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# Introduction

This document captures the technologies under consideration for future amendments of the Multi-Image Application Format (MIAF), ISO/IEC 23000-22 specification.

The current technologies under consideration include:

* Tone mapping in allowed derivation chain.

# Include tone mapping in allowed derivation chain

# 2.1 Abstract

Propose some changes to ISO/IEC 23000-22 (MIAF) [1] so that the Tone-Mapping

derived image item as introduced in ISO/IEC 23008-12 3rd edition DAM 1 [2] and mentioned in ISO/IEC 23000-22 CDAM 1 [3] is allowed in MIAF image item derivation chains.

# 2.2 Proposal

The modified parts are highlighted in yellow.

Change subclause 7.3.11.1 General to read:

A MIAF file may include any derived image defined in ISO/IEC 23008-12 with the constraints defined here.

A MIAF player shall process all derived images of the types identified in this subclause.

The maximum derivation chain is shown in the following list; the Identity, Grid, Overlay, and Tone-map derivations are optional. All derivation chains shall originate from one or more coded images. An identity derivation shall not be derived immediately from another identity derivation. If derivations occur, they shall be in this order:

— mandatory coded image(s)

— optional identity derivation (subclause 7.3.11.2)

— optional grid (subclause 7.3.11.4)

— optional identity derivation (subclause 7.3.11.2)

— optional overlay (subclause 7.3.11.3)

— optional identity derivation (subclause 7.3.11.2)

— optional tone map (subclause 7.3.11.5)

— optional identity derivation (subclause 7.3.11.2)

.

# References

1. ISO/IEC 23000-22,"Information technology — Multimedia application format (MPEG-A) — Part 22: Multi-image application format (MIAF)"
2. ISO/IEC 23008-12:2025 AMD 1:2025, "Information technology — High efficiency coding and media delivery in heterogeneous environments – Part 12: Image File Format - Amendment 1: Support for tone map derived image items and other improvements”
3. ISO/IEC 23000-22 CDAM 1, "Implementation based technologies for MIAF" https://www.mpeg.org/wpcontent/uploads/mpeg\_meetings/148\_Kemer/w24413

# Codec switch constraints

# 2.1 Abstract

Propose to add an explicit constraint prohibiting codec switches within sequence tracks in MIAF.

# 2.2 Introduction

The ISO Base Media File Format permits multiple sample entries within a track (stsd), and does not by itself forbid codec switching. Derived specifications often introduce stricter constraints. CMAF, for instance, requires that all sample entries in a track use the same codingname (four-character code). HEIF, in turn, defines “the sample entry of type 'hvc1' ...” for image sequence tracks coded with HEVC, implicitly assuming only a single sample entry, but without explicitly prohibiting codec switches. This lack of clarity may cause interoperability issues.

# 2.3 Proposal

It is proposed that MIAF explicitly prohibit codec switching within sequence tracks, in alignment with CMAF’s constraint.

**Constraint**: For sequence tracks in MIAF, all sample entries in the stsd box shall have the same codingname (four-character code). Consequently, all samples in a sequence track shall conform to a single codec type. Multiple sample entries may be present, provided they all have the same codingname (e.g., to allow different codec configurations within a track).

This aligns with CMAF constraints and clarifies the assumption made in HEIF regarding “the sample entry” for image sequence tracks.

# MIAF Profiles for VVC

# 4.1 Abstract

Propose the following MIAF VVC profiles:

1. MIAF VVC Basic Profile
2. MIAF VVC Basic Chroma Extended Profile
   1. **Introduction**

The proposal in m74467, provides the motivation for defining new profiles in MIAF for VVC. The VVC standard (formalized as Rec. ITU-T H.266 and ISO/IEC 23090-3) supports multiple profiles, tiers and levels covering different applications and use cases for still picture and image sequences.

In this contribution m75559 we propose the following profiles:

1. MIAF VVC Basic Profile
2. MIAF VVC Basic Chroma Extended Profile

The proposed profiles cover only a subset of features supported by VVC, as below, which we believe should be generally supported in MIAF.

1. Media – still pictures, image sequence, video (single-layer, multilayer)
2. Bit-depth – 8 to 10 bits
3. Chroma format – 4:0:0, 4:2:0, 4:2:2, 4:4:4
4. Tier – Main Tier
5. Level – up to 6.0
6. HDR – up to 10 bits

There are additional features supported in VVC for example, bit-depth beyond 10 bits (12-16 bits), Tier – high Tier for higher bitrate and FPS, levels supporting beyond 8K (12K, 16K) and HDR beyond 10 bits (12-16 bits). We also recommend that the experts in Application Format group have further discussions and resolution on the above-mentioned additional features.

* 1. **Profiles proposal**

A.11 MIAF VVC Basic profile

A.11.1 Adopted shared constraints

This profile includes the requirements of

— self-containment (subclause 8.2),

— grid-limit (subclause 8.4),

— single-track (subclause 8.5),

— matched-duration (subclause 8.7).

— HDR support (subclause 8.8).

A.11.2 Image item coding

Images coded with the following VVC profiles at Main tier may be present and shall be supported by the MIAF reader as coded image items; the level signalled by the file shall be the indicated level or lower:

— VVC Main 10 Still Picture Profile, Level 6

— VVC Main 10 Profile, Level 6.

— VVC Multilayer Main 10 Profile, Level 6.

NOTE These profiles support both the 4:0:0 and 4:2:0 chroma sampling formats and bit depth ranging from 8-10 bits.

A.11.3 Image sequence and video coding

VVC image sequences shall be stored in accordance with ISO/IEC 14496-15.

The VVC image sequence tracks conforming to this MIAF profile shall contain image sequences coded at Main tier and the level signalled by the file shall be the indicated level or lower.

For video tracks conforming to this MIAF profile, VVC Main 10 Profile at Main tier level 5.1 or lower shall be indicated in the sample entry and shall be supported by the MIAF reader.

A.11.4 Brand identification

The brand to identify files that conform to the MIAF VVC Basic profile is 'MiVB'. As permitted in 7.2.1.2, this profile requires the brand 'mif1' to be present in the FileTypeBox.

A.12 MIAF VVC Basic Chroma Extended profile

A.12.1 Adopted shared constraints

This profile inherits the shared constraints requirement of the MIAF VVC Basic profile defined in Clause A.11.

A.12.2 Image item coding

Images conforming to the MIAF VVC Basic profile or coded with the following VVC profiles at Main tier may be present and shall be supported by the MIAF reader and MIAF renderer; the level signalled by the file shall be the indicated level or lower:

— VVC Main 10 4:4:4 Still Picture Profile, Level 6

— VVC Main 10 4:4:4 Profile, Level 6.

— VVC Multilayer Main 10 4:4:4 Profile, Level 6.

NOTE These VVC profiles impose that the MIAF reader and the MIAF renderer support the 4:2:2 and 4:4:4 chroma sampling format in addition to the requirements of the MIAF VVC Basic profile.

A.12.3 Image sequence and video coding

The VVC image sequence tracks conforming to this MIAF profile shall contain image sequences coded at Main tier and the level signalled by the file shall be the indicated level or lower.

For video tracks conforming to this MIAF profile, the requirements of the MIAF VVC Basic profile apply or VVC Main 10 profile at Main tier level 6 or VVC Main 10 4:4:4 profile at Main tier level 6 or lower shall be indicated in the sample entry and shall be supported by the MIAF reader.

A.12.4 Brand identification

The brand to identify files that conform to the MIAF VVC Basic Chroma Extended profile is 'MVBC'. As permitted in 7.2.1.2, this profile requires the brand 'mif1' to be present in the FileTypeBox.