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Red Hat Enterprise Linux Release 9.2 Manual Pages on 'clnt_broadcast.3' command

$ man clnt_broadcast.3

RPC(3) Linux Programmer's Manual RPC(3)

NAME

rpc - library routines for remote procedure calls

SYNOPSIS AND DESCRIPTION

These routines allow C programs to make procedure calls on other ma?
chines across the network. First, the client calls a procedure to send
a data packet to the server. Upon receipt of the packet, the server
calls a dispatch routine to perform the requested service, and then
sends back a reply. Finally, the procedure call returns to the client.

To take use of these routines, include the header file <rpc/rpc.h>.

The prototypes below make use of the following types:

```
typedef int bool_t;
typedef bool_t (*xdrproc_t) (XDR *, void *, ...);
typedef bool_t (*resultproc_t) (caddr_t resp,
                                struct sockaddr_in *raddr);
```

See the header files for the declarations of the AUTH, CLIENT, SVCXPRT,
and XDR types.

void auth_destroy(AUTH *auth);

A macro that destroys the authentication information associated
with auth. Destruction usually involves deallocation of private
data structures. The use of auth is undefined after calling
auth_destroy().

AUTH *authnone_create(void);

Create and return an RPC authentication handle that passes nonusable authentication information with each remote procedure call. This is the default authentication used by RPC.

```
AUTH *authunix_create(char *host, int uid, int gid,
                      int len, int *aup_gids);
```

Create and return an RPC authentication handle that contains au? thentication information. The parameter host is the name of the machine on which the information was created; uid is the user's user ID; gid is the user's current group ID; len and aup_gids refer to a counted array of groups to which the user belongs. It is easy to impersonate a user.

```
AUTH *authunix_create_default(void);
```

Calls authunix_create() with the appropriate parameters.

```
int callrpc(char *host, unsigned long prognum,
            unsigned long versnum, unsigned long procnum,
            xdrproc_t inproc, char *in,
            xdrproc_t outproc, char *out);
```

Call the remote procedure associated with prognum, versnum, and procnum on the machine, host. The parameter in is the address of the procedure's argument(s), and out is the address of where to place the result(s); inproc is used to encode the procedure's parameters, and outproc is used to decode the procedure's re? sults. This routine returns zero if it succeeds, or the value of enum clnt_stat cast to an integer if it fails. The routine clnt_perrno() is handy for translating failure statuses into messages.

Warning: calling remote procedures with this routine uses UDP/IP as a transport; see clntudp_create() for restrictions. You do not have control of timeouts or authentication using this rou? tine.

```
enum clnt_stat clnt_broadcast(unsigned long prognum,
                              unsigned long versnum, unsigned long procnum,
                              xdrproc_t inproc, char *in,
```

xdrproc_t outproc, char *out,

resultproc_t eachresult);

Like callrpc(), except the call message is broadcast to all lo? cally connected broadcast nets. Each time it receives a re? sponse, this routine calls eachresult(), whose form is:

eachresult(char *out, struct sockaddr_in *addr);

where out is the same as out passed to clnt_broadcast(), except that the remote procedure's output is decoded there; addr points to the address of the machine that sent the results. If eachre? sult() returns zero, clnt_broadcast() waits for more replies; otherwise it returns with appropriate status.

Warning: broadcast sockets are limited in size to the maximum transfer unit of the data link. For ethernet, this value is 1500 bytes.

enum clnt_stat clnt_call(CLIENT *clnt, unsigned long procnum,

xdrproc_t inproc, char *in,

xdrproc_t outproc, char *out,

struct timeval tout);

A macro that calls the remote procedure procnum associated with the client handle, clnt, which is obtained with an RPC client creation routine such as clnt_create(). The parameter in is the address of the procedure's argument(s), and out is the address of where to place the result(s); inproc is used to encode the procedure's parameters, and outproc is used to decode the proce? dure's results; tout is the time allowed for results to come back.

clnt_destroy(CLIENT *clnt);

A macro that destroys the client's RPC handle. Destruction usu? ally involves deallocation of private data structures, including clnt itself. Use of clnt is undefined after calling clnt_de? stroy(). If the RPC library opened the associated socket, it will close it also. Otherwise, the socket remains open.

CLIENT *clnt_create(char *host, unsigned long prog,

unsigned long vers, char *proto);

Generic client creation routine. host identifies the name of the remote host where the server is located. proto indicates which kind of transport protocol to use. The currently sup? ported values for this field are ?udp? and ?tcp?. Default time? outs are set, but can be modified using clnt_control().

Warning: using UDP has its shortcomings. Since UDP-based RPC messages can hold only up to 8 Kbytes of encoded data, this transport cannot be used for procedures that take large argu? ments or return huge results.

bool_t clnt_control(CLIENT *cl, int req, char *info);

A macro used to change or retrieve various information about a client object. req indicates the type of operation, and info is a pointer to the information. For both UDP and TCP, the sup? ported values of req and their argument types and what they do are:

CLSET_TIMEOUT struct timeval // set total timeout

CLGET_TIMEOUT struct timeval // get total timeout

Note: if you set the timeout using clnt_control(), the timeout parameter passed to clnt_call() will be ignored in all future calls.

CLGET_SERVER_ADDR struct sockaddr_in // get server's address

The following operations are valid for UDP only:

CLSET_RETRY_TIMEOUT struct timeval // set the retry timeout

CLGET_RETRY_TIMEOUT struct timeval // get the retry timeout

The retry timeout is the time that "UDP RPC" waits for the server to reply before retransmitting the request.

clnt_freeres(CLIENT * clnt, xdrproc_t outproc, char *out);

A macro that frees any data allocated by the RPC/XDR system when it decoded the results of an RPC call. The parameter out is the address of the results, and outproc is the XDR routine describ? ing the results. This routine returns one if the results were successfully freed, and zero otherwise.

void clnt_geterr(CLIENT *clnt, struct rpc_err *errp);

A macro that copies the error structure out of the client handle to the structure at address errp.

void clnt_pcreateerror(char *s);

Print a message to standard error indicating why a client RPC handle could not be created. The message is prepended with string s and a colon. Used when a clnt_create(), clntraw_cre?ate(), clnttcp_create(), or clntudp_create() call fails.

void clnt_perrno(enum clnt_stat stat);

Print a message to standard error corresponding to the condition indicated by stat. Used after callrpc().

clnt_perror(CLIENT *clnt, char *s);

Print a message to standard error indicating why an RPC call failed; clnt is the handle used to do the call. The message is prepended with string s and a colon. Used after clnt_call().

char *clnt_spcreateerror(char *s);

Like clnt_pcreateerror(), except that it returns a string in?stead of printing to the standard error.

Bugs: returns pointer to static data that is overwritten on each call.

char *clnt_sperrno(enum clnt_stat stat);

Take the same arguments as clnt_perrno(), but instead of sending a message to the standard error indicating why an RPC call failed, return a pointer to a string which contains the message. The string ends with a NEWLINE.

clnt_sperrno() is used instead of clnt_perrno() if the program does not have a standard error (as a program running as a server quite likely does not), or if the programmer does not want the message to be output with printf(3), or if a message format dif?ferent than that supported by clnt_perrno() is to be used.

Note: unlike clnt_sperror() and clnt_spcreateerror(), clnt_sper?rno() returns pointer to static data, but the result will not get overwritten on each call.

char *clnt_sperror(CLIENT *rpch, char *s);

Like clnt_perror(), except that (like clnt_sperrno()) it returns a string instead of printing to standard error.

Bugs: returns pointer to static data that is overwritten on each call.

CLIENT *clntraw_create(unsigned long prognum, unsigned long versnum);

This routine creates a toy RPC client for the remote program prognum, version versnum. The transport used to pass messages to the service is actually a buffer within the process's address space, so the corresponding RPC server should live in the same address space; see svcraw_create(). This allows simulation of RPC and acquisition of RPC overheads, such as round trip times, without any kernel interference. This routine returns NULL if it fails.

CLIENT *clnttcp_create(struct sockaddr_in *addr,
unsigned long prognum, unsigned long versnum,
int *sockp, unsigned int sendsz, unsigned int recvsz);

This routine creates an RPC client for the remote program prognum, version versnum; the client uses TCP/IP as a transport. The remote program is located at Internet address *addr. If addr->sin_port is zero, then it is set to the actual port that the remote program is listening on (the remote portmap service is consulted for this information). The parameter sockp is a socket; if it is RPC_ANYSOCK, then this routine opens a new one and sets sockp. Since TCP-based RPC uses buffered I/O, the user may specify the size of the send and receive buffers with the parameters sendsz and recvsz; values of zero choose suitable de? faults. This routine returns NULL if it fails.

CLIENT *clntudp_create(struct sockaddr_in *addr,
unsigned long prognum, unsigned long versnum,
struct timeval wait, int *sockp);

This routine creates an RPC client for the remote program prognum, version versnum; the client uses use UDP/IP as a trans?

port. The remote program is located at Internet address addr. If addr->sin_port is zero, then it is set to actual port that the remote program is listening on (the remote portmap service is consulted for this information). The parameter sockp is a socket; if it is RPC_ANYSOCK, then this routine opens a new one and sets sockp. The UDP transport resends the call message in intervals of wait time until a response is received or until the call times out. The total time for the call to time out is specified by clnt_call().

Warning: since UDP-based RPC messages can hold only up to 8 Kbytes of encoded data, this transport cannot be used for proce? dures that take large arguments or return huge results.

CLIENT *clntudp_bufcreate(struct sockaddr_in *addr,
unsigned long prognum, unsigned long versnum,
struct timeval wait, int *sockp,
unsigned int sendsize, unsigned int recosize);

This routine creates an RPC client for the remote program prognum, on versnum; the client uses use UDP/IP as a transport. The remote program is located at Internet address addr. If addr->sin_port is zero, then it is set to actual port that the remote program is listening on (the remote portmap service is consulted for this information). The parameter sockp is a socket; if it is RPC_ANYSOCK, then this routine opens a new one and sets sockp. The UDP transport resends the call message in intervals of wait time until a response is received or until the call times out. The total time for the call to time out is specified by clnt_call().

This allows the user to specify the maximum packet size for sending and receiving UDP-based RPC messages.

void get_myaddress(struct sockaddr_in *addr);

Stuff the machine's IP address into *addr, without consulting the library routines that deal with /etc/hosts. The port number is always set to htons(PMAPPORT).

struct pmaplist *pmap_getmaps(struct sockaddr_in *addr);

A user interface to the portmap service, which returns a list of the current RPC program-to-port mappings on the host located at IP address *addr. This routine can return NULL. The command rpcinfo -p uses this routine.

unsigned short pmap_getport(struct sockaddr_in *addr,
unsigned long prognum, unsigned long versnum,
unsigned int protocol);

A user interface to the portmap service, which returns the port number on which waits a service that supports program number prognum, version versnum, and speaks the transport protocol as? sociated with protocol. The value of protocol is most likely IPPROTO_UDP or IPPROTO_TCP. A return value of zero means that the mapping does not exist or that the RPC system failed to con? tact the remote portmap service. In the latter case, the global variable rpc_createerr contains the RPC status.

enum clnt_stat pmap_rmtcall(struct sockaddr_in *addr,
unsigned long prognum, unsigned long versnum,
unsigned long procnum,
xdrproc_t inproc, char *in,
xdrproc_t outproc, char *out,
struct timeval tout, unsigned long *portp);

A user interface to the portmap service, which instructs portmap on the host at IP address *addr to make an RPC call on your be? half to a procedure on that host. The parameter *portp will be modified to the program's port number if the procedure succeeds. The definitions of other parameters are discussed in callrpc() and clnt_call(). This procedure should be used for a ?ping? and nothing else. See also clnt_broadcast().

bool_t pmap_set(unsigned long prognum, unsigned long versnum,
unsigned int protocol, unsigned short port);

A user interface to the portmap service, which establishes a mapping between the triple [prognum,versnum,protocol] and port

on the machine's portmap service. The value of protocol is most likely IPPROTO_UDP or IPPROTO_TCP. This routine returns one if it succeeds, zero otherwise. Automatically done by svc_regis? ter().

bool_t pmap_unset(unsigned long prognum, unsigned long versnum);

A user interface to the portmap service, which destroys all map? ping between the triple [prognum,versnum,*] and ports on the ma? chine's portmap service. This routine returns one if it suc? ceeds, zero otherwise.

int registerrpc(unsigned long prognum, unsigned long versnum,
unsigned long procnum, char *(*procname)(char *),
xdrproc_t inproc, xdrproc_t outproc);

Register procedure procname with the RPC service package. If a request arrives for program prognum, version versnum, and proce? dure procnum, procname is called with a pointer to its parame? ter(s); procname should return a pointer to its static re? sult(s); inproc is used to decode the parameters while outproc is used to encode the results. This routine returns zero if the registration succeeded, -1 otherwise.

Warning: remote procedures registered in this form are accessed using the UDP/IP transport; see svcudp_create() for restric? tions.

struct rpc_createerr rpc_createerr;

A global variable whose value is set by any RPC client creation routine that does not succeed. Use the routine clnt_pcreateer? ror() to print the reason why.

void svc_destroy(SVCXPRT *xprt);

A macro that destroys the RPC service transport handle, xprt. Destruction usually involves deallocation of private data struc? tures, including xprt itself. Use of xprt is undefined after calling this routine.

fd_set svc_fdset;

A global variable reflecting the RPC service side's read file

descriptor bit mask; it is suitable as a parameter to the se?
lect(2) system call. This is of interest only if a service im?
plementor does their own asynchronous event processing, instead
of calling svc_run(). This variable is read-only (do not pass
its address to select(2)!), yet it may change after calls to
svc_getreqset() or any creation routines.

int svc_fds;

Similar to svc_fdset, but limited to 32 file descriptors. This
interface is obsoleted by svc_fdset.

svc_freeargs(SVCXPRT *xprt, xdrproc_t inproc, char *in);

A macro that frees any data allocated by the RPC/XDR system when
it decoded the arguments to a service procedure using
svc_getargs(). This routine returns 1 if the results were suc?
cessfully freed, and zero otherwise.

svc_getargs(SVCXPRT *xprt, xdrproc_t inproc, char *in);

A macro that decodes the arguments of an RPC request associated
with the RPC service transport handle, xprt. The parameter in
is the address where the arguments will be placed; inproc is the
XDR routine used to decode the arguments. This routine returns
one if decoding succeeds, and zero otherwise.

struct sockaddr_in *svc_getcaller(SVCXPRT *xprt);

The approved way of getting the network address of the caller of
a procedure associated with the RPC service transport handle,
xprt.

void svc_getreqset(fd_set *rdfds);

This routine is of interest only if a service implementor does
not call svc_run(), but instead implements custom asynchronous
event processing. It is called when the select(2) system call
has determined that an RPC request has arrived on some RPC
socket(s); rdfds is the resultant read file descriptor bit mask.
The routine returns when all sockets associated with the value
of rdfds have been serviced.

void svc_getreq(int rdfds);

Similar to svc_getreqset(), but limited to 32 file descriptors.

This interface is obsoleted by svc_getreqset().

bool_t svc_register(SVCXPRT *xprt, unsigned long prognum,
unsigned long versnum,
void (*dispatch)(svc_req *, SVCXPRT *),
unsigned long protocol);

Associates prognum and versnum with the service dispatch proce?
dure, dispatch. If protocol is zero, the service is not regis?
tered with the portmap service. If protocol is nonzero, then a
mapping of the triple [prognum,versnum,protocol] to
xprt->xp_port is established with the local portmap service
(generally protocol is zero, IPPROTO_UDP or IPPROTO_TCP). The
procedure dispatch has the following form:

dispatch(struct svc_req *request, SVCXPRT *xprt);

The svc_register() routine returns one if it succeeds, and zero
otherwise.

void svc_run(void);

This routine never returns. It waits for RPC requests to ar?
rive, and calls the appropriate service procedure using svc_ge?
treq() when one arrives. This procedure is usually waiting for
a select(2) system call to return.

bool_t svc_sendreply(SVCXPRT *xprt, xdrproc_t outproc, char *out);

Called by an RPC service's dispatch routine to send the results
of a remote procedure call. The parameter xprt is the request's
associated transport handle; outproc is the XDR routine which is
used to encode the results; and out is the address of the re?
sults. This routine returns one if it succeeds, zero otherwise.

void svc_unregister(unsigned long prognum, unsigned long versnum);

Remove all mapping of the double [prognum,versnum] to dispatch
routines, and of the triple [prognum,versnum,*] to port number.

void svcerr_auth(SVCXPRT *xprt, enum auth_stat why);

Called by a service dispatch routine that refuses to perform a
remote procedure call due to an authentication error.

void svcerr_decode(SVCXPRT *xprt);

Called by a service dispatch routine that cannot successfully decode its parameters. See also svc_getargs().

void svcerr_noproc(SVCXPRT *xprt);

Called by a service dispatch routine that does not implement the procedure number that the caller requests.

void svcerr_noprog(SVCXPRT *xprt);

Called when the desired program is not registered with the RPC package. Service implementors usually do not need this routine.

void svcerr_progvers(SVCXPRT *xprt);

Called when the desired version of a program is not registered with the RPC package. Service implementors usually do not need this routine.

void svcerr_systemerr(SVCXPRT *xprt);

Called by a service dispatch routine when it detects a system error not covered by any particular protocol. For example, if a service can no longer allocate storage, it may call this rou? tine.

void svcerr_weakauth(SVCXPRT *xprt);

Called by a service dispatch routine that refuses to perform a remote procedure call due to insufficient authentication parame? ters. The routine calls svcerr_auth(xprt, AUTH_TOOWEAK).

SVCXPRT *svcfd_create(int fd, unsigned int sendsize,
unsigned int recvsize);

Create a service on top of any open file descriptor. Typically, this file descriptor is a connected socket for a stream protocol such as TCP. sendsize and recvsize indicate sizes for the send and receive buffers. If they are zero, a reasonable default is chosen.

SVCXPRT *svcraw_create(void);

This routine creates a toy RPC service transport, to which it returns a pointer. The transport is really a buffer within the process's address space, so the corresponding RPC client should

live in the same address space; see clntraw_create(). This rou?
tine allows simulation of RPC and acquisition of RPC overheads
(such as round trip times), without any kernel interference.
This routine returns NULL if it fails.

SVCXPRT *svctcp_create(int sock, unsigned int send_buf_size,
unsigned int recv_buf_size);

This routine creates a TCP/IP-based RPC service transport, to
which it returns a pointer. The transport is associated with
the socket sock, which may be RPC_ANYSOCK, in which case a new
socket is created. If the socket is not bound to a local TCP
port, then this routine binds it to an arbitrary port. Upon
completion, xprt->xp_sock is the transport's socket descriptor,
and xprt->xp_port is the transport's port number. This routine
returns NULL if it fails. Since TCP-based RPC uses buffered
I/O, users may specify the size of buffers; values of zero
choose suitable defaults.

SVCXPRT *svcudp_bufcreate(int sock, unsigned int sendsize,
unsigned int recosize);

This routine creates a UDP/IP-based RPC service transport, to
which it returns a pointer. The transport is associated with
the socket sock, which may be RPC_ANYSOCK, in which case a new
socket is created. If the socket is not bound to a local UDP
port, then this routine binds it to an arbitrary port. Upon
completion, xprt->xp_sock is the transport's socket descriptor,
and xprt->xp_port is the transport's port number. This routine
returns NULL if it fails.
This allows the user to specify the maximum packet size for
sending and receiving UDP-based RPC messages.

SVCXPRT *svcudp_create(int sock);

This call is equivalent to svcudp_bufcreate(sock,SZ,SZ) for some
default size SZ.

bool_t xdr_accepted_reply(XDR *xdrs, struct accepted_reply *ar);

Used for encoding RPC reply messages. This routine is useful

for users who wish to generate RPC-style messages without using the RPC package.

bool_t xdr_authunix_parms(XDR *xdrs, struct authunix_parms *aupp);

Used for describing UNIX credentials. This routine is useful for users who wish to generate these credentials without using the RPC authentication package.

void xdr_callhdr(XDR *xdrs, struct rpc_msg *chdr);

Used for describing RPC call header messages. This routine is useful for users who wish to generate RPC-style messages without using the RPC package.

bool_t xdr_callmsg(XDR *xdrs, struct rpc_msg *cmsg);

Used for describing RPC call messages. This routine is useful for users who wish to generate RPC-style messages without using the RPC package.

bool_t xdr_opaque_auth(XDR *xdrs, struct opaque_auth *ap);

Used for describing RPC authentication information messages. This routine is useful for users who wish to generate RPC-style messages without using the RPC package.

bool_t xdr_pmap(XDR *xdrs, struct pmap *regs);

Used for describing parameters to various portmap procedures, externally. This routine is useful for users who wish to gener? ate these parameters without using the pmap interface.

bool_t xdr_pmaplist(XDR *xdrs, struct pmaplist **rp);

Used for describing a list of port mappings, externally. This routine is useful for users who wish to generate these parame? ters without using the pmap interface.

bool_t xdr_rejected_reply(XDR *xdrs, struct rejected_reply *rr);

Used for describing RPC reply messages. This routine is useful for users who wish to generate RPC-style messages without using the RPC package.

bool_t xdr_replymsg(XDR *xdrs, struct rpc_msg *rmsg);

Used for describing RPC reply messages. This routine is useful for users who wish to generate RPC style messages without using

the RPC package.

void xprt_register(SVCXPRT *xprt);

After RPC service transport handles are created, they should register themselves with the RPC service package. This routine modifies the global variable svc_fds. Service implementors usu? ally do not need this routine.

void xprt_unregister(SVCXPRT *xprt);

Before an RPC service transport handle is destroyed, it should unregister itself with the RPC service package. This routine modifies the global variable svc_fds. Service implementors usu? ally do not need this routine.

ATTRIBUTES

For an explanation of the terms used in this section, see at? tributes(7).

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?Interface ? Attribute ? Value ?

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?auth_destroy(), authnone_create(), ? Thread safety ? MT-Safe ?

?authunix_create(), ? ? ?

?authunix_create_default(), ? ? ?

?callrpc(), clnt_broadcast(), ? ? ?

?clnt_call(), clnt_destroy(), ? ? ?

?clnt_create(), clnt_control(), ? ? ?

?clnt_freeres(), clnt_geterr(), ? ? ?

?clnt_pcreateerror(), clnt_perrno(), ? ? ?

?clnt_perror(), ? ? ?

?clnt_spcreateerror(), ? ? ?

?clnt_sperrno(), clnt_sperror(), ? ? ?

?clntraw_create(), clnttcp_create(), ? ? ?

?clntudp_create(), ? ? ?

?clntudp_bufcreate(), ? ? ?

?get_myaddress(), pmap_getmaps(), ? ? ?

?pmap_getport(), pmap_rmtcall(), ? ? ?

?pmap_set(), pmap_unset(), ? ? ?

?registerrpc(), svc_destroy(), ? ? ?

?svc_freeargs(), svc_getargs(), ? ? ?

?svc_getcaller(), svc_getreqset(), ? ? ?

?svc_getreq(), svc_register(), ? ? ?

?svc_run(), svc_sendreply(), ? ? ?

?svc_unregister(), svcerr_auth(), ? ? ?

?svcerr_decode(), svcerr_noproc(), ? ? ?

?svcerr_noprog(), svcerr_progvers(), ? ? ?

?svcerr_systemerr(), ? ? ?

?svcerr_weakauth(), ? ? ?

?svcfd_create(), svcraw_create(), ? ? ?

?svctcp_create(), ? ? ?

?svcudp_bufcreate(), ? ? ?

?svcudp_create(), xdr_accepted_re? ? ? ?

?ply(), ? ? ?

?xdr_authunix_parms(), ? ? ?

?xdr_callhdr(), ? ? ?

?xdr_callmsg(), xdr_opaque_auth(), ? ? ?

?xdr_pmap(), xdr_pmaplist(), ? ? ?

?xdr_rejected_reply(), ? ? ?

?xdr_replymsg(), ? ? ?

?xprt_register(), xprt_unregister() ? ? ?

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SEE ALSO

xdr(3)

The following manuals:

Remote Procedure Calls: Protocol Specification

Remote Procedure Call Programming Guide

rpcgen Programming Guide

RPC: Remote Procedure Call Protocol Specification, RFC 1050, Sun Mi?

crosystems, Inc., USC-ISI.

COLOPHON