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## **Information technology — Abstract Syntax Notation One (ASN.1): Specification of basic notation**

### **AMENDMENT 1: Rules of extensibility**

*Technologies de l'information — Notation de syntaxe abstraite numéro 1  
(ASN.1): Spécifications des notations de base*

*AMENDEMENT 1: Règles pour l'extensibilité*



Reference number  
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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. 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.

Amendment 1 to International Standard ISO/IEC 8824-1:1995 was prepared by Joint Technical Committee ISO/IEC JTC 1, Information technology, Subcommittee SC 21, *Open systems interconnection, data management and open distributed processing*, in collaboration with ITU-T. The identical text is published as ITU-T Rec. X.680/Amd.1.

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## Introduction

This Recommendation | International Standard documents the changes to ITU-T Rec. X.680 | ISO/IEC 8824-1 needed to support the ASN.1 Rules of Extensibility.

The ASN.1 Rules of Extensibility describes how to write an ASN.1 module in such a way as to allow a phased migration to a new version of an ASN.1 specification. The new version may differ from the previous version by new components being added to a SET, SEQUENCE or CHOICE, new enumerations being added to an enumerated type, and constraints on a subtype specification being relaxed. A phased migration to the new version of the ASN.1 specification allows communicating peers throughout a network to simultaneously have differing knowledge of the set of values allowed in the abstract syntax, yet be able to communicate without the knowledge by any peer that its peer has a different understanding of what the set of values in the abstract syntax is.

For example, initially peers A, B, C and D may have identical views of the types of values that can be exchanged. Assuming that the ASN.1 specification that describes these values was originally defined with extensibility in mind, it can be extended by adding new components to a SEQUENCE, for example, thereby creating a new version of the ASN.1 specification. Peers A and B may immediately adopt the new version, while peers C and D continue using the old version, yet all four peers can continue communicating with one another without difficulty because the SEQUENCE was originally defined as being extensible. When peers A and B exchange a value of the newly extended SEQUENCE they will both see values for the new components that were added to the SEQUENCE (provided they are sent). When peer A (or B) sends a message containing the newly added components to peer C (or D), the message will appear to C at the abstract level (i.e. after the message has been decoded) without any of the newly added components; only the original components in the SEQUENCE will be seen. When peer C (or D) sends a message to peer A (or B), the message will (of course) not contain any of the new components, however, it will appear to A as though a peer using the same version of the ASN.1 specification as A (e.g. B) had sent the message with all of the new components missing. Peers C and D continue to exchange messages with each other the way they always did.

## INTERNATIONAL STANDARD

## ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – ABSTRACT SYNTAX NOTATION ONE (ASN.1):  
SPECIFICATION OF BASIC NOTATIONAMENDMENT 1  
(to Rec. X.680 | ISO/IEC 8824-1)

## Rules of extensibility

## 1 Scope

This Recommendation | International Standard documents the changes to ITU-T Rec. X.680 | ISO/IEC 8824-1 needed to support the ASN.1 Rules of Extensibility.

## 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 editions of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunications Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

## 2.1 Identical Recommendations | International Standards

- ITU-T Recommendation X.680 (1994) | ISO/IEC 8824-1:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation.*
- ITU-T Recommendation X.682 (1994) | ISO/IEC 8824-3:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Constraint specification.*
- ITU-T Recommendation X.683 (1994) | ISO/IEC 8824-4:1995, *Information technology – Abstract Syntax Notation One (ASN.1). Parameterization of ASN.1 specifications.*
- ITU-T Recommendation X.690 (1994) | ISO/IEC 8825-1:1995, *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 (1995) | ISO/IEC 8825-2:1996, *Information technology – ASN.1 encoding rules – Specification of Packed Encoding Rules (PER).*

## 3 Changes to Introduction

*{Add the following text to the Introduction of ITU-T Rec. X.680 | ISO/IEC 8824-1 immediately before the existing paragraph which begins “Clauses 8 to 31”:]}*

An ASN.1 specification will initially be produced with a set of fully defined ASN.1 types. At a later stage, however, it may be necessary to change those types (usually by the addition of extra components in a sequence or set type). If this is to be possible in such a way that implementations using the old type definitions can interwork with implementations using the new type definitions in a defined way, encoding rules need to provide appropriate support. The ASN.1 notation supports the inclusion of an **extension marker** on a number of types. This signals to encoding rules the intention of the designer that this type is one of a series of related types (i.e. versions of the same initial type) called an **extension series**, and that the encoding rules are required to enable information transfer between implementations using different types that are related by being part of the same extension series.