CCITT SGXV
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Experts Group for ATM Video Coding

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TITLE : Multimedia multiplex and negotiation methods
PURPOSE : Discussion

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1. Introduction

Multimedia multiplex methods have been discussed through the media control layer, and merits and demerits of each multimedia multiplex method have been clarified in AVC-226.

In this document, the interface between the media control layer and upper layer (i.e. video codec) is discussed taking requirements from application services into consideration.

The negotiation methods necessary for multimedia multiplex are also discussed in this contribution.

2. Interface of media control layer

The interface between media control layer and video codec was studied for detailed realization. There might be the following three examples of the interface designs (Fig.1). These should be examined from the view points of the application service requirements.

It is assumed here that AAL provides cell boundaries to the media control layer, though this has not yet been formally requested nor agreed to for AAL type 2.

(1) Codec constructs complete bitstream, such as H.221 and H.261, taking the network conditions and characteristics into account (Fig.1 example 1).

H.221 can be easily involved in case of user multiplex. Since the media control layer simply segments the video data into AAL payloads and cell boundaries are not positively utilized, this method may be suitable when the unique word technique is applied to synchronization recovery against cell loss and bit errors in the coded video data.

(2) The interface is defined according to video structure, on a MB or a slice basis (Fig.1 example 2).

The interface will be independent of the network conditions, thus adaptation to different networks are confined to the design of media control layer.

Complete video bit stream is constructed and/or unique word may be inserted within the media control layer. To cope with cell loss or other transmission characteristics, packing to cells in the media control layer requires cell headers which indicate the start of cell coinciding with that of the video data unit or not, boundaries of the MB or slice data inside the cell, existence of fill bits at the end of cell, etc.

(3) The method intermediate between (1) and (2). The network characteristics is considered to some extent and the interface unit is for example several MBs (N cells) (Fig.1 example 3).

User (video codec in this case) structures video data as in Example 2 above, but cell loss resilience can be more powerful since cell boundaries are directly utilized by resetting motion vectors at the start of the structured video data etc. Such a packing technique is described in the companion document AVC-269. media control layer simply segments the video data into AAL payloads as in Example 1 above.

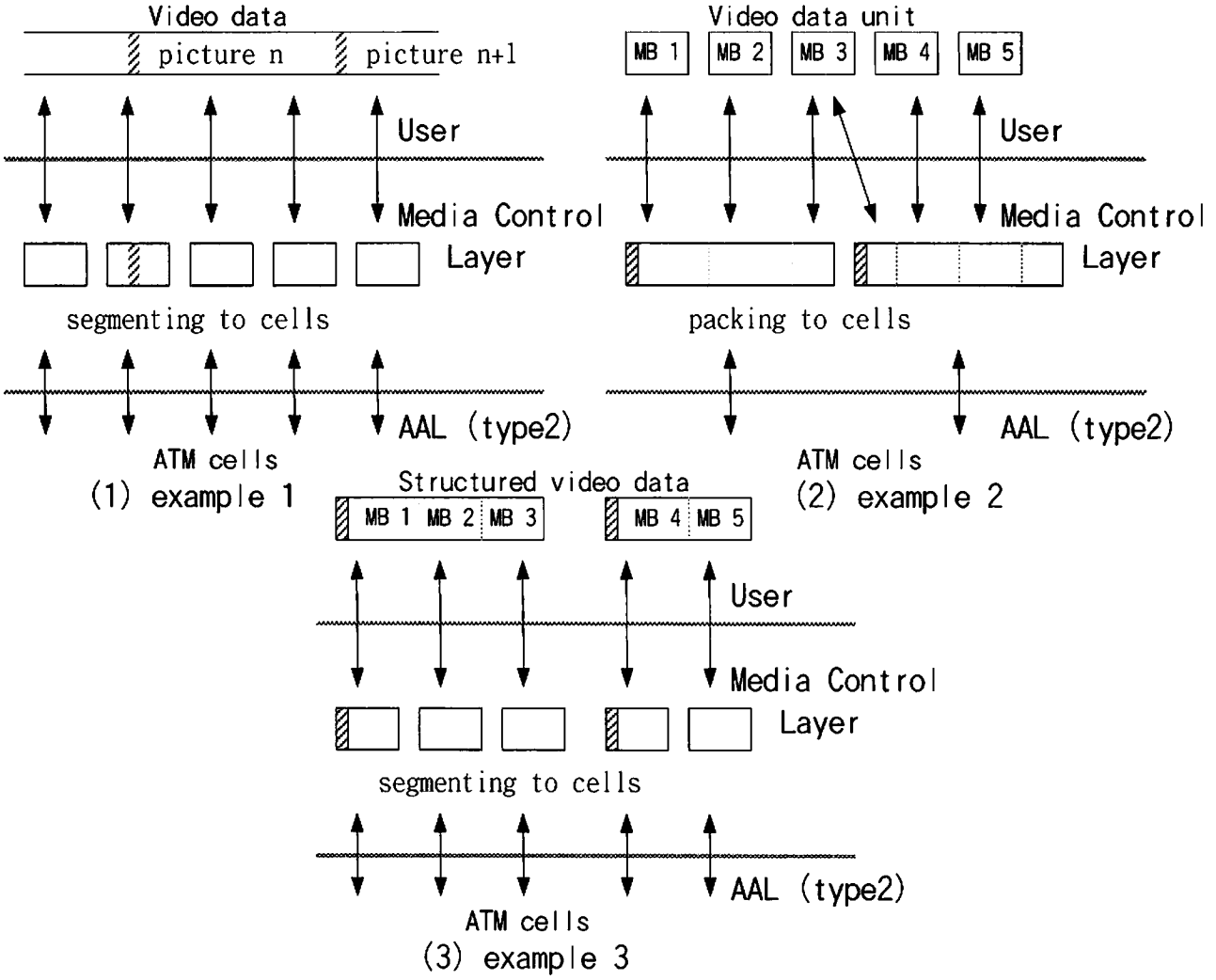

Fig.1 Interface between Media Control Layer and Codec.

3. Negotiation method

The negotiation relating to multimedia multiplex will be neccesary. The negotiation items are listed up and possible negotiation methods for each item are classified into three categories.

method A: outband signals in call control message

method B: signals through a channel that is independent of call control signaling channel or information channel. This negotiation channel is opened after the outband negotiation but before the start of audiovisual signal transport.

method C: inband signals of the information channel

(1) The terminal class, application class. A

The terminal or application class, such as BC/LLC/HLC in N-ISDN, should be identified before the connection establishment to decide whether two terminals are capable to communicate each other.

(2) The method of multimedia multiplexing. A or B

A multimedia multiplex method will be selected, if multiplex method is flexible as described in AVC-226.

The terminal may identify the multiplex method by the kind of service, when multiplex method is unique for the service class (method A).

Otherwise, the selection will be performed by the protocol between media control layers (method B).

(3) Kinds of usable media. A and (B or C)

It is necessary to negotiate usable media for the communication like capability exchange sequence defined in H.242.

The same consideration as above (2) is applicable, when kind of media is fixed for the application.

Negotiation protocol between applications will be used through inband/outband channel (method B or C).

3.1 In case of uni-directional transmission (distributive service)

The multimedia multiplex method and available media must be known for each type of service before the connection establishment (1) in distributive or networkcast service.

In this case, procedures above (2) to (3) can be omitted and it is possible to start the communication immediately after the connection establishment.

3.2 In case of non-symmetrical transmission (i.e. the return channel exists for signaling purpose)

Negotiation procedures above (2) to (3) can be realized utilizing the signaling channel (method B) in the same way as the case of symmetrical communication.

Method B may be a better candidate than method C for inband negotiation. Because method B will provide flexibility and independency for the protocol and that is applicable to non-symmetrical communication as well as symmetrical communication.

4. Conclusions

This contribution has discussed the interface between media control layer and codec for video transport in multimedia multiplex. Three examples have been examined from service requirements point of view (cell loss, H.221 consideration). The negotiation items and possible negotiation methods for multimedia multiplex have also been discussed including the case of non-symmetrical communication.

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