ITU Telecommunication Standardization Sector
Study Group 15
Experts Group for Video Coding and Systems
in ATM and Other Network Environments

Document AVC-711
13 December 1994

Source: SG13 Rapporteurs for Q.6/13
Title: SG13 Report and Liasion Statement on AAL Matters
Purpose: Report

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This document contains the following outcome of the SG13 meeting held in November 1994 on the subject matter. Our original questions leading to the third paper is also attached at the end.

| Annex | Source | Title |
|---|---|---|
| 1 | Rapporteurs Q.6 (A. D. Odedra BT UK, and K. Yamazaki KDD Japan) | Report of the joint meeting of SWP 13-2-1 and 13-2-2 |
| 2 | Rapporteur Q.6.1 (K. Yamazaki, KDD Japan) | Report of the meeting |
| 3 | Q.6 / SG13 | Proposed Liaison to ITU-T SG 15 (ATM Video Group), ITU-T SG9, ITU-R SG11 and ISO/IEC MPEG (for information): AAL matters |

*Annex 1 to AVC-711*

Study Group 13

Geneva, 14-25 November 1994

Questions : 6 / 13

SOURCE : Rapporteurs Q.6 (A. D. Odedra BT UK, and K. Yamazaki KDD Japan)

TITLE : Report of the joint meeting of SWP 13-2-1 and 13-2-2

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The joint group met for 1/2 a day under the chairmanship of the Q.6 Rapporteurs.

In TD.9(P) and TD.7(13/2), Liaison Rapporteur (Mr. J-Y. Cochennec, France) reported on ITU-T SG9 activities. TD.29(2/13) from ITU-T SG15 ATM Video Coding Experts Group reported on discussions on AAL aspects; 1) the SG15 experts group has defined multiple service scenarios, 2) AAL type 5 without SSCS as well as AAL type 1 is included for support of CBR MPEG2 depending on service scenarios and related studies, and 3) AAL options in various service and network scenarios are under study in the SG15 experts group.

D.500 (UK) presented in accompanying Liaisons from ETSI that the view of the majority in ETSI was to use: AAL type 1 for CBR AMS (Audio-visual and Multimedia Services), and AAL type 2 (based on AAL type 1) for class B VBR AMS.

D.512 (BT) described the requirements of class B services and made an actual proposal of an AAL for class B services based on the current specification of AAL type 1 in ITU-T.

D.574 (USA) proposed use of AAL5 to support CBR MPEG2 for video on demand applications with the assumption that ATM networks bound the value of CDV (Cell Delay Variation) within, e.g., 1 ms.

During discussions a question was raised about whether support of MPEG2 fits into CBR and service class A or C in terms of current terminology of I.362; cell loss aspects were also discussed; No consensus of a common understanding could be reached on these points.

D.623 and D.626 (Siemens) addressed AAL5 with AVSSCS for audio visual multimedia services; their view presented was that there was no clear technical advantage for use of AAL1 or AAL5, but that due to commercial considerations like early availability of AAL5 chips preference should be given to use AAL5 and a new AVSSCS. Siemens proposed to describe AAL5-AVSSCS in additional section of Recommendation I.363 and also that use of AAL5 with and without AVSSCS to support real time (class A and B) services should be described as an alternative solution in I.362. There was no consensus on these proposals in the joint meeting.

A view was expressed that experts groups now have enough knowledge on ATM and AAL aspects after several years of collaborative standardization activities, e.g., IVS (Integrated Video Services) activities with ITU-T SG15, ITU-T SG9 and ITU-R SG11, that they should continue the study of AAL aspects from their expertise viewpoints, hence it is a time to leave these issues to experts groups; No conclusion was reached.

As a result of these discussions, there is a need to review the need of inclusion of specification of alignment of AAL types to service classes in I.362. It will be appropriate to remove all references to alignment of AAL types to service classes from I.362. A confirmation on this issue and the usefulness of I.362 will be taken at the July 1995 meeting of SG13.

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*Annex 2 to AVC-711*

Study Group 13

Geneva, 14-25 November 1994

Questions : 6.1 / 13

SOURCE : Rapporteur Q.6.1 (K. Yamazaki, KDD Japan)

TITLE : Report of the meeting

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1. General

The group met under the chairmanship of Mr. Katsuyuki Yamazaki (KDD, Japan). After discussions of two days and drafting activities of abut three days, the group produced for the first time the draft Recommendation I.363.X for AAL types 1 and 2, i.e., the proposed revision of AAL type 1 in I.363/1993 version, which will be in a frozen state at the next July 1995 meeting.

2. Major discussions of the meeting

2.1 Liaisons from SG15 ATM Video Coding Experts Group

Mr. Radha (USA) from the SG15 ATM Video Coding Experts Group kindly attended the meeting and presented Liaisons from that group, i.e., TD.1(2/13) - TD.5(2/13) which include several questions. After useful technical discussions between Mr. Radha and experts in the SG13 group, the meeting agreed to send a Liaison to the SG15 group on issues of the use of cell loss priority and of interworking with 64 kbit/s-based ISDN for giving further technical clarification on ATM and AAL type 1. The Liaison was drafted by Mr. B.Bharucha (USA) and Mr. B.Kittams (USA).

2.2 Text enhancement of I.363.X

Contributions for enhancing the text of I363.X were presented; D.457(Spain) and D.547(France) for the source clock frequency recovery, D.550(Ascom) and D.560(USA) for the SDT (Structured Data Transfer) method, D.458(Spain) for the SNP (Sequence Number Protection) parity bit, D.549(Ascom) for the SRTS (Synchronous Residual Time Stamp) parameter N, and D.566(USA) for the new material on encoding and information transfer principles. These proposal were agreed upon in principle, and the text of I.363.X was drafted and advanced by the drafting activity accordingly.

D.552(IBM) proposed to extend the SDT method for enabling dynamic change of the SDT block size to support multimedia communications. It was felt by the meeting that further elaboration is necessary in both the need and the detailed procedure for such a method.

2.3 Voice/modem over ATM

At the last meeting, a Liaison including a status report on the issue of voice over ATM was prepared and sent to SG15 (voice coding), SG14 (voice-band modem) and SG12 (QOS of voice). Note that applications discussed here are an A-law or μ-law encoded CBR 64 kbit/s voice signal and voice-band modem signal.

The group reviewed Liaisons received (TD.17(2/13), TD.21(/13) and TD.22(2/13)), which stated that they are in favor of complete fill cell rather than partially fill cell. Detection and compensation of lost cells are identified important for particularly supporting voice-band modem signal.

D.521(NTT) presented three approaches and their technical implications for detection and compensation of lost cells, and proposed to use AAL type 1 for voice over ATM.

D.573(USA) proposed to create the new AAL format for voice/modem which utilizes 48 octets cell payload with the assumption that ATM networks bound the value of CDV (Cell Delay Variation) within the small value compared to a 6 ms cell interval, e.g., 1 ms.

Several views for creating the new AAL format for voice/modem were expressed on 1) uncertainty of network performance (CDV value), 2) possible impact of traffic control and OAM aspects on a cell interval and CDV, 3) excluding a future possibility of the use of sequence count processing, and 4) commonalty between supports of a 64 kbit/s digital signal and a voice signal; there was no common understanding obtained by the meeting. The gain of 2 % (48/47) available by a new AAL was proposed important, but no consensus was reached.

The discussion group was formed and led by Mr. K. Heilmann (Germany) ,whose result is summarized below:

- The experts all agreed on the provisional assumption that an "intelligent" buffer management method can be used to detect cell loss in the case that the CDV is small compared to the cell inter-arrival time. This means that the sequence count processing may not be needed for voice/modem. Some delegates expressed the opinion that this is true for all 64 kbit/s services.

- There was no agreement whether the AAL type 1 header SAR-PDU shall be retained or not. The feeling of the meeting was that it has to be carefully considered if the introduction of a new AAL format for voice can cause interworking problems, e.g., with PSTN/64 kbit/s-based ISDN networks.

3. Future activity

The need for an interim Rapporteur's meeting was identified. Agenda, place and date are:

- Agenda: Voice/modem over ATM
  Video over ATM
- Place: Stockholm (with kind invitation of Ericsson)
- Date: Four days in April - May time-frame. The exact date will be informed to the correspondence group.

The contact point for the correspondence group is yamazaki@lab.kdd.co.jp.

4. Proposed Liaison document

Annex-1 : To ITU-T SG15 (Video Group), ITU-T SG9, ITU-R SG11 and ISO/IEC MPEG on AAL matters

5. Attachments

TD.4 (2/13) : Draft Recommendation I.363.X

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SOURCE : Q.6 / SG13

TITLE : Proposed Liaison to ITU-T SG 15 (ATM Video Group), ITU-T SG9, ITU-R SG11 and ISO/IEC MPEG (for information)

SUBJECT : AAL matters

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SG13/WP2/Q.6.1 AAL experts thank the SG15 ATM Video Coding Experts Group for the timely Liaisons on issues of mutual interest related to video services over ATM.

1. STATUS and PRIORITY parameters passed to the AAL user

In reply to the Liaison about priority and error indication primitives we wish to make the following points:

(1) The existing AAL type 1 agreements on primitives passed from the AAL type 1 to the AAL user already provides the requested STATUS parameter (See § 2.1.2.2.1).

(2) There is no provision made in current agreements on CBR sources over ATM or in type 1 agreements for passing a PRIORITY parameter from the AAL user to the AAL type 1, since the priority is always "high".

The lack of text in Rec. I.363 on a PRIORITY parameter for CBR sources is based on an existing note in Rec. I.150 which states:

"Note - the cell loss priority mechanism would not normally be used for constant bit rate (CBR) sources; i.e., cells belonging to a CBR service would not normally have the CLP indicator set."

To clarify this situation and to emphasize that "low" priority should not be used, the following text is being added to a section describing information flows between the ATM layer and the AAL type 1 in the draft Rec. I.363.X:

"The submitted loss priority parameter is set to high priority".

2. Use of AAL type 1

After further discussion, the SG13/Q.6 experts felt some clarification of the different services AAL type 1 can provide to the AAL user might provide useful insights to the SG15 experts group. The AAL type 1 agreements provide a variety of capabilities to the AAL user. It is up to the user of AAL type 1 to specify which subset of capabilities match the user's needs.

As an example, consider two possible implementations of AAL type 1 which could be used to support a 384 kbit/s CBR service application. Assume that both AAL type 1 implementations detect SAR-PDU loss, and fill the payload.

Implementation 1:

Type of circuit transport - bit stream (without the use of pointer).
Source clock frequency recovery - asynchronous with SRTS or adaptive clock.

Implementation 2:

Type of circuit transport - structured data transfer (with the use of pointer and block size of 6 octets.
Source clock frequency recovery - synchronous.

With implementation 1 the AAL user is receiving information bits at a rate determined by a 384 kbit/s clock which is not locked to a network clock. With implementation 2 the AAL user is receiving information bits with periodic octet block indication (i.e., 8 kHz integrity) at a rate determined by a 384 kbit/s clock locked to a network clock. Which implementation is appropriate depends on the needs of the application. Further options arise when considering what error control procedure to use in the event of cell loss. AAL type 1 implementations can support the following:

- insertion of AAL generated data,
- error correction by AAL (i.e., FEC options), and
- no action by AAL to indicate error to the AAL user.

Both implementations could use any of these error control options. Once again the needs of the application will decide the appropriate choice.

3. Draft Rec. I.363.X

The SG13/Q.6 experts group at its November 1994 meeting produced the draft Recommendation I.363.X, the revised version of I.363/1993 version, as attached to this Liaison document. I.363.X is planned to be in a frozen text at the SG13 July 1995 meeting.

4. Interim Rapporter's meeting

The SG13/Q6 experts group will hold an interim Rapporter's meeting. Agenda, place and date are:

- Agenda: Voice/modem over ATM
  Video over ATM
- Place: Stockholm (with kind invitation of Ericsson)
- Date: Four days in April - May time-frame. The exact date (TBD in the final version of Liaison).

Participation of experts from ITU-T SG15, SG9, ITU-R SG11, ISO/MPEG is highly appreciated.

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Attachment : Draft Rec. I.363.X

*Appendix (original questions from the SG15 Experts Group)*

Annex 1 to AVC-704

Source: Rapporteur for Q.2/15 (Sakae OKUBO)
Title: Correspondence to Rapporteur for Q.6/13 (Mr. Katsuyuki Yamazaki)
Subject: Priority and error indication primitive parameters at ALL-SAP
Purpose: Request for action

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At its Norway meeting in July 1994, Experts Group for Video Coding and Systems in ATM and Other Network Environments in Study Group 15 discussed the primitive parameters at the boundary between the AAL layer and the multimedia multiplex (H.222.1) layer for audiovisual communications. After having reviewed input contributions, we concluded that primitive parameters should be defined for priority and error indication as follows:

Table 1 Proposed definition of primitives for use with H.222.1 at AAL-SAP

| primitive | direction | parameters |
|---|---|---|
| AAL_UNITDATA.request | user to AAL | DATA, PRIORITY |
| AAL_UNITDATA.indication | AAL to user | DATA, STATUS |

where STATUS in AAL_UNITDATA.indication includes error indication that DATA may include errors based on the AAL error correction/detection results. The primitive names and the exact meaning of the parameters in Table 1 require further study. There may be a STRUCTURE parameter associated with the AAL_UNITDATA.request and AAL_UNITDATA.indication primitives.

It is our agreement that the linkage between the higher layer priority request (e.g. transport_priority bit in the H.222.0 Transport Stream) and the primitive parameter setting at the AAL-SAP should not be tight; it should be left to the choice of applications. In the case of an integrated H.32X terminal, the entity which might set the transport_priority bit has access to the AAL-SAP, and can set the PRIORITY parameter as required. In the case of a Transport Stream being accessed remotely, it remains the users option as to how priority should be implemented, and as to whether it should or should not be used. Such choices depend on cost, and network Quality Of Service offerings.

We request SG13 to consider definition of additional primitive parameters at AAL-SAP which are necessary for audiovisual communications as discussed above.

Annex 3 to AVC-704

Source: Rapporteur for Q.2/15 (Sakae OKUBO)
Title: Correspondence to Rapporteur for Q.6/13 (Mr. Katsuyuki Yamazaki)
Subject: Audiovisual services between the two terminals accommodated in B-ISDN and N-ISDN
Purpose: Request for advice

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Experts Group for Video Coding and Systems in ATM and Other Network Environments in Study Group 15 has been studying audiovisual systems and terminals in B-ISDN; H.32X for utilizing new generation audiovisual coding (e.g. H.262|MPEG-2 Video) and H.32Y for adapting existing H.320 to B-ISDN. One of the essential features of such B-ISDN terminals, particularly videoconferencing and videophone terminals, is to interwork with existing H.320 audiovisual terminals accommodated in N-ISDN. According to I.581, the network interconnection between B-ISDN UNI and N-ISDN UNI is supported through Interworking Function at the junction point of the two networks by using the AAL1 circuit emulation service.

Since existing H.320 terminals are not prepared for a long burst of errors caused by the cell loss, we need a cell loss protection mechanism for the B-N interworking in the B-ISDN portion of the connection if the cell loss is excessive. Furthermore, the cell loss protection mechanism should not incur excessive delay in conversational services. The current short interleaver in AAL 1 has been specified to meet these requirements. Hence we understand that AAL 1 with short interleaver in the Convergence Sublayer should be invoked for audiovisual B-N interworking where the cell loss is problematic.

At the July 1994 meeting of the Experts Group in Norway, some questions were raised how this AAL can be invoked at the Interworking Function. When an audiovisual terminal accommodated in B-ISDN places a call, it knows that its N-ISDN destination should also be an audiovisual terminal, thus such AAL should be negotiated. Since AAL should be terminated at the Interworking Function, the Interworking Function may have to support multiple service dependent AALs; such as "Circuit transport", "Video Signal Transport".

When a terminal accommodated in the N-ISDN places a call, it may carry audiovisual attributes in LLC/HLC, thus the Interworking Function may be able to invoke AAL1 with short interleaver for the connection. LLC/HLC, however, is generally not decoded inside the network according to the principle that the network is service independent. If that is the case, there seems to be

no way for Interworking Function to identify whether the call is audiovisual or of unrestricted digital information.

Related to the above discussion, we feel that availability of AAL tools (e.g. FEC) should be negotiated at the start of a call among terminals, terminal adaptors and Interworking Functions. If such AAL capabilities are not communicated, it is not clear how terminals and adaptors will decide when to use these capabilities.

We would like to seek advice of the SG13 members on the following:

1) whether our understanding for B-N interworking and operation of the Interworking Function is correct,
2) what provisions are necessary in the audiovisual terminals to achieve B-N interworking, and
3) how the choice of AAL1 tools is negotiated and signalled to the remote end.

Annex 4 to AVC-704

Source: Rapporteur for Q.2/15 (Sakae OKUBO)
Title: Correspondence to Rapporteur for Q.6/13 (Mr. Katsuyuki Yamazaki)
Subject: AAL1 short interleaver, circuit transport and support of SDT
Purpose: Request for clarification

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At its July 1994 meeting in Norway, the SG15 Experts Group for Video Coding and Systems in ATM and Other Network Environments gratefully received your input regarding the "circuit emulation" for Broadband and Narrowband interworking. We now understand that the "Circuit transport" service of AAL1 is the right word, that the "Circuit transport" supports the SDT pointer, but the "Video signal transport" with the short interleaver FEC does not support the SDT pointer, and that the support of both SDT and FEC in AAL1 is under study.

It is appreciated if we could receive further clarification on how the choice of an appropriate AAL service be negotiated and signalled for communication between two H.32Y (adaptation of H.320 to B-ISDN) terminals or for interworking between an N-ISDN H.320 terminal and a B-ISDN H.32Y terminal.

END