**3GPP TSG SA WG4 Meeting 131-bis-eS4-250471r02**

**online, , 11th Apr 2025 – 17th Apr 2025 revision of S4aV250022**

**Source: Qualcomm Germany, Tencent**

**Title: Pseudo-CR on [VOPS] Updates to System Integration**

**Spec: 3GPP TS26.265v1.0.0**

**Agenda item: 9.5**

**Document for: Decision**

**1. Introduction**

At the last meeting the system integration was simplified.

**2. Reason for Change**

At the last meeting the system integration was simplified, but not completed.

A collection of common system related metadata is provided in the following:

1. ISO/IEC 14496-15 defines the decoder configuration record
2. Web Codecs API refers to the decoder configuration record
3. DASH Initialization and CMAF Initialization Segments contain the decoder configuration record for MSE based configuration. In addition, width and height may be specified in track header.
4. RRC7798 defines the payload related parameters: <https://datatracker.ietf.org/doc/html/rfc7798#section-7>
5. To configure the Android media codec, see here, <https://developer.android.com/reference/android/media/MediaCodec#configure(android.media.MediaFormat,%20android.view.Surface,%20android.media.MediaCrypto,%20int)>. [For HEVC it is said to use](https://developer.android.com/reference/android/media/MediaCodec#CSD) for CSD#0 VPS, SPS and PPS.

Systems integration parameters of relevance are:

- The codecs string begins with the prefix "hev1." or "hvc1.", with a suffix of four dot-separated fields as described in Section E.3 of [iso14496-15].

- Chunks/Access units

- Random access

- Decoder Configuration parameters see section 8.3.3.1 of [iso14496-15].

- profile, tier, level

- constraints flags

- chroma format

- bit depth chroma and luma

- frame rates, average or constant

- layering structure

- NAL units

- VPS (Video Parameter Set): Contains parameters that apply to the entire video sequence.

- SPS (Sequence Parameter Set): Contains parameters that apply to a sequence of pictures.

- PPS (Picture Parameter Set): Contains parameters that apply to individual pictures.

- declarative SEI NAL unit, as specified in ISO/IEC 23008-2. When one or more SEI NAL units containing an SEI manifest SEI message and/or an SEI prefix indication SEI message are available, they should be stored as instances of nalUnit.

- Multi-layer

**3. Conclusions**

Let’s discuss the content as baseline and have proper resolution by the April meeting.

**4. Proposal**

It is proposed to agree the following changes to 3GPP TS26.265v0.6.0 at SA4-131-bis-e.

**5. Revision**

**Prior to Meeting**

|  |  |  |  |
| --- | --- | --- | --- |
| [**S4aV250022**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/3GPP_SA4_AHOC_MTGs/SA4_VIDEO/Docs/S4aV250022.zip) | [VOPS] Updates to System Integration | Qualcomm Germany | Thomas Stockhammer |

**Online Discussion**: (March 18, 2025)

* Waqar: This random access point needs consistent documentation.
	+ Thomas: Exactly, the definitions will be general. And it will be concrete for HEVC, MV-HEVC, frame packing…
* Emmanuel: I think it would be good to integrate multilayer in the definitions.
	+ Thomas: I agree.
* Alexis: Do we need to consider other aspects like delay?
	+ Thomas: If people believe it is relevant, yes. We don’t need to do everything but we need to be sure we cover what is used.
	+ Gilles: And we will have to define how this delay impacts interoperability.
* Thomas: The table may be not the best way to add this. Maybe clauses are better.

**Decision**: Agreed as basis for further work (not implemented into the draft TS).

[S4aV250022](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/3GPP_SA4_AHOC_MTGs/SA4_VIDEO/Docs/S4aV250022.zip) is **agreed as basis for further work**.

**During the meeting**

[Emmanuel Thomas on Mon, 14 Apr 2025 09:10:45 +0000](https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_SA_WG4_VIDEO;861fb324.2504b)

1. The first change interacts with the 6th change in 601.
	1. *Yes, indeed. We need to merge it. I am happy to take a first step*
2. We find the “chunk” to misleading in the context of 3GPP SA4, e.g. CMAF Chunk. We suggest not to use Chunk even though WebCodecs does, we can always explain a mapping afterwards.
	1. *I understand the confusion here and maybe we should call it coded access unit (CAU)?*

\* \* \* First Change \* \* \* \*

# 7 Common System Integration

7.1 Introduction

This clause documents general functionalities that are relevant for integration of video codecs into delivery systems to support common APIs on encoders and decoders.

7.2 Functional Definitions

### 7.2.1 General

##### 7.2.1.1 Summary

This clause defines functional definitions for system integration in Table 7.2.1.1-1. The remainder of this

Table 7.2.1.1-1 Functional Definitions

|  |  |  |
| --- | --- | --- |
| Term | Summary | Details |
| Codec String | A single value identifying the codec indicated to render the content in the Bitstream as defined in IETF RFC 6381. | 7.2.1.2 |
| Decoder Configuration | a data structure storing essential parameters needed for decoding and rendering a video stream. | 7.2.1.3 |
| Random Access Point | A bit position in the Bitstream, for which in combination with the Decoder Configuration, the Bitstream can be randomly accessed, i.e. in decoding order the Bitstream carries sufficient information to access the media in the stream. | 7.2.1.4 |
| Access Unit (AU) | See Clause 3.1 |  |
| Coded access unit (CAU) | bits corresponding to an Access Unit | 7.2.1.5 |
| Random Access CAU | A CAU that starts with a random access point | 7.2.1.6 |

##### 7.2.1.2 Codec String

The *Codec String* provides means to identify the codec needed to decode and render the content in the Bitstream. The codec parameters shall also include the profile and level information where applicable. The content of this parameter shall conform to the id-simple production of IETF RFC 6381:2011, subclause 3.2, without the enclosing DQUOTE characters. The codec identifier for the media format, mapped into the name space for codecs as specified in IETF RFC 6381:2011, subclause 3.3, shall be used.

##### 7.2.1.3 Decoder Configuration

The *Decoder Configuration* provides parameters about the Bitstream and shall follow the format defined in ISO/IEC 14496-15 including:

- profile, tier, level

- constraints flags

- chroma format

- bit depth chroma and luma

- frame rates, average or constant

- layering structure

- NAL units

- VPS (Video Parameter Set): Contains parameters that apply to the entire video sequence.

- SPS (Sequence Parameter Set): Contains parameters that apply to a sequence of pictures.

- PPS (Picture Parameter Set): Contains parameters that apply to individual pictures.

- declarative SEI NAL unit, as specified in ISO/IEC 23008-2. When one or more SEI NAL units containing an SEI manifest SEI message and/or an SEI prefix indication SEI message are available, they should be stored as instances of nalUnit.

##### 7.2.1.4 Random Access Point

**- Closed loop RAP (CL-RAP)** is an intra coded picture that can identify a RAP in a bitstream. It can be the first coded picture or can appear later in a bitstream. Each CL-RAP is the first picture in decoding order of a coded video sequence (CVS) but does not need to be an output picture or be the first picture in display order. All frames that follow a CL-RAP in decoding order and belong in the same coded video sequence are decodable and can potentially be all output by the decoder depending on their coding parameters.

**- Open loop RAP (OL-RAP)** is an intra coded frame that can identify a RAP in a bitstream. It can be the first frame in the bitstream in decoding order or can appear later in the bitstream. An OL-RAP does not need to be an output picture or be the first picture in display order. Other pictures that follow the OL-RAP in coding order can refer to an OL-RAP for prediction. However, an OL-RAP, if it is the first picture in the bitstream in decoding order, may also be followed in coding order by some pictures that can refer to pictures that are not present in the bitstream. In that case, these pictures cannot be decoded. These pictures can be referred to as leading pictures. Subsequently, when those pictures are detected, they are not decoded and can be discarded by the decoder.

**- Gradual decoder refresh (GDR) access point** identifies a RAP in a bitstream from where decoding operations can start by a decoder. However, unlike other RAP types, decoding may not be instantaneous and may initially result in decoding errors in the decoded and reconstructed pictures. Nevertheless, these decoding errors are expected to disappear after a certain maximum period, from which point decoding can continue without any further decoding errors.

##### 7.2.1.5 Coded Access Unit

Editor’s Note: This needs to be completed.

##### 7.2.1.6 Random Access CAU

Editor’s Note: This needs to be completed.

### 7.2.2 AVC

Editor’s Note: This needs to be completed.

### 7.2.3 HEVC

Editor’s Note: This needs to be completed.

\* \* \* End of Changes \* \* \* \*