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| **Title** | **WD of ISO/IEC 23090-25 Conformance and Reference Software for Carriage of Visual Volumetric Video-based Coding Data** |
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Scope

This document specifies the reference software for carriage of V3C data as specified in ISO/IEC 23090-10. The information provided describes the reference software modules and the features that it supports. It also provides a description of how the reference software can be utilized. Finally, it also provides a description of conformance test vectors.

[Ed. (DP): We are currently focusing on the implementation itself. The summary of the most up to date development status can be found in [this google sheet](https://docs.google.com/spreadsheets/d/1LvHMEu3GxANkG2p4AcYcl58wubYoy8Ef1FT97RSWVgs/edit#gid=0) and in the [GitLab repository](http://mpegx.int-evry.fr/software/MPEG/Systems/PCC-SYS/23090-10-conformance) itself. We expect to update this document substantially after MPEG#138]

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 23090-10:2021, Information technology — Coded representation of immersive media — Part 10: Carriage of visual volumetric video-based coding data*

Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC FDIS 23090-10 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>

Abbreviated terms

For the purposes of this International Standard, the following abbreviations apply:

|  |  |
| --- | --- |
| ISOBMFF | ISO base media file format |
| PCC | point cloud compression |
| V3C | visual volumetric video-based coding |
| V-PCC | video-based Point Cloud Coding |

Reference software for ISO/IEC 23090-10

General

The source code for ISO/IEC 23090-10 reference software is available on MPEG’s GitLab server and is accessible to MPEG members via the following URL:

<http://mpegx.int-evry.fr/software/MPEG/Systems/PCC-SYS/23090-10-conformance>

All merge requests should be submitted to the repository on MPEG’s GitLab server after following the contribution guidelines from [CONTRIBUTING.md](http://mpegx.int-evry.fr/software/MPEG/Systems/PCC-SYS/23090-10-conformance/-/blob/master/CONTRIBUTING.md) file.

[Ed. (DP): We should consider making public mirror for releases on MPEG’s GitHub account.]

Overview

The volumetric carriage reference software utilizes in the architecture the reference software for the ISOBMFF [libisomediafile](https://github.com/MPEGGroup/isobmff), the reference software for V-PCC [mpeg-pcc-tmc2](http://mpegx.int-evry.fr/software/MPEG/PCC/TM/mpeg-pcc-tmc2) and other miscellaneous supporting libraries. Figure 1 shows the simplified overview of the architecture for the reference software implementation. Boxes with a gray colored background are in the scope of the reference software implementation.

Diagram

Description automatically generated

Figure 1: Architecture overview

The reference software implementation consists of the V3C carriage library libV3CCarriage, and the command line application with the name V3CCarriageApp. While the library implements an API to parse and write data structures as defined in 23090-10, the command line application uses this API together with other helping libraries to implement actual multiplexing and demultiplexing functionality.

Figure 2 shows a design concept of track structure architecture for V3CCarriageApp where every track derives from the TrackBase class and depending on the track type the derived class is either the V3CTrackBase or the VideoTrackBase which are responsible for creation of the correct track type itself. The actual classes which are used to create track objects derive from V3CTrackBase and VideoTrackBase and are responsible for creation of the correct sample entry and sample formats.

Diagram

Description automatically generated

Figure 2: Design of thrack structure archtecure for V3CCarriaeApp

[Ed. (DP) Update this figure as the text is way to small]

Feature support list

Table 1 summarizes a list of features adopted in the V3C carriage specification and indicates which features are currently supported by the reference software.

Table 1: V3C Reference Software Feature Support List

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Feature** | **4CCs** | **Version** | **Support** | **Status** |
| Common | V3CConfigurationBox | v3cC | 0 | TRUE | OK |
| V3CUnitHeaderBox | vunt | 0 | TRUE | OK |
| V3CAtlasParamSampleGroupDescriptionEntry | vaps | 0 | FALSE | implementing |
| ObjectSwitchAlternativesBox | swpc | 0 | TRUE | OK |
| Single track | V3CBitstreamSampleEntry | v3e1 v3eg | 0 | TRUE | OK |
| Multiplexer | N/A |  | FALSE | implementing |
| Demultiplexer | N/A |  | FALSE | implementing |
| Sub-samples | N/A |  | FALSE | implementing |
| Multi track | V3CAtlasSampleEntry | v3c1 v3cg v3cb v3a1 v3ag | 0 | TRUE | OK |
| V3CAtlasTileConfigurationBox | v3tC | 0 | TRUE | OK |
| V3CAtlasTileSampleEntry | v3t1 | 0 | TRUE | OK |
| MultiMapVideoBox | mmvi | 0 | TRUE | OK |
| PlayoutTrackGroupBox | potg | 0 | TRUE | OK |
| Single atlas multiplexer | N/A |  | FALSE | implementing |
| Single atlas demultiplexer | N/A |  | FALSE | implementing |
| Single atlas tiles multiplexer | N/A |  | FALSE | implementing |
| Single atlas tiles demultiplexer | N/A |  | FALSE | implementing |
| Multi atlas multiplexer | N/A |  | FALSE | implementing |
| Multi atlas demultiplexer | N/A |  | FALSE | implementing |
| Non-timed | V3CConfigurationProperty | v3cp | 0 | TRUE | OK |
| V3CUnitHeaderProperty | vutp | 0 | TRUE | OK |
| V3CAtlasTileConfigurationProperty | v3tp | 0 | TRUE | OK |
| PlayoutEntityToGroupBox | eply | 0 | TRUE | OK |
| Single atlas multiplexer | N/A |  | FALSE | implementing |
| Single atlas demultiplexer | N/A |  | FALSE | implementing |
| Single atlas tiles multiplexer | N/A |  | FALSE | implementing |
| Single atlas tiles demultiplexer | N/A |  | FALSE | implementing |
| Multi atlas multiplexer | N/A |  | FALSE | implementing |
| Multi atlas demultiplexer | N/A |  | FALSE | implementing |
| Partial access | Vector3 | N/A |  | TRUE | OK |
| V3CBoundingBox | N/A |  | TRUE | OK |
| TileMapping | N/A |  | TRUE | OK |
| V3CObject | N/A |  | TRUE | OK |
| V3CObjectCollection | N/A |  | TRUE | OK |
| V3CSpatialRegion | N/A |  | TRUE | OK |
| V3CTileVideoComponentGroupBox | vtcg | 0 | TRUE | OK |
| V3CBoundsBox | vpbb | 0 | TRUE | OK |
| V3CSpatialRegionCollectionBox | v3sc | 0 | TRUE | OK |
| DynamicVolumetricMetadataSampleEntry | dyvm | 0 | FALSE | implementing |
| Static partial access multiplexer | N/A |  | FALSE | implementing |
| Static partial access demultiplexer | N/A |  | FALSE | implementing |
| Dynamic partial access multiplexer | N/A |  | FALSE | implementing |
| Dynamic partial access demultiplexer | N/A |  | FALSE | implementing |
| Viewport metadata | ExtCameraInfo | N/A |  | FALSE | implementing |
| IntCameraInfo | N/A |  | FALSE | implementing |
| ViewportInfo | N/A |  | FALSE | implementing |
| ViewportInfoConfigurationBox | 6vpC | 0 | FALSE | implementing |
| ViewportInfoSampleEntry | 6vpt | 0 | FALSE | implementing |
| Viewport track multiplexer | N/A |  | FALSE | implementing |
| Viewport track demultiplexer | N/A |  | FALSE | implementing |

Usage of V3CCarriageApp

TBD Describe how the V3CCarriageApp can be used and point to a GitLab README where it also will be described.

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Conformance for ISO/IEC 23090-10

TBD describe what this section is about and provide information on how to find conformance files and what those files include

Bibliography

1. ISO/IEC 23090-10 “Information technology — Coded representation of immersive media — Part 10: Carriage of visual volumetric video-based coding data”