H.323

H.323/1

H.323

• derived from H.320 (ISDN multimedia)
• components:
  H.323: overall architecture =
  H.225.0: call control, RAS to gatekeeper: “may I?”, user location
  H.235: security for H.323 terminals
  H.245: capabilities exchange, indications, notifications
  H.332: large group conferences
  H.450: supplementary services
  H.246: interworking between H.323 and other H.xxx standards
  Q.931: call setup = ISDN, similar to Q.2931 (ATM)
  Q.932: supplementary services
• mostly ASN.1 (PER) based
• signaling TCP-based

H.323/2
**H.323 Zones**

- **T1**: Terminal 1
- **GK**: Gatekeeper
- **GW**: Gateway
- **T2**: Terminal 2
- **T3**: Terminal 3
- **R**: Remote
- **Σ**: MCU

**H.323/3**

**H.323 Elements**

- **H.323 Terminal**: PC with H.323 software
- **MCU**: Multipoint control unit ➔ mixes audio and video
- **MC**: Multipoint controller ➔ performs signaling for centralized conferences
- **MP**: Multipoint process ➔ actual device for mixing
- **gatekeeper**: Session control
- **gateway**: Interface between H.323 systems and other systems: PSTN, H.323 (PSTN mm), H.320 (ISDN), H.321 (ATM mm)

**H.323/4**
H.323 gatekeeper

- controls sessions
- performs user location and registration
- admission control
- reroutes signaling
- processes RAS (registration, admission, status) from H.323 terminals

H.323/5

Gatekeeper Discovery

endpoint                          gatekeeper

GRQ

GCF

GRJ

H.323/6
Registration with Gatekeeper

H.323/7

H.323 Phases

Initialization: register with GK

GK admission: obtain permission
  GK resolves address

Call signaling: signaling connection to peer
  call initiation and completion/rejection

Negotiation/configuration: negotiate roles during call
  capability exchange
  determine mode of operation

Media exchange: configure and open logical channels
  transmit and receive data streams

Re-negotiation: change members, parameters, media, . . .

Shutdown: terminate the call/conference
  deregister user on log-off

H.323/8
H.323v1 call setup (w/o fastStart)

H.323/9

Gatekeeper-routed Signaling

H.323/10
Both Endpoints Registered – GK Routed

H.323/11

H.323 problems

- very complex (200+ pages)
- for “UNI” only
- no multicast signaling
- limited multicast conferences (MCUs)
- call = TCP connection ↔ mobility, reliability
- but: capability negotiation (H.245)
- no media servers
- agile ports ↔ firewalls difficult

H.323/12
H.323 delay

- several TCP connections ➔ very long latency (6.5-8 RTTs)
- 1 TCP SYN loss ➔ delay of 6 seconds
- 2 TCP SYN losses ➔ delay of 24 seconds

➔ H.323v2 for fewer connections, UDP?

H.323/13