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Infrastructure of audiovisual services – Systems aspects

Role management and additional media channels for ITU-T H.300-series terminals

Recommendation ITU-T H.239

ITU-T

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Recommendation ITU-T H.239

Role management and additional media channels for ITU-T H.300-series terminals

Summary

Recommendation ITU-T H.239 defines the procedures for use of more than one video channel in ITU-T H.320-based systems, and for labelling individual channels with a "role", which indicates requirements for processing the channel and the role of the channel content in the call. Role labels are applicable to both ITU-T H.320 and ITU-T H.245 signalling-based systems. The defined procedures include control, indication and capability exchange mechanisms

This revised version introduces a number of typographical corrections and clarifications to the previous version, primarily the description of MCU procedures.

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Recommendation ITU-T H.239

Role management and additional media channels for ITU-T H.300-series terminals

1 Scope

This Recommendation defines the procedures for use of more than one video channel in ITU-T H.320-based systems, and for labelling individual channels with a "role", which indicates requirements for processing the channel and the role of the channel content in the call. Role labels are applicable to both ITU-T H.320 and ITU-T H.245 signalling-based systems.

The defined procedures include control, indication, and capability exchange mechanisms.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T H.221] Recommendation ITU-T H.221 (2009), *Frame structure for a 64 to 1920 kbit/s channel in audiovisual teleservices*.
- [ITU-T H.224] Recommendation ITU-T H.224 (2005), *A real time control protocol for simplex applications using the H.221 LSD/HSD/MLP channels*.
- [ITU-T H.230] Recommendation ITU-T H.230 (2009), *Frame-synchronous control and indication signals for audiovisual systems*.
- [ITU-T H.242] Recommendation ITU-T H.242 (2009), *System for establishing communication between audiovisual terminals using digital channels up to 2 Mbit/s*.
- [ITU-T H.243] Recommendation ITU-T H.243 (2005), *Procedures for establishing communication between three or more audiovisual terminals using digital channels up to 1920 kbit/s*.
- [ITU-T H.245] Recommendation ITU-T H.245 (2009), *Control protocol for multimedia communication*.
- [ITU-T H.310] Recommendation ITU-T H.310 (1998), *Broadband audiovisual communication systems and terminals*.
- [ITU-T H.320] Recommendation ITU-T H.320 (2004), *Narrow-band visual telephone systems and terminal equipment*.
- [ITU-T H.323] Recommendation ITU-T H.323 (2009), *Packet-based multimedia communications systems*.
- [ITU-T H.324] Recommendation ITU-T H.324 (2009), *Terminal for low bit-rate multimedia communication*.
- [ITU-T T.120] Recommendation ITU-T T.120 (2007), *Data protocols for multimedia conferencing*.

[ISO/IEC 13871] ISO/IEC 13871:1995, *Information technology – Telecommunications and information exchange between systems – Private telecommunications networks – Digital channel aggregation.*

3 Definitions

This Recommendation defines the following terms:

3.1 bonding: Term referring to [ISO/IEC 13871], which defines "Bandwidth ON Demand" (BOND) mechanisms.

3.2 cap: Capability message.

3.3 channel: A transport mechanism for a stream of data, such as a video stream. Examples include an ITU-T H.245 Logical Channel, or the ITU-T H.320 BAS and HSD channels.

3.4 control & indication: Messages, including requests, responses, commands, and indication messages, but not including capability messages.

3.5 device: An end-user system, gateway, or Multipoint Control Unit (MCU).

3.6 end-user system: A terminal which is an ultimate source or sink of multimedia streams, such as a device which is meant for use by a human end user. Intermediary devices such as MCUs or gateways are not end-user systems.

3.7 intermediary device: A multipoint control unit (MCU) or gateway.

3.8 kbits: Units of 1000 bits.

3.9 main video channel: For ITU-T H.320, the remainder of the traditional video channel, after subtracting the additional media channel (AMC) channel. When no AMC channel exists, this is the same as the traditional video channel. For ITU-T H.245-based systems, this is any logical channel which does not have a role label.

3.10 role: A label which may be applied to a channel, identifying the nature of the content of the data carried in the channel. The phrase "the <role label> channel" should be read as meaning "the channel for which <role label> has been indicated".

3.11 second video channel: For ITU-T H.320, the proposed new additional media channel (AMC). For ITU-T H.245-based systems this channel is any logical channel with an explicit role label.

3.12 stream: The data content carried in a channel.

3.13 sub-timeslot: An ITU-T H.221 sub-channel of 8 kbit/s. It consists of a single bit position of a timeslot, with the timeslot considered as octets (or in the case of restricted calls, septets) transmitted at 8 kHz. Sub-timeslots are numbered from 1 to 8 within each timeslot, corresponding to the bit-numbers shown in [ITU-T H.221]. For restricted calls, sub-timeslot 8 is considered to exist, but to be unavailable for use. This term is used in this Recommendation instead of "sub-channel" to avoid confusion with ITU-T H.245 Logical Channels or the ITU-T H.320 bit-rate allocation signal (BAS), frame alignment signal (FAS), low-speed data (LSD), high-speed data (HSD), multi-layer protocol (MLP), encryption control signal (ECS) or additional media channel (AMC) channels.

3.14 timeslot: A single 64 kbit/s (or in the case of restricted calls, 56 kbit/s) ISDN B-channel, or in the case of an H₀, H₁₁ or H₁₂ channel, a single 64 kbit/s (or in the case of restricted calls, 56 kbit/s) Time-Slot, as described in clause 1 of [ITU-T H.221] and Figure 2 of [ITU-T H.221]. Timeslots are numbered from 1 to N (where N is the total number of timeslots) as shown in [ITU-T H.221]. This term is used in this Recommendation instead of "channel" to avoid confusion with ITU-T H.245 Logical Channels or the ITU-T H.320 bit-rate allocation signal (BAS), frame alignment signal (FAS),

low-speed data (LSD), high-speed data (HSD), multi-layer protocol (MLP), encryption control signal (ECS) or additional media channel (AMC) channels.

3.15 traditional video channel: For [ITU-T H.320], the video channel as defined by [ITU-T H.320] when no additional media channel (AMC) is in use. For ITU-T H.245-based systems, this is the same as the main video channel.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

ASN.1	Abstract Syntax Notation One
AMC	Additional Media Channel
BAS	Bit-rate Allocation Signal
BOND	Bandwidth On Demand
C&I	Control & Indication
ECS	Encryption Control Signal
FAS	Frame Alignment Signal
HSD	High Speed Data
LSD	Low Speed Data
MBE	Multiple Byte Extension
MCU	Multipoint Control Unit
MLP	Multi-Layer Protocol
OID	Object Identifier
PID	Parameter Identifier
SBE	Single Byte Extension
VIR	Video Indicate Ready to activate

5 Conventions

5.1 System terminology

In order to simplify references, this Recommendation refers to two classes of signalling systems for ITU-T H.300-series devices.

"ITU-T H.320" refers to ITU-T H.320 systems.

"ITU-T H.245" refers to those systems that use signalling according to [ITU-T H.245]; these include ITU-T H.310, ITU-T H.323 and ITU-T H.324 systems.

5.2 Transport channel terminology

In this Recommendation, the traditional ITU-T H.320 video channel, and in the case of ITU-T H.245-based systems, the **sessionID** 2 video channel, is referred to as the "main" video channel. The terminology used to describe these is given in Table 1.

Table 1 – Transport channel terminology

ITU-T H.239 term	ITU-T H.320 channels	ITU-T H.245 based channels
"control channel"	BAS	LC 0
"main video channel"	Traditional ITU-T H.320 video channel	LC with no role label
"second video channel"	AMC	LC with an explicit role
"3rd video channel"	AMC2 (for future study)	LC nn
etc.	AMC3, etc. (for future study)	LC nn

5.3 Message names

In this Recommendation signalling messages which are common to both ITU-T H.245 and ITU-T H.320 signalling systems are referred to by their names as given in Annex A of [ITU-T H.245], except in cases where their use in the unique H.320 signalling environment is described. Message names are presented in **bold font** to distinguish them from the other text of this Recommendation.

Table 2 provides a reference for corresponding ITU-T H.245 and ITU-T H.242/H.230 messages mentioned in this Recommendation.

Table 2 – Corresponding ITU-T H.245 and ITU-T H.320 video signals

ITU-T H.245 name	ITU-T H.320/H.230 mnemonic
cancelMultipointConference	cancel-MCC
cancelMultipointModeCommand	cancel-MMS
logicalChannelActive	VIA, VIA2, VIA3
logicalChannelInactive	VIS
multipointConference	MCC
multipointModeCommand	MMS
terminalYouAreSeeing	VIN
videoFastUpdatePicture	VCU
videoFreezePicture	VCF
NOTE – ITU-T H.320 symbols VIA2 and VIA3 signal activity of alternate video sources (for example a document camera, VCR, or DVD player) on a single video channel, as described in clause 4.4 of [ITU-T H.320]. They do not indicate activity on alternate video channels. Activity of the primary video source on any video channel should be signalled with VIA.	

5.4 Requirement terminology

In this Recommendation the following conventions are used:

- "Shall" indicates a mandatory requirement.
- "Should" indicates a suggested but optional course of action.
- "May" indicates an optional course of action rather than a recommendation that something take place.

6 Overview

ITU-T H.245-based systems provide for multiple channels of video, while ITU-T H.320 systems provide for only a single video channel. However, neither of these define a one-way transmission method, methods to label a video channel's content as a presentation video stream, or methods to

control presentation video in a multipoint conference. This Recommendation provides these extensions, as well as a means to add an additional video channel to ITU-T H.320.

The mechanisms are designed for both one-way and two-way video transmission. One-way transmission is particularly advantageous for presentation video; it reduces computational complexity in the devices, and it simplifies the distribution of the presentation stream in MCUs.

6.1 Roles and role labels

The architecture of this Recommendation separates the idea of transport channels (logical channels in ITU-T H.245, BAS, main video, main audio, LSD, HSD, MLP, etc. in ITU-T H.320) from "roles".

Roles, which are indicated by "role labels" on a channel, indicate both the purpose of the stream carried on a channel, and indicate how the stream should be presented at the end-user system and processed by an MCU.

The general architecture is that a role label may be assigned to any channel (audio, video, or data) where it is useful to establish policies for presentation, management, or distribution of the information on that channel.

6.2 Additional media channels

While [ITU-T H.320] has no provision for multiple video channels, it does provide a variety of data channels (LSD, HSD, MLP, H-MLP), which could be used to transport a second video stream. However, these channels are commonly used for both ITU-T H.224 and ITU-T T.120 services. Permitting a second video stream to run over these channels would interfere with these services, and complicates the allocation of these channels in a multipoint conference. In addition, use of the existing data channels is not extensible.

Therefore, for ITU-T H.320, a second video channel called the Additional Media Channel (AMC) is described. In principle, this framework could be extended to include more than one AMC channel (e.g. AMC2, AMC3, etc.) but as applications for more than one AMC are not well defined, this functionality is for further study.

The ITU-T H.320 AMC is described in Annex B.

7 ITU-T H.239 capabilities exchange

The capabilities given in this clause are distinct from those given in Annex B for the AMC.

ITU-T H.239 capabilities use very similar structures for both ITU-T H.320 and ITU-T H.245-based signalling systems, to ease the implementation of gateways and MCUs.

The **h239ControlCapability** indicates that the device supports ITU-T H.239 and the **flowControlReleaseRequest** and **flowControlReleaseResponse** messages defined in Table 7.

A separate **h239ExtendedVideoCapability** message expresses video capabilities used with roles.

The ITU-T H.239 capability signals permit a device to send capabilities that correspond to the following ITU-T H.245 capability structure:

{1 or more capabilities for traditional video channel},
{ {1 or more capabilities for second video channel}, {1 or more capabilities for main video channel while second video channel is open} }

The {1 or more capabilities for traditional video channel} shall be sent via the normal capability exchange mechanism.

The {1 or more capabilities for second video channel} shall be sent via the **h239ExtendedVideoCapability** message as described below.