DRAFT AMENDMENT
ISO/IEC 23008-12:2016 DAM 1

ISO/IEC JTC 1/SC 29

Secretariat: **JISC**

Voting begins on:
2016-10-12

Voting terminates on:
2017-01-03

Information technology — High efficiency coding and media delivery in heterogeneous environments —

Part 12:
Image file format

AMENDMENT 1: Support for AVC, JPEG and layered coding of images

Technologies de l'information — Codage à haute efficacité et livraison des medias dans des environnements hétérogènes —

Partie 12: Format de fichier d'image

AMENDEMENT 1: .

ICS: 35.040

This document is circulated as received from the committee secretariat.

Reference number
ISO/IEC 23008-12:2016/DAM 1:2016(E)

© ISO/IEC 2016

iTeh STANDARD PREVIEW
(standards.iteh.ai)

COPYRIGHT PROTECTED DOCUMENT

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

Amendment 1 to ISO/IEC 23008-12:201x was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Information technology — High efficiency coding and media delivery in heterogeneous environments — Part 12: Image file format, AMENDMENT 1: Support for AVC, JPEG and layered coding of images

Add the following definition and renumber the subclauses of 3.1:

3.1.x
HEVC image item
image item of type `'hvc1'` or `'lhv1'`

Add clause 6.4.8:

6.4.8   Multi-layer images

Some coding formats allow coding of images in a multi-layer manner, where the coded data representing an image is partitioned into several layers. A basic version of the image can be obtained by decoding the base layer, and each enhancement layer improves the basic version with respect to one or more aspects, such as spatial resolution and bit depth. In another example, an enhancement layer provides a second view, which can be used in stereoscopic displaying.

It is possible to specify several image items from the same multi-layer coded data representing an image, where each image item represents a different subset of the layers. Only one occurrence of the coded data is needed in a file, while the same layer can be included in several image items by using extents.

Each layer in a multi-layer image is associated with layer identifier different from the layer identifiers of the other layers of the image. The assignment of layer identifiers is specific to the image coding format or the mapping of the image coding format to this specification.

The decoding of a multi-layer image item may result into one or more reconstructed images.

NOTE 1: For example, when a multi-layer image contains two views, a decoder is typically specified to decode and return the decoded images of both the views.

When the decoding of a multi-layer image item results into more than one reconstructed images, a `LayerSelectorProperty` item property shall be present for the image item.

NOTE 2: The layer given in the `LayerSelectorProperty` item property chooses the reconstructed image from the set of reconstructed images obtained as the result of decoding the image item. The chosen reconstructed image might not be presented as is but might undergo further transformation (for example cropping) before actually being presented.

Some coding formats allow the use of decoded images of another bitstream as references for prediction. In such cases there shall be an item reference of `'exbl'` from a scalably coded image item to the image item that is first decoded and then used as reference in the decoding of the scalably coded image item.

In clause 6.5 add the following

6.5.11 Layer selection

6.5.11.1 Definition

Box Type: `'lsel'`
Property Type: Descriptive item property
Container: `ItemPropertyContainerBox`
Mandatory (per an item):   No
Quantity (per an item):   Zero or one

If the decoding of a multi-layer image item results into more than one reconstructed images, the `'lsel'` item property shall be associated with the image item. Otherwise, the `'lsel'` item property shall not be associated with an image item.

The `'lsel'` item property, if any, shall precede, in the item property association order, all transformative item properties.

This property is used to select which of the reconstructed images is described by subsequent descriptive item properties in the item property association order and manipulated by transformative item properties, if any, to generate an output image of the image item.

6.5.11.2 Syntax

```
aligned(8) class LayerSelectorProperty
extends ItemProperty('lsel') {
   unsigned int(16) layer_id;
}
```

6.5.11.3 Semantics

`layer_id` specifies the layer identifier of the image among the reconstructed images that is described by subsequent descriptive item properties in the item property association order and manipulated by transformative item properties, if any, to generate an output image of the image item.

6.5.12 Image Mirroring

6.5.12.1 Definition

Box Type: `'imir'`
Property Type: Transformative item property
Container: `ItemPropertyContainerBox`
Mandatory (per an item):   No
Quantity (per an item):   At most one

The image mirroring `'imir'` transformative item property mirrors the image about either a vertical or horizontal axis.

6.5.12.2 Syntax

```
aligned(8) class ImageMirror
extends ItemProperty('imir') {
   unsigned int (7) reserved = 0;
   unsigned int (1) axis;
}
```

6.5.12.3 Semantics

`axis` specifies a vertical (`axis` = 0) or horizontal (`axis` = 1) axis for the mirroring operation

add the following as clause 6.8 "Relating an untimed item to a timed sequence"

[Ed. (MH): Separation of the text to the entity group definition and sample group definition to different clauses could be considered for consistency compared to other entity groups and sample groups. The sample group description entry syntax should be included for consistency, presumably that is just empty.]

It is useful in some situations to be able to say that a given untimed image relates to a particular position in the timeline of a track. An entity group of type `'eqiv'` (equivalence) can be used for this purpose. Equivalent images are visually substitutable, but possibly coded differently (e.g. different resolution, compression, etc.); this differs from the `'altr'` entity group in that it applies to selected images in tracks as specified below, not whole tracks.

The semantics of the `'eqiv'` entity group are that all the items included in an `'eqiv'` entity group are 'equivalent' and that the tracks in the same `'eqiv'` entity group include selected samples, as specified below, that are 'equivalent' to the items.

Tracks in this entity group should have a sample group of type `'eqiv'`. The value of `grouping_type_parameter` of the `'eqiv'` sample group shall be equal to the `group_id` of the `'eqiv'` entity group. There may be several sample groups of type `'eqiv'`, each with a different value of `grouping_type_parameter`.

All the samples marked by an `'eqiv'` sample group are 'equivalent' to the each other and to the items in an entity group with `group_id` equal to `grouping_type_parameter` of the sample group.

In the case that an `'eqiv'` entity group contains one image item and one track that marks only one sample, the timing of the sample documents the time that the image item was drawn from.

There is usually at most one sample in a given track that is equivalent to a given image item.

Add as the last paragraph of 8.1:

[Ed. (MH): COR1 already included the following clarification:

Metadata specified in Annex C or according to the item type and MIME type values is descriptive and does not normatively affect the presentation. In particular, an image item can be rotated by 90, 180, or 270 degrees using the `'irot'` transformative item property. Rotation metadata, e.g. according to Annex C, is ignored in the displaying process.

]

Metadata embedded into a coded image item, if any, should not contradict with any item property or any metadata item associated with the image item. When metadata is embedded in a coded image item, it should also be represented by an item property or a metadata item associated with the image item.

Switch the order of Annex B and Annex C so that Annex B becomes "Storage of externally specified metadata" and Annex C becomes HEVC Image File Format. Note that in the following the clauses of Annex B still refer to the original Annex B (HEVC Image File Format).

Replace the content of B.2.2.1 with the following:

B.2.2.1.1 General

There shall be no inter prediction between HEVC image items, except for the case of an external base layer (see below). If inter prediction between images exist, the HEVC pictures shall be stored according to F.3.

`HEVCItemData` is structurally identical to the syntax defined in ISO/IEC 14496-15 for an HEVC sample. `HEVCItemData` shall not contain any extractor or aggregator NAL unit like structures defined in ISO/IEC 14496-15.

NOTE: Functionality similar to sharing NAL units through extractors between samples of different tracks can be achieved in image items through the use of extents.

B.2.2.1.2 Image item of type `'hvc1'`

An item of type `'hvc1'` consists of the NAL units of an HEVC bitstream that are length-delimited as specified below, and the bitstream contains exactly one access unit.

NAL units with nuh_layer_id greater than 0 may be present in items of type `'hvc1'`. Readers shall ignore NAL units with nuh_layer_id greater than 0 in an item of type `'hvc1'`.

NOTE: The base layer of HEVC items of type `'hvc1'` may be IDR, CRA or BLA pictures as defined ISO/IEC 23008-2.

B.2.2.1.3 Image item of type `'lhv1'`

An item of type `'lhv1'` consists of the NAL units of an HEVC bitstream that are length-delimited as specified below, and the bitstream contains exactly one access unit.

NOTE: An item of type `'lhv1'` consists of an initial IRAP access unit as defined ISO/IEC 23008-2, can contain more than one coded picture, and contains at most one coded picture with any specific value of nuh_layer_id.

All image items of type `'lhv1'` shall have an associated property called the `'oinf'` property. The `'oinf'` property provides a summary of the high-level characteristics of the bitstream containing the image item, similar to the `'oinf'` sample grouping of ISO/IEC 14496-15.

All image items of type `'lhv1'` shall have an associated with a `TargetOlsProperty` item property. `TargetOlsProperty` provides the output layer set index to be used as input for the decoding process of coded image item.

When `LayerSelectorProperty` is associated with an image item of type 'lhv1', it shall contain a `layer_id` that is among the nuh_layer_id values of the output layers of the output layer set identified by `TargetOlsProperty` associated with the same image item.

When there is an `'exbl'` item reference from an image item of type `'lhv1'` to another image item, the decoded pixel array of that another image item serves as the decoded picture with nuh_layer_id equal to 0 for the decoding of the `'lhv1'` image item. Moreover, the variable BllrapPicFlag, as specified by ISO/IEC 23008-2, is set equal to 1 and nal_unit_type for the decoded picture with nuh_layer_id equal to 0 is set equal to IDR_W_RADL, as specified by ISO/IEC 23008-2, for the decoding of the `'lhv1'` image item.

Remove the following paragraph from B.2.2.2:

The HEVCItemData is structurally identical to the syntax defined in ISO/IEC 14496-15 for an HEVC sample. HEVCItemData shall not contain any extractor or aggregator NAL units defined in ISO/IEC 14496-15.

Replace the content of B.2.3 with the following:

Box Type:	`'hvcC'`
Property Type:	Descriptive item property
Container:	`ItemPropertyContainerBox`
Mandatory (per an item):	Yes, for an image item of type `'hvc1'`
Quantity (per an item):	One for an image item of type `'hvc1'`

Each HEVC image item of type `'hvc1'` shall have an associated property that is exactly identical to the `HEVCConfigurationBox` as defined in ISO/IEC 14496-15.

`essential` shall be equal to 1 for an `'hvcC'` item property associated with an image item of type `'hvc1'`.

Replace the content of B.2.4 with the following:

Box Type:	`'subs'`
Property Type:	Descriptive item property
Container:	`ItemPropertyContainerBox`
Mandatory (per an item):	No
Quantity (per an item):	Zero or more for an HEVC image item

Sub-sample information for HEVC coded images may be given using an associated property that is exactly identical to `SubSampleInformationBox` for HEVC as defined in ISO/IEC 14496-12 and ISO/IEC 14496-15. The `entry_count` field of the `SubSampleInformationBox` shall be equal to 1, and the `sample_delta` field of the `SubSampleInformationBox` shall be equal to 0.

Zero or more properties of type `'subs'` may be linked to the same HEVC image item.

In B.2.5.1 replace the sentence

> An HEVC coded auxiliary image uses the `item_type` value `'hvc1'`.

with the following:

An HEVC coded auxiliary image uses the `item_type` value `'hvc1'` or `'lhv1'`.

Add the following clauses at the end of subclauses of B.2, before B.3:

B.2.7   Layered HEVC configuration item property

Box Type:	`'lhvC'`
Property Type:	Descriptive item property
Container:	`ItemPropertyContainerBox`
Mandatory (per an item):	Yes, for an image item of type `'lhv1'`
Quantity (per an item):	One for an image item of type `'lhv1'`

Each HEVC image item of type `'lhv1'` shall have an associated property that is exactly identical to the `LHEVCConfigurationBox` as defined in ISO/IEC 14496-15.

`essential` shall be equal to 1 for an `'lhvC'` item property associated with an image item of type `'lhv1'`.

B.2.8   Operating points info property

B.2.8.1   Description

Box Type: 'oinf'
Property Type: Descriptive item property
Container: ItemPropertyContainerBox
Mandatory (per an item):   Yes, for an image item of type 'lhv1'
Quantity (per an item):   One or more

The operating points info property 'oinf' is similar to the operating points information sample group specified in ISO/IEC 14496-15 but applies to image items.

Image items originating from the same bitstream shall be associated with the same 'oinf' property. The 'oinf' property informs about the different operating points provided by a bitstream and their constitution. Each operating point is related to an output layer set and a combination of a profile, level and tier. For each operating point, the 'oinf' property provides the minimum and maximum width and height of output pictures, the chroma format, and the bit-depth. TargetOlsProperty associated with an image item provides the output layer set index that can be used to select which operating-point-specific information of the 'oinf' property applies to the image item. The property also provides the dependency information between layers and the scalability types in the bitstream.

B.2.8.2   Syntax

```
aligned(8) class OperatingPointsInformationProperty
extends ItemFullProperty('oinf', version = 0, flags = 0){
   unsigned int(16) scalability_mask;
   unsigned int(2) reserved;
   unsigned int(6) num_profile_tier_level;
   for (i=1; i<=num_profile_tier_level; i++) {
      unsigned int(2) general_profile_space;
      unsigned int(1) general_tier_flag;
      unsigned int(5) general_profile_idc;
      unsigned int(32) general_profile_compatibility_flags;
      unsigned int(48) general_constraint_indicator_flags;
      unsigned int(8) general_level_idc;
   }
   unsigned int(16) num_operating_points;
   for (i=0; i<num_operating_points) {
      unsigned int(16) output_layer_set_idx;
      unsigned int(8) reserved = 0;
      unsigned int(8) layer_count;
      for (j=0; j<layer_count; j++) {
         unsigned int(8) ptl_idx;
         unsigned int(6) layer_id;
         unsigned int(1) is_outputlayer;
         unsigned int(1) is_alternate_outputlayer;
      }
      unsigned int(16) minPicWidth;
      unsigned int(16) minPicHeight;
      unsigned int(16) maxPicWidth;
      unsigned int(16) maxPicHeight;
      unsigned int(2) maxChromaFormat;
      unsigned int(3) maxBitDepthMinus8;
      unsigned int(3) reserved = 0;
   }
   unsigned int(8) max_layer_count;
   for (i=0; i<max_layer_count; i++) {
      unsigned int(8) dependent_layerID;
      unsigned int(8) num_layers_dependent_on;
      for (j=0; j< num_layers_dependent_on; j++) {
         unsigned int(8) dependent_on_layerID;
      }
      for (j=0; j<16; j++) {
         if (scalability_mask & (1 << j))
            unsigned int(8) dimension_identifier;
      }
   }
}
```

[Ed. It is preferable that in ISO/IEC 14496-15 a data structure is specified for the content of `OperatingPointsInformation`, which is then included here by reference rather than copying the syntax structure as done above. When this inclusion by reference is done, TemporalId related fields need to be semantically constrained to be equal to 0 in the HEIF specification. The editor's note will be implemented, when ISO/IEC 14496-15 3rd edition FDIS is available.]

B.2.8.3   Semantics

The semantics of fields in the `OperatingPointsInformationProperty` are identical to the fields of `OperatingPointsInformation` sample group description entry as defined in ISO/IEC 14496-15.

B.2.9 Target output layer set property

B.2.9.1 Description

Box Type:	'tols'
Property Type:	Descriptive item property
Container:	ItemPropertyContainerBox
Mandatory (per an item):	Yes, for an image item of type 'lhv1'
Quantity (per an item):	One or an image item of type 'lhv1', zero otherwise

B.2.9.2 Syntax

```
aligned(8) class TargetOlsProperty
extends ItemFullProperty('tols', version = 0, flags = 0){
    unsigned int(16) target_ols_index;
}
```

B.2.9.3 Semantics

`target_ols_idx` provides the output layer set index to be provided to the L-HEVC decoding process as the value of TargetOlsIdx variable, specified in clause F.8 of HEVC.

NOTE: Output layer set index equal to 0 indicates an output layer set consisting of the base layer only. It is discouraged to have 'lhv1' image items with an associated TargetOlsProperty with target_ols_idx equal to 0 present in files. Instead, the inclusion of the respective 'hvc1' image items is encouraged.

Replace the content of B.3.2 with the following:

The sample entry of type 'hvc1', 'hvc2', or 'lhv1' shall be used for an image sequence track coded with HEVC, as specified in ISO/IEC 14496-15.

The HEVCSampleEntry or LHEVCSampleEntry shall be used as specified in ISO/IEC 14496-15.

NOTE: As specified in clause エラー!参照元が見つかりません。, a CodingConstraintsBox is required to be present in the HEVCSampleEntry and LHEVCSampleEntry, in addition to the boxes required by ISO/IEC 14496-15 to be contained in the HEVCSampleEntry and LHEVCSampleEntry, respectively.

For a track containing an HEVC image sequence, either all samples shall be sync samples or the all_ref_pics_intra field in the CodingConstraintsBox specified in エラー!参照元が見つかりません。 shall be set to one.

Replace the content of B.3.3 with the following:

The SEI messages for the auxiliary channel follow the same principle as any other SEI message for the sample entry; i.e. they may be included in the decoder configuration record of the sample entry types specified for HEVC or its multi-layer extensions in ISO/IEC 14496-15. When aux_track_type is equal to 'urn:mpeg:hevc:2015:auxid:xxx' (where xxx is a positive integer), as specified in F.2.5, an HEVC SEI message describing the auxiliary image sequence should be included in the sample entry.

Add the following clauses (B.4.3 and B.4.4):