

**NAME**

**xdr**, **xdr\_array**, **xdr\_bool**, **xdr\_bytes**, **xdr\_char**, **xdr\_destroy**, **xdr\_double**, **xdr\_enum**, **xdr\_float**, **xdr\_free**, **xdr\_getpos**, **xdr\_hyper**, **xdr\_inline**, **xdr\_int**, **xdr\_long**, **xdr\_longlong\_t**, **xdrmem\_create**, **xdr\_opaque**, **xdr\_pointer**, **xdrrec\_create**, **xdrrec\_endofrecord**, **xdrrec\_eof**, **xdrrec\_skiprecord**, **xdr\_reference**, **xdr\_setpos**, **xdr\_short**, **xdr\_sizeof**, **xdrstdio\_create**, **xdr\_string**, **xdr\_u\_char**, **xdr\_u\_hyper**, **xdr\_u\_int**, **xdr\_u\_long**, **xdr\_u\_longlong\_t**, **xdr\_u\_short**, **xdr\_union**, **xdr\_vector**, **xdr\_void**, **xdr\_wrapstring** - library routines for external data representation

**LIBRARY**

Standard C Library (libc, -lc)

**SYNOPSIS**

```
#include <rpc/types.h>
```

```
#include <rpc/xdr.h>
```

See *DESCRIPTION* for function declarations.

**DESCRIPTION**

These routines allow C programmers to describe arbitrary data structures in a machine-independent fashion. Data for remote procedure calls are transmitted using these routines.

*int*

**xdr\_array**(*XDR \*xdrs*, *char \*\*arrp*, *u\_int \*sizep*, *u\_int maxsize*, *u\_int elsize*, *xdrproc\_t elproc*)

A filter primitive that translates between variable-length arrays and their corresponding external representations. The *arrp* argument is the address of the pointer to the array, while *sizep* is the address of the element count of the array; this element count cannot exceed *maxsize*. The *elsize* argument is the **sizeof** each of the array's elements, and *elproc* is an XDR filter that translates between the array elements' C form, and their external representation. This routine returns one if it succeeds, zero otherwise.

*int*

**xdr\_bool**(*XDR \*xdrs*, *bool\_t \*bp*)

A filter primitive that translates between booleans (C integers) and their external representations. When encoding data, this filter produces values of either one or zero. This routine returns one if it succeeds, zero otherwise.

*int*

**xdr\_bytes**(*XDR \*xdrs*, *char \*\*sp*, *u\_int \*sizep*, *u\_int maxsize*)

A filter primitive that translates between counted byte strings and their external representations. The *sp* argument is the address of the string pointer. The length of the string is located at address *sizep*; strings cannot be longer than *maxsize*. This routine returns one if it succeeds, zero otherwise.

*int*

**xdr\_char**(XDR \*xdrs, char \*cp)

A filter primitive that translates between C characters and their external representations. This routine returns one if it succeeds, zero otherwise. Note: encoded characters are not packed, and occupy 4 bytes each. For arrays of characters, it is worthwhile to consider **xdr\_bytes()**, **xdr\_opaque()** or **xdr\_string()**.

*void*

**xdr\_destroy**(XDR \*xdrs)

A macro that invokes the destroy routine associated with the XDR stream, *xdrs*. Destruction usually involves freeing private data structures associated with the stream. Using *xdrs* after invoking **xdr\_destroy()** is undefined.

*int*

**xdr\_double**(XDR \*xdrs, double \*dp)

A filter primitive that translates between C *double* precision numbers and their external representations. This routine returns one if it succeeds, zero otherwise.

*int*

**xdr\_enum**(XDR \*xdrs, enum\_t \*ep)

A filter primitive that translates between C *enums* (actually integers) and their external representations. This routine returns one if it succeeds, zero otherwise.

*int*

**xdr\_float**(XDR \*xdrs, float \*fp)

A filter primitive that translates between C *floats* and their external representations. This routine returns one if it succeeds, zero otherwise.

*void*

**xdr\_free**(xdrproc\_t proc, void \*objp)

Generic freeing routine. The first argument is the XDR routine for the object being freed. The second argument is a pointer to the object itself. Note: the pointer passed to this routine is *not* freed, but what it points to *is* freed (recursively).

*u\_int*

**xdr\_getpos**(XDR \*xdrs)

A macro that invokes the get-position routine associated with the XDR stream, *xdrs*. The routine returns an unsigned integer, which indicates the position of the XDR byte stream. A desirable feature of XDR streams is that simple arithmetic works with this number, although the XDR stream instances need not guarantee this.

*int*

**xdr\_hyper**(XDR \*xdrs, quad\_t \*llp)

A filter primitive that translates between ANSI C *long long* integers and their external representations. This routine returns one if it succeeds, zero otherwise.

*long \**

**xdr\_inline**(XDR \*xdrs, int len)

A macro that invokes the in-line routine associated with the XDR stream, *xdrs*. The routine returns a pointer to a contiguous piece of the stream's buffer; *len* is the byte length of the desired buffer. Note: pointer is cast to *long \**.

Warning: **xdr\_inline**() may return NULL (0) if it cannot allocate a contiguous piece of a buffer. Therefore the behavior may vary among stream instances; it exists for the sake of efficiency.

*int*

**xdr\_int**(XDR \*xdrs, int \*ip)

A filter primitive that translates between C integers and their external representations. This routine returns one if it succeeds, zero otherwise.

*int*

**xdr\_long**(XDR \*xdrs, long \*lp)

A filter primitive that translates between C *long* integers and their external representations. This routine returns one if it succeeds, zero otherwise.

*int*

**xdr\_longlong\_t**(XDR \*xdrs, quad\_t \*llp)

A filter primitive that translates between ANSI C *long long* integers and their external representations. This routine returns one if it succeeds, zero otherwise.

*void*

**xdrmem\_create**(XDR \*xdrs, char \*addr, u\_int size, enum xdr\_op op)

This routine initializes the XDR stream object pointed to by *xdrs*. The stream's data is written to, or read from, a chunk of memory at location *addr* whose length is no more than *size* bytes long. The *op* argument determines the direction of the XDR stream (either XDR\_ENCODE, XDR\_DECODE, or XDR\_FREE).

*int*

**xdr\_opaque**(XDR \*xdrs, char \*cp, u\_int cnt)

A filter primitive that translates between fixed size opaque data and its external representation. The *cp* argument is the address of the opaque object, and *cnt* is its size in bytes. This routine returns one if it succeeds, zero otherwise.

*int*

**xdr\_pointer**(XDR \*xdrs, char \*\*objpp, u\_int objsize, xdrproc\_t xdrobj)

Like **xdr\_reference**() except that it serializes NULL pointers, whereas **xdr\_reference**() does not. Thus, **xdr\_pointer**() can represent recursive data structures, such as binary trees or linked lists.

*void*

**xdrrec\_create**(XDR \*xdrs, u\_int sendsize, u\_int recvsiz, void \*handle, int (\*readit)(), int (\*writeit)())

This routine initializes the XDR stream object pointed to by *xdrs*. The stream's data is written to a buffer of size *sendsize*; a value of zero indicates the system should use a suitable default. The stream's data is read from a buffer of size *recvsiz*; it too can be set to a suitable default by passing a zero value. When a stream's output buffer is full, **writeit**() is called. Similarly, when a stream's input buffer is empty, **readit**() is called. The behavior of these two routines is similar to the system calls read(2) and write(2), except that *handle* is passed to the former routines as the first argument. Note: the XDR stream's *op* field must be set by the caller.

Warning: this XDR stream implements an intermediate record stream. Therefore there are additional bytes in the stream to provide record boundary information.

*int*

**xdrrec\_endofrecord**(XDR \*xdrs, int sendnow)

This routine can be invoked only on streams created by **xdrrec\_create**(). The data in the output buffer is marked as a completed record, and the output buffer is optionally written out if *sendnow* is non-zero. This routine returns one if it succeeds, zero otherwise.

*int*

**xdrrec\_eof**(XDR \*xdrs)

This routine can be invoked only on streams created by **xdrrec\_create**(). After consuming the rest of the current record in the stream, this routine returns one if the stream has no more input, zero otherwise.

*int*

**xdrrec\_skiprecord**(XDR \*xdrs)

This routine can be invoked only on streams created by **xdrrec\_create**(). It tells the XDR implementation that the rest of the current record in the stream's input buffer should be discarded. This routine returns one if it succeeds, zero otherwise.

*int*

**xdr\_reference**(XDR \*xdrs, char \*\*pp, u\_int size, xdrproc\_t proc)

A primitive that provides pointer chasing within structures. The *pp* argument is the address of the pointer; *size* is the **sizeof** the structure that *\*pp* points to; and *proc* is an XDR procedure that filters the structure between its C form and its external representation. This routine returns one if it succeeds, zero otherwise.

Warning: this routine does not understand NULL pointers. Use **xdr\_pointer**() instead.

*int*

**xdr\_setpos**(XDR \*xdrs, u\_int pos)

A macro that invokes the set position routine associated with the XDR stream *xdrs*. The *pos* argument is a position value obtained from **xdr\_getpos**(). This routine returns one if the XDR stream could be repositioned, and zero otherwise.

Warning: it is difficult to reposition some types of XDR streams, so this routine may fail with one type of stream and succeed with another.

*int*

**xdr\_short**(XDR \*xdrs, short \*sp)

A filter primitive that translates between C *short* integers and their external representations. This routine returns one if it succeeds, zero otherwise.

*unsigned long*

**xdr\_sizeof**(xdrproc\_t func, void \*data)

This routine returns the amount of memory required to encode *data* using filter *func*.

```
#ifdef _STDIO_H_
```

```
/* XDR using stdio library */
```

```
void
```

```
xdrstdio_create(XDR *xdrs, FILE *file, enum xdr_op op)
```

```
#endif
```

This routine initializes the XDR stream object pointed to by *xdrs*. The XDR stream data is written to, or read from, the Standard I/O stream *file*. The *op* argument determines the direction of the XDR stream (either XDR\_ENCODE, XDR\_DECODE, or XDR\_FREE).

Warning: the destroy routine associated with such XDR streams calls `fflush(3)` on the *file* stream, but never `fclose(3)`.

*int*

**xdr\_string**(XDR \*xdrs, char \*\*sp, u\_int maxsize)

A filter primitive that translates between C strings and their corresponding external representations. Strings cannot be longer than *maxsize*. Note: *sp* is the address of the string's pointer. This routine returns one if it succeeds, zero otherwise.

*int*

**xdr\_u\_char**(XDR \*xdrs, unsigned char \*ucp)

A filter primitive that translates between *unsigned* C characters and their external representations. This routine returns one if it succeeds, zero otherwise.

*int*

**xdr\_u\_hyper**(XDR \*xdrs, u\_quad\_t \*ullp)

A filter primitive that translates between *unsigned* ANSI C *long long* integers and their external

representations. This routine returns one if it succeeds, zero otherwise.

*int*

**xdr\_u\_int**(XDR \*xdrs, unsigned \*up)

A filter primitive that translates between C *unsigned* integers and their external representations. This routine returns one if it succeeds, zero otherwise.

*int*

**xdr\_u\_long**(XDR \*xdrs, unsigned long \*ulp)

A filter primitive that translates between C *unsigned long* integers and their external representations. This routine returns one if it succeeds, zero otherwise.

*int*

**xdr\_u\_longlong\_t**(XDR \*xdrs, u\_quad\_t \*ullp)

A filter primitive that translates between *unsigned* ANSI C *long long* integers and their external representations. This routine returns one if it succeeds, zero otherwise.

*int*

**xdr\_u\_short**(XDR \*xdrs, unsigned short \*usp)

A filter primitive that translates between C *unsigned short* integers and their external representations. This routine returns one if it succeeds, zero otherwise.

*int*

**xdr\_union**(XDR \*xdrs, enum\_t \*dscmp, char \*unp, const struct xdr\_discrim \*choices, xdrproc\_t defaultarm)

A filter primitive that translates between a discriminated C *union* and its corresponding external representation. It first translates the discriminant of the union located at *dscmp*. This discriminant is always an *enum\_t*. Next the union located at *unp* is translated. The *choices* argument is a pointer to an array of *xdr\_discrim* structures. Each structure contains an ordered pair of [*value*, *proc*]. If the union's discriminant is equal to the associated *value*, then the **proc()** is called to translate the union. The end of the *xdr\_discrim* structure array is denoted by a routine of value NULL. If the discriminant is not found in the *choices* array, then the **defaultarm()** procedure is called (if it is not NULL). Returns one if it succeeds, zero otherwise.

*int*

**xdr\_vector**(XDR \*xdrs, char \*arrp, u\_int size, u\_int elsize, xdrproc\_t elproc)

A filter primitive that translates between fixed-length arrays and their corresponding external representations. The *arrp* argument is the address of the pointer to the array, while *size* is the element count of the array. The *elsize* argument is the **sizeof** each of the array's elements, and *elproc* is an XDR filter that translates between the array elements' C form, and their external representation. This routine returns one if it succeeds, zero otherwise.

*int*

**xdr\_void**(void)

This routine always returns one. It may be passed to RPC routines that require a function argument, where nothing is to be done.

*int*

**xdr\_wrapstring**(XDR \*xdrs, char \*\*sp)

A primitive that calls **xdr\_string**(xdrs, sp, MAXUN.UNSIGNED); where MAXUN.UNSIGNED is the maximum value of an unsigned integer. The **xdr\_wrapstring**() function is handy because the RPC package passes a maximum of two XDR routines as arguments, and **xdr\_string**(), one of the most frequently used primitives, requires three. Returns one if it succeeds, zero otherwise.

## SEE ALSO

rpc(3)

*eXternal Data Representation Standard: Protocol Specification.*

*eXternal Data Representation: Sun Technical Notes.*

*XDR: External Data Representation Standard*, Sun Microsystems, Inc., USC-ISI, RFC1014.

## HISTORY

The **xdr\_sizeof** function first appeared in FreeBSD 9.0.