ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

X.691
Amendment 3
(05/2007)

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: Specification of Packed Encoding Rules (PER)

Amendment 3: PER encoding instructions

ITU-T Recommendation X.691 (2002) – Amendment 3

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INTERNATIONAL STANDARD ISO/IEC 8825-2
ITU-T RECOMMENDATION X.691

Information technology – ASN.1 encoding rules:
Specification of Packed Encoding Rules (PER)

Amendment 3: PER encoding instructions

Summary

Amendment 3 to ITU-T Rec. X.691 | ISO/IEC 8825-2 provides support for the PER Encoding Instructions specified and applied in accordance with ITU-T Rec. X.695 | ISO/IEC 8825-6, and corrects defects related to user-defined constraints and the use of the extension bit in octetstring and bitstring PER encodings.

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, 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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Specification of Packed Encoding Rules (PER)

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1) Clause 1

Replace the text of clause 1 with the following:

This Recommendation | International Standard specifies a set of Packed Encoding Rules that may be used to derive a transfer syntax for values of types defined in ITU-T Rec. X.680 | ISO/IEC 8824-1. These Packed Encoding Rules are also to be applied for decoding such a transfer syntax in order to identify the data values being transferred.

The encoding rules specified in this Recommendation | International Standard:

– are used at the time of communication;

– are intended for use in circumstances where minimizing the size of the representation of values is the major concern in the choice of encoding rules;

– allow the extension of an abstract syntax by addition of extra values, preserving the encodings of the existing values, for all forms of extension described in ITU-T Rec. X.680 | ISO/IEC 8824-1;

– can be modified in accordance with the provisions of ITU-T Rec. X.695 | ISO/IEC 8825-6.

2) Subclause 2.1

Append the following to 2.1:

– ITU-T Recommendation X.695 (2007) | ISO/IEC 8825-6:2008, *Information technology – ASN.1 encoding rules: Registration and application of PER encoding instructions.*

3) Subclause 3.5 *bis*

Insert a new subclause 3.5 bis as follows:

3.5 *bis* PER Encoding Instructions

This Recommendation | International Standard makes use of the following term defined in ITU-T Rec. X.695 | ISO/IEC 8825-6:

– identifying keyword.

4) Subclause 7.10

Replace subclause 7.10 with the following:

7.10 The rules of this Recommendation | International Standard apply to both algorithms and to both variants unless otherwise stated (but see 8 *bis*.2 and 8 *bis*.3).

5)   Subclause 8.1

Replace subclause 8.1 with the following:

8.1   Dynamic conformance is specified by clause ~~9~~8 *bis* onwards.

6)   Clause 8 *bis*

Insert a new clause 8 bis as follows:

8 *bis*   PER encoding instructions

8 *bis*.1   PER encoding instructions can be associated with a type in accordance with the provisions of ITU-T Rec. X.680 | ISO/IEC 8824-1 and ITU-T Rec. X.695 | ISO/IEC 8825-6.

> NOTE 1 – The application of some PER encoding instructions can make it impossible to encode all the abstract values of the type. Where this can arise, the specific PER encoding instruction identifies the problem. It is a designers decision, based on the possible need to use multiple encoding rules, whether to add an explicit constraint on the type in order to restrict the range of abstract values to those that can be handled by the encoding using the PER encoding instruction. This can make the specification less readable, but ensures that all encoding rules can encode all allowed abstract values, making relaying possible without errors.

> NOTE 2 – Each PER encoding instruction starts with an identifying keyword that unambiguously identifies that encoding instruction.

8 *bis*.2   If the ALIGNED version of either BASIC-PER or CANONICAL-PER is in use, then all PER encoding instructions shall be silently ignored and have no affect on the encoding.

8 *bis*.3   If the UNALIGNED version of either BASIC-PER or CANONICAL-PER is in use, then if a type has an associated encoding instruction, the following subclauses shall apply.

8 *bis*.3.1   If the identifying keyword is not known, then a "not supported" error message shall be issued.

8 *bis*.3.2   If the identifying keyword is known, the procedures of this Recommendation | International Standard shall be modified by the amendments to those procedures that are specified by the PER encoding instruction (see ITU-T Rec. X.695 | ISO/IEC 8825-6).

> NOTE 1 – If multiple PER encoding instructions are associated with a type, then the amendments specified for all of them shall be applied.

> NOTE 2 – It is an error in the register of PER encoding instructions if amendments produced by two or more separate encoding instructions conflict and it is not stated that they are mutually exclusive.

7)   Subclause 9.3.2 *bis*

Add a new subclause 9.3.2 bis as follows:

9.3.2 *bis*   User-defined constraints (see ITU-T Rec. X.682 | ISO/IEC 8824-3, 9.1) are not PER visible.

8)   Subclause 9.6.3 *ter*

Delete subclause 9.6.3 ter (which was added by Amendment 1).

9)   Subclause 15.6

Replace subclause 15.6 with the following:

15.6   If the type is extensible for PER encodings (see 9.3.8), then a bit-field consisting of a ~~If an extension marker is present in the size constraint specification of the bitstring type, a~~ single bit shall be added to the field-list ~~in a bit-field of length one~~. The bit shall be set to 1 if the length of this encoding is not within the range of the extension root, and zero otherwise. In the former case, 15.11 shall be invoked to add the length as a semi-constrained whole number to the field-list, followed by the bitstring value. In the latter case, the length and value shall be encoded as if ~~the~~no extension ~~marker~~ is ~~not~~ present in the constraint.

10)   Subclause 16.3

Replace subclause 16.3 with the following:

16.3   If the type is extensible for PER encodings (see 9.3.8), then a bit-field consisting of a ~~If there is a PER-visible size constraint and an extension marker is present in it, a~~ single bit shall be added to the field-list ~~in a bit-field of length one~~. The bit shall be set to 1 if the length of this encoding is not within the range of the extension root, and zero otherwise. In the former case, 16.8 shall be invoked to add the length as a semi-constrained whole number to the field-list, followed by the octetstring value. In the latter case, the length and value shall be encoded as if ~~the~~no extension ~~marker~~ is ~~not~~ present in the constraint.

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