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

Document AVC-208
January 1992

SOURCE: SGXVIII
TITLE : LIAISON STATEMENTS TO ATM VIDEO CODING EXPERTS GROUP

The following liaison statements from SGXVIII in response to SGXV ATM Video Coding Experts Group are attached:

END

Appendix 3.

~~Appendix C~~
~~to Report of SWPXVIII/8-3~~

(添付 1)

QUESTIONS: 2/XVIII, 13/XVIII, 22/XVIII

SOURCE: WPXVIII/8, Melbourne meeting, 2 - 13 December '91

TITLE: Liaison Statement to CCITT SGXV ATM Video Coding Experts Group, SGI & SGXI, CMTT/3, CCIR IWP 11/9 and ISO/IEC JTC1/SC29 (for information and action)

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SGXVIII is pleased to note your group's positive support for the IVS Co-ordination activities initiated by SGXVIII and further developed at the ITU IVS Co-ordination meeting in Tokyo, 25 - 27 September 1991. The desire of each of the groups involved for greater co-ordination and harmonisation of their coding studies is a good start to achieving the objectives of IVS in B-ISDN. SG XVIII looks forward to joint discussions on these issues at the proposed IVS Technical Workshop, tentatively planned for the end of October 1992. The revised standardisation timetable from CMTT/2 and the identification of additional outstanding technical issues by CCITT SGXV and CCIR IWP 11/9 were welcomed and have been incorporated into the current revision of the IVS Baseline Document. The December 1991 updated version of the IVS Baseline, also incorporating the latest results of SGXVIII studies of relevance to IVS (including AAL Type 1 and Cell Loss Priority (CLP)), is attached.

Despite the clarification provided by CMTT/3 via their Liaison to SGXVIII, there is still some uncertainty as to the extent that CMTT/2 are studying and producing video coding standards specifically suited to the ATM basis of B-ISDN. It is apparent that CMTT/2 has an initial emphasis on STM with a view to later adaptation to ATM. SGXVIII considers it premature for CMTT/2 to assume and consider as a mandatory constraint that the same bit-rate reduction algorithm, being studied by CMTT/2, will be used for secondary distribution in both STM and ATM networks.

SGXVIII therefore consider it necessary for (secondary) there to be an assessment of other options to progress the study of ATM video coding for distribution services at a satisfactory level consistent with SGXVIII's network development timetable for B-ISDN. The proposed (Technical) Workshop will facilitate a broader understanding of the issues involved. AAL Type 1 and 2 matters and the revised version of Rec. I.363 §2 has been sent as a separate Liaison Statement to CMTT and CCITT SGXV.

Appendix -

CCITT
Study Group XVIII
Melbourne, 2 - 13 December 1991

(添付2)

Questions : 2, 13 & 22 / XVIII

SOURCE : SWP XVIII/8

TITLE : Proposed Liaison statement to SG XV ATM video coding experts group and CMTT/3 on AAL for supporting video signal transport

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Purpose : For information and action

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1. General

SWP XVIII/8-3 is responsible for AAL types 1 and 2 as well as general services and IVS (Integrated Video Services) aspects. At its Melbourne meeting during 2 - 13 December, SWP XVIII/8-3 made a significant progress in AAL work. This liaison states the current status of AAL work, requests both SG XV ATM video coding experts group and CMTT/3 to see our results, and invites their inputs in order to further progress in AAL for video signal transport. For this purpose, The latest version of I.363 section 2 (AAL type 1), and possible candidate functions for AAL type 2 are attached to this liaison respectively. It should also be noted that we wish to continue liaisons on AAL matters as a part of IVS activities, since protocol development work is closely linked with video services to be provided by AAL.

2. AAL type 1

2.1 For asynchronous/synchronous circuit transport

SWP XVIII/8-3 successfully developed AAL type 1 protocol for two types of AAL layer service, namely asynchronous and synchronous circuit transport, and prepared almost stable specifications. Example users of these two layer services and main features of the protocol are summarized below;

1) Asynchronous circuit transport
   - Transport of G.702 signals, i.e., 1.544, 2.048, 6.312 and 8.448 Mbit/s signal transport via B-ISDN.
   - Support of source clock frequency recovery to meet jitter performance specified in G.823 and G.824.

2) Synchronous circuit transport
   - Transport of 64, 384, 1536/1920 kbit/s signals of

N-ISDN Recommendations.
- Support of structured data transfer, e.g., transfer of 8 kHz structured data as specified for N-ISDN bearer services.

2.2 For video signal transport

It should be addressed to both SG XV and CMTT/3, for their video signal transport, on the need for functions of asynchronous/synchronous circuit transport, i.e. need for source clock frequency recovery and structured data transfer. And if such function is necessary, applicability of the method specified for asynchronous/synchronous circuit transport will also be addressed.

According to requests from SG XV and CMTT/3 on AAL descriptions, the text was drafted and incorporated into I.363 section 2 for those areas listed below;

For SG XV : - Interleaving to be optional; - Cell loss notification;

For CMTT/3 : - Error correction using Reed-Solomon code and octet interleaving.

Particularly emphasized regarding 8 kHz timing is distinction between A) delivery of 8 kHz clock within terminal as reference local clock, and B) transfer of 8 kHz structured data between two ends. For supporting B), the method specified for synchronous circuit transport can apply. For supporting A), current I.363 does not state anything, since we understand that it may be implementation matter as the case in N-ISDN. Clarification from SG XV and CMTT/3 on this issue is also required.

3. AAL type 2 - Commonality between AAL type 1 and type 2, and functions to be provided by AAL type 2

SWP XVIII/8-3 concluded to delete example structure and coding of AAL type 2, currently described in I.363 section 3, for 1992 Recommendation.

Commonality of AALs for CBR/VBR was addressed to the meeting by SG XV. After discussions. we recognized that clarification should be provided by SG XV, since there might be puzzlement on AALs. The following are brief extract from specifications of AAL type 1 and should be considered for this issue;

- Data to be exchanged between AAL type 1 and an AAL user is such that 1) the length shall be constant, 2) interval between two consecutive data shall be constant, 3) if data is organized into structured block, e.g. 6 octets within 125 microsecond as in the case of 384 kbit/s, length of block (6 octets in the above example) shall also be always constant.

- SAR and CS of AAL type 1 is specified in a closely linked manner to facilitate efficiency and robustness of protocol. It may be difficult to separate SAR and CS clearly form OSI modelling viewpoint.

- CS functions and protocol developed for asynchronous/ synchronous circuit transport may also be applicable to, 1) AAL type 1 for video signal transport, 2) AAL type 2 for video signal transport, as suggested above.

- As an objective, commonality should be achieved between AALs for video signal transport, as well as among various types of AAL layer services.

Therefore, SG XV is kindly requested to study AAL type 1 (I.363 section 2 as attached to this liaison) carefully, and is invited to provide clarification on commonality issue.

SWP XVIII/8-3 has begun exploring the possibility of commonality between AAL type 1 and type 2 functions and protocols. To further progress in AAL type 2 work, candidate functions were drafted, and attached to this liaison.

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. Comments are invited from SG XV and CMTT/3 to allow SWP XVIII/8-3 to progress in work for AAL type 2.

ATTACHMENTS

ATTACHMENT 1 : Revised text of I.363 section 2 (AAL type 1)
ATTACHMENT 2 : Candidate functions for AAL type 2

APPENDIX 4.

CCITT
Study Group XVIII
Melbourne, 2 - 13 December 1991

(添付 3)

Questions : 2, 13 & 22 / XVIII

SOURCE : ~~SWP XVIII/8-3~~ Working Party XVIII/8( )

TITLE : Proposed Liaison statement to CMTT/3 on AAL for supporting high quality audio signals

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Purpose : For information and action

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SWP XVIII/8-3 is currently defining the Convergence Sublayer (CS) functions and protocols for class A services (CBR services). These services will use AAL type 1. The need of CS for asynchronous circuit transport, synchronous circuit transport, video signal transport and voice-band signal transport has been identified and the work on CSs is progressing. Text on these Css will appear in the 1992 I.363 Recommendation.

SWP XVIII/8-3 has in addition prepared a text with the basic functions for the CS for high quality audio signal transport. This liaison statement requests from CMTT/3 the confirmation of the need of providing the high quality audio signal transport in the B-ISDN, as in the case of an affirmative answer we would request that CMTT/3 identifies the respective CS functions and protocols to be used, in order that SWP XVIII/8-3 can take a decision on its inclusion in the 1992 I.363 Recommendation.

The present text on the functions of CS for high quality audio signal transport as proposed is the following;

a) Handling of AAL user information
The length of AAL-SDU is one octet.

b) Handling of cell delay variation
A buffer is used to support this function. The size of this buffer is dependent upon specifications provided in Recommendation I.35B.

c) Handling of lost and misinserted cells
The SN counter values are further processed at this sublayer to detect lost and misinserted cells. Misinserted cells are discarded.

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Information in lost cells may be recovered by the mechanism described in e). The exact functions for handling of lost cells and buffer underflow are for further study.

d) Source clock frequency recovery

This function is for further study.

e) Monitoring of user information field for bit errors and corrective actions

Forward error correction may be performed to protect against bit errors. The data interleaving mechanism (e.g. bit or octet interleaving) may also be performed on an optional basis. Furthermore, these two methods may be combined to give more secure protection against errors.

Note - Other functions, e.g. the need for CS-PCI and monitoring and handling of bit errors in CS-PCI, are for further study.

CCITT Study Group XVIII
Melbourne, 2-13 December 1991

~~Temporary Document~~ 37 (XVIII/8)

Appendix 9

Source : Rapporteur on Traffic Control and Resource Management

WP XVIII/8C

Title : Liaison Statement to SG XV

Subject : Answer to Liaison from SG XV

(添付 4)

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SG XVIII informs SG XV that a draft recommendation I.371 on Traffic Control and Resource Management enhancing previous recommendation I.311 Section 4 has been agreed at the Melbourne meeting and should be approved at the CCITT Plenary Meeting in 1992.

1. Use of CLP bit

1.1 Negotiation of Peak Cell Rate for CLP = 0 and CLP = 1 flows

It is for the moment controversial within SG XVIII to decide whether Peak Cell Rate will be negotiated and enforced separately for each flow or whether it will be negotiated and enforced for CLP = 0 and for the aggregate CLP = 0 + CLP = 1 flow as depicted on figure 1 of SG XV Liaison.

Although the second approach does not appear to raise in principle any difficulty at the cell level, its efficiency may depend on the distribution of traffic between the three different classes, i.e. only CLP = 0, only CLP = 1 and CLP = 0 + 1. Concerns have been expressed that this scheme could preclude implementations on ATM switching nodes.

This remains for further study. It is therefore recommended that SG XV not make any assumption concerning the final decision on this issue. Nevertheless, further inputs from SG XV are welcome.

1.2 Merit of the use of the CLP bit

~~Coordination with SWP XVIII/8-1 required~~

The assessment of the improvement of network utilization by the use of CLP bit to differentiate two QoS classes has not been made by SG XVIII yet, specifically when resource is provisioned for the CLP = 1 flow in order to provide for a given QoS. SG XVIII intends to address this issue as soon as possible.

The current text of recommendation I.371 on the use of the CLP bit reads as follows :

> *"The high priority CLP = 0 traffic, as indicated by the user, will be assured by the network, provided that the user does not exceed the negotiated contract. As stated however in section 3.2.3.2, there is a probability that the UPC unduly decides that an ATM CLP = 0 connection is not conforming (Type I Errors on figure 6/I.371). If the violation tagging option is used by the network operator, CLP = 0 cells may be subject to changing the CLP bit to 1.*

The expected Type I error ratio, as a part of the end-to-end network performance, should remain very low (it may be of the order of 10-9)."

~~1.2 Question to SG XV~~

It is the understanding of SG XVIII that SG XV would use the CLP bit as an end-to-end multiplexing identifier. SG XVIII believes that procedures such as disabling tagging of CLP = 0 cells on a subscription or a connection basis will result in additional network complexity. Furthermore, there may be no correlation between the cells of the two substreams and the desired loss priority. For this reason, ~~it is for the moment recommended that~~ the CLP bit ~~not be used~~ as an end-to-end multiplexing identifier.

~~1.3 Fast resource allocation~~

SG XVIII introduced ATM user to user information indication in ATM cell header. This indication may be utilized by the ATM service user, including the AAL, to facilitate layer identification required for supporting layered coding.

1.3 Fast resource Management

This issue is still being studied by SG XVIII. SG XV's attention is drawn to I.371. Further input from SG XV on the use of such schemes is invited.

2. Usage Parameter Control for Peak Cell Rate

2.1 Peak Cell Rate at S_B

Peak Cell Rate is currently defined for a point-to-point VCC as follows :

- Location : ATM Layer Service Access Point
- Basic event : 48 octet SDU DATA_REQUEST
- Definition : the inverse of the minimum inter-arrival time between two subsequent basic events

It is noted that this definition includes OAM cells possibly generated above the ATM layer.

2.2 Peak Cell Rate at T_B

It is considered that the standardization of a maximum Cell Delay Variation between the location as defined above and T_B is the only way to decouple properly the Customer/Terminal Equipment and Usage Parameter Control implementations.

If multiplexing functions are performed above the ATM layer, SG XVIII suggests that DATA_REQUESTs be spaced out by the AAL in order to conform to the definition above. It is noted that Cell Delay Variation introduced at the Physical Layer at S_B due to the cell insertion is not relevant to the Peak Cell Rate definition. This is part of the Cell Delay Variation allocated to the Customer Equipment.

If ATM multiplexing of a number of ATM connections is performed within the terminal, the resulting Cell Delay Variation is also part of the Cell Delay Variation allocated to the Customer Equipment. At the moment, SG XVIII also suggests that a Terminal Equipment operates as a single multiplexing queue.

The impact on the overall Customer Equipment Cell Delay Variation is expected not to be significant.

However, the GFC protocol is also to be considered, as it may be supported by the Terminal Equipment. In this case, the overall ATM layer Cell Delay Variation is the only relevant parameter and has to conform to the allocated maximum Cell Delay Variation.

SG XVIII does not consider its responsibility to include standardization of performance objectives internal to the Customer Equipment. However, it is felt that a Reference model is required to unambiguously define the responsibilities. This is under study.

NM p.11 of AVC-208 ANNEX 31

(to the report of ISDN experts of SG XVIII)

CCITT
STUDY GROUP XVIII
Melbourne, 2-13 December 1991
Questions: 3,4; 2,13,22/XVIII, 5/XVIII
Experts Group for ATM Video Coding in SG XV
Source: Q5/XVIII
Purpose: Response to Liaison from SG XV
Experts Group for Video Coding to SG XVIII
Subject: Standardization of NP Parameter Values

and To CMTT/3 (for info)

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Q5/XVIII has initiated and is pursuing efforts to establish values for various ATM network performance parameters. One topic discussed in the Q5/XVIII meeting was the estimation of cell error ratio (CER). Although more conservative estimate of this parameter based on further characterization of the error performance of underlying transmission facilities is deemed necessary, a value of about 2X10E-6 ~~appears to be the best value of cell error ratio that can be achieved based on the currently specified G.82x values~~.

In response to item number 6 of the Addendum, Q5/XVIII has initiated similar efforts for the characterization of cell loss ratio. Preliminary results are provided in a companion contribution.

The Q5/XVIII Group appreciates the concerns expressed by the Experts Group for Video Coding in SG XV and hopes to be able to provide further information on NP parameters in the future.

is expected to be the best value of the cell error ratio that can be achieved, assuming that the transmission network just conforms to the objective values for physical layer performance as currently specificied in G.82x.

It is noted that this figure encompasses a number of errored situations caused by transmission misfunctionings, from single transmission errors up to long bursts of errors - SG XVIII is pursuing its work to characterize further error conditions in B-ISDN and will inform SG XV of the results of this work.

STUDY GROUP XVIII
Melbourne, 2-13 December 1991

Question: ' 5/XVIII
Source: Working Party XVIII/6
Purpose: Response to Liaison from SG XV Experts Group on Video Coding; Liaison to CMTT/3
Subject: G.82X Provisional Objectives and ATM Cell Loss

(添付 6)

Contact: Special Rapporteur on Question 5/XVIII

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This liaison communicates the implication of the severely errored second ratio (SESR) objective of draft Recommendation G.82X for ATM cell loss.

Draft Recommendation G.82X has a provisional SESR objective of 0.2%. (This is an end-to-end objective based on a reference connection of 27,500 km and multiple transit countries). SES events correspond to a severely corrupted signal for more than 1 ms, causing the loss of hundreds of ATM cells when the transmission rate is, for example, 155 Mbit/s. Multiplexing in the ATM layer will prevent a single application from experiencing all this loss. ~~but the effects on video codecs may still be severe~~. This substantial cell loss would occur 86 times per day if the 0.2% SESR objective were just met (172 times per day) and if half of SES events caused lost cells for 1 ms or more. This might happen during the worst month. this may still affect operations of video codecs.

A companion liaison from WP XVIII/6 relates G.82X objectives to errored ATM cells. We are concerned that our preliminary estimates of both errored and lost cell rates may be greater than those being assumed in work on ATM video coding, and hope this information is useful in directing such work.

Note that while these results have been expressed in terms of ~~the~~ ATM layer performance, the degradations ~~are these~~ ~~which~~ arise from the underlying physical layer, and similar degradations ~~would~~ would be experienced by any signal, carried by ~~the~~ a physical layer just conforming to G.82x. It is possible that some AAL types may improve bit error and cell loss performance provided by the ATM layer. These AAL issues will continue to be studied in WP XVIII/8, in cooperation with WP XVIII/6 who will also continue studies on the relationship of transmission network performance objective to ATM network performance.