IP Multicast and H.323-by using a simple bridge placed at the boundary where connectivity breaks down, or where multicast is not available. When a non-Windows 2000 client or a Windows 2000 client that does not have IP Multicast connectivity to the Conference Management Service wants to participate in a multicast conference, the client calls the H.323 bridge with enough information to identify the SDP text that describes the conference. The H.323 bridge, on behalf of the H.323 client, verifies that it has multicast connectivity to the host, then Conference Management Service, joins the multicast group defining the conference, obtains the media streams, mixes the audio, transcodes the audio if necessary, switches video, and sends the output to the H.323 client. On the other side, the bridge relays the H.323 client’s media to the multicast host group, thereby allowing other multicast clients in the conference to see the H.323 client. The H.323 conferencing bridge connects multicast-incapable clients to multicast conferences.

Advantages:

- A corporation is rarely a single multicast island, thus H.323 becomes crucial for connecting the multicast-incapable client to the multicast conference.
- Routers do not have to be multicast enabled.
- Client machines do not need to be multicast capable. Thus, non-Windows 2000 clients can connect to multicast conferences.
- H.323 serves as a backup method for conferencing when the multicast infrastructure is temporarily down.

Limitations:

- Network routers must be multicast enabled between the Conference Management Service and all H.323 bridges that are expected to join the conference.
- Only H.323 clients that support Microsoft NetMeeting® conferencing software are supported.
- Remote access is not supported.
- The H.323 bridge must be part of a data conference or video conference resource.
- Audio/video quality might be degraded, compared to full multicast.
- Audio/video quality and performance can degrade in large H.323 conferences. For example, 40 H.323 attendees in a conference could exhaust CPU resources. A 450-MHz server with 256 megabytes (MB) of RAM can support approximately 40 H.323 clients spread out in different conferences on one server.
- Participants might not see the video of the *active talker*. The active talker in a conference is the person who has most recently sent audio. Ideally, the active talker should be visible when he or she starts talking. However, the Active Talker algorithm can take up to 7 seconds to switch the video to the current speaker. Thus, participants might not see the appropriate video.

Configuring an H.323 Resource

To configure an H.323-capable resource in Exchange Conferencing Server, create a resource that has both the Data and Video CTP, as described in the Exchange Conferencing Server documentation. In the Video CTP, select the **Enable H.323 Data Provider** check box as shown in Figure 1. It is recommended that you set the **Data** and **Video** sizes to the same value.

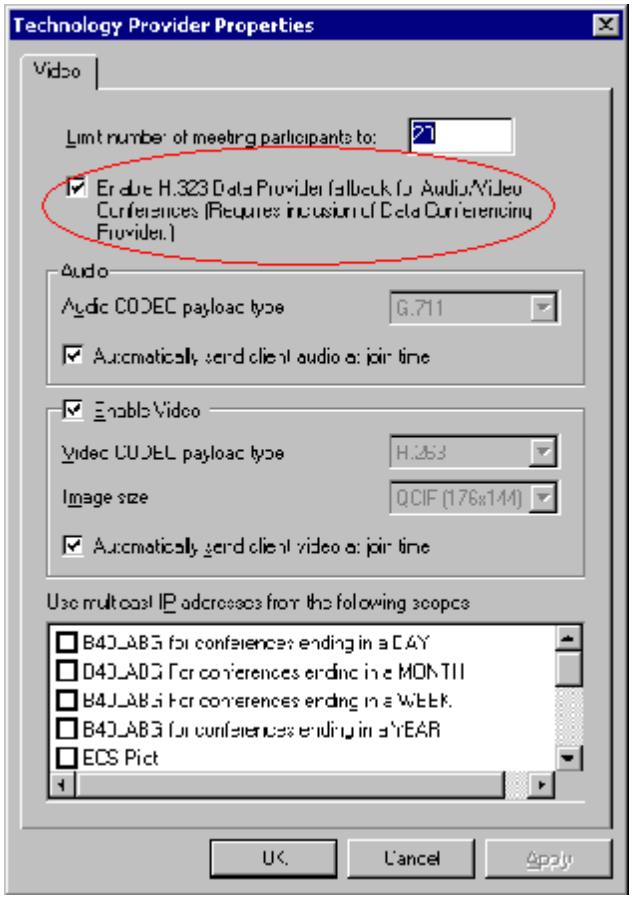

Figure 1. Technology Provider Property Sheet

For More Information

Microsoft Exchange 2000 Server: http://www.microsoft.com/exchange
Exchange 2000 Conferencing Server:
http://www.microsoft.com/exchange/prodinfo/2000/ECS_datasheet.htm
IP Multicast Initiative: http://www.ipmulticast.com
International Telecommunication Union (H.323): http://www.itu.int/