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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Communication procedures

Gateway control protocol: The use of Local and Remote Descriptors with ITU-T H.221 and ITU-T H.223 multiplexing

Recommendation ITU-T H.248.20

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Recommendation ITU-T H.248.20

Gateway control protocol: The use of Local and Remote Descriptors with ITU-T H.221 and ITU-T H.223 multiplexing

Summary

Recommendation ITU-T H.248.20 defines how the Local and Remote Descriptors are used within ITU-T H.248, ITU-T H.221 and ITU-T H.223 multiplexing (MUX) terminations to associate demultiplexed streams (logical channels) with ITU-T H.248.1 streams.

This revision incorporates updates the allowed media values to align with the latest version of the Session Description Protocol (SDP).

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T H.248.20	2002-11-29	16
2.0	ITU-T H.248.20	2013-03-16	16

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

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Gateway control protocol: The use of Local and Remote Descriptors with ITU-T H.221 and ITU-T H.223 multiplexing

1 Scope

This Recommendation defines how ITU-T H.248.1 Local and Remote Descriptors are coded in the case of the use of ITU-T H.221 and ITU-T H.223 multiplexes. Figure 1 shows the scope of this Recommendation.

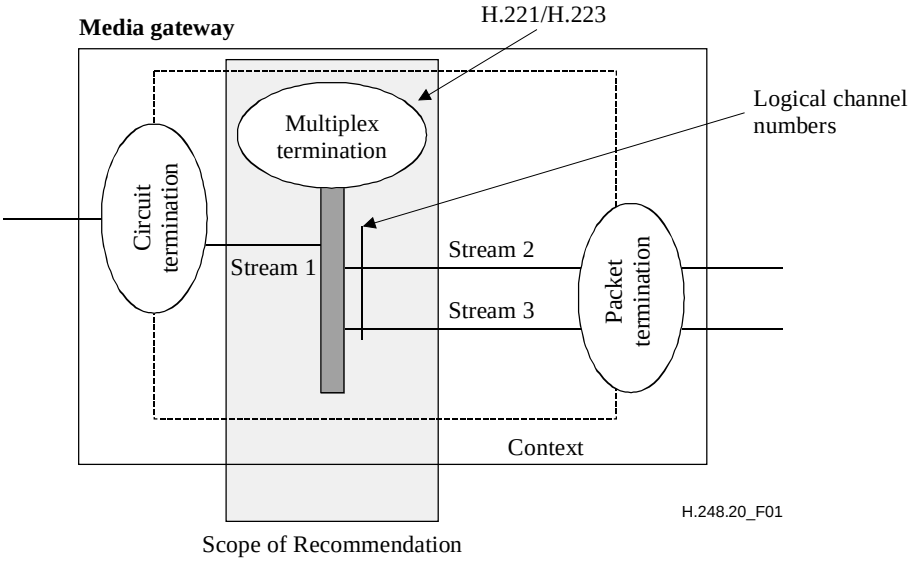

Figure 1 – Scope of this Recommendation

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.223] Recommendation ITU-T H.223 (2001), *Multiplexing protocol for low bit rate multimedia communication.*

[ITU-T H.245] Recommendation ITU-T H.245 (2011), *Control protocol for multimedia communication.*

[ITU-T H.248.1] Recommendation ITU-T H.248.1 (2013), *Gateway control protocol: Version 3.*

[ITU-T H.324] Recommendation ITU-T H.324 (2009), *Terminal for low bit-rate multimedia communication.*

[IETF RFC 3550] IETF RFC 3550 (2003), *RTP: A Transport Protocol for Real-Time Applications.*

[IETF RFC 4566] IETF RFC 4566 (2006), *SDP: Session Description Protocol*.

3 Definitions

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

ABNF Augmented Backus-Naur Form

LCN Logical Channel Number

MG Media Gateway

MGC Media Gateway Controller

MUX Multiplex

PER Packed Encoding Rules

RTP Real-time Transport Protocol

SDP Session Description Protocol

TDM Time Division Multiplex

5 Logical channel parameters within the MUX termination

Every demultiplexed [ITU-T H.221] and [ITU-T H.223] media stream is associated with an [ITU-T H.248.1] Stream. For each ITU-T H.248.1 stream, a Stream Descriptor is defined within the MUX termination. The Logical Channel Number (LCN) values for the ITU-T H.221 and ITU-T H.223 media streams are defined in the Local and Remote Descriptors. Which descriptor is used depends on the media direction of the logical channel defined by a specific LCN (different LCN values may be used in each media direction of the logical channel). The Local Descriptor defines the media flowing in to the multiplexer, and the value in the Remote Descriptor defines the media flowing out from the multiplexer. If either descriptor is not defined, the media stream flow is not activated for the specific direction. A descriptor MAY be added later during the session (using the ITU-T H.248.1 Modify command) or the media stream is unidirectional. If the ITU-T H.221 and ITU-T H.223 media stream is bidirectional, both the Local and Remote Descriptors MUST be defined, even if the LCN value, codecs etc. are the same in both media stream directions. For the ITU-T H.248.1 Stream associated with the ITU-T H.245 control stream (LCN 0), only the Local Descriptor (e.g., if the control stream is not associated with an ITU-T H.248.1 Stream which also is defined elsewhere within the Context) may be used, even if the control stream is bidirectional.

If the demultiplexed streams are forwarded to a packet network (e.g., IP network, transported using the Real-time Transport Protocol (RTP), the payload types, etc. (i.e., for the IP port) are defined within the ephemeral packet termination. The payload type values may, or may not, be the same within the multiplexed ITU-T H.221 and ITU-T H.223 stream and within the demultiplexed packet streams.

5.1 Text encoding

According to [ITU-T H.248.1], the stream Local and Remote Descriptors contain SDP. As such, SDP is required to describe how the stream maps to an ITU-T H.245 Logical Channel Number. The use of SDP for the ITU-T H.245 control stream is optional, since the LCN value MUST be 0 by default. The clauses below describe the necessary SDP syntax and values to describe this mapping for the ITU-T H.221 and ITU-T H.223 Multiplex termination.

5.1.1 "c=line" Line for H.221 and H.223 MUX termination

The syntax of the connection field:

connection-field = "c=" nettype SP addrtype SP connection-address CRLF

The value of nettype is "H221" or "H223". The value of addrtype is "–".

The value of connection-address is irrelevant, so any value which is allowed according to the ABNF rules can be used. This Recommendation uses the "–" value.

5.1.2 "m=line" Line for ITU-T H.221 and ITU-T H.223 MUX termination

The syntax of the media field:

media-field = "m=" media SP port ["/" integer] SP proto 1*(SP fmt) CRLF

The possible media values for media are "audio", "video", "data" and "application", depending on the media type within the specific ITU-T H.248.1 Stream. Value "application" is used if a Stream is defined for the demultiplexed ITU-T H.245 messages.

NOTE – Some older applications may use the value "control". To aid interoperability MGs should be able to recognize "control".

The value of port defines the ITU-T H.221 and ITU-T H.223 Logical Channel Number (LCN) associated with the ITU-T H.248.1 stream defined in the Local or Remote Descriptor (depending on the media flow direction) for that specific ITU-T H.248.1 stream.

The use of the optional "/" integer parameter in the ITU-T H.221 and ITU-T H.223 MUX Termination, defining number of ports, is not defined by this Recommendation.

The use of a media field for the demultiplexed control stream (ITU-T H.245 messages in an ITU-T H.324 network) is optional. Its use depends on whether the ITU-T H.245 messages are "transported" to specific termination(s) within the ITU-T H.248.1 Context, or if they are terminated at the MUX termination and then transported elsewhere using other mechanisms (e.g., as ITU-T H.248.1 Events). If a media field for the control stream is used, the value of port MUST be zero (the LCN value for the ITU-T H.245 control channel).

The value of proto is "H221" or "H223".

The fmt value defines the payload type used to encode the specific media within the multiplexed ITU-T H.223 stream. If the media is "control", the value of fmt is "H245".

5.2 Binary encoding

The Logical Channel Number is indicated through the use of Annex C/H.248.1 property "LCN" C007. A value of 0 indicates that the stream is an ITU-T H.245 control stream. The multiplex value of "H221" or "H223" shall indicate that non-zero ITU-T H.245 LCN values are multiplexed ITU-T H.221 and ITU-T H.223 streams.

6 Example

The following example describes a connection using the text encoding, where a multiplexed ITU-T H.223 stream, transported on a TDM bearer in a network using Annex C of [ITU-T H.324] ("H.324M"), is demultiplexed in the MG. The demultiplexed media streams are then transported on an IP network using separate RTP connections for each media. The ITU-T H.248.1 Context includes three terminations; one TDM termination, one MUX termination and one RTP termination.

Three ITU-T H.248 Streams are used in the example: One for the multiplexed ITU-T H.223 stream (StreamID = 1), one for the demultiplexed audio stream (StreamID = 2) and one for the demultiplexed video stream (StreamID = 3).

NOTE – Only the SDP parameters affected by this Recommendation are included in the examples.

6.1 Context model

Figure 2 shows the Context model used in the example.

NOTE – ITU-T H.248.1 Stream 4 described in clause 6.4 is not shown in the picture since it is not associated with another termination in this example. It is used "internally" within the MUX Termination.

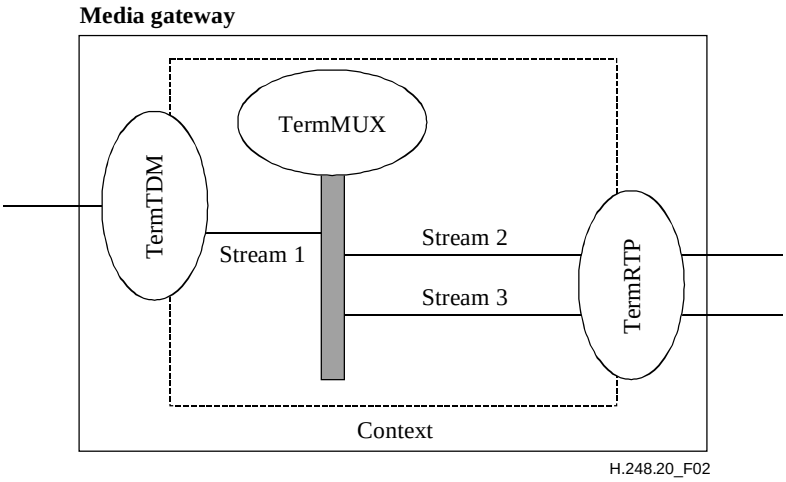

Figure 2 – Example context model

6.2 The media descriptor for the TDM termination

```
TID= MyTDM/7/1
   Media = {
     Stream = 1 {
       Local, Remote, and LocalControl Descriptors
     }
   }
```

6.3 The multiplex descriptor for the MUX termination

```
Mux = H.223 {MyTDM/7/1}
```

6.4 The media descriptor for the MUX termination

The payload type in the SDP m= lines defines the codec used for that specific stream received in the multiplexed TDM stream.

```
Media = {
     Stream = 1 {
          LocalControl = {
                    H.324 properties etc…
               }
          },
          Stream = 2 {                          ;demultiplexed audio stream
               Local = {
                    v=0
                    c=H223 - -
                    m=audio 1 H223 4               ;codec G.723.1, LCN 1
               },
               Remote = {
                    v=0
                    c=H223 - -
                    m=audio 2 H223 4               ;codec G.723.1, LCN 2
               }
          },
          Stream = 3 {                          ;demultiplexed video stream
```

```
              Local = {
            v=0
            c=H223 - -
            m=video 3 H223 34              ;codec H.263, LCN 3
              },
              Remote = {
            v=0
            c=H223 - -
            m=video 4 H223 34              ;codec H.263, LCN 4
              }
          },
          Stream = 4 {                        ;demultiplexed H.245 stream
              Local = {
            v=0
            c=H223 - -
            m=control 0 H223 H245
              }
     }
}
```

6.5 The media descriptor for the RTP termination

The ITU-T H.245 Stream identifier values for the audio and video streams are identical to the values used in the MUX Termination. This way the streams are connected to each other within the Context, as defined in [ITU-T H.248.1].

```
Media = {
     Stream = 2 {                          ;audio stream
              Local = {
            v=0
            c=IN IP4 192.133.124.134
            m=audio 20000 RTP/AVT 4        ;codec G.723.1
              },
              Remote = {
            v=0
            c=IN IP4 186.156.231.198
            m=audio 23000 RTP/AVT 4        ;codec G.723.1
              }
          },
          Stream = 3 {                        ;video stream
              Local = {
            v=0
            c=IN IP4 192.133.124.134
            m=video 20002 RTP/AVT 34       ;codec H.263
              },
              Remote = {
            v=0
            c=IN IP4 186.156.231.198
            m=video 23002 RTP/AVT 34       ;codec H.263
              }
          }
}
```

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