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Red Hat Enterprise Linux Release 9.2 Manual Pages on 'IMPLEMENT_EXTERN_ASN1.3oss!' command

```
$ man IMPLEMENT_EXTERN_ASN1.3oss!
```

```
ASN1_EXTERN_FUNCS(3oss!)      OpenSSL      ASN1_EXTERN_FUNCS(3oss!)
```

NAME

ASN1_EXTERN_FUNCS, ASN1_ex_d2i, ASN1_ex_d2i_ex, ASN1_ex_i2d,
ASN1_ex_new_func, ASN1_ex_new_ex_func, ASN1_ex_free_func,
ASN1_ex_print_func, IMPLEMENT_EXTERN_ASN1 - ASN.1 external function
support

SYNOPSIS

```
#include <openssl/asn1t.h>
```

```
typedef int ASN1_ex_d2i(ASN1_VALUE **pval, const unsigned char **in, long len,  
    const ASN1_ITEM *it, int tag, int aclass, char opt,  
    ASN1_TLC *ctx);
```

```
typedef int ASN1_ex_d2i_ex(ASN1_VALUE **pval, const unsigned char **in, long len,  
    const ASN1_ITEM *it, int tag, int aclass, char opt,  
    ASN1_TLC *ctx, OSSL_LIB_CTX *libctx,  
    const char *propq);
```

```
typedef int ASN1_ex_i2d(const ASN1_VALUE **pval, unsigned char **out,  
    const ASN1_ITEM *it, int tag, int aclass);
```

```
typedef int ASN1_ex_new_func(ASN1_VALUE **pval, const ASN1_ITEM *it);
```

```
typedef int ASN1_ex_new_ex_func(ASN1_VALUE **pval, const ASN1_ITEM *it,  
    OSSL_LIB_CTX *libctx, const char *propq);
```

```

typedef void ASN1_ex_free_func(ASN1_VALUE **pval, const ASN1_ITEM *it);
typedef int ASN1_ex_print_func(BIO *out, const ASN1_VALUE **pval,
                               int indent, const char *fname,
                               const ASN1_PCTX *pctx);

struct ASN1_EXTERN_FUNCS_st {
    void *app_data;
    ASN1_ex_new_func *asn1_ex_new;
    ASN1_ex_free_func *asn1_ex_free;
    ASN1_ex_free_func *asn1_ex_clear;
    ASN1_ex_d2i *asn1_ex_d2i;
    ASN1_ex_i2d *asn1_ex_i2d;
    ASN1_ex_print_func *asn1_ex_print;
    ASN1_ex_new_ex_func *asn1_ex_new_ex;
    ASN1_ex_d2i_ex *asn1_ex_d2i_ex;
};
typedef struct ASN1_EXTERN_FUNCS_st ASN1_EXTERN_FUNCS;

#define IMPLEMENT_EXTERN_ASN1(sname, tag, fptrs)

```

DESCRIPTION

ASN.1 data structures templates are typically defined in OpenSSL using a series of macros such as `ASN1_SEQUENCE()`, `ASN1_SEQUENCE_END()` and so on. Instead templates can also be defined based entirely on external functions. These external functions are called to perform operations such as creating a new `ASN1_VALUE` or converting an `ASN1_VALUE` to or from DER encoding.

The macro `IMPLEMENT_EXTERN_ASN1()` can be used to create such an externally defined structure. The name of the structure should be supplied in the `sname` parameter. The tag for the structure (e.g. typically `V_ASN1_SEQUENCE`) should be supplied in the `tag` parameter.

Finally a pointer to an `ASN1_EXTERN_FUNCS` structure should be supplied

in the `fptrs` parameter.

The `ASN1_EXTERN_FUNCS` structure has the following entries.

`app_data`

A pointer to arbitrary application specific data.

`asn1_ex_new`

A "new" function responsible for constructing a new `ASN1_VALUE` object. The newly constructed value should be stored in `*pval`. The `it` parameter is a pointer to the `ASN1_ITEM` template object created via the `IMPLEMENT_EXTERN_ASN1()` macro.

Returns a positive value on success or 0 on error.

`asn1_ex_free`

A "free" function responsible for freeing the `ASN1_VALUE` passed in `*pval` that was previously allocated via a "new" function. The `it` parameter is a pointer to the `ASN1_ITEM` template object created via the `IMPLEMENT_EXTERN_ASN1()` macro.

`asn1_ex_clear`

A "clear" function responsible for clearing any data in the `ASN1_VALUE` passed in `*pval` and making it suitable for reuse. The `it` parameter is a pointer to the `ASN1_ITEM` template object created via the `IMPLEMENT_EXTERN_ASN1()` macro.

`asn1_ex_d2i`

A "d2i" function responsible for converting DER data with the tag `tag` and class `class` into an `ASN1_VALUE`. If `*pval` is non-NULL then the `ASN1_VALUE` it points to should be reused. Otherwise a new `ASN1_VALUE` should be allocated and stored in `*pval`. `*in` points to the DER data to be decoded and `len` is the length of that data.

After decoding *in should be updated to point at the next byte after the decoded data. If the ASN1_VALUE is considered optional in this context then opt will be nonzero. Otherwise it will be zero.

The it parameter is a pointer to the ASN1_ITEM template object created via the IMPLEMENT_EXTERN_ASN1() macro. A pointer to the current ASN1_TLC context (which may be required for other ASN1 function calls) is passed in the ctx parameter.

The asn1_ex_d2i entry may be NULL if asn1_ex_d2i_ex has been specified instead.

Returns ≤ 0 on error or a positive value on success.

asn1_ex_i2d

An "i2d" function responsible for converting an ASN1_VALUE into DER encoding. On entry *pval will contain the ASN1_VALUE to be encoded. If default tagging is to be used then tag will be -1 on entry. Otherwise if implicit tagging should be used then tag and aclass will be the tag and associated class.

If out is not NULL then this function should write the DER encoded data to the buffer in *out, and then increment *out to point to immediately after the data just written.

If out is NULL then no data should be written but the length calculated and returned as if it were.

The asn1_ex_i2d entry may be NULL if asn1_ex_i2d_ex has been specified instead.

The return value should be negative if a fatal error occurred, or 0 if a non-fatal error occurred. Otherwise it should return the length of the encoded data.

asn1_ex_print

A "print" function. out is the BIO to print the output to. *pval is the ASN1_VALUE to be printed. indent is the number of spaces of indenting to be printed before any data is printed. fname is currently unused and is always "". pctx is a pointer to the ASN1_PCTX for the print operation.

Returns 0 on error or a positive value on success. If the return value is 2 then an additional newline will be printed after the data printed by this function.

asn1_ex_new_ex

This is the same as `asn1_ex_new` except that it is additionally passed the `OSSL_LIB_CTX` to be used in `libctx` and any property query string to be used for algorithm fetching in the `propq` parameter. See "ALGORITHM FETCHING" in `crypto(7)` for further details. If `asn1_ex_new_ex` is non NULL, then it will always be called in preference to `asn1_ex_new`.

asn1_ex_d2i_ex

This is the same as `asn1_ex_d2i` except that it is additionally passed the `OSSL_LIB_CTX` to be used in `libctx` and any property query string to be used for algorithm fetching in the `propq` parameter. See "ALGORITHM FETCHING" in `crypto(7)` for further details. If `asn1_ex_d2i_ex` is non NULL, then it will always be called in preference to `asn1_ex_d2i`.

RETURN VALUES

Return values for the various callbacks are as described above.

SEE ALSO

`ASN1_item_new_ex(3)`

HISTORY

The `asn1_ex_new_ex` and `asn1_ex_d2i_ex` callbacks were added in OpenSSL 3.0.

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