INTERNATIONAL ORGANISATION FOR STANDARDISATION
ORGANISATION INTERNATIONALE DE NORMALISATION
ISO/IEC JTC1/SC29/WG11
CODING OF MOVING PICTURES AND AUDIO

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ISO/IEC JTC1/SC29/WG11 MPEG2014/M33220
March 2014, Valencia, Spain

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Source	**Telecom ParisTech**
Status	**For consideration during the 108th MPEG meeting**
Title	**Considerations for TEMI in ISOBMFF**
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1   Introduction

During its 107th meeting, MPEG has produced two documents: the PDAM 6 of MPEG-2 TS [1] in which the ability to carry timeline information is provided by means of descriptors; and the exploration document [2] on Uniform Signaling for Timeline Alignment. In this contribution, we provide a use case where it is relevant to carry timeline information, in the form of time codes, in the ISOBMFF. We review different options and propose to adopt one of the options.

2   Use Case

Our use case is the following. An application records a TV program, in the form of an MPEG-2 Transport Stream, containing time code information (e.g. typically stored using SMPTE time codes, and associated synchronized metadata (e.g. events in a sport program) stored in the form of XML data also containing the same time codes. Somewhere in the network the TS is repackaged in MP4 files. The MP4 files is delivered (for instance using DASH) to an HTML client, which also retrieves the XML data separately. Some JavaScript code processes the XML metadata synchronously based on the time code information stored in the MP4 files.

3   Options and Proposal

There are several options with the available tools to satisfy the above use cases.

3.1   Using the Producer Reference Time Box

This box maybe provided at different locations in the file (e.g. at fragment boundaries) and provides a mapping between a media time and an NTP time. This is interesting but has the following limitations:
- cannot work when multiple independent tracks with multiple time codes need to be stored in the same file
- provides only NTP times, no SMPTE time codes

3.2   Using metadata streams

Any metadata stream could be used:
- XML metadata track
- Text metadata streams

- binary metadata streams
- WebVTT streams of type metadata

For all these options either a text or XML or binary syntax has to be defined or specified (for instance using RFC5484). Track references could be used to link the timecode track and one or more tracks.

3.3 Using TEMI streams

With TEMI streams as defined in [1], it is possible to carry with "temi_timeline_descriptor" time information such as timestamps (32/32 bits, 64/32 bits, NTP, PTP or SMPTE Time codes as defined in RFC5484).

This approach has the advantage of unifying the carriage between MPEG-2 TS and ISOBMFF, and of providing a solution to link ISO files with external add-ons.

4   Conclusion

We recommend MPEG to adopt a method for the carriage of time codes (including SMPTE time codes) in the ISOBMFF.

5   References

[1] N14117, Study Text of ISO/IEC 13818-1:2013/PDAM 6 - Delivery of Timeline for External Data
[2] N14150, Proposed Exploration of "Uniform Signaling for Timeline Alignment"