
**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)*



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This third edition cancels and replaces the second edition of ISO/IEC 8825-3:2008 which has been technically revised. It also incorporates ISO/IEC 8825-3:2008/Cor.1:2012.

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TELECOMMUNICATION
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X.692

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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 Encoding Control Notation
(ECN)**

Recommendation ITU-T X.692



ITU-T X-SERIES RECOMMENDATIONS
DATA NETWORKS, OPEN SYSTEM COMMUNICATIONS AND SECURITY

| | |
|-----------------------------------------------|--------------------|
| PUBLIC DATA NETWORKS | |
| Services and facilities | X.1–X.19 |
| Interfaces | X.20–X.49 |
| Transmission, signalling and switching | X.50–X.89 |
| Network aspects | X.90–X.149 |
| Maintenance | X.150–X.179 |
| Administrative arrangements | X.180–X.199 |
| OPEN SYSTEMS INTERCONNECTION | |
| Model and notation | X.200–X.209 |
| Service definitions | X.210–X.219 |
| Connection-mode protocol specifications | X.220–X.229 |
| Connectionless-mode protocol specifications | X.230–X.239 |
| PICS proformas | X.240–X.259 |
| Protocol Identification | X.260–X.269 |
| Security Protocols | X.270–X.279 |
| Layer Managed Objects | X.280–X.289 |
| Conformance testing | X.290–X.299 |
| INTERWORKING BETWEEN NETWORKS | |
| General | X.300–X.349 |
| Satellite data transmission systems | X.350–X.369 |
| IP-based networks | X.370–X.379 |
| MESSAGE HANDLING SYSTEMS | X.400–X.499 |
| DIRECTORY | X.500–X.599 |
| OSI NETWORKING AND SYSTEM ASPECTS | |
| Networking | X.600–X.629 |
| Efficiency | X.630–X.639 |
| Quality of service | X.640–X.649 |
| Naming, Addressing and Registration | X.650–X.679 |
| Abstract Syntax Notation One (ASN.1) | X.680–X.699 |
| OSI MANAGEMENT | |
| Systems management framework and architecture | X.700–X.709 |
| Management communication service and protocol | X.710–X.719 |
| Structure of management information | X.720–X.729 |
| Management functions and ODMA functions | X.730–X.799 |
| SECURITY | X.800–X.849 |
| OSI APPLICATIONS | |
| Commitment, concurrency and recovery | X.850–X.859 |
| Transaction processing | X.860–X.879 |
| Remote operations | X.880–X.889 |
| Generic applications of ASN.1 | X.890–X.899 |
| OPEN DISTRIBUTED PROCESSING | X.900–X.999 |
| INFORMATION AND NETWORK SECURITY | X.1000–X.1099 |
| SECURE APPLICATIONS AND SERVICES | X.1100–X.1199 |
| CYBERSPACE SECURITY | X.1200–X.1299 |
| SECURE APPLICATIONS AND SERVICES | X.1300–X.1399 |
| CYBERSECURITY INFORMATION EXCHANGE | X.1500–X.1599 |
| CLOUD COMPUTING SECURITY | X.1600–X.1699 |

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**INTERNATIONAL STANDARD ISO/IEC 8825-3
RECOMMENDATION ITU-T X.692**

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

Summary

Recommendation ITU-T X.692 | ISO/IEC 8825-3 defines the Encoding Control Notation (ECN) used to specify encodings (of ASN.1 types) that differ from those provided by standardized encoding rules such as the Basic Encoding Rules (BER) and the Packed Encoding Rules (PER).

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FOREWORD

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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.

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CONTENTS

| | <i>Page</i> |
|-------------------------------------------------------------------------------------------------------|-------------|
| Introduction | x |
| Information technology – ASN.1 encoding rules: Specification of Encoding Control Notation (ECN) | 1 |
| 1 Scope | 1 |
| 2 Normative references..... | 1 |
| 2.1 Identical Recommendations International Standards | 1 |
| 2.2 Additional references | 2 |
| 3 Definitions | 2 |
| 3.1 ASN.1 definitions..... | 2 |
| 3.2 ECN-specific definitions | 2 |
| 4 Abbreviations | 5 |
| 5 Definition of ECN syntax | 5 |
| 6 Encoding conventions and notation | 5 |
| 7 The ECN character set..... | 5 |
| 8 ECN lexical items..... | 6 |
| 8.1 Encoding object references | 6 |
| 8.2 Encoding object set references | 6 |
| 8.3 Encoding class references | 7 |
| 8.4 Reserved word items | 7 |
| 8.5 Reserved encoding class name items | 7 |
| 8.6 Non-ECN item | 7 |
| 9 ECN Concepts | 8 |
| 9.1 Encoding Control Notation (ECN) specifications | 8 |
| 9.2 Encoding classes | 8 |
| 9.3 Encoding structures | 9 |
| 9.4 Encoding objects | 9 |
| 9.5 Encoding object sets..... | 9 |
| 9.6 Defining new encoding classes | 10 |
| 9.7 Defining encoding objects..... | 11 |
| 9.8 Differential encoding-decoding..... | 11 |
| 9.9 Encoders options in encodings | 12 |
| 9.10 Properties of encoding objects | 12 |
| 9.11 Parameterization..... | 12 |
| 9.12 Governors..... | 13 |
| 9.13 General aspects of encodings | 13 |
| 9.14 Identification of information elements | 14 |
| 9.15 Reference fields and determinants | 14 |
| 9.16 Replacement classes and structures..... | 14 |
| 9.17 Mapping abstract values onto fields of encoding structures..... | 15 |
| 9.18 Transforms and transform composites | 16 |
| 9.19 Contents of Encoding Definition Modules..... | 16 |
| 9.20 Contents of the Encoding Link Module | 17 |
| 9.21 Defining encodings for primitive encoding classes..... | 17 |
| 9.22 Application of encodings | 19 |
| 9.23 Combined encoding object set | 19 |
| 9.24 Application point..... | 19 |
| 9.25 Conditional encodings..... | 20 |
| 9.26 Other conditions for applying encodings | 20 |
| 9.27 Encoding control for the open type | 21 |
| 9.28 Changes to ASN.1 Recommendations International Standards..... | 21 |

| | | |
|----|----------------------------------------------------------------------------------------|----|
| 10 | Identifying encoding classes, encoding objects, and encoding object sets | 21 |
| 11 | Encoding ASN.1 types | 24 |
| | 11.1 General | 24 |
| | 11.2 Built-in encoding classes used for implicitly generated encoding structures | 25 |
| | 11.3 Simplification and expansion of ASN.1 notation for encoding purposes | 25 |
| | 11.4 The implicitly generated encoding structure | 27 |
| 12 | The Encoding Link Module (ELM)..... | 28 |
| | 12.1 Structure of the ELM..... | 28 |
| | 12.2 Encoding types | 28 |
| 13 | Application of encodings | 29 |
| | 13.1 General | 29 |
| | 13.2 The combined encoding object set and its application | 29 |
| 14 | The Encoding Definition Module (EDM) | 32 |
| 15 | The renames clause..... | 33 |
| | 15.1 Explicitly generated and exported structures..... | 33 |
| | 15.2 Name changes | 34 |
| | 15.3 Specifying the region for name changes | 35 |
| 16 | Encoding class assignments..... | 36 |
| | 16.1 General | 36 |
| | 16.2 Encoding structure definition | 39 |
| | 16.3 Alternative encoding structure | 42 |
| | 16.4 Repetition encoding structure..... | 43 |
| | 16.5 Concatenation encoding structure | 43 |
| 17 | Encoding object assignments..... | 44 |
| | 17.1 General | 44 |
| | 17.2 Encoding with a defined syntax | 44 |
| | 17.3 Encoding with encoding object sets | 45 |
| | 17.4 Encoding using value mappings..... | 46 |
| | 17.5 Encoding an encoding structure | 46 |
| | 17.6 Differential encoding-decoding..... | 48 |
| | 17.7 Encoding options..... | 49 |
| | 17.8 Non-ECN definition of encoding objects | 50 |
| 18 | Encoding object set assignments | 50 |
| | 18.1 General | 50 |
| | 18.2 Built-in encoding object sets | 51 |
| 19 | Mapping values | 52 |
| | 19.1 General..... | 52 |
| | 19.2 Mapping by explicit values | 53 |
| | 19.3 Mapping by matching fields..... | 54 |
| | 19.4 Mapping by #TRANSFORM encoding objects | 55 |
| | 19.5 Mapping by abstract value ordering..... | 56 |
| | 19.6 Mapping by value distribution | 57 |
| | 19.7 Mapping integer values to bits | 58 |
| 20 | Defining encoding objects using defined syntax | 59 |
| 21 | Types used in defined syntax specification | 60 |
| | 21.1 The Unit type | 60 |
| | 21.2 The EncodingSpaceSize type..... | 60 |
| | 21.3 The EncodingSpaceDetermination type..... | 61 |
| | 21.4 The UnusedBitsDetermination type..... | 61 |
| | 21.5 The OptionalityDetermination type | 62 |
| | 21.6 The AlternativeDetermination type | 63 |
| | 21.7 The RepetitionSpaceDetermination type | 63 |
| | 21.8 The Justification type | 64 |

| | | |
|---------|------------------------------------------------|----|
| 21.9 | The Padding type | 65 |
| 21.10 | The Pattern and Non-Null-Pattern types | 65 |
| 21.11 | The RangeCondition type | 66 |
| 21.12 | The Comparison type | 66 |
| 21.13 | The SizeRangeCondition type | 67 |
| 21.14 | The ReversalSpecification type | 67 |
| 21.15 | The ResultSize type | 68 |
| 21.16 | The HandleValueSet type | 68 |
| 21.17 | The IntegerMapping type | 69 |
| 22 | Commonly used encoding property groups | 69 |
| 22.1 | Replacement specification | 69 |
| 22.1.1 | Encoding properties, syntax and purpose | 69 |
| 22.1.2 | Specification restrictions | 70 |
| 22.1.3 | Encoder actions | 71 |
| 22.1.4 | Decoder actions | 72 |
| 22.2 | Pre-alignment and padding specification | 72 |
| 22.2.1 | Encoding properties, syntax and purpose | 72 |
| 22.2.2 | Specification constraints | 72 |
| 22.2.3 | Encoder actions | 73 |
| 22.2.4 | Decoder actions | 73 |
| 22.3 | Start pointer specification | 73 |
| 22.3.1 | Encoding properties, syntax and purpose | 73 |
| 22.3.2 | Specification constraints | 73 |
| 22.3.3 | Encoder actions | 73 |
| 22.3.4 | Decoder actions | 74 |
| 22.4 | Encoding space specification | 74 |
| 22.4.1 | Encoding properties, syntax and purpose | 74 |
| 22.4.2 | Specification restrictions | 75 |
| 22.4.3 | Encoder actions | 75 |
| 22.4.4 | Decoder actions | 76 |
| 22.5 | Optionality determination | 76 |
| 22.5.1 | Encoding properties, syntax and purpose | 76 |
| 22.5.2 | Specification restrictions | 76 |
| 22.5.3 | Encoder actions | 77 |
| 22.5.4 | Decoder actions | 77 |
| 22.6 | Alternative determination | 78 |
| 22.6.1 | Encoding properties, syntax and purpose | 78 |
| 22.6.2 | Specification restrictions | 78 |
| 22.6.3 | Encoder actions | 79 |
| 22.6.4 | Decoder actions | 79 |
| 22.7 | Repetition space specification | 79 |
| 22.7.1 | Encoding properties, syntax and purpose | 79 |
| 22.7.2 | Specification constraints | 80 |
| 22.7.3 | Encoder actions | 81 |
| 22.7.4 | Decoder actions | 82 |
| 22.8 | Value padding and justification | 82 |
| 22.8.1 | Encoding properties, syntax, and purpose | 82 |
| 22.8.2 | Specification restrictions | 83 |
| 22.8.3 | Encoder actions | 83 |
| 22.8.4 | Decoder actions | 84 |
| 22.9 | Identification handle specification | 84 |
| 22.9.1 | Encoding properties, syntax and purpose | 84 |
| 22.9.2 | Specification constraints | 85 |
| 22.9.3 | Encoders actions | 85 |
| 22.9.4 | Decoders actions | 85 |
| 22.10 | Concatenation specification | 86 |
| 22.10.1 | Encoding properties, syntax and purpose | 86 |
| 22.10.2 | Specification constraints | 86 |
| 22.10.3 | Encoder actions | 86 |
| 22.10.4 | Decoder actions | 87 |

| | | |
|---------|----------------------------------------------------------------------------|-----|
| 22.11 | Contained type encoding specification..... | 87 |
| 22.11.1 | Encoding properties, syntax and purpose..... | 87 |
| 22.11.2 | Encoder actions..... | 87 |
| 22.11.3 | Decoder actions..... | 87 |
| 22.12 | Bit reversal specification..... | 87 |
| 22.12.1 | Encoding properties, syntax, and purpose..... | 87 |
| 22.12.2 | Specification constraints..... | 88 |
| 22.12.3 | Encoder actions..... | 88 |
| 22.12.4 | Decoder actions..... | 88 |
| 23 | Defined syntax specification for bit-field and constructor classes..... | 88 |
| 23.1 | Defining encoding objects for classes in the alternatives category..... | 88 |
| 23.1.1 | The defined syntax..... | 88 |
| 23.1.2 | Purpose and restrictions..... | 89 |
| 23.1.3 | Encoder actions..... | 89 |
| 23.1.4 | Decoder actions..... | 90 |
| 23.2 | Defining encoding objects for classes in the bitstring category..... | 90 |
| 23.2.1 | The defined syntax..... | 90 |
| 23.2.2 | Model for the encoding of classes in the bitstring category..... | 91 |
| 23.2.3 | Purpose and restrictions..... | 91 |
| 23.2.4 | Encoder actions..... | 92 |
| 23.2.5 | Decoder actions..... | 92 |
| 23.3 | Defining encoding objects for classes in the boolean category..... | 92 |
| 23.3.1 | The defined syntax..... | 92 |
| 23.3.2 | Purpose and restrictions..... | 94 |
| 23.3.3 | Encoder actions..... | 94 |
| 23.3.4 | Decoder actions..... | 94 |
| 23.4 | Defining encoding objects for classes in the characterstring category..... | 95 |
| 23.4.1 | The defined syntax..... | 95 |
| 23.4.2 | Model for the encoding of classes in the characterstring category..... | 95 |
| 23.4.3 | Purpose and restrictions..... | 96 |
| 23.4.4 | Encoder actions..... | 96 |
| 23.4.5 | Decoder actions..... | 97 |
| 23.5 | Defining encoding objects for classes in the concatenation category..... | 97 |
| 23.5.1 | The defined syntax..... | 97 |
| 23.5.2 | Purpose and restrictions..... | 98 |
| 23.5.3 | Encoder actions..... | 99 |
| 23.5.4 | Decoder actions..... | 99 |
| 23.6 | Defining encoding objects for classes in the integer category..... | 99 |
| 23.6.1 | The defined syntax..... | 99 |
| 23.6.2 | Purpose and restrictions..... | 99 |
| 23.6.3 | Encoder actions..... | 100 |
| 23.6.4 | Decoder actions..... | 100 |
| 23.7 | Defining encoding objects for the #CONDITIONAL-INT class..... | 100 |
| 23.7.1 | The defined syntax..... | 100 |
| 23.7.2 | Purpose and restrictions..... | 101 |
| 23.7.3 | Encoder actions..... | 102 |
| 23.7.4 | Decoder actions..... | 103 |
| 23.8 | Defining encoding objects for classes in the null category..... | 103 |
| 23.8.1 | The defined syntax..... | 103 |
| 23.8.2 | Purpose and restrictions..... | 105 |
| 23.8.3 | Encoder actions..... | 105 |
| 23.8.4 | Decoder actions..... | 105 |
| 23.9 | Defining encoding objects for classes in the octetstring category..... | 105 |
| 23.9.1 | The defined syntax..... | 105 |
| 23.9.2 | Model for the encoding of classes in the octetstring category..... | 106 |
| 23.9.3 | Purpose and restrictions..... | 106 |
| 23.9.4 | Encoder actions..... | 107 |
| 23.9.5 | Decoder actions..... | 107 |
| 23.10 | Defining encoding objects for classes in the open type category..... | 108 |
| 23.10.1 | The defined syntax..... | 108 |
| 23.10.2 | Model for the encoding of classes in the open type category..... | 109 |

| | | |
|---------|-------------------------------------------------------------------------|-----|
| 23.10.3 | Purpose and restrictions | 109 |
| 23.10.4 | Encoder actions | 109 |
| 23.10.5 | Decoder actions | 110 |
| 23.11 | Defining encoding objects for classes in the optionality category | 110 |
| 23.11.1 | The defined syntax | 110 |
| 23.11.2 | Purpose and restrictions | 111 |
| 23.11.3 | Encoder actions | 111 |
| 23.11.4 | Decoder actions | 111 |
| 23.12 | Defining encoding objects for classes in the pad category | 111 |
| 23.12.1 | The defined syntax | 111 |
| 23.12.2 | Purpose and restrictions | 112 |
| 23.12.3 | Encoder actions | 113 |
| 23.12.4 | Decoder actions | 113 |
| 23.13 | Defining encoding objects for classes in the repetition category | 113 |
| 23.13.1 | The defined syntax | 113 |
| 23.13.2 | Purpose and restrictions | 113 |
| 23.13.3 | Encoder actions | 114 |
| 23.13.4 | Decoder actions | 114 |
| 23.14 | Defining encoding objects for the #CONDITIONAL-REPETITION class | 114 |
| 23.14.1 | The defined syntax | 114 |
| 23.14.2 | Purpose and restrictions | 115 |
| 23.14.3 | Encoder actions | 116 |
| 23.14.4 | Decoder actions | 116 |
| 23.15 | Defining encoding objects for classes in the tag category | 117 |
| 23.15.1 | The defined syntax | 117 |
| 23.15.2 | Purpose and restrictions | 118 |
| 23.15.3 | Encoder actions | 118 |
| 23.15.4 | Decoder actions | 119 |
| 23.16 | Defining encoding objects for classes in the other categories | 119 |
| 24 | Defined syntax specification for the #TRANSFORM encoding class | 119 |
| 24.1 | Summary of encoding properties and defined syntax | 119 |
| 24.2 | Source and target of transforms | 121 |
| 24.3 | The int-to-int transform | 122 |
| 24.4 | The bool-to-bool transform | 123 |
| 24.5 | The bool-to-int transform | 124 |
| 24.6 | The int-to-bool transform | 124 |
| 24.7 | The int-to-chars transform | 124 |
| 24.8 | The int-to-bits transform | 125 |
| 24.9 | The bits-to-int transform | 126 |
| 24.10 | The char-to-bits transform | 127 |
| 24.11 | The bits-to-char transform | 129 |
| 24.12 | The bit-to-bits transform | 129 |
| 24.13 | The bits-to-bits transform | 130 |
| 24.14 | The chars-to-composite-char transform | 130 |
| 24.15 | The bits-to-composite-bits transform | 131 |
| 24.16 | The octets-to-composite-bits transform | 131 |
| 24.17 | The composite-char-to-chars transform | 131 |
| 24.18 | The composite-bits-to-bits transform | 131 |
| 24.19 | The composite-bits-to-octets transform | 132 |
| 25 | Complete encodings and the #OUTER class | 132 |
| 25.1 | Encoding properties, syntax and purpose for the #OUTER class | 132 |
| 25.2 | Encoder actions for #OUTER | 133 |
| 25.3 | Decoder actions for #OUTER | 133 |
| Annex A | Addendum to Rec. ITU-T X.680 ISO/IEC 8824-1 | 135 |
| A.1 | Exports and imports clauses | 135 |
| A.2 | Addition of REFERENCE | 136 |
| A.3 | Notation for character string values | 136 |

| | |
|----------------------------------------------------------------------------------------------------|-----|
| Annex B Addendum to Rec. ITU-T X.681 ISO/IEC 8824-2 | 137 |
| B.1 Definitions | 137 |
| B.2 Additional lexical items | 137 |
| B.2.1 Ordered value list field references | 137 |
| B.2.2 Ordered encoding object list field references | 137 |
| B.2.3 Encoding class field references | 137 |
| B.3 Addition of "ENCODING-CLASS" | 137 |
| B.4 FieldSpec additions | 138 |
| B.5 Fixed-type ordered value list field spec | 138 |
| B.6 Fixed-class encoding object field spec | 138 |
| B.7 Variable-class encoding object field spec | 138 |
| B.8 Fixed-class encoding object set field spec | 139 |
| B.9 Fixed-class ordered encoding object list field spec | 139 |
| B.10 Encoding class field spec | 139 |
| B.11 Ordered value list notation | 140 |
| B.12 Ordered encoding object list notation | 140 |
| B.13 Primitive field names | 140 |
| B.14 Additional reserved words | 140 |
| B.15 Definition of encoding objects | 141 |
| B.16 Additions to "Setting" | 141 |
| Annex C Addendum to Rec. ITU-T X.683 ISO/IEC 8824-4 | 143 |
| D.1 General examples | 146 |
| D.1.1 An encoding object for a boolean type | 146 |
| D.1.2 An encoding object for an integer type | 147 |
| D.1.3 Another encoding object for an integer type | 147 |
| D.1.4 An encoding object for an integer type with holes | 147 |
| D.1.5 A more complex encoding object for an integer type | 148 |
| D.1.6 Positive integers encoded in BCD | 148 |
| D.1.7 An encoding object of class #BITS | 149 |
| D.1.8 An encoding object for an octetstring type | 150 |
| D.1.9 An encoding object for a character string type | 150 |
| D.1.10 Mapping character values to bit values | 150 |
| D.1.11 An encoding object for a sequence type | 151 |
| D.1.12 An encoding object for a choice type | 151 |
| D.1.13 Encoding a bitstring containing another encoding | 152 |
| D.1.14 An encoding object set | 152 |
| D.1.15 ASN.1 definitions | 153 |
| D.1.16 EDM definitions | 153 |
| D.1.17 ELM definitions | 154 |
| D.2 Specialization examples | 154 |
| D.2.1 Encoding by distributing values to an alternative encoding structure | 154 |
| D.2.2 Encoding by mapping ordered abstract values to an alternative encoding structure | 155 |
| D.2.3 Compression of non-continuous value ranges | 155 |
| D.2.4 Compression of non-continuous value ranges using a transform | 156 |
| D.2.5 Compression of an unevenly distributed value set by mapping ordered abstract values | 156 |
| D.2.6 Presence of an optional component depending on the value of another component | 156 |
| D.2.7 The presence of an optional component depends on some external condition | 157 |
| D.2.8 A variable length list | 157 |
| D.2.9 Equal length lists | 158 |
| D.2.10 Uneven choice alternative probabilities | 159 |
| D.2.11 A version 1 message | 160 |
| D.2.12 The encoding object set | 161 |
| D.2.13 ASN.1 definitions | 161 |
| D.2.14 EDM definitions | 162 |
| D.2.15 ELM definitions | 162 |
| D.3 Explicitly generated structure examples | 162 |
| D.3.1 Sequence with optional components defined by a pointer | 163 |
| D.3.2 Addition of a boolean type as a presence determinant | 163 |
| D.3.3 Sequence with optional components identified by a unique tag and delimited by a length field | 165 |

| | | |
|---------|-------------------------------------------------------------------------------------------|-----|
| D.3.4 | Sequence-of type with a count | 166 |
| D.3.5 | Encoding object sets..... | 166 |
| D.3.6 | ASN.1 definitions..... | 167 |
| D.3.7 | EDM definitions..... | 167 |
| D.3.8 | ELM definitions | 167 |
| D.4 | A more-bit encoding example | 168 |
| D.4.1 | Description of the problem..... | 168 |
| D.4.2 | Use of ASN.1 to provide the more-bit determinant..... | 168 |
| D.4.3 | Use of value mappings to provide the more-bit determinant | 169 |
| D.4.4 | Use of the replacement mechanism to provide the more-bit determinant | 170 |
| D.5 | Legacy protocol specified with tabular notation | 170 |
| D.5.1 | Introduction..... | 170 |
| D.5.2 | Encoding definition for the top-level message structure | 172 |
| D.5.3 | Encoding definition for a message structure | 172 |
| D.5.4 | Encoding for the sequence type "B"..... | 173 |
| D.5.5 | Encoding for an octet-aligned sequence-of type with a length determinant..... | 173 |
| D.5.6 | Encoding for an octet-aligned sequence-of type which continues to the end of the PDU..... | 173 |
| D.5.7 | EDM definitions..... | 173 |
| D.5.8 | ELM definitions | 174 |
| Annex E | Support for Huffman encodings..... | 175 |
| Annex F | Additional information on the Encoding Control Notation (ECN) | 177 |
| Annex G | Summary of the ECN notation | 178 |

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 (Rec. ITU-T X.690 | ISO/IEC 8825-1 and Rec. ITU-T 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 Rec. ITU-T 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 Rec. ITU-T 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 Rec. ITU-T 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 Rec. ITU-T 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.

NOTE – This Recommendation | International Standard is based on ISO/IEC 10646:2003. It cannot be applied using later versions of this standard.

2.1 Identical Recommendations | International Standards

- Recommendation ITU-T X.660 (2011) | ISO/IEC 9834-1:2012, *Information technology – Open Systems Interconnection – Procedures for the operation of OSI Registration Authorities: General procedures and top arcs of the international object identifier tree.*
- Recommendation ITU-T X.680 (2015) | ISO/IEC 8824-1:2015, *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation*
- Recommendation ITU-T X.681 (2015) | ISO/IEC 8824-2:2015, *Information technology – Abstract Syntax Notation One (ASN.1): Information object specification.*
- Recommendation ITU-T X.682 (2015) | ISO/IEC 8824-3:2015, *Information technology – Abstract Syntax Notation One (ASN.1): Constraint specification.*
- Recommendation ITU-T X.683 (2015) | ISO/IEC 8824-4:2015, *Information technology – Abstract Syntax Notation One (ASN.1): Parameterization of ASN.1 specifications.*
- Recommendation ITU-T X.690 (2015) | ISO/IEC 8825-1:2015, *Information technology – ASN.1 encoding Rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER), and Distinguished Encoding Rules (DER).*

- Recommendation ITU-T X.691 (2015) | ISO/IEC 8825-2:2015, *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.1:2015".

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.