INTERNATIONAL STANDARD

ISO/IEC 15444-9

Second edition
2023-05

Information technology — JPEG 2000 image coding system —

Part 9: Interactivity tools, APIs and protocols

Technologies de l'information — Système de codage d'images JPEG 2000 —

Partie 9: Outils d'interactivité, interfaces de programmes d'application et protocoles

Reference number
ISO/IEC 15444-9:2023(E)

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

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This document was prepared by ITU-T (as ITU-T T.808) and drafted in accordance with its editorial rules, in collaboration with Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

This second edition cancels and replaces the first edition (ISO/IEC 15444-9:2005), which has been technically revised. It also incorporates the Amendment(s) ISO/IEC 15444-9:2005/Amd 1:2006, ISO/IEC 15444-9:2005/Amd 2:2008, ISO/IEC 15444-9:2005/Amd 3:2008, ISO/IEC 15444-9:2005/Amd 4:2010 and ISO/IEC 15444-9:2005/Amd 5:2014 and the Technical Corrigenda ISO/IEC 15444-9:2005/Cor 1:2007, ISO/IEC 15444-9:2005/Cor 2:2008 and ISO/IEC 15444-9:2005/Cor 3:2011.

The main changes are as follows:

— extends support for the file format specified in Rec. ITU-T T.815 | ISO/IEC 15444-16;

— clarifies normative server responsibilities in response to certain request fields documented in Annex C;

— removes the registration authority (Annex L); and

— adds media type registration information (Annex O).

A list of all parts in the ISO/IEC 15444 series can be found on the ISO and IEC websites.

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INTERNATIONAL STANDARD ISO/IEC 15444-9
RECOMMENDATION ITU-T T.808

Information technology – JPEG 2000 image coding system: Interactivity tools, APIs and protocols

Summary

Rec. ITU-T T.808 | ISO/IEC 15444-9 provides a network protocol that allows for the interactive and progressive transmission of JPEG 2000 coded data and files from a server to a client. The first edition of this Recommendation | International Standard dates to 2005. It has since then been supplemented by amendments and corrigenda. Additionally, other members of the JPEG 2000 family of Recommendations | International Standards, that are capable of being used with the network protocol described in this Recommendation | International Standard have since been introduced. This second edition incorporates the changes associated with these developments, without modifying the original scope.

This Recommendation was developed jointly with ISO/IEC JTC 1/SC 29/WG 1 (JPEG), and is common text with ISO/IEC 15444-9.

This second edition cancels and replaces the first edition, which has been technically revised.

The main changes compared to the previous edition are as follows:

1. consolidates all outstanding amendments and corrigenda published since the first edition;
2. extends support for the file format specified in Rec. ITU-T T.815 | ISO/IEC 15444-16;
3. clarifies normative server responsibilities in response to certain request fields documented in Annex C;
4. removes the registration authority (Annex L); and
5. adds media type registration information (Annex O).

This Recommendation contains an electronic attachment that is available from the ITU website at: https://handle.itu.int/11.1002/2000/7460, and from the ISO website at: https://standards.iso.org/iso-iec/15444/-9\ed-2/en.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T T.808	2005-01-08	16	11.1002/1000/7460
1.1	ITU-T T.808 (2005) Amd. 1	2006-05-29	16	11.1002/1000/8815
1.2	ITU-T T.808 (2005) Cor. 1	2007-01-13	16	11.1002/1000/9049
1.3	ITU-T T.808 (2005) Amd. 2	2007-08-29	16	11.1002/1000/9232
1.4	ITU-T T.808 (2005) Cor. 2	2008-06-13	16	11.1002/1000/9517
1.5	ITU-T T.808 (2005) Amd. 3	2008-06-13	16	11.1002/1000/9516
1.6	ITU-T T.808 (2005) Amd. 4	2010-05-22	16	11.1002/1000/10646
1.7	ITU-T T.808 (2005) Cor. 3	2011-05-14	16	11.1002/1000/11315
1.8	ITU-T T.808 (2005) Amd. 5	2013-03-16	16	11.1002/1000/11884
2.0	ITU-T T.808 (V2)	2022-12-14	16	11.1002/1000/15209

Keywords

API, application programme interface, image coding, interactivity, JPEG 2000, protocols.

* To access the Recommendation, type the URL http://handle.itu.int/ in the address field of your web browser, followed by the Recommendation's unique ID. For example, http://handle.itu.int/11.1002/1000/11830-en.

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FOREWORD

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The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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Introduction

Rec. ITU-T T.800 | ISO/IEC 15444-1 (JPEG 2000) is a specification that describes an image compression system that allows great flexibility, not only for the compression of images but also for access into the codestream. The codestream provides a number of mechanisms for locating and extracting portions of the compressed image data for the purpose of retransmission, storage, display, or editing. This access allows storage and retrieval of compressed image data appropriate for a given application without decoding.

The purpose of this Recommendation | International Standard is to provide a network protocol that allows for the interactive and progressive transmission of JPEG 2000 coded data and files from a server to a client. This protocol allows a client to request only the portions of an image (by region, quality or resolution level) that are applicable to the client's needs. The protocol also allows the client to access metadata or other content from the file.

The substantive updates in this edition, compared to Edition 1, are:

1. consolidates all outstanding amendments and corrigenda published since the first edition;
2. extends support the file format specified in Rec. ITU-T T.815 | ISO/IEC 15444-16;
3. clarifies normative server responsibilities in response to certain request fields documented in Annex C;
4. removes the registration authority (Annex L); and
5. adds media type registration information (Annex O).

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INTERNATIONAL STANDARD
ITU-T RECOMMENDATION

Information technology – JPEG 2000 image coding system: Interactivity tools, APIs and protocols

1 Scope

This Recommendation | International Standard[1] defines, in an extensible manner, syntaxes and methods for the remote interrogation and optional modification of JPEG 2000 codestreams and files in accordance with their definition in Rec. ITU-T T.800 | ISO/IEC 15444-1 and other members of the Rec. ITU-T T.8xx | ISO/IEC 15444-x family of Recommendations | Standards.

In this Recommendation | International Standard, the defined syntaxes and methods are referred to as the JPEG 2000 Interactive Protocol, "JPIP", and interactive applications using JPIP are referred to as "JPIP systems."

JPIP specifies a protocol consisting of a structured series of interactions between a client and a server by means of which image file metadata, structure and partial or whole image codestreams can be exchanged in a manner that avoids or minimises the communication of information not required by client. This Recommendation | International Standard includes definitions of the semantics and values to be exchanged, and suggests how these can be passed using a variety of existing network transports.

With JPIP, the following tasks can be accomplished in varying, compatible ways:

- the exchange of capabilities;
- the negotiation of capabilities to use in a session;
- the request and transfer of the following elements from a variety of containers, such as JPEG 2000 files, JPEG 2000 codestreams and other container files:
  - selective data segments;
  - selective and defined structures;
  - parts of an image or its related metadata.

2 Normative references

The following Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions 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.

- Recommendation ITU-T T.800 | ISO/IEC 15444-1, *Information technology – JPEG 2000 image coding system: Core coding system.*
- Recommendation ITU-T T.801 | ISO/IEC 15444-2, *Information technology – JPEG 2000 image coding system: Extensions.*
- Recommendation ITU-T T.802 | ISO/IEC 15444-3, *Information technology – JPEG 2000 image coding system: Motion JPEG 2000.*
- Recommendation ITU-T T.805 | ISO/IEC 15444-6, *Information technology – JPEG 2000 image coding system: Compound image file format.*
- Recommendation ITU-T T.809 | ISO/IEC 15444-10, *Information technology – JPEG 2000 image coding system: Extensions for three-dimensional data.*
- Recommendation ITU-T T.814 | ISO/IEC 15444-15, *Information technology – High-Throughput JPEG 2000.*
- Recommendation ITU-T T.815 | ISO/IEC 15444-16, *Information technology – Encapsulation of JPEG 2000 images into ISO/IEC 23008-12.*

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[1] This Recommendation | International Standard contains an electronic attachment that is available from the ITU website at: https://handle.itu.int/11.1002/2000/7460, and from the ISO website at: https://standards.iso.org/iso-iec/15444/-9\ed-2/en.

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- IETF RFC 768 (1980), *User Datagram Protocol*. Available from World Wide Web: http://www.ietf.org/rfc/rfc0768.txt.
- IETF RFC 2046 (1996), *Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types*. Available from World Wide Web: http://www.ietf.org/rfc/rfc2046.txt.
- IETF RFC 2616 (1999), *Hypertext Transfer Protocol – HTTP/1.1*. Available from World Wide Web: http://www.ietf.org/rfc/rfc2616.txt.
- IETF RFC 3986 (2005), *Uniform Resource Identifiers (URI): Generic Syntax*. Available from World Wide Web: https://datatracker.ietf.org/doc/html/rfc3986.
- IETF RFC 5234 (2008), *Augmented BNF for Syntax Specifications: ABNF*. Available from World Wide Web: https://datatracker.ietf.org/doc/html/rfc5234.
- IETF RFC 9293 (2022), *Transmission Control Protocol*. Available from World Wide Web: https://datatracker.ietf.org/doc/html/rfc9293.

3 Definitions

For the purposes of this Recommendation | International Standard, the terms and definitions given in Rec. ITU-T T.800 | ISO/IEC 15444-1 and Rec. ITU-T T.801 | ISO/IEC 15444-2 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 JPEG 2000 definitions

The following definitions are used within this Recommendation | International Standard. In some cases, these definitions differ from those used in other standards and/or Recommendations.

3.1.1 **J2KI**: A file that conforms to the `'j2ki'` brand specified in Rec. ITU-T T.815 | ISO/IEC 15444-16.

3.1.2 **J2KS**: A file that conforms to the `'j2ks'` brand specified in Rec. ITU-T T.815 | ISO/IEC 15444-16.

3.1.3 **JPH**: The file format specified in Rec. ITU-T T.814 | ISO/IEC 15444-15: High Throughput JPEG 2000.

3.1.4 **JPEG 2000 codestream**: Codestream conforming to the specification in Rec. ITU-T. T.800 | ISO/IEC 15444-1, possibly including capabilities specified elsewhere.

3.1.5 **JPEG 2000 family file**: File conforming to one of the file formats defined in the Rec. ITU-T T.8xx | ISO/IEC 15444-x family of Recommendations | Standards.

3.1.6 **JPM**: The file format specified in Rec. ITU-T T.805 | ISO/IEC 15444-6.

3.1.7 **metadata**: Any collection of "boxes" from a JPEG 2000 family file.

3.1.8 **MJ2**: The file format specified in Rec. ITU-T T.802 | ISO/IEC 15444-3.

3.2 HTTP definitions

The following definitions are intended to match HTTP/1.1. In the case of any difference, these definitions shall be used.

3.2.1 **connection**: Transport layer virtual circuit established between two programs for the purpose of communication.

3.2.2 **entity**: The information transferred as the payload of a request or response.

Note on entry: An entity consists of metainformation in the form of entity-header fields and content in the form of an entity-body.

3.2.3 **proxy**: An intermediary program which acts as both a server and a client for the purpose of making requests on behalf of other clients.

Note on entry: Requests are serviced internally or by passing them on, with possible translation, to other servers.

3.3 JPIP definitions

The following definitions are used within this Recommendation | International Standard. In some cases, these definitions differ from those used in other standards and/or Recommendations.

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