# INTERNATIONAL STANDARD

## ISO/IEC 8825-6

Third edition
2015-11-15

# Information technology — ASN.1 encoding rules: Registration and application of PER encoding instructions

*Technologies de l'information — Règles de codage ASN.1: Enregistrement et application des instructions de codage PER*

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# Foreword

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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 third edition cancels and replaces the second edition of ISO/IEC 8825-6:2008 which has been technically revised.

ISO/IEC 8825-6 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.695 (08/2015).

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International Telecommunication Union

# ITU-T

# X.695

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

(08/2015)

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: Registration and application of PER encoding instructions

Recommendation ITU-T X.695

ITU-T X-SERIES RECOMMENDATIONS

**DATA NETWORKS, OPEN SYSTEM COMMUNICATIONS AND SECURITY**

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

**INTERNATIONAL STANDARD ISO/IEC 8825-6**
**RECOMMENDATION ITU-T X.695**

# Information technology –
# ASN.1 encoding rules:
# Registration and application of PER encoding instructions

**Summary**

Recommendation ITU-T X.695 | ISO/IEC 8825-6 specifies the rules for applying PER encoding instructions using either type prefixes or an encoding control section.

Encoding instructions are a means of modifying the encodings of ASN.1 types for some specified encoding rule (in this case PER). They can be inserted in an ASN.1 specification in square brackets (much like a tag in the Basic Encoding Rules, BER) immediately before the type that they affect (type prefixes), or they can be collected together at the end of an ASN.1 module (an encoding control section).

It also specifies the procedures for developing, registering and publishing new PER encoding instructions from time to time.

**History**

| Edition | Recommendation | Approval | Study Group | Unique ID[*] |
|---------|---------------|----------|-------------|-----------|
| 1.0 | ITU-T X.695 | 2007-05-29 | 17 | 11.1002/1000/9112 |
| 2.0 | ITU-T X.695 | 2008-11-13 | 17 | 11.1002/1000/9613 |
| 3.0 | ITU-T X.695 | 2015-08-13 | 17 | 11.1002/1000/12488 |

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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.

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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**

Rec. ITU-T X.680 | ISO/IEC 8824-1 makes syntactic provision for the application of encoding instructions to modify the behaviour of a particular set of encoding rules, identified by an encoding reference (see Rec. ITU-T X.680 | ISO/IEC 8824-1).

Rec. ITU-T X.691 | ISO/IEC 8825-2 specifies the BASIC-PER and CANONICAL-PER encoding rules, each with two variants: the ALIGNED variant and the UNALIGNED variant. The PER encoding instructions allow minor variations to be made in parts of the UNALIGNED variant of a BASIC-PER and CANONICAL-PER encoding. They have no effect on the ALIGNED variant of these encodings.

> NOTE – The purpose of PER encoding instructions is to ease the task of producing an ASN.1 specification, which when encoded by the UNALIGNED variant of a PER encoding produces bit-patterns that exactly match those of a legacy protocol. It is unusual for the ALIGNED variant to be used for this purpose, and so for simplicity all PER encoding instructions have no effect on the ALIGNED variant.

This Recommendation | International Standard specifies the use of type prefixes and encoding control sections (see Rec. ITU-T X.680 | ISO/IEC 8824-1, 31.3 and clause 54) to associate one or more PER encoding instructions with an ASN.1 type. Where an encoding instruction is associated with an ASN.1 type, specific clauses in Rec. ITU-T X.691 | ISO/IEC 8825-2 are amended according to the specification of the encoding instruction. These mechanisms are similar to those for the application of XER encoding instructions specified in Rec. ITU-T X.693 | ISO/IEC 8825-4.

This Recommendation | International Standard also specifies the procedures for the operation of a Registration Authority to receive, record and publish the specification of PER encoding instructions that are agreed from time to time. The Registration Authority is the ITU Telecommunication Standardization Bureau, and the form of publication is an Implementers' Guide for ASN.1. This Guide will be available freely on an ITU-T web-site.

This Recommendation | International Standard also specifies the procedures to be used for the approval of new PER encoding instructions. Broadly, these procedures involve the prior publication in the Implementers' Guide of a proposed new encoding instruction, with a later publication announcing that the new encoding instruction has been approved by a simple resolution of the relevant Study Group of ITU-T and the relevant Sub-Committee of ISO/IEC JTC 1.

Clauses 6 to 9 specify the operation of the Registration Authority for PER encoding instructions.

Clauses 10 to 13 specify the application of PER encoding instructions to an ASN.1 specification.

Annex A is informative and contains an example of the application of PER encoding instructions using encoding prefixes.

Annex B is informative and contains an example of the application of the same PER encoding instructions using an encoding control section.

Annex C is informative and summarizes the productions defined in this Recommendation | International Standard.

INTERNATIONAL STANDARD
ITU-T RECOMMENDATION

# Information technology –
# ASN.1 encoding rules:
# Registration and application of PER encoding instructions

## 1    Scope

This Recommendation | International Standard:

    a)   specifies the information needed and the format to be used for specifying PER encoding instructions;

    b)   specifies the mechanisms for approving new PER encoding instructions from time to time and the operation of the Registration Authority for PER encoding instructions;

    c)   specifies the means of associating a PER encoding instruction with an ASN.1 type using both type prefixes and an encoding control section.

## 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.

### 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.691 (2015) | ISO/IEC 8825-2:2015, *Information technology – ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)*.

## 3    Definitions

For the purposes of this Recommendation | International Standard, the definitions of Rec. ITU-T X.680 | ISO/IEC 8824-1 apply. The following additional definitions apply.

**3.1**    **associated encoding instructions (for a type)**: A set of PER encoding instructions associated with a type.

**3.2**    **final encoding instructions (for a type)**: The set of PER encoding instructions associated with a type as a result of the complete ASN.1 specification, and which are applied in producing encodings of that type.

**3.3**    **identifying keyword**: A word or hyphenated word that identifies a PER encoding instruction.

**3.4**    **inherited encoding instructions**: PER encoding instructions that are associated with the type identified by a type reference.

**3.5**    **Joint ITU-T | ISO/IEC JTC1 Collaborative Team for ASN.1**: A group established in accordance with Rec. ITU-T A.23, Annex A and ISO/IEC JTC 1 Directives Edition 5 Version 2.0, subclause 2.6.4 and Annex K, clause 8 to progress work on Joint Text in relation to Abstract Syntax Notation One (ASN.1).

**3.6**    **PER encoding instructions (PER EIs)**: Notation used to change the unaligned PER encoding of a type (or of a component of a type).

    NOTE – PER encoding instructions are included in either a PER type prefix (see Rec. ITU-T X.680 | ISO/IEC 8824-1, 31.3) or a PER encoding control section (see Rec. ITU-T X.680 | ISO/IEC 8824-1, clause 54).

**3.7**    **PER EI proposal**: A proposal for a new PER encoding instruction that is progressing to either the REJECTED or the APPROVED state.