INTERNATIONAL STANDARD

ISO/IEC 14496-12

Seventh edition
2022-01

Information technology — Coding of audio-visual objects —

Part 12: ISO base media file format

Technologies de l'information — Codage des objets audiovisuels —
Partie 12: Format ISO de base pour les fichiers médias

Reference number
ISO/IEC 14496-12:2022(E)

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Published in Switzerland

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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 or www.iec.ch/members_experts/refdocs).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

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*.

This seventh edition cancels and replaces the sixth edition (ISO/IEC 14496-12:2020), which has been technically revised.

The main changes care as follows:

— re-organization of all the introductory material, such that it the material needed by a specific audience or applying to specific aspects is brought together;

— terminology with respect to timing is more consistent and simpler;

— replacing the word 'metadata' as describing the structural data, as the word metadata is also used with another meaning, and the dual use was confusing;

— providing better wording for the `TrackHeader` flags;

— other minor editorial improvements.

A list of all parts in the ISO/IEC 14496 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 and www.iec.ch/national-committees.

Introduction

The ISO base media file format is designed to contain timed media information for a presentation in a flexible, extensible format that facilitates interchange, management, editing, and presentation of the media. This presentation may be 'local' to the system containing the presentation, or may be via a network or other stream delivery mechanism.

The file structure is object-oriented; a file can be decomposed into constituent objects very simply, and the structure of the objects inferred directly from their type.

The file format is designed to be independent of any particular network protocol while enabling efficient support for them in general.

The ISO base media file format is a base format for media file formats.

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Information technology — Coding of audio-visual objects —

Part 12:
ISO base media file format

1 Scope

This document specifies the ISO base media file format, which is a general format forming the basis for a number of other more specific file formats. This format contains the timing, structure, and media information for timed sequences of media data, such as audio-visual presentations.

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 639-2, *Codes for the representation of names of languages — Part 2: Alpha-3 code*

ITU-T X.667/ ISO/IEC 9834-8, *Information technology – Procedures for the operation of object identifier registration authorities – Part 8: Generation of universally unique identifiers (UUIDs) and their use in object identifiers*

ISO/IEC 10646, *Information technology — Universal coded character set (UCS)*

ISO/IEC 13818-2:2013, *Information technology — Generic coding of moving pictures and associated audio information — Part 2: Video*

ISO/IEC 14496-1, *Information technology — Coding of audio-visual objects — Part 1: Systems*

ISO/IEC 14496-10:2014, *Information technology — Coding of audio-visual objects — Part 10: Advanced Video Coding*

ISO 15076-1, *Image technology colour management — Architecture, profile format and data structure — Part 1: Based on ICC.1:2010*

ISO/IEC 15938-1, *Information technology — Multimedia content description interface — Part 1: Systems*

ISO/IEC 23001-1, *Information technology — MPEG systems technologies — Part 1: Binary MPEG format for XML*

ISO/IEC 23002-3, *Information technology — MPEG video technologies — Part 3: Representation of auxiliary video and supplemental information*

ISO/IEC 23003-4, *Information technology — MPEG audio technologies — Part 4: Dynamic range control*

ITU-T H.265 / ISO/IEC 23008-2, *Information technology — High efficiency coding and media delivery in heterogeneous environments — Part 2: High efficiency video coding*

ISO/IEC 23091-2, *Information technology —Coding-independent code points — Part 2: Video*

ISO/IEC 23091-3, *Information technology — Coding-independent code points — Part 3: Audio*

IETF RFC 1951, *DEFLATE Compressed Data Format Specification version 1.3*

IETF RFC 2045, *Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies*

IETF RFC 2046, *Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types*

IETF RFC 3629, *UTF-8, a transformation format of ISO 10646*

IETF RFC 3711:2004, *The Secure Real-time Transport Protocol (SRTP)*

IETF RFC 5052, *Forward Error Correction (FEC) Building Block*

IETF RFC 5905, *Network Time Protocol Version 4: Protocol and Algorithms Specification*

ITU-R TF.460-6:2002, *Standard-frequency and time-signal emissions*

ITU-R BS.1770-4, *Algorithms to measure audio programme loudness and true-peak audio level*

IETF BCP 47, *Tags for Identifying Languages*

IETF RFC 4122, *A Universally Unique IDentifier (UUID) URN Namespace*

IETF RFC 3061, *A URN Namespace of Object Identifiers*

W3C Recommendation, *Extensible Markup Language (XML) 1.0 (Fifth Edition)*, 26 November 2008, https://www.w3.org/TR/2008/REC-xml-20081126/

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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/

3.1.1
box
object-oriented building block defined by a unique type identifier and length

Note 1 to entry: Called 'atom' in some specifications, including the first definition of MP4

3.1.2
chunk
contiguous set of samples for one track

3.1.3
clean aperture
part of a decoded video image from which undesirable pixels introduced for coding purposes such as having integer number of coding blocks have been removed for presentation

3.1.4
container box
box whose sole purpose is to contain and group a set of related boxes

Note 1 to entry: Container boxes are normally not derived from `FullBox`

3.1.5
file level
byte position in an ISO base media file not contained in a Box structure

3.1.6
full aperture
decoded video image as output by the decoder which may contain undesirable pixels for presentation

3.1.7
hint track
special track which does not contain media data, but instead contains instructions for packaging one or more tracks into a streaming channel

3.1.8
hinter
tool that is run on a file containing only media, to add one or more hint tracks to the file and so facilitate streaming

3.1.9
index file
ISO base media file containing only `SegmentIndexBox`

3.1.10
ISO base media file
file conforming to the file format described in this document (either a movie file, a metadata file, a segment file or an index file)

3.1.11
item
data which does not require timed processing, as opposed to sample data

3.1.12
leading sample
sample associated with a random access point (RAP) that precedes the RAP in composition order and immediately follows the RAP or another leading sample in decoding order, and which possibly cannot be correctly decoded when decoding starts from the RAP

3.1.13
leaf subsegment
subsegment that does not contain any indexing information that would enable its further division into subsegments

3.1.14
mod
modulo operator: (x mod y) = x-y floor (x/y)

3.1.15
media data box
box which can hold the actual media data for a presentation (`'mdat'`)

3.1.16
metadata file
ISO base media file containing a top-level `MetaBox`

Note 1 to entry: A Movie File may also be a Metadata File, and vice-versa.

3.1.17
movie box
container box whose sub-boxes define the structure-data for a presentation (`'moov'`)

3.1.18
movie file
ISO base media file containing a `MovieBox`