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

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Title: Start up procedures for H.310 terminals
Purpose: Proposal

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1. Introduction

The H.310 call phases consist of Phase A (channel setup), Phase B (audiovisual information exchange) and Phase C (channel teardown) [1]. Phase A is subdivided into the following:

- A1 initial VC setup
- A2 capabilities exchange
- A3 additional VC setup or bandwidth/AAL modification
- A4 subchannel establishment

This document intends to clarify Phases A1 and A3, proposing the two VC method where an initial VC is set up for the H.245 message exchange and another VC for audiovisual signal transport. Actions toward SG11 are also considered.

2. Choice of additional VC setup or bandwidth/AAL modification

Draft H.310 includes two options for Phase A3: additional VC setup and bandwidth/AAL modification. Since H.310 defines different type of terminals with different AALs, the negotiation before an audiovisual communication includes choice of AAL. Since AAL modification during the call is not defined, it is not likely that we can switch to AAL1 after having started an initial VC for the H.245 message exchange through AAL5 or vice versa. Even if the network is not concerned with the AAL which is used by the terminal, switching AAL during the call may not be simple for the terminal design.

Opening a default bidirectional H.245 control channel first and then a bidirectional or unidirectional audiovisual communication channel (two VC method) is a neat solution [2]. The H.245 control channel and its procedures should be common to and mandatory for all the H.310 terminals. It is further desirable that all the terminals, regardless of audiovisual or not, have a common negotiation scheme for compatibility checking*.

It is proposed that we should concentrate on this method as a basic mode of operation, leaving the bandwidth modification method (single VC method) for further study. The single VC method may be required depending on the tariff structure (if opening two VCs, one with a low bit rate and another with a high bit, is much more costly than opening a VC with an aggregate bit rate).

After having negotiated terminal capabilities including NAC (Network Adaptation Capabilities), the second VC is established for audiovisual transport which may be bidirectional or unidirectional but has agreed parameters in terms of bit rate, AAL, multiplex structure, etc.

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*This further desire needs more careful thought in the light of function sharing between the outband Q.2931 messages and the inband H.245 messages. A guiding rule established at the Kamifukuoka meeting in January 1995 is "that only essential elements should be indicated in Q.2931 which were determined to be terminal type and the start up options (Section 6.3/AVC-743R)."

3. Call set up parameters for the initial VC (Phase A1)

Phase A1 establishes a VC for H.245 messages. This call has the following SETUP message (**items** in bold are of our particular interest). All of the optional elements are listed here; H.310 should define whether each optional element is included and with what parameters if included.

(M) mandatory element, (O) optional element

Information Element	Coding	
Protocol discriminator (M)	Q.2931 user-network call/connection control messages	
Call reference (M)	A value is assigned by the originating side of the interface for a call which is unique to the originating side only within a particular signalling VC.	
Message type (M)	SETUP	
Message length (M)	as appropriate	
AAL parameters (O)		
	AAL type (octet 5)	AAL type 5
	Forward max. CPCS-SDU size (octet 6.1 & 6.2)	as appropriate???
	Backward max. CPCS-SDU size (octet 7.1 & 7.2)	as appropriate???
	SSCS type (octet 8.1)	Frame Relay SSCS [3]
ATM traffic descriptor (M)		
	Forward peak cell rate for CLP=0+1 (octets 7.1-3)	167 cells per second which corresponds to 64 kbit/s
	Backward peak cell rate for CLP=0+1 (octets 8.1-3)	167 cells per second which corresponds to 64 kbit/s
Broadband bearer capability (M)		
	Bearer Class (octet 5)	BCOB-A (BCOB-C?)*
	Traffic Type (octet 5a)	Constant Bit Rate
	Timing Requirements (octet 5a)	End-to-End Timing Not Required
	Susceptibility to clipping (octet 6)	not susceptible to clipping {???}
	User plane connection configuration (octet 6)	point-to-point
Broadband high layer information (O) [4]		
	High Layer Information Type (octet 5)	Reference to ITU-T SG 15 terminal protocol Recommendation
	Terminal Protocol Identification (octet 6 for SG 15 terminal protocol identification)	H.310 ROT & SOT, or H.310 RAST
	Forward (bits 8-5) / Backward (bits 4-1) Multiplexing Capability (octet 6a for SG 15 terminal protocol identification)	No multiplex
Broadband repeat indication (O)	???	

* The traffic is of variable rate (there may be time to send no H.245 messages), but we want no delay when the H.245 message is sent out.

Broadband low layer information (O)	User information layer 1 protocol (octet 5)	{all values reserved}
	User information layer 2 protocol (octet 6)	ITU-T Recommendation Q.922 {?} [3]
	User information layer 3 protocol (octet 7)	???
Generic identifier transport (O?) (tentative, see the liaison from SG11 Helsinki [5]	Resource correlation number tag (octet 6)	H.245 resource/correlation number
	Resource correlation number length (octet 6.1)	
	Resource correlation number (octets 6.2 to 6.5)	correlation_ID
Called party number (O)		
Called party subaddress (O)		
Calling party number (O)		
Calling party subaddress (O)		
Connection identifier (O)	VP-associated signalling (octet 5)	VP-associated signalling (same VPI for user information as for signalling) {?}
	Preferred / exclusive (octet 5)	Exclusive VPCI; exclusive VCI {?}
	Virtual Path Connection Identifier (octet 6 and 7)	as appropriate
	Virtual Channel Identifier (octet 8 and 9)	as appropriate
End-to-end transit delay (O)	Cumulative transit delay value (octets 5.1 and 5.2)	as appropriate
	Maximum end-to-end transit delay value (octets 6.1 and 6.2)	as appropriate
Notification indicator (O)		
OAM traffic descriptor (O)		
QOS parameter (M)	QOS-class forward (octet 5)	Unspecified QOS class
	QOS-class backward (octet 6)	Unspecified QOS class
Broadband sending complete (O)		
Transit network selection (O)		

Choice of the bit rate for the initial VC (H.245 message channel) is based on the following considerations:

- necessary capacity: BAS channel of the N-ISDN is 400 bit/s. Broadband audiovisual service should be faster in the control process with more information exchanges (due to acknowledged procedures, etc.)
- minimum rate of the network service: 64 kbit/s is a minimum?

It is proposed to use 64 kbit/s for the H.245 message channel.

4. Consideration of PVC case

In case of PVC connection, the characteristics of the remote terminal and the desired mode of operation is known before the communication. Hence there might be no need for the H.245 capability exchange. The configuration of sub-channels (PIDs and descriptor contents) is also known before the communication, thus sub-channels might not be set up by the H.245 procedures.

A question arises whether the initial VC is required for audiovisual communications in the PVC environment. However, it is still needed due to the following reasons:

1) Even in the PVC environments, different type of terminals will be connected to the UNI, automatically or manually, at the time of communication, thus the identification of the remote terminal type and characteristics is useful.

2) The H.245 procedures address the following:

   - Capability exchange
   - Mode request
   - Logical channel signalling
   - Master-slave determination
   - C&I signals
   - Maintenance loop
   - Round trip delay measurement
   - H.233 multiplex table

   Out of these, the last four procedures except "H.233 multiplex table" are needed even in the PVC environments.

5. Interworking among RAST, ROT, SOT

The following table lists all the communication combinations among different type of H.310 terminals. There are several incompatible cases due to mismatch of AAL or audiovisual resources or both.

Local	Remote				
	RAST-P (AAL1)	ROT (AAL1)	ROT (AAL5)	SOT (AAL1)	SOT (AAL5)
RAST-P (AAL1)	Yes	Yes	No *	Yes	No *
ROT (AAL1)	Yes	No **	No ***	Yes	No *
ROT (AAL5)	No *	No ***	No **	No *	Yes
SOT (AAL1)	Yes	Yes	No *	No **	No ***
SOT (AAL5)	No *	No *	Yes	No ***	No **

No * due to incompatible AAL
No ** due to incompatible audiovisual resources
No *** due to incompatible AAL and audiovisual resources

We need to distinguish clearly incompatible combinations (with "No" in the table) at the time of call setup. This should be by means of outband signalling.

6. Response to SG11 liaison

The current B-HLI[3] includes the following:

- Terminal protocol identification
  - H.310 ROT & SOT
  - H.310 RAST
  - H.321
  - H.320.
- Forward and Backward Multiplexing Capability
  - No multiplex
  - TS
  - TS with FEC
  - PS
  - PS with FEC
  - H.221

We have the following observations:

1) H.320 terminal protocol identification is useful? No terminals accommodated in B-ISDN indicate this identification. It is useful if the N-B gateway includes this in the call from H.320. However, the N-B gateway is generic, thus cannot be specific to audiovisual services?

2) Do we maintain TS with FEC, PS with FEC? For the current CBR services, FEC is included as an option in AAL1 while error concealment is sufficient for AAL5.

   Or, they can be left for future use?

3) Identification of H.310 ROT and SOT is required (with AAL difference as well?).

7. H.245 and DSM-CC procedures

See the companion contribution AVC-838 which discusses this subject.

8. Conclusion

An outstanding issue of the H.310 communication procedures has been discussed and the use of the two VC solution is proposed for the basic mode of operation.

References

[1] AVC-746 Draft H.310 (Editor: Hayder Radha), 5 May, 1995.
[2] AVC-724 H.24X channel (Japan), 17 January 1995.
[3] AVC-801 H.310 network adaptation protocol reference model following the Haninge meeting (S. Dunstan), July 1995.
[4] AVC-806 Proposed liaison response to ITU-T SG15 Q.2/15 (Rapporteur for Q. 15/11 B. Petri), July 1995.
[5] AVC-807 Session and Resource/Correlation identification capability of DSS2 and B-ISUP signalling protocols (SG11 SWP 2/1 & SWP 2/3 - B-ISDN Signalling Protocols), July 1995.
[6] AVC-838 Relation between DSM-CC and H.245 (Japan), October 1995.

END