CCITT SGXV
Working Party XV/1
Experts Group for ATM Video Coding

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TITLE: Virtual Path Support of Multimedia Service Multiplexes

PURPOSE: Proposal

Abstract

This document examines further the potential role of virtual paths in supporting the switched delivery of multimedia services over an ATM-based B-ISDN. The need for signalling and control to ensure bounded cross media delays is also discussed and liaison proposed to SGXVIII to request specific action on this issue.

1 Introduction

Previous documents (AVC-39, AVC-42) have discussed the likely size of cross-media delay arising from the routing of the separate media components of a multimedia connection over potentially diverse physical paths and the same physical path. The conclusion of both documents was that the likely cross media delay was of the order of a few milliseconds and did not represent a major impediment to either service delivery or performance. The issue of cross media synchronisation is of interest to a number of groups within CCITT e.g SG1 as possible Quality of Service (QOS) parameter, SGXVIII/8 and SGXVIII/5 as a possible network capability required in association with multimedia service support.

2. The Virtual Path as a Vehicle for Multimedia Multiplexing

Virtual paths will be used within ATM networks to provide flexible and cost-efficient management of network resources. Many administrations propose to use virtual paths to significantly reduce call handling cost in the core network through the use of semipermanent connections. Call routing within the network can be based on adding a Virtual Channel to an existing VP, or if no VP exists which matches the requirements of the connection, one will be established. VP management and control under these circumstances is under direct network control. However, typical VP based call support within a network, whether multi or mono-media, will not require call management facilities at the level necessary for the dynamic switching of VCs (ref AVC-42).

One obvious consequence of mixing media on a single virtual path is that the Quality of Service (QOS) required must correspond to that of the most sensitive service, and for many applications this may not be a cost effective solution (i.e. mixing loss sensitive data and delay sensitive video traffic) and multiple virtual paths may be required. Multiplexing all services onto a single VP results in zero cross media delay at the cost of a potential mismatch of QOS. Separate VPs ensure a QOS matched exactly to the media.

3. Bounded Cross Media Delay

While cross media delays arising from media multiplexing at the ATM layer (i.e. VC based) are expected to be minimal, an additional guarantee is required to ensure they remain bounded for all cases. A network based bounded delay can be achieved by requiring the network to ensure all media components follow a common physical path i.e. transit the same exchanges or that diverse paths matching the synchronisation limits are available. To ensure a bounded delay under such circumstances, it is necessary to provide a mechanism for associating the service components of a multimedia call and reflecting this association in all stages of call handling. Signalling for call establishment and for the addition and deletion of media components must therefore be capable of indicating that particular services are associated for the purposes of synchronisation.

The necessity for signalling to indicate, and the network to support, the synchronisation range required is an area requiring further study. Further study of the cross-media relative delay for a range of multimedia applications is also required.

4. Conclusion

Virtual path networking will play a significant role in supporting the transport of multimedia services within the B-ISDN. However, VP switching is not a pre-requisite for the support of multimedia services.

Ensuring a bounded cross media delay requires that all, or some, media components of a multimedia call can be marked/indicated as associated for the purposes of call handling and routing. Achieving this objective requires the development of appropriate signalling and control.

It is proposed that the SGXV Experts Group provide a liaison statement to SGXVIII describing the intended use of ATM layer media multiplexing (and hence VP and VC based solutions) and requesting that the signalling and control required to ensure bounded cross media differential delay be included in developing standards for the support of multimedia services on B-ISDN.