Liaisons from SG XVIII

(3 Liaisons included)

ADC - 312

SOURCE : SG XVIII/8-3

TITLE : Proposed Liaison to CCITT SG XV ATM Video Coding Experts Group, CMTT/3, CCIR IWP 11/9, CCIR 11B and ISO/IEC JTC1/SC29/WG11 (for information and action)

SUBJECT: Our IVS activities

CONTACT: Special Rapporteur SWP XVIII/8-3 (Services, IVS and AAL 1/2)

Mr. K.YAMAZAKI
KDD R&D Labs.
2-1-15 Ohara, Kamifukuoka-shi
356 JAPAN
FAX:+81 492 66 9810
E-mail:yamazaki%sun1.kddlabs.co.jp@uunet.UU.NET

Editor IVS Baseline Document
Mr. Dennis M. Dorman
AOTC
11/172 William Street
Melbourne, 3000 AUSTRALIA
FAX:+61 3 634 6566

The IVS Baseline Document, June 1992 updated version, is attached which incorporates the latest results of SG XVIII studies of relevance to IVS and comments made by IVS groups. SG XVIII will submit the 1992 version of B-ISDN Recommendations to CCITT Plenary Assembly for approval. I.211 section 3 "video services and coding aspects" is advanced according to the results of studies based on the 1990 Recommendation and agreements reached so far between SG XVIII and coding groups involved in IVS studies. New text introduced comes mainly from the IVS Baseline Document Annexes 4 and 5 with a little modification for consistency and better readability.

Information exchanged between us has provided a firm basis for making progress in standardization activities of each group. Therefore, we believe that the IVS Technical Session, which was originally proposed at the Tokyo IVS ITU Coordination Meeting and was confirmed at the SG XVIII Melbourne meeting, will be significantly useful for promoting further mutual understanding and for achieving an optimized association between network and coding techniques. We propose two days meeting on 26 (Mon.) - 27 (Tue.) October to take place (possibly in London) taking account of schedule of coding groups (SG XV, CMTT, CCIR and MPEG) meetings.

The focus of the IVS Technical Session should be on coding and network issues. Participation should be limited to around 40 people to facilitate fruitful technical discussions. The chairman of the IVS ITU Coordination Meeting (Mr. Andrew M. Day) will arrange invitations to chairmen of the appropriate groups.

ANNEX : IVS Baseline Document [to be attached] (Not attached)

SOURCE : SG ~~SWP~~ XVIII/~~8-3~~

TITLE : Proposed Liaison to SG XV ATM Video Coding Experts Group and CMTT/3 (for information and action)

SUBJECT: B-ISDN AAL matters

CONTACT: Special Rapporteur SWP XVIII/8-3
K.YAMAZAKI
KDD R&D Labs.
2-1-15 Ohara, Kamifukuoka-shi
356 JAPAN
FAX:+81 492 66 7510 ~~0348~~
E-mail:yamazaki%sun1.kddlabs.co.jp@uunet.UU.NET

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1. 1992 version of I.363 "AAL types 1 and2"

ANNEX-1 of this Liaison contains 1992 version of I.363 "AAL types 1 and 2", that will be submitted to the CCITT Plenary Assembly. There were several improvements and editorial changes made from the Melbourne version, particularly two texts of CS functions for "asynchronous and synchronous circuit transport" were merged into the one text under "circuit transport".

2. Revised list of possible functions for AAL type 1/2 video signal transport

ANNEX-2 presents a revised list of possible functions for AAL type 1/2 video signal transport. The list incorporates comments raised by SG XV ATM Video Coding Experts Group from its Stockholm meeting.

3. Question to SG XV on support of H.320 terminal in B-ISDN

The question was raised on support of existing H.320 terminal in B-ISDN. The impacts of cell losses was addressed, particularly in the context of AAL type 1 circuit transport. Considerations of this issue are further described in ANNEX-3 of this Liaison. SG XVIII wishes to have an answer from SG XV ATM Video Coding Expert Group.

4. Question to CMTT on polynomials to be used for the Reed-Solomon code

I.363 specifies the error correction method for unidirectional video signal transport. Question was raised on exact polynomials to be used for the Reed-Solomon code. Considerations on this issue are summarized in ANNEX-4 of this Liaison. SG XVIII wishes to have an answer from CMTT to complete specifications of I.363.

ANNEX-1	:	Revised I.363 sections 1, 2 and 3 [to be attached] (Not attached)
ANNEX-2	:	Possible functions of AAL 1/2 video signal transport [to be attached from APPENDIX-2 to SWP XVIII/8-3 Report]
ANNEX-3	:	Considerations on support of H.320 in B-ISDN
ANNEX-4	:	Considerations on polynomials to be used for the Reed-Solomon code

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Possible functions for video signal transport of AAL type 1/2

To further progress in video signal transport of AAL type 1/2, candidate functions are drafted and listed below. Listed functions are, firstly, those which are not covered in the current AAL type 1 specifications and are suggested for video signal transport of AAL type 1/2. Since it is under study on whether type 1 or type 2 will be used for interactive video signal transport, applicability of type 1 and/or type 2 is noted to each function. Secondary, the need of AAL type 1 specific functions, developed for asynchronous and synchronous circuit transport, is addressed. If such function will be necessary, possible expansion of AAL type 1 specification should be studied.

At this stage, SWP XVIII/8-3 does not have any specific intention on inclusion of each function into Recommendation I.363, but wish to use this list as a starting point. It should also be noted that this is not a complete list. The list should be particularly considered by SG XV ATM video coding experts group for interactive video signal transport and CMTT for distributive one. Through IVS activities, comments are invited that will allow SWP XVIII/8-3 to progress in work for AAL type 1/2 video signal transport.

1. Functions not covered in the current AAL type 1 but suggested for video signal transport

1.1 Multiplexing of information types or media (type 2)

Possible user of this function may be multimedia multiplexing as suggested by SG XV ATM video coding experts group. Two types of multiplexing can be possible; (1) SAR level multiplexing which will generate cell-by-cell based multiplexed streams, (2) CS level multiplexing which will be composed of number of CS-PDU streams with one SAR-PDU. (See multimedia multiplexing methods identified in SG XV ATM video coding experts group)

1.2 Handling of Cell Loss Priority (CLP) (type 2, type 1?)

This function will allow an AAL user to use cell-by-cell based CLP capability by setting CLP as high priority at the transmitting end. The use of this function may be carefully studied in conjunction with layered coding techniques as suggested in I.211 section 3 (Video aspects). The impact of violation tagging should also be addressed, for which SWP XVIII/8-7 has been studying. (See item 3 of SWP XVIII/8-7 Living List)

1.3 Per-cell error protection (type 1 and/or 2)

For distributive video signal transport, correction method of bit errors and cell losses is specified based on Forward Error Correction (FEC) combined with octet interleaving. The need for this function and required performance should be addressed for interactive video signal transport. Delay issue introduced by such method should also be examined.

1.4 Framing of user data (type 2)

This function may be provided by the field identifying cell payload as begging, continuation, end and single segment of user data. The possible other method to support this functions is to use a pointer that indicates the beginning of framed user data.

As an additional function associated with this function, the need for aligning the user data, particularly the beginning of packetized data, to cell boundary should be addressed.

1.5 Partially filled cell (type 2)

This function relates to the necessity of length indicator field.

1.6 Need for expansion of the SN length (type 1 ? or type 2 ?)

The question is raised by SG XV ATM video coding experts group on whether or not three bit SN of type 1 will be sufficient to accommodate bursty cell losses. This should be studied taking account of required performance for video signal transport, in conjunction of possible characteristics of bursty cell losses and defined network performance being studied in WP XVIII/6.

2. Functions of AAL type 1 circuit transport to be examined for video signal transport

2.1 Source clock frequency recovery

Two methods are described in AAL type 1 circuit transport, i.e., SRTS and adaptive clock. SRTS has been invented in SWP XVIII/8-3 to meet specific jitter performance specified in G.823/824 for transporting PDH signals. While adaptive clock is conventional method widely used in the existing terminals and the network. As a third method, this function may be provided by an AAL user itself by implementing synchronization pattern within a layer above AAL. (See I.211 section 2.5)

The need of this function is identified for interactive video signal transport by SG XV ATM video coding experts group. Required performance and applicability of each method to an AAL user should be carefully studied.

Considerations on support of H.320 in B-ISDN
(Question to SG XV ATM Video Coding Experts Group)

1. Introduction

In Rec. I.363, the definition of the AAL type 1 relies on 4 Convergence Sublayer (CS) descriptions. AAL users have to use one of these CS in order to connect their terminals to ATM networks. However, when defining some CS, a common view has been to think about the connection of future terminals. Problems may appear when users will connect their existing terminals. For example the connection of H.320 terminals by using one of the CS defined for the AAL type 1 is not straightforward. The intention of this paper is to draw the attention to this particular problem.

2. Which CS for H.320 terminals ?

Recommendation H.320 addresses terminals containing a video codec according to Rec. H.261, an audio codec according to. G.711 or G.722, a system control according to Rec. H.242, a multiplex according to H.221, and a network interface according to I.400 series. These terminals have been designed for narrowband-ISDNs, and their bitrates are px64 kbit/s, with p = 1 to 30. Nevertheless, at least during the early stage of ATM, these terminals may be connected to broadband-ISDNs.

On the other hand, it should be pointed out that video coding according to H.261 has no means to cope with lacks of information at reception, as would occur when a cell would be lost. The loss of 47 octets will undoubtly cause severe damages in the signal recovery, even if dummy octets are inserted in the signal flow before entering the decoder. Because inter-frame coding is highly used in H.261 coders, a proper recovery of the video signal may take some picture durations (maximum 132, i.e. 4.4 s, according to Rec H.261 para. 3.4.) until forced updating will "clean up" the picture.

Thus, depending on ATM network performances, i.e. depending on the cell loss rate, correction capabilities to recover missing data may be mandatory. Figures of the mean time interval between two lost cells are given hereafter for typical H.320 bitrates :

- bitrate : 384 kbit/s, CLR : 10-8, mean interval : 27 hours
- bitrate : 1920 kbit/s, CLR : 10-8, mean interval : 5.4 hours.

For connecting H.320 terminals to ATM networks, users will use AAL type 1, with a choice between two CS defined in Rec. I.363 :

- the CS for synchronous circuit transport
- the CS for video signal transport

In the CS for synchronous circuit transport described in Rec. I.363 para. 2.3.2.1.2., the handling of lost and misinserted cells only relies on the insertion of dummy SAR-SDU payloads without any cell loss correction capability. Therefore the use of this CS for H.320 terminals is likely to cause problems in the video decoder leading to perceptible effects for the users.

In the CS for video signal transport, handling of lost and misinserted cells provides means to recover information in lost cells. However, this method, described in para. 2.3.2.2.4.1. is only applicable to unidirectional video services because of the delay it implies. The delay of the interleaver is 125 ms for 384 kbit/s and 25 ms for 1920 kbit/s. Taking into account both transmission and reception, and both directions, these figures would become 500 ms for 384 kbit/s and 100 ms for 1920 kbit/s interactive terminals.

For other terminals, i.e. interactive video terminals, only the insertion of dummy SAR-SDU payloads is proposed. As a result, although this CS has been designed to cope with video signals, its use is not satisfactory in the case of H.320 terminals.

To summarize, the situation is as follows :

i) for H.320 terminals cell loss correction capability may be mandatory depending on network performances ;

ii) no capability is currently defined in Rec. I.363 for interactive low bitrate video signals.

As a result, it is proposed to complete the AAL type 1 definition in Rec. I.363 in order to enable the connection of existing terminals as H.320 terminals. Particularly, a method to recover signals in the case of cell loss has to be defined.

3. Conclusion

In the first stage of ATM, the connection of existing video terminals, e.g. H.320 terminals, has to be envisaged. For these terminals, the use of CS as they are currently defined in Rec. I.363 is not satisfactory in terms of cell loss correction. Depending on the opinion of other groups dealing with video coding and service aspects, it may be necessary to enhance the CS for video signal transport.

Considerations on polynomials to be used for the Reed-Solomon code
(Question to CMTT)

1. Introduction

In Rec. I.363 section 2, a CS for video signal transport has been described. Particularly, a correction method for bit errors and cell losses for unidirectional video services has been described. This method relies on FEC using RS codes. This paper focuses on the necessity to specify the exact RS codes to be used.

2. Discussion

In Rec. I.363, para 2.5.2.2.4.1., a correction method relying on RS codes is proposed. For the implementation of this method for signals that need it, it is necessary to give the exact description of the RS code.

RS codes are built over GF (256). For the specification of the RS code, the following elements have to be given :

- the primitive polynomial which defines the multiplication in GF(256) and the primitive element of GF(256).

- the generator polynomial . For any RS code this polynomial is expressed as

$$\prod_{i=0}^{t-1}(x-\alpha^{i+k})$$

In the preceding equation t is the code redundancy (t = 4 in our case), and k is the base exponent for the generator polynomial.

For the former, examples are given : $p(x) = x^8+x^4+x^3+x^2+1$ or $p(x) = x^8+x^7+x^2+x+1$

For the latter, some values for k are k = 0, k = 1, k = 128.

3. Conclusion

For the implementation the CS for video signal transport described in Rec. I.363 section 2, the need is felt to define precisely the RS code to be used in the correction method described in para 2.5.2.2.4.1. This paper raises the issue and gives examples of solutions.

CCITT Study Group XVIII
Geneva 09-19 June 1992

Source : ~~Special Rapporteur on Traffic Control and Resource Management~~ Study Group XVIII

Title : Liaisons to SG II and SG XV

Contact Point: Mr. Boudreuse

Liaison to SG II

SG XVIII informs SG II that draft recommendation I.371 has been approved at its Geneva Meeting and will be provided for further approval to the Plenary Assembly.

The points raised by SG II in its Liaison have been addressed.

- It is the viewpoint of SG XVIII and therefore recommended in I.371 that the Peak Cell Rate always be present in any Source Traffic Descriptor. This is to protect the network by limiting the maximum amount of traffic entering the network.

- I.371 is actually addressing traffic and congestion controls at the cell level as well as at the call level. It is the suggestion of SG XVIII that SG II focuses its work on issues which may help enhancing control functions, such as traffic source characterization (in particular the statistical "transaction variables" which could provide inputs to the definition of further traffic parameters beyond Peak Cell Rate) and ways to use Virtual Path Connections (as outlined in section 3.2.1.1 of I.371). Inputs on the use of the CLP to provide for different Network Performance Objectives is also welcome.

- Alternative on CLP issues has been reduced to one and the result is reflected accordingly in I.371.

Liaison to SG XV - Traffic Control and Usage Parameter Control issues

SG XVIII informs SG XV that draft recommendation I.371 has been approved at its Geneva Meeting and will be provided for further approval to the Plenary Assembly.

It is the viewpoint of SG XVIII that the needs expressed by SG XV in its Liaison are met by the standardization of the Source Traffic Descriptor. I.371 proposes a reference algorithmic method which enables to check whether a terminal is compliant or not. This method is applicable to the currently defined traffic paraleter, i.e. the Peak Cell Rate.

It should also be noted that, given a terminal is complying with the Traffic Contract, the network has the responsibility to limit undue UPC/NPC actions to a very small value, which is part of Network Performance objectives.

In the future, it is the intention of SG XVIII to study and include further traffic parameters beside the Peak Cell Rate. These parameters may likely be as well defined in terms of an algorithm, so that the terminal can easily ensure compliance at all times of teh life of a connection.

SG XVIII welcomes all inputs on Source Traffic characteristics to define relevant additional parameters.
