

ISO/IEC 8824-1:2015-11 (E)

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

CONTENTS

	<i>Page</i>
Introduction	viii
1 Scope	1
2 Normative references	1
2.1 Identical Recommendations International Standards	1
2.2 Additional references	2
3 Definitions	2
3.1 International Object Identifier tree specification	2
3.2 Information object specification	2
3.3 Constraint specification	3
3.4 Parameterization of ASN.1 specification	3
3.5 Structure for identification of organizations	3
3.6 Universal Multiple-Octet Coded Character Set (UCS)	3
3.7 Representation of dates and times	3
3.8 Additional definitions	4
4 Abbreviations	9
5 Notation	9
5.1 General	9
5.2 Productions	10
5.3 The alternative collections	10
5.4 Non-spacing indicator	10
5.5 Example of a production	10
5.6 Layout	11
5.7 Recursion	11
5.8 References to permitted sequences of lexical items	11
5.9 References to a lexical item	11
5.10 Short-hand notations	11
5.11 Value references and the typing of values	12
6 The ASN.1 model of type extension	12
7 Extensibility requirements on encoding rules	12
8 Tags	13
9 Encoding instructions	14
10 Use of the ASN.1 notation	14
11 The ASN.1 character set	15

12	ASN.1 lexical items	16
	12.1 General rules	16
	12.2 Type references	17
	12.3 Identifiers	17
	12.4 Value references	17
	12.5 Module references	17
	12.6 Comments	17
	12.7 Empty lexical item	18
	12.8 Numbers	18
	12.9 Real numbers	18
	12.10 Binary strings	18
	12.11 XML binary string item	18
	12.12 Hexadecimal strings	18
	12.13 XML hexadecimal string item	19
	12.14 Character strings	19
	12.15 XML character string item	20
	12.16 The simple character string lexical item	22
	12.17 Time value character strings	22
	12.18 XML time value character string item	22
	12.19 The property and setting names lexical item	22
	12.20 Assignment lexical item	22
	12.21 Range separator	22
	12.22 Ellipsis	22
	12.23 Left version brackets	23
	12.24 Right version brackets	23
	12.25 Encoding references	23
	12.26 Integer-valued Unicode labels	23
	12.27 Non-integer Unicode labels	23
	12.28 XML end tag start item	23
	12.29 XML single tag end item	23
	12.30 XML boolean true item	23
	12.31 XML boolean extended-true item	24
	12.32 XML boolean false item	24
	12.33 XML boolean extended-false item	24
	12.34 XML real not-a-number item	24
	12.35 XML real infinity item	24
	12.36 XML tag names for ASN.1 types	25
	12.37 Single character lexical items	26
	12.38 Reserved words	26
13	Module definition	27
14	Referencing type and value definitions	31
15	Notation to support references to ASN.1 components	32
16	Assigning types and values	33
17	Definition of types and values	35
18	Notation for the boolean type	38
19	Notation for the integer type	38
20	Notation for the enumerated type	39
21	Notation for the real type	41
22	Notation for the bitstring type	42
23	Notation for the octetstring type	44
24	Notation for the null type	45

25	Notation for sequence types.....	45
26	Notation for sequence-of types.....	48
27	Notation for set types.....	51
28	Notation for set-of types.....	52
29	Notation for choice types.....	52
30	Notation for selection types.....	54
31	Notation for prefixed types.....	55
	31.1 General.....	55
	31.2 The tagged type.....	55
	31.3 The encoding prefixed type.....	56
32	Notation for the object identifier type.....	57
33	Notation for the relative object identifier type.....	58
34	Notation for the OID internationalized resource identifier type.....	60
35	Notation for the relative OID internationalized resource identifier type.....	60
36	Notation for the embedded-pdv type.....	61
37	Notation for the external type.....	63
38	The time type.....	64
	38.1 General.....	64
	38.2 Time properties and settings of time abstract values.....	64
	38.3 Basic value notation and XML value notation for time abstract values with specified property settings.....	68
	38.4 Useful time types.....	72
39	The character string types.....	74
40	Notation for character string types.....	74
41	Definition of restricted character string types.....	75
42	Naming characters, collections and property category sets.....	79
43	Canonical order of characters.....	82
44	Definition of unrestricted character string types.....	83
45	Notation for types defined in clauses 46 to 48.....	84
46	Generalized time.....	84
47	Universal time.....	86
48	The object descriptor type.....	87
49	Constrained types.....	87
50	Element set specification.....	88
51	Subtype elements.....	90
	51.1 General.....	90
	51.2 Single value.....	92
	51.3 Contained subtype.....	92
	51.4 Value range.....	92
	51.5 Size constraint.....	92
	51.6 Type constraint.....	93
	51.7 Permitted alphabet.....	93
	51.8 Inner subtyping.....	93
	51.9 Pattern constraint.....	95
	51.10 Property settings.....	95
	51.11 Duration range.....	96
	51.12 Time point range.....	96
	51.13 Recurrence range.....	97

52	The extension marker	97
53	The exception identifier	99
54	Encoding control sections	99
Annex A	ASN.1 regular expressions	101
A.1	Definition	101
A.2	Metacharacters	101
Annex B	The defined time types	105
B.1	General	105
B.2	The ASN.1 defined time types module	105
Annex C	Rules for type and value Compatibility	110
C.1	The need for the value mapping concept (tutorial introduction)	110
C.2	Value mappings	112
C.3	Identical type definitions	113
C.4	Specification of value mappings	115
C.5	Additional value mappings defined for the character string types	115
C.6	Specific type and value compatibility requirements	116
C.7	Examples	117
Annex D	Assigned object identifier and OID internationalized resource identifier values	119
D.1	Values assigned in this Recommendation International Standard	119
D.2	Object identifiers in the ASN.1 and encoding rules standards	119
Annex E	Encoding references	121
Annex F	Assignment and use of arcs in the International Object Identifier tree	122
F.1	General	122
F.2	Use of the International Object Identifier tree by the object identifier (OBJECT IDENTIFIER) type	122
F.3	Use of the International Object Identifier tree by the OID internationalized resource identifier (OID-IRI) type	122
Annex G	Examples and hints	123
G.1	Example of a personnel record	123
G.1.1	Informal description of Personnel Record	123
G.1.2	ASN.1 description of the record structure	123
G.1.3	ASN.1 description of a record value	124
G.2	Guidelines for use of the notation	124
G.2.1	Boolean	125
G.2.2	Integer	125
G.2.3	Enumerated	125
G.2.4	Real	126
G.2.5	Bit string	127
G.2.6	Octet string	128
G.2.7	UniversalString, BMPString and UTF8String	129
G.2.8	CHARACTER STRING	129
G.2.9	Null	130
G.2.10	Sequence and sequence-of	130
G.2.11	Set and set-of	132
G.2.12	Tagged	134
G.2.13	Choice	135
G.2.14	Selection type	137
G.2.16	Embedded-pdv	138
G.2.17	External	138
G.2.18	Instance-of	138
G.2.19	Object identifier	139
G.2.20	OID internationalized resource identifier	139
G.2.21	Relative object identifier	139

G.3	Value notation and property settings (TIME type and useful time types).....	140
G.3.1	Date	140
G.3.2	Time of day	140
G.3.3	Date and time of day	141
G.3.4	Time interval	141
G.3.5	Recurring interval.....	142
G.4	Identifying abstract syntaxes	142
G.5	Subtypes	143
Annex H	Tutorial annex on ASN.1 character strings.....	147
H.1	Character string support in ASN.1	147
H.2	The UniversalString, UTF8String and BMPString types	147
H.3	On ISO/IEC 10646 conformance requirements.....	148
H.4	Recommendations for ASN.1 users on ISO/IEC 10646 conformance	148
H.5	Adopted subsets as parameters of the abstract syntax	149
H.6	The CHARACTER STRING type	149
Annex I	Tutorial annex on the ASN.1 model of type extension	150
I.1	Overview	150
I.2	Meaning of version numbers	151
I.3	Requirements on encoding rules.....	152
I.4	Combination of (possibly extensible) constraints.....	152
I.4.1	Model	152
I.4.2	Serial application of constraints	152
I.4.3	Use of set arithmetic.....	153
I.4.4	Use of the Contained Subtype notation	154
Annex J	Tutorial annex on the TIME type.....	155
J.1	The collections of ASN.1 types for times and dates.....	155
J.2	ISO 8601 key concepts.....	155
J.3	Abstract values of the TIME type.....	156
J.4	Time properties of the time abstract values.....	157
J.5	Value notation	157
J.6	Use of the ASN.1 subtype notation	158
J.7	The property settings subtype notation.....	158
Annex K	Analyzing TIME type value notation.....	160
K.1	General	160
K.2	Analyzing the full string.....	160
K.3	Analysis of a string containing an interval	161
K.4	Analysis of a string containing a date.....	161
K.5	Analysis of a string containing a year.....	162
K.6	Analysis of a string containing a century.....	162
K.7	Analysis of a string containing a time	162
K.8	Analysis of a string containing a simple time	163
Annex L	Summary of the ASN.1 notation	164