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SERIES T: TERMINALS FOR TELEMATIC SERVICES
Still-image compression – JPEG 2000

Information technology – JPEG 2000 image coding system: Reference software

Recommendation ITU-T T.804

ITU-T

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Information technology –
JPEG 2000 image coding system: Reference software

Summary

Rec. ITU-T T.800 | ISO/IEC 15444-1 defines a set of lossless and lossy compression methods for coding continuous-tone, bi-level, greyscale or colour digital still images. This Recommendation | International Standard provides three independently created software reference implementations of Rec. ITU-T T.800 | ISO/IEC 15444-1, in order to assist implementers of Rec. ITU-T T.800 | ISO/IEC 15444-1 in testing and understanding its content:

- JASPER
- JJ2000
- OPENJPEG

The three reference software packages are informative only. This Recommendation | International Standard does not define any additional part of the JPEG 2000 image coding system.

Each version of the reference software contains source code, which may be compiled to provide the following functionality:

- transcoding from selected, widely available image formats into a JPEG 2000 codestream;
- transcoding from selected, widely available image formats into the JP2 file format;
- selection of a wide range of JPEG 2000 encoding options (as documented in each reference software);
- decoding from a JPEG 2000 codestream to a range of selected widely available image formats;
- partial processing of a JP2 file to extract a JPEG 2000 codestream for decoding to a range of selected widely available image formats (not included in the reference software);
- some additional tools to help with evaluation and testing.

The reference software packages are intended for use as a testing and validation tool for other implementations of JPEG 2000, and to help in the understanding of Rec. ITU-T T.800 | ISO/IEC 15444-1. Although components of the reference software may find application in software intended for product development, this was not an objective of the development of this software, and prospective implementers are cautioned against making any estimations of performance or resource usage based on the reference software.

This new edition integrates the contents of Rec. ITU-T T.804 (2002) | ISO/IEC 15444-5:2003, its Amendment 1 (2014) | Amd.1:2003 and its Amendment 2 (2015) | Amd.2:2015.

History

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* 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>.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

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.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at <http://www.itu.int/ITU-T/ipr/>.

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Electronic attachment: JASPER, JJ2000, OPENJPEG reference packages

**Information technology –
JPEG 2000 image coding system: Reference software**

1 Scope

Rec. ITU-T T.800 | ISO/IEC 15444-1¹ defines a set of lossless and lossy compression methods for coding continuous-tone, bi-level, greyscale or colour digital still images. This Recommendation | International Standard provides three independently created software reference implementations of Rec. ITU-T T.800 | ISO/IEC 15444-1, in order to assist implementers of Rec. ITU-T T.800 | ISO/IEC 15444-1 in testing and understanding its content. The packages are JASPER, JJ2000 and OPENJPEG.

The reference software packages are informative only. This Recommendation | International Standard does not define any additional part of the JPEG 2000 image coding system.

Each version of the reference software contains source code, which may be compiled to provide the following functionality:

- transcoding from selected, widely available image formats into a JPEG 2000 codestream;
- transcoding from selected, widely available image formats into the JP2 file format;
- selection of a wide range of JPEG 2000 encoding options (as documented in each reference software);
- decoding from a JPEG 2000 codestream to a range of selected widely available image formats;
- Processing of a JP2 file to extract a JPEG 2000 codestream for decoding and conversion to a range of selected widely available image formats.
- The ability to extract metadata from a JP2 file, including the contents of the Image Header box and the colour space.
- The decoding of JP2 files that use the Three-Component Matrix-Based form of the Restricted ICC method for the specification of colour space and the conversion of the decoded image data to the sRGB colour space for display, including limited upsampling of all decoded components to the same resolution.
- The decoding of JP2 files that use the Monochrome form of the Restricted ICC method for the specification of colour space and the conversion of the decoded image data to the sRGB based greyscale space as defined within the JP2 file format.
- The decoding of JP2 files that use the sYCC colour space and the conversion of the decoded image data to the sRGB colour space for display, including upsampling of all decoded components to the same resolution.
- some additional tools to help with evaluation and testing.

The reference software is intended for use as a testing and validation tool for other implementations of JPEG 2000, and to help in the understanding of Rec. ITU-T T.800 | ISO/IEC 15444-1. Although components of the reference software may find application in software intended for product development, this was not an objective of the development of this software, and prospective implementers are cautioned against making any estimations of performance or resource usage based on the reference software.

2 Normative references

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

¹ This Specification includes an electronic attachment containing the JASPER, JJ2000 and OPENJPEG reference packages.