

ISO/IEC 8824-1:2021-06 (E)

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

Contents

	Page
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	10
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	15
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.....	44
25	Notation for sequence types.....	45
26	Notation for sequence-of types.....	48
27	Notation for set types.....	50
28	Notation for set-of types.....	51
29	Notation for choice types.....	52
30	Notation for selection types.....	54
31	Notation for prefixed types.....	54
31.1	General.....	54
31.2	The tagged type.....	55
31.3	The encoding prefixed type.....	55
32	Notation for the object identifier type.....	56
33	Notation for the relative object identifier type.....	58
34	Notation for the OID internationalized resource identifier type.....	59
35	Notation for the relative OID internationalized resource identifier type.....	60
36	Notation for the embedded-pdv type.....	60
37	Notation for the external type.....	62

38	The time type.....	63
	38.1 General.....	63
	38.2 Time properties and settings of time abstract values.....	63
	38.3 Basic value notation and XML value notation for time abstract values with specified property settings.....	67
	38.4 Useful time types.....	71
39	The character string types.....	72
40	Notation for character string types.....	73
41	Definition of restricted character string types.....	73
42	Naming characters, collections and property category sets.....	77
43	Canonical order of characters.....	81
44	Definition of unrestricted character string types.....	82
45	Notation for types defined in clauses 46 to 48.....	83
46	Generalized time.....	83
47	Universal time.....	84
48	The object descriptor type.....	85
49	Constrained types.....	86
50	Element set specification.....	87
51	Subtype elements.....	89
	51.1 General.....	89
	51.2 Single value.....	90
	51.3 Contained subtype.....	90
	51.4 Value range.....	90
	51.5 Size constraint.....	91
	51.6 Type constraint.....	91
	51.7 Permitted alphabet.....	91
	51.8 Inner subtyping.....	92
	51.9 Pattern constraint.....	93
	51.10 Property settings.....	93
	51.11 Duration range.....	94
	51.12 Time point range.....	95
	51.13 Recurrence range.....	95
52	The extension marker.....	95
53	The exception identifier.....	97
54	Encoding control sections.....	98
	A.1 Definition.....	99
	A.2 Metacharacters.....	99
	B.1 General.....	103
	B.2 The ASN.1 defined time types module.....	103
	C.1 The need for the value mapping concept (tutorial introduction).....	108
	C.2 Value mappings.....	110
	C.3 Identical type definitions.....	111
	C.4 Specification of value mappings.....	113
	C.5 Additional value mappings defined for the character string types.....	113
	C.6 Specific type and value compatibility requirements.....	114
	C.7 Examples.....	115
	C.7.2 Example 1.....	115
	C.7.3 Example 2.....	115
	C.7.4 Example 3.....	115
	C.7.5 Example 4.....	115
	C.7.6 Example 5.....	115
	C.7.7 Example 6.....	116

D.1	Values assigned in this Recommendation International Standard	117
D.2	Object identifiers in the ASN.1 and encoding rules standards	117
F.1	General	120
F.2	Use of the International Object Identifier tree by the object identifier (OBJECT IDENTIFIER) type.....	120
F.3	Use of the International Object Identifier tree by the OID internationalized resource identifier (OID-IRI) type.....	120
G.1	Example of a personnel record.....	121
G.1.1	Informal description of Personnel Record.....	121
G.1.2	ASN.1 description of the record structure.....	121
G.1.3	ASN.1 description of a record value	122
G.2	Guidelines for use of the notation	122
G.2.1	Boolean	123
G.2.2	Integer	123
G.2.3	Enumerated	123
G.2.4	Real	124
G.2.5	Bit string.....	124
G.2.6	Octet string.....	126
G.2.7	UniversalString, BMPString and UTF8String	126
G.2.8	CHARACTER STRING	127
G.2.9	Null	128
G.2.10	Sequence and sequence-of	128
G.2.11	Set and set-of.....	130
G.2.12	Tagged.....	132
G.2.13	Choice	133
G.2.14	Selection type.....	135
G.2.16	Embedded-pdv	136
G.2.17	External	136
G.2.18	Instance-of.....	136
G.2.19	Object identifier	137
G.2.20	OID internationalized resource identifier.....	137
G.2.21	Relative object identifier	137
G.3	Value notation and property settings (TIME type and useful time types).....	137
G.3.1	Date	137
G.3.2	Time of day	138
G.3.3	Date and time of day	138
G.3.4	Time interval	139
G.3.5	Recurring interval.....	140
G.4	Identifying abstract syntaxes	140
G.5	Subtypes.....	141
H.1	Character string support in ASN.1	145
H.2	The UniversalString, UTF8String and BMPString types.....	145
H.3	On ISO/IEC 10646 conformance requirements	146
H.4	Recommendations for ASN.1 users on ISO/IEC 10646 conformance.....	146
H.5	Adopted subsets as parameters of the abstract syntax	147
H.6	The CHARACTER STRING type	147
I.1	Overview	148
I.2	Meaning of version numbers.....	149
I.3	Requirements on encoding rules	150
I.4	Combination of (possibly extensible) constraints	150
I.4.1	Model	150
I.4.2	Serial application of constraints	150
I.4.3	Use of set arithmetic.....	151
I.4.4	Use of the Contained Subtype notation	152
J.1	The collections of ASN.1 types for times and dates.....	153
J.2	ISO 8601 key concepts.....	153
J.3	Abstract values of the TIME type.....	154
J.4	Time properties of the time abstract values.....	155
J.5	Value notation	155

J.6	Use of the ASN.1 subtype notation	156
J.7	The property settings subtype notation	156
K.1	General	158
K.2	Analyzing the full string.....	158
K.3	Analysis of a string containing an interval	159
K.4	Analysis of a string containing a date	159
K.5	Analysis of a string containing a year	160
K.6	Analysis of a string containing a century	160
K.7	Analysis of a string containing a time	160
K.8	Analysis of a string containing a simple time	161