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# STANDARD

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## **Information technology — ASN.1 encoding rules: Specification of Encoding Control Notation (ECN)**

*Technologies de l'information — Règles de codage ASN.1:  
Spécification de la notation de contrôle de codage (ECN)*

WITHDRAWN

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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.

ISO/IEC 8825-3 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 Rec. ITU-T X.692 (11/2008).

This second edition cancels and replaces the first edition (ISO/IEC 8825-3:2002), which has been technically revised. It also incorporates the Amendments ISO/IEC 8825-3:2002/Amd.1:2005 and ISO/IEC 8825-3:2002/Amd.2:2006, and the Technical Corrigendum ISO/IEC 8825-3:2002/Cor.1:2006.

ISO/IEC 8825 consists of the following parts, under the general title *Information technology — ASN.1 encoding rules*:

- *Part 1: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)*
- *Part 2: Specification of Packed Encoding Rules (PER)*
- *Part 3: Specification of Encoding Control Notation (ECN)*
- *Part 4: XML Encoding Rules (XER)*
- *Part 5: Mapping W3C XML schema definitions into ASN.1*
- *Part 6: Registration and application of PER encoding instructions*

## Introduction

The Encoding Control Notation (ECN) is a notation for specifying encodings of ASN.1 types that differ from those provided by standardized encoding rules. ECN can be used to encode all types of an ASN.1 specification, but can also be used with standardized encoding rules such as BER or PER (ITU-T Rec. X.690 | ISO/IEC 8825-1 and ITU-T Rec. X.691 | ISO/IEC 8825-2) to specify only the encoding of types that have special requirements.

An ASN.1 type specifies a set of abstract values. Encoding rules specify the representation of these abstract values as a series of bits. ECN is designed to meet the following encoding needs:

- a) The need to write ASN.1 types (and get the support of ASN.1 tools in implementations) for established ("legacy") protocols where the encoding is already determined and differs from all standardized encoding rules.
- b) The need to produce encodings that are minor variations on standardized rules

The linkage provided in an ECN specification to an ASN.1 specification is well-defined and machine processable, so encoders and decoders can be automatically generated from the combined specifications. This is a significant factor in reducing both the amount of work and the possibility of errors in making interoperable systems. Another significant advantage is the ability to provide automatic tool support for testing.

These advantages are available with ASN.1 alone when standardized encoding rules suffice, but the ECN work provides these advantages in circumstances where the standardized encoding rules are not sufficient.

NOTE 1 – Currently ECN support only binary-based encodings, but could be extended in the future to cover character-based encodings.

Annex A forms an integral part of this Recommendation | International Standard, and details modifications to be made to ITU-T Rec. X.680 | ISO/IEC 8824-1 to support the notation used in this Recommendation | International Standard.

Annex B forms an integral part of this Recommendation | International Standard, and details modifications to be made to ITU-T Rec. X.681 | ISO/IEC 8824-2 to support the notation used in this Recommendation | International Standard.

Annex C forms an integral part of this Recommendation | International Standard, and details modifications to be made to ITU-T Rec. X.683 | ISO/IEC 8824-4 to support the notation used in this Recommendation | International Standard.

NOTE 2 – It is not intended that Annexes A, B and C be progressed as amendments to the referenced Recommendations | International Standards. The modifications are solely for the purpose of ECN definition (see clause 5 and 9.28).

Annex D does not form an integral part of this Recommendation | International Standard, and contains examples of the use of ECN.

Annex E does not form an integral part of this Recommendation | International Standard and provides more detail on the support for Huffman encodings in ECN.

Annex F does not form an integral part of this Recommendation | International Standard, and identifies a Web site providing access to further information and links relevant to ECN.

Annex G does not form an integral part of this Recommendation | International Standard, and provides a summary of ECN using the notation of clause 5.

**INTERNATIONAL STANDARD****ITU-T RECOMMENDATION**

**Information technology –  
ASN.1 encoding rules:  
Specification of Encoding Control Notation (ECN)**

## **1 Scope**

This Recommendation | International Standard defines a notation for specifying encodings of ASN.1 types or of parts of types.

It provides several mechanisms for such specification, including:

- direct specification of the encoding using standardized notation;
- specification of the encoding by reference to standardized encoding rules;
- specification of the encoding of an ASN.1 type by reference to an encoding structure;
- specification of the encoding using non-ECN notation.

It also provides the means to link the specification of encodings to the type definitions to which they are to be applied.

ECN does not currently provide any support for specifications using the OID internationalized resource identifier type or the relative OID internationalized resource identifier type (see ITU-T Rec. X.680 | ISO/IEC 8824-1), and these are not referred to further in this Standard.

## **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 International 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**

- ITU-T Recommendation X.660 (1992) | ISO/IEC 9834-1:1993, *Information technology – Open Systems Interconnection – Procedures for the operation of OSI Registration Authorities: General procedures*. (plus amendments).
- ITU-T Recommendation X.680 (2008) | ISO/IEC 8824-1:2008, *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation*
- ITU-T Recommendation X.681 (2008) | ISO/IEC 8824-2:2008, *Information technology – Abstract Syntax Notation One (ASN.1): Information object specification*.
- ITU-T Recommendation X.682 (2008) | ISO/IEC 8824-3:2008, *Information technology – Abstract Syntax Notation One (ASN.1): Constraint specification*.
- ITU-T Recommendation X.683 (2008) | ISO/IEC 8824-4:2008, *Information technology – Abstract Syntax Notation One (ASN.1): Parameterization of ASN.1 specifications*.
- ITU-T Recommendation X.690 (2008) | ISO/IEC 8825-1:2008, *Information technology – ASN.1 encoding Rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER), and Distinguished Encoding Rules (DER)*.

- ITU-T Recommendation X.691 (2008) | ISO/IEC 8825-2:2008, *Information technology – ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)*.

NOTE 1 – Notwithstanding the ISO publication date, the above specifications are normally referred to as "ASN.1:2008".

NOTE 2 – The above references shall be interpreted as references to the identified Recommendations | International Standards together with all their published amendments and technical corrigenda.

## 2.2 Additional references

- ISO/IEC 10646:2003, *Information technology – Universal Multiple-Octet Coded Character Set (UCS)*.

NOTE – The above reference shall be interpreted as a reference to ISO/IEC 10646 together with all its published amendments and technical corrigenda.

