

**NAME**

ASN1\_generate\_nconf, ASN1\_generate\_v3 - ASN1 generation functions

**SYNOPSIS**

```
#include <openssl/asn1.h>
```

```
ASN1_TYPE *ASN1_generate_nconf(char *str, CONF *nconf);
ASN1_TYPE *ASN1_generate_v3(char *str, X509V3_CTX *cnf);
```

**DESCRIPTION**

These functions generate the ASN1 encoding of a string in an **ASN1\_TYPE** structure.

**str** contains the string to encode **nconf** or **cnf** contains the optional configuration information where additional strings will be read from. **nconf** will typically come from a config file whereas **cnf** is obtained from an **X509V3\_CTX** structure which will typically be used by X509 v3 certificate extension functions. **cnf** or **nconf** can be set to **NULL** if no additional configuration will be used.

**GENERATION STRING FORMAT**

The actual data encoded is determined by the string **str** and the configuration information. The general format of the string is:

**[modifier,type[:value]]**

That is zero or more comma separated modifiers followed by a type followed by an optional colon and a value. The formats of **type**, **value** and **modifier** are explained below.

**SUPPORTED TYPES**

The supported types are listed below. Unless otherwise specified only the **ASCII** format is permissible.

**BOOLEAN, BOOL**

This encodes a boolean type. The **value** string is mandatory and should be **TRUE** or **FALSE**. Additionally **TRUE**, **true**, **Y**, **y**, **YES**, **yes**, **FALSE**, **false**, **N**, **n**, **NO** and **no** are acceptable.

**NULL**

Encode the **NULL** type, the **value** string must not be present.

**INTEGER, INT**

Encodes an **ASN1INTEGER** type. The **value** string represents the value of the integer, it can be prefaced by a minus sign and is normally interpreted as a decimal value unless the prefix **0x** is included.

**ENUMERATED, ENUM**

Encodes the **ASN1ENUMERATED** type, it is otherwise identical to **INTEGER**.

**OBJECT, OID**

Encodes an **ASN1OBJECT IDENTIFIER**, the **value** string can be a short name, a long name or numerical format.

**UTCTIME, UTC**

Encodes an **ASN1 UTCTime** structure, the value should be in the format **YYMMDDHHMMSSZ**.

**GENERALIZEDTIME, GENTIME**

Encodes an **ASN1 GeneralizedTime** structure, the value should be in the format **YYYYMMDDHHMMSSZ**.

**OCTETSTRING, OCT**

Encodes an **ASN1OCTET STRING**. **value** represents the contents of this structure, the format strings **ASCII** and **HEX** can be used to specify the format of **value**.

**BITSTRING, BITSTR**

Encodes an **ASN1BIT STRING**. **value** represents the contents of this structure, the format strings **ASCII**, **HEX** and **BITLIST** can be used to specify the format of **value**.

If the format is anything other than **BITLIST** the number of unused bits is set to zero.

**UNIVERSALSTRING, UNIV, IA5, IA5STRING, UTF8, UTF8String, BMP, BMPSTRING, VISIBLESTRING, VISIBLE, PRINTABLESTRING, PRINTABLE, T61, T61STRING, TELETEXSTRING, GeneralString, NUMERICSTRING, NUMERIC**

These encode the corresponding string types. **value** represents the contents of this structure. The format can be **ASCII** or **UTF8**.

#### **SEQUENCE, SEQ, SET**

Formats the result as an **ASN1SEQUENCE** or **SET** type. **value** should be a section name which will contain the contents. The field names in the section are ignored and the values are in the generated string format. If **value** is absent then an empty **SEQUENCE** will be encoded.

#### **MODIFIERS**

Modifiers affect the following structure, they can be used to add **EXPLICIT** or **IMPLICIT** tagging, add wrappers or to change the string format of the final type and value. The supported formats are documented below.

#### **EXPLICIT, EXP**

Add an explicit tag to the following structure. This string should be followed by a colon and the tag value to use as a decimal value.

By following the number with **U, A, P** or **C** **UNIVERSAL, APPLICATION, PRIVATE** or **CONTEXT SPECIFIC** tagging can be used, the default is **CONTEXT SPECIFIC**.

#### **IMPLICIT, IMP**

This is the same as **EXPLICIT** except **IMPLICIT** tagging is used instead.

#### **OCTWRAP, SEQWRAP, SETWRAP, BITWRAP**

The following structure is surrounded by an **OCTET STRING**, a **SEQUENCE**, a **SET** or a **BIT STRING** respectively. For a **BIT STRING** the number of unused bits is set to zero.

#### **FORMAT**

This specifies the format of the ultimate value. It should be followed by a colon and one of the strings **ASCII, UTF8, HEX** or **BITLIST**.

If no format specifier is included then **ASCII** is used. If **UTF8** is specified then the value string must be a valid **UTF8** string. For **HEX** the output must be a set of hex digits. **BITLIST** (which is only valid for a **BIT STRING**) is a comma separated list of the indices of the set bits, all other bits are zero.

#### **EXAMPLES**

A simple **IA5String**:

```
IA5STRING:Hello World
```

An **IA5String** explicitly tagged:

```
EXPLICIT:0,IA5STRING:Hello World
```

An **IA5String** explicitly tagged using **APPLICATION** tagging:

```
EXPLICIT:0A,IA5STRING:Hello World
```

A **BITSTRING** with bits 1 and 5 set and all others zero:

```
FORMAT:BITLIST,BITSTRING:1,5
```

A more complex example using a config file to produce a **SEQUENCE** consisting of a **BOOL** an **OID** and a **UTF8String**:

```
asn1 = SEQUENCE:seq_section
```

```
[seq_section]
```

```
field1 = BOOLEAN:TRUE
```

```
field2 = OID:commonName
```

```
field3 = UTF8:Third field
```

This example produces an RSAPrivateKey structure, this is the key contained in the file client.pem in all OpenSSL distributions (note: the field names such as 'coeff' are ignored and are present just for clarity):

```
asn1=SEQUENCE:private_key
[private_key]
version=INTEGER:0

n=INTEGER:0xBB6FE79432CC6EA2D8F970675A5A87BFBE1AFF0BE63E879F2AFFB93644\
D4D2C6D000430DEC66ABF47829E74B8C5108623A1C0EE8BE217B3AD8D36D5EB4FCA1D9

e=INTEGER:0x010001

d=INTEGER:0x6F05EAD2F27FFAEC84BEC360C4B928FD5F3A9865D0FCAAD291E2A52F4A\
F810DC6373278C006A0ABBA27DC8C63BF97F7E666E27C5284D7D3B1FFFE16B7A87B51D

p=INTEGER:0xF3929B9435608F8A22C208D86795271D54EBDFB09DDEF539AB083DA912\
D4BD57

q=INTEGER:0xC50016F89DFF2561347ED1186A46E150E28BF2D0F539A1594BBD7FE467\
46EC4F

exp1=INTEGER:0x9E7D4326C924AFC1DEA40B45650134966D6F9DFA3A7F9D698CD4ABEA\
9C0A39B9

exp2=INTEGER:0xBA84003BB95355AFB7C50DF140C60513D0BA51D637272E355E397779\
E7B2458F

coeff=INTEGER:0x30B9E4F2AFA5AC679F920FC83F1F2DF1BAF1779CF989447FABC2F5\
628657053A
```

This example is the corresponding public key in a SubjectPublicKeyInfo structure:

```
# Start with a SEQUENCE
asn1=SEQUENCE:pubkeyinfo

# pubkeyinfo contains an algorithm identifier and the public key wrapped
# in a BIT STRING
[pubkeyinfo]
algorithm=SEQUENCE:rsa_alg
pubkey=BITWRAP,SEQUENCE:rsapubkey

# algorithm ID for RSA is just an OID and a NULL
[rsa_alg]
algorithm=OID:rsaEncryption
parameter=NULL

# Actual public key: modulus and exponent
[rsapubkey]
n=INTEGER:0xBB6FE79432CC6EA2D8F970675A5A87BFBE1AFF0BE63E879F2AFFB93644\
D4D2C6D000430DEC66ABF47829E74B8C5108623A1C0EE8BE217B3AD8D36D5EB4FCA1D9

e=INTEGER:0x010001
```

## RETURN VALUES

*ASN1\_generate\_nconf()* and *ASN1\_generate\_v3()* return the encoded data as an **ASN1\_TYPE** structure or **NULL** if an error occurred.

The error codes that can be obtained by [ERR\\_get\\_error\(3\)](#).

**SEE ALSO**

[ERR\\_get\\_error\(3\)](#)

**HISTORY**

*ASN1\_generate\_nconf()* and *ASN1\_generate\_v3()* were added to OpenSSL 0.9.8