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Information processing systems — Open Systems Interconnection — Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1)

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8825 was prepared by Technical Committee ISO/TC 97, *Information processing systems*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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0 Introduction

ISO 8824 (Specification of Abstract Syntax Notation One) specifies a notation for the definition of abstract syntaxes, enabling application layer standards to define the types of information they need to transfer using the presentation service. It also specifies a notation for the specification of values of a defined type.

This International Standard defines a set of encoding rules that may be applied to values of types defined using the notation specified in ISO 8824. 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 may be more than one set of encoding rules that can be applied to values of types that are defined using the notation of ISO 8824. This International Standard defines one set of encoding rules, called **basic encoding rules**.

This International Standard is technically aligned with the relevant parts of CCITT Recommendation X.409 (1984).

Annex A gives examples of the application of the encoding rules. It is not part of this International Standard.

Annex B summarises the assignment of object identifier values made in this International Standard and is not part of this International Standard.

1 Scope and field of application

This International Standard specifies a set of basic encoding rules that may be used to derive the specification of a transfer syntax for values of types defined using the notation specified in ISO 8824. These basic encoding rules are also to be applied for decoding such a transfer syntax in order to identify the data values being transferred.

These basic encoding rules are used at the time of communication (by the presentation service provider when required by a presentation context).

2 References

ISO 2022, *Information processing - ISO 7-bit and 8-bit coded character sets - Code extension techniques*.

ISO 2375, *Data processing - Procedure for registration of escape sequences*.

ISO 7498, *Information processing systems - Open Systems Interconnection - Basic Reference Model*.

ISO 8823, *Information processing systems - Open Systems Interconnection - Connection-oriented presentation protocol specification*.

ISO 8824, *Information processing systems - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1)*.

CCITT X.409 (1984), *Message handling systems: presentation transfer syntax and notation*.

3 Definitions

The definitions of ISO 8824 are used in this International Standard.

3.1 dynamic conformance: A statement of the requirement for an implementation to adhere to the behaviour prescribed by this International Standard in an instance of communication.

3.2 static conformance: A statement of the requirement for support by an implementation of a valid set of features from among those defined by this International Standard.

3.3 data value: Information specified as the value of a type; the type and the value are defined using ASN.1.

3.4 encoding (of a data value): The complete sequence of octets used to represent the data value.

NOTE — Some CCITT Recommendations use the term "data element" for this sequence of octets, but the term is not used in this International Standard, as other International Standards use it to mean "data value".

3.5 identifier octets: Part of a data value encoding which is used to identify the type of the value.

3.6 length octets: Part of a data value encoding following the identifier octets which is used to determine the end of the encoding.

3.7 end-of-contents octets: Part of a data value encoding, occurring at its end, which is used to determine the end of the encoding.

NOTE — Not all encodings require end-of-contents octets.

3.8 contents octets: That part of a data value encoding which represents a particular value, to distinguish it from other values of the same type.

3.9 primitive encoding: A data value encoding in which the contents octets directly represent the value.

3.10 constructed encoding: A data value encoding in which the contents octets are the complete encoding of one or more other data values.

3.11 sender: An implementation encoding a data value for transfer.

3.12 receiver: An implementation decoding the octets produced by a sender, in order to identify the data value which was encoded.

4 Abbreviations and notation

4.1 Abbreviations

ASN.1 Abstract Syntax Notation One

4.2 Notation

4.2.1 This International Standard references the notation defined by ISO 8824.

4.2.2 This International Standard specifies the value of each octet in an encoding by use of the terms "most significant bit" and "least significant bit".

NOTE — Lower layer standards use the same notation to define the order of bit transmission on a serial line, or the assignment of bits to parallel channels.

4.2.3 For the purposes of this International Standard only, the bits of an octet are numbered from 8 to 1, where bit 8 is the "most significant bit", and bit 1 is the "least significant bit".

5 Conformance

5.1 Dynamic conformance is specified by clause 6 to clause 21 inclusive.

5.2 Static conformance is specified by those standards which specify the application of these basic encoding rules.

5.3 Alternative encodings are permitted by this International Standard as a sender's option. Conforming receivers shall support all alternatives.

NOTE — Examples of such alternative encodings appear in 6.3.2 b) and table 2.

6 General rules for encoding

6.1 Structure of an encoding

6.1.1 The encoding of a data value shall consist of four components which shall appear in the following order:

- a) identifier octets (see 6.2);
- b) length octets (see 6.3);
- c) contents octets (see 6.4);
- d) end-of-contents octets (see 6.5).