INTERNATIONAL STANDARD

ISO/IEC 8825-7

Second edition
2015-11-15

Information technology — ASN.1 encoding rules: Specification of Octet Encoding Rules (OER)

Technologies de l'information -- Règles de codage ASN.1: Spécification des règles de codage des octets (OER)

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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 2.

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 document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

This second edition cancels and replaces the first edition of ISO/IEC 8825-7:2014 which has been technically revised.

ISO/IEC 8825-7 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 6, *Telecommunications and information exchange between systems*, in collaboration with ITU-T. The identical text is published as ITU-T X.696 (08/2015).

International Telecommunication Union

ITU-T X.696

(08/2015)

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

SERIES X: DATA NETWORKS, OPEN SYSTEM COMMUNICATIONS AND SECURITY

OSI networking and system aspects – Abstract Syntax Notation One (ASN.1)

Information technology – ASN.1 encoding rules: Specification of Octet Encoding Rules (OER)

Recommendation ITU-T X.696

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For further details, please refer to the list of ITU-T Recommendations.

INTERNATIONAL STANDARD ISO/IEC 8825-7
RECOMMENDATION ITU-T X.696

Information technology – ASN.1 encoding rules: Specification of Octet Encoding Rules (OER)

Summary

Recommendation ITU-T X.696 | ISO/IEC 8825-7 specifies two sets of binary encoding rules that can be applied to values of all ASN.1 types using less processing resources than the Basic Encoding Rules and its derivatives (described in Rec. ITU-T X.690 | ISO/IEC 8825-1) and the Packed Encoding Rules (described in Rec. ITU-T X.691 | ISO/IEC 8825-2).

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T X.696	2014-08-29	17	11.1002/1000/12151
2.0	ITU-T X.696	2015-08-13	17	11.1002/1000/12487

* 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 not 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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Introduction

The publications Rec. ITU-T X.680 | ISO/IEC 8824-1, Rec. ITU-T X.681 | ISO/IEC 8824-2, Rec. ITU-T X.682 | ISO/IEC 8824-3, Rec. ITU-T X.683 | ISO/IEC 8824-4 together describe Abstract Syntax Notation One (ASN.1), a notation for the definition of messages to be exchanged between peer applications.

This Recommendation | International Standard defines encoding rules that may be applied to values of ASN.1 types which have been defined using the notation specified in the above-mentioned publications. Application of these encoding rules produces a transfer syntax for such values. It is implicit in the specification of these encoding rules that they are also to be used for decoding.

There are more than one set of encoding rules that can be applied to values of ASN.1 types. This Recommendation | International Standard defines two sets of Octet Encoding Rules, so-called because the encoding of every type takes a whole number of octets. Encoding and decoding data with the Octet Encoding Rules is usually faster than encoding and decoding the same data with the Basic Encoding Rules (described in Rec. ITU-T X.690 | ISO/IEC 8825-1) or the Packed Encoding Rules (described in Rec. ITU-T X.691 | ISO/IEC 8825-2).

NOTE – The encoding rules specified in this Recommendation | International Standard derive from the Octet Encoding Rules (OER) published by American Association of State Highway and Transportation Officials (AASHTO), Institute of Transportation Engineers (ITE) and National Electrical Manufacturers Association (NEMA) as NTCIP 1102:2004. In most practical cases, an implementation of this Recommendation | International Standard can interoperate with an implementation of NTCIP 1102.

Clauses 8 to 30 specify the BASIC-OER encoding of ASN.1 types.

Clause 31 specifies the CANONICAL-OER encoding of ASN.1 types.

Annex A is informative and contains examples of BASIC-OER and CANONICAL-OER encodings.

INTERNATIONAL STANDARD
ITU-T RECOMMENDATION

Information technology – ASN.1 encoding rules: Specification of Octet Encoding Rules (OER)

1 Scope

This Recommendation | International Standard specifies a set of Basic Octet Encoding Rules (BASIC-OER) that may be used to derive a transfer syntax for values of the types defined in Rec. ITU-T X.680 | ISO/IEC 8824-1, Rec. ITU-T X.681 | ISO/IEC 8824-2, Rec. ITU-T X.682 | ISO/IEC 8824-3, Rec. ITU-T X.683 | ISO/IEC 8824-4. This Recommendation | International Standard also specifies a set of Canonical Octet Encoding Rules (CANONICAL-OER) which provides constraints on the Basic Octet Encoding Rules and produces a unique encoding for any given ASN.1 value. It is implicit in the specification of these encoding rules that they are also to be used for decoding.

The encoding rules specified in this Recommendation | International Standard:

- are used at the time of communication;
- are intended for use in circumstances where encoding/decoding speed is the major concern in the choice of encoding rules;
- allow the extension of an abstract syntax by addition of extra values for all forms of extensibility described in Rec. ITU-T X.680 | ISO/IEC 8824-1.

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.

NOTE – This Recommendation | International Standard is based on ISO/IEC 10646:2003 and the Unicode standard version 3.2.0:2002. It cannot be applied using later versions of these two standards.

2.1 Identical Recommendations | International Standards

- Recommendation ITU-T X.680 (2015) | ISO/IEC 8824-1:2015, *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation*.
- Recommendation ITU-T X.681 (2015) | ISO/IEC 8824-2:2015, *Information technology – Abstract Syntax Notation One (ASN.1): Information object specification.*
- Recommendation ITU-T X.682 (2015) | ISO/IEC 8824-3:2015, *Information technology – Abstract Syntax Notation One (ASN.1): Constraint specification.*
- Recommendation ITU-T X.683 (2015) | ISO/IEC 8824-4:2015, *Information technology – Abstract Syntax Notation One (ASN.1): Parameterization of ASN.1 specifications.*
- Recommendation ITU-T X.690 (2015) | ISO/IEC 8825-1:2015, *Information technology – ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER).*
- Recommendation ITU-T X.691 (2015) | ISO/IEC 8825-2:2015, *Information technology – ASN.1 encoding rules: Specification of Packed Encoding Rules (PER).*

2.2 Additional references

- ISO/IEC 2375:2003, *Information technology – Procedure for registration of escape sequences and coded character sets.*
- *ISO International Register of Coded Character Sets to be Used with Escape Sequences.*
- ISO/IEC 10646:2003, *Information technology – Universal Multiple-Octet Coded Character Set (UCS).*