ISO/IEC JTC 1/SC 29/WG 03 N0470

**ISO/IEC JTC 1/SC 29/WG 03  
MPEG Systems   
Convenorship: KATS (Korea, Republic of)**

**Document type:** Output Document

**Title:** WD of ISO/IEC 23090-26 Conformance and Reference Software for Carriage of Geometry-based Point Cloud Compression Data

**Status:** Approved

**Date of document:** 2022-01-21

**Source:** ISO/IEC JTC 1/SC 29/WG 03

**No. of pages:** 6 (with cover page)

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**Committee URL:** <https://isotc.iso.org/livelink/livelink/open/jtc1sc29wg3>

**INTERNATIONAL ORGANIZATION FOR STANDARDIZATION**

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**ISO/IEC JTC 1/SC 29/WG 03 MPEG SYSTEMS**

**ISO/IEC JTC 1/SC 29/WG 03 N0470**

**January 2022, Virtual**

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| **Source** | **WG 03, MPEG Systems** |
| **Status** | **Approved** |
| **Serial Number** | **21186** |

Scope

This document specifies the reference software for carriage of G-PCC data as specified in ISO/IEC 23090-18. 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): The proponents of the technologies in 23090-18 still need to participate more actively in the development of the software as documented [here](http://mpegx.int-evry.fr/software/MPEG/Systems/PCC-SYS/V-PCC/-/issues/161" \l "note_56452). We expect more participation from the proponents before MPEG#138. The current status of the development can be found in [this google sheet](https://docs.google.com/spreadsheets/d/14Uh2sw572O1p4QKXebAcwt7gJPYL_OOI9n6QXyMZp0E/edit" \l "gid=0).]

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 23090-18:2021, Information technology — Coded representation of immersive media — Part 18: Carriage of geometry-based point cloud compression data*

*ISO/IEC 14496-12:2021, Information technology — Coding of audio-visual objects — Part 12: ISO base media file format*

Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC FDIS 23090-18 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 |
| G-PCC | Geometry-based point cloud compression (specified in ISO/IEC 23090-9) |

Reference software for ISO/IEC 23090-18

General

The source code for ISO/IEC 23090-18 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/23090-18-conformance>

All merge requests should be submitted to the repository on MPEG’s GitLab server after following the contribution guidelines from CONTRIBUTING.md file.

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

Overview

The G-PCC carriage reference software utilizes in the architecture the reference software for the ISOBMFF [libisomediafile](https://github.com/MPEGGroup/isobmff), the reference software for G-PCC mpeg-pcc-tmc13 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 G-PCC carriage library *libGPCCCarriage*, and the command line application with the name *GPCCCarriageApp*. While the library implements an API to parse and write data structures as defined in 23090-18, the command line application uses this API together with other helping libraries to implement actual multiplexing and demultiplexing functionality.

Feature support list

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

Table 1: G-PCC Reference Software Feature Support List

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Feature** | **4CCs** | **Version** | **Support** | **Status** |
| Common | GPCCConfigurationBox | gpcC | 0 | FALSE | TBD |
| GPCCComponentInfoBox | ginf | 0 | FALSE | TBD |
| GPCCScalabilityInfoBox | gsci | 0 | FALSE | TBD |
| TileInventoryInfoEntry | gtii | 0 | FALSE | TBD |
| Single track | GPCCSampleEntry (single track) | gpe1 gpeg | 0 | FALSE | TBD |
| Multiplexer | N/A |  | FALSE | TBD |
| Demultiplexer | N/A |  | FALSE | TBD |
| Sub-samples | N/A |  | FALSE | TBD |
| Multi track | GPCCSampleEntry (multiple tracks) | gpc1 gpcg | 0 | FALSE | TBD |
| Multiplexer | N/A |  | FALSE | TBD |
| Demultiplexer | N/A |  | FALSE | TBD |
| Sub-samples | N/A |  | FALSE | TBD |
| Alternative tracks | N/A |  | FALSE | TBD |
| GPCCSampleEntry (Tile-base track) | gpeb gpcb | 0 | FALSE | TBD |
| GPCCTileSampleEntry | gpt1 | 0 | FALSE | TBD |
| GPCCTileConfigurationBox | gptC |  | FALSE | TBD |
| Multiplexer (tiles) | N/A |  | FALSE | TBD |
| Demultiplexer (tiles) | N/A |  | FALSE | TBD |
| Sub-samples (tiles) | N/A |  | FALSE | TBD |
| Non-timed | GPCCItemData | gpe1 gpc1 gpeb | 0 | FALSE | TBD |
| GPCConfigurationProperty | gpcC | 0 | FALSE | TBD |
| GPCCComponentInformationProperty | ginf | 0 | FALSE | TBD |
| GPCCSpatialRegionInfoProperty | gpsr | 0 | FALSE | TBD |
| GPCC Tile Item | gpt1 | 0 | FALSE | TBD |
| GPCCTileInfoProperty | gpti | 0 | FALSE | TBD |
| Sub-sample item property | ??? |  | FALSE | TBD |
| Partial access | Vector3 | N/A | 0 | TRUE | OK |
| GPCCBoundingBox | N/A | 0 | FALSE | TBD |
| TileMappingInfo | N/A | 0 | FALSE | TBD |
| GPCCSpatialRegionStruct | N/A | 0 | FALSE | TBD |
| GPCCSpatialRegionInfoBox | gpsr | 0 | FALSE | TBD |
| DynamicGPCCSpatialRegionSampleEntry | gpdr | 0 | FALSE | TBD |
| Static partial access multiplexer | N/A |  | FALSE | TBD |
| Static partial access demultiplexer | N/A |  | FALSE | TBD |
| Dynamic partial access multiplexer | N/A |  | FALSE | TBD |
| Dynamic partial access demultiplexer | N/A |  | FALSE | TBD |
| Viewport metadata | ExtCameraInfoStruct | N/A | 0 | FALSE | TBD |
| IntCameraInfoStruct | N/A | 0 | FALSE | TBD |
| ViewportInfoStruct | N/A | 0 | FALSE | TBD |
| GPCCViewportInfoConfigurationBox | gvpC | 0 | FALSE | TBD |
| DynamicGPCCViewportSampleEntry | gpdv | 0 | FALSE | TBD |
| Static viewport multiplexer | N/A |  | FALSE | TBD |
| Static viewport demultiplexer | N/A |  | FALSE | TBD |
| Dynamic viewport multiplexer | N/A |  | FALSE | TBD |
| Dynamic viewport demultiplexer | N/A |  | FALSE | TBD |

Usage of GPCCCarriageApp

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

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Conformance for ISO/IEC 23090-18

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 23090-18 “Information technology — Coded representation of immersive media — Part 18: Carriage of Geometry-based Point Cloud Compression Data”