
**Information technology — JPEG 2000
image coding system —**

**Part 3:
Motion JPEG 2000**

*Technologies de l'information — Système de codage d'image
JPEG 2000 —*

Partie 3: Motion JPEG 2000



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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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO/IEC 15444 may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 15444-3 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*, in collaboration with ITU-T, but is not published as common text at this time.

ISO/IEC 15444 consists of the following parts, under the general title *Information technology — JPG 2000 image coding system*:

- *Part 1: Core coding system*
- *Part 2: Extensions*
- *Part 3: Motion JPEG 2000*
- *Part 4: Conformance testing*
- *Part 5: Reference software*
- *Part 6: Compound image file format*

Annex A forms a normative part of this part of ISO/IEC 15444. Annexes B to E are for information only.

Introduction

This document specifies the use of the wavelet-based JPEG2000 codec for the coding and display of timed sequences of images. It has been defined by ISO/IEC JTC 1 SC 29/WG 1 as part three of the JPEG2000 International Standard. In this specification, a file format is defined, and guidelines for the use of the JPEG2000 codec for timed sequences are supplied. The Motion JPEG2000 file format MJ2 is designed to contain one or more motion sequences of JPEG2000 images, with their timing, and also optional audio annotations, all composed into an overall presentation.

Motion JPEG2000 is expected to be used in a variety of applications, particularly where the codec is already available for other reasons, or where the high-quality frame-based approach, with no inter-frame coding, is appropriate. These application areas include:

- digital still cameras,
- error-prone environments such as wireless and the internet,
- PC-based video capturing,
- high quality digital video recording for professional broadcasting and motion picture production from film-based to digital systems,
- and high-resolution medical and satellite imaging.

Motion JPEG2000 is a flexible format, permitting a wide variety of usages, such as editing, display, interchange, and streaming.

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.

Media-data is not 'framed' by the file format; the file format declarations that give the size, type and position of media data units are not physically contiguous with the media data. This makes it possible to subset the media-data, and to use it in its natural state, without requiring it to be copied to make space for framing. The meta-data is used to describe the media data by reference, not by inclusion.

The file format does not require that a single presentation be in a single file. This enables both sub-setting and re-use of content. When combined with the non-framing approach, it also makes it possible to include media data in files not formatted to this specification (e.g. 'raw' files containing only media data and no declarative information, or file formats already in use in the media or computer industries).

The file format is based on a common set of designs and a rich set of possible structures and usages. The same format serves all usages; translation is not required. However, when used in a particular way (e.g. for local presentation), the file may need structuring in certain ways for optimal behavior (e.g. time-ordering of the data). No normative structuring rules are defined by this specification, unless a restricted profile is used.

Motion JPEG2000 is based on the MPEG-4 MP4 file format, and JPEG2000 is represented as a peer coding system to MPEG4 visual, in this specification.

INFORMATION TECHNOLOGY — JPEG 2000 IMAGE CODING SYSTEM — PART 3: MOTION JPEG 2000

1 Scope

This document specifies the use of the wavelet-based JPEG2000 codec for the coding and display of timed sequences of images (motion sequences), possibly combined with audio, and composed into an overall presentation. In this specification, a file format is defined, and guidelines for the use of the JPEG2000 codec for motion sequences are supplied.

2 Normative references

The following Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this Recommendation | International Standard. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this Recommendation | International Standard are encouraged to investigate the possibility of applying the most recent edition of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

ITU-T Rec.T.800 | ISO/IEC 15444-1, *Information technology – JPEG 2000 image coding system – Part 1: Core coding system*

ISO/IEC 14496-1:2001, *Information technology – Coding of audio-visual objects – Part 1: Systems*; particularly the MP4 file format: clause 13, and the syntax description language (SDL), clause 14

ISO 639-2:1998, *Codes for the representation of names of languages – Part 2: Alpha-3 code*

3 Definitions

- 3.1 **Box:** An object-oriented building block defined by a unique type identifier and length
- 3.2 **Chunk:** A contiguous set of samples for one track
- 3.3 **Container Box:** A box whose sole purpose is to contain and group a set of related boxes
- 3.4 **Hint Track:** A special track which does not contain media data. Instead it contains instructions for packaging one or more tracks into a streaming channel
- 3.5 **Hint:** A tool that is run on a file containing only media, to add one or more hint tracks to the file and so facilitate streaming
- 3.6 **Movie Box:** A container box whose sub-boxes define the meta-data for a presentation. ('moov')
- 3.7 **Media Data Box:** A container box which can hold the actual media data for a presentation ('mdat')
- 3.8 **Motion sequence:** A timed sequence of JPEG2000 images
- 3.9 **MJ2 File:** The name of the file format described in this specification
- 3.10 **Presentation:** One or more motion sequences (q.v.), possibly combined with audio
- 3.11 **Sample:** In non-hint tracks, a sample is an individual frame of video, or a compressed frame of audio. In hint tracks, a sample defines the formation of one or more streaming packets
- 3.12 **Sample Table:** A packed directory for the timing and physical layout of the samples in a track