CHAPTER 1

# Overview of H.323

This chapter provides an overview of H.323 and includes the following sections:

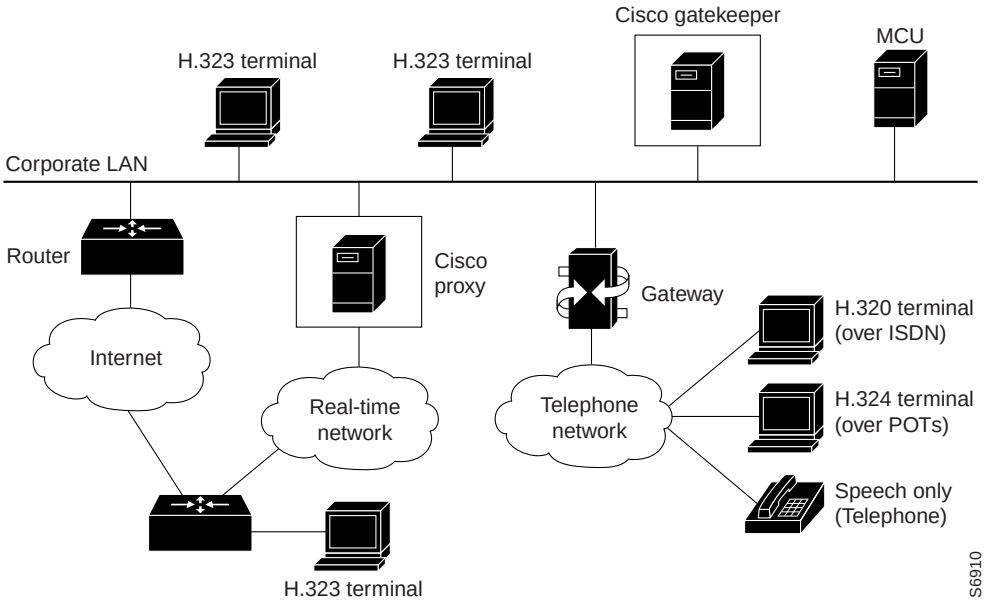


H.323 is an ITU standard for transmitting audio, video, and data conferencing data on an IP-based internetwork. The H.323 standard provides for the following types of *endpoints* in the network:

- H.323 Terminals
- Gatekeepers
- MCUs
- Gateways

Figure 1-1 shows a typical H.323 network:

*Figure 1-1 H.323 Network*




# H.323 Terminals

An H.323 terminal is an endpoint in the LAN that participates in real-time, two-way communications with another H.323 terminal, gateway, or multipoint control unit (MCU). A terminal must support audio communication and can also support audio with video, audio with data, or a combination of all three.

H.323 terminals must support the following standards and protocols:

- H.245—An ITU standard used by the terminal to negotiate its use usage of the channel. The H.245 control channel provides in-band reliable transport for capabilities exchange, mode preference from the receiving end, logical channel signaling, and control and indication. Part of the capabilities exchange includes specifying which coder-decoders (CODECs) are available. Recommended audio CODECs include G.711, G.722, G.723, G.723.1, G.728, and G.729. Recommended video CODECs include H.261 and H.263.
- H.225.0—An ITU standard that uses a variant of Q.931 to set up the connection between two H.323 endpoints.
- RAS—(Registration Admission Status) A protocol used to communicate with the H.323 gatekeeper.
- RTP and RTCP—(Real-Time Transport Protocol and Real-Time Control Protocol) Protocols used to sequence the audio and video packets. The RTP header contains a time stamp and sequence number, allowing the receiving device to buffer as much as necessary to remove jitter and latency by synchronizing the packets to play back a continuous stream of sound. RTCP controls RTP and gathers reliability information and periodically passes this information onto session participants.

# Gatekeepers

Gatekeepers are optional nodes that manage other nodes in an H.323 network. Other nodes communicate with the gatekeeper using the RAS protocol. A gatekeeper is not required in an H.323 network, but it must be used if one is present.

The H.323 nodes attempt to *register* with a gatekeeper on startup. When an H.323 node wants to communicate with another endpoint, it requests *admission* to the call, using a symbolic alias for the endpoint name such as an E.164 (ITU-T recommendation for international telecommunication numbering) address or an e-mail ID. If the gatekeeper decides the call can proceed, it returns a destination IP address to the originating H.323 node. This IP address can be the actual address of the target endpoint or it can be an intermediate address. Finally, a gatekeeper and its registered endpoints exchange *status* information.

## Gatekeeper Zones

H.323 endpoints are grouped together in zones. Each zone has one gatekeeper that manages all the endpoints in the zone. A zone is an administrative convenience similar to a DNS domain. Gatekeeper zones are normally set up to correspond to geographic zones.

# MCUs

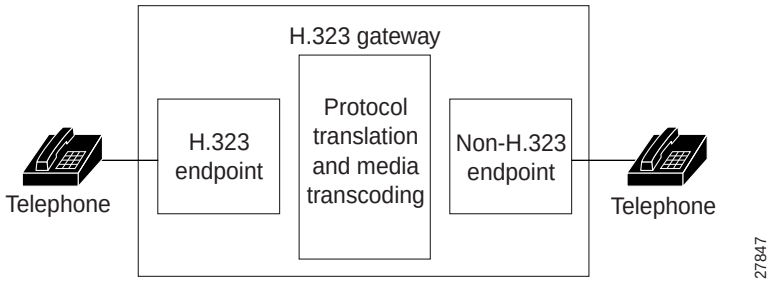
An MCU is an endpoint on the LAN that provides the capability for three or more terminals and gateways to participate in a multipoint conference. It controls and mixes video, audio, and data from terminals to create a robust video conference. An MCU can also connect two terminals in a point-to-point conference that can later develop into a multipoint conference.

**Note** Some terminals have limited multipoint-control built into them. These terminals might not require an MCU with all the functionality mentioned previously.

# Gateways

An H.323 gateway can provide an interface between H.323 and the Public Switched Telephone Network (PSTN), H.320 terminals, V.70 terminals, H.324 terminals, and other speech terminals. It provides standard interfaces to the PSTN, processes the voice and fax signals using CODECs to convert between circuit-switched and packet formats, and works with the gatekeeper through the RAS protocol to route calls through the network. Gateways provide translation between transmission formats, such as H.245 and H.242. Figure 1-2 shows a gateway between an H.323 terminal and a speech-only telephone.

*Figure 1-2 Gateway Between an H.323 Terminal and a Speech-only Telephone*



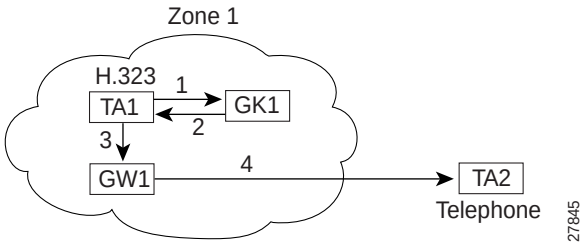

# How Terminals, Gatekeepers, and Gateways Work Together

Gateways provide protocol conversion between terminals running different types of protocols. Gateways communicate with gatekeepers using the RAS protocol. The gatekeeper maintains resource computing information, which it uses to select the appropriate gateway during the admission of a call. In Figure 1-3 and Figure 1-4:

- TA1 is an H.323 terminal registered to GK1.
- GW1 is an H.323-to-H.320 gateway registered to GK1.
- TA2 is a telephone.

Figure 1-3 illustrates the processing of a call that originates with a device in the zone (TA1) and is intended for a device outside the zone (TA2).

*Figure 1-3 Processing of Calls Going Out of the Zone*

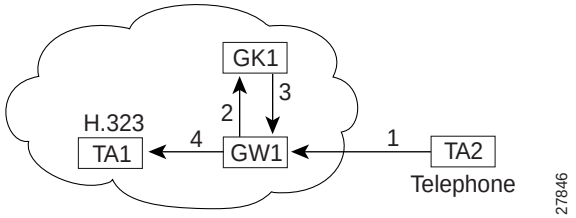



A call from TA1 to TA2 is set up as follows:

1. TA1 asks GK1 for permission to connect to TA2's E.164 address.
2. The gatekeeper looks through its local registrations and does not find any H.323 terminals registered with that E.164 address, so the gatekeeper assumes that it is a telephone outside the scope of H.323. The gatekeeper instructs TA1 to connect to the GW1 IP address.
3. TA1 connects to GW1.
4. GW1 completes the call to TA2.

Figure 1-4 illustrates the processing of a call that originates with a device outside the zone (TA2) and is intended for a device in the zone (TA1).

*Figure 1-4 Processing of Calls Coming Into the Zone*




A call from TA2 to TA1 is set up as follows:

1. TA2 calls GW1 and provides the TA1 E.164 address as the final destination.
2. GW1 sends a message to GK1 asking to connect to that address.
3. GK1 gives GW1 the address of TA1.
4. GW1 completes the call with TA1.