ASN1C

ASN.1 Compiler
Version 7.3
PER Runtime
Reference Manual

Objective Systems, Inc. version 7.3 — January 2019

Author's Contact Information

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ASN1C PER Runtime Classes and Library Functions

The **ASN.1 C++ runtime classes** are wrapper classes that provide an object-oriented interface to the ASN.1 C runtime library functions. The classes described in this manual are derived from the common classes documented in the ASN1C C/C++ Common runtime manual. They are specific to the Packed Encoding Rules (PER)as defined in the X.691 ITU-T standard. These PER specific C++ runtime classes include the PER message buffer classes.

The **ASN.1 PER Runtime Library** contains the low-level constants, types, and functions that are assembled by the compiler to encode/decode more complex structures.

This library consists of the following items:

- A global include file ("asn1per.h") that is compiled into all generated source files.
- An object library of functions that are linked with the C functions after compilation with a C complier.

In general, programmers will not need to be too concerned with the details of these functions. The ASN.1 compiler generates calls to them in the C or C++ source files that it creates. However, the functions in the library may also be called on their own in applications requiring their specific functionality.

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6.1 PER C++ Runtime Classes.

Modules

- PER Message Buffer Classes

6.1.1 Detailed Description

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Classes

- class ASN1PERMessageBuffer
- class ASN1PEREncodeBuffer
- class ASN1PERDecodeBuffer

6.2.1 Detailed Description

The ASN.1 C++ runtime classes are wrapper classes that provide an object-oriented interface to the ASN.1 C runtime library functions. These classes are derived from the common classes documented in the ASN1C C/C++ Common Runtime Functions manual and are specific the Packed Encoding Rules (PER). These classes manage the buffers for encoding and decoding ASN.1 PER messages.

6.3 PER Runtime Library Functions.

Modules

- PER C Decode Functions.
- PER C Encode Functions.
- PER C Utility Functions

Classes

- struct PERField
- struct BinDumpBuffer

Macros

- #define **ASN_K_EXTENUM** OSINT32_MAX
- #define **MAX_BIGINTBYTES** (1024)
- #define **OSYEAR_BASIC** OSUINTCONST(0x8000000)
- #define **OSYEAR_PROLEPTIC** OSUINTCONST(0x4000000)
- #define **OSYEAR_NEGATIVE** OSUINTCONST(0x2000000)
- #define **OSYEAR_L**(n) ((OSUINT32)(n) << 28)
- #define **OSYEAR_MASK** (OSYEAR_BASIC|OSYEAR_PROLEPTIC|OSYEAR_NEGATIVE|OSYEAR_L(0xF))
- #define **OSANY** (OSYEAR_NEGATIVE|OSYEAR_L(5))
- #define **OSANY_MASK** (OSYEAR_NEGATIVE|OSYEAR_L(0xF))
- #define **OSCENTURY** 0x4000u
- #define **OSYEAR** 0x2000u
- #define **OSMONTH** 0x1000u
- #define **OSWEEK** 0x0800u
- #define **OSDAY** 0x0400u
- #define **OSHOURS** 0x0200u
- #define **OSMINUTES** 0x0100u
- #define **OSSECONDS** 0x0080u
- #define **OSUTC** 0x0040u
- #define **OSDIFF** 0x0020u
- #define **OSFRACTION** 0x000Fu
- #define **OSDURATION** 0x0010u
- #define **PU_SETCHARSET**(csetvar, canset, abits, ubits)
- #define **PU_INSLENFLD**(pctxt)
- #define **PU_NEWFIELD**(pctxt, suffix)
- #define **PU_PUSHNAME**(pctxt, name)
- #define **PU_PUSHELEMNAME**(pctxt, idx)
- #define **PU_POPNAME**(pctxt)
- #define **PU_SETBITOFFSET**(pctxt)
- #define **PU_SETBITCOUNT**(pctxt)
- #define **PU_SETOPENTYPEFLDLIST**(pMainBFList, pOpenTypeBFList)
- #define **EXTPERMETHOD**
- #define **EXTPERCLASS**
- #define **PD_BIT**(pctxt, pvalue) DEC_BIT(pctxt,pvalue)

- #define **PU_SETSIZECONSTRAINT**(pctxt, rootLower, rootUpper, extLower, extUpper)
- #define **PU_INITSIZECONSTRAINT**(pctxt) PU_SETSIZECONSTRAINT(pctxt,0,0,0,0)
- #define **PU_GETSIZECONSTRAINT**(pctxt, extbit)
- #define **PU_GETCTXTBITOFFSET**(pctxt) (((pctxt)->buffer.byteIndex * 8) + (8 - (pctxt)->buffer.bitOffset))
- #define PU_GETPADBITS(pctxt) (((pctxt)->buffer.bitOffset == 8) ? 0 : (pctxt)->buffer.bitOffset)
- #define **PU_SETCTXTBITOFFSET**(pctxt, _bitOffset)
- #define **PD_BYTE_ALIGN0**(pctxt)
- #define **PD_BYTE_ALIGN** PD_BYTE_ALIGN0
- #define **PD_CHECKSEQOFLEN**(pctxt, numElements, minElemBits)
- #define pd_bit(pctxt, pvalue) rtxDecBit(pctxt,pvalue)
- #define **pd_bits**(pctxt, pvalue, nbits) rtxDecBits(pctxt,pvalue,nbits)
- #define **pd_octets**(pctxt, pbuffer, bufsiz, nbits) rtxDecBitsToByteArray(pctxt,pbuffer,bufsiz,nbits)
- #define **pe_GeneralString**(pctxt, value, permCharSet) pe_VarWidthCharString(pctxt, value)
- #define **pe_GraphicString**(pctxt, value, permCharSet) pe_VarWidthCharString(pctxt, value)
- #define **pe_T61String**(pctxt, value, permCharSet) pe_VarWidthCharString(pctxt, value)
- #define **pe_TeletexString**(pctxt, value, permCharSet) pe_VarWidthCharString(pctxt, value)
- #define **pe_VideotexString**(pctxt, value, permCharSet) pe_VarWidthCharString(pctxt, value)
- #define **pe_ObjectDescriptor**(pctxt, value, permCharSet) pe_VarWidthCharString(pctxt, value)
- #define **pe_UTF8String**(pctxt, value, permCharSet) pe_VarWidthCharString(pctxt, value)
- #define **pe_IA5String**(pctxt, value, permCharSet) pe_ConstrainedStringEx (pctxt, value, permCharSet, 8, 7, 7)
- #define **pe_NumericString**(pctxt, value, permCharSet)
- #define **pe_PrintableString**(pctxt, value, permCharSet) pe_ConstrainedStringEx (pctxt, value, permCharSet, 8, 7, 7)
- #define **pe_VisibleString**(pctxt, value, permCharSet) pe_ConstrainedStringEx (pctxt, value, permCharSet, 8, 7, 7)
- #define **pe_ISO646String** pe_IA5String
- #define **pe_GeneralizedTime** pe_IA5String
- #define **pe_UTCTime** pe_GeneralizedTime
- #define **pd_GeneralString**(pctxt, pvalue, permCharSet) pd_VarWidthCharString (pctxt, pvalue)
- #define **pd_GraphicString**(pctxt, pvalue, permCharSet) pd_VarWidthCharString (pctxt, pvalue)
- #define **pd_VideotexString**(pctxt, pvalue, permCharSet) pd_VarWidthCharString (pctxt, pvalue)
- #define **pd_TeletexString**(pctxt, pvalue, permCharSet) pd_VarWidthCharString (pctxt, pvalue)
- #define **pd_T61String**(pctxt, pvalue, permCharSet) pd_VarWidthCharString (pctxt, pvalue)
- #define **pd_ObjectDescriptor**(pctxt, pvalue, permCharSet) pd_VarWidthCharString (pctxt, pvalue)
- #define **pd_UTF8String**(pctxt, pvalue, permCharSet) pd_VarWidthCharString (pctxt, pvalue)
- #define **pd_IA5String**(pctxt, pvalue, permCharSet) pd_ConstrainedStringEx (pctxt, pvalue, permCharSet, 8, 7, 7)
- #define **pd_NumericString**(pctxt, pvalue, permCharSet)
- #define **pd_PrintableString**(pctxt, pvalue, permCharSet) pd_ConstrainedStringEx (pctxt, pvalue, permCharSet, 8, 7, 7)
- #define **pd_VisibleString**(pctxt, pvalue, permCharSet) pd_ConstrainedStringEx (pctxt, pvalue, permCharSet, 8, 7, 7)
- #define **pd_ISO646String** pd_IA5String
- #define **pd_GeneralizedTime** pd_IA5String
- #define **pd_UTCTime** pd_GeneralizedTime
- #define **pe_GetMsgLen** pu_getMsgLen
- #define **pe_ExpandBuffer**(pctxt, nbytes) rtxExpandOutputBuffer(pctxt,nbytes)
- #define **pd_AnyCentury**(pctxt, string) pd_DateStr (pctxt, string, OSANY|OSCENTURY)
- #define **pd_AnyCenturyInt**(pctxt, pvalue) pd_UnconsInteger (pctxt, pvalue)
- #define **pd_AnyDate**(pctxt, string) pd_DateStr (pctxt, string, OSANY|OSYEAR|OSMONTH|OSDAY)
- #define **pd_AnyYear**(pctxt, string) pd_DateStr (pctxt, string, OSANY|OSYEAR)

- #define **pd_AnyYearInt**(pctxt, pvalue) pd_UnconsInteger (pctxt, pvalue)
- #define **pd_AnyYearDay**(pctxt, string) pd_DateStr (pctxt, string, OSANY|OSYEAR|OSDAY)
- #define **pd_AnyYearMonth**(pctxt, string) pd_DateStr (pctxt, string, OSANY|OSYEAR|OSMONTH)
- #define **pd_AnyYearMonthDay**(pctxt, string) pd_DateStr (pctxt, string, OSANY|OSYEAR|OSMONTH|OSDAY)
- #define **pd_AnyYearWeek**(pctxt, string) pd_DateStr (pctxt, string, OSANY|OSYEAR|OSWEEK)
- #define **pd_AnyYearWeekDay**(pctxt, string) pd_DateStr (pctxt, string, OSANY|OSYEAR|OSWEEK|OSDAY)
- #define **pd_Century**(pctxt, string) pd_DateStr (pctxt, string, OSCENTURY)
- #define **pd_CenturyInt**(pctxt, pvalue) pd_ConsUInt8 (pctxt, pvalue, 0, 99)
- #define **pd_Date**(pctxt, string) pd_DateStr (pctxt, string, OSYEAR_BASIC|OSYEAR|OSMONTH|OSDAY);
- #define **pd_DateTime**(pctxt, string)
- #define **pd_DurationInterval**(pctxt, string) pd_Duration (pctxt, string, FALSE)
- #define **pd_DurationEndDateInterval**(pctxt, string, flags) pd_Interval (pctxt, string, FALSE, OSDURATION, flags)
- #define **pd_DurationEndTimeInterval**(pctxt, string, flags) pd_Interval (pctxt, string, FALSE, OSDURATION, flags)
- #define **pd_DurationEndDateTimeInterval**(pctxt, string, flags) pd_Interval (pctxt, string, FALSE, OSDURATI↩ ON, flags)
- #define **pd_Hours**(pctxt, string) pd_TimeStr (pctxt, string, OSHOURS)
- #define **pd_HoursUtc**(pctxt, string) pd_TimeStr (pctxt, string, OSHOURS|OSUTC)
- #define **pd_HoursAndDiff**(pctxt, string) pd_TimeStr (pctxt, string, OSHOURS|OSDIFF)
- #define **pd_HoursAndFraction**(pctxt, string, n) pd_TimeStr (pctxt, string, OSHOURS|(n))
- #define **pd_HoursUtcAndFraction**(pctxt, string, n) pd_TimeStr (pctxt, string, OSHOURS|OSUTC|(n))
- #define **pd_HoursAndDiffAndFraction**(pctxt, string, n) pd_TimeStr (pctxt, string, OSHOURS|OSDIFF|(n))
- #define **pd_Minutes**(pctxt, string) pd_TimeStr (pctxt, string, OSHOURS|OSMINUTES)
- #define **pd_MinutesUtc**(pctxt, string) pd_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSUTC)
- #define **pd_MinutesAndDiff**(pctxt, string) pd_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSDIFF)
- #define **pd_MinutesAndFraction**(pctxt, string, n) pd_TimeStr (pctxt, string, OSHOURS|OSMINUTES|(n))
- #define **pd_MinutesUtcAndFraction**(pctxt, string, n) pd_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OS↩ UTC|(n))
- #define **pd_MinutesAndDiffAndFraction**(pctxt, string, n) pd_TimeStr (pctxt, string, OSHOURS|OSMINUT↩ ES|OSDIFF|(n))
- #define **pd_RecStartEndDateInterval**(pctxt, string, flags) pd_Interval (pctxt, string, TRUE, flags, flags)
- #define **pd_RecStartEndTimeInterval**(pctxt, string, flags) pd_Interval (pctxt, string, TRUE, flags, flags)
- #define **pd_RecStartEndDateTimeInterval**(pctxt, string, flags) pd_Interval (pctxt, string, TRUE, flags, flags)
- #define **pd_RecDurationInterval**(pctxt, string) pd_Duration (pctxt, string, TRUE)
- #define **pd_RecStartDateDurationInterval**(pctxt, string, flags) pd_Interval (pctxt, string, TRUE, flags, OSDU↩ RATION)
- #define **pd_RecStartTimeDurationInterval**(pctxt, string, flags) pd_Interval (pctxt, string, TRUE, flags, OSDU↩ RATION)
- #define **pd_RecStartDateTimeDurationInterval**(pctxt, string, flags) pd_Interval (pctxt, string, TRUE, flags, O↩ SDURATION)
- #define **pd_RecDurationEndDateInterval**(pctxt, string, flags) pd_Interval (pctxt, string, TRUE, OSDURATION, flags)
- #define **pd_RecDurationEndTimeInterval**(pctxt, string, flags) pd_Interval (pctxt, string, TRUE, OSDURATION, flags)
- #define **pd_RecDurationEndDateTimeInterval**(pctxt, string, flags) pd_Interval (pctxt, string, TRUE, OSDUR↩ ATION, flags)
- #define **pd_StartEndDateInterval**(pctxt, string, flags) pd_Interval (pctxt, string, FALSE, flags, flags)
- #define **pd_StartEndTimeInterval**(pctxt, string, flags) pd_Interval (pctxt, string, FALSE, flags, flags)
- #define **pd_StartEndDateTimeInterval**(pctxt, string, flags) pd_Interval (pctxt, string, FALSE, flags, flags)
- #define **pd_StartDateDurationInterval**(pctxt, string, flags) pd_Interval (pctxt, string, FALSE, flags, OSDURA↩ TION)

- #define **pd_StartTimeDurationInterval**(pctxt, string, flags) pd_Interval (pctxt, string, FALSE, flags, OSDURA↩TION)
- #define **pd_StartDateTimeDurationInterval**(pctxt, string, flags) pd_Interval (pctxt, string, FALSE, flags, OSD↩URATION)
- #define **pd_TimeOfDay**(pctxt, string) pd_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSSECONDS)
- #define **pd_TimeOfDayUtc**(pctxt, string) pd_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSSECON↩DS|OSUTC)
- #define **pd_TimeOfDayAndDiff**(pctxt, string) pd_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSSECON↩DS|OSDIFF)
- #define **pd_TimeOfDayAndFraction**(pctxt, string, n) pd_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OS↩SECONDS|(n))
- #define **pd_TimeOfDayUtcAndFraction**(pctxt, string, n) pd_TimeStr (pctxt, string, OSHOURS|OSMINUT↩ES|OSSECONDS|OSUTC|(n))
- #define **pd_TimeOfDayAndDiffAndFraction**(pctxt, string, n) pd_TimeStr (pctxt, string, OSHOURS|OSMINU↩TES|OSSECONDS|OSDIFF|(n))
- #define **pd_Year**(pctxt, string) pd_DateStr (pctxt, string, OSYEAR)
- #define **pd_YearDay**(pctxt, string) pd_DateStr (pctxt, string, OSYEAR|OSDAY)
- #define **pd_YearMonth**(pctxt, string) pd_DateStr (pctxt, string, OSYEAR|OSMONTH)
- #define **pd_YearMonthDay**(pctxt, string) pd_DateStr (pctxt, string, OSYEAR|OSMONTH|OSDAY);
- #define **pd_YearWeek**(pctxt, string) pd_DateStr (pctxt, string, OSYEAR|OSWEEK)
- #define **pd_YearWeekDay**(pctxt, string) pd_DateStr (pctxt, string, OSYEAR|OSWEEK|OSDAY)
- #define **pe_AnyCentury**(pctxt, string) pe_DateStr (pctxt, string, OSANY|OSCENTURY)
- #define **pe_AnyCenturyInt**(pctxt, value) pe_UnconsInteger (pctxt, value)
- #define **pe_AnyDate**(pctxt, string) pe_DateStr (pctxt, string, OSANY|OSYEAR|OSMONTH|OSDAY)
- #define **pe_AnyYear**(pctxt, string) pe_DateStr (pctxt, string, OSANY|OSYEAR)
- #define **pe_AnyYearInt**(pctxt, value) pe_UnconsInteger (pctxt, value)
- #define **pe_AnyYearDay**(pctxt, string) pe_DateStr (pctxt, string, OSANY|OSYEAR|OSDAY)
- #define **pe_AnyYearMonth**(pctxt, string) pe_DateStr (pctxt, string, OSANY|OSYEAR|OSMONTH)
- #define **pe_AnyYearMonthDay**(pctxt, string) pe_DateStr (pctxt, string, OSANY|OSYEAR|OSMONTH|OSDAY)
- #define **pe_AnyYearWeek**(pctxt, string) pe_DateStr (pctxt, string, OSANY|OSYEAR|OSWEEK)
- #define **pe_AnyYearWeekDay**(pctxt, string) pe_DateStr (pctxt, string, OSANY|OSYEAR|OSWEEK|OSDAY)
- #define **pe_Century**(pctxt, string) pe_DateStr (pctxt, string, OSCENTURY)
- #define **pe_CenturyInt**(pctxt, value) pe_ConsUnsigned (pctxt, value, 0, 99)
- #define **pe_Date**(pctxt, string) pe_DateStr (pctxt, string, OSYEAR_BASIC|OSYEAR|OSMONTH|OSDAY)
- #define **pe_DateTime**(pctxt, string)
- #define **pe_DurationInterval**(pctxt, string) pe_Duration (pctxt, string, FALSE)
- #define **pe_DurationEndDateInterval**(pctxt, string, flags) pe_Interval (pctxt, string, FALSE, OSDURATION, flags)
- #define **pe_DurationEndTimeInterval**(pctxt, string, flags) pe_Interval (pctxt, string, FALSE, OSDURATION, flags)
- #define **pe_DurationEndDateTimeInterval**(pctxt, string, flags) pe_Interval (pctxt, string, FALSE, OSDURATI↩ON, flags)
- #define **pe_Hours**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS)
- #define **pe_Hours**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS)
- #define **pe_HoursUtc**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS|OSUTC)
- #define **pe_HoursUtc**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS|OSUTC)
- #define **pe_HoursAndDiff**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS|OSDIFF)
- #define **pe_HoursAndFraction**(pctxt, string, n) pe_TimeStr (pctxt, string, OSHOURS|(n))
- #define **pe_HoursUtcAndFraction**(pctxt, string, n) pe_TimeStr (pctxt, string, OSHOURS|OSUTC|(n))
- #define **pe_HoursAndDiffAndFraction**(pctxt, string, n) pe_TimeStr (pctxt, string, OSHOURS|OSDIFF|(n))
- #define **pe_Minutes**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS|OSMINUTES)

- #define **pe_MinutesUtc**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSUTC)
- #define **pe_MinutesAndDiff**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSDIFF)
- #define **pe_MinutesAndFraction**(pctxt, string, n) pe_TimeStr (pctxt, string, OSHOURS|OSMINUTES|(n))
- #define **pe_MinutesUtcAndFraction**(pctxt, string, n) pe_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OS↩UTC|(n))
- #define **pe_MinutesAndDiffAndFraction**(pctxt, string, n) pe_TimeStr (pctxt, string, OSHOURS|OSMINUT↩ES|OSDIFF|(n))
- #define **pe_RecStartEndDateInterval**(pctxt, string, flags) pe_Interval (pctxt, string, TRUE, flags, flags)
- #define **pe_RecStartEndTimeInterval**(pctxt, string, flags) pe_Interval (pctxt, string, TRUE, flags, flags)
- #define **pe_RecStartEndDateTimeInterval**(pctxt, string, flags) pe_Interval (pctxt, string, TRUE, flags, flags)
- #define **pe_RecDurationInterval**(pctxt, string) pe_Duration (pctxt, string, TRUE)
- #define **pe_RecStartDateDurationInterval**(pctxt, string, flags) pe_Interval (pctxt, string, TRUE, flags, OSDU↩RATION)
- #define **pe_RecStartTimeDurationInterval**(pctxt, string, flags) pe_Interval (pctxt, string, TRUE, flags, OSDU↩RATION)
- #define **pe_RecStartDateTimeDurationInterval**(pctxt, string, flags) pe_Interval (pctxt, string, TRUE, flags, O↩SDURATION)
- #define **pe_RecDurationEndDateInterval**(pctxt, string, flags) pe_Interval (pctxt, string, TRUE, OSDURATION, flags)
- #define **pe_RecDurationEndTimeInterval**(pctxt, string, flags) pe_Interval (pctxt, string, TRUE, OSDURATION, flags)
- #define **pe_RecDurationEndDateTimeInterval**(pctxt, string, flags) pe_Interval (pctxt, string, TRUE, OSDUR↩ATION, flags)
- #define **pe_StartEndDateInterval**(pctxt, string, flags) pe_Interval (pctxt, string, FALSE, flags, flags)
- #define **pe_StartEndTimeInterval**(pctxt, string, flags) pe_Interval (pctxt, string, FALSE, flags, flags)
- #define **pe_StartEndDateTimeInterval**(pctxt, string, flags) pe_Interval (pctxt, string, FALSE, flags, flags)
- #define **pe_StartDateDurationInterval**(pctxt, string, flags) pe_Interval (pctxt, string, FALSE, flags, OSDURA↩TION)
- #define **pe_StartTimeDurationInterval**(pctxt, string, flags) pe_Interval (pctxt, string, FALSE, flags, OSDURA↩TION)
- #define **pe_StartDateTimeDurationInterval**(pctxt, string, flags) pe_Interval (pctxt, string, FALSE, flags, OSD↩URATION)
- #define **pe_TimeOfDay**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSSECONDS)
- #define **pe_TimeOfDayUtc**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSSECONDS|O↩SUTC)
- #define **pe_TimeOfDayAndDiff**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSSECON↩DS|OSDIFF)
- #define **pe_TimeOfDayAndFraction**(pctxt, string, n) pe_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OS↩SECONDS|(n))
- #define **pe_TimeOfDayUtcAndFraction**(pctxt, string, n) pe_TimeStr (pctxt, string, OSHOURS|OSMINUT↩ES|OSSECONDS|OSUTC|(n))
- #define **pe_TimeOfDayAndDiffAndFraction**(pctxt, string, n) pe_TimeStr (pctxt, string, OSHOURS|OSMINU↩TES|OSSECONDS|OSDIFF|(n))
- #define **pe_Year**(pctxt, string) pe_DateStr (pctxt, string, OSYEAR)
- #define **pe_YearDay**(pctxt, string) pe_DateStr (pctxt, string, OSYEAR|OSDAY)
- #define **pe_YearMonth**(pctxt, string) pe_DateStr (pctxt, string, OSYEAR|OSMONTH)
- #define **pe_YearMonthDay**(pctxt, string) pe_DateStr (pctxt, string, OSYEAR|OSMONTH|OSDAY)
- #define **pe_YearWeek**(pctxt, string) pe_DateStr (pctxt, string, OSYEAR|OSWEEK)
- #define **pe_YearWeekDay**(pctxt, string) pe_DateStr (pctxt, string, OSYEAR|OSWEEK|OSDAY)

Typedefs

- typedef struct PERField **PERField**

Functions

- int **pu_checkSizeConstraint** (OSCTXT *pctxt, int size)
- Asn1SizeCnst * **pu_getSizeConstraint** (OSCTXT *pctxt, OSBOOL extbit)
- int **pu_getBitOffset** (OSCTXT *pctxt)
- void **pu_setBitOffset** (OSCTXT *pctxt, int bitOffset)

6.3.1 Detailed Description

The ASN.1 Packed Encoding Rules (PER) runtime library contains the low-level constants, types, and functions that are assembled by the compiler to encode/decode more complex structures. The PER low-level C encode/decode functions are identified by their prefixes: pe_ for PER encode, pd_ for PERdecode, and pu_ for PER utility functions.

6.3.2 Macro Definition Documentation

6.3.2.1 pd_bit

```
#define pd_bit(
              pctxt,
              pvalue ) rtxDecBit(pctxt,pvalue)
```

perutil

6.3.2.2 PD_BYTE_ALIGN0

```
#define PD_BYTE_ALIGN0(
              pctxt )
```

Value:

```
((!(pctxt)->buffer.aligned) ? 0 : \
(((pctxt)->buffer.bitOffset != 8) ? ( \
(pctxt)->buffer.byteIndex++,       \
(pctxt)->buffer.bitOffset = 8,     \
0) : 0                    \
))
```

6.3.2.3 PD_CHECKSEQOFLEN

```
#define PD_CHECKSEQOFLEN(
              pctxt,
              numElements,
              minElemBits )
```

Value:

```
((pctxt->buffer.size > 0) ?  \
(((numElements * minElemBits) > (pctxt->buffer.size * 8)) ? \
LOG_RTERR (pctxt,ASN_E_INVLEN) : 0) : 0)
```

6.3.2.4 pd_DateTime

```
#define pd_DateTime(
              pctxt,
              string )
```

Value:

```
pd_DateTimeStr (pctxt, string, \
OSYEAR_BASIC|OSYEAR|OSMONTH|OSDAY|OSHOURS|OSMINUTES|OSSECONDS);
```

6.3.2.5 pd_NumericString

```
#define pd_NumericString(
              pctxt,
              pvalue,
              permCharSet )
```

Value:

```
pd_ConstrainedStringEx (pctxt, pvalue, \
(permCharSet == 0)?NUM_CANSET:permCharSet, 4, 4, 4)
```

6.3.2.6 pe_DateTime

```
#define pe_DateTime(
              pctxt,
              string )
```

Value:

```
pe_DateTimeStr (pctxt, string, \
OSYEAR_BASIC|OSYEAR|OSMONTH|OSDAY|OSHOURS|OSMINUTES|OSSECONDS)
```

6.3.2.7 pe_NumericString

```
#define pe_NumericString(
              pctxt,
              value,
              permCharSet )
```

Value:

```
pe_ConstrainedStringEx (pctxt, value, \
(permCharSet == 0)?NUM_CANSET:permCharSet, 4, 4, 4)
```

6.3.2.8 PU_GETPADBITS

```
#define PU_GETPADBITS(
              pctxt ) (((pctxt)->buffer.bitOffset == 8) ?  0 :  (pctxt)->buffer.bitOffset)
```

This macro returns the number of padding bits in the last byte following an encode or decode operation.

6.3.2.9 PU_GETSIZECONSTRAINT

```
#define PU_GETSIZECONSTRAINT(
              pctxt,
              extbit )
```

Value:

```
((extbit) ? \
&ACINFO(pctxt)->sizeConstraint.ext : &ACINFO(pctxt)->sizeConstraint.root)
```

6.3.2.10 PU_SETCHARSET

```
#define PU_SETCHARSET(
              csetvar,
              canset,
              abits,
              ubits )
```

Value:

```
csetvar.charSet.nchars = 0; \
csetvar.canonicalSet = canset; \
csetvar.canonicalSetSize = sizeof(canset)-1; \
csetvar.canonicalSetBits = pu_bitcnt(csetvar.canonicalSetSize); \
csetvar.charSetUnalignedBits = ubits; \
csetvar.charSetAlignedBits = abits;
```

6.3.2.11 PU_SETCTXTBITOFFSET

```
#define PU_SETCTXTBITOFFSET(
              pctxt,
              _bitOffset )
```

Value:

```
do { \
(pctxt)->buffer.byteIndex = (_bitOffset / 8); \
(pctxt)->buffer.bitOffset = (OSUINT16)(8 - (_bitOffset % 8)); \
} while(0)
```

6.3.2.12 PU_SETSIZECONSTRAINT

```
#define PU_SETSIZECONSTRAINT(
              pctxt,
              rootLower,
              rootUpper,
              extLower,
              extUpper )
```

Value:

```
ACINFO(pctxt)->sizeConstraint.root.lower = rootLower; \
ACINFO(pctxt)->sizeConstraint.root.upper = rootUpper; \
ACINFO(pctxt)->sizeConstraint.ext.lower = extLower; \
ACINFO(pctxt)->sizeConstraint.ext.upper = extUpper
```

6.4 PER C Decode Functions.

Macros

- #define pd_moveBitCursor(pctxt, bitOffset) rtxMoveBitCursor(pctxt,bitOffset)

Functions

- int pd_BigInteger (OSCTXT *pctxt, const char **ppvalue)
- int pd_BigIntegerEx (OSCTXT *pctxt, const char **ppvalue, int radix)
- int pd_BigIntegerValue (OSCTXT *pctxt, const char **ppvalue, int radix, OSUINT32 nbytes)
- int pd_BitString (OSCTXT *pctxt, OSUINT32 *numbits_p, OSOCTET *buffer, OSSIZE bufsiz)
- int pd_BitString64 (OSCTXT *pctxt, OSSIZE *numbits_p, OSOCTET *buffer, OSSIZE bufsiz)
- int pd_BitString32 (OSCTXT *pctxt, ASN1BitStr32 *pbitstr, OSSIZE lower, OSSIZE upper)
- int pd_BMPString (OSCTXT *pctxt, ASN1BMPString *pvalue, Asn116BitCharSet *permCharSet)
- int pd_UniversalString (OSCTXT *pctxt, ASN1UniversalString *pvalue, Asn132BitCharSet *permCharSet)
- int pd_byte_align (OSCTXT *pctxt)
- int pd_ChoiceOpenTypeExt (OSCTXT *pctxt, const OSOCTET **object_p2, OSSIZE *pnumocts)
- int pd_ConsInteger (OSCTXT *pctxt, OSINT32 *pvalue, OSINT64 lower, OSINT64 upper)
- int pd_ConsInt8 (OSCTXT *pctxt, OSINT8 *pvalue, OSINT64 lower, OSINT64 upper)
- int pd_ConsInt16 (OSCTXT *pctxt, OSINT16 *pvalue, OSINT64 lower, OSINT64 upper)
- int pd_ConsInt64 (OSCTXT *pctxt, OSINT64 *pvalue, OSINT64 lower, OSINT64 upper)
- int pd_ConsUnsigned (OSCTXT *pctxt, OSUINT32 *pvalue, OSUINT64 lower, OSUINT64 upper)
- int pd_ConsUnsignedSignedBound (OSCTXT *pctxt, OSUINT32 *pvalue, OSINT64 lower, OSINT64 upper)
- int pd_ConsUInt8 (OSCTXT *pctxt, OSUINT8 *pvalue, OSUINT64 lower, OSUINT64 upper)
- int pd_ConsUInt8SignedBound (OSCTXT *pctxt, OSUINT8 *pvalue, OSINT64 lower, OSINT64 upper)
- int pd_ConsUInt16 (OSCTXT *pctxt, OSUINT16 *pvalue, OSUINT64 lower, OSUINT64 upper)
- int pd_ConsUInt16SignedBound (OSCTXT *pctxt, OSUINT16 *pvalue, OSINT64 lower, OSINT64 upper)
- int pd_ConsUInt64 (OSCTXT *pctxt, OSUINT64 *pvalue, OSUINT64 lower, OSUINT64 upper)
- int pd_ConsUInt64SignedBound (OSCTXT *pctxt, OSUINT64 *pvalue, OSINT64 lower, OSINT64 upper)
- int pd_ConsWholeNumber (OSCTXT *pctxt, OSUINT32 *padjusted_value, OSUINT32 range_value)
- int pd_ConsWholeNumber64 (OSCTXT *pctxt, OSUINT64 *padjusted_value, OSUINT64 range_value)
- int pd_ConstrainedString (OSCTXT *pctxt, const char **string, Asn1CharSet *pCharSet)
- int pd_ConstrainedStringEx (OSCTXT *pctxt, const char **string, const char *charSet, OSUINT32 abits, OSU↩ INT32 ubits, OSUINT32 canSetBits)
- int pd_ConstrFixedLenStringEx (OSCTXT *pctxt, char *strbuf, size_t bufsiz, const char *charSet, OSUINT32 abits, OSUINT32 ubits, OSUINT32 canSetBits)
- int pd_16BitConstrainedString (OSCTXT *pctxt, Asn116BitCharString *pString, Asn116BitCharSet *pCharSet)
- int pd_32BitConstrainedString (OSCTXT *pctxt, Asn132BitCharString *pString, Asn132BitCharSet *pCharSet)
- int pd_DateStr (OSCTXT *pctxt, const char **string, OSUINT32 flags)
- int pd_DateTimeStr (OSCTXT *pctxt, const char **string, OSUINT32 flags)
- int pd_Duration (OSCTXT *pctxt, const char **string, OSBOOL rec)
- int pd_DynBitString (OSCTXT *pctxt, ASN1DynBitStr *pBitStr)
- int pd_DynBitString64 (OSCTXT *pctxt, ASN1DynBitStr64 *pBitStr)
- int pd_DynOctetString (OSCTXT *pctxt, ASN1DynOctStr *pOctStr)
- int pd_DynOctetString64 (OSCTXT *pctxt, OSDynOctStr64 *pOctStr)
- int pd_GetBinStrDataOffset (OSCTXT *pctxt, OSUINT32 *pnumbits, OSBOOL bitStrFlag)
- int pd_GetComponentLength (OSCTXT *pctxt, OSUINT32 itemBits)
- int pd_GetComponentLength64 (OSCTXT *pctxt, OSUINT32 itemBits, OSSIZE *plength)

- int pd_Interval (OSCTXT *pctxt, const char **string, OSBOOL rec, OSUINT32 startFlags, OSUINT32 endFlags)
- int pd_Length (OSCTXT *pctxt, OSUINT32 *pvalue)
- int pd_Length64 (OSCTXT *pctxt, OSSIZE *pvalue)
- int pd_ObjectIdentifier (OSCTXT *pctxt, ASN1OBJID *pvalue)
- int pd_oid64 (OSCTXT *pctxt, ASN1OID64 *pvalue)
- int pd_RelativeOID (OSCTXT *pctxt, ASN1OBJID *pvalue)
- int pd_OctetString (OSCTXT *pctxt, OSUINT32 *pnumocts, OSOCTET *buffer, OSUINT32 bufsiz)
- int pd_OctetString64 (OSCTXT *pctxt, OSSIZE *pnumocts, OSOCTET *buffer, OSSIZE bufsiz)
- int pd_OpenType (OSCTXT *pctxt, const OSOCTET **object_p2, OSSIZE *pnumocts)
- int pd_OpenTypeExt (OSCTXT *pctxt, const OSOCTET **object_p2, OSSIZE *pnumocts)
- int pd_Real (OSCTXT *pctxt, OSREAL *pvalue)
- int pd_Real2 (OSCTXT *pctxt, OSREAL *pvalue)
- int pd_SmallLength (OSCTXT *pctxt, OSUINT32 *pvalue)
- int pd_SmallNonNegWholeNumber (OSCTXT *pctxt, OSUINT32 *pvalue)
- int pd_SemiConsInteger (OSCTXT *pctxt, OSINT32 *pvalue, OSINT64 lower)
- int pd_SemiConsUnsigned (OSCTXT *pctxt, OSUINT32 *pvalue, OSUINT64 lower)
- int pd_SemiConsUnsignedSignedBound (OSCTXT *pctxt, OSINT32 *pvalue, OSINT64 lower)
- int pd_SemiConsInt8 (OSCTXT *pctxt, OSINT8 *pvalue, OSINT64 lower)
- int pd_SemiConsUInt8 (OSCTXT *pctxt, OSUINT8 *pvalue, OSUINT64 lower)
- int pd_SemiConsUInt8SignedBound (OSCTXT *pctxt, OSUINT8 *pvalue, OSINT64 lower)
- int pd_SemiConsInt16 (OSCTXT *pctxt, OSINT16 *pvalue, OSINT64 lower)
- int pd_SemiConsUInt16 (OSCTXT *pctxt, OSUINT16 *pvalue, OSUINT64 lower)
- int pd_SemiConsUInt16SignedBound (OSCTXT *pctxt, OSUINT16 *pvalue, OSINT64 lower)
- int pd_SemiConsInt64 (OSCTXT *pctxt, OSINT64 *pvalue, OSINT64 lower)
- int pd_SemiConsUInt64 (OSCTXT *pctxt, OSUINT64 *pvalue, OSUINT64 lower)
- int pd_SemiConsUInt64SignedBound (OSCTXT *pctxt, OSUINT64 *pvalue, OSINT64 lower)
- int pd_TimeStr (OSCTXT *pctxt, const char **string, OSUINT32 flags)
- int pd_UnconsInteger (OSCTXT *pctxt, OSINT32 *pvalue)
- int pd_UnconsLength (OSCTXT *pctxt, OSUINT32 *pvalue)
- EXTPERMETHOD int pd_UnconsLength64 (OSCTXT *pctxt, OSSIZE *pvalue)
- int pd_UnconsUnsigned (OSCTXT *pctxt, OSUINT32 *pvalue)
- int pd_UnconsInt8 (OSCTXT *pctxt, OSINT8 *pvalue)
- int pd_UnconsUInt8 (OSCTXT *pctxt, OSUINT8 *pvalue)
- int pd_UnconsInt16 (OSCTXT *pctxt, OSINT16 *pvalue)
- int pd_UnconsUInt16 (OSCTXT *pctxt, OSUINT16 *pvalue)
- int pd_UnconsInt64 (OSCTXT *pctxt, OSINT64 *pvalue)
- int pd_UnconsUInt64 (OSCTXT *pctxt, OSUINT64 *pvalue)
- int pd_VarWidthCharString (OSCTXT *pctxt, const char **pvalue)
- int pd_YearInt (OSCTXT *pctxt, OSINT32 *pvalue)
- int pd_Real10 (OSCTXT *pctxt, const char **ppvalue)
- OSBOOL pd_isFragmented (OSCTXT *pctxt)
- void **pd_OpenTypeStart** (OSCTXT *pctxt, OSSIZE *pSavedSize, OSINT16 *pSavedBitOff)
- int **pd_OpenTypeEnd** (OSCTXT *pctxt, OSSIZE savedSize, OSINT16 savedBitOff)
- int uperDecConstrString (OSCTXT *pctxt, const char **string, const char *charSet, OSUINT32 nbits, OSUINT32 canSetBits)
- int uperDecConstrFixedLenString (OSCTXT *pctxt, char *strbuf, size_t bufsiz, const char *charSet, OSUINT32 nbits, OSUINT32 canSetBits)

6.4.1 Detailed Description

PER runtime library decode functions handle the decoding of the primitive ASN.1 data types and length variables. Calls to these functions are assembled in the C source code generated by the ASN1C complier to decode complex ASN.1 structures. These functions are also directly callable from within a user's application program if the need to decode a primitive item exists.

The procedure to decode a primitive data item is as follows:

1. Call the pu_newContext or pu_initContext function to specify the address of the buffer containing the encoded ASN.1 data to be decoded and whether the data is aligned, or unaligned.
2. Call the specific decode function to decode the value.

6.4.2 Macro Definition Documentation

6.4.2.1 pd_moveBitCursor

```
#define pd_moveBitCursor(
             pctxt,
             bitOffset ) rtxMoveBitCursor(pctxt,bitOffset)
```

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
bitOffset	The bit offset inside the message buffer.

6.4.3 Function Documentation

6.4.3.1 pd_16BitConstrainedString()

```
int pd_16BitConstrainedString (
             OSCTXT * pctxt,
             Asn116BitCharString * pString,
             Asn116BitCharSet * pCharSet )
```

This function will encode a constrained ASN.1 character string. This function is normally not called directly but rather is called from Useful Type Character String encode functions that deal with 16-bit strings. The only function that does not release is the pe_BMPString function.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
pString	Character string to be encoded. The structure includes a count field containing the number of characters to encode and an array of unsigned short integers to hold the 16-bit characters to be encoded.
pCharSet	Pointer to the constraining character set. This contains an array containing all valid characters in the set as well as the aligned and unaligned bit counts required to encode the characters.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.2 pd_32BitConstrainedString()

```
int pd_32BitConstrainedString (
             OSCTXT * pctxt,
             Asn132BitCharString * pString,
             Asn132BitCharSet * pCharSet )
```

This function will encode a constrained ASN.1 character string. This function is normally not called directly but rather is called from Useful Type Character String encode functions that deal with 32-bit strings. The only function that does not release is the pe_UniversalString function.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
pString	Character string to be encoded. The structure includes a count field containing the number of characters to encode and an array of unsigned short integers to hold the 32-bit characters to be encoded.
pCharSet	Pointer to the constraining character set. This contains an array containing all valid characters in the set as well as the aligned and unaligned bit counts required to encode the characters.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.3 pd_BigInteger()

```
int pd_BigInteger (
             OSCTXT * pctxt,
             const char ** ppvalue )
```

This function decodes a variable of the ASN.1 INTEGER type. In this case, the integer is assumed to be of a larger size than can fit in a C or C++ long type (normally 32 or 64 bits). For example, parameters used to calculate security values are typically larger than these sizes. These variables are stored in character string constant variables. They are represented as hexadecimal strings starting with "0x" prefix. If it is necessary to convert a hexadecimal string to another radix, then use the ::rtxBigIntSetStr / ::rtxBigIntToString functions.

Parameters

pctxt	Pointer to context block structure.
ppvalue	Pointer to a character pointer variable to receive the decoded unsigned value. Dynamic memory is allocated for the variable using the ::rtxMemAlloc function. The decoded variable is represented as a decimal string starting with no prefix.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.4 pd_BigIntegerEx()

```
int pd_BigIntegerEx (
             OSCTXT * pctxt,
             const char ** ppvalue,
             int radix )
```

This variant of the pd_BigInteger function allows the user to select the radix of the decoded integer string.

Parameters

pctxt	Pointer to context block structure.
ppvalue	Pointer to a character pointer variable to receive the decoded unsigned value. Dynamic memory is allocated for the variable using the ::rtxMemAlloc function. The decoded variable is represented as a decimal string starting with no prefix.
radix	Radix to be used for decoded string. Valid values are 2, 8, 10, or 16.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.5 pd_BigIntegerValue()

```
int pd_BigIntegerValue (
             OSCTXT * pctxt,
             const char ** ppvalue,
             int radix,
             OSUINT32 nbytes )
```

This function decodes only the value portion of an integer field. It is assume the length was decode separately.

Parameters

pctxt	Pointer to context block structure.
ppvalue	Pointer to a character pointer variable to receive the decoded unsigned value. Dynamic memory is allocated for the variable using the ::rtxMemAlloc function. The decoded variable is represented as a decimal string starting with no prefix.
radix	Radix to be used for decoded string. Valid values are 2, 8, 10, or 16.
nbytes	Length in bytes of the value component.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.6 pd_BitString()

```
int pd_BitString (
             OSCTXT * pctxt,
             OSUINT32 * numbits_p,
             OSOCTET * buffer,
             OSSIZE bufsiz )
```

This function will decode a value of the ASN.1 bit string type whose maximum size is is known in advance. The ASN1C complier generates a call to this function to decode bit string productions or elements that contain a size constraint.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
numbits_p	Pointer to an unsigned integer variable to receive decoded number of bits.
buffer	Pointer to a fixed-size or pre-allocated array of bufsiz octets to receive a decoded bit string.
bufsiz	Length (in octets) of the buffer to receive the decoded bit string.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.7 pd_BitString32()

```
int pd_BitString32 (
             OSCTXT * pctxt,
             ASN1BitStr32 * pbitstr,
             OSSIZE lower,
             OSSIZE upper )
```

This version of pd_BitString will decode a bit string into the standard 32-bit bit string type which can hold up to 32 bits.

See also

pd_BitString

6.4.3.8 pd_BitString64()

```
int pd_BitString64 (
             OSCTXT * pctxt,
             OSSIZE * numbits_p,
             OSOCTET * buffer,
             OSSIZE bufsiz )
```

64-bit version of pd_BitString. Length is returned in a size-typed variable which scales to 64-bits on 64-bit machines.

See also

pd_BitString

6.4.3.9 pd_BMPString()

```
int pd_BMPString (
             OSCTXT * pctxt,
             ASN1BMPString * pvalue,
             Asn116BitCharSet * permCharSet )
```

This function will decode a variable of the ASN.1 BMP character string. This differs from the decode routines for the character strings previously described in that the BMP string type is based on 16-bit characters. A 16-bit character string is modeled using an array of unsigned short integers.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
pvalue	Pointer to character string structure to receive the decoded result. The structure includes a count field containing the number of characters and an array of unsigned short integers to hold the 16-bit character values.
permCharSet	A pointer to the constraining character set. This contains an array containing all valid characters in the set as well as the aligned and unaligned bit counts required to encode the characters.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.10 pd_byte_align()

```
int pd_byte_align (
             OSCTXT * pctxt )
```

This function will position the decode bit cursor on the next byte boundary.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.11 pd_ChoiceOpenTypeExt()

```
int pd_ChoiceOpenTypeExt (
             OSCTXT * pctxt,
             const OSOCTET ** object_p2,
             OSSIZE * pnumocts )
```

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
object_p2	A pointer to an open type variable to receive the decoded data.
pnumocts	A pointer to an unsigned buffer of bufsiz octets to receive decoded data.

6.4.3.12 pd_ConsInt16()

```
int pd_ConsInt16 (
             OSCTXT * pctxt,
             OSINT16 * pvalue,
             OSINT64 lower,
             OSINT64 upper )
```

This function will decode a 16-bit integer constrained either by a value or value range constraint.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to 16-bit integer variable to receive decoded value.
lower	Lower range value.
upper	Upper range value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.13 pd_ConsInt64()

```
int pd_ConsInt64 (
             OSCTXT * pctxt,
```

```
            OSINT64 * pvalue,
            OSINT64 lower,
            OSINT64 upper )
```

This function will decode a 64-bit integer constrained either by a value or value range constraint.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to 64-bit integer variable to receive decoded value.
lower	Lower range value, represented as 64-bit integer.
upper	Upper range value, represented as 64-bit integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.14 pd_ConsInt8()

```
int pd_ConsInt8 (
            OSCTXT * pctxt,
            OSINT8 * pvalue,
            OSINT64 lower,
            OSINT64 upper )
```

This function will decode an 8-bit integer constrained either by a value or value range constraint.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to 8-bit integer variable to receive decoded value.
lower	Lower range value.
upper	Upper range value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.15 pd_ConsInteger()

```
int pd_ConsInteger (
             OSCTXT * pctxt,
             OSINT32 * pvalue,
             OSINT64 lower,
             OSINT64 upper )
```

This function will decode an integer constrained either by a value or value range constraint.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to integer variable to receive decoded value.
lower	Lower range value.
upper	Upper range value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.16 pd_ConstrainedString()

```
int pd_ConstrainedString (
             OSCTXT * pctxt,
             const char ** string,
             Asn1CharSet * pCharSet )
```

This function decodes a constrained string value. This is a deprecated version of the function provided for backward compatibility.

Parameters

pctxt	Pointer to context block structure.
string	Pointer to const char* to receive decoded string. Memory will be allocated for this variable using internal memory management functions.
pCharSet	Pointer to a character set descriptor structure. This contains an array containing all valid characters in the set as well as the aligned and unaligned bit counts required to encode the characters.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.17 pd_ConstrainedStringEx()

```
int pd_ConstrainedStringEx (
             OSCTXT * pctxt,
             const char ** string,
             const char * charSet,
             OSUINT32 abits,
             OSUINT32 ubits,
             OSUINT32 canSetBits )
```

This function decodes a constrained string value. This version of the function allows all of the required permitted alphabet constraint parameters to be passed in as arguments.

Parameters

pctxt	Pointer to context block structure.
string	Pointer to const char* to receive decoded string. Memory will be allocated for this variable using internal memory management functions.
charSet	String containing permitted alphabet character set. Can be null if no character set was specified.
abits	Number of bits in a character set character (aligned).
ubits	Number of bits in a character set character (unaligned).
canSetBits	Number of bits in a character from the canonical set representing this string.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.18 pd_ConstrFixedLenStringEx()

```
int pd_ConstrFixedLenStringEx (
             OSCTXT * pctxt,
             char * strbuf,
             size_t bufsiz,
             const char * charSet,
             OSUINT32 abits,
             OSUINT32 ubits,
             OSUINT32 canSetBits )
```

This function decodes a constrained string value into a fixed-size buffer. This function allows all of the required permitted alphabet constraint parameters to be passed in as arguments.

Parameters

pctxt	Pointer to context block structure.
strbuf	Pointer to character array to receive decoded string.
bufsiz	Size of strbuf character array.
charSet	String containing permitted alphabet character set. Can be null if no character set was specified.
abits	Number of bits in a character set character (aligned).
ubits	Number of bits in a character set character (unaligned).
canSetBits	Number of bits in a character from the canonical set representing this string.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.19 pd_ConsUInt16()

```
int pd_ConsUInt16 (
             OSCTXT * pctxt,
             OSUINT16 * pvalue,
             OSUINT64 lower,
             OSUINT64 upper )
```

This function will decode a 16-bit unsigned integer constrained either by a value or value range constraint.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to 16-bit unsigned integer variable to receive decoded value.
lower	Lower range value.
upper	Upper range value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.20 pd_ConsUInt16SignedBound()

```
int pd_ConsUInt16SignedBound (
             OSCTXT * pctxt,
             OSUINT16 * pvalue,
             OSINT64 lower,
             OSINT64 upper )
```

This function will decode a 16-bit unsigned integer constrained either by a value or value range constraint.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to 16-bit unsigned integer variable to receive decoded value.
lower	Lower range value.
upper	Upper range value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.21 pd_ConsUInt64()

```
int pd_ConsUInt64 (
             OSCTXT * pctxt,
             OSUINT64 * pvalue,
             OSUINT64 lower,
             OSUINT64 upper )
```

This function will decode a 64-bit unsigned integer constrained either by a value or value range constraint.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to 64-bit unsigned integer variable to receive decoded value.
lower	Lower range value.
upper	Upper range value.

Returns

Completion status of operation:

- 0 (0) = success,

- negative return value is error.

6.4.3.22 pd_ConsUInt64SignedBound()

```
int pd_ConsUInt64SignedBound (
             OSCTXT * pctxt,
             OSUINT64 * pvalue,
             OSINT64 lower,
             OSINT64 upper )
```

This function will decode a 64-bit unsigned integer constrained either by a value or value range constraint.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to 64-bit unsigned integer variable to receive decoded value.
lower	Lower range value.
upper	Upper range value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.23 pd_ConsUInt8()

```
int pd_ConsUInt8 (
             OSCTXT * pctxt,
             OSUINT8 * pvalue,
             OSUINT64 lower,
             OSUINT64 upper )
```

This function will decode an 8-bit unsigned integer constrained either by a value or value range constraint.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to 8-bit unsigned integer variable to receive decoded value.
lower	Lower range value.
upper	Upper range value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.24 pd_ConsUInt8SignedBound()

```
int pd_ConsUInt8SignedBound (
             OSCTXT * pctxt,
             OSUINT8 * pvalue,
             OSINT64 lower,
             OSINT64 upper )
```

This function will decode an 8-bit unsigned integer constrained either by a value or value range constraint.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to 8-bit unsigned integer variable to receive decoded value.
lower	Lower range value.
upper	Upper range value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.25 pd_ConsUnsigned()

```
int pd_ConsUnsigned (
             OSCTXT * pctxt,
             OSUINT32 * pvalue,
             OSUINT64 lower,
             OSUINT64 upper )
```

This function will decode an unsigned integer constrained either by a value or value range constraint.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to unsigned integer variable to receive decoded value.
lower	Lower range value.
upper	Upper range value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.26 pd_ConsUnsignedSignedBound()

```
int pd_ConsUnsignedSignedBound (
             OSCTXT * pctxt,
             OSUINT32 * pvalue,
             OSINT64 lower,
             OSINT64 upper )
```

This function will decode an unsigned integer constrained either by a value or value range constraint.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to unsigned integer variable to receive decoded value.
lower	Lower range value.
upper	Upper range value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.27 pd_ConsWholeNumber()

```
int pd_ConsWholeNumber (
             OSCTXT * pctxt,
             OSUINT32 * padjusted_value,
             OSUINT32 range_value )
```

This function decodes a constrained whole number as specified in Section 10.5 of the X.691 standard.

Parameters

pctxt	Pointer to context block structure.
padjusted_value	Pointer to unsigned adjusted integer value to receive decoded result. To get the final value, this value is added to the lower boundary of the range.
range_value	Unsigned integer value specifying the total size of the range. This is obtained by subtracting the lower range value from the upper range value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.28 pd_ConsWholeNumber64()

```
int pd_ConsWholeNumber64 (
             OSCTXT * pctxt,
             OSUINT64 * padjusted_value,
             OSUINT64 range_value )
```

This function decodes a constrained whole number as specified in Section 10.5 of the X.691 standard, represented as 64-bit integer.

Parameters

pctxt	Pointer to context block structure.
padjusted_value	Pointer to 64-bit unsigned adjusted integer value to receive decoded result. To get the final value, this value is added to the lower boundary of the range.
range_value	Unsigned 64-bit integer value specifying the total size of the range. This is obtained by subtracting the lower range value from the upper range value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.29 pd_DateStr()

```
int pd_DateStr (
             OSCTXT * pctxt,
             const char ** string,
             OSUINT32 flags )
```

This function will decode an ISO 8601 DATE type.

Parameters

pctxt	Pointer to context block structure.
string	Pointer to string variable to receive decoded value in string form (YYYY:MM:DD) and ect.
flags	Set of flags: OSANY|OSCENTURY|OSYEAR|OSMONTH|OSWEEK|OSDAY.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.30 pd_DateTimeStr()

```
int pd_DateTimeStr (
             OSCTXT * pctxt,
             const char ** string,
             OSUINT32 flags )
```

This function will decode an ISO 8601 DATE-TIME type.

Parameters

pctxt	Pointer to context block structure.
string	Pointer to string variable to receive decoded value in string form (YYYY-MM-DDTHH:MM:SS) and ect.
flags	Set of flags: OSANY|OSCENTURY|OSYEAR|OSMONTH|OSWEEK|OSDAY| OSHOURS|OSMINUTES|OSSECONDS|OSUTC|OSDIFF|n. n - set digit number of fraction part.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.31 pd_Duration()

```
int pd_Duration (
             OSCTXT * pctxt,
             const char ** string,
             OSBOOL rec )
```

This function will decode an ISO 8601 DURATION types.

Parameters

pctxt	Pointer to context block structure.
string	Pointer to string variable to receive decoded value in string form (PnYnMnDTnHnMnS).
rec	Decode recursive interval (Rn/).

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.32 pd_DynBitString()

```
int pd_DynBitString (
             OSCTXT * pctxt,
             ASN1DynBitStr * pBitStr )
```

This function will decode a variable of thr ASN.1 BIT STRING type. This function allocates dynamic memory t store the decoded result. The ASN1C complier generates a call to this function to decode an unconstrained bit string production or element.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
pBitStr	Pointer to a dynamic bit string structure to receive the decoded result. This structure contains a field to hold the number of decoded bits and a pointer to an octet string to hold the decoded data. Memory is allocated by the decoder using the rtxMemAlloc function. This memory is tracked within the context and released when the pu_freeContext function is invoked.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.33 pd_DynBitString64()

```
int pd_DynBitString64 (
             OSCTXT * pctxt,
             ASN1DynBitStr64 * pBitStr )
```

64-bit version of pd_DynBitString.

See also

pd_DynBitString

6.4.3.34 pd_DynOctetString()

```
int pd_DynOctetString (
             OSCTXT * pctxt,
             ASN1DynOctStr * pOctStr )
```

This function will decode a value of the ASN.1 octet string type whose maximum size is known in advance. The ASN1C complier generates a call to this function to decode octet string productions or elements that contain a size constraint.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
pOctStr	A pointer to a dynamic octet string to receive the decoded result.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.35 pd_DynOctetString64()

```
int pd_DynOctetString64 (
             OSCTXT * pctxt,
             OSDynOctStr64 * pOctStr )
```

64-bit version of pd_DynOctetString.

See also

pd_DynOctetString

6.4.3.36 pd_GetBinStrDataOffset()

```
int pd_GetBinStrDataOffset (
             OSCTXT * pctxt,
             OSUINT32 * pnumbits,
             OSBOOL bitStrFlag )
```

This function gets the offset in bits to the data field within a PER-encoded binary string (i.e a BIT or OCTET STRING).

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
pnumbits	A pointer to an unsigned integer to receive the bit count value.
bitStrFlag	TRUE if type being operaton is a BIT STRING; FALSE if OCTET STRING.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.37 pd_GetComponentLength()

```
int pd_GetComponentLength (
             OSCTXT * pctxt,
             OSUINT32 itemBits )
```

This function gets the total length of a PER-encoded component. In the case of a fragmented length, it will look ahead and add up each of the individual length components.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
itemBits	The size of the specific entity.

Returns

Completion status of operation:

- >= 0 = success, total parsed length
- negative return value is error.

6.4.3.38 pd_GetComponentLength64()

```
int pd_GetComponentLength64 (
             OSCTXT * pctxt,
             OSUINT32 itemBits,
             OSSIZE * plength )
```

This function gets the total length of a PER-encoded component. In the case of a fragmented length, it will look ahead and add up each of the individual length components. This version will return length value up to 64-bits in size in 64-bit systems.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
itemBits	The size of the specific entity.
plength	Pointer to variable to hold parsed length value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.39 pd_Interval()

```
int pd_Interval (
             OSCTXT * pctxt,
             const char ** string,
             OSBOOL rec,
             OSUINT32 startFlags,
             OSUINT32 endFlags )
```

This function will decode an ISO 8601 INTERVAL type.

Parameters

pctxt	Pointer to context block structure.
string	Pointer to string variable to receive decoded value in string form (start/end).
rec	Decode recursive interval (Rn/).
startFlags	Set format flags of interval start: OSANY|OSCENTURY|OSYEAR|OSMONTH|OSWEEK|OSDAY| OSHOURS|OSMINUTES|OSSECONDS|OSUTC|OSDIFF|n or OSDURATION. n - set digit number of fraction part.
endFlags	Set format flags of interval end.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.40 pd_isFragmented()

```
OSBOOL pd_isFragmented (
             OSCTXT * pctxt )
```

This function peeks at the open type length to determine if it is fragmented.

Parameters

pctxt	Pointer to a context structure.

6.4.3.41 pd_Length()

```
int pd_Length (
             OSCTXT * pctxt,
             OSUINT32 * pvalue )
```

This function will decode a length determinant value.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
pvalue	A pointer to an unsigned integer variable to receive the decoded length value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.42 pd_Length64()

```
int pd_Length64 (
             OSCTXT * pctxt,
             OSSIZE * pvalue )
```

This function will decode a length determinant value. This variant support lengths up to 64 bits in size on 64-bit architectures.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
pvalue	A pointer to a size type variable to receive the decoded length value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.43 pd_ObjectIdentifier()

```
int pd_ObjectIdentifier (
             OSCTXT * pctxt,
             ASN1OBJID * pvalue )
```

This function decodes a value of the ASN.1 object identifier type.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to value to receive decoded result. The ASN1OBJID structure contains an integer to hold the number of subidentifiers and an array to hold the subidentifier values.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.44 pd_OctetString()

```
int pd_OctetString (
             OSCTXT * pctxt,
             OSUINT32 * pnumocts,
             OSOCTET * buffer,
             OSUINT32 bufsiz )
```

This function will decode a value of the ASN.1 octet string type whose maximun size is known in advance. The ASN1C compiler generates a call to this function to decode octet string productions or elements that contain a size constraint.

Parameters

pctxt	Pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
pnumocts	A pointer to an unsigned buffer of bufsiz octets to receive decoded data.
buffer	A pointer to a pre-allocated buffer of size octets to receive the decoded data.
bufsiz	The size of the buffer to receive the decoded result.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.45 pd_OctetString64()

```
int pd_OctetString64 (
             OSCTXT * pctxt,
             OSSIZE * pnumocts,
             OSOCTET * buffer,
             OSSIZE bufsiz )
```

This function will decode a value of the ASN.1 octet string type whose maximun size is known in advance. The ASN1C compiler generates a call to this function to decode octet string productions or elements that contain a size constraint. This varaint of the function supports OCTET STRING's with sizes up to 64 bits in size on 64 bit systems.

Parameters

pctxt	Pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
pnumocts	A pointer to an unsigned buffer of bufsiz octets to receive decoded data.
buffer	A pointer to a pre-allocated buffer of size octets to receive the decoded data.
bufsiz	The size of the buffer to receive the decoded result.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.46 pd_oid64()

```
int pd_oid64 (
             OSCTXT * pctxt,
             ASN1OID64 * pvalue )
```

This function decodes a value of the ASN.1 object identifier type using 64-bit subidentifiers.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to value to receive decoded result. The ASN1OID64 structure contains an integer to hold the number of subidentifiers and an array of 64-bit unsigned integers to hold the subidentifier values.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.47 pd_OpenType()

```
int pd_OpenType (
             OSCTXT * pctxt,
             const OSOCTET ** object_p2,
             OSSIZE * pnumocts )
```

This function will decode an ASN.1 open type. This used to be the ASN.1 ANY type, but now is used in a variety of applications requiring an encoding that can be interpreted by a decoder without prior knowledge of the type of the variable.

Parameters

pctxt	Pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
object_p2	A pointer to an open type variable to receive the decoded data.
pnumocts	A pointer to an unsigned buffer of bufsiz octets to receive decoded data.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.48 pd_OpenTypeExt()

```
int pd_OpenTypeExt (
             OSCTXT * pctxt,
             const OSOCTET ** object_p2,
             OSSIZE * pnumocts )
```

This function will decode an ASN.1 open type extension. These are extra fields in a version-2 message that may be present after the ... extension marker. An open type structure (extElem1) is added to a message structure that contains an extension marker but no extension elements. The pd_OpenTypeExt function will populate this structure with the complete extension information (optional bit or choice index, length and data). A subsequent call to pe_OpenTypeExt will cause the saved extension fields to be included in a newly encoded message of the given type.

Parameters

pctxt	Pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
object_p2	A pointer to an open type variable to receive the decoded data.
pnumocts	A pointer to an unsigned buffer of bufsiz octets to receive decoded data.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.49 pd_Real()

```
int pd_Real (
             OSCTXT * pctxt,
             OSREAL * pvalue )
```

This function will decode a value of the binary encoded ASN.1 real type. This function allows non-zero finite REAL values to be encoded in base 2 or base 10. This function provides support for the plus-infinity special real values.

Parameters

pctxt	Pointer to a context structure. This provides a storage area for the function to store all workings variables that must be maintained between function calls.
pvalue	Pointer to an real variable to receive decoded value.

Returns

Completion status of operation:

- 0 (0) = success,

- negative return value is error.

6.4.3.50 pd_Real10()

```
int pd_Real10 (
             OSCTXT * pctxt,
             const char ** ppvalue )
```

This function will decode a value of the decimal encoded ASN.1 real type.

Parameters

pctxt	Pointer to a context structure. This provides a storage area for the function to store all workings variables that must be maintained between function calls.
ppvalue	Pointer to a character pointer variable to receive the decoded result. Dynamic memory is allocated for the variable using the ::rtxMemAlloc function.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.51 pd_Real2()

```
int pd_Real2 (
             OSCTXT * pctxt,
             OSREAL * pvalue )
```

This function will decode a value of the binary encoded ASN.1 real type. This function requires that non-zero finite REAL values be encoded in base 2. This function provides support for the plus-infinity special real values.

Parameters

pctxt	Pointer to a context structure. This provides a storage area for the function to store all workings variables that must be maintained between function calls.
pvalue	Pointer to an real variable to receive decoded value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.52 pd_RelativeOID()

```
int pd_RelativeOID (
             OSCTXT * pctxt,
             ASN1OBJID * pvalue )
```

This function decodes a value of the ASN.1 RELATIVE-OID type.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to value to receive decoded result. The ASN1OBJID structure contains an integer to hold the number of subidentifiers and an array to hold the subidentifier values.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.53 pd_SemiConsInt16()

```
int pd_SemiConsInt16 (
             OSCTXT * pctxt,
             OSINT16 * pvalue,
             OSINT64 lower )
```

This function will decode a semi-constrained 16-bit integer.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to 64-bit integer variable to receive decoded value.
lower	Lower range value, represented as signed 64-bit integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.54 pd_SemiConsInt64()

```
int pd_SemiConsInt64 (
             OSCTXT * pctxt,
             OSINT64 * pvalue,
             OSINT64 lower )
```

This function will decode a semi-constrained 64-bit integer.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to 64-bit integer variable to receive decoded value.
lower	Lower range value, represented as signed 64-bit integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.55 pd_SemiConsInt8()

```
int pd_SemiConsInt8 (
             OSCTXT * pctxt,
             OSINT8 * pvalue,
             OSINT64 lower )
```

This function will decode a semi-constrained 8-bit integer.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to 8-bit integer variable to receive decoded value.
lower	Lower range value, represented as signed 64-bit integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.56 pd_SemiConsInteger()

```
int pd_SemiConsInteger (
             OSCTXT * pctxt,
             OSINT32 * pvalue,
             OSINT64 lower )
```

This function will decode a semi-constrained integer.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to integer variable to receive decoded value.
lower	Lower range value, represented as signed integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.57 pd_SemiConsUInt16()

```
int pd_SemiConsUInt16 (
             OSCTXT * pctxt,
             OSUINT16 * pvalue,
             OSUINT64 lower )
```

This function will decode a semi-constrained unsigned 16-bit integer.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to unsigned 64-bit integer variable to receive decoded value.
lower	Lower range value, represented as unsigned 64-bit integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.58 pd_SemiConsUInt16SignedBound()

```
int pd_SemiConsUInt16SignedBound (
             OSCTXT * pctxt,
             OSUINT16 * pvalue,
             OSINT64 lower )
```

This function will decode a semi-constrained unsigned 16-bit integer.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to unsigned 64-bit integer variable to receive decoded value.
lower	Lower range value, represented as unsigned 64-bit integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.59 pd_SemiConsUInt64()

```
int pd_SemiConsUInt64 (
             OSCTXT * pctxt,
             OSUINT64 * pvalue,
             OSUINT64 lower )
```

This function will decode a semi-constrained unsigned 64-bit integer.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to unsigned 64-bit integer variable to receive decoded value.
lower	Lower range value, represented as unsigned 64-bit integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.60 pd_SemiConsUInt64SignedBound()

```
int pd_SemiConsUInt64SignedBound (
             OSCTXT * pctxt,
             OSUINT64 * pvalue,
             OSINT64 lower )
```

This function will decode a semi-constrained unsigned 64-bit integer.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to unsigned 64-bit integer variable to receive decoded value.
lower	Lower range value, represented as unsigned 64-bit integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.61 pd_SemiConsUInt8()

```
int pd_SemiConsUInt8 (
             OSCTXT * pctxt,
             OSUINT8 * pvalue,
             OSUINT64 lower )
```

This function will decode a semi-constrained unsigned 8-bit integer.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to unsigned 8-bit integer variable to receive decoded value.
lower	Lower range value, represented as unsigned 64-bit integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.62 pd_SemiConsUInt8SignedBound()

```
int pd_SemiConsUInt8SignedBound (
             OSCTXT * pctxt,
             OSUINT8 * pvalue,
             OSINT64 lower )
```

This function will decode a semi-constrained unsigned 8-bit integer.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to unsigned 8-bit integer variable to receive decoded value.
lower	Lower range value, represented as unsigned 64-bit integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.63 pd_SemiConsUnsigned()

```
int pd_SemiConsUnsigned (
             OSCTXT * pctxt,
             OSUINT32 * pvalue,
             OSUINT64 lower )
```

This function will decode a semi-constrained unsigned integer.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to unsigned integer variable to receive decoded value.
lower	Lower range value, represented as unsigned integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.64 pd_SemiConsUnsignedSignedBound()

```
int pd_SemiConsUnsignedSignedBound (
             OSCTXT * pctxt,
             OSINT32 * pvalue,
             OSINT64 lower )
```

This function will decode a semi-constrained unsigned integer.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to unsigned integer variable to receive decoded value.
lower	Lower range value, represented as unsigned integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.65 pd_SmallLength()

```
int pd_SmallLength (
             OSCTXT * pctxt,
             OSUINT32 * pvalue )
```

This function will decode a normally small length determinant as specified in 11.9 of the X.691 standard. This is a number that is expected to be small, but whose size is potentially unlimited due to the presence of an extension maker.

Parameters

pctxt	Pointer to a context structure. This provides a storage area for the function to store all workings variables that must be maintained between function calls.
pvalue	Pointer to an unsigned integer value to receive decoded results.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.66 pd_SmallNonNegWholeNumber()

```
int pd_SmallNonNegWholeNumber (
             OSCTXT * pctxt,
             OSUINT32 * pvalue )
```

This function will decode a small non-negative whole number as specified in Section 10.6 of the X.691 standard. This is a number that is expected to be small, but whose size is potentially unlimited due to the presence of an extension maker.

Parameters

pctxt	Pointer to a context structure. This provides a storage area for the function to store all workings variables that must be maintained between function calls.
pvalue	Pointer to an unsigned integer value to receive decoded results.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.67 pd_TimeStr()

```
int pd_TimeStr (
             OSCTXT * pctxt,
             const char ** string,
             OSUINT32 flags )
```

This function will decode ISO 8601 TIME types.

Parameters

pctxt	Pointer to context block structure.
string	Pointer to string variable to receive decoded value in string form (HH:MM:SS) and ect.
flags	Set of flags: OSHOURS|OSMINUTES|OSSECONDS|OSUTC|OSDIFF|n. n - set digit number of fraction part.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.68 pd_UnconsInt16()

```
int pd_UnconsInt16 (
             OSCTXT * pctxt,
             OSINT16 * pvalue )
```

This function will decode an unconstrained 16-bit integer.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to 16-bit integer variable to receive decoded value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.69 pd_UnconsInt64()

```
int pd_UnconsInt64 (
             OSCTXT * pctxt,
             OSINT64 * pvalue )
```

This function will decode an unconstrained 64-bit integer.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to 64-bit integer variable to receive decoded value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.70 pd_UnconsInt8()

```
int pd_UnconsInt8 (
             OSCTXT * pctxt,
             OSINT8 * pvalue )
```

This function will decode an unconstrained 8-bit integer.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to 8-bit integer variable to receive decoded value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.71 pd_UnconsInteger()

```
int pd_UnconsInteger (
             OSCTXT * pctxt,
             OSINT32 * pvalue )
```

This function will decode an unconstrained integer.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to integer variable to receive decoded value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.72 pd_UnconsLength()

```
int pd_UnconsLength (
             OSCTXT * pctxt,
             OSUINT32 * pvalue )
```

This function will decode an unconstrained length value or a length value with upper bound $>$ 64k.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to integer variable to receive decoded value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.73 pd_UnconsLength64()

```
EXTPERMETHOD int pd_UnconsLength64 (
             OSCTXT * pctxt,
             OSSIZE * pvalue )
```

This function will decode an unconstrained length value or a length value with upper bound $>$ 64k. This variant supports lengths up to 64 bits in size.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to size type variable to receive decoded value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.74 pd_UnconsUInt16()

```
int pd_UnconsUInt16 (
             OSCTXT * pctxt,
             OSUINT16 * pvalue )
```

This function will decode an unconstrained integer into an unsigned 16-bit integer. An error is returned if the value being decoded cannot be represented by ∗pvalue (it is negative or too large).

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to unsigned 16-bit integer variable to receive decoded value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.75 pd_UnconsUInt64()

```
int pd_UnconsUInt64 (
             OSCTXT * pctxt,
             OSUINT64 * pvalue )
```

This function will decode an unconstrained integer into an unsigned 64-bit integer. An error is returned if the value being decoded cannot be represented by ∗pvalue (it is negative or too large).

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to unsigned 64-bit integer variable to receive decoded value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.76 pd_UnconsUInt8()

```
int pd_UnconsUInt8 (
             OSCTXT * pctxt,
             OSUINT8 * pvalue )
```

This function will decode an unconstrained integer into an unsigned 8-bit integer. An error is returned if the value being decoded cannot be represented by ∗pvalue (it is negative or too large).

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to unsigned 8-bit integer variable to receive decoded value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.77 pd_UnconsUnsigned()

```
int pd_UnconsUnsigned (
             OSCTXT * pctxt,
             OSUINT32 * pvalue )
```

This function will decode an unconstrained integer into an unsigned type. An error is returned if the value to be decoded cannot be represented by ∗pvalue (it is either negative or too large).

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to unsigned integer variable to receive decoded value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.78 pd_UniversalString()

```
int pd_UniversalString (
             OSCTXT * pctxt,
             ASN1UniversalString * pvalue,
             Asn132BitCharSet * permCharSet )
```

This function will decode a variable of the ASN.1 32-bit character string. This differs from the decode routines for the character strings previously described because the universal string type is based on 32-bit characters. A 32-bit character string is modeled using an array of unsigned integers.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
pvalue	Pointer to character string structure to receive the decoded result. The structure includes a count field containing the number of characters and an array of unsigned short integers to hold the 32-bit character values.
permCharSet	A pointer to the constraining character set. This contains an array containing all valid characters in the set as well as the aligned and unaligned bit counts required to encode the characters.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.79 pd_VarWidthCharString()

```
int pd_VarWidthCharString (
             OSCTXT * pctxt,
             const char ** pvalue )
```

This function will decode a variable of the ASN.1 character string.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to a character pointer variable to receive the decoded result. Dynamic memory is allocated for the variable using the ::rtxMemAlloc function.

Returns

Completion status of operation:

- 0 (0) = success,

- negative return value is error.

6.4.3.80 pd_YearInt()

```
int pd_YearInt (
             OSCTXT * pctxt,
             OSINT32 * pvalue )
```

This function will decode an ISO 8601 YEAR type.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to integer variable to receive decoded value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.81 uperDecConstrFixedLenString()

```
int uperDecConstrFixedLenString (
             OSCTXT * pctxt,
             char * strbuf,
             size_t bufsiz,
             const char * charSet,
             OSUINT32 nbits,
             OSUINT32 canSetBits )
```

This function decodes a constrained string value into a fixed-size buffer. This version supports unaligned PER only. It allows all of the required permitted alphabet constraint parameters to be passed in as arguments.

Parameters

pctxt	Pointer to context block structure.
strbuf	Pointer to character array to receive decoded string.
bufsiz	Size of strbuf character array.
charSet	String containing permitted alphabet character set. Can be null if no character set was specified.
nbits	Number of bits in a character set character (unaligned).
canSetBits	Number of bits in a character from the canonical set representing this string.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.4.3.82 uperDecConstrString()

```
int uperDecConstrString (
             OSCTXT * pctxt,
             const char ** string,
             const char * charSet,
             OSUINT32 nbits,
             OSUINT32 canSetBits )
```

This function decodes a constrained string value. This version supports unaligned PER only. It allows all of the required permitted alphabet constraint parameters to be passed in as arguments.

Parameters

pctxt	Pointer to context block structure.
string	Pointer to const char* to receive decoded string. Memory will be allocated for this variable using internal memory management functions.
charSet	String containing permitted alphabet character set. Can be null if no character set was specified.
nbits	Number of bits in a character set character (unaligned).
canSetBits	Number of bits in a character from the canonical set representing this string.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5 PER C Encode Functions.

Macros

- #define pe_bit(pctxt, value) rtxEncBit(pctxt,value)
- #define pe_bits(pctxt, value, nbits) rtxEncBits(pctxt,value,nbits)
- #define pe_CheckBuffer(pctxt, nbytes) rtxCheckOutputBuffer(pctxt,nbytes)
- #define pe_ConsInteger(pctxt, value, lower, upper) pe_ConsInt64(pctxt, value, lower, upper)
- #define pe_ConsUnsigned(pctxt, value, lower, upper) pe_ConsUInt64(pctxt, value, lower, upper)
- #define pe_ConsUnsignedSignedBound(pcxt, value, lower, upper) pe_ConsUInt64SignedBound(pctxt, value, lower, upper)
- #define pe_octets(pctxt, pvalue, nbits) rtxEncBitsFromByteArray(pctxt,pvalue,nbits)
- #define pe_SemiConsInteger(pctxt, value, lower) pe_SemiConsInt64(pctxt, value, lower)
- #define pe_SemiConsUnsigned(pctxt, value, lower) pe_SemiConsUInt64(pctxt, value, lower)

Functions

- int pe_16BitConstrainedString (OSCTXT *pctxt, Asn116BitCharString value, Asn116BitCharSet *pCharSet)
- int pe_32BitConstrainedString (OSCTXT *pctxt, Asn132BitCharString value, Asn132BitCharSet *pCharSet)
- int pe_2sCompBinInt (OSCTXT *pctxt, OSINT32 value)
- int pe_2sCompBinInt64 (OSCTXT *pctxt, OSINT64 value)
- int pe_aligned_octets (OSCTXT *pctxt, OSOCTET *pvalue, OSUINT32 nocts)
- int pe_BigInteger (OSCTXT *pctxt, const char *pvalue)
- int pe_bits64 (OSCTXT *pctxt, OSUINT64 value, OSUINT32 nbits)
- int pe_BitString (OSCTXT *pctxt, OSSIZE numbits, const OSOCTET *data)
- int **pe_BitString32** (OSCTXT *pctxt, ASN1BitStr32 *pbitstr, OSUINT32 lower, OSUINT32 upper)
- int **pe_BinaryStringData** (OSCTXT *pctxt, OSSIZE itemCount, OSSIZE segSizeBits, const OSOCTET *data, const Asn1SizeCnst *pSizeCnst, OSBOOL bitStrFlag)
- EXTPERMETHOD int pe_BitStringExt (OSCTXT *pctxt, OSSIZE numbits, const OSOCTET *data, OSSIZE dataSize, const OSOCTET *extData)
- int pe_BMPString (OSCTXT *pctxt, ASN1BMPString value, Asn116BitCharSet *permCharSet)
- int pe_UniversalString (OSCTXT *pctxt, ASN1UniversalString value, Asn132BitCharSet *permCharSet)
- int pe_byte_align (OSCTXT *pctxt)
- int pe_ChoiceTypeExt (OSCTXT *pctxt, OSUINT32 numocts, const OSOCTET *data)
- int pe_ConsInt64 (OSCTXT *pctxt, OSINT64 value, OSINT64 lower, OSINT64 upper)
- int pe_ConstrainedString (OSCTXT *pctxt, const char *string, Asn1CharSet *pCharSet)
- int pe_ConstrainedStringEx (OSCTXT *pctxt, const char *string, const char *charSet, OSUINT32 abits, OSUI↩ NT32 ubits, OSUINT32 canSetBits)
- int pe_ConsUInt64 (OSCTXT *pctxt, OSUINT64 value, OSUINT64 lower, OSUINT64 upper)
- int pe_ConsUInt64SignedBound (OSCTXT *pctxt, OSUINT64 value, OSINT64 lower, OSINT64 upper)
- int pe_ConsWholeNumber (OSCTXT *pctxt, OSUINT32 adjusted_value, OSUINT32 range_value)
- int pe_ConsWholeNumber64 (OSCTXT *pctxt, OSUINT64 adjusted_value, OSUINT64 range_value)
- int pe_DateStr (OSCTXT *pctxt, const char *string, OSUINT32 flags)
- int pe_DateTimeStr (OSCTXT *pctxt, const char *string, OSUINT32 flags)
- int pe_Duration (OSCTXT *pctxt, const char *string, OSBOOL rec)
- OSUINT32 pe_GetIntLen (OSUINT32 value)
- size_t pe_GetMsgBitCnt (OSCTXT *pctxt)
- OSOCTET * pe_GetMsgPtr (OSCTXT *pctxt, OSINT32 *pLength)
- OSOCTET * pe_GetMsgPtrU (OSCTXT *pctxt, OSUINT32 *pLength)

- OSOCTET * pe_GetMsgPtr64 (OSCTXT *pctxt, OSSIZE *pLength)
- int pe_Interval (OSCTXT *pctxt, const char *string, OSBOOL rec, OSUINT32 startFlags, OSUINT32 endFlags)
- int pe_Length (OSCTXT *pctxt, OSSIZE value)
- int pe_NonNegBinInt (OSCTXT *pctxt, OSUINT32 value)
- int pe_NonNegBinInt64 (OSCTXT *pctxt, OSUINT64 value)
- int pe_ObjectIdentifier (OSCTXT *pctxt, ASN1OBJID *pvalue)
- int pe_oid64 (OSCTXT *pctxt, ASN1OID64 *pvalue)
- int pe_RelativeOID (OSCTXT *pctxt, ASN1OBJID *pvalue)
- int pe_OctetString (OSCTXT *pctxt, OSSIZE numocts, const OSOCTET *data)
- int pe_OpenType (OSCTXT *pctxt, OSSIZE numocts, const OSOCTET *data)
- int pe_OpenTypeEnd (OSCTXT *pctxt, OSUINT32 pos, void *pPerField)
- int pe_OpenTypeExt (OSCTXT *pctxt, OSRTDList *pElemList)
- int pe_OpenTypeExtBits (OSCTXT *pctxt, OSRTDList *pElemList)
- int pe_OpenTypeStart (OSCTXT *pctxt, OSUINT32 *pPos, void **ppPerField)
- int pe_Real (OSCTXT *pctxt, OSREAL value)
- int pe_SmallNonNegWholeNumber (OSCTXT *pctxt, OSUINT32 value)
- int pe_SmallLength (OSCTXT *pctxt, OSSIZE value)
- int pe_SemiConsInt64 (OSCTXT *pctxt, OSINT64 value, OSINT64 lower)
- int pe_SemiConsUnsignedSignedBound (OSCTXT *pctxt, OSUINT32 value, OSINT64 lower)
- int pe_SemiConsUInt64 (OSCTXT *pctxt, OSUINT64 value, OSUINT64 lower)
- int pe_SemiConsUInt64SignedBound (OSCTXT *pctxt, OSUINT64 value, OSINT64 lower)
- int pe_TimeStr (OSCTXT *pctxt, const char *string, OSUINT32 flags)
- int pe_UnconsLength (OSCTXT *pctxt, OSSIZE value)
- int pe_UnconsInteger (OSCTXT *pctxt, OSINT32 value)
- int pe_UnconsInt64 (OSCTXT *pctxt, OSINT64 value)
- int pe_UnconsUnsigned (OSCTXT *pctxt, OSUINT32 value)
- int pe_UnconsUInt64 (OSCTXT *pctxt, OSUINT64 value)
- int pe_VarWidthCharString (OSCTXT *pctxt, const char *value)
- int pe_YearInt (OSCTXT *pctxt, OSINT32 value)
- int pe_Real10 (OSCTXT *pctxt, const char *pvalue)
- int uperEncConstrString (OSCTXT *pctxt, const char *string, const char *charSet, OSUINT32 nbits, OSUINT32 canSetBits)

6.5.1 Detailed Description

The Per low-level encode functions handle the PER encoding of the primitive ASN.1 data types. Calls to these functions are assembled in the C source code generated by the ASN1C complier to accomplish the encoding of complex ASN.1 structures. These functions are also directly callable from within a user's application program if the need to accomplish a low level encoding function exists.

The procedure to call a low-level encode function is the same as the procedure to call a compiler generated encode function described above. The pu_newContext function must first be called to set a pointer to the buffer into which the variable is to be encoded. A static encode buffer is specified by assigning a pointer to a buffer and a buffer size. Setting the buffer address to NULL and buffer size to 0 specifies a dynamic buffer. The encode function is then invoked. The result of the encoding will start at the beginning of the specified buffer, or, if a dynamic buffer was used, only be obtained by calling pe_GetMsgPtr. The length of the encoded compound is obtained by calling pe_GetMsgLen.

6.5.2 Macro Definition Documentation

6.5.2.1 pe_bit

```
#define pe_bit(
              pctxt,
              value ) rtxEncBit(pctxt,value)
```

This function will encode a varialbe of the ASN.1 BOOLEAN type in single bit,

Parameters

pctxt	Pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
value	The BOOLEAN value to be encoded.

6.5.2.2 pe_bits

```
#define pe_bits(
              pctxt,
              value,
              nbits ) rtxEncBits(pctxt,value,nbits)
```

This function encodes multiple bits.

Parameters

pctxt	Pointer to context block structure.
value	Unsigned integer containing the bits to be encoded.
nbits	Number of bits in value to encode.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.2.3 pe_CheckBuffer

```
#define pe_CheckBuffer(
              pctxt,
              nbytes ) rtxCheckOutputBuffer(pctxt,nbytes)
```

This function will determine if the given number of bytes will fit in the encode buffer. If not, either the buffer is expanded (if it is a dynamic buffer) or an error is signaled.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
nbytes	Number of bytes of space required to hold the variable to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.2.4 pe_ConsInteger

```
#define pe_ConsInteger(
              pctxt,
              value,
              lower,
              upper ) pe_ConsInt64(pctxt, value, lower, upper)
```

This function encodes an integer constrained either by a value or value range constraint.

Parameters

pctxt	Pointer to context block structure.
value	Value to be encoded.
lower	Lower range value.
upper	Upper range value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.2.5 pe_ConsUnsigned

```
#define pe_ConsUnsigned(
              pctxt,
              value,
```

```
            lower,
            upper ) pe_ConsUInt64(pctxt, value, lower, upper)
```

This function encodes an unsigned integer constrained either by a value or value range constraint. The constrained unsigned integer option is used if:

1. The lower value of the range is >= 0, and 2. The upper value of the range is >= MAXINT

Parameters

pctxt	Pointer to context block structure.
value	Value to be encoded.
lower	Lower range value.
upper	Upper range value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.2.6 pe_ConsUnsignedSignedBound

```
#define pe_ConsUnsignedSignedBound(
            pcxt,
            value,
            lower,
            upper ) pe_ConsUInt64SignedBound(pctxt, value, lower, upper)
```

This function encodes an unsigned integer constrained either by a value or value range constraint. The constrained unsigned integer option is used if:

1. The lower value of the range is >= 0, and 2. The upper value of the range is >= MAXINT

Parameters

pctxt	Pointer to context block structure.
value	Value to be encoded.
lower	Lower range value.
upper	Upper range value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.2.7 pe_octets

```
#define pe_octets(
              pctxt,
              pvalue,
              nbits ) rtxEncBitsFromByteArray(pctxt,pvalue,nbits)
```

This fuction will encode an array of octets. The Octets will be encoded unaligned starting at the current bit offset within the encode buffer.

Parameters

pctxt	A pointer to a context structure. The provides a storage area for the function to store all working variables that must be maintained between function calls.
pvalue	A pointer to an array of octets to encode
nbits	The number of Octets to encode

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.2.8 pe_SemiConsInteger

```
#define pe_SemiConsInteger(
              pctxt,
              value,
              lower ) pe_SemiConsInt64(pctxt, value, lower)
```

This function encodes an semi-constrained integer.

Parameters

pctxt	Pointer to context block structure.
value	Value to be encoded.
lower	Lower range value, represented as signed integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.2.9 pe_SemiConsUnsigned

```
#define pe_SemiConsUnsigned(
              pctxt,
              value,
              lower ) pe_SemiConsUInt64(pctxt, value, lower)
```

This function encodes an semi-constrained unsigned integer.

Parameters

pctxt	Pointer to context block structure.
value	Value to be encoded.
lower	Lower range value, represented as unsigned integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3 Function Documentation

6.5.3.1 pe_16BitConstrainedString()

```
int pe_16BitConstrainedString (
             OSCTXT * pctxt,
             Asn116BitCharString value,
             Asn116BitCharSet * pCharSet )
```

This function will encode a constrained ASN.1 character string. This function is normally not called directly but rather is called from Useful Type Character String encode functions that deal with 16-bit strings. The only function that does that in this release is the pe_BMPString function.

Parameters

pctxt	Pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
value	Character string to be encoded. The structure includes a count field containing the number of characters to encode and an array of unsigned short integers to hold the 16-bit characters to be encoded.
pCharSet	Pointer to the constraining character set. The contains an array containing all valid characters in the set as well as the aligned and unaligned bit counts required to encode the characters.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.2 pe_2sCompBinInt()

```
int pe_2sCompBinInt (
             OSCTXT * pctxt,
             OSINT32 value )
```

This function encodes a two's complement binary integer as specified in Section 10.4 of the X.691 standard.

Parameters

pctxt	Pointer to context block structure.
value	Signed integer value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.3 pe_2sCompBinInt64()

```
int pe_2sCompBinInt64 (
             OSCTXT * pctxt,
             OSINT64 value )
```

This function encodes a two's complement binary 64-bit integer as specified in Section 10.4 of the X.691 standard.

Parameters

pctxt	Pointer to context block structure.
value	Signed 64-bit integer value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.4 pe_32BitConstrainedString()

```
int pe_32BitConstrainedString (
             OSCTXT * pctxt,
             Asn132BitCharString value,
             Asn132BitCharSet * pCharSet )
```

This function will encode a constrained ASN.1 character string. This function is normally not called directly but rather is called from Useful Type Character String encode functions that deal with 32-bit strings. The only function that does that in this release is the pe_UniversalString function.

Parameters

pctxt	Pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
value	Character string to be encoded. The structure includes a count field containing the number of characters to encode and an array of unsigned short integers to hold the 32-bit characters to be encoded.
pCharSet	Pointer to the constraining character set. The contains an array containing all valid characters in the set as well as the aligned and unaligned bit counts required to encode the characters.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.5 pe_aligned_octets()

```
int pe_aligned_octets (
             OSCTXT * pctxt,
```

```
OSOCTET * pvalue,
OSUINT32 nocts )
```

Parameters

pctxt	Pointer to context block structure.
pvalue	A pointer to a character string containing the value to be encoded.
nocts	The number of octets.

6.5.3.6 pe_BigInteger()

```
int pe_BigInteger (
             OSCTXT * pctxt,
             const char * pvalue )
```

The pe_BigInteger function will encode a variable of the ASN.1 INTEGER type. In this case, the integer is assumed to be of a larger size than can fit in a C or C++ long type (normally 32 or 64 bits). For example, parameters used to calculate security values are typically larger than these sizes. Items of this type are stored in character string constant variables. They can be represented as decimal strings (with no prefixes), as hexadecimal strings starting with a "0x" prefix, as octal strings starting with a "0o" prefix or as binary strings starting with a "0b" prefix. Other radixes currently are not supported. It is highly recommended to use the hexadecimal or binary strings for better performance.

Parameters

pctxt	Pointer to context block structure.
pvalue	A pointer to a character string containing the value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.7 pe_bits64()

```
int pe_bits64 (
             OSCTXT * pctxt,
             OSUINT64 value,
             OSUINT32 nbits )
```

This function encodes multiple bits, using unsigned 64-bit integer to hold bits.

Parameters

pctxt	Pointer to context block structure.
value	Unsigned 64-bit integer containing the bits to be encoded.
nbits	Number of bits in value to encode.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.8 pe_BitString()

```
int pe_BitString (
             OSCTXT * pctxt,
             OSSIZE numbits,
             const OSOCTET * data )
```

This function will encode a value of the ASN.1 bit string type.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
numbits	The number of bits in the string to be encoded.
data	Pointer to the bit string data to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.9 pe_BitStringExt()

```
EXTPERMETHOD int pe_BitStringExt (
             OSCTXT * pctxt,
             OSSIZE numbits,
             const OSOCTET * data,
             OSSIZE dataSize,
             const OSOCTET * extData )
```

This function will encode a value of the ASN.1 bit string type. In this case, the bit string has an extended size and may contain extension data.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
numbits	The total number of bits in the string to be encoded (root + extension).
data	Pointer to the root bit string data to be encoded.
dataSize	Size, in octets, of the root bit string data.
extData	Pointer to extension bit string data to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.10 pe_BMPString()

```
int pe_BMPString (
             OSCTXT * pctxt,
             ASN1BMPString value,
             Asn116BitCharSet * permCharSet )
```

This function will encode a variable of the ASN.1 BMP character string. This differs from the encode routines for the character strings previously described in that the BMP string type is based on 16-bit characters. A 16-bit character string is modeled using an array of unsigned short integers.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
value	Character string to be encoded. This structure includes a count field containing the number of characters to encode and an array of unsigned short integers to hold the 16-bit characters to be encoded.
permCharSet	Pointer to the constraining character set. This contains an array containing all valid characters in the set as well as the aligned and unaligned bit counts required to encode the characters.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.11 pe_byte_align()

```
int pe_byte_align (
             OSCTXT * pctxt )
```

This function will position the encode bit cursor on the next byte boundry.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

Referenced by ASN1PEREncodeBuffer::byteAlign().

6.5.3.12 pe_ChoiceTypeExt()

```
int pe_ChoiceTypeExt (
             OSCTXT * pctxt,
             OSUINT32 numocts,
             const OSOCTET * data )
```

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
numocts	Number of octets in the string to be encoded.
data	Pointer to octet string data to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.13 pe_ConsInt64()

```
int pe_ConsInt64 (
             OSCTXT * pctxt,
             OSINT64 value,
             OSINT64 lower,
             OSINT64 upper )
```

This function encodes a 64-bit integer constrained either by a value or value range constraint.

Parameters

pctxt	Pointer to context block structure.
value	Value to be encoded, represented as 64-bit integer.
lower	Lower range value, represented as 64-bit integer.
upper	Upper range value, represented as 64-bit integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.14 pe_ConstrainedString()

```
int pe_ConstrainedString (
             OSCTXT * pctxt,
             const char * string,
             Asn1CharSet * pCharSet )
```

This function encodes a constrained string value. This is a deprecated version of the function provided for backward compatibility.

Parameters

pctxt	Pointer to context block structure.
string	Pointer to string to be encoded.
pCharSet	Pointer to a character set descriptor structure.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.15 pe_ConstrainedStringEx()

```
int pe_ConstrainedStringEx (
             OSCTXT * pctxt,
             const char * string,
             const char * charSet,
             OSUINT32 abits,
             OSUINT32 ubits,
             OSUINT32 canSetBits )
```

This function encodes a constrained string value. This version of the function allows all of the required permitted alphabet constraint parameters to be passed in as arguments.

Parameters

pctxt	Pointer to context block structure.
string	Pointer to string to be encoded.
charSet	String containing permitted alphabet character set. Can be null if no character set was specified.
abits	Number of bits in a character set character (aligned).
ubits	Number of bits in a character set character (unaligned).
canSetBits	Number of bits in a character from the canonical set representing this string.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.16 pe_ConsUInt64()

```
int pe_ConsUInt64 (
             OSCTXT * pctxt,
             OSUINT64 value,
             OSUINT64 lower,
             OSUINT64 upper )
```

This function encodes an unsigned 64-bit integer constrained either by a value or value range constraint. The constrained unsigned integer option is used if:

1. The lower value of the range is >= 0, and 2. The upper value of the range is >= MAXINT

Parameters

pctxt	Pointer to context block structure.
value	Value to be encoded, represented as unsigned 64-bit integer.
lower	Lower range value, represented as unsigned 64-bit integer.
upper	Upper range value, represented as unsigned 64-bit integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.17 pe_ConsUInt64SignedBound()

```
int pe_ConsUInt64SignedBound (
             OSCTXT * pctxt,
             OSUINT64 value,
             OSINT64 lower,
             OSINT64 upper )
```

This function encodes an unsigned 64-bit integer constrained either by a value or value range constraint. The constrained unsigned integer option is used if:

1. The lower value of the range is >= 0, and 2. The upper value of the range is >= MAXINT

Parameters

pctxt	Pointer to context block structure.
value	Value to be encoded, represented as unsigned 64-bit integer.
lower	Lower range value, represented as unsigned 64-bit integer.
upper	Upper range value, represented as unsigned 64-bit integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.18 pe_ConsWholeNumber()

```
int pe_ConsWholeNumber (
             OSCTXT * pctxt,
             OSUINT32 adjusted_value,
             OSUINT32 range_value )
```

This function encodes a constrained whole number as specified in Section 10.5 of the X.691 standard.

Parameters

pctxt	Pointer to context block structure.
adjusted_value	Unsigned adjusted integer value to be encoded. The adjustment is done by subtracting the lower value of the range from the value to be encoded.
range_value	Unsigned integer value specifying the total size of the range. This is obtained by subtracting the lower range value from the upper range value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.19 pe_ConsWholeNumber64()

```
int pe_ConsWholeNumber64 (
             OSCTXT * pctxt,
             OSUINT64 adjusted_value,
             OSUINT64 range_value )
```

This function encodes a constrained whole number as specified in Section 10.5 of the X.691 standard, represented as 64-bit integer.

Parameters

pctxt	Pointer to context block structure.
adjusted_value	Unsigned adjusted integer value to be encoded. The adjustment is done by subtracting the lower value of the range from the value to be encoded.
range_value	Unsigned integer value specifying the total size of the range. This is obtained by subtracting the lower range value from the upper range value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.20 pe_DateStr()

```
int pe_DateStr (
             OSCTXT * pctxt,
             const char * string,
             OSUINT32 flags )
```

This function will encode an ISO 8601 DATE types.

Parameters

pctxt	Pointer to context block structure.
string	Character string variable containing value to be encoded in string form (YYYY:MM:DD) and ect.
flags	Set of flags: OSANY|OSCENTURY|OSYEAR|OSMONTH|OSWEEK|OSDAY.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.21 pe_DateTimeStr()

```
int pe_DateTimeStr (
             OSCTXT * pctxt,
             const char * string,
             OSUINT32 flags )
```

This function will encode an ISO 8601 DATE-TIME types.

Parameters

pctxt	Pointer to context block structure.
string	Character string variable containing value to be encoded in string form (YYYY-MM-DDTHH:MM:SS) and ect.
flags	Set of flags: OSANY|OSCENTURY|OSYEAR|OSMONTH|OSWEEK|OSDAY| OSHOURS|OSMINUTES|OSSECONDS|OSUTC|OSDIFF|n. n - set digit number of fraction part.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.22 pe_Duration()

```
int pe_Duration (
             OSCTXT * pctxt,
             const char * string,
             OSBOOL rec )
```

This function will encode an ISO 8601 DURATION types.

Parameters

pctxt	Pointer to context block structure.
string	Character string variable containing value to be encoded in string form (PnYnMnDTnHnMnS).
rec	Encode recursive interval (Rn/).

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.23 pe_GetIntLen()

```
OSUINT32 pe_GetIntLen (
             OSUINT32 value )
```

Parameters

value	Length value to be encoded.

6.5.3.24 pe_GetMsgBitCnt()

```
size_t pe_GetMsgBitCnt (
```

```
            OSCTXT * pctxt )
```

Parameters

pctxt	Pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.

Referenced by ASN1PEREncodeBuffer::getMsgBitCnt().

6.5.3.25 pe_GetMsgPtr()

```
OSOCTET* pe_GetMsgPtr (
            OSCTXT * pctxt,
            OSINT32 * pLength )
```

This function will return the message pointer and length of an encoded message. This function is called after a complier generated encode function to get the pointer and length of the message. It is normally used when dynamic encoding is specified because the message pointer is not known until encoding is complete. If static encoding is used, the message starts at the beginning of the specified buffer adn the pe_GetMsgLen function can be used to obtain the lenght of the message.

Parameters

pctxt	Pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
pLength	Pointer to variable to receive length of the encoded message.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.26 pe_GetMsgPtr64()

```
OSOCTET* pe_GetMsgPtr64 (
            OSCTXT * pctxt,
            OSSIZE * pLength )
```

This version of pe_GetMsgPtr return the length as a size-typed value rather than a signed integer.

See also

pe_GetMsgPtr

6.5.3.27 pe_GetMsgPtrU()

```
OSOCTET* pe_GetMsgPtrU (
             OSCTXT * pctxt,
             OSUINT32 * pLength )
```

This version of pe_GetMsgPtr return the length as a 32-bit unsigned rather than a signed integer.

See also

pe_GetMsgPtr

6.5.3.28 pe_Interval()

```
int pe_Interval (
             OSCTXT * pctxt,
             const char * string,
             OSBOOL rec,
             OSUINT32 startFlags,
             OSUINT32 endFlags )
```

This function will encode an ISO 8601 INTERVAL type.

Parameters

pctxt	Pointer to context block structure.
string	Character string variable containing value to be encoded in string form (start/end).
rec	Encode recursive interval (Rn/).
startFlags	Set format flags of interval start: OSANY|OSCENTURY|OSYEAR|OSMONTH|OSWEEK|OSDAY|OSHOURS|OSMINUTES|OSSECONDS|OSUTC|OSDIFF|n or OSDURATION. n - set digit number of fraction part.
endFlags	Set format flags of interval end.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.29 pe_Length()

```
int pe_Length (
             OSCTXT * pctxt,
             OSSIZE value )
```

This function will encode a length determinant value.

Parameters

pctxt	Pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
value	Length value to be encoded.

Returns

If successful, then one of the following values:

- if value >= 16384, then fragmentation is required. The return will be the number of values to encode in the current fragment. The return will be a multiple of 16384, with the following constraints: 16384 <= return <= 65536 return <= value
- value (the given length) Otherwise, a negative error status code.

6.5.3.30 pe_NonNegBinInt()

```
int pe_NonNegBinInt (
             OSCTXT * pctxt,
             OSUINT32 value )
```

This function encodes a non-negative binary integer as specified in Section 10.3 of the X.691 standard.

Parameters

pctxt	Pointer to context block structure.
value	Unsigned integer value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.31 pe_NonNegBinInt64()

```
int pe_NonNegBinInt64 (
             OSCTXT * pctxt,
             OSUINT64 value )
```

This function encodes a non-negative binary 64-bit integer as specified in Section 10.3 of the X.691 standard.

Parameters

pctxt	Pointer to context block structure.
value	Unsigned 64-bit integer value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.32 pe_ObjectIdentifier()

```
int pe_ObjectIdentifier (
             OSCTXT * pctxt,
             ASN1OBJID * pvalue )
```

This function encodes a value of the ASN.1 object identifier type.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to value to be encoded. The ASN1OBJID structure contains a numids fields to hold the number of subidentifiers and an array to hold the subidentifier values.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.33 pe_OctetString()

```
int pe_OctetString (
             OSCTXT * pctxt,
             OSSIZE numocts,
             const OSOCTET * data )
```

This function will encode a value of the ASN.1 octet string type.

Parameters

pctxt	A pointer to a context structure. The provides a storage area for the function to store all working variables that must be maintained between function calls.
numocts	Number of octets in the string to be encoded.
data	Pointer to octet string data to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.34 pe_oid64()

```
int pe_oid64 (
             OSCTXT * pctxt,
             ASN1OID64 * pvalue )
```

This function encodes a value of the ASN.1 object identifier type, using 64-bit subidentifiers.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to value to be encoded. The ASN1OID64 structure contains a numids fields to hold the number of subidentifiers and an array of unsigned 64-bit integers to hold the subidentifier values.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.35 pe_OpenType()

```
int pe_OpenType (
             OSCTXT * pctxt,
             OSSIZE numocts,
             const OSOCTET * data )
```

This function will encode an ASN.1 open type. This used to be the ANY type, but now is used in a variety of applications requiring an encoding that can be interpreted by a decoder without a prior knowledge of the type of the variable.

Parameters

pctxt	A pointer to a context structure. The provides a storage area for the function to store all working variables that must be maintained between function calls.
numocts	Number of octets in the string to be encoded.
data	Pointer to octet string data to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.36 pe_OpenTypeEnd()

```
int pe_OpenTypeEnd (
             OSCTXT * pctxt,
             OSUINT32 pos,
             void * pPerField )
```

This function will finish encoding extension in ASN.1 open type. It will write open type length to saved position. If required function do fragmentation of open type data.

Parameters

pctxt	A pointer to a context structure. The provides a storage area for the function to store all working variables that must be maintained between function calls.
pos	Position that was saved in pe_OpenTypeStart function.
pPerField	A pointer to bit field that was saved in pe_OpenTypeStart function.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.37 pe_OpenTypeExt()

```
int pe_OpenTypeExt (
             OSCTXT * pctxt,
             OSRTDList * pElemList )
```

This function will encode an ASN.1 open type extension. An open type extension field is the data that potentially resides after the ... marker in a version-1 message. The open type structure contains a complete encoded bit set including option element bits or choice index, length, and data. Typically, this data is populated when a version-1 system decodes a version-2 message. The extension fields are retained and can then be re-encoded if a new message is to be sent out (for example, in a store and forward system).

Parameters

pctxt	A pointer to a context structure. The provides a storage area for the function to store all working variables that must be maintained between function calls.
pElemList	A pointer to the open type to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.38 pe_OpenTypeExtBits()

```
int pe_OpenTypeExtBits (
             OSCTXT * pctxt,
             OSRTDList * pElemList )
```

Parameters

pctxt	A pointer to a context structure. The provides a storage area for the function to store all working variables that must be maintained between function calls.
pElemList	A pointer to the open type to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.39 pe_OpenTypeStart()

```
int pe_OpenTypeStart (
             OSCTXT * pctxt,
```

```
OSUINT32 * pPos,
void ** ppPerField )
```

This function will start encoding extension in ASN.1 open type. It will reserve place to open type length and return current buffer position.

Parameters

pctxt	A pointer to a context structure. The provides a storage area for the function to store all working variables that must be maintained between function calls.
pPos	A pointer to return current buffer position.
ppPerField	A pointer to to return current bit field record.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.40 pe_Real()

```
int pe_Real (
             OSCTXT * pctxt,
             OSREAL value )
```

This function will encode a value of the ASN.1 real type. This function provides support for the plus-infinity and minus-infinity special real values. Use the rtxGetPlusInfinity or rtxGetMinusInfinity functions to get these special values.

Parameters

pctxt	A pointer to a context structure. The provides a storage area for the function to store all working variables that must be maintained between function calls.
value	Value to be encoded. Special real values plus and minus infinity are encoded by using the rtxGetPlusInfinity and the rtxGetMinusInfinity functions to se the real value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.41 pe_Real10()

```
int pe_Real10 (
             OSCTXT * pctxt,
             const char * pvalue )
```

This function will encode a number from character string to ASN.1 real type using decimal encoding. Number may be represented in integer, decimal, and exponent formats.

Parameters

pctxt	A pointer to a context structure. The provides a storage area for the function to store all working variables that must be maintained between function calls.
pvalue	Value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.42 pe_RelativeOID()

```
int pe_RelativeOID (
             OSCTXT * pctxt,
             ASN1OBJID * pvalue )
```

This function encodes a value of the ASN.1 RELATIVE-OID type.

Parameters

pctxt	Pointer to context block structure.
pvalue	Pointer to value to be encoded. The ASN1OBJID structure contains a numids fields to hold the number of subidentifiers and an array to hold the subidentifier values.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.43 pe_SemiConsInt64()

```
int pe_SemiConsInt64 (
             OSCTXT * pctxt,
             OSINT64 value,
             OSINT64 lower )
```

This function encodes an semi-constrained 64-bit integer.

Parameters

pctxt	Pointer to context block structure.
value	Value to be encoded, represented as 64-bit integer.
lower	Lower range value, represented as signed 64-bit integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.44 pe_SemiConsUInt64()

```
int pe_SemiConsUInt64 (
             OSCTXT * pctxt,
             OSUINT64 value,
             OSUINT64 lower )
```

This function encodes an semi-constrained unsigned 64-bit integer.

Parameters

pctxt	Pointer to context block structure.
value	Value to be encoded, represented as unsigned 64-bit integer.
lower	Lower range value, represented as unsigned 64-bit integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.45 pe_SemiConsUInt64SignedBound()

```
int pe_SemiConsUInt64SignedBound (
             OSCTXT * pctxt,
             OSUINT64 value,
             OSINT64 lower )
```

This function encodes an semi-constrained unsigned 64-bit integer.

Parameters

pctxt	Pointer to context block structure.
value	Value to be encoded, represented as unsigned 64-bit integer.
lower	Lower range value, represented as unsigned 64-bit integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.46 pe_SemiConsUnsignedSignedBound()

```
int pe_SemiConsUnsignedSignedBound (
             OSCTXT * pctxt,
             OSUINT32 value,
             OSINT64 lower )
```

This function encodes an semi-constrained unsigned integer.

Parameters

pctxt	Pointer to context block structure.
value	Value to be encoded.
lower	Lower range value, represented as unsigned integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.47 pe_SmallLength()

```
int pe_SmallLength (
             OSCTXT * pctxt,
             OSSIZE value )
```

This function will encode a normally small length as specified in Section 11.9 of the X.691 standard. This is a number that is expected to be small, but whose size is potentially unlimited due to the presence of an extension marker.

Parameters

pctxt	A pointer to a context structure. The provides a storage area for the function to store all working variables that must be maintained between function calls.
value	An unsigned integer value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.48 pe_SmallNonNegWholeNumber()

```
int pe_SmallNonNegWholeNumber (
             OSCTXT * pctxt,
             OSUINT32 value )
```

This function will endcode a small, non-negative whole number as specified in Section 10.6 of teh X.691 standard. This is a number that is expected to be small, but whose size is potentially unlimited due to the presence of an extension marker.

Parameters

pctxt	A pointer to a context structure. The provides a storage area for the function to store all working variables that must be maintained between function calls.
value	An unsigned integer value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.49 pe_TimeStr()

```
int pe_TimeStr (
             OSCTXT * pctxt,
             const char * string,
             OSUINT32 flags )
```

This function will encode an ISO 8601 TIME types.

Parameters

pctxt	Pointer to context block structure.
string	Character string variable containing value to be encoded in string form (HH:MM:SS) and ect.
flags	Set of flags: OSHOURS|OSMINUTES|OSSECONDS|OSUTC|OSDIFF|n. n - set digit number of fraction part.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.50 pe_UnconsInt64()

```
int pe_UnconsInt64 (
             OSCTXT * pctxt,
             OSINT64 value )
```

This function encodes an unconstrained 64-bit integer.

Parameters

pctxt	Pointer to context block structure.
value	Value to be encoded, represented as 64-bit integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.51 pe_UnconsInteger()

```
int pe_UnconsInteger (
             OSCTXT * pctxt,
             OSINT32 value )
```

This function encodes an unconstrained integer.

Parameters

pctxt	Pointer to context block structure.
value	Value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.52 pe_UnconsLength()

```
int pe_UnconsLength (
             OSCTXT * pctxt,
             OSSIZE value )
```

This function encodes an unconstrained length value.

Parameters

pctxt	A pointer to a context structure. The provides a storage area for the function to store all working variables that must be maintained between function calls.
value	Value to be encoded.

Returns

If successful, the encoded number of bytes is returned; otherwise, a negative error status code. Note that in the non-error case, this will always be equal to value unless a fragmented length is encoded.

6.5.3.53 pe_UnconsUInt64()

```
int pe_UnconsUInt64 (
             OSCTXT * pctxt,
             OSUINT64 value )
```

This function encodes an unconstrained unsigned 64-bit integer.

Parameters

pctxt	Pointer to context block structure.
value	Value to be encoded, represented as unsigned 64-bit integer.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.54 pe_UnconsUnsigned()

```
int pe_UnconsUnsigned (
             OSCTXT * pctxt,
             OSUINT32 value )
```

This function encodes an unconstrained unsigned integer.

Parameters

pctxt	Pointer to context block structure.
value	Value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.55 pe_UniversalString()

```
int pe_UniversalString (
             OSCTXT * pctxt,
             ASN1UniversalString value,
             Asn132BitCharSet * permCharSet )
```

This function will encode a variable of the ASN.1 Universal character string. This differs from the encode routines for the character strings previously described in that the Universal string type is based on 32-bit characters. A 32-bit character string is modeled using an array of unsigned integers.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
value	Character string to be encoded. The structure includes a count field containing all valid characters in the set as well as the aligned and unaligned bit counts required to encode the characters.
permCharSet	A pointer to the constraining character set. This contains an array containing all valid characters in the set as well as the aligned and the unaligned bit counts required to encode the characters.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.56 pe_VarWidthCharString()

```
int pe_VarWidthCharString (
             OSCTXT * pctxt,
             const char * value )
```

This function will encode a ASN.1 character string.

Parameters

pctxt	A pointer to a context structure. The provides a storage area for the function to store all working variables that must be maintained between function calls.
value	A pointer to a character string containing the value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.57 pe_YearInt()

```
int pe_YearInt (
             OSCTXT * pctxt,
             OSINT32 value )
```

This function will encode an ISO 8601 YEAR type.

Parameters

pctxt	Pointer to context block structure.
value	Value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.5.3.58 uperEncConstrString()

```
int uperEncConstrString (
             OSCTXT * pctxt,
             const char * string,
             const char * charSet,
             OSUINT32 nbits,
             OSUINT32 canSetBits )
```

This function encodes a constrained string value. This version supports unaligned PER only. It allows all of the required permitted alphabet constraint parameters to be passed in as arguments.

Parameters

pctxt	Pointer to context block structure.
string	Pointer to string to be encoded.
charSet	String containing permitted alphabet character set. Can be null if no character set was specified.
nbits	Number of bits in a character set character (unaligned).
canSetBits	Number of bits in a character from the canonical set representing this string.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.6 PER C Utility Functions

Macros

- #define **pd_setp**(pctxt, bufaddr, bufsiz, aligned) pu_setBuffer(pctxt, bufaddr, bufsiz, aligned)
- #define **pe_setp**(pctxt, bufaddr, bufsiz, aligned) pu_setBuffer(pctxt, bufaddr, bufsiz, aligned)

Functions

- int pu_addSizeConstraint (OSCTXT *pctxt, const Asn1SizeCnst *pSize)
- OSBOOL **pu_alignCharStr** (OSCTXT *pctxt, OSUINT32 len, OSUINT32 nbits, Asn1SizeCnst *pSize)
- OSUINT32 **pu_bitcnt** (OSUINT32 value)
- Asn1SizeCnst * **pu_checkSize** (Asn1SizeCnst *pSizeList, OSUINT32 value, OSBOOL *pExtendable)
- int pu_checkSizeExt (Asn1SizeCnst *pSizeCnst, OSSIZE value, OSBOOL *pExtendable, Asn1SizeValueRange *pSizeRange, OSBOOL *pExtSize)
- void pu_freeContext (OSCTXT *pctxt)
- size_t **pu_getMaskAndIndex** (size_t bitOffset, unsigned char *pMask)
- size_t pu_getMsgLen (OSCTXT *pctxt)
- size_t pu_getMsgLenBits (OSCTXT *pctxt)
- void pu_hexdump (OSCTXT *pctxt)
- int pu_setBuffer (OSCTXT *pctxt, OSOCTET *bufaddr, size_t bufsiz, OSBOOL aligned)
- int pe_resetBuffer (OSCTXT *pctxt)
- int pu_initContext (OSCTXT *pctxt, OSOCTET *bufaddr, OSUINT32 bufsiz, OSBOOL aligned)
- int pu_initContextBuffer (OSCTXT *pTarget, OSCTXT *pSource)
- const char * **pu_getFullName** (OSCTXT *pctxt, const char *suffix)
- void pu_insLenField (OSCTXT *pctxt)
- OSBOOL pu_isFixedSize (const Asn1SizeCnst *pSizeList)
- OSCTXT * pu_newContext (OSOCTET *bufaddr, OSUINT32 bufsiz, OSBOOL aligned)
- PERField * pu_newField (OSCTXT *pctxt, const char *nameSuffix)
- void pu_initFieldList (OSCTXT *pctxt, OSINT16 bitOffset)
- void pu_initRtxDiagBitFieldList (OSCTXT *pctxt, OSINT16 bitOffset)
- void pu_popName (OSCTXT *pctxt)
- void pu_pushElemName (OSCTXT *pctxt, int idx)
- void pu_pushName (OSCTXT *pctxt, const char *name)
- void pu_setCharSet (Asn1CharSet *pCharSet, const char *permSet)
- int pu_set16BitCharSet (OSCTXT *pctxt, Asn116BitCharSet *pCharSet, Asn116BitCharSet *pAlphabet)
- void pu_set16BitCharSetFromRange (Asn116BitCharSet *pCharSet, OSUINT16 firstChar, OSUINT16 lastChar)
- void **pu_setFldBitCount** (OSCTXT *pctxt)
- void **pu_setFldBitOffset** (OSCTXT *pctxt)
- void **pu_setFldListFromCtxt** (OSCTXT *pctxt, OSCTXT *srcctxt)
- void **pu_setOpenTypeFldList** (OSCTXT *pctxt, OSRTSList *plist)
- void **pu_setRtxDiagOpenTypeFldList** (OSRTDiagBitFieldList *pMainBFList, OSRTDiagBitFieldList *pOpen↩ TypeBFList)
- OSBOOL **pu_setTrace** (OSCTXT *pCtxt, OSBOOL value)
- void **pu_setAligned** (OSCTXT *pctxt, OSBOOL value)
- void **pu_deleteFieldList** (OSCTXT *pctxt)
- OSBOOL **pu_BitAndOctetStringAlignmentTest** (const Asn1SizeCnst *pSizeCnst, OSSIZE itemCount, OSB↩ OOL bitStrFlag)
- void pu_bindump (OSCTXT *pctxt, const char *varname)

- void **pu_dumpField** (OSCTXT *pctxt, PERField *pField, const char *varname, size_t nextBitOffset, BinDump↩ Buffer *pbuf)
- int pu_set32BitCharSet (OSCTXT *pctxt, Asn132BitCharSet *pCharSet, Asn132BitCharSet *pAlphabet)
- void pu_set32BitCharSetFromRange (Asn132BitCharSet *pCharSet, OSUINT32 firstChar, OSUINT32 lastChar)
- int pu_GetLibVersion (OSVOIDARG)
- const char * pu_GetLibInfo (OSVOIDARG)

6.6.1 Detailed Description

The PER utility functions are common routines used by both the PER encode and decode functions.

6.6.2 Function Documentation

6.6.2.1 pe_resetBuffer()

```
int pe_resetBuffer (
             OSCTXT * pctxt )
```

This function resets the PER encode buffer to allow a new message to be encoded into it.

Parameters

pctxt	Pointer to a context structure.

Returns

Status of operation: 0 if successful, or a negative value if an error occurs.

6.6.2.2 pu_addSizeConstraint()

```
int pu_addSizeConstraint (
             OSCTXT * pctxt,
             const Asn1SizeCnst * pSize )
```

This function is used to add size to a context variable.

Parameters

pctxt	A pointer to a context structure. The referenced size constraint is added to this structure for use by a subsequent encode or decode function.
pSize	A pointer to the size constraint to add the context variable.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.6.2.3 pu_bindump()

```
void pu_bindump (
             OSCTXT * pctxt,
             const char * varname )
```

This function provides a detailed binary dump of the contents of the buffer currently specified in the given context. The list of fields dumped by this function was previously built up within the context using calls pu_newField, pu_pushName, and pu_popName. These calls are built into both compiler-generated and low-level PER encode/decode functions to trace the actual bit encoding of a given construct.

Parameters

pctxt	A pointer to a context structure. The contents of the encode or decode buffer that was specified in the call to pu_initContext or pu_newContext is dumped.
varname	The name of the top-level variable name of the structure being dumped.

Referenced by ASN1PERMessageBuffer::binDump().

6.6.2.4 pu_checkSizeExt()

```
int pu_checkSizeExt (
             Asn1SizeCnst * pSizeCnst,
             OSSIZE value,
             OSBOOL * pExtendable,
             Asn1SizeValueRange * pSizeRange,
             OSBOOL * pExtSize )
```

This function checks if the given value falls within the root or extension part of the given size constraint.

Parameters

pSizeCnst	A pointer to a size constraint structure.
value	The value to be checked.
pExtendable	Pointer to boolean indicating if size constraint is extensible.
pSizeRange	Size range which value falls within.
pExtSize	Indicates if the size range is an extension range.

Returns

Status of the operation. 0 = success or RTERR_CONSVIO if size if not within the constraint bounds.

6.6.2.5 pu_freeContext()

```
void pu_freeContext (
             OSCTXT * pctxt )
```

This function releases all dynamicmemeory associated with a context. This function should be called even if the referenced context variable is not dynamic. The reason is because it frees memory allocated within the context as well as the context structure (it will only try to free the context structure if it detects that it was previously allocated using the pu_newContext function).

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.

6.6.2.6 pu_GetLibInfo()

```
const char* pu_GetLibInfo (
             OSVOIDARG  )
```

Returns information string describing the library. The string contains name of library, its version and flags used for building the library.

Returns

Information string

6.6.2.7 pu_GetLibVersion()

```
int pu_GetLibVersion (
             OSVOIDARG  )
```

Returns numeric version of run-time library. The format of version is as follows: MmP, where: M - major version number; m - minor version number; p - patch release number. For example, the value 581 means the version 5.81.

Returns

Version of run-time library in numeric format.

6.6.2.8 pu_getMsgLen()

```
size_t pu_getMsgLen (
             OSCTXT * pctxt )
```

This function will return the number of bytes in a PER message. This function is called after a complier generated encode function is called to get the byte count of the encoded component.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.

See also

pu_getMsgLenBits

Returns

Length (in bytes) of encoded message content.

Referenced by ASN1PERMessageBuffer::getMsgLen().

6.6.2.9 pu_getMsgLenBits()

```
size_t pu_getMsgLenBits (
             OSCTXT * pctxt )
```

This function will return the number of bits in a PER message. This function is called after a complier generated encode function is called to get the bit count of the encoded component.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.

See also

pu_getMsgLen

Returns

Length (in bits) of encoded message content.

6.6.2.10 pu_hexdump()

```
void pu_hexdump (
             OSCTXT * pctxt )
```

This function provides a standard hesadecimal dump of the contents of the buffer currently specified in the given context.

Parameters

pctxt	Pointer to a context structure. The contents of the encode or decode buffer that was specified in the call to pu_initContext or pu_newContext is dumped.

Referenced by ASN1PERMessageBuffer::hexDump().

6.6.2.11 pu_initContext()

```
int pu_initContext (
             OSCTXT * pctxt,
             OSOCTET * bufaddr,
             OSUINT32 bufsiz,
             OSBOOL aligned )
```

This function is used to initialize a pre-allocated OSCTXT structure. This can be an OSCTXT variable declared on the stack or a pointer to an OSCTXT structure that was previously allocated. This function sets all internal variables within the structure to their initial values.

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
bufaddr	For encoding, this is the address of a buffer to receive the encoded PER message (note: this is optional, if specified to NULL a dynamic buffer will be allocated). For decoding, this is that address of the buffer that contains the PER message to be decoded.
bufsiz	For encoding, this is the size of the encoded buffer (note: this is optional, if the bufaddr arguement is specified to NULL, then dynamic encoding is in effect and the buffer size is indefinite). For decoding, this is the length (in octets) of the PER message to be decoded.
aligned	A Boolean value specifying whether aligned or unaligned encoding should be performed.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.6.2.12 pu_initContextBuffer()

```
int pu_initContextBuffer (
             OSCTXT * pTarget,
             OSCTXT * pSource )
```

This function is used to initialize the buffer of an OSCTXT structure with buffer data from a second context structure. This function copies the buffer information from the source context buffer to the destination structure. The non-buffer related fields in the context remain untouched.

Parameters

pTarget	A pointer to the target context structure. Buffer information within this structure is updated with data from the source context.
pSource	A pointer to the source context structure. Buffer information from the source context structure is copied to the target structure.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.6.2.13 pu_initFieldList()

```
void pu_initFieldList (
             OSCTXT * pctxt,
             OSINT16 bitOffset )
```

This function initializes a new bit field list for diagnostics tracing. It is now deprecated and has been replaced by function pu_initRtxDiagBitFieldList which works with the common context bit tracing list structure rather than the ASN.1 PER-specific list.

Parameters

pctxt	A pointer to a context structure.
bitOffset	Current bit offset.

6.6.2.14 pu_initRtxDiagBitFieldList()

```
void pu_initRtxDiagBitFieldList (
             OSCTXT * pctxt,
             OSINT16 bitOffset )
```

This function initializes a new bit field list for diagnostics tracing. It is used in code to encode or decode table-constrained open type data to break down the patterns within the containers.

Parameters

pctxt	A pointer to a context structure.
bitOffset	Current bit offset.

6.6.2.15 pu_insLenField()

```
void pu_insLenField (
             OSCTXT * pctxt )
```

Parameters

pctxt	A pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.

6.6.2.16 pu_isFixedSize()

```
OSBOOL pu_isFixedSize (
             const Asn1SizeCnst * pSizeList )
```

This function determines if a size constraint is fixed (i.e allows only one value such as SIZE (2))

Parameters

pSizeList	A pointer to a size constraint structure.

Returns

TRUE if size constraint is fixed.

6.6.2.17 pu_newContext()

```
OSCTXT* pu_newContext (
             OSOCTET * bufaddr,
```

```
            OSUINT32 bufsiz,
            OSBOOL aligned )
```

This function is similar to the pu_initContext function in that it initializes a context variable. The difference is that this function allocates a new structure and then initializes it. It is equivalent to calling malloc to allocate a context structure and then calling pu_initContext to initialize it.

Parameters

bufaddr	For encoding, this is the address of a buffer to receive the encoded PER message (note: this is optional, if specified as NULL a dynamic buffer will be allocated). For decoding, this is that address of the buffer that contains the PER message to be decoded.
bufsiz	For encoding, this is the size of the encoded buffer (note: this is optional, if the bufaddr argument is specified to NULL, then dynamic encoding is in effect and the buffer size is indefinite). For decoding, this is the length (in octets) of the PER message to be decoded.
aligned	A Boolean value specifying whether aligned or unaligned encoding should be performed.

Returns

A pointer to OSCTXT structure to receive the allocated structure. NULL is returned if any error occurs in allocating or initializing the context.

6.6.2.18 pu_newField()

```
PERField* pu_newField (
            OSCTXT * pctxt,
            const char * nameSuffix )
```

This function creates a new bit field in a diagnostics bit trace field list. It is now deprecated and has been replaced by the common function rtxDiagNewBitField.

Parameters

pctxt	A pointer to a context structure.
nameSuffix	Suffix to be append to current element name.

6.6.2.19 pu_popName()

```
void pu_popName (
            OSCTXT * pctxt )
```

Pop an element name from the diagnostics bit trace stack. This function is now deprecated and has been replaced with the common function rtxCtxtPopElemName which is used maintain a name stack for other purposes as well (for example, error reporting).

Parameters

pctxt	A pointer to a context structure.

6.6.2.20 pu_pushElemName()

```
void pu_pushElemName (
             OSCTXT * pctxt,
             int idx )
```

Push an array element on the diagnostics bit trace stack. This function is now deprecated and has been replaced with the common function rtxCtxtPushArrayElemName which is used maintain a name stack for other purposes as well (for example, error reporting).

Parameters

pctxt	A pointer to a context structure.
idx	The location to insert the element.

6.6.2.21 pu_pushName()

```
void pu_pushName (
             OSCTXT * pctxt,
             const char * name )
```

Push an element on the diagnostics bit trace stack. This function is now deprecated and has been replaced with the common function rtxCtxtPushElemName which is used maintain a name stack for other purposes as well (for example, error reporting).

Parameters

pctxt	A pointer to a context structure.
name	A pointer to the element to add to the stack.

6.6.2.22 pu_set16BitCharSet()

```
int pu_set16BitCharSet (
             OSCTXT * pctxt,
```

```
            Asn116BitCharSet * pCharSet,
            Asn116BitCharSet * pAlphabet )
```

This function sets a permitted alphabet character set for 16-bit character strings. This is the resulting set of character when the character associated with a 16-bit string type is merged with a permitted alphabet constraint.

Parameters

pctxt	Pointer to a context structure.
pCharSet	Pointer to a character set structure describing the character set currently associated with the character string type. The resulting character set structure after being merged with the permSet parameter.
pAlphabet	Pointer to a structure describing the 16-bit permitted alphabet.

Returns

Status value of zero if successful, or a negative value if failure.

6.6.2.23 pu_set16BitCharSetFromRange()

```
void pu_set16BitCharSetFromRange (
            Asn116BitCharSet * pCharSet,
            OSUINT16 firstChar,
            OSUINT16 lastChar )
```

This function sets a permitted alphabet character set for 16-bit character strings from a sequential range of characters (for example, 'A'..'Z').

Parameters

pCharSet	Pointer to a character set structure describing the character set currently associated with the character string type. The resulting character set structure after being merged with the permSet parameter.
firstChar	The first character in the range.
lastChar	The last character in the range.

6.6.2.24 pu_set32BitCharSet()

```
int pu_set32BitCharSet (
            OSCTXT * pctxt,
            Asn132BitCharSet * pCharSet,
            Asn132BitCharSet * pAlphabet )
```

This function sets a permitted alphabet character set for 32-bit character strings. This is the resulting set of character when the character associated with a 16-bit string type is merged with a permitted alphabet constraint.

Parameters

pctxt	Pointer to a context structure.
pCharSet	Pointer to a character set structure describing the character set currently associated with the character string type. The resulting character set structure after being merged with the permSet parameter.
pAlphabet	Pointer to a structure describing the 32-bit permitted alphabet.

Returns

Status value of zero if successful, or a negative value if failure.

6.6.2.25 pu_set32BitCharSetFromRange()

```
void pu_set32BitCharSetFromRange (
             Asn132BitCharSet * pCharSet,
             OSUINT32 firstChar,
             OSUINT32 lastChar )
```

This function sets a permitted alphabet character set for 32-bit character strings from a sequential range of characters (for example, 'A'..'Z').

Parameters

pCharSet	Pointer to a character set structure describing the character set currently associated with the character string type. The resulting character set structure after being merged with the permSet parameter.
firstChar	The first character in the range.
lastChar	The last character in the range.

6.6.2.26 pu_setBuffer()

```
int pu_setBuffer (
             OSCTXT * pctxt,
             OSOCTET * bufaddr,
             size_t bufsiz,
             OSBOOL aligned )
```

This function is used to set the buffer pointer for PER encoding or decoding. For encoding, the buffer would either be a static byte array in memory to receive the encoded message or, if bufaddr was set to NULL, would indicate encoding is to be done to a dynamic buffer. For decoding, a buffer in memory would be specified which contains the message to be decoded.

Parameters

pctxt	Pointer to a context structure.
bufaddr	Address of memory buffer. For encoding, this may be set to NULL to indicate a dynamic buffer is to be used.
bufsiz	Size, in byte, of static memory buffer.
aligned	Indicate if aligned (true) or unaligned (false) PER should be used for encoding or decoding.

6.6.2.27 pu_setCharSet()

```
void pu_setCharSet (
             Asn1CharSet * pCharSet,
             const char * permSet )
```

This function sets a permitted alphabet character set. This is the resulting set of characters when the character associated with a standard character string type is merged with a permitted alphabet constraint.

Parameters

pCharSet	A pointer to a character set structure describing the character set currently associated with the character string type. The resulting character set structure after being merged with the permSet parameter.
permSet	A null-terminated string of permitted characters.

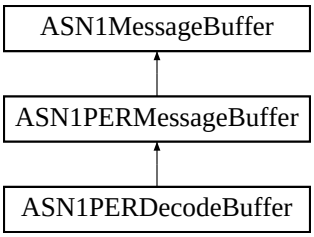
Chapter 7

Class Documentation

7.1 ASN1PERDecodeBuffer Class Reference

`#include <asn1PerCppTypes.h>`

Inheritance diagram for ASN1PERDecodeBuffer:



Public Member Functions

- ASN1PERDecodeBuffer (OSBOOL aligned)
- ASN1PERDecodeBuffer (const OSOCTET *pMsgBuf, size_t msgBufLen, OSBOOL aligned)
- ASN1PERDecodeBuffer (const OSOCTET *pMsgBuf, size_t msgBufLen, OSBOOL aligned, OSRTContext *p↩ Context)
- EXTPERMETHOD ASN1PERDecodeBuffer (OSRTInputStream &istream, OSBOOL aligned)
- EXTPERMETHOD ASN1PERDecodeBuffer (const char *filePath, OSBOOL aligned)
- int byteAlign ()
- EXTPERMETHOD int decodeBits (OSSIZE nbits, OSUINT32 &value)
- EXTPERMETHOD int decodeBits (OSSIZE nbits, OSOCTET *buffer, OSSIZE bufsize)
- EXTPERMETHOD int decodeBytes (OSSIZE nbits, OSOCTET *buffer, OSSIZE bufsize)
- virtual OSBOOL isA (Type bufferType)
- EXTPERMETHOD int peekByte (OSOCTET &ub)
- EXTPERMETHOD int readBinaryFile (const char *filePath)
- EXTPERMETHOD int readBytes (OSOCTET *buffer, size_t bufsize, size_t nbytes)

Additional Inherited Members

7.1.1 Detailed Description

The ASN1PERDecodeBuffer class is derived from the ASN1PERMessageBuffer base class. It contains variables and methods specific to decoding ASN.1 PER messages. It is used to manage the input buffer containing the ASN.1 message to be decoded. This class has 3 overloaded constructors.

7.1.2 Constructor & Destructor Documentation

7.1.2.1 ASN1PERDecodeBuffer() [1/5]

```
ASN1PERDecodeBuffer::ASN1PERDecodeBuffer (
            OSBOOL aligned )  [inline]
```

This is a default constructor. Use getStatus() method to determine has error occured during the initialization or not.

Parameters

aligned	Flag indicating if the message was encoded using aligned (TRUE)∗ or unaligned (FALSE) encoding.

7.1.2.2 ASN1PERDecodeBuffer() [2/5]

```
ASN1PERDecodeBuffer::ASN1PERDecodeBuffer (
            const OSOCTET * pMsgBuf,
            size_t msgBufLen,
            OSBOOL aligned )  [inline]
```

This constructor is used to describe the message to be decoded. Use getStatus() method to determine has error occured during the initialization or not.

Parameters

pMsgBuf	A pointer to the message to be decoded.
msgBufLen	Length of the message buffer.
aligned	Flag indicating if the message was encoded using aligned (TRUE) ∗ or unaligned (FALSE) encoding.

7.1.2.3 ASN1PERDecodeBuffer() [3/5]

```
ASN1PERDecodeBuffer::ASN1PERDecodeBuffer (
            const OSOCTET * pMsgBuf,
            size_t msgBufLen,
            OSBOOL aligned,
            OSRTContext * pContext )  [inline]
```

This constructor is used to describe the message to be decoded. Use getStatus() method to determine has error occured during the initialization or not.

Parameters

pMsgBuf	A pointer to the message to be decoded.
msgBufLen	Length of the message buffer.
aligned	Flag indicating if the message was encoded using aligned (TRUE) * or unaligned (FALSE) encoding.
pContext	A pointer to an OSRTContext structure created by the user.

7.1.2.4 ASN1PERDecodeBuffer() [4/5]

```
EXTPERMETHOD ASN1PERDecodeBuffer::ASN1PERDecodeBuffer (
            OSRTInputStream & istream,
            OSBOOL aligned )
```

This version of the ASN1PERDecodeBuffer constructor takes a reference to an input stream object and an aligned flag argument (stream decoding version).

Parameters

istream	A reference to an input stream object.
aligned	Flag indicating if aligned (TRUE) or unaligned (FALSE) encoding should be done.

7.1.2.5 ASN1PERDecodeBuffer() [5/5]

```
EXTPERMETHOD ASN1PERDecodeBuffer::ASN1PERDecodeBuffer (
            const char * filePath,
            OSBOOL aligned )
```

This constructor takes a pointer to the path of a file containing a binary PER message to be decoded.

Parameters

filePath	Complete file path and name of file to read.
aligned	Flag indicating if the message was encoded using aligned (TRUE) ∗ or unaligned (FALSE) encoding.

7.1.3 Member Function Documentation

7.1.3.1 byteAlign()

```
int ASN1PERDecodeBuffer::byteAlign ( )  [inline]
```

This method aligns the input buffer or stream to the next octet boundary.

Returns

Status of operation: 0 = success, negative value if error occurred.

7.1.3.2 decodeBits() [1/2]

```
EXTPERMETHOD int ASN1PERDecodeBuffer::decodeBits (
            OSSIZE nbits,
            OSUINT32 & value )
```

This method decodes the given number of bits (up to 32) from the input buffer/stream into an unsigned 32-bit integer variable.

Parameters

nbits	Number of bits to decode
value	Reference to unsigned integer variable to receive decoded value.

Returns

Status of operation: 0 = success, negative value if error occurred.

7.1.3.3 decodeBits() [2/2]

```
EXTPERMETHOD int ASN1PERDecodeBuffer::decodeBits (
             OSSIZE nbits,
             OSOCTET * buffer,
             OSSIZE bufsize )
```

This method decodes the given number of bits from the input buffer/stream into the given byte array.

Parameters

nbits	Number of bits to decode
buffer	Reference to byte array to received decoded value.
bufsize	Size of the buffer in bytes.

Returns

Status of operation: 0 = success, negative value if error occurred.

7.1.3.4 decodeBytes()

```
EXTPERMETHOD int ASN1PERDecodeBuffer::decodeBytes (
             OSSIZE nbits,
             OSOCTET * buffer,
             OSSIZE bufsize )
```

This method decodes the given number of whole bytes from the input buffer/stream into the given byte array. The input buffer/stream is assumed to be aligned to a byte boundary.

Parameters

nbytes	Number of bytes to decode
buffer	Reference to byte array to received decoded value.
bufsize	Size of the buffer in bytes.

Returns

Status of operation: 0 = success, negative value if error occurred.

7.1.3.5 isA()

```
virtual OSBOOL ASN1PERDecodeBuffer::isA (
             Type bufferType )  [inline], [virtual]
```

This method checks the type of the message buffer.

Parameters

bufferType	Enumerated identifier specifying a derived class. The only possible value for this class is PERDecode.

Returns

Boolean result of the match operation. True if this is the class corresponding to the identifier argument.

7.1.3.6 peekByte()

```
EXTPERMETHOD int ASN1PERDecodeBuffer::peekByte (
             OSOCTET & ub )
```

This method is used to peek at the next available byte in the decode buffer/stream without advancing the cursor.

Parameters

ub	Single byte buffer to receive peeked byte.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

7.1.3.7 readBinaryFile()

```
EXTPERMETHOD int ASN1PERDecodeBuffer::readBinaryFile (
             const char * filePath )
```

This method reads the file into the buffer to decode.

Parameters

filePath	The zero-terminated string containing the path to the file.

Returns

Completion status of operation:

- 0 (0) = success,

- negative return value is error.

7.1.3.8 readBytes()

```
EXTPERMETHOD int ASN1PERDecodeBuffer::readBytes (
             OSOCTET * buffer,
             size_t bufsize,
             size_t nbytes )
```

This method is used to read the given number of bytes from the underlying buffer/stream into the given buffer.

Parameters

buffer	Buffer into which data should be read.
bufsize	Size of the buffer
nbytes	Number of bytes to read. Must be <= bufsize.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

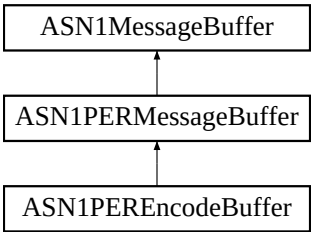
The documentation for this class was generated from the following file:

- asn1PerCppTypes.h

7.2 ASN1PEREncodeBuffer Class Reference

```
#include <asn1PerCppTypes.h>
```

Inheritance diagram for ASN1PEREncodeBuffer:



Public Member Functions

- ASN1PEREncodeBuffer (OSBOOL aligned)
- ASN1PEREncodeBuffer (OSOCTET *pMsgBuf, size_t msgBufLen, OSBOOL aligned)
- ASN1PEREncodeBuffer (OSOCTET *pMsgBuf, size_t msgBufLen, OSBOOL aligned, OSRTContext *pContext)
- ASN1PEREncodeBuffer (OSRTOutputStream &ostream, OSBOOL aligned)
- int byteAlign ()
- int encodeBit (OSBOOL value)
- int encodeBits (const OSOCTET *pvalue, size_t nbits, OSUINT32 bitOffset=0)
- size_t getMsgBitCnt ()
- virtual EXTPERMETHOD OSOCTET * getMsgCopy ()
- virtual EXTPERMETHOD const OSOCTET * getMsgPtr ()
- EXTPERMETHOD int init ()
- virtual OSBOOL isA (Type bufferType)
- int **GetMsgBitCnt** ()

Additional Inherited Members

7.2.1 Detailed Description

The ASN1PEREncodeBuffer class is derived from the ASN1PERMessageBuffer base class. It contains variables and methods specific to encoding ASN.1 messages. It is used to manage the buffer into which an ASN.1 PER message is to be encoded.

7.2.2 Constructor & Destructor Documentation

7.2.2.1 ASN1PEREncodeBuffer() [1/4]

```
ASN1PEREncodeBuffer::ASN1PEREncodeBuffer (
            OSBOOL aligned )  [inline]
```

This version of the ASN1PEREncodeBuffer constructor that takes one argument, aligned flag. It creates a dynamic memory buffer into which a PER message is encoded.

Parameters

aligned	Flag indicating if aligned (TRUE) or unaligned (FALSE) encoding should be done.

7.2.2.2 ASN1PEREncodeBuffer() [2/4]

```
ASN1PEREncodeBuffer::ASN1PEREncodeBuffer (
```

```
            OSOCTET * pMsgBuf,
            size_t msgBufLen,
            OSBOOL aligned )  [inline]
```

This version of the ASN1PEREncodeBuffer constructor takes a message buffer and size argument and an aligned flag argument (static encoding version).

Parameters

pMsgBuf	A pointer to a fixed-size message buffer to receive the encoded message.
msgBufLen	Size of the fixed-size message buffer.
aligned	Flag indicating if aligned (TRUE) or unaligned (FALSE) encoding should be done.

7.2.2.3 ASN1PEREncodeBuffer() [3/4]

```
ASN1PEREncodeBuffer::ASN1PEREncodeBuffer (
            OSOCTET * pMsgBuf,
            size_t msgBufLen,
            OSBOOL aligned,
            OSRTContext * pContext )  [inline]
```

This version of the ASN1PEREncodeBuffer constructor takes a message buffer and size argument and an aligned flag argument (static encoding version) as well as a pointer to an existing context object.

Parameters

pMsgBuf	A pointer to a fixed-size message buffer to receive the encoded message.
msgBufLen	Size of the fixed-size message buffer.
aligned	Flag indicating if aligned (TRUE) or unaligned (FALSE) encoding should be done.
pContext	A pointer to an OSRTContext structure created by the user.

7.2.2.4 ASN1PEREncodeBuffer() [4/4]

```
ASN1PEREncodeBuffer::ASN1PEREncodeBuffer (
            OSRTOutputStream & ostream,
            OSBOOL aligned )
```

This version of the ASN1PEREncodeBuffer constructor takes a reference to an output stream object and an aligned flag argument (stream encoding version).

Parameters

ostream	A reference to an output stream object.
aligned	Flag indicating if aligned (TRUE) or unaligned (FALSE) encoding should be done.

7.2.3 Member Function Documentation

7.2.3.1 byteAlign()

```
int ASN1PEREncodeBuffer::byteAlign ( )  [inline]
```

This method aligns the output buffer or stream to the next octet boundary.

Returns

Status of operation: 0 = success, negative value if error occurred.

References pe_byte_align().

7.2.3.2 encodeBit()

```
int ASN1PEREncodeBuffer::encodeBit (
            OSBOOL value )  [inline]
```

This method writes a single encoded bit value to the output buffer or stream.

Parameters

value	Boolean value of bit to be written.

Returns

Status of operation: 0 = success, negative value if error occurred.

7.2.3.3 encodeBits()

```
int ASN1PEREncodeBuffer::encodeBits (
            const OSOCTET * pvalue,
            size_t nbits,
            OSUINT32 bitOffset = 0 )  [inline]
```

This method writes the given number of bits from the byte array to the output buffer or stream starting from the given bit offset.

Parameters

pvalue	Pointer to byte array containing data to be encoded.
nbits	Number of bits to copy from byte array to encode buffer.
bitOffset	Starting bit offset from which bits are to be copied.

Returns

Status of operation: 0 = success, negative value if error occurred.

7.2.3.4 getMsgBitCnt()

```
size_t ASN1PEREncodeBuffer::getMsgBitCnt ( )  [inline]
```

This method returns the length (in bits) of the encoded message.

Returns

Length(in bits)of encoded message

References pe_GetMsgBitCnt().

7.2.3.5 getMsgCopy()

```
virtual EXTPERMETHOD OSOCTET* ASN1PEREncodeBuffer::getMsgCopy ( )  [virtual]
```

This method returns a copy of the current encoded message. Memory is allocated for the message using the 'new' operation. It is the user's responsibility to free the memory using 'delete'.

Returns

Pointer to copy of encoded message. It is the user's responsibility to release the memory using the 'delete' operator (i.e., delete [] ptr;)

7.2.3.6 getMsgPtr()

```
virtual EXTPERMETHOD const OSOCTET* ASN1PEREncodeBuffer::getMsgPtr ( )  [virtual]
```

This method returns the internal pointer to the current encoded message.

Returns

Pointer to encoded message.

7.2.3.7 init()

```
EXTPERMETHOD int ASN1PEREncodeBuffer::init ( )
```

This method reinitializes the encode buffer pointer to allow a new message to be encoded. This makes it possible to reuse one message buffer object in a loop to encode multiple messages. After this method is called, any previously encoded message in the buffer will be overwritten on the next encode call.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

7.2.3.8 isA()

```
virtual OSBOOL ASN1PEREncodeBuffer::isA (
             Type bufferType )  [inline], [virtual]
```

This method checks the type of the message buffer.

Parameters

bufferType	Enumerated identifier specifying a derived class. The only possible value for this class is PEREncode.

Returns

Boolean result of the match operation. True if this is the class corresponding to the identifier argument.

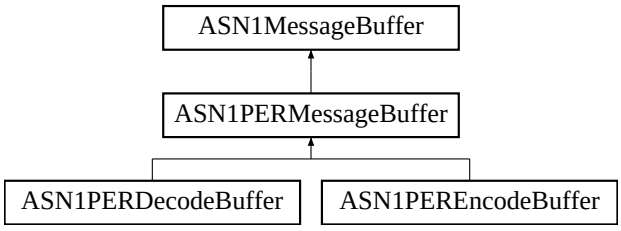
The documentation for this class was generated from the following file:

- asn1PerCppTypes.h

7.3 ASN1PERMessageBuffer Class Reference

```
#include <asn1PerCppTypes.h>
```

Inheritance diagram for ASN1PERMessageBuffer:



Public Member Functions

- void binDump (const char *varname)
- void hexDump ()
- virtual size_t getMsgLen ()
- OSBOOL isAligned ()
- void setTrace (OSBOOL value)
- EXTPERMETHOD int setBuffer (const OSOCTET *pMsgBuf, size_t msgBufLen)
- void newBitField (const char *nameSuffix)
- void setBitFieldCount ()
- void **BinDump** (const char *varname)
- void **HexDump** ()
- int **GetMsgLen** ()
- void **SetTrace** (OSBOOL value)

Protected Member Functions

- EXTPERMETHOD ASN1PERMessageBuffer (Type bufferType, OSBOOL aligned)
- EXTPERMETHOD ASN1PERMessageBuffer (OSRTStream &stream, OSBOOL aligned)
- EXTPERMETHOD ASN1PERMessageBuffer (Type bufferType, OSOCTET *pMsgBuf, size_t msgBufLen, OS↩ BOOL aligned)
- EXTPERMETHOD ASN1PERMessageBuffer (Type bufferType, OSOCTET *pMsgBuf, size_t msgBufLen, OS↩ BOOL aligned, OSRTContext *pContext)

7.3.1 Detailed Description

The ASN1PERMessageBuffer class is derived from the ASN1MessageBuffer base class. It is the base class for the ASN1PEREncodeBuffer and ASN1PERDecodeBuffer derived classes. It contains variables and methods specific to encoding or decoding ASN.1 messages using the Packed Encoding Rules (PER). It is used to manage the buffer into which an ASN.1 message is to be encoded or decoded.

7.3.2 Constructor & Destructor Documentation

7.3.2.1 ASN1PERMessageBuffer() [1/4]

```
EXTPERMETHOD ASN1PERMessageBuffer::ASN1PERMessageBuffer (
            Type bufferType,
            OSBOOL aligned )  [protected]
```

This constructor does not set a PER input source. It is used by the derived encode buffer classes. Use the getStatus() method to determine if an error has occured during initialization.

Parameters

bufferType	Type of message buffer that is being created (for example, PEREncode or PERDecode).
aligned	Flag indicating if aligned (TRUE) or unaligned (FALSE) encoding should be done.

7.3.2.2 ASN1PERMessageBuffer() [2/4]

```
EXTPERMETHOD ASN1PERMessageBuffer::ASN1PERMessageBuffer (
             OSRTStream & stream,
             OSBOOL aligned )  [protected]
```

This constructor associates a stream with a PER encode or decode buffer. It is used by the derived encode buffer classes to create a stream-based PER encoder or decoder.

Parameters

stream	Stream class reference.
aligned	Flag indicating if aligned (TRUE) or unaligned (FALSE) encoding should be done.

7.3.2.3 ASN1PERMessageBuffer() [3/4]

```
EXTPERMETHOD ASN1PERMessageBuffer::ASN1PERMessageBuffer (
             Type bufferType,
             OSOCTET * pMsgBuf,
             size_t msgBufLen,
             OSBOOL aligned )  [protected]
```

This constructor allows a memory buffer holding a binary PER message to be specified. Use the getStatus() method to determine if an error has occured during initialization.

Parameters

bufferType	Type of message buffer that is being created (for example, PEREncode or PERDecode).
pMsgBuf	A pointer to a fixed size message buffer to recieve the encoded message.
msgBufLen	Size of the fixed-size message buffer.
aligned	Flag indicating if aligned (TRUE) or unaligned (FALSE) encoding should be done.

7.3.2.4 ASN1PERMessageBuffer() [4/4]

```
EXTPERMETHOD ASN1PERMessageBuffer::ASN1PERMessageBuffer (
             Type bufferType,
             OSOCTET * pMsgBuf,
             size_t msgBufLen,
             OSBOOL aligned,
             OSRTContext * pContext )  [protected]
```

This constructor allows a memory buffer holding a binary PER message to be specified. It also allows a pre-existing context to be associated with this buffer. Use the getStatus() method to determine if an error has occured during initialization.

Parameters

bufferType	Type of message buffer that is being created (for example, PEREncode or PERDecode).
pMsgBuf	A pointer to a fixed size message buffer to recieve the encoded message.
msgBufLen	Size of the fixed-size message buffer.
aligned	Flag indicating if aligned (TRUE) or unaligned (FALSE) encoding should be done.
pContext	A pointer to an OSRTContext structure.

7.3.3 Member Function Documentation

7.3.3.1 binDump()

```
void ASN1PERMessageBuffer::binDump (
             const char * varname )  [inline]
```

This method outputs a binary dump of the current buffer contents to stdout.

Parameters

varname	char pointer to current buffer

References pu_bindump().

7.3.3.2 getMsgLen()

```
virtual size_t ASN1PERMessageBuffer::getMsgLen ( )  [inline], [virtual]
```

This method returns the length of a previously encoded PER message.

Parameters

-	none

References pu_getMsgLen().

7.3.3.3 hexDump()

```
void ASN1PERMessageBuffer::hexDump ( )  [inline]
```

This method outputs a hexadecimal dump of the current buffer contents to stdout.

Parameters

-	none

References pu_hexdump().

7.3.3.4 isAligned()

```
OSBOOL ASN1PERMessageBuffer::isAligned ( )  [inline]
```

This method indicates if PER aligned encoding is in effect.

Parameters

-	none

Returns

Boolean result: true if aligned; false if unaligned.

7.3.3.5 newBitField()

```
void ASN1PERMessageBuffer::newBitField (
            const char * nameSuffix )
```

This method creates a new bit trace field.

7.3.3.6 setBitFieldCount()

```
void ASN1PERMessageBuffer::setBitFieldCount ( )
```

This method sets the bit count in the last created field. The count is calculated by subtracting the current bit offset from the offset that was saved after the last newBitField call.

7.3.3.7 setBuffer()

```
EXTPERMETHOD int ASN1PERMessageBuffer::setBuffer (
             const OSOCTET * pMsgBuf,
             size_t msgBufLen )
```

This method sets a buffer to receive the encoded message.

Parameters

pMsgBuf	A pointer to a memory buffer to use to encode a message. The buffer should be declared as an array of unsigned characters (OSOCTETs). This parameter can be set to NULL to specify dynamic encoding (i.e., the encode functions will dynamically allocate a buffer for the message).
msgBufLen	The length of the memory buffer in bytes. If pMsgBuf is NULL, this parameter specifies the initial size of the dynamic buffer; if 0 - the default size will be used.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

7.3.3.8 setTrace()

```
void ASN1PERMessageBuffer::setTrace (
             OSBOOL value )  [inline]
```

This method turns PER diagnostic tracing on or off.

This enables the collection of the bit statistics inside the PER library functions that can be displayed using the binDump method.

Parameters

value	Boolean value indicating whether tracing should be on (true) or off (false).

The documentation for this class was generated from the following file:

- asn1PerCppTypes.h

7.4 BinDumpBuffer Struct Reference

Public Attributes

- unsigned char **lb**
- unsigned char **lbm**
- char **fmtBitBuffer** [40]
- char **fmtHexBuffer** [10]
- char **fmtAscBuffer** [10]
- int **fmtBitCharIdx**
- int **fmtHexCharIdx**
- int **fmtAscCharIdx**

The documentation for this struct was generated from the following file:

- asn1per.h

7.5 PERField Struct Reference

Public Attributes

- const char * **name**
- size_t **bitOffset**
- size_t **numbits**
- OSRTSList * **openTypeFields**

The documentation for this struct was generated from the following file:

- asn1per.h

Chapter 8

File Documentation

8.1 asn1per.h File Reference

```
#include "rtsrc/asn1type.h"
#include "rtsrc/asn1CharSet.h"
#include "rtxsrc/rtxBitEncode.h"
#include "rtxsrc/rtxBitDecode.h"
#include "rtxsrc/rtxBuffer.h"
#include "rtxsrc/rtxDiagBitTrace.h"
```

Classes

- struct PERField
- struct BinDumpBuffer

Macros

- #define **ASN_K_EXTENUM** OSINT32_MAX
- #define **MAX_BIGINTBYTES** (1024)
- #define **OSYEAR_BASIC** OSUINTCONST(0x8000000)
- #define **OSYEAR_PROLEPTIC** OSUINTCONST(0x4000000)
- #define **OSYEAR_NEGATIVE** OSUINTCONST(0x2000000)
- #define **OSYEAR_L**(n) ((OSUINT32)(n) << 28)
- #define **OSYEAR_MASK** (OSYEAR_BASIC|OSYEAR_PROLEPTIC|OSYEAR_NEGATIVE|OSYEAR_L(0xF))
- #define **OSANY** (OSYEAR_NEGATIVE|OSYEAR_L(5))
- #define **OSANY_MASK** (OSYEAR_NEGATIVE|OSYEAR_L(0xF))
- #define **OSCENTURY** 0x4000u
- #define **OSYEAR** 0x2000u
- #define **OSMONTH** 0x1000u
- #define **OSWEEK** 0x0800u
- #define **OSDAY** 0x0400u

- #define **OSHOURS** 0x0200u
- #define **OSMINUTES** 0x0100u
- #define **OSSECONDS** 0x0080u
- #define **OSUTC** 0x0040u
- #define **OSDIFF** 0x0020u
- #define **OSFRACTION** 0x000Fu
- #define **OSDURATION** 0x0010u
- #define **PU_SETCHARSET**(csetvar, canset, abits, ubits)
- #define **PU_INSLENFLD**(pctxt)
- #define **PU_NEWFIELD**(pctxt, suffix)
- #define **PU_PUSHNAME**(pctxt, name)
- #define **PU_PUSHELEMNAME**(pctxt, idx)
- #define **PU_POPNAME**(pctxt)
- #define **PU_SETBITOFFSET**(pctxt)
- #define **PU_SETBITCOUNT**(pctxt)
- #define **PU_SETOPENTYPEFLDLIST**(pMainBFList, pOpenTypeBFList)
- #define **EXTPERMETHOD**
- #define **EXTPERCLASS**
- #define **PD_BIT**(pctxt, pvalue) DEC_BIT(pctxt,pvalue)
- #define **PU_SETSIZECONSTRAINT**(pctxt, rootLower, rootUpper, extLower, extUpper)
- #define **PU_INITSIZECONSTRAINT**(pctxt) PU_SETSIZECONSTRAINT(pctxt,0,0,0,0)
- #define **PU_GETSIZECONSTRAINT**(pctxt, extbit)
- #define **PU_GETCTXTBITOFFSET**(pctxt) (((pctxt)->buffer.byteIndex * 8) + (8 - (pctxt)->buffer.bitOffset))
- #define PU_GETPADBITS(pctxt) (((pctxt)->buffer.bitOffset == 8) ? 0 : (pctxt)->buffer.bitOffset)
- #define **PU_SETCTXTBITOFFSET**(pctxt, _bitOffset)
- #define **PD_BYTE_ALIGN0**(pctxt)
- #define **PD_BYTE_ALIGN** PD_BYTE_ALIGN0
- #define **PD_CHECKSEQOFLEN**(pctxt, numElements, minElemBits)
- #define pd_moveBitCursor(pctxt, bitOffset) rtxMoveBitCursor(pctxt,bitOffset)
- #define pe_bit(pctxt, value) rtxEncBit(pctxt,value)
- #define pe_bits(pctxt, value, nbits) rtxEncBits(pctxt,value,nbits)
- #define pe_CheckBuffer(pctxt, nbytes) rtxCheckOutputBuffer(pctxt,nbytes)
- #define pe_ConsInteger(pctxt, value, lower, upper) pe_ConsInt64(pctxt, value, lower, upper)
- #define pe_ConsUnsigned(pctxt, value, lower, upper) pe_ConsUInt64(pctxt, value, lower, upper)
- #define pe_ConsUnsignedSignedBound(pcxt, value, lower, upper) pe_ConsUInt64SignedBound(pctxt, value, lower, upper)
- #define pe_octets(pctxt, pvalue, nbits) rtxEncBitsFromByteArray(pctxt,pvalue,nbits)
- #define pe_SemiConsInteger(pctxt, value, lower) pe_SemiConsInt64(pctxt, value, lower)
- #define pe_SemiConsUnsigned(pctxt, value, lower) pe_SemiConsUInt64(pctxt, value, lower)
- #define **pd_setp**(pctxt, bufaddr, bufsiz, aligned) pu_setBuffer(pctxt, bufaddr, bufsiz, aligned)
- #define **pe_setp**(pctxt, bufaddr, bufsiz, aligned) pu_setBuffer(pctxt, bufaddr, bufsiz, aligned)
- #define pd_bit(pctxt, pvalue) rtxDecBit(pctxt,pvalue)
- #define **pd_bits**(pctxt, pvalue, nbits) rtxDecBits(pctxt,pvalue,nbits)
- #define **pd_octets**(pctxt, pbuffer, bufsiz, nbits) rtxDecBitsToByteArray(pctxt,pbuffer,bufsiz,nbits)
- #define **pe_GeneralString**(pctxt, value, permCharSet) pe_VarWidthCharString(pctxt, value)
- #define **pe_GraphicString**(pctxt, value, permCharSet) pe_VarWidthCharString(pctxt, value)
- #define **pe_T61String**(pctxt, value, permCharSet) pe_VarWidthCharString(pctxt, value)
- #define **pe_TeletexString**(pctxt, value, permCharSet) pe_VarWidthCharString(pctxt, value)
- #define **pe_VideotexString**(pctxt, value, permCharSet) pe_VarWidthCharString(pctxt, value)
- #define **pe_ObjectDescriptor**(pctxt, value, permCharSet) pe_VarWidthCharString(pctxt, value)
- #define **pe_UTF8String**(pctxt, value, permCharSet) pe_VarWidthCharString(pctxt, value)

- #define **pe_IA5String**(pctxt, value, permCharSet) pe_ConstrainedStringEx (pctxt, value, permCharSet, 8, 7, 7)
- #define **pe_NumericString**(pctxt, value, permCharSet)
- #define **pe_PrintableString**(pctxt, value, permCharSet) pe_ConstrainedStringEx (pctxt, value, permCharSet, 8, 7, 7)
- #define **pe_VisibleString**(pctxt, value, permCharSet) pe_ConstrainedStringEx (pctxt, value, permCharSet, 8, 7, 7)
- #define **pe_ISO646String** pe_IA5String
- #define **pe_GeneralizedTime** pe_IA5String
- #define **pe_UTCTime** pe_GeneralizedTime
- #define **pd_GeneralString**(pctxt, pvalue, permCharSet) pd_VarWidthCharString (pctxt, pvalue)
- #define **pd_GraphicString**(pctxt, pvalue, permCharSet) pd_VarWidthCharString (pctxt, pvalue)
- #define **pd_VideotexString**(pctxt, pvalue, permCharSet) pd_VarWidthCharString (pctxt, pvalue)
- #define **pd_TeletexString**(pctxt, pvalue, permCharSet) pd_VarWidthCharString (pctxt, pvalue)
- #define **pd_T61String**(pctxt, pvalue, permCharSet) pd_VarWidthCharString (pctxt, pvalue)
- #define **pd_ObjectDescriptor**(pctxt, pvalue, permCharSet) pd_VarWidthCharString (pctxt, pvalue)
- #define **pd_UTF8String**(pctxt, pvalue, permCharSet) pd_VarWidthCharString (pctxt, pvalue)
- #define **pd_IA5String**(pctxt, pvalue, permCharSet) pd_ConstrainedStringEx (pctxt, pvalue, permCharSet, 8, 7, 7)
- #define **pd_NumericString**(pctxt, pvalue, permCharSet)
- #define **pd_PrintableString**(pctxt, pvalue, permCharSet) pd_ConstrainedStringEx (pctxt, pvalue, permCharSet, 8, 7, 7)
- #define **pd_VisibleString**(pctxt, pvalue, permCharSet) pd_ConstrainedStringEx (pctxt, pvalue, permCharSet, 8, 7, 7)
- #define **pd_ISO646String** pd_IA5String
- #define **pd_GeneralizedTime** pd_IA5String
- #define **pd_UTCTime** pd_GeneralizedTime
- #define **pe_GetMsgLen** pu_getMsgLen
- #define **pe_ExpandBuffer**(pctxt, nbytes) rtxExpandOutputBuffer(pctxt,nbytes)
- #define **pd_AnyCentury**(pctxt, string) pd_DateStr (pctxt, string, OSANY|OSCENTURY)
- #define **pd_AnyCenturyInt**(pctxt, pvalue) pd_UnconsInteger (pctxt, pvalue)
- #define **pd_AnyDate**(pctxt, string) pd_DateStr (pctxt, string, OSANY|OSYEAR|OSMONTH|OSDAY)
- #define **pd_AnyYear**(pctxt, string) pd_DateStr (pctxt, string, OSANY|OSYEAR)
- #define **pd_AnyYearInt**(pctxt, pvalue) pd_UnconsInteger (pctxt, pvalue)
- #define **pd_AnyYearDay**(pctxt, string) pd_DateStr (pctxt, string, OSANY|OSYEAR|OSDAY)
- #define **pd_AnyYearMonth**(pctxt, string) pd_DateStr (pctxt, string, OSANY|OSYEAR|OSMONTH)
- #define **pd_AnyYearMonthDay**(pctxt, string) pd_DateStr (pctxt, string, OSANY|OSYEAR|OSMONTH|OSDAY)
- #define **pd_AnyYearWeek**(pctxt, string) pd_DateStr (pctxt, string, OSANY|OSYEAR|OSWEEK)
- #define **pd_AnyYearWeekDay**(pctxt, string) pd_DateStr (pctxt, string, OSANY|OSYEAR|OSWEEK|OSDAY)
- #define **pd_Century**(pctxt, string) pd_DateStr (pctxt, string, OSCENTURY)
- #define **pd_CenturyInt**(pctxt, pvalue) pd_ConsUInt8 (pctxt, pvalue, 0, 99)
- #define **pd_Date**(pctxt, string) pd_DateStr (pctxt, string, OSYEAR_BASIC|OSYEAR|OSMONTH|OSDAY);
- #define **pd_DateTime**(pctxt, string)
- #define **pd_DurationInterval**(pctxt, string) pd_Duration (pctxt, string, FALSE)
- #define **pd_DurationEndDateInterval**(pctxt, string, flags) pd_Interval (pctxt, string, FALSE, OSDURATION, flags)
- #define **pd_DurationEndTimeInterval**(pctxt, string, flags) pd_Interval (pctxt, string, FALSE, OSDURATION, flags)
- #define **pd_DurationEndDateTimeInterval**(pctxt, string, flags) pd_Interval (pctxt, string, FALSE, OSDURATION, flags)
- #define **pd_Hours**(pctxt, string) pd_TimeStr (pctxt, string, OSHOURS)
- #define **pd_HoursUtc**(pctxt, string) pd_TimeStr (pctxt, string, OSHOURS|OSUTC)

- #define **pd_HoursAndDiff**(pctxt, string) pd_TimeStr (pctxt, string, OSHOURS|OSDIFF)
- #define **pd_HoursAndFraction**(pctxt, string, n) pd_TimeStr (pctxt, string, OSHOURS|(n))
- #define **pd_HoursUtcAndFraction**(pctxt, string, n) pd_TimeStr (pctxt, string, OSHOURS|OSUTC|(n))
- #define **pd_HoursAndDiffAndFraction**(pctxt, string, n) pd_TimeStr (pctxt, string, OSHOURS|OSDIFF|(n))
- #define **pd_Minutes**(pctxt, string) pd_TimeStr (pctxt, string, OSHOURS|OSMINUTES)
- #define **pd_MinutesUtc**(pctxt, string) pd_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSUTC)
- #define **pd_MinutesAndDiff**(pctxt, string) pd_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSDIFF)
- #define **pd_MinutesAndFraction**(pctxt, string, n) pd_TimeStr (pctxt, string, OSHOURS|OSMINUTES|(n))
- #define **pd_MinutesUtcAndFraction**(pctxt, string, n) pd_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OS↩UTC|(n))
- #define **pd_MinutesAndDiffAndFraction**(pctxt, string, n) pd_TimeStr (pctxt, string, OSHOURS|OSMINUT↩ES|OSDIFF|(n))
- #define **pd_RecStartEndDateInterval**(pctxt, string, flags) pd_Interval (pctxt, string, TRUE, flags, flags)
- #define **pd_RecStartEndTimeInterval**(pctxt, string, flags) pd_Interval (pctxt, string, TRUE, flags, flags)
- #define **pd_RecStartEndDateTimeInterval**(pctxt, string, flags) pd_Interval (pctxt, string, TRUE, flags, flags)
- #define **pd_RecDurationInterval**(pctxt, string) pd_Duration (pctxt, string, TRUE)
- #define **pd_RecStartDateDurationInterval**(pctxt, string, flags) pd_Interval (pctxt, string, TRUE, flags, OSDUR↩ATION)
- #define **pd_RecStartTimeDurationInterval**(pctxt, string, flags) pd_Interval (pctxt, string, TRUE, flags, OSDU↩RATION)
- #define **pd_RecStartDateTimeDurationInterval**(pctxt, string, flags) pd_Interval (pctxt, string, TRUE, flags, O↩SDURATION)
- #define **pd_RecDurationEndDateInterval**(pctxt, string, flags) pd_Interval (pctxt, string, TRUE, OSDURATION, flags)
- #define **pd_RecDurationEndTimeInterval**(pctxt, string, flags) pd_Interval (pctxt, string, TRUE, OSDURATION, flags)
- #define **pd_RecDurationEndDateTimeInterval**(pctxt, string, flags) pd_Interval (pctxt, string, TRUE, OSDURA↩TION, flags)
- #define **pd_StartEndDateInterval**(pctxt, string, flags) pd_Interval (pctxt, string, FALSE, flags, flags)
- #define **pd_StartEndTimeInterval**(pctxt, string, flags) pd_Interval (pctxt, string, FALSE, flags, flags)
- #define **pd_StartEndDateTimeInterval**(pctxt, string, flags) pd_Interval (pctxt, string, FALSE, flags, flags)
- #define **pd_StartDateDurationInterval**(pctxt, string, flags) pd_Interval (pctxt, string, FALSE, flags, OSDURAT↩ION)
- #define **pd_StartTimeDurationInterval**(pctxt, string, flags) pd_Interval (pctxt, string, FALSE, flags, OSDURA↩TION)
- #define **pd_StartDateTimeDurationInterval**(pctxt, string, flags) pd_Interval (pctxt, string, FALSE, flags, OSD↩URATION)
- #define **pd_TimeOfDay**(pctxt, string) pd_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSSECONDS)
- #define **pd_TimeOfDayUtc**(pctxt, string) pd_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSSECONDS|O↩SUTC)
- #define **pd_TimeOfDayAndDiff**(pctxt, string) pd_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSSECON↩DS|OSDIFF)
- #define **pd_TimeOfDayAndFraction**(pctxt, string, n) pd_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OS↩SECONDS|(n))
- #define **pd_TimeOfDayUtcAndFraction**(pctxt, string, n) pd_TimeStr (pctxt, string, OSHOURS|OSMINUT↩ES|OSSECONDS|OSUTC|(n))
- #define **pd_TimeOfDayAndDiffAndFraction**(pctxt, string, n) pd_TimeStr (pctxt, string, OSHOURS|OSMINUT↩ES|OSSECONDS|OSDIFF|(n))
- #define **pd_Year**(pctxt, string) pd_DateStr (pctxt, string, OSYEAR)
- #define **pd_YearDay**(pctxt, string) pd_DateStr (pctxt, string, OSYEAR|OSDAY)
- #define **pd_YearMonth**(pctxt, string) pd_DateStr (pctxt, string, OSYEAR|OSMONTH)
- #define **pd_YearMonthDay**(pctxt, string) pd_DateStr (pctxt, string, OSYEAR|OSMONTH|OSDAY);

- #define **pd_YearWeek**(pctxt, string) pd_DateStr (pctxt, string, OSYEAR|OSWEEK)
- #define **pd_YearWeekDay**(pctxt, string) pd_DateStr (pctxt, string, OSYEAR|OSWEEK|OSDAY)
- #define **pe_AnyCentury**(pctxt, string) pe_DateStr (pctxt, string, OSANY|OSCENTURY)
- #define **pe_AnyCenturyInt**(pctxt, value) pe_UnconsInteger (pctxt, value)
- #define **pe_AnyDate**(pctxt, string) pe_DateStr (pctxt, string, OSANY|OSYEAR|OSMONTH|OSDAY)
- #define **pe_AnyYear**(pctxt, string) pe_DateStr (pctxt, string, OSANY|OSYEAR)
- #define **pe_AnyYearInt**(pctxt, value) pe_UnconsInteger (pctxt, value)
- #define **pe_AnyYearDay**(pctxt, string) pe_DateStr (pctxt, string, OSANY|OSYEAR|OSDAY)
- #define **pe_AnyYearMonth**(pctxt, string) pe_DateStr (pctxt, string, OSANY|OSYEAR|OSMONTH)
- #define **pe_AnyYearMonthDay**(pctxt, string) pe_DateStr (pctxt, string, OSANY|OSYEAR|OSMONTH|OSDAY)
- #define **pe_AnyYearWeek**(pctxt, string) pe_DateStr (pctxt, string, OSANY|OSYEAR|OSWEEK)
- #define **pe_AnyYearWeekDay**(pctxt, string) pe_DateStr (pctxt, string, OSANY|OSYEAR|OSWEEK|OSDAY)
- #define **pe_Century**(pctxt, string) pe_DateStr (pctxt, string, OSCENTURY)
- #define **pe_CenturyInt**(pctxt, value) pe_ConsUnsigned (pctxt, value, 0, 99)
- #define **pe_Date**(pctxt, string) pe_DateStr (pctxt, string, OSYEAR_BASIC|OSYEAR|OSMONTH|OSDAY)
- #define **pe_DateTime**(pctxt, string)
- #define **pe_DurationInterval**(pctxt, string) pe_Duration (pctxt, string, FALSE)
- #define **pe_DurationEndDateInterval**(pctxt, string, flags) pe_Interval (pctxt, string, FALSE, OSDURATION, flags)
- #define **pe_DurationEndTimeInterval**(pctxt, string, flags) pe_Interval (pctxt, string, FALSE, OSDURATION, flags)
- #define **pe_DurationEndDateTimeInterval**(pctxt, string, flags) pe_Interval (pctxt, string, FALSE, OSDURATION, flags)
- #define **pe_Hours**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS)
- #define **pe_HoursUtc**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS|OSUTC)
- #define **pe_Hours**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS)
- #define **pe_HoursUtc**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS|OSUTC)
- #define **pe_HoursAndDiff**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS|OSDIFF)
- #define **pe_HoursAndFraction**(pctxt, string, n) pe_TimeStr (pctxt, string, OSHOURS|(n))
- #define **pe_HoursUtcAndFraction**(pctxt, string, n) pe_TimeStr (pctxt, string, OSHOURS|OSUTC|(n))
- #define **pe_HoursAndDiffAndFraction**(pctxt, string, n) pe_TimeStr (pctxt, string, OSHOURS|OSDIFF|(n))
- #define **pe_Minutes**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS|OSMINUTES)
- #define **pe_MinutesUtc**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSUTC)
- #define **pe_MinutesAndDiff**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSDIFF)
- #define **pe_MinutesAndFraction**(pctxt, string, n) pe_TimeStr (pctxt, string, OSHOURS|OSMINUTES|(n))
- #define **pe_MinutesUtcAndFraction**(pctxt, string, n) pe_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OS↩UTC|(n))
- #define **pe_MinutesAndDiffAndFraction**(pctxt, string, n) pe_TimeStr (pctxt, string, OSHOURS|OSMINUT↩ES|OSDIFF|(n))
- #define **pe_RecStartEndDateInterval**(pctxt, string, flags) pe_Interval (pctxt, string, TRUE, flags, flags)
- #define **pe_RecStartEndTimeInterval**(pctxt, string, flags) pe_Interval (pctxt, string, TRUE, flags, flags)
- #define **pe_RecStartEndDateTimeInterval**(pctxt, string, flags) pe_Interval (pctxt, string, TRUE, flags, flags)
- #define **pe_RecDurationInterval**(pctxt, string) pe_Duration (pctxt, string, TRUE)
- #define **pe_RecStartDateDurationInterval**(pctxt, string, flags) pe_Interval (pctxt, string, TRUE, flags, OSDUR↩ATION)
- #define **pe_RecStartTimeDurationInterval**(pctxt, string, flags) pe_Interval (pctxt, string, TRUE, flags, OSDU↩RATION)
- #define **pe_RecStartDateTimeDurationInterval**(pctxt, string, flags) pe_Interval (pctxt, string, TRUE, flags, O↩SDURATION)
- #define **pe_RecDurationEndDateInterval**(pctxt, string, flags) pe_Interval (pctxt, string, TRUE, OSDURATION, flags)

- #define **pe_RecDurationEndTimeInterval**(pctxt, string, flags) pe_Interval (pctxt, string, TRUE, OSDURATION, flags)
- #define **pe_RecDurationEndDateTimeInterval**(pctxt, string, flags) pe_Interval (pctxt, string, TRUE, OSDURA↩TION, flags)
- #define **pe_StartEndDateInterval**(pctxt, string, flags) pe_Interval (pctxt, string, FALSE, flags, flags)
- #define **pe_StartEndTimeInterval**(pctxt, string, flags) pe_Interval (pctxt, string, FALSE, flags, flags)
- #define **pe_StartEndDateTimeInterval**(pctxt, string, flags) pe_Interval (pctxt, string, FALSE, flags, flags)
- #define **pe_StartDateDurationInterval**(pctxt, string, flags) pe_Interval (pctxt, string, FALSE, flags, OSDURAT↩ION)
- #define **pe_StartTimeDurationInterval**(pctxt, string, flags) pe_Interval (pctxt, string, FALSE, flags, OSDURAT↩ION)
- #define **pe_StartDateTimeDurationInterval**(pctxt, string, flags) pe_Interval (pctxt, string, FALSE, flags, OSD↩URATION)
- #define **pe_TimeOfDay**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSSECONDS)
- #define **pe_TimeOfDayUtc**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSSECONDS|O↩SUTC)
- #define **pe_TimeOfDayAndDiff**(pctxt, string) pe_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSSECON↩DS|OSDIFF)
- #define **pe_TimeOfDayAndFraction**(pctxt, string, n) pe_TimeStr (pctxt, string, OSHOURS|OSMINUTES|OSS↩ECONDS|(n))
- #define **pe_TimeOfDayUtcAndFraction**(pctxt, string, n) pe_TimeStr (pctxt, string, OSHOURS|OSMINUT↩ES|OSSECONDS|OSUTC|(n))
- #define **pe_TimeOfDayAndDiffAndFraction**(pctxt, string, n) pe_TimeStr (pctxt, string, OSHOURS|OSMINUT↩ES|OSSECONDS|OSDIFF|(n))
- #define **pe_Year**(pctxt, string) pe_DateStr (pctxt, string, OSYEAR)
- #define **pe_YearDay**(pctxt, string) pe_DateStr (pctxt, string, OSYEAR|OSDAY)
- #define **pe_YearMonth**(pctxt, string) pe_DateStr (pctxt, string, OSYEAR|OSMONTH)
- #define **pe_YearMonthDay**(pctxt, string) pe_DateStr (pctxt, string, OSYEAR|OSMONTH|OSDAY)
- #define **pe_YearWeek**(pctxt, string) pe_DateStr (pctxt, string, OSYEAR|OSWEEK)
- #define **pe_YearWeekDay**(pctxt, string) pe_DateStr (pctxt, string, OSYEAR|OSWEEK|OSDAY)

Typedefs

- typedef struct PERField **PERField**

Functions

- int pd_BigInteger (OSCTXT ∗pctxt, const char ∗∗ppvalue)
- int pd_BigIntegerEx (OSCTXT ∗pctxt, const char ∗∗ppvalue, int radix)
- int pd_BigIntegerValue (OSCTXT ∗pctxt, const char ∗∗ppvalue, int radix, OSUINT32 nbytes)
- int pd_BitString (OSCTXT ∗pctxt, OSUINT32 ∗numbits_p, OSOCTET ∗buffer, OSSIZE bufsiz)
- int pd_BitString64 (OSCTXT ∗pctxt, OSSIZE ∗numbits_p, OSOCTET ∗buffer, OSSIZE bufsiz)
- int pd_BitString32 (OSCTXT ∗pctxt, ASN1BitStr32 ∗pbitstr, OSSIZE lower, OSSIZE upper)
- int pd_BMPString (OSCTXT ∗pctxt, ASN1BMPString ∗pvalue, Asn116BitCharSet ∗permCharSet)
- int pd_UniversalString (OSCTXT ∗pctxt, ASN1UniversalString ∗pvalue, Asn132BitCharSet ∗permCharSet)
- int pd_byte_align (OSCTXT ∗pctxt)
- int pd_ChoiceOpenTypeExt (OSCTXT ∗pctxt, const OSOCTET ∗∗object_p2, OSSIZE ∗pnumocts)
- int pd_ConsInteger (OSCTXT ∗pctxt, OSINT32 ∗pvalue, OSINT64 lower, OSINT64 upper)
- int pd_ConsInt8 (OSCTXT ∗pctxt, OSINT8 ∗pvalue, OSINT64 lower, OSINT64 upper)

- int pd_ConsInt16 (OSCTXT *pctxt, OSINT16 *pvalue, OSINT64 lower, OSINT64 upper)
- int pd_ConsInt64 (OSCTXT *pctxt, OSINT64 *pvalue, OSINT64 lower, OSINT64 upper)
- int pd_ConsUnsigned (OSCTXT *pctxt, OSUINT32 *pvalue, OSUINT64 lower, OSUINT64 upper)
- int pd_ConsUnsignedSignedBound (OSCTXT *pctxt, OSUINT32 *pvalue, OSINT64 lower, OSINT64 upper)
- int pd_ConsUInt8 (OSCTXT *pctxt, OSUINT8 *pvalue, OSUINT64 lower, OSUINT64 upper)
- int pd_ConsUInt8SignedBound (OSCTXT *pctxt, OSUINT8 *pvalue, OSINT64 lower, OSINT64 upper)
- int pd_ConsUInt16 (OSCTXT *pctxt, OSUINT16 *pvalue, OSUINT64 lower, OSUINT64 upper)
- int pd_ConsUInt16SignedBound (OSCTXT *pctxt, OSUINT16 *pvalue, OSINT64 lower, OSINT64 upper)
- int pd_ConsUInt64 (OSCTXT *pctxt, OSUINT64 *pvalue, OSUINT64 lower, OSUINT64 upper)
- int pd_ConsUInt64SignedBound (OSCTXT *pctxt, OSUINT64 *pvalue, OSINT64 lower, OSINT64 upper)
- int pd_ConsWholeNumber (OSCTXT *pctxt, OSUINT32 *padjusted_value, OSUINT32 range_value)
- int pd_ConsWholeNumber64 (OSCTXT *pctxt, OSUINT64 *padjusted_value, OSUINT64 range_value)
- int pd_ConstrainedString (OSCTXT *pctxt, const char **string, Asn1CharSet *pCharSet)
- int pd_ConstrainedStringEx (OSCTXT *pctxt, const char **string, const char *charSet, OSUINT32 abits, OSU↩ INT32 ubits, OSUINT32 canSetBits)
- int pd_ConstrFixedLenStringEx (OSCTXT *pctxt, char *strbuf, size_t bufsiz, const char *charSet, OSUINT32 abits, OSUINT32 ubits, OSUINT32 canSetBits)
- int pd_16BitConstrainedString (OSCTXT *pctxt, Asn116BitCharString *pString, Asn116BitCharSet *pCharSet)
- int pd_32BitConstrainedString (OSCTXT *pctxt, Asn132BitCharString *pString, Asn132BitCharSet *pCharSet)
- int pd_DateStr (OSCTXT *pctxt, const char **string, OSUINT32 flags)
- int pd_DateTimeStr (OSCTXT *pctxt, const char **string, OSUINT32 flags)
- int pd_Duration (OSCTXT *pctxt, const char **string, OSBOOL rec)
- int pd_DynBitString (OSCTXT *pctxt, ASN1DynBitStr *pBitStr)
- int pd_DynBitString64 (OSCTXT *pctxt, ASN1DynBitStr64 *pBitStr)
- int pd_DynOctetString (OSCTXT *pctxt, ASN1DynOctStr *pOctStr)
- int pd_DynOctetString64 (OSCTXT *pctxt, OSDynOctStr64 *pOctStr)
- int pd_GetBinStrDataOffset (OSCTXT *pctxt, OSUINT32 *pnumbits, OSBOOL bitStrFlag)
- int pd_GetComponentLength (OSCTXT *pctxt, OSUINT32 itemBits)
- int pd_GetComponentLength64 (OSCTXT *pctxt, OSUINT32 itemBits, OSSIZE *plength)
- int pd_Interval (OSCTXT *pctxt, const char **string, OSBOOL rec, OSUINT32 startFlags, OSUINT32 endFlags)
- int pd_Length (OSCTXT *pctxt, OSUINT32 *pvalue)
- int pd_Length64 (OSCTXT *pctxt, OSSIZE *pvalue)
- int pd_ObjectIdentifier (OSCTXT *pctxt, ASN1OBJID *pvalue)
- int pd_oid64 (OSCTXT *pctxt, ASN1OID64 *pvalue)
- int pd_RelativeOID (OSCTXT *pctxt, ASN1OBJID *pvalue)
- int pd_OctetString (OSCTXT *pctxt, OSUINT32 *pnumocts, OSOCTET *buffer, OSUINT32 bufsiz)
- int pd_OctetString64 (OSCTXT *pctxt, OSSIZE *pnumocts, OSOCTET *buffer, OSSIZE bufsiz)
- int pd_OpenType (OSCTXT *pctxt, const OSOCTET **object_p2, OSSIZE *pnumocts)
- int pd_OpenTypeExt (OSCTXT *pctxt, const OSOCTET **object_p2, OSSIZE *pnumocts)
- int pd_Real (OSCTXT *pctxt, OSREAL *pvalue)
- int pd_Real2 (OSCTXT *pctxt, OSREAL *pvalue)
- int pd_SmallLength (OSCTXT *pctxt, OSUINT32 *pvalue)
- int pd_SmallNonNegWholeNumber (OSCTXT *pctxt, OSUINT32 *pvalue)
- int pd_SemiConsInteger (OSCTXT *pctxt, OSINT32 *pvalue, OSINT64 lower)
- int pd_SemiConsUnsigned (OSCTXT *pctxt, OSUINT32 *pvalue, OSUINT64 lower)
- int pd_SemiConsUnsignedSignedBound (OSCTXT *pctxt, OSINT32 *pvalue, OSINT64 lower)
- int pd_SemiConsInt8 (OSCTXT *pctxt, OSINT8 *pvalue, OSINT64 lower)
- int pd_SemiConsUInt8 (OSCTXT *pctxt, OSUINT8 *pvalue, OSUINT64 lower)
- int pd_SemiConsUInt8SignedBound (OSCTXT *pctxt, OSUINT8 *pvalue, OSINT64 lower)
- int pd_SemiConsInt16 (OSCTXT *pctxt, OSINT16 *pvalue, OSINT64 lower)
- int pd_SemiConsUInt16 (OSCTXT *pctxt, OSUINT16 *pvalue, OSUINT64 lower)

- int pd_SemiConsUInt16SignedBound (OSCTXT *pctxt, OSUINT16 *pvalue, OSINT64 lower)
- int pd_SemiConsInt64 (OSCTXT *pctxt, OSINT64 *pvalue, OSINT64 lower)
- int pd_SemiConsUInt64 (OSCTXT *pctxt, OSUINT64 *pvalue, OSUINT64 lower)
- int pd_SemiConsUInt64SignedBound (OSCTXT *pctxt, OSUINT64 *pvalue, OSINT64 lower)
- int pd_TimeStr (OSCTXT *pctxt, const char **string, OSUINT32 flags)
- int pd_UnconsInteger (OSCTXT *pctxt, OSINT32 *pvalue)
- int pd_UnconsLength (OSCTXT *pctxt, OSUINT32 *pvalue)
- EXTPERMETHOD int pd_UnconsLength64 (OSCTXT *pctxt, OSSIZE *pvalue)
- int pd_UnconsUnsigned (OSCTXT *pctxt, OSUINT32 *pvalue)
- int pd_UnconsInt8 (OSCTXT *pctxt, OSINT8 *pvalue)
- int pd_UnconsUInt8 (OSCTXT *pctxt, OSUINT8 *pvalue)
- int pd_UnconsInt16 (OSCTXT *pctxt, OSINT16 *pvalue)
- int pd_UnconsUInt16 (OSCTXT *pctxt, OSUINT16 *pvalue)
- int pd_UnconsInt64 (OSCTXT *pctxt, OSINT64 *pvalue)
- int pd_UnconsUInt64 (OSCTXT *pctxt, OSUINT64 *pvalue)
- int pd_VarWidthCharString (OSCTXT *pctxt, const char **pvalue)
- int pd_YearInt (OSCTXT *pctxt, OSINT32 *pvalue)
- int pd_Real10 (OSCTXT *pctxt, const char **ppvalue)
- OSBOOL pd_isFragmented (OSCTXT *pctxt)
- void **pd_OpenTypeStart** (OSCTXT *pctxt, OSSIZE *pSavedSize, OSINT16 *pSavedBitOff)
- int **pd_OpenTypeEnd** (OSCTXT *pctxt, OSSIZE savedSize, OSINT16 savedBitOff)
- int uperDecConstrString (OSCTXT *pctxt, const char **string, const char *charSet, OSUINT32 nbits, OSUINT32 canSetBits)
- int uperDecConstrFixedLenString (OSCTXT *pctxt, char *strbuf, size_t bufsiz, const char *charSet, OSUINT32 nbits, OSUINT32 canSetBits)
- int pe_16BitConstrainedString (OSCTXT *pctxt, Asn116BitCharString value, Asn116BitCharSet *pCharSet)
- int pe_32BitConstrainedString (OSCTXT *pctxt, Asn132BitCharString value, Asn132BitCharSet *pCharSet)
- int pe_2sCompBinInt (OSCTXT *pctxt, OSINT32 value)
- int pe_2sCompBinInt64 (OSCTXT *pctxt, OSINT64 value)
- int pe_aligned_octets (OSCTXT *pctxt, OSOCTET *pvalue, OSUINT32 nocts)
- int pe_BigInteger (OSCTXT *pctxt, const char *pvalue)
- int pe_bits64 (OSCTXT *pctxt, OSUINT64 value, OSUINT32 nbits)
- int pe_BitString (OSCTXT *pctxt, OSSIZE numbits, const OSOCTET *data)
- int **pe_BitString32** (OSCTXT *pctxt, ASN1BitStr32 *pbitstr, OSUINT32 lower, OSUINT32 upper)
- int **pe_BinaryStringData** (OSCTXT *pctxt, OSSIZE itemCount, OSSIZE segSizeBits, const OSOCTET *data, const Asn1SizeCnst *pSizeCnst, OSBOOL bitStrFlag)
- EXTPERMETHOD int pe_BitStringExt (OSCTXT *pctxt, OSSIZE numbits, const OSOCTET *data, OSSIZE dataSize, const OSOCTET *extData)
- int pe_BMPString (OSCTXT *pctxt, ASN1BMPString value, Asn116BitCharSet *permCharSet)
- int pe_UniversalString (OSCTXT *pctxt, ASN1UniversalString value, Asn132BitCharSet *permCharSet)
- int pe_byte_align (OSCTXT *pctxt)
- int pe_ChoiceTypeExt (OSCTXT *pctxt, OSUINT32 numocts, const OSOCTET *data)
- int pe_ConsInt64 (OSCTXT *pctxt, OSINT64 value, OSINT64 lower, OSINT64 upper)
- int pe_ConstrainedString (OSCTXT *pctxt, const char *string, Asn1CharSet *pCharSet)
- int pe_ConstrainedStringEx (OSCTXT *pctxt, const char *string, const char *charSet, OSUINT32 abits, OSUI↩ NT32 ubits, OSUINT32 canSetBits)
- int pe_ConsUInt64 (OSCTXT *pctxt, OSUINT64 value, OSUINT64 lower, OSUINT64 upper)
- int pe_ConsUInt64SignedBound (OSCTXT *pctxt, OSUINT64 value, OSINT64 lower, OSINT64 upper)
- int pe_ConsWholeNumber (OSCTXT *pctxt, OSUINT32 adjusted_value, OSUINT32 range_value)
- int pe_ConsWholeNumber64 (OSCTXT *pctxt, OSUINT64 adjusted_value, OSUINT64 range_value)
- int pe_DateStr (OSCTXT *pctxt, const char *string, OSUINT32 flags)

- int pe_DateTimeStr (OSCTXT *pctxt, const char *string, OSUINT32 flags)
- int pe_Duration (OSCTXT *pctxt, const char *string, OSBOOL rec)
- OSUINT32 pe_GetIntLen (OSUINT32 value)
- size_t pe_GetMsgBitCnt (OSCTXT *pctxt)
- OSOCTET * pe_GetMsgPtr (OSCTXT *pctxt, OSINT32 *pLength)
- OSOCTET * pe_GetMsgPtrU (OSCTXT *pctxt, OSUINT32 *pLength)
- OSOCTET * pe_GetMsgPtr64 (OSCTXT *pctxt, OSSIZE *pLength)
- int pe_Interval (OSCTXT *pctxt, const char *string, OSBOOL rec, OSUINT32 startFlags, OSUINT32 endFlags)
- int pe_Length (OSCTXT *pctxt, OSSIZE value)
- int pe_NonNegBinInt (OSCTXT *pctxt, OSUINT32 value)
- int pe_NonNegBinInt64 (OSCTXT *pctxt, OSUINT64 value)
- int pe_ObjectIdentifier (OSCTXT *pctxt, ASN1OBJID *pvalue)
- int pe_oid64 (OSCTXT *pctxt, ASN1OID64 *pvalue)
- int pe_RelativeOID (OSCTXT *pctxt, ASN1OBJID *pvalue)
- int pe_OctetString (OSCTXT *pctxt, OSSIZE numocts, const OSOCTET *data)
- int pe_OpenType (OSCTXT *pctxt, OSSIZE numocts, const OSOCTET *data)
- int pe_OpenTypeEnd (OSCTXT *pctxt, OSUINT32 pos, void *pPerField)
- int pe_OpenTypeExt (OSCTXT *pctxt, OSRTDList *pElemList)
- int pe_OpenTypeExtBits (OSCTXT *pctxt, OSRTDList *pElemList)
- int pe_OpenTypeStart (OSCTXT *pctxt, OSUINT32 *pPos, void **ppPerField)
- int pe_Real (OSCTXT *pctxt, OSREAL value)
- int pe_SmallNonNegWholeNumber (OSCTXT *pctxt, OSUINT32 value)
- int pe_SmallLength (OSCTXT *pctxt, OSSIZE value)
- int pe_SemiConsInt64 (OSCTXT *pctxt, OSINT64 value, OSINT64 lower)
- int pe_SemiConsUnsignedSignedBound (OSCTXT *pctxt, OSUINT32 value, OSINT64 lower)
- int pe_SemiConsUInt64 (OSCTXT *pctxt, OSUINT64 value, OSUINT64 lower)
- int pe_SemiConsUInt64SignedBound (OSCTXT *pctxt, OSUINT64 value, OSINT64 lower)
- int pe_TimeStr (OSCTXT *pctxt, const char *string, OSUINT32 flags)
- int pe_UnconsLength (OSCTXT *pctxt, OSSIZE value)
- int pe_UnconsInteger (OSCTXT *pctxt, OSINT32 value)
- int pe_UnconsInt64 (OSCTXT *pctxt, OSINT64 value)
- int pe_UnconsUnsigned (OSCTXT *pctxt, OSUINT32 value)
- int pe_UnconsUInt64 (OSCTXT *pctxt, OSUINT64 value)
- int pe_VarWidthCharString (OSCTXT *pctxt, const char *value)
- int pe_YearInt (OSCTXT *pctxt, OSINT32 value)
- int pe_Real10 (OSCTXT *pctxt, const char *pvalue)
- int uperEncConstrString (OSCTXT *pctxt, const char *string, const char *charSet, OSUINT32 nbits, OSUINT32 canSetBits)
- int pu_addSizeConstraint (OSCTXT *pctxt, const Asn1SizeCnst *pSize)
- OSBOOL **pu_alignCharStr** (OSCTXT *pctxt, OSUINT32 len, OSUINT32 nbits, Asn1SizeCnst *pSize)
- OSUINT32 **pu_bitcnt** (OSUINT32 value)
- Asn1SizeCnst * **pu_checkSize** (Asn1SizeCnst *pSizeList, OSUINT32 value, OSBOOL *pExtendable)
- int pu_checkSizeExt (Asn1SizeCnst *pSizeCnst, OSSIZE value, OSBOOL *pExtendable, Asn1SizeValueRange *pSizeRange, OSBOOL *pExtSize)
- void pu_freeContext (OSCTXT *pctxt)
- size_t **pu_getMaskAndIndex** (size_t bitOffset, unsigned char *pMask)
- size_t pu_getMsgLen (OSCTXT *pctxt)
- size_t pu_getMsgLenBits (OSCTXT *pctxt)
- void pu_hexdump (OSCTXT *pctxt)
- int pu_setBuffer (OSCTXT *pctxt, OSOCTET *bufaddr, size_t bufsiz, OSBOOL aligned)
- int pe_resetBuffer (OSCTXT *pctxt)

- int pu_initContext (OSCTXT *pctxt, OSOCTET *bufaddr, OSUINT32 bufsiz, OSBOOL aligned)
- int pu_initContextBuffer (OSCTXT *pTarget, OSCTXT *pSource)
- const char * **pu_getFullName** (OSCTXT *pctxt, const char *suffix)
- void pu_insLenField (OSCTXT *pctxt)
- OSBOOL pu_isFixedSize (const Asn1SizeCnst *pSizeList)
- OSCTXT * pu_newContext (OSOCTET *bufaddr, OSUINT32 bufsiz, OSBOOL aligned)
- PERField * pu_newField (OSCTXT *pctxt, const char *nameSuffix)
- void pu_initFieldList (OSCTXT *pctxt, OSINT16 bitOffset)
- void pu_initRtxDiagBitFieldList (OSCTXT *pctxt, OSINT16 bitOffset)
- void pu_popName (OSCTXT *pctxt)
- void pu_pushElemName (OSCTXT *pctxt, int idx)
- void pu_pushName (OSCTXT *pctxt, const char *name)
- void pu_setCharSet (Asn1CharSet *pCharSet, const char *permSet)
- int pu_set16BitCharSet (OSCTXT *pctxt, Asn116BitCharSet *pCharSet, Asn116BitCharSet *pAlphabet)
- void pu_set16BitCharSetFromRange (Asn116BitCharSet *pCharSet, OSUINT16 firstChar, OSUINT16 lastChar)
- void **pu_setFldBitCount** (OSCTXT *pctxt)
- void **pu_setFldBitOffset** (OSCTXT *pctxt)
- void **pu_setFldListFromCtxt** (OSCTXT *pctxt, OSCTXT *srcctxt)
- void **pu_setOpenTypeFldList** (OSCTXT *pctxt, OSRTSList *plist)
- void **pu_setRtxDiagOpenTypeFldList** (OSRTDiagBitFieldList *pMainBFList, OSRTDiagBitFieldList *pOpen↩ TypeBFList)
- OSBOOL **pu_setTrace** (OSCTXT *pCtxt, OSBOOL value)
- void **pu_setAligned** (OSCTXT *pctxt, OSBOOL value)
- void **pu_deleteFieldList** (OSCTXT *pctxt)
- OSBOOL **pu_BitAndOctetStringAlignmentTest** (const Asn1SizeCnst *pSizeCnst, OSSIZE itemCount, OSB↩ OOL bitStrFlag)
- void pu_bindump (OSCTXT *pctxt, const char *varname)
- void **pu_dumpField** (OSCTXT *pctxt, PERField *pField, const char *varname, size_t nextBitOffset, BinDump↩ Buffer *pbuf)
- int pu_set32BitCharSet (OSCTXT *pctxt, Asn132BitCharSet *pCharSet, Asn132BitCharSet *pAlphabet)
- void pu_set32BitCharSetFromRange (Asn132BitCharSet *pCharSet, OSUINT32 firstChar, OSUINT32 lastChar)
- int pu_GetLibVersion (OSVOIDARG)
- const char * pu_GetLibInfo (OSVOIDARG)
- int **pu_checkSizeConstraint** (OSCTXT *pctxt, int size)
- Asn1SizeCnst * **pu_getSizeConstraint** (OSCTXT *pctxt, OSBOOL extbit)
- int **pu_getBitOffset** (OSCTXT *pctxt)
- void **pu_setBitOffset** (OSCTXT *pctxt, int bitOffset)

8.1.1 Detailed Description

ASN.1 runtime constants, data structure definitions, and functions to support the Packed Encoding Rules (PER) as defined in the ITU-T X.691 standard.

8.2 asn1PerCppTypes.h File Reference

```
#include "rtpersrc/asn1per.h"
#include "rtsrc/asn1CppTypes.h"
#include "rtxsrc/rtxBitEncode.h"
```

Classes

- class ASN1PERMessageBuffer
- class ASN1PEREncodeBuffer
- class ASN1PERDecodeBuffer

8.2.1 Detailed Description

PER C++ type and class definitions.

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