

# Introduction to ViaVideo and Desktop Video Conferencing

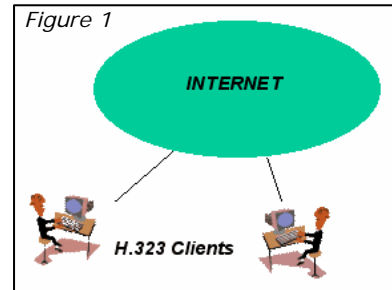
## H.323 Basics

### Introduction

H.323 is an International standard protocol for videoconferencing. It uses the Internet/LAN for connectivity between endpoints. Endpoints can be client videoconferencing terminals, Multipoint Control Units (MCUs), or gateways.

### Point-to-Point Videoconferencing

Consider two client terminals that are connected to the Internet. (See Figure 1) An example of a client terminal or end point is a Polycom ViaVideo. The ViaVideo and its associated peripherals allow the user to make a call to another client, send the local audio/video stream to the remote client, and hear/view the received audio/video stream on a local speaker/monitor that is connected.

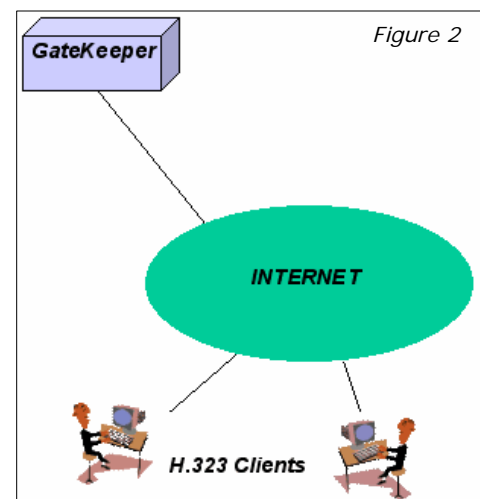


Assume one user (the local user) uses a ViaVideo to call a user at a remote ViaVideo (client terminal) by entering the IP address of the remote ViaVideo. The clients setup a call between the stations following the specifications of the H.323 protocol. Once the call is setup, the clients exchange audio/video streams over the Internet. The point-to-point videoconference continues until one of the users "hangs up" the call.

One of the problems with this type of video call is that IP numbers are used for the call. IP numbers are difficult to remember; some users have dynamically assigned (DHCP) IP numbers that can change every time they boot their system; and we have noted problems in using IP addressing when different vendor systems are used. We thus do not recommend the use of IP dialing although it is occasionally used.

### The Gatekeeper

To alleviate the problem of IP dialing, the H.323 standard defines the use of a gatekeeper (See Figure 2). The gatekeeper is a system that connects to the Internet just like the client terminals. The IP address of the gatekeeper is configured into the client terminals and when the clients "power up", they communicate with the gatekeeper and transfer certain information to the gatekeeper that describes the client. This process is known as registration; the client registers with the gatekeeper.



Two identifiers are assigned to and configured in each client terminal. One is a H.323 Alias. It is usually descriptive of the particular client terminal and usually contains alphanumeric characters. The other descriptor is the H.323 Extension. It usually consists of several numbers and can be thought of as being the video telephone number of the client. While it is possible to use either the H.323 Alias or the H.323 extension for dialing, it is difficult to dial alphanumeric characters on most clients; it is the H.323 extension that is normally used for dialing.

When the clients register with the gatekeeper, they pass their IP numbers, H.323 alias, and H.323 extension to the gatekeeper where it is stored. This allows a local user to dial a remote user by entering the remote users H.323 extension (video telephone number) rather than an IP address. The local client terminal communicates the H.323 extension to the gatekeeper. The gatekeeper then checks to see if the remote client is registered with the gatekeeper. If it is, the gatekeeper sets up the call between the two clients; if it is not registered, the call is rejected. Once the call has been setup, the audio/video streams flow directly between the clients over the Internet. The gatekeeper can perform a number of other management functions as well.

For instructions on how to register with the ECU gatekeeper, contact the University Help Desk at 252-328-6866 and ask for the "Gatekeeper Registration Instructions document".

### **Multipoint Videoconferences**

To this point we have only considered point-to-point videoconferences. These are conferences between two client terminals. The question can then be raised, "what if we have users at three or more clients that want to hold a videoconference". To handle this situation, the H.323 standard introduces the concept of a Multipoint Control Unit (MCU). The MCU (See Figure 3) is an endpoint that can be thought of as a "video bridge". The MCU connects to the Internet as does any other endpoint and registers with the gatekeeper, as does any other endpoint.

A MCU, depending on its design capacity, can handle a certain number of simultaneous videoconferences each with each videoconference being logically separate from the others and with each having a specified number of users. At this time, the ECU MCU can handle a total of 16 video participants.

When users want to join a particular videoconferencing session, they dial the conference number/password combination. The gatekeeper checks to see if that combination has been registered by a MCU. If it has, the gatekeeper completes the call by connecting the client to the specified videoconference on the MCU; otherwise, the call is rejected. Once the call has been connected, the client's audio/video stream is then sent over the Internet from the client to the MCU. Similarly, other clients connect to the session and send their audio/video streams to the MCU. The MCU selects one of the audio/video streams on the videoconference and returns that audio/video stream to all of the clients (that is all except the client whose stream was selected). There are several methods for selecting an audio/video stream. Audio switching and chairman control are two alternatives. Typically, the method that is chosen is audio switching where the MCU selects the stream that currently has active audio (someone is talking or is talking the loudest). We frequently refer to this selection process by saying that this particular stream (client) has "captured" the MCU.

### **Bandwidth Considerations**

The H.323 client terminals encode the selected audio (usually from a microphone) and video (usually from a camera) inputs. The encoded audio and video are then compressed into a single audio/video stream and sent to the remote end point (another client terminal or a MCU). Different rates can be selected for the encoding process. As an example, an encoding rate of 384 Kbps might be selected. 64 Kbps is reserved for the audio and 320 Kbps is reserved for the video. The 384 Kbps stream is compressed (redundancy is removed) and sent to the remote end point. Similarly a 384 Kbps stream is received from the remote end point. 384Kbps is the ECU recommended setting.