Overview of Videoconferencing Technology

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Nature of Network Connections

• dedicated connection or path fully allocated to a single use
  – digital leased lines (e.g. Kilostream and Megastream)
  – dial-up digital connections (e.g. ISDN2 or ISDN30)

• shared connection or path not fully allocated to a single use
  – local shared computer networks (e.g. Ethernet)
  – internet networks (e.g. the JANET internet)
Dedicated Connections or Paths

• can be confident that the availability of resource will remain during a usage period
• (typically) resource is dedicated to Videoconferencing use and cannot be re-used to support other services when not required for VC
• cost of resource is not negligible and cannot be apportioned between VC and other activities
Shared Connections or Paths

• availability of resource is very likely to change during the time of a VC usage period, this is likely to include bursts of congestion

• traffic may suffer loss, error, long latency and jitter, VC technology needs to be robust in the face of these difficulties

• (typically) resource is NOT dedicated to Videoconferencing use and will be re-used to support other services when not required for VC

• cost of resource is low and CAN be apportioned between VC and other activities
H.320 - Videoconferencing for worlds with guaranteed QoS

• standard from International Telecommunications Union (ITU, a specialised UN agency)
• “umbrella” standard for visual telephone services where channel rates do not exceed 1920 kbit/s
H.320 Umbrella

- **Mandatory**
  - video
  - audio
  - G.711
  - data format
  - H.261
  - H.221, H.230, H.242

- **Options**
  - H.261 (Annex D)
  - H.263,
  - H.243,
  - H.281,
  - T.120,
  - etc
Video Features of H.320

• **must** support video via H.261 at QCIF (176 x 144) resolution
• **commonly** supports video via H.261 at CIF (common interchange format) (352 x 288)
• **may** also support video via H.262, H.263 and these include resolutions other than CIF and QCIF
Audio Features of H.320

• *must* support audio via G.711 (suitable for voice with an upper frequency cut off of 3.4kHz and generate 56-64kbit/s of digital information)

• *may* also support G.722 (with an upper frequency cut off of 7kHz and generates 48-56-64kbit/s of digital information)

• *may* also support G.728 (suitable for voice with an upper frequency cut off of 3.4kHz and generates only 16kbit/s of digital information)
Multiparty Conferences and Other Issues

- are supported via the use of multipoint conference units (MCUs)
- MCU may support “continuous presence” video, voice switched video or chairman control
- remote operation of cameras may be supported
Support for Data Transmission

- H.320 terminals may provide facilities for data transmission to add capabilities such as file transfer, whiteboarding and so on
- application data support via T.120, which itself is another “umbrella” standard
H.323 - Videoconferencing for worlds WITHOUT guaranteed QoS

• standard from International Telecommunications Union (ITU), but builds on earlier important work from IETF (Internet Engineering Task Force)

• “umbrella” standard for visual telephone services where underlying transport is a Packet Based Network which may not provide a guaranteed quality of service
H.323 Umbrella

H.323 “Packet-based multimedia communications systems”
H.323 Video Support

• if video is provided, it must provide video via H.261 at QCIF
• may also provide H.261 at CIF and H.263 at QCIF and CIF
• may also provide other resolutions from subQCIF through to 16CIF and may also allow the negotiation of other video codecs
H.323 Audio Support

- **must** support audio via G.711 (suitable for voice with an upper frequency cut off of 3.4kHz and generate 56-64kbit/s of digital information)
- **may** also support G.723 (an ultra low bandwidth codec generating only 5.3 or 6.3 kbit/s)
- **may** also support G.728 or other codecs
H.323 Data Support

- will be via T.120
- H.323 terminals are expected to be rich in data facilities
- application sharing, whiteboards, application to present pre-prepared “slide” materials, shared editors etc. are likely to be readily available
H.323 Entities

- the H.323 world possesses many other entities in addition to terminal units and can interact with other worlds
H.323 Zone
H.323 Entities

- Gateways - provide interworking to/from other styles of videoconferencing
- Gatekeepers - provides address translation facilities and controls access to the network by terminals. May also provide bandwidth management and location of Gateways
H.323 Multipoint Support

- Multipoint Controllers (MC) - provide the control for multi-party conferences
- Multipoint Processors (MP) - provide mixing, switching or other processing of media streams under the control of an MC
- Multipoint Control Unit - must contain an MC and may optionally contain one or more MPs
Hedging one’s Bets

• The Welsh Video Network will be established as a hybrid of H.320 ISDN6 together with IP-based H.323 with gateways in between.

• It is expected that the equipment will be dual standard.

• Long term strategy favours H.323 for potential ubiquity and better costing model.
Some Personal Thoughts

• think carefully about the nature, arrangements and usage patterns of your VC equipped rooms

• a good “conference room” layout may not be a good “lecture room” layout, unless you think carefully

• think about the teachers need to address a local class of students as well as potentially multiple distant classes of students