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

AMENDMENT 2: Time type support

Technologies de l'information — Règles de codage ASN.1: Spécification des règles de codage compact (PER) —

AMENDEMENT 2: Support de type temps

ISO/IEC 8825-2:2002/Amd 2:2007

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

Amendment 2

Time type support

1) Contents

Update the Contents as follows:

28 <i>bis</i>	Encoding the time type, the useful time types, the defined time types and the additional time types
28 bis.1	General
28 bis.2	Encoding subtypes with the "Basic=Date" property setting
28 bis.3	Encoding subtypes with the "Basic=Time" property setting
28 bis.4	Encoding subtypes with the "Basic=Date-Time" property setting
28 bis.5	Encoding subtypes with the "Basic=Interval Interval-type=SE" property setting
28 bis.6	Encoding subtypes with the "Basic=Interval Interval-type=D" property setting
28 bis.7	Encoding subtypes with the "Basic=Interval Interval-type=SD" or "Basic=Interval Interval-type=DE" property setting
28 bis.8	Encoding subtypes with the "Basic=Rec-Interval Interval-type=SE" property setting
28 bis.9	Encoding subtypes with the "Basic=Rec-Interval Interval-type=D" property setting
28 bis.10	Encoding subtypes with the "Basic=Rec-Interval Interval-type=SD" or "Basic=Rec-Interval Interval-type=DE" property setting
28 bis.11	Encoding subtypes with mixed settings of the Basic property

2) New clause 9.3.11 *bis*

Insert clause 9.3.11 bis after clause 9.3.11:

9.3.11 *bis* Property setting constraints on the time type (or on the useful and defined time types) which are not extensible after the application of ITU-T Rec. X.680 | ISO/IEC 8824-1, 48.3 to 48.5, are PER-visible. Property setting constraints which are extensible are not PER-visible.

3) New clause 28 bis

Insert clause 28 bis before clause 29:

28 bis Encoding the time type, the useful time types, the defined time types and the additional time types

28 bis.1 General

- **28** *bis.***1.1** The encoding of the useful time types, the defined time types and the additional time types shall be determined by the property settings of the abstract values of these types. Property settings for the abstract values of the useful and defined time types are specified in ITU-T Rec. X.680 | ISO/IEC 8824-1, 34 *bis.*4 and Annex A *bis*, respectively. Property settings for the abstract values of additional time types are determined by the property settings of the parent type, restricted by any PER-visible constraints that apply (see 9.3.11 *bis*).
- **28** *bis.***1.2** If all the abstract values of the type to be encoded have one of the property settings listed in a row of column 2 of Table 2, then that type shall be encoded as if the type with its constraints (if any) had been replaced by the type specified in the corresponding row of column 3 of Table 2. Otherwise, it shall be encoded as specified in 28 *bis.*11.
 - NOTE If a time property (for example **Midnight**) is not listed in Table 2 for a particular row, there is no constraint on its setting.
- 28 bis.1.3 For rows 24 to 32 to be applicable, all abstract values of the type are required to have the same value of n in Fn.
- **28** *bis.***1.4** The types specified in column 3 of Table 2 are defined (using the ASN.1 notation) in 28 *bis.*2 to 28 *bis.*10, and are assumed to be defined in an environment of **AUTOMATIC TAGS**.
 - NOTE 1 The use of these type reference names in the specification of PER encodings does not make them available for use by an application designer in an ASN.1 specification, nor are they reserved words in such a specification. However, with the removal of **-encoding**, they correspond to the names of the useful time types or defined time types specified in ITU-T Rec. X.680 | ISO/IEC 8824-1, 34 bis.4 and Annex A bis.
 - NOTE 2 All the useful and defined time types satisfy the conditions for one of the rows of Table 2, and hence have optimized encodings. Additional time types may satisfy the conditions for one of the rows, but are otherwise encoded as specified in 28 bis.11. The unconstrained **TIME** type is always encoded as specified in 28 bis.11.

Table 2 – Encoding of a time subtype with all abstract values having specified property settings

Row number	Property settings C 8825-2:200	/Amd 2:200 ASN.1 type to be encoded
1	"Basic=Date Date=C Year=Basic" or lec-8825-2-2002-a "Basic=Date Date=C Year=Proleptic"	nd-2-2007 CENTURY-ENCODING (see 28 bis.2.1)
2	"Basic=Date Date=C Year=Negative" or "Basic=Date Date=C Year=Ln" (for any n)	ANY-CENTURY-ENCODING (see 28 bis.2.2)
3	"Basic=Date Date=Y Year=Basic" or "Basic=Date Date=Y Year=Proleptic"	YEAR-ENCODING (see 28 bis.2.3)
4	"Basic=Date Date=Y Year=Negative" or "Basic=Date Date=Y Year=Ln" (for any n)	ANY-YEAR-ENCODING (see 28 bis.2.4)
5	"Basic=Date Date=YM Year=Basic" or "Basic=Date Date=YM Year=Proleptic"	YEAR-MONTH-ENCODING (see 28 bis.2.5)
6	"Basic=Date Date=YM Year=Negative" or "Basic=Date Date=YM Year=Ln" (for any n)	ANY-YEAR-MONTH-ENCODING (see 28 bis.2.6)
7	"Basic=Date Date=YMD Year=Basic" Or "Basic=Date Date=YMD Year=Proleptic"	DATE-ENCODING (see 28 bis.2.7)
8	"Basic=Date Date=YMD Year=Negative" or "Basic=Date Date=YMD Year=Ln" (for any n)	ANY-DATE-ENCODING (see 28 bis.2.8)

Table 2 – Encoding of a time subtype with all abstract values having specified property settings

Row number	Property settings	ASN.1 type to be encoded
	"Basic=Date Date=YD Year=Basic"	YEAR-DAY-ENCODING
9	or	(see 28 bis.2.9)
	"Basic=Date Date=YD Year=Proleptic"	
	"Basic=Date Date=YD Year=Negative"	ANY-YEAR-DAY-ENCODING
10	or	(see 28 bis.2.10)
	"Basic=Date Date=YD Year=Ln" (for any n)	
	"Basic=Date Date=YW Year=Basic"	YEAR-WEEK-ENCODING
11	or	(see 28 bis.2.11)
	"Basic=Date Date=YW Year=Proleptic"	
	"Basic=Date Date=YW Year=Negative"	ANY-YEAR-WEEK-ENCODING
12	or	(see 28 bis.2.12)
	"Basic=Date Date=YW Year=Ln" (for any n)	
	"Basic=Date Date=YWD Year=Basic"	YEAR-WEEK-DAY-ENCODING
13	or	(see 28 bis.2.13)
	"Basic=Date Date=YWD Year=Proleptic"	
	"Basic=Date Date=YWD Year=Negative"	ANY-YEAR-WEEK-DAY-ENCODING
14	or	(see 28 bis.2.14)
	"Basic=Date Date=YWD Year=Ln" (for any n)	
	"Basic=Time Time=H Local-or-UTC=L"	HOURS-ENCODING
15	ileh STANDARI	(see 28 bis.3.1)
	"Basic=Time Time=H Local-or-UTC=Z"	HOURS-UTC-ENCODING
16	<u>(standards</u>	(see 28 bis.3.2)
	"Basic=Time Time=H Local-or-UTC=LD"	HOURS-AND-DIFF-ENCODING
17	100 110 000 000	(see 28 bis.3.3)
10	"Basic=Time Time=HM Local-or-UTC=L"	/Amd 2:200/ MINUTES-ENCODING
18 http	s://standards.iteh.ai/catalog/standards/sist/bde8d	3af-7ec9-44be-b (see 28 bis.3.4) 1e42e7/iso-
19	"Basic=Time Time=HM Local-or-UTC=Z"002-a	nd-2-2007 MINUTES-UTC-ENCODING
19		(see 28 bis.3.5)
20	"Basic=Time Time=HM Local-or-UTC=LD"	MINUTES-AND-DIFF-ENCODING
20		(see 28 bis.3.6)
21	"Basic=Time Time=HMS Local-or-UTC=L"	TIME-OF-DAY-ENCODING
21	"Basic=Time Time=HMS Local-or-UTC=Z"	(see 28 bis.3.7) TIME-OF-DAY-UTC-ENCODING
22	Basic-lime lime-imb hocal-of-ofc-2	(see 28 bis.3.8)
	"Basic=Time Time=HMS Local-or-UTC=LD"	TIME-OF-DAY-AND-DIFF-ENCODING
23	24210-11mc 11mc-mp Hocar-or-ore-mp	(see 28 bis.3.9)
	"Basic=Time Time=HFn Local-or-UTC=L"	HOURS-AND-FRACTION-ENCODING
24	(but see 28 bis.1.3)	(see 28 bis.3.10)
	"Basic=Time Time=HFn Local-or-UTC=Z"	HOURS-UTC-AND-FRACTION-ENCODING
25	(but see 28 bis.1.3)	(see 28 bis.3.11)
	"Basic=Time Time=HFn Local-or-UTC=LD"	HOURS-AND-DIFF-AND-FRACTION-ENCODING
26	(but see 28 bis.1.3)	(see 28 bis.3.12)
	"Basic=Time Time=HMFn Local-or-UTC=L"	MINUTES-AND-FRACTION-ENCODING
27	(but see 28 bis.1.3)	(see 28 bis.3.13)
	"Basic=Time Time=HMFn Local-or-UTC=Z"	MINUTES-UTC-AND-FRACTION-ENCODING
28	(but see 28 bis.1.3)	(see 28 bis.3.14)
	"Basic=Time Time=HMFn Local-or-UTC=LD"	MINUTES-AND-DIFF-AND-FRACTION-ENCODING
29	(but see 28 bis.1.3)	(see 28 bis.3.15)
	"Basic=Time Time=HMSFn Local-or-UTC=L"	TIME-OF-DAY-AND-FRACTION-ENCODING
30	(but see 28 bis.1.3)	(see 28 bis.3.16)
	L · · · · · · · · · · · · · · · · · · ·	<u>'</u>

Table 2 – Encoding of a time subtype with all abstract values having specified property settings

Row number	Property settings	ASN.1 type to be encoded
31	"Basic=Time Time=HMSFn Local-or-UTC=Z" (but see 28 bis.1.3)	TIME-OF-DAY-UTC-AND-FRACTION-ENCODING (see 28 bis.3.17)
32	"Basic=Time Time=HMSFn Local-or-UTC=LD" (but see 28 bis.1.3)	TIME-OF-DAY-AND-DIFF-AND-FRACTION- ENCODING (see 28 bis.3.18)
33	"Basic=Date-Time" All abstract values are required to have the same additional property settings specified in one of rows 1 to 14 for "Basic=Date" together with the same additional property settings specified in one of the rows 15 to 32 for "Basic=Time".	DATE-TIME-ENCODING {Date-Type, Time-Type} (instantiated as specified in 28 bis.4.1)
34	"Basic=Interval Interval-type=SE SE-point=Date" All abstract values are required to have the same additional property settings specified in one of rows 1 to 14 for "Basic=Date".	START-END-DATE-INTERVAL-ENCODING {Date-Type} (see 28 bis.5.1)
35	"Basic=Interval Interval-type=SE SE-point=Time" All abstract values are required to have the same additional property settings specified in one of rows 15 to 32 for "Basic=Time".	START-END-TIME-INTERVAL-ENCODING {Time-Type} (see 28 bis.5.2)
36	"Basic=Interval Interval-type=SE SE-point=Date-Time" All abstract values are required to have the same additional property settings specified in one of rows 1 to 14 for "Basic=Date" together with the same additional property settings specified in one of rows 15 to 32 for "Basic=Time".	START-END-DATE-TIME-INTERVAL-ENCODING {Date-Type, Time-Type} (see 28 bis.5.3) Amd 2:2007
http 37	"Basic=Interval Interval-type=D" is/bde8c	duration-interval-encoding (see 28 bis.6.1)
38	"Basic=Interval Interval-type=SD SE-point=Date" All abstract values are required to have the same additional property settings specified in one of rows 1 to 14 for "Basic=Date".	START-DATE-DURATION-INTERVAL-ENCODING {Date-Type} (see 28 bis.7.1)
39	"Basic=Interval Interval-type=SD SE-point=Time" All abstract values are required to have the same additional property settings specified in one of rows 15 to 32 for "Basic=Time".	START-TIME-DURATION-INTERVAL-ENCODING {Time-Type} (see 28 bis.7.2)
40	"Basic=Interval Interval-type=SD SE-point=Date-Time" All abstract values are required to have the same additional property settings specified in one of rows 1 to 14 for "Basic=Date" together with the same additional property settings specified in one of rows 15 to 32 for "Basic=Time".	START-DATE-TIME-DURATION- INTERVAL-ENCODING {Date-Type, Time-Type} (see 28 bis.7.3)
41	"Basic=Interval Interval-type=DE SE-point=Date" All abstract values are required to have the same additional properties specified in one of rows 1 to 14 for "Basic=Date".	DURATION-END-DATE-INTERVAL-ENCODING {Date-Type} (see 28 bis.7.4)

Table 2 – Encoding of a time subtype with all abstract values having specified property settings

Row number	Property settings	ASN.1 type to be encoded
42	"Basic=Interval Interval-type=DE SE-point=Time" All abstract values are required to have the same	DURATION-END-TIME-INTERVAL-ENCODING {Time-Type}
	additional properties specified in one of rows 15 to 32 for "Basic=Time".	(see 28 bis.7.5)
42	"Basic=Interval Interval-type=DE	DURATION-END-DATE-TIME-INTERVAL-
43	SE-point=Date-Time"	ENCODING {Date-Type, Time-Type}
	All abstract values are required to have the same additional properties specified in one of rows 1 to 14 for	(see 28 bis.7.6)
	"Basic=Date" together with the same additional	, , , , ,
	property settings specified in one of rows 15 to 32 for "Basic=Time".	
44	"Basic=Rec-Interval Interval-type=SE SE-point=Date"	REC-START-END-DATE-INTERVAL-ENCODING {Date-Type}
	All abstract values are required to have the same	(see 28 bis.8.1)
	additional property settings specified in one of rows 1 to 14 for "Basic=Date".	
45	"Basic=Rec-Interval Interval-type=SE SE-point=Time"	REC-START-END-TIME-INTERVAL-ENCODING {Time-Type}
	All abstract values are required to have the same	(see 28 bis.8.2)
	additional property settings specified in one of rows 15 to 32 for "Basic=Time".) PREVIEW
	"Basic=Rec-Interval Interval-type=SE	REC-START-END-DATE-TIME-INTERVAL-
46	SE-point=Date-Time"	ENCODING
	All abstract values are required to have the same additional property settings specified in one of rows 1 to 14 for "Basic=Date" together with the same	(see 28 bis.8.3)
	additional property settings specified in one of rows 15 to	/Amd 2:2007
	32 for "Basic=Time". atalog/standards/sist/bde8d	3af-7ec9-44be-b385-0071851e42e7/iso-
47	"Basic=Rec-Interval Interval-type=D"()2-a	nd-2- REC-DURATION-INTERVAL-ENCODING (see 28 bis.9.1)
48	"Basic=Rec-Interval Interval-type=SD SE-point=Date"	REC-START-DATE-DURATION-INTERVAL- ENCODING
	All abstract values are required to have the same	{Date-Type}
	additional property settings specified in one of rows 1 to 14 for "Basic=Date".	(see 28 bis.10.1)
49	"Basic=Rec-Interval Interval-type=SD SE-point=Time"	REC-START-TIME-DURATION-INTERVAL- ENCODING
	All abstract values are required to have the same	{Time-Type}
	additional property settings specified in one of rows 15 to 32 for "Basic=Time".	(see 28 bis.10.2)
50	"Basic=Rec-Interval Interval-type=SD SE-point=Date-Time"	REC-START-DATE-TIME-DURATION-INTERVAL- ENCODING
	All abstract values are required to have the same	{Date-Type, Time-Type}
	additional property settings specified in one of rows 1 to	(see 28 bis.10.3)
	14 for "Basic=Date" together with the same	
	additional property settings specified in one of rows 15 to 32 for "Basic=Time".	
	"Basic=Rec-Interval Interval-type=DE	REC-DURATION-END-DATE-INTERVAL-ENCODING
51	SE-point=Date"	{Date-Type}
	All abstract values are required to have the same additional properties specified in one of rows 1 to 14 for "Basic=Date".	(see 28 bis.10.4)

Table 2 – Encoding of a time subtype with all abstract values having specified property settings

Row number	Property settings	ASN.1 type to be encoded
52	"Basic=Rec-Interval Interval-type=DE SE-point=Time" All abstract values are required to have the same additional properties specified in one of rows 15 to 32 for "Basic=Time".	REC-DURATION-END-TIME-INTERVAL-ENCODING {Time-Type} (see 28 bis.10.5)
53	"Basic=Rec-Interval Interval-type=DE SE-point=Date-Time" All abstract values are required to have the same additional properties specified in one of rows 1 to 14 for "Basic=Date" together with the same additional property settings specified in one of rows 15 to 32 for "Basic=Time".	REC-DURATION-END-DATE-TIME-INTERVAL- ENCODING {Date-Type, Time-Type} (see 28 bis.10.6)

28 bis.2 Encoding subtypes with the "Basic=Date" property setting

This subclause defines the ASN.1 types referenced in Table 2, column 3 for types where all the abstract values of the type have the "Basic=Date" property setting.

28 *bis.***2.1** The **CENTURY-ENCODING** type is:

```
CENTURY-ENCODING ::= INTEGER(0..99) -- 7 bits
```

with the integer value set to the value specified by the first two digits of the year component of the abstract value.

28 bis.2.2 The ANY-CENTURY-ENCODING type is:

```
ANY-CENTURY-ENCODING ::= INTEGER (MIN..MAX)
```

with the integer value set to the value specified by the year component of the abstract value, ignoring the last two digits.

```
28 bis.2.3 The YEAR-ENCODING type is:
```

```
YEAR-ENCODING ::= CHOICE { -- 2 bits for choice determinant immediate INTEGER (2005..2020), -- 4 bits near-future INTEGER (2021..2276), -- 8 bits near-past INTEGER (1749..2004), -- 8 bits remainder INTEGER (MIN..1748 | 2277..MAX)}
```

with the integer value set to the year component of the abstract value.

NOTE – This has been optimized to provide a 6-bit or a 10-bit encoding in common cases.

28 bis.2.4 The any-year-encoding type is:

```
ANY-YEAR-ENCODING ::= INTEGER (MIN..MAX)
```

with the integer value set to the year component of the abstract value.

28 bis.2.5 The YEAR-MONTH-ENCODING type is:

with the YEAR-ENCODING set according to 28 bis.2.3 and the month integer value set to the month component of the abstract value.

NOTE – This has been optimized to provide a 10-bit or a 14-bit encoding in common cases.

28 bis.2.6 The any-year-month-encoding type is:

with the ANY-YEAR-ENCODING set according to 28 bis.2.4 and the month integer value set to the month component of the abstract value.

28 bis.2.7 The DATE-ENCODING type is:

with the YEAR-ENCODING set according to 28 bis.2.3, the month integer value set to the month component of the abstract value and the day integer value set to the day component of the abstract value.

NOTE – This has been optimized to provide a 15-bit or a 19-bit encoding in common cases.

28 bis.2.8 The ANY-DATE-ENCODING type is:

with the **ANY-YEAR-ENCODING** set according to 28 bis.2.4, the **month** integer value set to the month component of the abstract value and the **day** integer value set to the day component of the abstract value.

28 bis.2.9 The YEAR-DAY-ENCODING type is:

with the YEAR-ENCODING set according to 28 bis.2.3 and the day integer value set to the day component of the abstract value.

28 bis.2.10 The ANY-YEAR-DAY-ENCODING type is:

with the ANY-YEAR-ENCODING set according to 28 bis.2.4 and the day integer value set to the day component of the abstract value.

28 bis.2.11 The YEAR-WEEK-ENCODING type is: 825-2:2002/Amd 2:2007

with the YEAR-ENCODING set according to 28 bis.2.3 and the week integer value set to the week component of the abstract value.

NOTE – This has been optimized to provide a 12-bit or a 16-bit encoding in common cases.

28 bis.2.12 The ANY-YEAR-WEEK-ENCODING type is:

with the ANY-YEAR-ENCODING set according to 28 bis.2.4 and the week integer value set to the week component of the abstract value.

28 bis.2.13 The YEAR-WEEK-DAY-ENCODING type is:

with the YEAR-ENCODING set according to 28 bis.2.3, the week integer value set to the week component of the abstract value and the day integer value set to the day component of the abstract value.

NOTE – This has been optimized to provide a 15-bit or a 19-bit encoding in common cases.