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

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SOURCE: Australia

TITLE: Contributions to Work Plan

PURPOSE: Proposal

Abstract

In this document we highlight the areas of work which must be completed before a standard for video communications over the B-ISDN can be produced. To define a complete standard requires input from other groups, particularly SGXVIII. SGXVIII are taking a phased approach to the development of B-ISDN, with basic capabilities available now (1992), enhanced capabilities being standardised in 1994 and some capabilities standardised after 1994. This suggests that we should take a phased approach to the development of the coding standard. In this document we develop a table of work items. This table can be used as a basis for developing a detailed work timetable which identifies the Experts Group outputs as well as inputs required from other groups to progress the work. The Experts Group should, where necessary, advise of the need for appropriate work in other groups to ensure that the overall system is completed in an appropriate timeframe for B-ISDN availability.

1. Introduction

To complete a standard for video communications on the B-ISDN requires consideration of the number of areas, ie, network capabilities and performance, overall system, video coding and audio coding methods. Through joint work with ISO/IEC MPEG the development of video compression algorithms is progressing at a rapid pace. There are, however, many issues which the Experts Group need to address to make the coding algorithm part of a complete system for audio-visual service delivery on the B–ISDN.

2. Work Items and Timetable

To clarify the issues, the choices which need to be made, and the inputs required to make these choices we submit the tables in Appendix 1 for consideration by the Experts Group. These provide a useful starting point for defining outstanding issues and we would appreciate contributions from other members to refine this table. Also included, as Appendix 2, is the standardisation timetable for SGXVIII.

From the list of work items and the attached SGXVIII timetable it is clear that a number of outstanding items may not be resolved in time for a 1994 recommendation. For example:

- A VBR codec design will require inputs on traffic parameters, UPC and network cell loss performance, which may not be available before 1994.
- A confirmed choice of multiplexing scheme relies on understanding, at least in broad terms, the cost of Virtual Channels. This information may not be available before 1994.

If the Experts Group wishes to resolve issues such as these before the 1994 recommendation then the need for additional information should be communicated to SGXVIII. Alternatively, it is possible to leave the complete resolution of such issues to the next phase of work.

There are also a number of areas where work can progress to a solution before 1994. For example:

- Selection of MPEG profiles for particular applications;
- Selection of picture formats;
- Work with SGXVIII to develop a suitable AAL structure;
- Development of timing recovery method and audio/video synchronisation;

- Provide advice on audio-visual system design, including audio algorithm choice and impact on performance (eg. delay), multiplexing methods;

Based on these observations we believe that an important goal of the November 1992 meeting is the development of a detailed workplan. The tables given can be used as a basis for this plan.

3. Conclusions

It is important, at this stage of our work, to develop a detailed work programme which identifies outstanding issues, their impacts and the inputs required to resolve them. This work programme should be aligned with the work programmes of SGXVIII and SGXI, ie, it should be consistent with the network and signalling capabilities. As a starting point for this process we propose the table given in Appendix 1. It is clear that it will not be possible to resolve all outstanding issues to provide a complete recommendation by 1994. However, there are a number of issues which can be resolved now. Recognising its own responsibilities within the framework of overall audio-visual standards for B-ISDN, the Experts Group should, where necessary, advise of the need for appropriate work in other groups to ensure that the overall system is developed.

Appendix 1. Work Items

General

Design component	Options	Inputs required	Impacts
Video, Audio, data multiplexing.	User multiplex SAR multiplex CS multiplex ATM multiplex Combination	Cost of multiple VCs Cross VCI delay	AAL Design Intermedia synch. Interworking Flexibility Multipoint implementation
Interworking with existing standard (H.221, MPEG 1 system)	Simulcast Switchable mode Both	Complexity assessment Application requirements	Multiplexing AAL Design
Intermedia Synchronisation		Media multiplex Network performance Accuracy requirements	AAL Design
Multipoint implementation	Switched presence Continuous presence		Coder profile Multiplex method MCU functionality
Data bit rates	(Note if VC multiplex is used then the data channel need not be considered)	Application requirements Multiplex method	Multiplex method AAL Design
Data error protection		Required performance Network performance	AAL Design

Audio (WP XV/2 responsibility)

Design component	Options	Inputs required	Impacts
Audio algorithm	MPEG Audio G.7xx	Applications requirements	QOS Interworking Compatibility
Audio interworking with H.261, MPEG 1		Applications requirements	Multiplex method AAL Design
Number of audio channels	1, 2, 3, 4, ...	Application requirements	Multiplex method AAL Design
Audio synchronisation		Application requirements	AAL Design

Video

Design component	Options	Inputs required	Impacts
Coded picture formats	Flexible spatial and temporal (large subset) Small subset Single fixed format	Applications requirements Interworking considerations	Timing recovery Picture quality Coding efficiency Delay Complexity
Video interworking (H.261, MPEG 1)	Embedded compatible bit-stream Simulcast Switchable mode All optional	Embedded vs Simulcast efficiency Complexity assessment.	Coder profile Cell loss resilience Multiplexing AAL Design
Error concealment/ recovery	None FEC Leaky prediction Layered coding Combination	Error characteristics VBR/CBR Network loading	Coder profile QOS
Timing recovery	SRTS (Frequency counting method) Stuffing method	Coded picture formats Accuracy requirements	AAL Design
VBR/CBR and Source shaping methods	CBR VBR peak+mean Other VBR	Network contract parameters Network policing Bandwidth tariffing information	Error concealment
MPEG algorithm profile	Frame types Scalability Compatibility All optional	Applications requirements	Everything

STANDARDISATION TIMETABLE 1 - CCITT SGXVIII

The timeframes of this work plan indicate when Recommendations are expected. The contents should reflect the development status of B-ISDN network capability and the stages in development of Recommendations relevant to video coding for the B-ISDN.

1. CCITT SGXVIII Network Capability	1992	1994	1994+
	Basic B-ISDN Capability (Release 1)	Enhanced B-ISDN (~Release 2)	Full B-ISDN Capability (~Release 3)
1.1 STM/ATM	- ATM	- ATM	- ATM
1.2 CBR/VBR	- CBR	- CBR & VBR	- CBR & VBR
1.3 Bit Rate	- 155 Mbit/s UNI User Rate <135.631 Mb/s	- 622 Mbit/s UNI Max Payload 599.040 Mb/s	
1.4 Design Features	- Peak rate only	- Statistical multiplexing	
1.5 Service Types	- point-to-point	- Point-to-Multipoint (multicasting) - Multipoint - Distribution	- Broadcast
1.6 Other Features	- Connection oriented & connectionless services - VCC Switched - VPC Semi-permanent	- Cell Loss Priority - Multi connections per call - Renegotiation within call - VPC Switched	- Multimedia capability
1.7 Interworking	- Connectionless (802.6) - Limited N-ISDN	- Full N-ISDN interworking	
1.7 Dependencies	CCITT SG1 - Stage 1 Service Descriptions CCITT SGXI - Stage 2 & 3 Service Descriptions CCITT SGXV - QOS & NP Required	Same as 1992, plus CMTT/2&3 - QOS Requirements	As per 1994