

Package ‘rzmq’

April 14, 2024

Title R Bindings for 'ZeroMQ'

Version 0.9.13

Description Interface to the 'ZeroMQ' lightweight messaging kernel (see <<https://zeromq.org/>> for more information).

License GPL-3

Depends R (>= 3.1.0)

SystemRequirements ZeroMQ >= 3.0.0: libzmq3-dev (deb) or zeromq-devel (rpm)

URL <https://docs.ropensci.org/rzmq/>
<https://ropensci.r-universe.dev/rzmq>

BugReports <https://github.com/ropensci/rzmq/issues>

RoxygenNote 7.2.3

NeedsCompilation yes

Author Whit Armstrong [aut],
Michael Schubert [ctb],
Jeroen Ooms [aut, cre] (<<https://orcid.org/0000-0002-4035-0289>>)

Maintainer Jeroen Ooms <jeroen@berkeley.edu>

Repository CRAN

Date/Publication 2024-04-14 17:20:02 UTC

R topics documented:

bind.socket	2
connect.socket	3
init.context	4
init.message	5
poll.socket	6
receive.multipart	8
receive.socket	9
send.multipart	10

send.socket	11
socket.options	12
zmq.error	14
zmq.version	15

Index 16

bind.socket	<i>Create an endpoint for accepting connections and bind it to the socket referenced by the socket argument.</i>
-------------	--

Description

The `zmq_bind()` function shall create an endpoint for accepting connections and bind it to the socket referenced by the `socket` argument.

The endpoint argument is a string consisting of two parts as follows: `transport ://address`. The transport part specifies the underlying transport protocol to use. The meaning of the address part is specific to the underlying transport protocol selected.

The following transports are defined:

`inproc` local in-process (inter-thread) communication transport, see `zmq_inproc(7)` `ipc` local inter-process communication transport, see `zmq_ipc(7)` `tcp` unicast transport using TCP, see `zmq_tcp(7)` `pgm`, `epgm` reliable multicast transport using PGM, see `zmq_pgm(7)` With the exception of `ZMQ_PAIR` sockets, a single socket may be connected to multiple endpoints using `zmq_connect()`, while simultaneously accepting incoming connections from multiple endpoints bound to the socket using `zmq_bind()`. Refer to `zmq_socket(3)` for a description of the exact semantics involved when connecting or binding a socket to multiple endpoints.

Usage

```
bind.socket(socket, address)
```

Arguments

socket	a zmq socket object.
address	a transport as described above.

Value

TRUE if operation succeeds or FALSE if the operation fails

Author(s)

ZMQ was written by Martin Sustrik <sustrik@250bpm.com> and Martin Lucina <mato@kotelna.sk>. `rzmq` was written by Whit Armstrong.

References

<http://www.zeromq.org> <http://api.zeromq.org> <http://zguide.zeromq.org/page:all>

See Also

[connect.socket](#), [bind.socket](#), [receive.socket](#), [send.socket](#), [poll.socket](#)

Examples

```
## Not run:

library(rzmq)
context = init.context()
in.socket = init.socket(context, "ZMQ_PULL")
bind.socket(in.socket, "tcp://*:5557")

out.socket = init.socket(context, "ZMQ_PUSH")
bind.socket(out.socket, "tcp://*:5558")

## End(Not run)
```

connect.socket	<i>Connect the socket referenced by the socket argument to the endpoint specified by the endpoint argument.</i>
----------------	---

Description

The `zmq_connect()` function shall connect the socket referenced by the `socket` argument to the endpoint specified by the `endpoint` argument.

The `endpoint` argument is a string consisting of two parts as follows: `transport://address`. The `transport` part specifies the underlying transport protocol to use. The meaning of the `address` part is specific to the underlying transport protocol selected.

The following transports are defined:

`inproc` local in-process (inter-thread) communication transport, see [zmq_inproc\(7\)](#) `ipc` local inter-process communication transport, see [zmq_ipc\(7\)](#) `tcp` unicast transport using TCP, see [zmq_tcp\(7\)](#) `pgm`, `epgm` reliable multicast transport using PGM, see [zmq_pgm\(7\)](#) With the exception of `ZMQ_PAIR` sockets, a single socket may be connected to multiple endpoints using `zmq_connect()`, while simultaneously accepting incoming connections from multiple endpoints bound to the socket using `zmq_bind()`. Refer to [zmq_socket\(3\)](#) for a description of the exact semantics involved when connecting or binding a socket to multiple endpoints.

Usage

```
connect.socket(socket, address)
disconnect.socket(socket, address)
```

Arguments

socket	a zmq socket object.
address	a transport as described above.

Value

TRUE if operation succeeds or FALSE if the operation fails

Author(s)

ZMQ was written by Martin Sustrik <sustrik@250bpm.com> and Martin Lucina <mato@kotelna.sk>. rzmq was written by Whit Armstrong.

References

<http://www.zeromq.org> <http://api.zeromq.org> <http://zguide.zeromq.org/page:all>

See Also

[connect.socket](#), [bind.socket](#), [receive.socket](#), [send.socket](#), [poll.socket](#)

Examples

```
## Not run:
library(rzmq)
context = init.context()
in.socket = init.socket(context, "ZMQ_PULL")
bind.socket(in.socket, "tcp://*:5557")

out.socket = init.socket(context, "ZMQ_PUSH")
bind.socket(out.socket, "tcp://*:5558")

## End(Not run)
```

init.context

initailize zmq context and zmq socket

Description

initialize zmq context and zmq socket for to be used for further zmq operations.

Usage

```
init.context(threads=1L)
init.socket(context, socket.type)
```

Arguments

threads	number of threads for the context to use
context	a zmq context object.
socket.type	The ZMQ socket type requested e.g. ZMQ_REQ,ZMQ_REP,ZMQ_PULL,ZMQ_PUSH, etc.

Value

init.context returns a zmq context object. init.socket returns a zmq socket object.

Author(s)

ZMQ was written by Martin Sustrik <sustrik@250bpm.com> and Martin Lucina <mato@kotelna.sk>. rzmq was written by Whit Armstrong.

References

<http://www.zeromq.org> <http://api.zeromq.org> <http://zguide.zeromq.org/page:all>

See Also

[connect.socket](#), [bind.socket](#), [receive.socket](#), [send.socket](#), [poll.socket](#)

Examples

```
## Not run:

library(rzmq)
context = init.context()
in.socket = init.socket(context, "ZMQ_PULL")

## End(Not run)
```

init.message	<i>create a message object.</i>
--------------	---------------------------------

Description

Create a ZeroMQ message object that can be sent multiple times

Usage

```
init.message(data, serialize=TRUE, xdr=.Platform$endian=="big")
```

Arguments

data	the R object to be sent
serialize	whether to call serialize before sending the data
xdr	passed directly to serialize command if serialize is requested

Value

a ZeroMQ message object as external pointer

Author(s)

ZMQ was written by Martin Sustrik <sustrik@250bpm.com> and Martin Lucina <mato@kotelna.sk>. rzmq was written by Whit Armstrong.

References

<http://www.zeromq.org> <http://api.zeromq.org> <http://zguide.zeromq.org/page:all>

See Also

[send.message.object](#)

Examples

```
## Not run:

## remote execution server in rzmq
library(rzmq)
data = list(x=5)
msg = init.message(data)

## End(Not run)
```

poll.socket	<i>Polls a list of sockets, waiting for the presence of a nonblocking read, write, or error event.</i>
-------------	--

Description

The `zmq_poll()` function shall poll a list of a sockets for either read, write, or error conditions subject to a millisecond resolution timeout.

Usage

```
poll.socket(sockets, events, timeout=0L)
```

Arguments

sockets	a list of zmq socket objects.
events	a list of character vectors containing one or more events in {read, write, error}. The first element in the list corresponds to the first zmq socket, and so on...
timeout	the numbers of seconds to wait for events. Fractional seconds are supported. ZeroMQ guarantees at most millisecond resolution. A timeout of -1L blocks until an event occurs; a timeout of 0L is non-blocking.

Value

A list of pairlists corresponding to the polled zmq sockets. Each list has one of more tags from {read, write, error} with logical values indicating the results of the poll operation.

Author(s)

ZMQ was written by Martin Sustrik <sustrik@250bpm.com> and Martin Lucina <mato@kotelna.sk>. rzmq was written by Whit Armstrong.

References

<http://www.zeromq.org> <http://api.zeromq.org> <http://zguide.zeromq.org/page:all>

See Also

[connect.socket](#), [bind.socket](#), [receive.socket](#), [send.socket](#), [poll.socket](#)

Examples

```
## Not run:
library(rzmq)

# Create a set of REP-REQ sockets that
# have a Send, Receive, Send, Receive, ...
# pattern.
context = init.context()
in.socket = init.socket(context, "ZMQ_REP")
bind.socket(in.socket, "tcp://*:5557")

out.socket = init.socket(context, "ZMQ_REQ")
connect.socket(out.socket, "tcp://*:5557")

# Poll the REP and REQ sockets for all events.
events <- poll.socket(list(in.socket, out.socket),
                      list(c("read", "write", "error"),
                           c("read", "write", "error")),
                      timeout=0L)

# The REQ socket is writable without blocking.
paste("Is upstream REP socket readable without blocking?", events[[1]]$read)
paste("Is upstream REP socket writable without blocking?", events[[1]]$write)
paste("Is downstream REQ socket readable without blocking?", events[[2]]$read)
paste("Is downstream REQ socket writable without blocking?", events[[2]]$write)

# Send a message to the REP socket from the REQ socket. The
# REQ socket must respond before the REP socket can send
# another message.
send.socket(out.socket, "Hello World")

events <- poll.socket(list(in.socket, out.socket),
                      list(c("read", "write", "error"),
                           c("read", "write", "error")),
                      timeout=0L)

# The incoming message is readable on the REP socket.
paste("Is upstream REP socket readable without blocking?", events[[1]]$read)
paste("Is upstream REP socket writable without blocking?", events[[1]]$write)
```

```

paste("Is downstream REQ socket readable without blocking?", events[[2]]$read)
paste("Is downstream REQ socket writable without blocking?", events[[2]]$write)

receive.socket(in.socket)

events <- poll.socket(list(in.socket, out.socket),
                      list(c("read", "write", "error"),
                           c("read", "write", "error")),
                      timeout=0L)

# The REQ socket is waiting for a response from the REP socket.
paste("Is upstream REP socket readable without blocking?", events[[1]]$read)
paste("Is upstream REP socket writable without blocking?", events[[1]]$write)
paste("Is downstream REQ socket readable without blocking?", events[[2]]$read)
paste("Is downstream REQ socket writable without blocking?", events[[2]]$write)

send.socket(in.socket, "Greetings")

events <- poll.socket(list(in.socket, out.socket),
                      list(c("read", "write", "error"),
                           c("read", "write", "error")),
                      timeout=0L)

# The REP response is waiting to be read on the REQ socket.
paste("Is upstream REP socket readable without blocking?", events[[1]]$read)
paste("Is upstream REP socket writable without blocking?", events[[1]]$write)
paste("Is downstream REQ socket readable without blocking?", events[[2]]$read)
paste("Is downstream REQ socket writable without blocking?", events[[2]]$write)

# Complete the REP-REQ transaction cycle by reading
# the REP response.
receive.socket(out.socket)

## End(Not run)

```

receive.multipart *Receive multipart ZMQ message*

Description

Returns a list of raw vectors for the parts of a multipart message.

Usage

```
receive.multipart(socket)
```

Arguments

socket The ZMQ socket from which to receive data

receive.socket	<i>Receive a message from the socket referenced by the socket argument.</i>
----------------	---

Description

The `zmq_recv()` function shall receive a message from the socket referenced by the `socket` argument. If there are no messages available on the specified socket, by default the function shall block until the request can be satisfied. A non-blocking receive can be obtained by setting `dont.wait` to `TRUE`. If there are no messages available on the specified socket, the `receive.socket()` call will return `NULL` immediately.

Usage

```
receive.socket(socket, unserialize=TRUE, dont.wait=FALSE)
receive.null.msg(socket)
receive.string(socket)
receive.int(socket)
receive.double(socket)
```

Arguments

<code>socket</code>	a zmq socket object
<code>unserialize</code>	whether to call <code>unserialize</code> on the received data
<code>dont.wait</code>	defaults to <code>false</code> , for blocking receive. Set to <code>TRUE</code> for non-blocking receive.

Value

the value sent from the remote server or `NULL` on failure. If `dont.wait` was `TRUE` and a message was not immediately available for receipt, `NULL` is returned and `get.zmq.errno()` is set to 11 or `get.zmq.strerror()` is set to `EAGAIN`.

Author(s)

ZMQ was written by Martin Sustrik <sustrik@250bpm.com> and Martin Lucina <mato@kotelna.sk>. `rzmq` was written by Whit Armstrong.

References

<http://www.zeromq.org> <http://api.zeromq.org> <http://zguide.zeromq.org/page:all>

See Also

[connect.socket](#), [bind.socket](#), [receive.socket](#), [send.socket](#), [poll.socket](#)

Examples

```
## Not run:
library(rzmq)

remote.exec <- function(out.socket, in.socket, fun, ...) {
  send.socket(out.socket, data=list(fun=fun, args=list(...)))
  receive.socket(in.socket)
}

context = init.context()
out.socket = init.socket(context, "ZMQ_PUSH")
bind.socket(out.socket, "tcp://*:5557")

in.socket = init.socket(context, "ZMQ_PULL")
bind.socket(in.socket, "tcp://*:5558")

myfun <- function(x) {
  sum(abs(x))
}

remote.exec(out.socket, in.socket, myfun, rnorm(1e3))

## End(Not run)
```

send.multipart	<i>Send multipart ZMQ message.</i>
----------------	------------------------------------

Description

Queue a list of raw vectors to be sent as a series of ZMQ message parts. Each part before the last will be sent with the SNDMORE flag.

Usage

```
send.multipart(socket, parts)
```

Arguments

socket	The ZMQ socket on which to send data
parts	A list of raw vectors; each component will be sent as one part of the message, in the order of the list

send.socket	<i>send a message.</i>
-------------	------------------------

Description

Queue the message referenced by the `msg` argument to be sent to the socket referenced by the `socket` argument.

A successful invocation of `send.socket` does not indicate that the message has been transmitted to the network, only that it has been queued on the socket and ZMQ has assumed responsibility for the message.

Usage

```
send.socket(socket, data, send.more=FALSE, serialize=TRUE, xdr=.Platform$endian=="big")
send.null.msg(socket, send.more=FALSE)
send.raw.string(socket, data, send.more=FALSE)
```

Arguments

<code>socket</code>	a zmq socket object
<code>data</code>	the R object to be sent
<code>send.more</code>	whether this message has more frames to be sent
<code>serialize</code>	whether to call <code>serialize</code> before sending the data
<code>xdr</code>	passed directly to <code>serialize</code> command if <code>serialize</code> is requested

Value

a boolean indicating success or failure of the operation.

Author(s)

ZMQ was written by Martin Sustrik <sustrik@250bpm.com> and Martin Lucina <mato@kotelna.sk>. rzmq was written by Whit Armstrong.

References

<http://www.zeromq.org> <http://api.zeromq.org> <http://zguide.zeromq.org/page:all>

See Also

[connect.socket](#), [bind.socket](#), [receive.socket](#), [send.socket](#), [poll.socket](#)

Examples

```
## Not run:

## remote execution server in rzmq
library(rzmq)
context = init.context()
in.socket = init.socket(context,"ZMQ_PULL")
bind.socket(in.socket,"tcp://*:5557")

out.socket = init.socket(context,"ZMQ_PUSH")
bind.socket(out.socket,"tcp://*:5558")

while(1) {
  msg = receive.socket(in.socket)
  fun <- msg$fun
  args <- msg$args
  print(args)
  ans <- do.call(fun,args)
  send.socket(out.socket,ans)
}

## End(Not run)
```

socket.options

set a socket option.

Description

The `zmq_setsockopt()` function shall set the option specified by the `option_name` argument to the value pointed to by the `option_value` argument for the ZMQ socket pointed to by the `socket` argument.

Usage

```
set.hwm(socket, option.value)
set.swap(socket, option.value)
set.affinity(socket, option.value)
set.identity(socket, option.value)
subscribe(socket, option.value)
unsubscribe(socket, option.value)
set.rate(socket, option.value)
set.recovery.ivl(socket, option.value)
set.recovery.ivl.msec(socket, option.value)
set.mcast.loop(socket, option.value)
set.sndbuf(socket, option.value)
set.rcvbuf(socket, option.value)
set.linger(socket, option.value)
set.reconnect.ivl(socket, option.value)
```

```
set.zmq.backlog(socket, option.value)
set.reconnect.ivl.max(socket, option.value)
get.rcvmore(socket)
get.last.endpoint(socket)
get.send.timeout(socket)
set.send.timeout(socket, option.value)
get.rcv.timeout(socket)
set.rcv.timeout(socket, option.value)
```

Arguments

socket	a zmq socket object
option.value	the new option value to bet set

Value

a boolean indicating success or failure of the operation or in the case of `getsocketoptions`, the value of the requested option.

Author(s)

ZMQ was written by Martin Sustrik <sustrik@250bpm.com> and Martin Lucina <mato@kotelna.sk>. rzmq was written by Whit Armstrong.

References

<http://www.zeromq.org> <http://api.zeromq.org> <http://zguide.zeromq.org/page:all>

See Also

[connect.socket](#), [bind.socket](#), [receive.socket](#), [send.socket](#), [poll.socket](#)

Examples

```
## Not run:

library(rzmq)
context = init.context()
socket = init.socket(context, "ZMQ_REQ")

set.hwm(socket, 1L)
set.swap(socket, 100L)
set.identity(socket, "big.ass.socket")

## End(Not run)
```

zmq.error	<i>get libzmq error numbers and error strings</i>
-----------	---

Description

return the error number or error description after a zmq call

Usage

```
zmq.errno()  
zmq.strerror()
```

Value

an integer for zmq.errno or a string for zmq.strerror

Author(s)

ZMQ was written by Martin Sustrik <sustrik@250bpm.com> and Martin Lucina <mato@kotelna.sk>. rzmq was written by Whit Armstrong.

References

<http://www.zeromq.org> <http://api.zeromq.org> <http://zguide.zeromq.org/page:all>

See Also

[connect.socket](#), [bind.socket](#), [receive.socket](#), [send.socket](#)

Examples

```
## Not run:  
  
library(rzmq)  
zmq.errno()  
zmq.strerror()  
  
## End(Not run)
```

zmq.version	<i>get version of libzmq</i>
-------------	------------------------------

Description

return the version string of the system zmq library

Usage

```
zmq.version()
```

Value

a string of the following format: major.minor.patch

Author(s)

ZMQ was written by Martin Sustrik <sustrik@250bpm.com> and Martin Lucina <mato@kotelna.sk>. rzmq was written by Whit Armstrong.

References

<http://www.zeromq.org> <http://api.zeromq.org> <http://zguide.zeromq.org/page:all>

See Also

[connect.socket](#), [bind.socket](#), [receive.socket](#), [send.socket](#)

Examples

```
## Not run:  
  
library(rzmq)  
zmq.version()  
  
## End(Not run)
```

Index

* utilities

- bind.socket, 2
 - connect.socket, 3
 - init.context, 4
 - init.message, 5
 - poll.socket, 6
 - receive.socket, 9
 - send.socket, 11
 - socket.options, 12
 - zmq.error, 14
 - zmq.version, 15
- bind.socket, 2, 3–5, 7, 9, 11, 13–15
- connect.socket, 3, 3, 4, 5, 7, 9, 11, 13–15
- disconnect.socket (connect.socket), 3
- get.last.endpoint (socket.options), 12
- get.rcv.timeout (socket.options), 12
- get.rcvmore (socket.options), 12
- get.send.timeout (socket.options), 12
- init.context, 4
- init.message, 5
- init.socket (init.context), 4
- poll.socket, 3–5, 6, 7, 9, 11, 13
- receive.double (receive.socket), 9
- receive.int (receive.socket), 9
- receive.multipart, 8
- receive.null.msg (receive.socket), 9
- receive.socket, 3–5, 7, 9, 9, 11, 13–15
- receive.string (receive.socket), 9
- send.message.object, 6
- send.message.object (send.socket), 11
- send.multipart, 10
- send.null.msg (send.socket), 11
- send.raw.string (send.socket), 11
- send.socket, 3–5, 7, 9, 11, 11, 13–15
- set.affinity (socket.options), 12
- set.hwm (socket.options), 12
- set.identity (socket.options), 12
- set.linger (socket.options), 12
- set.mcast.loop (socket.options), 12
- set.rate (socket.options), 12
- set.rcv.timeout (socket.options), 12
- set.rcvbuf (socket.options), 12
- set.reconnect.ivl (socket.options), 12
- set.recovery.ivl (socket.options), 12
- set.send.timeout (socket.options), 12
- set.sndbuf (socket.options), 12
- set.swap (socket.options), 12
- set.zmq.backlog (socket.options), 12
- socket.options, 12
- subscribe (socket.options), 12
- unsubscribe (socket.options), 12
- zmq.errno (zmq.error), 14
- zmq.error, 14
- zmq.strerror (zmq.error), 14
- zmq.version, 15