



# NSCET E-LEARNING PRESENTATION

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# **ELECTRONICS & COMMUNICATION ENGINEERING**



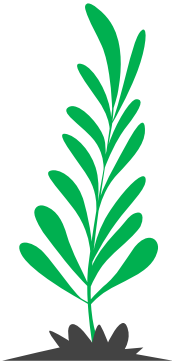
**IV YEAR / VIII th SEMESTER**

**EC 6018 – MULTIMEDIA COMPRESSION & COMMUNICATION**

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# Unit-4

VOIP TECHNOLOGY



H.323 was the first VoIP standard to adopt the Internet Engineering Task Force (IETF) standard Realtime Transport Protocol (RTP) to transport audio and video over IP networks.

# Protocols

H.323 is a system specification that describes the use of several ITU-T and IETF protocols

H.225.0 Registration, Admission and Status (RAS), which is used between an H.323 endpoint and a Gatekeeper to provide address resolution and admission control services.

- H.225.0 Call Signaling, which is used between any two H.323 entities in order to establish communication.

- H.245 control protocol for multimedia communication, which describes the messages and procedures used for capability exchange, opening and closing logical channels for audio, video and data, control and indications.

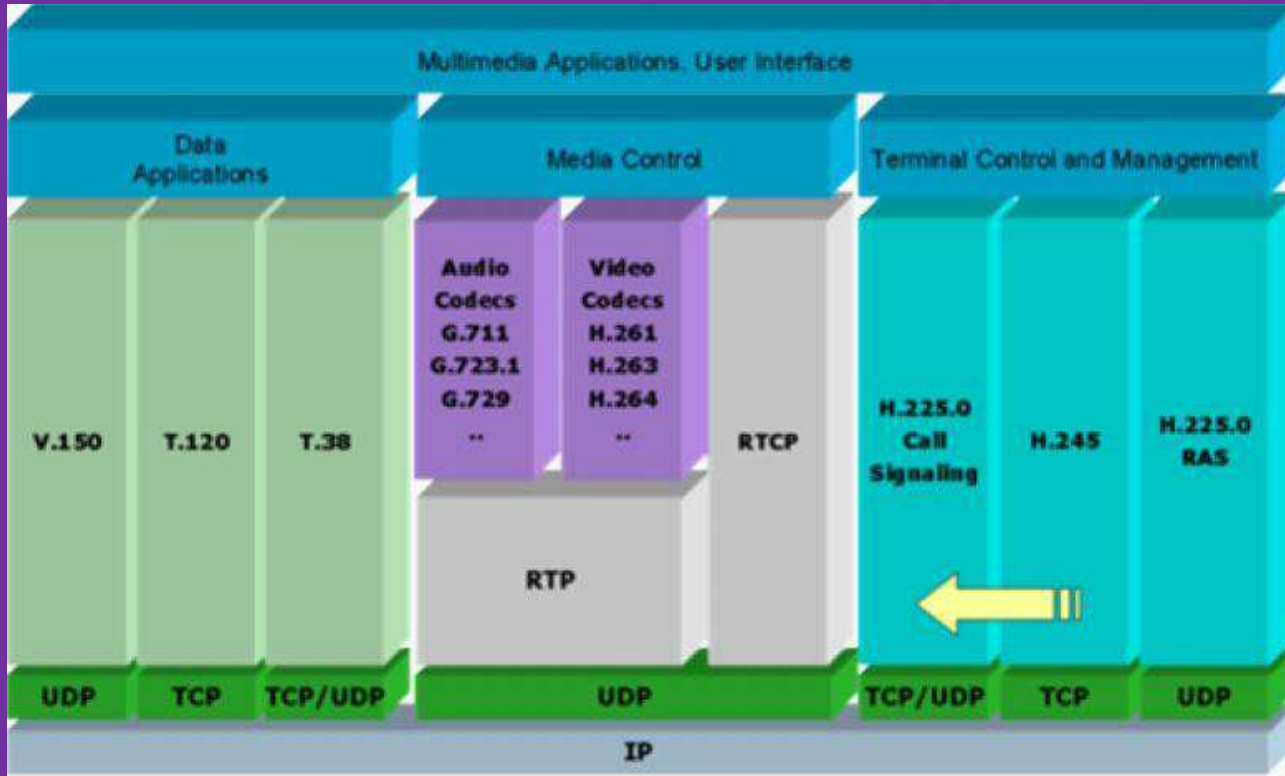
- Real-time Transport Protocol (RTP), which is used for sending or receiving multimedia information (voice, video, or text) between any two entities.

- H.235 series describes security within H.323, including security for both signaling and media.
- H.239 describes dual stream use in videoconferencing, usually one for live video, the other for still images.
- H.450 series describes various supplementary services.
- H.460 series defines optional extensions that might be implemented by an endpoint or a Gatekeeper, including ITU-T Recommendations H.460.17, H.460.18, and H.460.19 for Network address translation (NAT) / Firewall (FW) traversal.

# Codecs

- Audio codecs: G.711, G.729 (including G.729a), G.723.1, G.726, G.722, G.728, Speex, AACLD
- Text codecs: T.140
- Video codecs: H.261, H.263, H.264

# Architecture





# Multipoint Control Units

- A Multipoint Control Unit (MCU) is responsible for managing multipoint conferences and is composed of two logical entities referred to as the Multipoint Controller (MC) and the Multipoint Processor (MP).
- In addition to the normal audio mixing done by a traditional conference bridge.

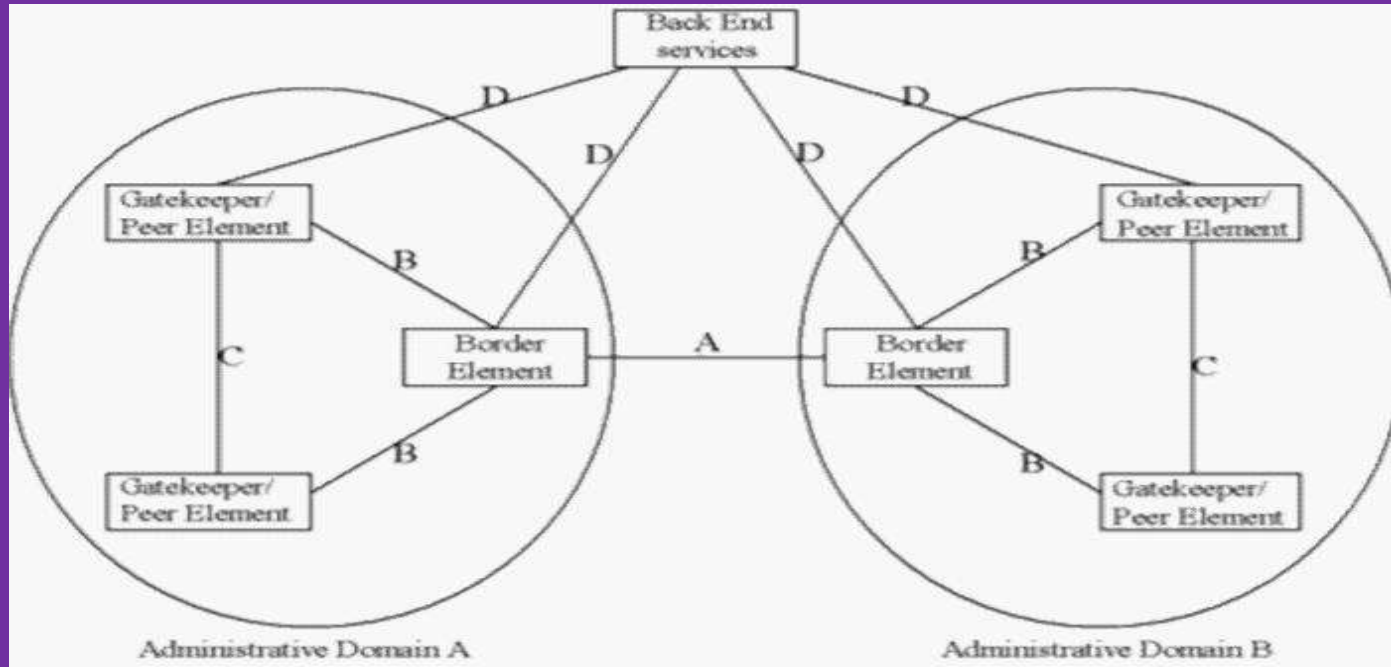
# Gateways

- Gateways are devices that enable communication between H.323 networks and other networks, such as PSTN or ISDN networks.
- Gateways are widely used today in order to enable the legacy PSTN phones to interconnect with the large, international H.323 networks that are presently deployed by services providers
- Gateways are also used in order to enable videoconferencing devices based on H.320 and H.324 to communicate with H.323 systems

# Gatekeepers

- A Gatekeeper is an optional component in the H.323 network that provides a number of services to terminals, gateways, and MCU devices.
- Gatekeepers may be designed to operate in one of two signaling modes, namely "direct routed" and "gatekeeper routed" mode
- In the gatekeeper routed mode, call signaling always passes through the gatekeeper
- H.323 endpoints use the RAS protocol to communicate with a gatekeeper

# Border Elements and Peer Elements



# H.323 Network Signaling

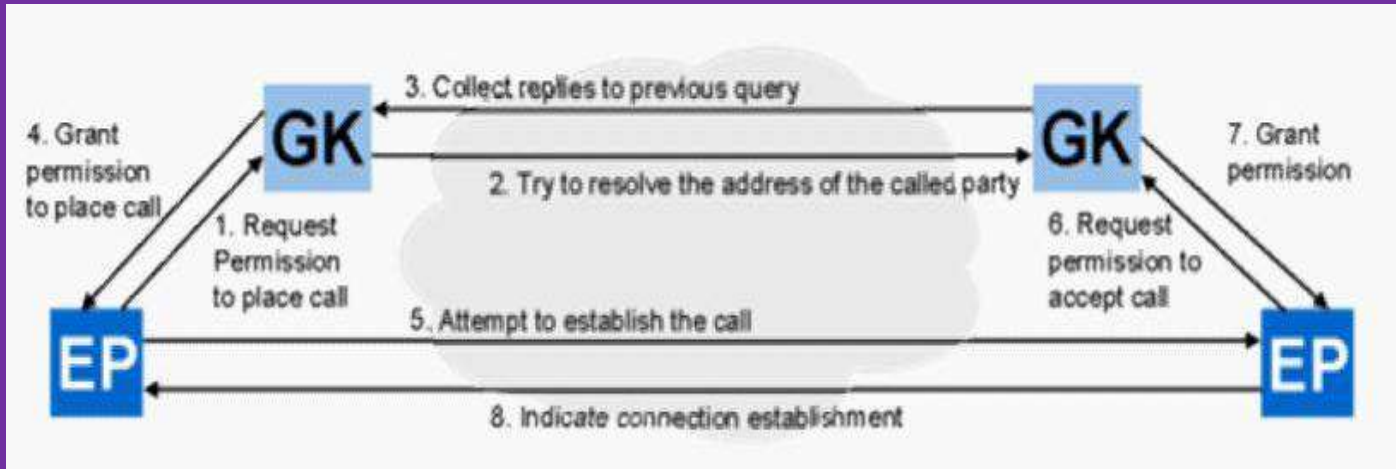


- H.323 is defined as a binary protocol, which allows for efficient message processing in network elements.
- The syntax of the protocol is defined in ASN.1 and uses the Packed Encoding Rules (PER)

# H.225.0 messages

- Setup and Setup acknowledge
- Call Proceeding
- Connect
- Alerting
- Information
- Release Complete
- Facility
- Progress
- Status and Status Inquiry
- Notify

# RAS Signaling



# RAS Messages

- Gatekeeper request, reject and confirm messages (GRx)
- Registration request, reject and confirm messages (RRx)
- Unregister request, reject and confirm messages (URx)
- Admission request, reject and confirm messages (ARx)
- Bandwidth request, reject and confirm message (BRx)
- Disengage request, reject and confirm (DRx)
- Location request, reject and confirm messages (LRx)
- Info request, ack, nack and response (IRx)
- Nonstandard message
- Unknown message response
- Request in progress (RIP)
- Resource availability indication and confirm (RAx)
- Service control indication and response (SCx)
- Admission confirm sequence (ACS)



# H.245 Call Control

- Once a call has initiated (but not necessarily fully connected) endpoints may initiate H.245 call control signaling in order to provide more extensive control over the conference
- H.245 provides capabilities such as capability negotiation, master/slave determination, opening and closing of "logical channels" (i.e., audio and video flows), flow control, and conference control.

# Capability Negotiation

- Video codecs: H.261, H.263, H.264
- Audio codecs: G.711, G.729, G.729a, G.723.1, G.726
- Text codecs: T.140

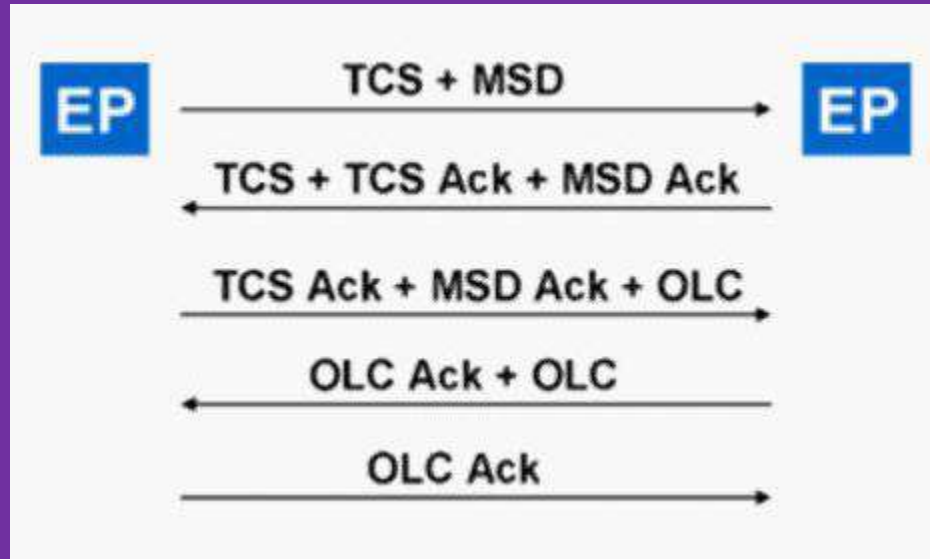
# Master/Slave Determination

- After sending a TCS message, H.323 entities (through H.245 exchanges) will attempt to determine which device is the "master" and which is the "slave." This process, referred to as Master/Slave
- Determination (MSD), is important, as the master in a call settles all "disputes" between the two devices

## Logical Channel Signaling

- Once capabilities are exchanged and master/slave determination steps have completed, devices may then open "logical channels" or media flows

# Fast Connect



# Thank You

