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Title: Comments on H.323 revision 5

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**General Comments**

AT&T has the following general comments on the September 22, 1995 version of H.323:

1. Remove H.324 related material.
2. On the centralized/distributed audio/video issue, we suggest:
    a. Text along the following line should be added: Audio and video should receive the same distribution treatment, i.e. either both are multi-cast or both are mixed centrally. Failure to handle both in the same fashion creates the following problems:
        — Lip synchronization cannot be achieved.
        — For the case where audio is centrally mixed, and video multicast, the terminal may have a difficult time deciding based on voice energy which received video stream(s) to display.

        Please note that "should" is deliberate.
    b. A note should be added along the lines of "In many configurations, especially those where terminals in a particular conference are concentrated on one or a few LAN segments, distributed operations result in minimum use of LAN bandwidth. In some configurations, such as those where only a small number of terminals are in each LAN segment for a particular conference, centralized operation may minimize total LAN bandwidth. The trade-offs and heuristics involved in these choices are beyond the scope of H.323, and are left to the manufacturer."
    c. It may be desirable to have this choice made on a per terminal rather than on a per conference basis to fully optimize LAN utilization.

d. Multi-uni-cast should be avoided or prohibited.

e. The gatekeeper must be aware of the choice made since centralized/distributed affects the amount of LAN capacity used by the call.

f. Distributed audio/video should be an optional capability declared by terminals and MCUs that can receive and mix multiple streams, up to some explicit limit. Distributed audio/video is efficient only if the streams are multicast (ie. one transmitted packet is received by several endpoints). The default and mandatory mode for each terminal, when distributed audio/video is not selected, is point-to-point connection (to a single other terminal or to an MCU serving as a centralized mixer). These are some circumstances where distributed audio/video may not be selected:

   — A super-domain does not conform to relevant standards for multicast.

   — A terminal cannot decode and mix as many received streams as there are other endpoints in the multicast.

   A single conference may combine distributed audio/video among one or more subsets of terminals with centralized mixing for the others. In this case, one or more MCUs are required, and they are a point of translation between the two modes (combining distributed audio/video on some ports with centralized mixing point-to-point on other ports). Cascaded MCUs, each hosting some distributed audio/video subset, can be used to eliminate the routing of multiple streams across limited-bandwidth paths.

g. The Multi-point controller(MC) is always part of a call, even a point-to-point call, to avoid 2->3 party transition problems.

h. The GK is the preferred center for the distribution of multi-cast addresses.

i. The super-domain is the scope of the multi-cast addresses.

j. The gatekeepers must coordinate multi-cast address usage.

k. Gatekeepers allocate multi-cast addresses from a statically assigned pool of addresses; consideration should also be given to possible dynamic creation of domains.

l. The number of audio/video streams the terminal can decode should be a part of the capability exchange. Is it now part of H.245?

3. The gatekeeper needs to be connected to the MC in order to control conference bandwidth.

4. Distributed audio/video are most efficient when data flow is minimized; thus skipping audio silence is important in this mode of operation. Possible video equivalents, such as not improving rendition during periods of little motion might be considered.

**Specific Comments on Sept. 22, 1995 H.323 Draft**

1. Sect. 1: substitute "Demand Priority LAN(IEEE 802.12)[VG-Anylan]" and "IEEE 802.3[Fast Ethernet]" for "fast ethernet" as more descriptive examples.
2. Fig. 1: Add interworking devices, such as an I.580 gateway between N-ISDN and B-ISDN, an H.323 GW -> N-ISDN -> Interworking device ->GSTN -> H.324, and finally H.323 GW -> N-ISDN -> LAN -> H.322. It may be desirable to drop the direct H.323 GW to Guaranteed QOS LAN connection, which, although possible, makes the figure more difficult to understand.
3. Fig. 1A: Add a general diagram of the gatekeeper, MC, gateway, etc.
4. Sec. 1.1.3: The term "MC" or Multi-point controller is too much like "MCU" to avoid confusion. Alternatives include EMC for "Essential Multi-point Controller" or "VMC" for "Virtual Multi-point Controller" or MCM for "Multi-point Capabilities Manager."
5. Sec. 1.2: A discussion of dynamic domain creation should be added; at least it should be noted as being for further study.
6. Sec. 1.2: If there is no gateway or gatekeeper (both optional), what sort of terminology is used?
7. Sec. 1.2.3: Add some text such as "Note that calls may leave via one GW and return to the same GW via another GW to avoid router over-load, or they may not. This is beyond the scope of the recommendation."
8. Fig. 5: Extend video, audio, data, and control to the LAN from H.22Z. Show end-to-network signaling terminating in H.22Z, and change the name to "call related signaling."
9. Sec. 5.2.2: In the 3rd bullet, drop the sentence related to T.84 and T.434.
10. Sec. 5.2.4: Add the following - "If the H.323 terminal supports H.263 with CIF or greater resolution, it shall support at least CIF resolution H.261."
11. Sec. 5.2.4: add at the end of para 1 "... on the LAN."
12. Sec. 5.2.7.1: Add a description of how the MC participates in the cap exchange at all times.
13. Sec. 5.2.7.2: Add section on how LAN addresses relate to H.245 logical channels.
14. Sec. 5.2.8: Some clarification needs to be added to mention, perhaps in a footnote, that (1)the RTCP control is outside of H.245, and (2) the H.22Z signaling for call setup is outside of H.245. Thus, there is a layer of signaling that is "above" or "below" H.245.
15. Sec. 5.2.5.2: Add a description of how audio energy messages are used to avoid decoder/mixer overload on the LAN. We recognize that this will require RTP enhancements, but it may be required for distributed operation of large conferences. The goal is to allow the receiving terminal to easily ascertain which

audio streams should be mixed without a requirement to monitor a possibly very large number of audio streams. We propose that this request could be part of a liaison to the IETF.

16. Sec. 5.2.6: Add here the following: "If a means of file transfer or image exchange and annotation is provided, T.120 standard applications T.126 and T.127 shall be provided in addition to any other means specified. Thus, the baseline of interoperability shall be T.120, including T.122, T.125, and T.124."

17. Sec. 5.2.7, para 1: Drop "multiplex table entry transmission."

18. Sec. 5.3, para 2, line 6/7: For "The Gateway ... same type terminal." add text to indicate that the gateway may appear to be different types of terminals at the same time, e.g. H.324 in one conference and H.320 in another.

19. Sec. 5.4, 5th bullet: We believe that the MC is responsible for conference management.

20. Sec. 5.4: Add that the GK and the MC must have a connection to allow the GK to be informed in an on-going fashion of the bandwidth required by the conference.

21. Sec. 5.4: Add list of areas outside the scope of H.323 including the following:

    - Reservation of LAN bandwidth.
    - Mechanisms for assuring quality of service.
    - Calling features beyond those supported by H.22Z (or maybe H.LAN_SIGNAL if this is agreed to).

22. Sec. 6: We suggest the creation of H.SIG or H.LANSIG which would cover call related operations up to the point where the initial reliable control link is established between the terminal and the GW/GK/MC, including any end-to-end Q.931 signaling. This has been suggested by other parties as well, and might allow such signaling to be used with H.322 terminals connected to guaranteed BW LANs such as FDDI that do not have defined call signaling.

23. Sec. 7.1: We suggest allowing for encrypted passwords over the LAN.

24. Sec. 7.1.1: We need a more detailed procedure for removing inactive terminals.

25. Sec. 7.2.1: We believe the unreliable channel is used to establish a reliable channel.

26. Sec. 7.2.1: More detail on how and when bandwidth is required should be added; we suspect this must go on the very first message.

27. Sec. 7.3: A conflict may exist between the desire to send audio early and the desire to tie audio to the opening of H.245 logical channels, which presumably cannot be opened until after the capability exchange is complete.

28. Sec. 8.1: Are the speech only terminals on the LAN or WAN, or both?

29. Sec. 8.2, 1):Refer to H.323 GW.

30. Sec. 8.2: Add a section on H.242/H.245 interworking. We expect that this will cover mapping H.221/H.230 BAS codes, and mapping multi-channel H.320 calls into H.323 calls where this concept has no meaning.

31. Sec. 8.5, 1): Substitute "Using an H.323 GW with B-ISDN interfaces conforming to H.321."

32. Sec. 8.6, 1): This seems more a theoretical possibility than anything else. 2) will be the case 99% of the time.

33. Sec. 9.1: Should the requirement for T.120 operation if these facilities are provided be repeated here?

34. Sec. 9.2: We believe it is possible than an IV is needed for each packet. This should be considered further.

35. Sec. 10: As mentioned earlier, the three multi-point cases need to be considered. It may be appropriate in this section to discuss how required BAS like MCC are translated into H.245-speak.

36. Sec. 10.1: Control of what is transmitted by changing cap sets should be discouraged; instead MCUs should control transmitted mode via MCC.

37. Sec. 11.1: The relationship of these loopbacks to LCV, LCV, and LCA must be defined and clarified.

38. Sec. 11.1: Which loopbacks are mandatory?