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Foreword

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Introduction

Derived visual tracks are designed to enable defining a timed sequence of visual transformation operations to be applied to input still images and/or samples of timed sequences of images in the same presentation. It is built using tools defined in the ISO base media file format (ISO/IEC 14496-12). This document specifies the core design and an initial base set of transformation operations.

The International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC) draw attention to the fact that it is claimed that compliance with this document may involve the use of a patent.

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Information technology — MPEG systems technologies —

Part 16:
Derived visual tracks in the ISO base media file format

1 Scope

This document defines a storage format for derived visual tracks and an initial base set of related transformation operations. The format defined in this document enables the interchange, editing, and display of timed sequences of images that result from transformation operations applied to input still images or samples of timed sequences of images in the same presentation.

This format defines normative structures used to contain the description of transformation operations, how to link that transformation operations to the inputs, and defines how to process those transformation operations to obtain a timed sequence of video frames.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 14496-12, *Information technology — Coding of audio-visual objects — Part 12: ISO Base Media file format*

ISO/IEC 23001-10, *Information technology — MPEG systems technologies — Part 10: Carriage of timed metadata metrics of media in ISO base media file format*

ISO/IEC 23008-12, *Information technology — High efficiency coding and media delivery in heterogeneous environments — Part 12: Image File Format*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 14496-12 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
derivation operation
container box representing an operation applying a *derivation transformation* (3.2) on an ordered list of *inputs* (3.5)

3.2
derivation transformation
visual transformation operation identified by a 32-bit value and a set of parameters that transforms *inputs* (3.5) into *visual outputs* (3.8)

Note 1 to entry: The 32-bit value is also known as a four-character code in ISO/IEC 14496-12.

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3.3
derived sample
sample containing an ordered list of *derivation operations* (3.1)

3.4
derived visual track
video or picture track that contains a timed sequence of *derived samples* (3.3)

3.5
input
parameter input (3.6) or *visual input* (3.7)

3.6
parameter input
metadata from an input item or track that is used as input for a *derivation transformation* (3.2) of a *derivation operation* (3.1)

Note 1 to entry: The parameter input is either an input metadata item from file-level `MetaBox` or an interval of an input metadata track (possibly spanning multiple samples).

3.7
visual input
video or still image that is used as input for a *derivation transformation* (3.2) of a *derivation operation* (3.1)

Note 1 to entry: The visual input is either an input image item from file-level `MetaBox`, an interval of an input track (possibly spanning multiple samples), the visual output of a preceding *derivation operation* (3.1) or the default input fill picture signalled in the configuration record of the *derived visual track* (3.4).

3.8
visual output
one video frame or a sequence of video frames that is output from a *derivation transformation* (3.2) of a *derivation operation* (3.1)

4 Derived visual tracks, design principles

A derived visual track describes a timed sequence of derived samples composed of an ordered list of derivation operations, each derivation operation applying a derivation transformation for the duration of the derived sample on an ordered list of inputs represented in the same presentation.

A derived visual track shall be either a video track (with the `'vide'` handler type in the `HandlerBox` of the `MediaBox` as defined in ISO/IEC 14496-12) or a picture track (with the `'pict'` handler type in the `HandlerBox` of the `MediaBox` as defined in ISO/IEC 23008-12). A derived visual track is identified by its containing sample entry of type `'dtrk'` `DerivedVisualSampleEntry`. Each sample described by a `DerivedVisualSampleEntry` is a derived sample.

A derived visual track shall include a `TrackReferenceTypeBox` with `reference_type` equal to `'dtrk'` referring to all the inputs. Each reference shall be one of:

a) the `track_ID` of a track used by derived samples in the track, or, if unified IDs are in use as defined by ISO/IEC 14496-12, a `track_group_id`;

b) the `item_ID` of an image item, in the file-level `MetaBox`, used by derived samples in the track.

An ID value in the track references is resolved to a `track_ID` whenever the file contains a track with such ID, is resolved to a `track_group_id` whenever unified IDs are in use and the file contains a track group with such ID, and is resolved to an `item_ID` otherwise.

NOTE 1 A `track_ID` can be an ID of a derived visual track.

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