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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).

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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.

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

This third edition cancels and replaces the second edition (ISO/IEC 14496-14:2018), of which it constitutes a minor revision. The changes compared to the previous edition are contained in Annex A and the Bibliography.

A list of all parts in the ISO/IEC 14496 series can be found on the ISO website.

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.

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Introduction

This document defines MP4 as an instance of the ISO Media File format (ISO/IEC 14496-12).

The general nature of the ISO Media File format is fully exercised by MP4. MPEG-4 presentations can be highly dynamic, and there is an infrastructure — the Object Descriptor Framework —, which serves to manage the objects and streams in a presentation. An Initial Object Descriptor serves as the starting point for this framework. In the usage modes documented in the ISO Media File, an Initial Object Descriptor would normally be present, as shown in Figures 1 to 3.

Figure 1 gives an example of a simple interchange file, containing two streams.

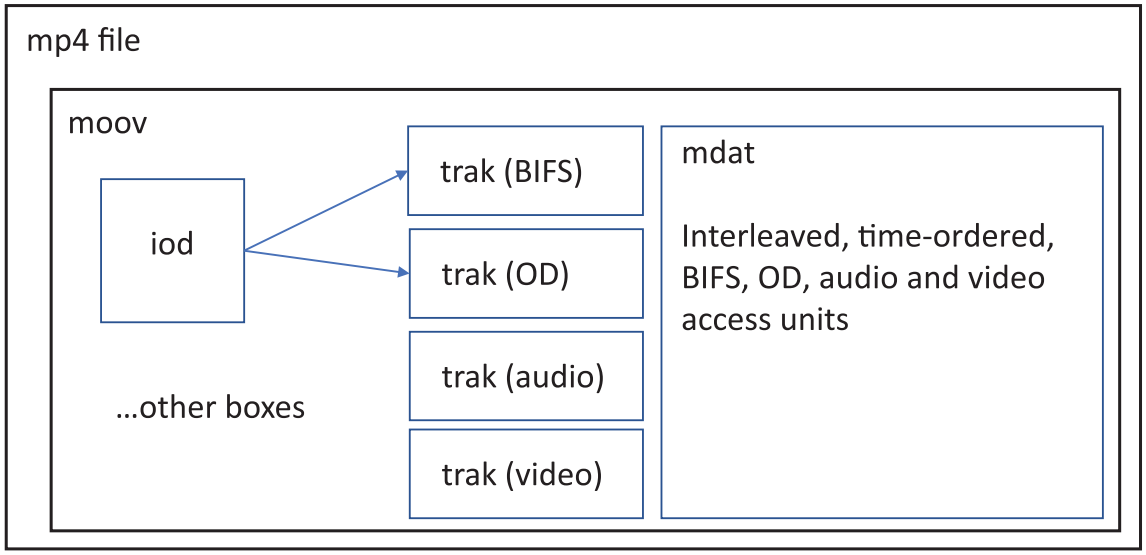


Figure 1 — Simple interchange file

In Figure 2, a set of files being used in the process of content creation is shown.

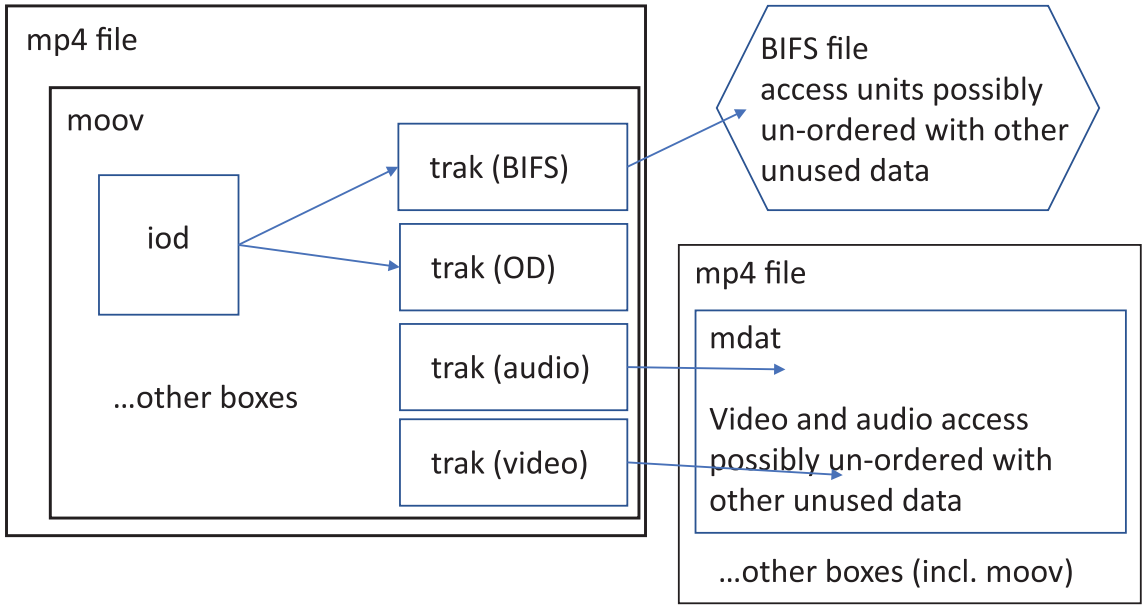


Figure 2 — Content creation file

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Figure 3 shows a presentation prepared for streaming over a multiplexing protocol, only one hint track is required.

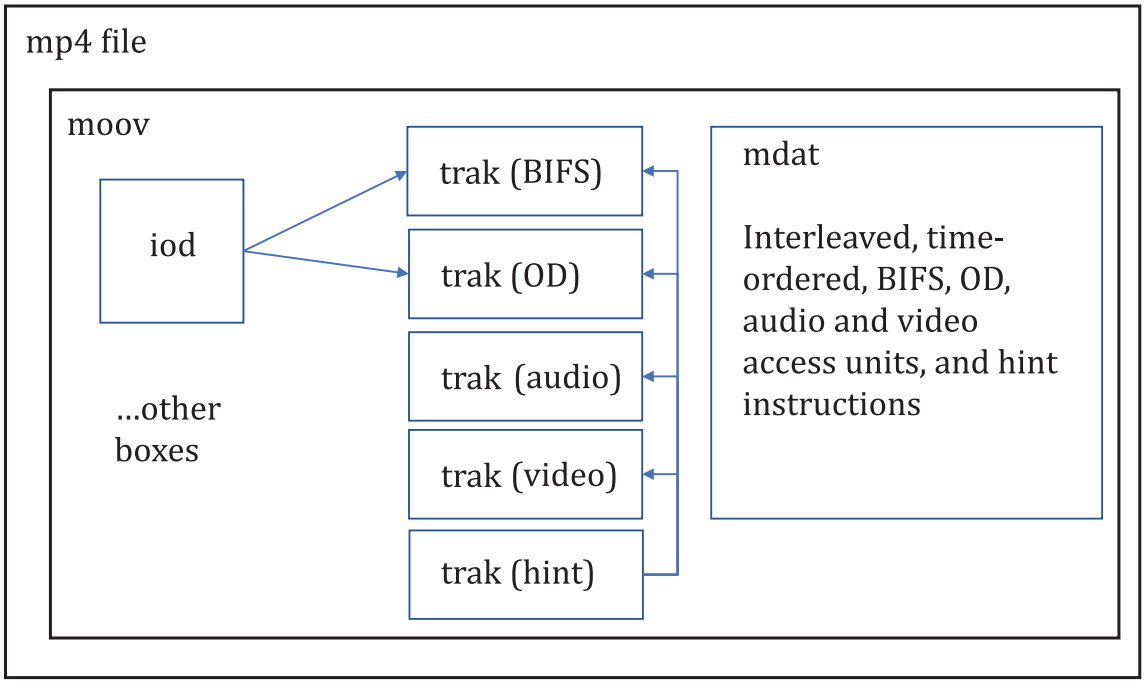


Figure 3 — Hinted presentation for streaming

Handling of audio timestamps and profile/level indication is covered in Annex A.

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Information technology — Coding of audio-visual objects —

Part 14: MP4 file format

1 Scope

This document defines the MP4 file format, as derived from the ISO Base Media File format.

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 14496-1:2010, *Information technology — Coding of audio-visual objects — Part 1: Systems*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 14496-12 and the following apply.

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

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

4 Storage of MPEG-4

4.1 Elementary stream tracks

4.1.1 Elementary stream data

To maintain the goals of streaming protocol independence, the media data is stored in its most 'natural' format, and not fragmented. This enables easy local manipulation of the media data. Therefore media-data is stored as access units, a range of contiguous bytes for each access unit (a single access unit is the definition of a 'sample' for an MPEG-4 media stream). This greatly facilitates the fragmentation process used in hint tracks. The file format can describe and use media data stored in other files, however this restriction still applies. Therefore, if a file is to be used which contains 'pre-fragmented' media data (e.g. an M4Mux stream on disc), the media data will need to be copied to re-form the access units, in order to import the data into this file format.

This is true for all stream types in this specification, including such 'meta-information' streams as Object Descriptor and the Clock Reference. The consequences of this are, on the positive side, that the file format treats all streams equally; on the negative side, this means that there are 'internal' cross-links between the streams. This means that adding and removing streams from a presentation will

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