Telecommunication Standardization Sector
Study Group 15
Experts Group for ATM Video Coding
(Rapporteur's Group on Part of Q.2/15)

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SOURCE : Japan
TITLE : Bitrate representation for VBR operation for ATM transmission
PURPOSE : Information

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1. Introduction

The current Video Working Draft (Sept. 9, 1993, Brussels) and its Delta (MPEG93/842) state that the *bit_rate* value in a *sequence_header* represents the maximum average bitrate over a picture period in the case of variable bitrate operation.

This document discusses the implications of an above definition when such VBR mode of opration is offered by an ATM network.

Also see AVC–452 (MPEG93/396) "Syntax modification for VBR operation," March 1993, Japan, for related discussions.

2. ATM network and the use of *bit_rate* field

2.1 Terminal–to–Network

In an ATM network a terminal must provide such parameters as a peak cell rate and and an average cell rate to a network when a terminal intends to establish a VBR conection.

A peak cell rate is uniquely defined to be a minimum interval between two successive ATM cells, while various methods may exist for defining an average cell rate depending on a specific UPC mechanism employed in a network.

See AVC–321 "Recommendation I. 371, Traffic Control and Congestion Control in B-ISDN," July, 1992 for detailed discussions.

It is unlikely that the *bit_rate* field in a *sequence_header* may be reffered to at connection set-up. A dedicated protocol will be defined for terminal–to–network negotiations.

2.2 Terminal–to–Terminal

A connected terminal may also need to know the negotiated peak cell rate, etc., to guarantee a normal decoding operation. This can be established by:

1. a Network–to–connected Terminal protocol
2. a calling terminal–to–connected Terminal protocol
   (a) out–of–band method (like UUS: User–to–User Signaling)
   (b) inband method
      i. like H.320
      ii. by referring to a *video_sequence*

Since MPEG-2 is supposedly complete, in a sense that it will offer means to provide all the necessary information to a decoder, the method 2. (b) ii should suffice and can be used as a candidate so far as the employed AAL (ATM Adaptaton Layer) will provide a transparent VBR connection assumed in defining the syntax for a *video_sequence*.

3. Requied AAL functions for VBR operation

As is mentioned in section 1, the *bit_rate* value represents the maximum average bitrate over a picture period. If an AAL has a peak shaping buffer with the size equal to the *bit_rate*, the declared *bit_rate* can be translated to a peak cell rate by a mere calculation, and an actual traffic flow can be shaped to conform to the calculated peak cell rate by using the shaping buffer.

On the other hand, in a case that a peak cell rate and an average cell rate are first given, then conforming to the *bit_rate* derived somehow from those parameters may need an additional bitrate control mechanism not required for avoiding policing actions by the network.

4. Conclusion

This document reviewed the current definition for the *bit_rate* value and its implications when a VBR mode of opration is offered by an ATM network.

5. References

[1] AVC–452 (MPEG93/396), "Syntax modification for VBR operation," March 1993, Japan.

[2] AVC–321 "Recommendation I. 371, Traffic Control and Congestion Control in B-ISDN," July, 1992.