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Title Comments on extractors usage in 14496-15
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1 Introduction

During MPEG 112 in Warsaw, contribution m36547 carefully reviewed the impact of badly formatted “extension” NAL units in AVC or HEVC when interpreted by an annex B (so-called “byte-stream” format) parser. Based on this contribution, both Defect Report and 14496-15 DIS have been edited. This contribution discusses these edits and proposes to replace them.

2 Specification Review

The SVC specification states in 6.2:

“Aggregators and Extractors shall be processed as defined in this International Standard (e.g. shall not directly be placed in the output buffer while accessing the file)”

The MVC specification states in 7.3:

“Aggregators and Extractors shall be processed as defined in this International Standard (e.g. shall not directly be placed in the output buffer while accessing the file).”

The L-HEVC specification states in 9.3:

“Aggregators and Extractors shall not be directly output by file parsers”

Annex A states:

“Aggregators and Extractors are file format internal structures enabling efficient grouping of NAL units or extraction of NAL units from other tracks.

Aggregators and Extractors use the NAL unit syntax. These structures are seen as NAL units in the context of the sample structure. While accessing a sample, **Aggregators must be removed** (leaving their contained or referenced NAL units) and **Extractors must be replaced** by the data they reference. **Aggregators and Extractors must not be present** in a stream outside the file format.”

We therefore fail to see where the problem is: since readers not removing/solving extractors are not compliant, changing the syntax of the extractors / aggregator for HEVC is not needed.

3 Possible Solutions

Our analysis is that the issue comes for avc1 only (since l-hevc is not out there).

The issue can be summarized as follows: SVC or MVC streams may be stored in a track with ‘avc1’ sample description, and the SVC or MVC components may use extractors/aggregators (not the base).

3.1 Approach 1

As seen previously, **compliant readers (e.g. existing ones) shall remove** aggregators and extractors. We therefore suggest adding the following note after Table 4:

“Note: When a track with ‘avc1’ sample description contains an svcC configuration, readers should be aware that extractors/aggregators may be present and shall be resolved, as indicated in Annex A.”

and adding the following note after Table 6 or Table 9:

“Note: When a track with ‘avc1’ sample description contains an mvcC configuration, readers should be aware that extractors/aggregators may be present and shall be resolved, as indicated in Annex A.”

The same logic could be applied to hvc1/hev1.

3.2 Approach 2

If true backward compatibility with avc1 is required (i.e. compatibility with readers having never implemented something else than avc1), we suggest to issue a corrigendum forbidding usage of extractors and aggregators in avc1, but still allowing SVC/MVC NAL units if an svcC /mvcC is present in avc1.

The same approach could be applied to hevc, forbidding aggregators/extractors in hvc1/hev1, and allowing them only in hvc2/hev2 or lhv1/lhe1.

4 Conclusion

We suggest MPEG to issue a study text for ISO/IEC 14496-15 that:

- removes the modifications on extractors for HEVC, and
- adds the edits suggested in this contribution, preferably approach 2.