DASH-IF Position Paper/Liaison: Streaming functionalities for new codecs

Proposal for a position paper/liaison to be communicated to JVET/MPEG, MC-IF and CTA WAVE

1   Background

MPEG and ITU-T have just completed two new codecs, namely VVC and EVC. In addition, other codecs are under development. Hence, there is the question on what would be needed on a functionality basis to advantageously add such codecs into the adaptive streaming functionalities. In the past we have been limited by what is supported on hardware devices and the streaming applications needed to deal with the functionalities and limitations of hardware devices, in particular to create "seamlessness".

2   Justification

However, hardware decoders are designed now based on conformance bitstreams. It is essential that we provide streaming feature-rich conformance streams to hardware and SOC implementers for robust VVC hardware decoders to deal with efficient and feature-rich streaming functionalities. This includes:

- Codec initialization: What is sufficient to initialize the codec?
- Codec configuration change: Once initialized, what parameters can be changed without decoder reinitialization?
- Random access, content splicing, and content switching
  o Random access: What kinds of random access can be done (without decoder reinitialization)?
  o Content splicing: What kinds of content can be spliced together (without decoder reinitialization)?
  o Content switching: What kinds of content can be seamlessly switched back and forth (without decoder reinitialization)?
- Coding efficiency: How can we maintain high coding efficiency while enabling the streaming functionalities?
- Suitable target latencies: How can we operate at target latencies while maintaining high coding efficiency?
- SEI message placement and handling: How does the SEI messages affect streaming functionalities? Initialization? Same SEIs across all CMAF Tracks?
- Cross-stream switching: For example support fast join or switching, how can this be achieved?

As MPEG and JVET are currently developing conformance software and conformance bitstreams and also have started to develop ISO BMFF and CMAF formats for these codecs, it is the right time to provide a set of streaming centric conformance rules to exploit the compression benefits of these new codecs.

The matter is to define splicing operations that occur in practice and make sure that decoders work. Once we have these conformance requirements in place, we can focus on streaming content generation requirements.

3   Objectives

The work item deals with collecting adaptive streaming centric conformance requirements for video bitstreams in order to influence the conformance work in MPEG, JVET, CTA WAVE and MC-IF:

- Collection of relevant streaming functionalities for video codecs based on experiences from current streaming deployments
- Definition of bitstream conformance requirements based on these functionalities
- Creation of a position paper and a liaison to the relevant organizations
- Support mapping of these potentially new functionality to ISO BMFF, DASH and CMAF to add the new codecs for core streaming functionalities
- Plan the next steps to integrate new codecs into DASH-IF and CMAF media profiles

4   Dependencies and Referenced Specifications

This document relates to work in DASH-IF or other organizations as follows

Organization	Work Item or Specification	Status
JVET	ITU-T H.266 | ISO/IEC 23090-3: VVC	FDIS (N19470/JVET-S2001)
JVET	ITU-T H.274 | ISO/IEC 23002-7: VSEI	FDIS (N19472/JVET-S2007)
JVET	ISO/IEC 23090-15: Conformance Testing for VVC	WD (JVET-R2008, N19474/JVET-S2008)
MPEG	ISO/IEC 23094-1: EVC	FDIS (N19229)
MPEG	ISO/IEC 23094-4: Conformance and Reference Software of EVC	CDAM (N19497)
MPEG	ISO/IEC 14496-15: Carriage of NAL unit structured video in the ISOBMFF	DAM (N19454)
MPEG	ISO/IEC 23000-19: CMAF	TuC (N19420)
MPEG	VVC Image file formats (if needed)	CDAM (N19460)

5   Supporting Individual Members

The generation of the new feature is supported by the following companies:

	Supporting Member	Contact Person
1	Qualcomm Incorporated	Thomas Stockhammer
2	ByteDance	Ye-Kui Wang
3	Tencent	Iraj Sodagar
4	Comcast	Alex Giladi
5	Nokia	Emre Aksu

Note :

- Please provide 5 DASH-IF members that support the inclusion of this IOP.

- Provide evidence that a complete value chain will be in place e.g. encoding/packager, service operator and client implementation including browser-based clients.

6 Expected Output and Timeline

The following outputs and timelines are expected:

Milestone	Description	Expected Date
1	• Start of activity	2020/08/20
2	• Draft Position paper for internal review	2020/09/15
3	• Document sent as draft to MPEG/JVET	2020/09/30
4	• Completion of the position paper	2020/11/30
5	• Initiate work of adding new codecs to DASH-IF IOPs	2021/01/01

7 Affected Documents

Provide the DASH-IF document that are expected to be affected, possibly new documents.

Affected Documents	Current Version
DASH-IF Position Paper on New codecs requirement	New
DASH-IF IOP Guidelines	V5.1

8 Leadership

Provide a person that is responsible for the completion of the IOP.

- Thomas Stockhammer (Qualcomm Incorporated, tsto@qti.qualcomm.com)
- Ye-Kui Wang (ByteDance, yekui.wang@bytedance.com)