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

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TITLE : Report of the meeting of SWP XVIII/8-3 (Services, IVS and AAL types 1 and 2)

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1. General

SWP XVIII/8-3 met for 3 days under the chairmanship of Mr. K.Yamazaki (KDD, Japan) to discuss general service aspects, IVS (Integrated Video Services) aspects and AAL types 1 and 2.

2. AAL type 1

2.1 Key issues

Based on contributions submitted, the meeting discussed key issues which require urgent study towards 1992 Recommendation of I.363 section 2 (AAL type 1). The summary of discussions is given below, and new text was produced according to the results of discussions.

2.1.1 Source clock frequency recovery method
- D.1745[USA]

For supporting asynchronous circuit transport such as G.702 signals transport via B-ISDN, some specific method to provide source clock frequency recovery is required to meet jitter performance specified in Recommendation G.823 and G.824. Two methods, namely SFET (Synchronous Frequency Encoding Technique) and TS (Time Stamp), have been proposed from USA and France respectively. Both methods have been extensively evaluated at every AAL type 1 meeting from viewpoints of performance, necessary overhead, tolerance for bit errors and suitability to other services.

D.1745 proposed consolidated method of both SFET and TS as the result of cooperative work carried out by USA and France. The method, referred to SRTS (Synchronous Residual Time Stamp), combines features of both SFET and TS, thus should be considered to be the best. The meeting welcomed the proposed method and asked Mr. B.Kittams (Bellcore, USA), in cooperation with Mr. J.Y.Cochennec (CNET, France), to prepare the text to be incorporated into I.363. The SWP XVIII/8-3 also expressed thanks to experts of both USA and France for their hard and patient work.

2.1.2 Structured data transfer method
- D.1711[USA], D.1850[NTT]

The need to support structured data transfer, e.g. 1536/1920 digital information transfer with 8 kHz integrity being provided by 64 kbit/s based ISDN, had been introduced and agreed at the Ottawa meeting. D.1850 suggested the simple method which was based on one of options tabled at the Ottawa meeting for initiating studies. The advanced method was proposed by D.1711 to enable more robustness, and was agreed upon. The text was developed by the drafting group led by Mr. B.Bharucha (AT&T, USA). The use of CSI bit for both SRTS and structured data transport was also elaborated by the group.

D.1850 also addressed to use partially filled cell for the case where packing delay is critical. The protocol was produced in relation with structured data transfer method and the text was incorporated.

2.1.3 SN/SNP validity check method
- D.1712[USA], D.1852[NTT], D.1920[France]

This issue had been addressed at the Ottawa meeting in order to give complete specifications on SN/SNP operations at the receiving end. Three contributions answered the request and proposed methods. Proposed three methods were equivalent, and the drafting group chaired by Mr. K.Oguchi (NTT, Japan) produced the merged text of I.363.

2.1.4 Convergence Sublayer for video signals transport
- TD.17[SGXV-ATM], TD.19[CMTT]

TD.17 from SGXV-ATM (ATM coding experts group of SG XV) included requirements for AAL type 1. This Liaison had been considered at the Ottawa meeting, and almost all of their requests had been incorporated. The meeting reconfirmed the results of the Ottawa meeting.

TD.19 from CMTT requested the forward error correction method, for the recovery of cell losses and bit errors, to be included in I.363. It was also noted that the proposed method, i.e., combination of Read-Solomon (RS) codes and octet interleaving, only concerns unidirectional video services where delay requirements are less stringent. The views of SGXV-ATM was expressed as such that they do not want that method within AAL. Instead, they need notification of cell losses and bit errors from AAL to an AAL user as requested in TD.17, and that request had been incorporated in I.363 at the Ottawa meeting.

The difference of requests from SGXV-ATM and CMTT is based on the different philosophy for errors, QOS perceived by viewers and arrangements against transmission impairments. The meeting fully understood the situation and agreed to accept CMTT proposal with additional text that describes applicability of the proposed method. The text was drafted by the group led by Mr. J.Y.Cochennec.

Regarding source clock frequency recovery method, the meeting agreed to ask both SGXV-ATM and CMTT, via Liaison document, about whether such method is necessary for their purpose. The background of this question is the following; the

SRTS method is designated to meet jitter performance required for G.702 signals, the required jitter performance for video purpose is unclear, and there may be another method suitable for video purpose such adaptive clock. The results from two groups will be necessary for SWP XVIII/8-3 to asses the exact method for video signals transport.

As to the structured data transfer method, it was noted that SGXV-ATM necessitates such method according to the results of the current studies. Question was raised on whether CMTT needs this method to carry their video signals. This should also be addressed to CMTT via Liaison document.

2.1.5 AAL type 1 and users

- D.1694[KDD], D.1948[UK]

D.1694 proposed to leave the protocol development work of user specific function to users, i.e. relevant standardization group, considering the I.363 as a basis for their work. D.1948 proposed that studies of CS be carried out in SGXV-ATM while retaining overall responsibility within SG XVIII.

After discussions, the meeting felt that it is premature to follow the proposal of D.1694, and agreed the suggestion proposed in D.1948. Furthermore, it was recognized to pursue the following approach in principle; to invite users to provide inputs, to draft text based on inputs taking account of harmonizations for different users, and to maintain text within SG XVIII. This approach is based on the strategy of achieving maximum commonality of CS between different users as an objective.

2.1.6 Others

- D.1849[NTT], D.1918[France], D.1887[FRG], D.1917[France], D.1851[NTT]

D.1849 proposed to include SDH signals transport as an example of synchronous circuit transport. The proposal was agreed and the text was produced.

The text describing initialization of SN value was presented in D.1918 and agreed upon.

D.1887 stated that cell mis-insertion ratio is negligibly small, hence handling of lost cells be only considered to enable simple specifications. The meeting appreciated the calculation and concluded to keep this issue open and invite further considerations.

D.1917 proposed to define primitives between SAR and CS of AAL type 1. The need to introduce primitives has not been identified so far. It was also noted that the use of primitive may lead to some mis-understanding of existence of clear separation between SAR and CS, while AAL type 1 SAR and CS is specified in closely linked manner. Therefore, the meeting concluded that it is premature to include primitives.

D.1851 presented a functional model of AAL type 1. The

meeting felt the proposed figure may cause some confusions, and should not be included in I.363.

The liaison statement on this subject was drafted and will be sent to CMTT.

2.2 Advancing the text of I.363
- TD.15[Ottawa report], D.1919[FT]

Drafting work was based on agreements reached so far, and revised text of I.363 section 2 appears in ANNEX B of WP XVIII/8 report.

During the drafting activities, concerns were raised on the inclusion of high quality audio in CS text of I.363, since no explicit users and requirements have been identified. This concern relates to further development of AAL specifications within SG XVIII, particularly beyond 1992 Recommendations. The concern was not resolved, and the issue of whether text on high quality audio should be provided in the 1992 Recommendation should be further addressed to the next meeting.

3. AAL type 2 - Commonality between AAL type 1 and type 2, and functions to be provided by AAL type 2
- TD.17&25[SGXV-ATM], D.1690[KDD], D.1921[FT], D.1886[FRG], D.1656[Aus.]

permit B-ISDN codecs to operate easily in either mode.

SGXV-ATM requested that commonality of the AAL to support CBR and VBR video signal transport should be considered in order to ~~facilitate interworking between B-ISDN codecs and N-ISDN codecs (px64 kbit/s)~~. SGXV-ATM also noted that the example of type 2 AAL in the current I.363 text may be restrictive for supporting a wide range of video services.

The meeting agreed that example structure and coding of AAL type 2 included in I.363 should be deleted, and that AAL type 2 work be elaborated from this meeting as described below.

Both D.1690 and D.1921 proposed that AAL type 2 should be based on AAL type 1. D.1690 also proposed that AAL type 2 should be upward-compatible to AAL type 1, since VBR is a super-set of CBR from viewpoint of protocol development for video. These proposals were ~~agreed upon in principle~~ explored and require further study.

D.1921 further identified that, for high bit rate VBR signals, no partially filled cells are needed, and that they are similar to CBR services. The use of AAL type 1 for VBR video was suggested. The experts being involved in development of AAL type 1 expressed that, to asses such use, the following be carefully examined ; - functions provided by AAL type 1, e.g. structured data transfer, - the form of data exchanged between AAL type 1 and user as specified in primitives. This should be addressed to SGXV-ATM and CMTT.

D.1886 proposed to divide AAL service class B to two sub-classes, i.e., ON/OFF pattern and non-ON/OFF pattern. With arguments raised on commonality issues mentioned above, discussions took place and resulted that relation between class B service and AAL type 1/2 be clarified and left to open issue.

D.1656 proposed multimedia multiplexing be based on the use of VC rather than be provided within AAL. The meeting did not reach any conclusion at this stage.

To further progress in AAL type 2 work, candidate functions were drafted, and attached as APPENDIX 2 of this report, based on contributions D.1690[KDD], D.1921[FT], D.1656[Aus.], D.1886[FRG] and D.1320[USA, submitted to the last Geneva meeting]. Listed functions are, firstly, those which are not covered in AAL type 1 and are suggested for AAL type 2. Secondary, the need of AAL type 1 functions for type 2 purpose is addressed, and if necessary, applicability of AAL type 1 method and protocol for such function should be examined.

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 also be sent to SGXV-ATM and CMTT for their consideration, and comments are invited that will allow SWP XVIII/8-3 to progress in work for AAL type 2 video signal transport.

4. Liaison to SGXV-ATM and CMTT regarding AAL types 1 and 2

AAL type 1 specifications for asynchronous and synchronous circuit transport are becoming stable towards 1992 Recommendation, and the SWP XVIII/8-3 needs inputs from SGXV-ATM and CMTT to progress in its work for video signals transport by AAL types 1 and 2. Therefore, the full text of I.363 section 2 will be sent to both groups for their considerations. Questions raised during the meeting as described above were also addressed to SGXV-ATM and CMTT.

5. Services

5.1 Text enhancement of I.211 section 2
- D.1695[KDD], D.1758[USA]

The drafting group chaired by Mr. R.Sinha (Bellcore, USA) was set up to produce revised text of I.211, in order to reflect agreements reached from 1990 Recommendation. Included are the text describing some specific service bit rates, i.e., nx64 kbit/s of N-ISDN and bit rates of G.702, for CBR services as proposed by D.1758. The text was also introduced by D.1695 to explain VP/VC aspects to cope with SWP XVIII/8-6 request. The revised version of I.211 section 2 appears in ANNEX C of WP XVIII/8 report. The group did not complete its work due to lack of time, and identified the text to be enhanced at the next meeting. Those text are marked in ANNEX C. Contributions proposing text are required to the next meeting.

5.2 Support of voice-band services
- TD.2[SGXV-WP2]

TD.2 raised concerns on voice services interworking between B-ISDN and PSTN for their studies on speech packetization. Particularly expressed in relation with SWP XVIII/8-3 studies were ; - A and u law conversion, - need for sequence number, -

possibility of VBR in the case of speech interpolation, - possible use of connectionless services, - echo control (ref. to D.174/XVIII[USA]).

This issue should also be studied in conjunction of work for AAL type 1 for voice-band signal transport. (See section I.363 section 2.3.1.1 Note and section 2.3.2.1.4) The meeting did not initiate Liaison statement since sufficient work have not been taken, and left this issue to open item.

o. Integrated Video Services (IVS) Aspects

TD 9 (Tokyo Report), TD 4 (CCIR IWP 11/9, TD 5 (MPEG), TD 17 & 25 (SGXV-ATM), TD 18 (CMTT), TD 21 (LRapp), TD 16 (SRapp Multimedia)

The December 1991 SGXVIII meeting considered and endorsed the report of the ITU IVS Co-ordination Meeting held in Tokyo, 25 - 27 September 1991 in which representatives of CCITT (SGs I, XV and XVIII), CMTT (TGs 2 & 3), CCIR (SG11 & IWP 11/9) and ISO/IEC JTC1/SC29 participated. Key issues and agreements coming out of the Tokyo Co-ordination meeting included:

- CMTT/2's current work on video coding for secondary distribution is based on STM and not ATM, which is not consistent with B-ISDN developments as was agreed as necessary by the 1988 CCITT Plenary Assembly.
- CCIR SG11 is currently not studying ATM video coding.
- With CCIR SG11 not studying ATM video coding and with CMTT/2's main interest in STM, together with CCITT SGXV's emphasis on ATM based systems, there can be expected to be continued production of different coding solutions across different delivery media and service types. Account must be taken of the need for harmonisation between groups coding for different delivery systems (eg. ISDN, terrestrial emission and satellite emission).
- ATM cell loss performance and details of other characteristics of ATM based networks is required by CCITT SGXV and CMTT/2.
- It was agreed that liaison with Sub-committee 29 of ISO/IEC JTC1 (incorporating MPEG) should be established.
- It was agreed that the IVS Baseline document should continue to be used to assist in the harmonisation of video network service and coding issues.
- It was also agreed that SGXVIII should maintain the editorial role on the IVS Baseline under the guidance of specific inputs from relevant areas.
- The meeting agreed that a broader based IVS Technical Workshop of 2 to 3 days duration should be held early to late 1992. The purpose would be to allow greater exposure of the technical issues associated with video network, service and coding aspects and to promote technical discussion and co-ordination at the expert rather than official administrative level.
- Standardisation timetables across CCITT SGs I, XV & XVIII, TG CMTT/2, CCIR SG 11 and MPEG were prepared to indicate the anticipated availability of standards related to video network, service and coding activities.

Liaison Statements addressing IVS aspects were received from CMTT/3, CCIR IWP 11/9, ISO/IEC JTC1/SC29 and the CCITT SGXV ATM Video Coding Experts Group. It was pleasing to note the positive support from these groups for the IVS Co-ordination activities initiated by SGXVIII. 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.

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 incorporated into the current revision of the IVS Baseline Document by the drafting group chaired by the editor, Mr D. Dorman (Telecom Australia).

There is a very clear and strong emphasis on ATM based video coding within the CCITT SGXV ATM Video Coding Experts Group. However there were some doubts expressed by the meeting on the extent to which CMTT are studying and producing video coding standards specifically suited to the ATM basis of B-ISDN. To include "STM/ATM" in the Standardisation Timetable of CMTT/2 implies equivalence, in the sense that the current STM based coding studies would be equally applicable to ATM. This approach is unlikely to produce the most appropriate solution. There is a need to first analyse the attributes of ATM as they impact on video coding. It is premature and quite inappropriate at this early stage to place a mandatory requirement on the use of the same bit-rate reduction algorithm for both STM and ATM.

To resolve this issue, either CMTT should rebalance their studies and/or outputs related to ATM and B-ISDN, or other ITU groups which already have a strong ATM video expertise basis should be mandated to broaden their studies to other video services as well. One option is to include video coding for distribution services into the terms of reference of CCITT SGXV, whose timetable is already closely linked to that of SGXVIII.

The IVS Baseline Document has been revised and sections enhanced with the material from the ITU IVS Co-ordination meeting report, Liaison Statements into this SGXVIII meeting and the relevant results from this SGXVIII meeting. The December 1991 revised version of the IVS Baseline can be found in ANNEX to the report of WPXVIII. A liaison Statement incorporating the Baseline is to be sent to CCITT SGs I, XI & XV, TG CMTT/3, CCIR SG11 & IWP 11/9 and ISO/IEC JTC1/ SC29.

The meeting felt that I.211 Section 3 (Video Aspects) is premature to go to a separate Recommendation in 1992 time-frame. Because of time constraints, text enhancement of I.211 Section 3 was not performed and should be done at the next meeting. At this Melbourne meeting, the SWP XVIII/8-3 was able to have a representative from SGXV-ATM, Mr. M. Biggar (Telecom Australia), and thanked him for his useful information and contribution to the AAL and IVS studies.