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ITU-T

TELECOMMUNICATION
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OF ITU

X.690
Amendment 1
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SERIES X: DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS

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

Information technology – ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)

Amendment 1: Support for EXTENDED-XER

ITU-T Recommendation X.690 (2002) – Amendment 1

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INTERNATIONAL STANDARD ISO/IEC 8825-1
ITU-T RECOMMENDATION X.690

Information technology – ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)

Amendment 1

Support for EXTENDED-XER

Summary

An Amendment 1 is provided for ITU-T Rec. X.680 | ISO/IEC 8824-1, ITU-T Rec. X.681 | ISO/IEC 8824-2, ITU-T Rec. X.690 | ISO/IEC 8825-1, ITU-T Rec. X.691 | ISO/IEC 8825-2 and ITU-T Rec. X.693 | ISO/IEC 8825-4. These amendments provide the following:

– Correction of a bug in CXER resulting from allowing white-space between a minus sign and a following INTEGER or REAL value (CXER was not canonical). This is no longer permitted, in value notation, XML Value Notation or in XER and CXER. **This is a change and not an addition**.

– Addition of encoding instructions in an ASN.1 module, using either a type prefix or within an encoding control section, in order to specify variations of the BASIC-XER encodings. These encoding instructions are designed to support mappings from an XSD specification to an ASN.1 specification. This provision has meant a change of terminology, where a type with "`[...]`" in front of it is a prefixed type, and the "`[...]`" notation may or may not be a tag. This change of terminology results in changes to the text (but not the substance) of the BER and PER specifications.

– The addition of NaN (Not-a-Number) and minus zero as new values for REAL (support for encoding these new values is provided in the amendment to ITU-T Rec. X.690 | ISO/IEC 8825-1 and ITU-T Rec. X.691 | ISO/IEC 8825-2, as well as in the amendment to ITU-T Rec. X.693 | ISO/IEC 8825-4).

– The addition of new XML Value Notations for **REAL**, **BOOLEAN**, **ENUMERATED**, and **INTEGER** that use text rather than empty-element tags for the values. These are available in XML Value Notation and in EXTENDED-XER, but not in BASIC-XER (for reasons of backwards-compatibility).

– Changes to the XML Value Notation for sequence-of (and the XER encodings) to provide delimitation of values where they are not XML elements (this occurs with the additional XML Value Notations, and only affects use of those additional XML Value Notations). This change is only concerned with use of XML Value Notations that have been added by this amendment, and these are not allowed in BASIC-XER, which is not affected.

This provides the necessary basic support for EXTENDED-XER.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. 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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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, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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Support for EXTENDED-XER

NOTE – All new or changed text in this amendment is underlined in the clauses being replaced. When merging all such text into the base Recommendation, the underlining is to be removed.

1)   New subclause 8.1.1.5

Insert a new subclause 8.1.1.5 as follows:

8.1.1.5   There are no encoding instructions (see ITU-T Rec. X.680 | ISO/IEC 8824-1, 3.6.22 *ter*) defined for the encoding rules specified in this Recommendation | International Standard.

2)   Subclause 8.5.2

Replace subclause 8.5.2 with the following:

8.5.2   If the real value is the value plus zero, there shall be no contents octets in the encoding.

3)   New subclause 8.5.2 *bis*

Insert a new subclause 8.5.2 bis as follows:

8.5.2 *bis*   If the real value is the value minus zero, then it shall be encoded as specified in 8.5.8.

4)   Subclause 8.5.5

Replace subclause 8.5.5 as follows:

8.5.5   Bit 8 of the first contents octet shall be set as follows:

    a)   if bit 8 = 1, then the binary encoding specified in 8.5.6 applies;

    b)   if bit 8 = 0 and bit 7 = 0, then the decimal encoding specified in 8.5.7 applies;

    c)   if bit 8 = 0 and bit 7 = 1, then either a "SpecialRealValue" (see ITU-T Rec. X.680 | ISO/IEC 8824-1) or the value minus zero is encoded, as specified in 8.5.8.

5)   Subclause 8.5.8

Replace subclause 8.5.8 with the following:

8.5.8   When "SpecialRealValues" <u>or minus zero</u> are to be encoded (bits 8 to 7 = 01), there shall be only one contents octet, with values as follows:

> 01000000   Value is **PLUS-INFINITY**
>
> 01000001   Value is **MINUS-INFINITY**
>
> <u>01000010</u>   <u>Value is **NOT-A-NUMBER**</u>
>
> <u>01000011</u>   <u>Value is minus zero</u>

All other values having bits 8 and 7 equal to 0 and 1 respectively are reserved for addenda to this Recommendation | International Standard.

6)   Subclause 8.14

Replace subclause 8.14 with the following:

8.14   Encoding of a value <u>of a prefixed type</u>

7)   New subclause 8.14.1 *pre*

Insert a new subclause 8.14.1 pre before subclause 18.14.1 as follows:

8.14.1 *pre*   If the prefixed type is an "EncodingPrefixedType", then the encoding is that of the "Type" in the "EncodingPrefixedType". If the prefixed type is a "TaggedType", then the following subclauses apply.

8)   Subclause 8.14.2

In subclause 8.14.2, replace "30.6" with "<u>30.2.7</u>".

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