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

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SOURCE: Australia

TITLE: Requirements for ATM Video Codecs

PURPOSE: Proposal

Abstract

As a part of the evolving *Draft Status Report on ATM Video Coding Standardization*, a list of requirements for video coders operating on the ATM Network has been initiated. This document proposes a number of additions to the list.

1. Introduction

To progress the task of developing a video coding system which is suitable for ATM networks, it is important to maintain a list of requirements which identify the important capabilities which such a coding system should have. The requirements list should be an evolving document in which uncertainties are resolved as understanding of the ATM network and ATM coding improves. The *Draft Status Report on ATM Video Coding Standardization,* chapter 4, and Annex 2 contains a preliminary list of requirements.

There are a number of groups concurrently developing video coding standards. These include ISO/IEC/JTC1/SC2/WG11 (MPEG) and TG CMTT/2. In the case of ISO/IEC the work is directed towards interactive access to stored digital video, though the final algorithms may have application in a range of areas, while TG CMTT/2 is principally concerned with the primary and secondary distribution of Television. Both of these applications could potentially be carried on the B-ISDN and therefore specific sets of requirements developed within these groups should be used as input to the requirements list maintained by the Experts Group. The requirements list is also a useful tool in the co-ordination of activity across the different groups, since it clarifies the areas where common work is possible and also those areas of work which are unique to the Experts Group.

2. Requirements List Additions

1. Functional Requirements:

- Audio/Video relative delay should be minimised. Limits are yet to be determined (End-to-end limits for broadcast services are known, however the proportion of this relative delay available to the codec has to be determined).
- The capability to support continuous presence multi-point connections is highly desirable.

2. Compatibility/Interworking Requirements:

Coder Input/Output Signal Format:

- The coding architecture should be capable of coding a range of input formats. The precise resolution at which coding takes place should be flexible to allow for a wide range of aspect ratios. For low resolution applications, a progressive format which includes QCIF, CIF and SIF would appear appropriate. Higher quality applications may demand coding of interlaced signals.
- The scheme should be capable of coding/decoding signals over a range of frame rates which includes all the regional variations which presently exist.

Backward/Forward Compatibility with Existing Standards:

- Interworking between the ATM codec on the B-ISDN and H.261 on the N-ISDN is very important and must be provided. The means of providing this interworking is yet to be decided.

Interworking:

- The overall coding architecture should allow for a range of codecs with different resolution and frame rate capabilities to be developed.

- It is highly desirable that codecs operating using different video format resolutions and frame rates be able to interwork.
- Extension of the coding scheme to high resolution, higher frame rate formats in a compatible manner should be possible so that the current range of codecs remain usable.
- The high performance requirements of some services (e.g. HDTV) should be considered when developing coding techniques for lower rate services.

3. Network related requirements:

Rate Control:

- Coders should be capable of operating in VBR mode with peak rate limited output. A precise definition of peak has been agreed within CCITT Working Party XVIII/8 [1].
- CBR operation, which is a special case of VBR, will be useful in certain circumstances.
- Other source shaping requirements may be standardised in the future (e.g. average rate). The codec should be designed so that future requirements can be incorporated.

Priority Channels:

- Independent rate control of the high and low priority cell streams should be assumed, until further clarification from SGXVIII is received.

Error Performance:

- Performance will be assessed under cell loss conditions. The precise conditions are yet to be determined and require inputs from SGXVIII.
- End-to-end service requirements are dealt with in CCITT SGI and CCIR SG11. These groups should be consulted.

3. Conclusion

A number of additions to the requirements list in Annex 2 of the *Draft Status Report on ATM Video Coding Standardization* are proposed. Australia believes that the requirements list is a valuable tool for co-ordinating the work of different groups developing video coding systems. Input should be sought from CMTT and ISO/IEC/JTC1/SC2/WG11 (MPEG). The full list of requirements should be input to the IVS baseline document.

References

[1]. CCITT Working Party XVIII/8 Report, Geneva, June 1991.