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Title	**Clarifications on MPEG DASH Conformance**
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1   Introduction

The MPEG DASH standard specifies conformance aspects for MPEG DASH content, i.e. for Media Presentation Descriptions (MPD), for Media Segments and in some occasions for the combined usage of MPD and segments. However, some aspects remain unspecified. This contribution identifies some of these aspects and proposes clarifications.

2   Conformance clarifications and proposals

2.1   Additional streams

In typical deployment of DASH, for instance when using an MP4 player extended to support DASH, such as GPAC, or when using JavaScript code in browser such as Chrome relying on the Media Source Extension and the existing MP4 pipeline, the rendering of the media content from the MP4 is constrained by DASH access engine, in the sense that only the downloaded media segments are fed to the media engine. However, the final rendering is not constrained by the MPD description. In particular, if the initialization or media segments contain additional streams that are not described in the MPD, the MP4 player will likely offer them in its GUI and play them. It is unclear from the conformance document if such situation is allowed. We believe there are use cases where this is interesting (e.g. metadata such as time code tracks).

We propose to clarify the above situation by adding a test vector in the conformance suite where initialization and media segments contain one track not advertised in the MPD.

2.2   Empty segments

Conforming Media Segments in DASH are required to satisfy some rules as defined in 6.2.3.1, the basic rule being that they "shall contain a number of complete access units", i.e. the Media Segment shall contain media data. However, in some situations, it may be useful to relax this rule, for instance:
- when an error occurred in the generation of the media segments (and the MPD cannot be updated),
- when segment alignment requires that a segment exists in a representation for which no data is available at that time (e.g. temporal scalability, variable frame rate).

- when media data is not produced during a portion (some segments) of the period (eg. subtitles)

There are 2 important aspects for a DASH engine with respect to the processing of media segments that should be considered when relaxing the rule:
- Requests for segments advertised as available in the MPD shall not fail, i.e. the DASH timing model (i.e. time and number based URL determination) shall be respected.
- Playback by the Media Engine shall not be affected.

It is believed that, in typical deployments, DASH engines do not validate the content of the media segments before delivering them to the media engines. If a media engine encounters 'free' boxes, it will simply ignore them. The media engine will maintain synchronization using tfdt boxes. The conformance rules here are stricter than what media players will do. The conformance rules should rather indicate that the Media Segment should be conformant with the media format and shall not break DASH playback.

We therefore propose to relax the rule in 6.2.31 as follows:

Replace:
"In addition, a Media Segment
   1) shall contain a number of complete access units.
   2) […]"
with:

"In addition, if it contains media data, a Media Segment:
   1) shall contain a number of complete access units.
   2) […]
otherwise the Media Segment shall not have a zero-size, shall not break conformance according to the media format.
"
We also propose to add a conformance sequence.

2.3 Differences between MPD and Segment information

2.3.1 Representation width and height
The DASH standard allows specifying the width and height of a Representation using attributes on the AdaptationSet, Representation or SubRepresentation elements. In some situations one does not want to specify them.

Consider the following scenario: an AVC stream is stored as 2 tracks in an MP4 file, and both tracks are exposed as Representations in the MPD. If the AVC Parameter Sets Representation sets the width and height attribute as the final width and height, then it is likely that a DASH player will select this representation even though it does not represent anything.

The @width and @height attributes are optional. The standard indicates "If not present on any level, the value is unknown". However, no conformance sequence exercises this feature. We propose to add such sequence.

2.3.2 Codecs

As a consequence of the point discussed above, there might be a mismatch between the codecs value as advertised in the MPD and the codecs constructed from all the tracks in the file. We believe such discrepancies should be allowed, namely to avoid signaling non important streams at the DASH level.

2.3.3 Other parameters

The same questions of combined MPD/Segment conformance can be raised for: language, par, codecs parameter, frame rate, … We suggest allowing such mismatches by adding test vectors exercising that.

3   Conclusion

We recommend MPEG to issue a COR on Part 1 and update the WD of Conformance of DASH to clarify the above points and to add the proposed conformance sequences in its conformance suite.