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Working Party XV/1
Experts Group for ATM Video Coding

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STUDY GROUP XVIII

Matsuyama, 26.11-7.12.1990

Questions: 2,13,22/XVIII

SOURCE: CHAIRMAN OF WP XVIII/8

TITLE: REPORT OF WP XVIII/8 - GENERAL B-ISDN ASPECTS

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1. General

Working Party XVIII/8 met in Matsuyama, Japan from 26 November-5 December 1990 under the chairmanship of Mr. A. Day (Australia).

On the basis of the 13 1990 B-ISDN Recommendations approved for invocation of Resolution No.2 procedures on 26 Nov. 1990 WP XVIII/8 advanced their detailed work towards 1992 Recommendations.

2. 1992 B-ISDN Recommendations objectives

The meeting agreed that as an objective the 1992 Recommendations should be sufficiently detailed to allow the initial support of commercial B-ISDN services using standardized procedures and interfaces.

A staged set of initial service requirements and network capabilities were defined to guide the standardization activities of WP XVIII/8, other WPs in SG XVIII and other Study Groups in CCITT addressing B-ISDN. These are outlined in Annex 1.

To extend the 1990 B-ISDN Recommendation to reflect these objectives, particular attention in the next two years will be required on:

- Signalling aspects of B-ISDN to allow basic B-ISDN bearer service control (in cooperation with SG XI).

- Resource management procedures and specification sufficient to allow ATM based service support.

- Stage 1 service description of initial B-ISDN service (in cooperation with SG I).

- Adaptation layer procedures and specification to support a range of B-ISDN services.

- OAM capabilities sufficient to support initial commercial services.

- Full specification of ATM aspects including generic flow control and ATM layer management.

- Finalization of UNI aspects in WP XVIII/8 to allow detailed specification of B-ISDN UNI by WP XVIII/3.

3. Changes in SWP structure and Special Rapporteur responsibilities

4. Results of WP XVIII/8 activities

Considerable progress was made at this meeting on advancing the technical basis for the 1992 B-ISDN Recommendations This includes

4.1 ATM aspects (I.150, I.361)

4.2 UNI aspects (I.413, I.432 (Part))

4.3 Service aspects (I.211)

Key achievements at this meeting are (1) ~~categorization of~~ bearer services (identified by SG I) to be provided by B-ISDN, (2) an updated version of (SG I) stage 1 service descriptions for advancing studies of SG I, (3) producing a baseline document of integrated video services (IVS) for future coordination activities among various standardization groups, and (4) some agreement on SAR of AAL type 1. Refer Annex 5 for further detail

4.4 OAM and evolution aspects (I.610)

4.5 AAL aspects (I.362, I.363)

. The network layer of the signalling is supported, not provided by the AAL.

. The ConnectionLess service is also provided above the AAL.

. The AAL provides different services, e.g. among others:

  * In assured mode a service comparable to the data-link layer;

  * In the non-assured mode the core service as defined in Q.922;

  * In non-assured message mode a service to support Connection Less service.

. A preliminary description of services, primitives and functions for inclusion in the Draft Rec. of 1992.

. An unambiguous description of the functions within the AAL, such as in the form of transition tables will become part of the draft Recommendation on AAL.

. The coding of the fields for SAR and CS will align with the octets.

. A coding for the CS-sublayer for the support of message mode ConnectionLess service was established. Further detail is contained in Annex 7. to this report

4.6 Signalling aspects

4.7 Resource management aspects

- There is a general feeling that we should start with a restricted set of telecommunication services for which both realistic network efficiency may be achieved and usage control handled adequately with simple mechanisms.

- A traffic parameter is only valid under the following conditions : it is understandable by the user and conformance is possible ; this parameter participates in resource allocation schemes to achieve the committed network performance and/or to increase network utilization ; it is controlable by the network (Usage and network parameter control) ; any new parameter added to the initial set should prove to enable a significant increase of network performance.

- The question of the benefit that services could make of two cell loss priority classes has to be urgently answered to make the adequate decision between the following choices :
  - there are two committed cell loss rates 10-x and 10-y under normal network conditions ;
  - only one cell loss rate 10-x is guaranteed ; there is no commitment on the lower cell loss priority.

Information is requested from service groups.

- At an interface, the only way to decouple properly upstream from downstream protocols seems to standardize the cell delay jitter. This decoupling may apply at the UNI and at subnetwork edges.

- UPC requirements : UPC has to protect efficiently the network, to be simple, transparent to the committed traffic, but to react fast to violations. Assumptions that the UPC may make on the user side behaviour should rely on standards. Similar requirements apply to NPC.
The number of enforced parameters per VP or VC is a key issue for assessing the UPC/NPC feasibility.

- Tagging cells in excess is an option (I.311) ; the efficiency of the mechanism is ~~argued~~ disputed. Use of the CLP for violation tagging depends upon the previous debate on committed cell loss rate(s) and interpretation of recommendation I.150.

- Preliminary proposals have been made to use the ability of ATM to decouple virtual connection setup and resource allocation in order to multiplex ON/OFF sources by using a fast resource allocation/release protocol.

- A basic set of traffic parameters and network mechanisms is aimed at in the 1992 set of recommendations. This set should enable first implementations optimized for CBR and bursty data services.

Further detail as included as Annex 9

5. Joint meeting activities in SG XVIII

5.1 General

To assist the transfer of B-ISDN responsibilities to other Working Parties in SG XVIII several Joint Working Parties were held in Matsuyama. The results of these meetings are indicated below.

6. Joint activities on integrated video services in B-ISDN

Consistent with SG XVIII's mandate under Question 22/XVIII to coordinate issues associated with video services and coding for B-ISDN across CCITT, CMTT and CCIR, a meeting was held on 30 November 1990 with representatives from related groups. Inputs to the meeting included CCITT SG XV ATM Experts Group (Chairman, //Mr. S. Okubo), CMTT/2 (Chairman, Experts Group, Mr. H. Murakami), CMTT/3, IWP CCIR 11/9 (Vice-Chairman, Mr. N. Tanimura) and ISO/IEC MPEG.

The objective of the meeting was to clarify the respective activities of each group, provide information and feedback on SG XVIII's accelerated activities and results on B-ISDN, and to address the need for, and mechanisms to achieve, increased harmonization and coordination of activities across the groups.

WP XVIII/8 tabled a baseline document on Integrated Video Services (IVS) in B-ISDN, which outlined the current status of studies in SG XVIII on B-ISDN network aspects (including adaptation layer aspects), video service interworking, video coding aspects and multimedia service aspects. The intention is that the baseline document has joint ownership by the groups involved and that these groups will provide new information on the progress of their study. The objective of the baseline document is to facilitate the availability of information across different aspects of B-ISDN video service support, to serve as a "living" document as progress is made in each relevant group, and to indicate the long term goal of the combined study areas for the supported integrated video services in B-ISDN.

As a result of the documents tabled and the associated discussions, the meeting welcomed ~~that~~ the initiative of SG XVIII to harmonize video study and agreed that:

- the projected objectives of the different groups in part represented an overlap amongst the various groups, in particular on distribution video services and the future HDTV objectives;

- there was a need to establish long term goals for Integrated Video Services in B-ISDN, to stop divergent development across different groups;

- the baseline document approach represented a useful mechanism to assist the harmonization of video service and coding studies across different groups;

- there was a need to further coordinate activities across these issues in 1991, once the associated groups had the opportunity to discuss these developments and provide input.

It was further agreed that a coordination meeting be held in the April/May timeframe amongst representatives of the involved groups, at which coordinated inputs to the baseline document from each group would be discussed, and objectives would be established for the long term goal for integrated video service in B-ISDN. The meeting will be coordinated by CCITT SG XVIII.

The meeting agreed that representatives from CCITT SG I and CCIR SG 11 be invited, given the responsibility of these groups in recommending the end to end service description and quality for interactive and distributing services respectively.

7. Joint meeting on B-ISDN signalling

8. Liaison statements

Liaison statements are contained in Annex 10.

9. Other aspects

9.1 AAL responsibilities

WP XVIII/8 were unable to achieve consensus on the split of responsibility for B-ISDN. AAL standardization across SG XI & SG XVIII. The issue of AAL standardization and responsibilities across all 4 types of AAL require urgent resolution at the June 1991 meeting.

10. Future activities

. WP XVIII/8 agreed that a Special Rapporteurs' meeting on AAL types 1 to 4 should be held on 11-15 March 1991. Details including agreed discussion subjects are outlined in Annex 11.

. A Seminar on resource management aspects is proposed prior to the June 1991 meeting.

. A coordination meeting on video service aspects in B-ISDN (as outlined in section 5) involving officials or their representative(s) from CCITT SG I, SG VIII, SG XI,X SG XVIII, CCIR SG 11 (11/71 AND 11/9) and CMTT/2 and 3.

Annex 1

Timetable of network and service results from SGXVIII to other groups (especially SGXI) requiring signalling capabilities

The attached table shows the timetable of network and service results that have been generated within SGXVIII. The intention is to clarify the services, network capabilities and network architectures that have been described by SGXVIII that require further work by other groups, but especially SGXI, to define signalling capabilities, procedures and protocols (working in co-operation with SGXVIII). The timetable shows the results that SGXVIII has identified in three stages: results released from SGXVIII by 1990 (primarily the 1990 B-ISDN Recommendations) shown as 'release 1', results expected by 1992 from SGXVIII, shown as 'release 2', and results expected by 1994 from SGXVIII, shown as 'release 3'. 1992 signalling Recommendations from SGXI are required to define signalling capabilities, procedures and protocols for the 'release 1' 1990 results, summarised in the first column.

Timetable of network and service results *from* SGXVIII *to* other groups (especially SGXI) requiring signalling capabilities

by 90 (release 1)[1]	by 92 (release 2)[2]	by 94 (release 3)
1. B-ISDN Bearer services[3]	← as for 90 with additions:	← as for 90 and 92 with additions:
BCOB-A (CBR, CO, with end-to-end timing) peak allocation	BCOB-B (VBR, CO, with end-to-end timing)	Multi-media
BCLB-D (VBR, CLS, no end-to-end timing) peak allocation	BCOB-C (VBR, CO, no end-to-end timing)	Distributive services
BCOB-X (unrestricted, proprietary AAL)	Bandwidth allocated on basis of traffic characteristics (CBR and VBR) for all classes	
	Relationship of CLP to QoS & Indication of QoS by user	Negotiation of QoS class by user from QoS classes
2. Network Architecture (refer I.311 §2)	← as for 90 with additions:	← as for 90 and 92 with additions:
For both UNI and NNI	Connectionless servers (switched access)	
VPC Switching (ATM cross connect)	Service Control Point (IN) access	
VPC Management	VP Resource management systems	
VCC Switching (ATM switching)		
non-intelligent multiplexing		
Connectionless servers interconnected with semi-permanent VCC/VPC		
3. Network Capabilities	← as for 90 with additions:	← as for 90 and 92 with additions:
VC switching (point-point)	Simple Multi-point VC & VP connections	Broadcast connections
VP switching (point-point)	VP configuration with standard OAM	VP configuration with integrated OAM and switching
VP establishment with proprietary OAM system	CLP use	
Indication of VPC and VCC peak bit-rate during establishment	Negotiation of VPC and VCC bandwidth during establishment	
	Re-negotiation of VPC/VCC bandwidth during active phase	
	Indication of QoS	
3.1 Traffic characteristics:	← as for 90 with additions:	← as for 90 and 92 with additions:
Peak allocated VCC and VPC	Bandwidth allocated to VCC and VPC on basis of traffic characteristics, including additional parameters e.g. average, burstiness, peak duration[4]	
Circuit emulation, including 64 kbit/s	N-ISDN interworking	
3.2 Connection Configurations	← as for 90 with additions:	← as for 90 and 92 with additions:
unidirectional, point to point	simple point to multipoint ATM bearers limited topologies, including add/drop features[5]	
bi-directional, point to point symmetrical asymmetrical		
single connection, simultaneous establishment	multi-connection, delayed establishment	
4. Other attributes	← as for 90 with additions:	← as for 90 and 92 with additions:
Common channel signalling transfer mode	Supplementary Services	
Meta-signalling channel	Broadband aspects of charging and relationship to resource allocation	
Initial guidance on charging		

Notes:
BCOB: Broadband Connection Oriented Bearer Service, BLCB: Broadband Connectionless Bearer Service.
1. Mandatory for 1992 Signalling Recommendations.
2. As an objective for 1992 Signalling Recommendations, to be included in 1992 Recommendations where possible.
3. This includes the support of narrowband ISDN services as defined in Q.767.
4. SGXI should note that further information on additional parameters may be available before '92 for inclusion in '92 signalling Recommendations if possible.
5. SGXI is requested to urgently study this connection configuration's feasibility.

Annexes 2 - 4 (omitted)

Annex 5

1. Introduction

The SWP meeting was held over the period ~~27~~ Nov - 3 Dec for discussing B-ISDN general service aspects, ~~v~~ideo coding aspects and AAL type 1/2.

2. Bearer services supported by B-ISDN

TD.16/WP8 informed the meeting that stage 1 service description of two bearer services, Broadband connection oriented bearer service (BCOB) and connectionless data bearer service (BCLB), are now under development in SG I. TD.8/WP8 and D.1061 proposed two additional bearer service categories, i.e. circuit emulated and packet emulated bearer services.

After discussions the meeting agreed to confirm the results obtained in SG I. Furthermore, it was recognized that circuit and packet emulation should be regarded as functions supported by the network in such cases as interworking between 64kbit/s-based and ATM-based network. The meeting also agreed that an ATM bearer service, proposed in TD.8/WP8, D.1061 and D.1027, should be covered under BCOB.

Concerning bearer services supported by 64kbit/s-based network, e.g. 64kbit/s unrestricted digital bearer service, it was recognized that such bearer services should continue to be supported by both ATM-based network and interworking between 64kbit/s-based and ATM-based networks.

The question was raised whether B-ISDN multimedia services can be encompassed by one class of bearer services. Definition of appropriate bearer services to support B-ISDN multimedia applications requires further study.

3. Stage 1 service descriptions

Based on the contributions, D.1025, D.1027 and D.1062, a small drafting group chaired by Mr. R.Sinha (USA) was established to examine stage 1 service descriptions contained in TD.16/WP8, focusing its work on (1) service attributes and values, and (2) identification of possible applications to be supported by B-ISDN. Inclusion of ATM bearer service into BCOB was also incorporated. The outputs of this group are attached in Annex 10 as proposed Liaison statement to SG I. ~~The Appendix 1~~ contains an updated version of service attributes and values, and will help SG I to advance stage 1 service descriptions. ~~The Appendix 1~~ It also identifies examples of possible applications for B-ISDN bearer services. This list of applications were forwarded to SWP 8-6 (Signalling) for further discussions on 1992 Recommendations.

D.1150 raised an issue about what combinations of symmetry (bi/uni - direction) and communication configuration (point/multipoint) will be supported in B-ISDN. This will have an impact on ATM connection identification, and clarification is required from service perspective. The Appendix 2 summarizes an example of possible combinations and implications.

4. Service bit rates

D.1208 proposed Nx64kbit/s, where N implies integral value, as service bit rates of CBR services. Concerns raised in the meeting were a fear of restricting capabilities of B-ISDN, and a possibility of applications which will require service bit rates of less than 64kbit/s. No agreement was reached at the meeting. It was, however, understood that there exists two ~~implications~~ possibilities of service bit rates for CBR services as summarized below;

1) Service bit rate is the actual bit rate. A user should generate traffic at exact bit rate. 64kbit/s unrestricted digital bearer service is a typical example of this implication.

2) Service bit rate means the ceiling to be supported by B-ISDN. A user can generate traffic at any bit rate less than service bit rate. (Note)

Note ; The use of the CBR service in this manner is for further study.

5. QOS classification

D.1068 proposed six QOS classes based on cell loss probability and cell transfer delay. The meeting felt that absolute delay may not be relevant to QOS classification but delay variation will be considered. The meeting recognized, from network designer's viewpoint, that there is a need to limit the number of required QOS mappings into bearer services.

It was agreed to send this as a liaison to CCITT SG I, VIII, XV, CCIR 11, CMTT 11, CMTT h, CMTT B & IEC/ISO (MPEG) (Refer section D)

6. Video aspects

D.983 proposed baseline document as the means for coordinating and harmonizing video coding studies across the various standardization groups. The SWP 8-3 agreed to the proposal and established the drafting group chaired by Mr. D.Dorman (Australia). The output of the group was accepted by SWP 8-3, and presented to WP 8 meeting on video aspects on Nov.30. The IVS baseline document appears in ~~Rec.~~ Appendix 5

D.962 presented results of evaluation about multiplexing gain for VBR video. Studies are requested in this area in close cooperation with video coding experts groups including SG XV.

7. AAL type 2

D.1210 proposed that functions of AAL type 2 should be specified as an optional basis to enable various users to select necessary functions, and to provide type 2 functions as generic as possible. The meeting agreed this approach in principle, and a first attempt of this approach was summarized in Appendix 3 for further studies.

8. AAL type 1

Based on contributions, COM-48, D.948, D.1020, D.1120, D.1121, D.1122 and D.1123, the small group chaired by Mr. P.Adam (France) was set up to discuss AAL type 1 specifications (I.363). The major agreement reached at this meeting is the use of polynomial plus parity bit for sequence number protection (SNP). The detailed report of the group appears in Appendix 4.

9. Future studies

The following areas will require further study towards 1992 Recommendations:

- Multimedia (in cooperation with WP 5 and video coding groups)
- Service bit rates (CBR and VBR)
- QOS (classification and implications) (in cooperation with WP 6)
- Use of CLP bit and commitment on cell loss rate for only one or for both priority level ?
- Relationship between CLP bit and VBR services
- Video aspects (in cooperation with video coding groups)
- AAL type 1
- AAL type 2

Appendixes 1-4 (omitted)
Appendix 5 → separate document AVC-25

Annexes 6 – 9 (omitted)

Annex 10

Liaison Statements for WPXVIII/8

The following liaison statements have been generated by XVIII/8 at the Matsuyama meeting December 1990

5. To CCITT SGs I,VIII,XI and XV; CCIR SGII,;CMTT/1, CMTT/2; and IEC/ISO(MPEG)

Integrated Video Services Baseline Document.

Attachment IVS Baseline Document WPXVIII/8 Annex 5, Appendix 5 (TD 41).

10. To XV Traffic Control and Resource Management Aspects

Liaison 5

SOURCE: CCITT SGXVIII SWP 8-3 (Services)

TITLE: Integrated Video Services (IVS) Baseline Document

SUBJECT: Liaison Statement to CCITT Study Groups I, VIII, XI, and XV; CCIR SG11; CMTT/1; CMTT/2; and IEC/ISO (MPEG).

Consistent with SG XVIII's mandates under Question 22/XVIII to coordinate issues associated with video services and coding for B-ISDN across CCITT, CMTT and CCIR, a meeting was held on 30 November 1990 with representatives from related groups. Participants to the meeting included representatives from SGXVIII and SGXV ATM Video Coding Experts Group (Chairman: Mr S Okubo), CMTT/2 (Chairman, experts group: Mr H Murakami), CMTT/3, IWP CCIR 11/9 (Vice-Chairman: Mr ~~N Torimura~~ H Tanimura) and ISO/IEC MPEG.

The objective of the meeting was to clarify the respective activities of each group, provide information and feedback on SGXVIII's accelerated activities and results on B-ISDN, and to address the need for, and mechanism to achieve, increased harmonisation and co-ordination of activities across the groups involved in standardisation of video services on B-ISDN.

As a result of the documents tabled and the associated discussions, the meeting welcomed the initiative of SG XVIII to harmonize video study and agreed that:

- the projected objectives of the different groups in part represented an overlap amongst the various groups, in particular on distribution video services and the future DTV objectives;
- there was a need to establish long term goals for Integrated Video Services in B-ISDN, to stop divergent developments across different groups;
- the baseline document approach represented a useful mechanism to assist the harmonisation of video service and coding studies across different groups;
- there was a need to further coordinate activities across these issues in 1991, once the associated groups had ~~had~~ the opportunity to discuss these developements and provide input.

It was further agreed that a coordination meeting be held in the April timeframe amongst representatives of the involved group, at which coordinated inputs to the baseline document from each group would be discussed, and objectives be established for the long term goal for integrated video service in B-ISDN. The meeting will be coordinated by CCITT SG XVIII.

The meeting agreed that representatives from CCITT SG I and CCIR SG 11 be invited, given the responsibility of these groups in recommending the end to end service description and quality for interactive and distributing services respectively.

A baseline document on Integrated Video Services (IVS) in B-ISDN has been initiated to provide the framework for ongoing studies on the video service aspects of B-ISDN. The baseline document provides a good basis for the complex task of harmonising the work of the wide range of groups involved in video service studies to ensure consistency with B-ISDN.

It is proposed that the groups involved have joint ownership of the baseline document and that it be used as the vehicle to facilitate and promote discussion, liaison and agreements in Integrated Video Services in B-ISDN. As such, each of the groups involved in video service standardisation for the B-ISDN is invited to contribute the results of their studies to this baseline document and to comment on the inputs provided by the other groups. SGXVIII, in cooperation with these groups, aims to coordinate the contents of the baseline document to achieve consistency with the B-ISDN and to achieve convergence of the different inputs to a common level of understanding and agreement.

The proposed baseline document is attached.

Attachment IVS Baseline Document WPXVIII/8 Annex 5, Appendix 5 (TD41)

Liaison 10

Liaison statement to Study Group XV

Traffic Control and Resource Management Aspects

In CCITT SG XVIII, during the Matsuyama meeting (26 Nov, 7 Dec, 1990), a Subworking Party was established to study the Traffic Control and Resource Management aspects of B-ISDN.

First results are relevant to traffic characterizing parameters. There is a general consensus to focus the initial activities on a limited set of parameters including peak rate. The future activity will be carried out in such a way not to preclude future refinements and compatibility with the already achieved results.

If both low priority and high priority cells are carried within one Virtual Channel (e.g. for layered video coding), CCITT SG XVIII is currently discussing whether both high priority (CLP bit set to zero) and total traffic require separate characterization. Consequently, the expected cell loss rate has not yet been determined. Inputs are required to decide whether the lower priority should provide for assured limits to cell loss rate or not.

As for the Usage Parameter Control function, SG XVIII foresees that the monitoring of the peak cell rate is mandatory for any kind of service. A Usage Parameter Control mechanism and the actions to be taken in case of violation are presently under study.

It is likely that the cell loss will be dominated by network congestion ; high priority cells are expected to be discarded with a very low probability (to be defined), except under severe network congestion. Furthermore, bursts of cell losses may happen and the length of the burst is likely to be service rate dependent.

In CCITT SG XVIII, the issue on how to provide multimedia services with different virtual channels is still under discussion. At this point in time, the assessment of the limit on differential delay between different virtual channels requires further study ; in any case, this assessment has to be based on a reference path throughout the network.

A virtual path connection may be used to limit the differential delay between different virtual channels.