



**International  
Standard**

**ISO/IEC 23090-25**

**Information technology — Coded  
representation of immersive media —**

**Part 25:**

**Conformance and reference  
software for carriage of visual  
volumetric video-based coding data**

*Technologies de l'information — Représentation codée de média  
immersifs —*

*Partie 25: Conformité et logiciel de référence pour le transport de  
données de codage basé sur la vidéo volumétrique*

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## 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives) or [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs)).

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

A list of all parts in the ISO/IEC 23090 series can be found on the ISO and IEC websites.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html) and [www.iec.ch/national-committees](http://www.iec.ch/national-committees).

## Introduction

The conformance and reference software in this document serves two main purposes:

- Validation of the written specification of ISO/IEC 23090-10;
- Conformance testing for checking interoperability for the various applications against the reference software which aims to be compliant with ISO/IEC 23090-10.

The reference software is structured as an extension of the ISO/BMFF reference software library and provides additional functions required for ISO/IEC 23090-10. In addition, it includes a small command line application that uses the library to perform some basic file operations such as multiplexing and demultiplexing a file.

Furthermore, this document is accompanied by a collection of conformance files. These files provide practical demonstrations of various features of ISO/IEC 23090-10, aiding in a more comprehensive understanding and application of ISO/IEC 23090-10.

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# Information technology — Coded representation of immersive media —

## Part 25:

# Conformance and reference software for carriage of visual volumetric video-based coding data

## 1 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.

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

## 3 Terms and definitions

No terms and definitions are listed in this document.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

## 4 Abbreviated terms

ISOBMFF	ISO base media file format
MIV	MPEG immersive video
PCC	point cloud compression
V3C	visual volumetric video-based coding
V-PCC	video-based point cloud compression

## 5 Reference software for ISO/IEC 23090-10

### 5.1 General

The reference software and conformance files are available at:

<https://standards.iso.org/iso-iec/23090/-25/ed-1/en/>

### 5.2 Architecture

Figure 1 shows a simplified overview of the reference software implementation architecture for the carriage of visual volumetric video-based coding data. The reference software implementation implements the features defined in ISO/IEC 23090-10 and is based on the reference software for ISOBMFF,<sup>[2]</sup> the reference software for MIV<sup>[1]</sup> and other supporting libraries. Boxes with a gray background in Figure 1 are part of the scope of the reference software implementation and are described in more detail in the following sections.

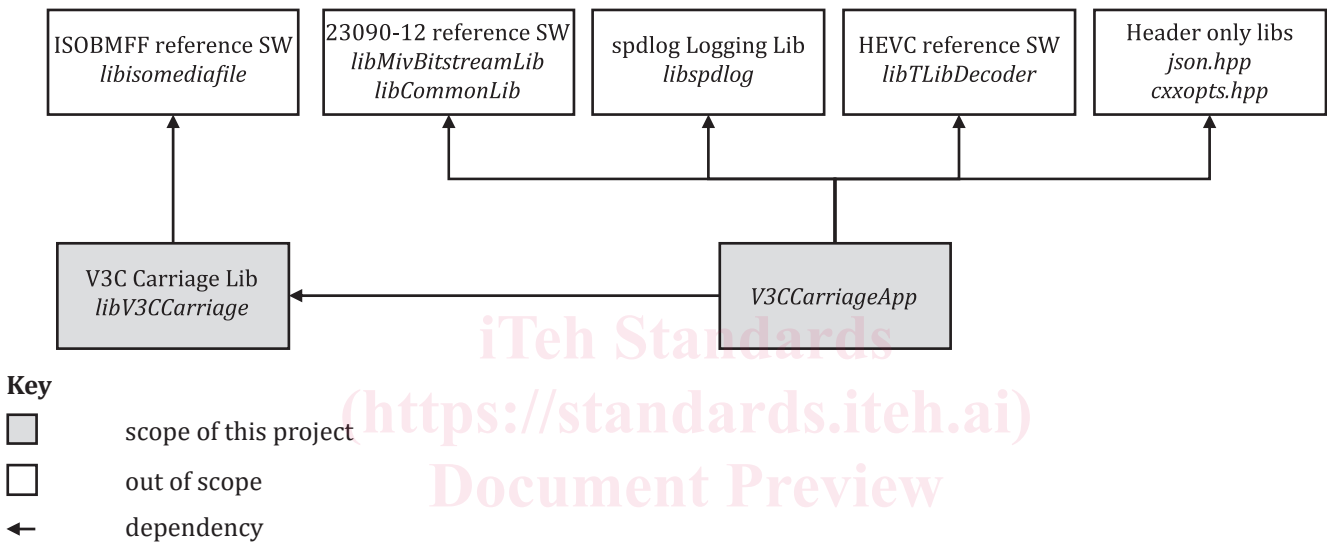


Figure 1 — Architecture overview

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. The documentation of the API and associated classes and functions is done using Doxygen<sup>[3]</sup> and can be built by running the Doxygen command in the root folder.

### 5.3 Features

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	Status
Common	V3CConfigurationBox	v3cC	0	OK
	V3CUnitHeaderBox	vunt	0	OK
	V3CAtlasParamSampleGroupDescriptionEntry	vaps	0	OK
	ObjectSwitchAlternativesBox	swpc	0	OK
Single track	V3CBitstreamSampleEntry	v3e1 v3eg	0	OK
	Multiplexer	N/A		Not Implemented
	Demultiplexer	N/A		Not Implemented
	Sub-samples	N/A		Not Implemented
Multi track	V3CAtlasSampleEntry	v3c1 v3cg v3cb v3a1 v3ag	0	OK
	V3CAtlasTileConfigurationBox	v3tC	0	OK
	V3CAtlasTileSampleEntry	v3t1	0	OK
	MultiMapVideoBox	mmvi	0	OK
	PlayoutTrackGroupBox	potg	0	OK
	Single atlas multiplexer	N/A		OK
	Single atlas demultiplexer	N/A		OK
	Single atlas tiles multiplexer	N/A		Not Implemented
	Single atlas tiles demultiplexer	N/A		Not Implemented
	Multi atlas multiplexer	N/A		OK
	Multi atlas demultiplexer	N/A		OK
Non-timed	V3CConfigurationProperty	v3cp	0	OK
	V3CUnitHeaderProperty	vutp	0	OK
	V3CAtlasTileConfigurationProperty	v3tp	0	OK
	PlayoutEntityToGroupBox	eply	0	OK
	Single atlas multiplexer	N/A		OK
	Single atlas demultiplexer	N/A		Not Implemented
	Single atlas tiles multiplexer	N/A		Not Implemented
	Single atlas tiles demultiplexer	N/A		Not Implemented
	Multi atlas multiplexer	N/A		OK
	Multi atlas demultiplexer	N/A		OK

Table 1 (continued)

	Feature	4CCs	Version	Status
Partial access	Vector3	N/A		OK
	V3CBoundingBox	N/A		OK
	TileMapping	N/A		OK
	V3CObject	N/A		OK
	V3CObjectCollection	N/A		OK
	V3CSpatialRegion	N/A		OK
	V3CTileVideoComponentGroupBox	vtcg	0	OK
	V3CBoundsBox	vpbb	0	OK
	V3CSpatialRegionCollectionBox	v3sc	0	OK
	DynamicVolumetricMetadataSampleEntry	dyvm	0	OK
	Static partial access multiplexer	N/A		Not Implemented
	Static partial access demultiplexer	N/A		Not Implemented
	Dynamic partial access multiplexer	N/A		Not Implemented
	Dynamic partial access demultiplexer	N/A		Not Implemented
Viewport metadata	ExtCameraInfo	N/A		OK
	IntCameraInfo	N/A		OK
	ViewportInfo	N/A		OK
	ViewportInfoConfigurationBox	6vpC	0	OK
	ViewportInfoSampleEntry	6vpt	0	OK
	Viewport track multiplexer	N/A		Not Implemented
	Viewport track demultiplexer	N/A		Not Implemented

5.4 V3C carriage library API

5.4.1 General

This clause contains documentation for the public exported API of the reference software. You are advised to use only the functions documented here.

5.4.2 V3CCreateBox

```
MP4Err V3CCreateBox(u32 type, MP4AtomPtr *pOut)
```

Create a V3C Box of a given type. If type FOURCC is not recognized it will create an UnknownBox with the provided type.

Parameters:

- type FOURCC of the box
- pOut output Box (if box type is not supported return an unknown box)

5.4.3 V3CCreateAtlasParamSampleGroupDescriptionEntry

```
MP4Err V3CCreateAtlasParamSampleGroupDescriptionEntry
(V3CAtlasParamSampleGroupDescriptionEntryPtr *pOut)
```

Create a V3C Atlas Parameters Sample Group Description Entry.

Parameters:

- pOut output instance of V3CAtlasParamSampleGroupDescriptionEntry