ITU Telecommunication Standardization Sector
Study Group 15
Experts Group for Video Coding and Systems
in ATM and Other Network Environments

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1. Introduction

This document discusses an appropriate channel for the H.24X inband signalling in broadband audiovisual communications. At the last meeting in Singapore, the following two alternatives were identified and the choice is left for further study (see Section 8.3/AVC-707R):

- A VC is initially used for only H.24X signalling and subsequently expanded to accommodate audiovisual signals as well
- A separate VC is used for H.24X signalling other than a VC for audiovisual signals

This document analyzes their characteristics and supports the second method for its simplicity and versatility.

2. Environments

We make the following assumptions, which are to be confirmed, for discussion of the subject matter:

1) Communication charge will be dependent on the bandwidth, i.e. peak cell rate.
2) The calling user pays the charges for both the calling side to called side channel and the called side to calling side channel.
3) The calling side user decides the bandwidth of the communication channel for both directions.
4) AAL type in a VC can not change once a communication starts.
5) H.222.1 multiplex structure, i.e. H.222.1 PS or TS, does not change once a communication starts.
6) Bandwidth of an audiovisual communication can take a wide range of values depending on the application. For example, the video bit rate for a particular communication can be any value between 2 Mbit/s and 15 Mbit/s even if MP@ML is known.

It is required that an algorithm should be provided which determines the necessary minimum peak cell rate [2]. It is not wise to set up a channel of say 15 Mbit/s, carry out negotiation through that channel, and then start 10 Mbit/s communication. This leads us to the requirement that the actual audiovisual bandwidth should be known before the channel is setup.

3. Items to be negotiated through the H.24X signalling

In addition to audiovisual capabilities such as audio coding rule and rate, video coding rule and rate, the following communication channel related items should be negotiated and determined at the start of the call.

- AAL type: type 1, 2 or 5.
- Multiplex structure: H.222.1 PS or TS (or non-H.222.1 multiplex?)
- Audiovisual channel configuration: symmetric, asymmetric or completely unidirectional
- Bit rates for the two directions: calling to called, called to calling

H.24X should be generic so that various audiovisual applications can commonly use it and find a maximum interworking mode. In the N-ISDN audiovisual communications, H.242 procedures through the H.221 BAS channel are serving for this purpose.

4. Possible H.24X signalling channels

Basically we have two alternatives for the H.24X signalling channel as mentioned in [1]; separate VC and embedded in audiovisual VC. The second solution may have two varieties. They are shown in Figure 1.

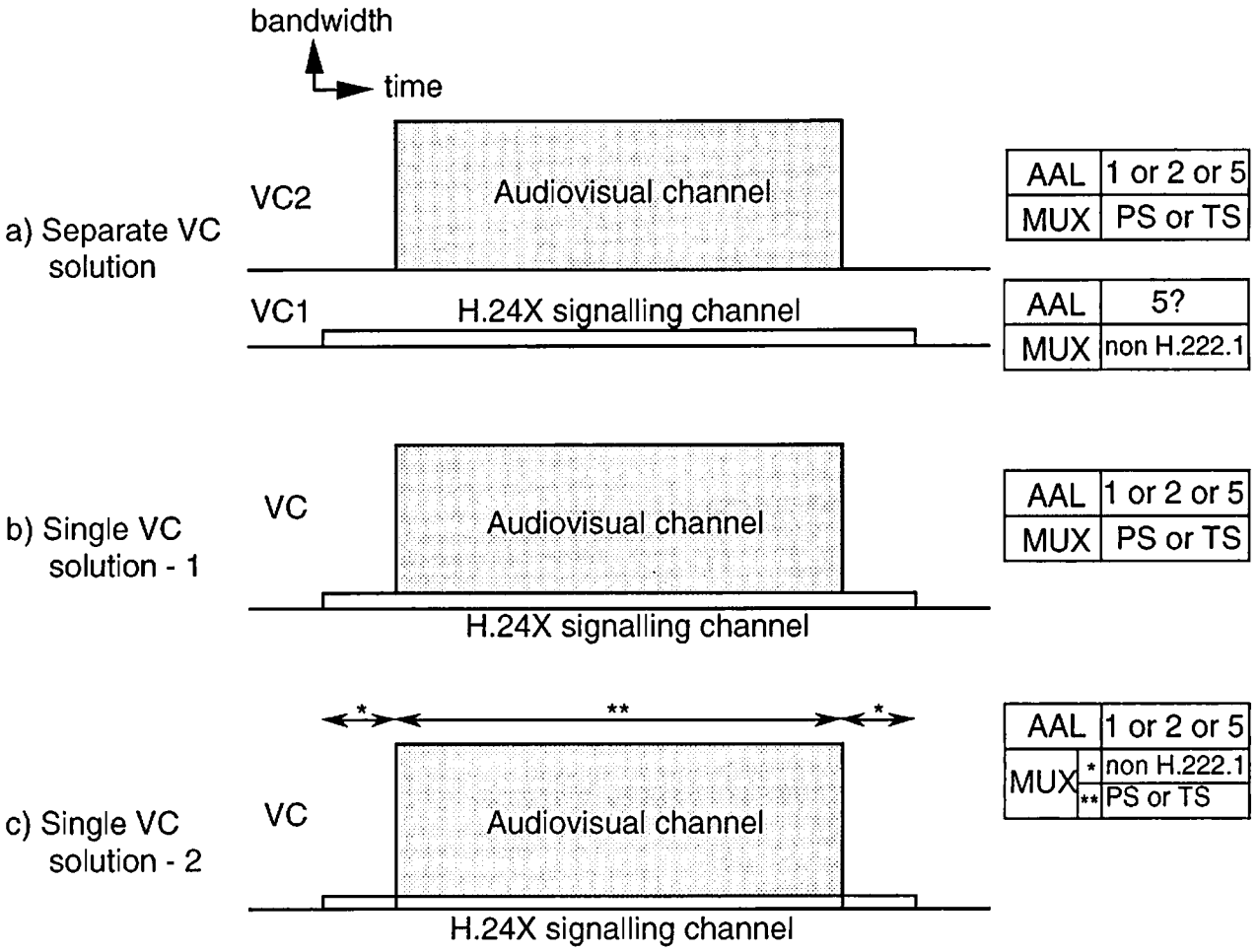

Figure 1 Alternatives for the H.24X signalling channel

Figure 1-a) shows the separate VC solution where a VC is dedicated for the H.24X signalling where AAL type 5 is likely to be used because of the signalling being not delay critical and the channel should be supported by the error free transport [3]. VC1 is first set up and negotiations for audiovisual communication are carried out to determine an appropriate mode of operation which includes such parameters as bit rate, AAL type, and multiplex structure, then VC2 is set up which may have different AAL type from that of VC1.

Figure 1-b) shows the first single VC solution where the same AAL type and multiplex structure are maintained whole through the communication, but the bandwidth is expanded or shrunk according to the negotiated audiovisual signal parameters.

Figure 1-c) shows the second single VC solution where the same AAL type is maintained whole through the communication, but the multiplex structure and bandwidth are changed during the communication according to the negotiated results. At the start and end part of the call, the multiplex may take a non-H.222.1 structure which is suitable for the H.24X signalling.

5. Discussion

In the single VC solution -1 (Figure 1-b), AAL type and multiplex structure should be determined a priori at the start of the call. For example, we may start the call with AAL type 5 and TS, but the H.24X signalling may reveal that the audiovisual communication should be by

AAL type 1 and PS because that is the only mode common between the calling and called terminals. Outband signalling may help us in this respect, but it is understood that Q.2931 signalling is for indication, not for negotiation. The calling side indicates its desired mode of operation and the called side responds only if it has matching facilities. {Is this understanding correct?}

In the single VC solution -2 (Figure 1-c), the multiplex structure problem is removed. The AAL type problem, however, still remains. Switching of the H.24X signalling channel in the middle of communication will complicate the system control in the terminal.

Both of the above cases assume that the bandwidth can be changed during a call through the user-network signalling. It is to be confirmed that this functionality is supported from the early implementation of the ATM networks. The other concern is that in case of asymmetrical audiovisual channel configuration, the H.24X signalling channel may become also asymmetrical in the sense that e.g. one direction is through AAL type 1 and H.222.1 multiplex, but the other direction is through AAL type 5 and non-H.222.1 multiplex because no audiovisual channel is involved in that direction.

The separate VC solution solves all the problems of the single VC solution listed above. It has flexibility due to independence of the H.24X signalling channel from the audiovisual channel. Both of the channels can use their proper AAL type and multiplex structure. The only disadvantage will possibly be the communication cost increase due to the use of multiple VCs. The degree of increase depends on the tariff which is not known at the moment.

6. Conclusion

Three alternative methods for providing the H.24X signalling channel have been discussed and the separate VC solution (Figure 1-a) is supported due to its simplicity and flexibility to various audiovisual channel configurations.

References

[1] AVC-707R "Report of the seventeenth Experts Group meeting in Singapore (1-11 November 1994) - Part I and Part II (Rapporteur)", November 1994

[2] AVC-723 "Representation of transfer rate in broadband audiovisual communications (Japan)", January 1995

[3] AVC-721 "Protocol stack for H.24X negotiation channel (Japan)", January 1995

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