

ZeroMQ Toolkit 1.5.5

ZeroMQ bindings for GNU Octave.

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To download a copy of the GNU Octave zeromq package, please visit <http://octave.sourceforge.net/zeromq/>.

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1 Installing and loading

The ZeroMQ toolkit must be installed and then loaded to be used.

It can be installed in GNU Octave directly from octave-forge, or can be installed in an off-line mode via a downloaded tarball.

The toolkit has a dependency on the zeromq library (<https://zeromq.org>), so it must be installed in order to successfully install the ZeroMQ toolkit.

For Fedora: `yum install zeromq-devel`

For Ubuntu: `apt install libzmq-dev`

The toolkit must be then be loaded once per each GNU Octave session in order to use its functionality.

1.1 Online Direct install

With an internet connection available, the ZeroMQ package can be installed from octave-forge using the following command within GNU Octave:

```
pkg install -forge zeromq
```

The latest released version of the toolkit will be downloaded and installed.

1.2 Off-line install

With the ZeroMQ toolkit package already downloaded, and in the current directory when running GNU Octave, the package can be installed using the following command within GNU Octave:

```
pkg install zeromq-1.5.5.tar.gz
```

1.3 Loading

Regardless of the method of installing the ZeroMQ toolkit, in order to use its functions, the toolkit must be loaded using the pkg load command:

```
pkg load zeromq
```

The toolkit must be loaded on each GNU Octave session.

2 Basic Usage Overview

The usage is very close to the ZeroMQ library C language bindings for the socket creation and manipulation with the exception of creating a zeromq context, which is automatically done in the bindings internals.

For example, a basic client that does a request / reply from a server on port local port 5555 (available as `zmq_example1.m`):

```
%% Create socket and connect to server
requester = zmq_socket (ZMQ_REQ);
zmq_connect (requester, "tcp://localhost:5555");

%% send some data
zmq_send (requester, uint8("Hello"), 5, 0);
%% try to read up to 10 bytes of reply data.
received = zmq_recv (requester, 10, 0);

zmq_close (requester);
```

An overview of the package can be displayed by running `help zeromq`

Help for each function can be displayed by `help thefunctionname`

ie:

```
help iszmq
```

3 Examples

There are several examples that come with the toolkit.

View example code using `edit examples/example_name`

ie:

```
edit examples/zmq_example1
```

3.1 Example1

Simple client REQ socket example that attempts to connect to a server and send a hello command and get back the response.

```
edit examples/zmq_example1
```

3.2 Example2

Simple server REP socket example that creates the server that the client from example 1 will connect to and responds back to client 'requests'

```
edit examples/zmq_example2
```

3.3 Example3

Simple server PUB socket example that creates 'weather' server sends weather updates for random zip codes.

```
edit examples/zmq_example3
```

3.4 Example4

Simple client SUB socket example that creates client that connects to the 'weather' server and subscribes for weather updates from zip-code 10001.

```
edit examples/zmq_example4
```

3.5 Example5

Simple client STREAM socket example that creates client that connects to octave.org and posts HEAD request.

```
edit examples/zmq_example5
```


4 Function Reference

The functions currently available in the ZeroMQ toolkit are described below;

4.1 ZeroMQ functions

4.1.1 iszmq

`tf = iszmq (h)`

Determine whether *h* is a zeromq socket object.

Inputs

h - a potential zeromq socket object to check

Outputs

tf - true if *h* is a zeromq socket object, otherwise false.

See also: zmq-socket.

4.1.2 zmq_bind

`status = zmq_bind (sock, endpoint)`

Bind a zeromq socket to a endpoint.

Inputs

sock - the socket to bind.

endpoint - the endpoint string.

Outputs

status - status for bind. On success, bind will return a *status* of true

See also: zmq-socket .

4.1.3 zmq_close

`zmq_close (sock)`

Close a zeromq socket.

Inputs

sock - the socket type to close.

Outputs

None

See also: zmq-socket .

4.1.4 zmq_connect

`status = zmq_connect (sock, endpoint)`

Connect a zeromq socket to a endpoint.

Inputs

sock - the socket to connect.

endpoint - the endpoint string.

Outputs

status - status for connect. On success, connect will return a *status* of true

See also: `zmq_socket`.

4.1.5 `zmq_curve_keypair`

```
[ publickey, privatekey ] = zmq_curve_keypair ()
```

Generate a random private/public keypair

Inputs

None

Outputs

publickey is a string that is the encoded public key

privatekey is a string that is the encoded private key

See also: `zmq_z85_encode` .

4.1.6 `zmq_curve_public`

```
publickey = zmq_curve_public (privatekey)
```

Derive the public key from a private key

Inputs

privatekey is a string that is the encoded private key. It must be 40 characters in length

Outputs

publickey is a string that is the encoded public key

See also: `zmq_curve_keypair`.

4.1.7 `zmq_disconnect`

```
status = zmq_disconnect (sock, endpoint)
```

Disconnect a zeromq socket from an endpoint.

Inputs

sock - the socket to disconnect from.

endpoint - a previously connected endpoint string to disconnect.

Outputs

status - status for disconnect. On success, disconnect will return a *status* of true

See also: `zmq_socket`, `zmq_connect`.

4.1.8 `zmq_errno`

```
errornum = zmq_errno ()
```

Get the value of errno from zeromq.

Inputs

None

Outputs

errnum is the *errno* value of the calling thread.

4.1.9 zmq_getsockopt

value = `zmq_getsockopt` (*sock*, *optionid*)

Get the current value of an option.

Inputs

sock - the socket to connect.

optionid - the `setsockopt` option to set.

Valid *optionids* are:

`ZMQ_RCVMORE`

Flag for whether a message has been split into multiple messages. The return value will be either 0 or 1.

`ZMQ_TYPE` Socket type for zeromq socket created with `zmq_socket`. Valid types are the same as the socket type value specified with `zmq_socket`.

`ZMQ_EVENTS`

Get the event state of zeromq socket. The returned value is a bit mask that may contain the following set values:

- `ZMQ_POLLIN` set when at least one message is available to read and `zmq_recv` will not block.
- `ZMQ_POLLOUT` set when at least one message can be written without `zmq_send` blocking.

`ZMQ_IDENTITY` or `ZMQ_ROUTING_ID`

Get the socket identity value

`ZMQ_RATE` Get the multicast data rate

`ZMQ_PRIORITY`

Get socket priority (linux only)

`ZMQ_BACKLOG`

Get length of queue for pending connections

`ZMQ_LAST_ENDPOINT`

Get the last endpoint the socket was connected to

`ZMQ_CONNECT_TIMEOUT`

Get the connect timeout value

`ZMQ SOCKS_PROXY`

Get the SOCKS5 proxy value (string)

`ZMQ_CURVE_SERVER`

Get whether socket is a curve server (1) or not (0)

`ZMQ_CURVE_PRIVATEKEY`

Get a the curve socket private key (string)

`ZMQ_CURVE_PUBLICKEY`

Get a the curve socket public key (string)

`ZMQ_CURVE_SERVERKEY`

Get a the curve socket public key (string)

ZMQ_PLAIN_SERVER
Get whether socket server will use plain authentication (1) or not (0)

ZMQ_PLAIN_USERNAME
Get the plain socket username (string)

ZMQ_PLAIN_PASSWORD
Get the plain socket password (string)

ZMQ_GSSAPI_SERVER
Get whether socket server will use gssapi authentication (1) or not (0)

ZMQ_GSSAPI_PLAINTEXT
Get whether socket will encrypt gssapi authentication (1) or not (0)

ZMQ_GSSAPI_PRINCIPAL
Get the name of the gssapi principal (string)

ZMQ_GSSAPI_SERVICE_PRINCIPAL
Get the name of the gssapi service principal (string)

ZMQ_MECHANISM
Get the security mechanism (ZMQ_NULL, ZMQ_PLAIN, ZMQ_CURVE, ZMQ_GSSAPI)

Outputs

value - the value set for the option, or [].

See also: `zmq-socket`, `zmq-setsockopt`.

4.1.10 `zmq_has`

yesno = `zmq_has (feature)`
Check if the `zmq` library supports a given feature.

Inputs

feature is the name of feature to check.

Currently known features are:

'ipc'	library supports the ipc:// protocol
'pgm'	library supports the pgm:// protocol
'tipc'	library supports the tipc:// protocol
'norm'	library supports the norm:// protocol
'curve'	library supports the CURVE security mechanism
'gssapi'	library supports the GSSAPI security mechanism
'draft'	library was built with the draft API.

Outputs

yesno - set to true if the feature is available, otherwise false.

4.1.11 `zmq_poll`

havedata = `zmq_poll (sock, timeout)`
indexlist = `zmq_poll (socklist, timeout)`
 Wait up to timeout time for received data on socket.

Inputs

sock - the socket to wait on.

socklist - the array of sockets to wait on.

timeout - timeout time in milliseconds. A value of 0 will return without waiting. A value of -1 will wait until there is data.

Outputs

havedata - value of 1 if have data.

indexlist - cell array of indexes to sockets that have data.

See also: `zmq_socket`.

4.1.12 `zmq_recv`

```
data = zmq_recv (sock, len)
```

```
data = zmq_recv (sock, len, flags)
```

Attempt to receive up to *len* bytes of data from zeromq socket.

Inputs

sock - the socket to receive from.

len - number of bytes to read.

flags - optional flags to pass to `recv`

Outputs

data - the read data in an uint8 array.

See also: `zmq_socket`.

4.1.13 `zmq_send`

```
count = zmq_send (sock, data)
```

```
count = zmq_send (sock, data, flags)
```

Attempt to send to *data* bytes of data to zeromq socket.

Inputs

sock - the socket to receive from.

data - data to send - either string or uint8 type.

flags - optional flags to pass to `send`

Outputs

count - number of bytes written to socket, or -1 on error.

See also: `zmq_socket`.

4.1.14 `zmq_setsockopt`

```
status = zmq_setsockopt (sock, optionid, value)
```

Set a socket option on a zeromq socket.

Inputs

sock - the socket to connect.

optionid - the setsockopt option to set.

value - the value to set.

Known valid *optionids* are:

ZMQ_SUBSCRIBE

Subscribe to incoming messages matching the value. The value is either a string or a uint8 array that must match the start of any incoming message

ZMQ_UNSUBSCRIBE

Unsubscribe from incoming messages

ZMQ_CONNECT_TIMEOUT

Set timeout for connect calls

ZMQ_IDENTITY or ZMQ_ROUTING_ID

Set the identity of a socket (string or uint8 data)

ZMQ_RATE Set the multicast data rate

ZMQ_PRIORITY

Set the socket priority (linux only)

ZMQ_BACKLOG

Set the queue length for incoming connections

ZMQ SOCKS_PROXY

Set the socks5 proxy value (string)

ZMQ_CURVE_SERVER

Set whether socket is a curve server (1) or not (0)

ZMQ_CURVE_PRIVATEKEY

Set the curve socket private key (string)

ZMQ_CURVE_PUBLICKEY

Set the curve socket public key (string)

ZMQ_CURVE_SERVERKEY

Set the curve socket public key (string)

ZMQ_PLAIN_SERVER

Set whether socket server will use plain authentication (1) or not (0)

ZMQ_PLAIN_USERNAME

Set the plain socket username (string)

ZMQ_PLAIN_PASSWORD

Set the plain socket password (string)

ZMQ_GSSAPI_SERVER

Set whether socket server will use gssapi authentication (1) or not (0)

ZMQ_GSSAPI_PLAINTEXT

Set whether socket will encrypt gssapi authentication (1) or not (0)

ZMQ_GSSAPI_PRINCIPAL

Set the name of the gssapi principal (string)

ZMQ_GSSAPI_SERVICE_PRINCIPAL

Set the name of the gssapi service principal (string)

Outputs

status - status for setsockopt. On success, setsockopt will return *status* of true

See also: zmq_getsockopt, ZMQ_SUBSCRIBE, ZMQ_UNSUBSCRIBE, ZMQ_CONNECT_TIMEOUT.

4.1.15 zmq_socket

sock = zmq_socket (*type*)

Create a zeromq socket.

Inputs

type - the socket type to create.

Supported socket types are:

ZMQ_PUB Publish socket

ZMQ_SUB Subscribe socket

ZMQ_REQ Request socket

ZMQ_REP Reply socket

ZMQ_PULL Pull socket

ZMQ_PUSH Push socket

ZMQ_PAIR Pair socket

ZMQ_DEALER
 Dealer socket

ZMQ_ROUTER
 Router socket

ZMQ_XPUB Publish socket

ZMQ_XSUB Subscribe socket

ZMQ_STREAM
 Stream socket

Outputs

sock - an instance of *octave.zeromq_socket* class.

See also: ZMQ_PUB, ZMQ_SUB, ZMQ_PUSH, ZMQ_PULL, ZMQ_REQ, ZMQ_REP, ZMQ_PAIR, ZMQ_DEALER, ZMQ_ROUTER, ZMQ_XPUB, ZMQ_XSUB, ZMQ_STREAM.

4.1.16 zmq_strerror

errorstr = zmq_strerror ()

Get the last error from zeromq.

Inputs

None

Outputs

errorstr - a string representation of the last error

4.1.17 zmq_unbind

status = zmq_unbind (*sock*, *endpoint*)

Unbind a previously bound zeromq socket from a endpoint.

Inputs

sock - the socket to unbind.

endpoint - the endpoint string to unbind.

Outputs

status - status for unbind. On success, unbind will return a *status* of true

See also: zmq-socket, zmq-bind .

4.1.18 zmq_version

[*major*, *minor*, *patch*] = zmq_version ()

Get the ZeroMQ library version.

Inputs

None

Outputs

major, *minor* *patch* - version of the ZeroMQ library.

4.1.19 zmq_z85_decode

data = zmq_z85_decode (*instr*)

Decode a z85 encoded string to a binary key.

Inputs

instr - a string encoded data

Outputs

data - uint8 decoded data

4.1.20 zmq_z85_encode

dest = zmq_z85_encode (*data*)

Encode a binary key as Z85 printable text.

Inputs

data - uint8 data that must have a size divisible by 4.

Outputs

dest - string encoded data

4.2 ZeroMQ socket type constants

4.2.1 ZMQ_DEALER

ZMQ_DEALER

Constant for dealer socket type.

See also: zmq-socket.

4.2.2 ZMQ_PAIR

ZMQ_PAIR

Constant for pair socket type.

See also: zmq_socket.

4.2.3 ZMQ_PUB

ZMQ_PUB

Constant for publisher type.

See also: zmq_socket.

4.2.4 ZMQ_PULL

ZMQ_PULL

Constant for pull socket type.

See also: zmq_socket.

4.2.5 ZMQ_PUSH

ZMQ_PUSH

Constant for push socket type.

See also: zmq_socket.

4.2.6 ZMQ_REP

ZMQ_REP

Constant for reply socket type.

See also: zmq_socket.

4.2.7 ZMQ_REQ

ZMQ_REQ

Constant for request socket type.

See also: zmq_socket.

4.2.8 ZMQ_ROUTER

ZMQ_ROUTER

Constant for router socket type.

See also: zmq_socket.

4.2.9 ZMQ_STREAM

ZMQ_STREAM

Constant for stream socket type.

See also: zmq_socket.

4.2.10 ZMQ_SUB

ZMQ_SUB

Constant for subscriber type.

See also: zmq_socket.

4.2.11 ZMQ_XPUB

ZMQ_XPUB

Constant for publisher type.

See also: zmq-socket.

4.2.12 ZMQ_XSUB

ZMQ_XSUB

Constant for subscriber type.

See also: zmq-socket.

4.3 ZeroMQ get/setsockopt constants

4.3.1 ZMQ_BACKLOG

ZMQ_BACKLOG

Constant for getsockopt and setsockopt to set backlog for pending connections

See also: zmq-getsockopt, zmq-setsockopt.

4.3.2 ZMQ_CONNECT_TIMEOUT

ZMQ_CONNECT_TIMEOUT

Constant for get/setsockopt connect timeout value

See also: zmq-getsockopt, zmq-setsockopt.

4.3.3 ZMQ_CURVE_PUBLICKEY

ZMQ_CURVE_PUBLICKEY

Constant for getsockopt and setsockopt CURVE_PUBLICKEY value option

See also: zmq-getsockopt, zmq-setsockopt.

4.3.4 ZMQ_CURVE_SECRETKEY

ZMQ_CURVE_PRIVATEKEY

Constant for getsockopt and setsockopt CURVE_PRIVATEKEY value option

See also: zmq-getsockopt, zmq-setsockopt.

4.3.5 ZMQ_CURVE_SERVER

ZMQ_CURVE_SERVER

Constant for getsockopt and setsockopt CURVE_SERVER value option

See also: zmq-getsockopt, zmq-setsockopt.

4.3.6 ZMQ_CURVE_SERVERKEY

ZMQ_CURVE_SERVERKEY

Constant for getsockopt and setsockopt CURVE_SERVERKEY value option

See also: zmq-getsockopt, zmq-setsockopt.

4.3.7 ZMQ_EVENTS

ZMQ_EVENTS

Constant for getsockopt EVENTS value option

See also: zmq_getsockopt.

4.3.8 ZMQ_GSSAPI_PLAINTEXT

ZMQ_GSSAPI_PLAINTEXT

Constant for getsockopt and setsockopt GSSAPI_PLAINTEXT value option

See also: zmq_getsockopt, zmq_setsockopt.

4.3.9 ZMQ_GSSAPI_PRINCIPAL

ZMQ_GSSAPI_PRINCIPAL

Constant for getsockopt and setsockopt GSSAPI_PRINCIPAL value option

See also: zmq_getsockopt, zmq_setsockopt.

4.3.10 ZMQ_GSSAPI_SERVER

ZMQ_GSSAPI_SERVER

Constant for getsockopt and setsockopt GSSAPI_SERVER value option

See also: zmq_getsockopt, zmq_setsockopt.

4.3.11 ZMQ_GSSAPI_SERVICE_PRINCIPAL

ZMQ_GSSAPI_SERVICE_PRINCIPAL

Constant for getsockopt and setsockopt GSSAPI_SERVICE_PRINCIPAL value option

See also: zmq_getsockopt, zmq_setsockopt.

4.3.12 ZMQ_IDENTITY

ZMQ_IDENTITY

Constant for getsockopt and setsockopt IDENTITY value option

See also: zmq_getsockopt, zmq_setsockopt.

4.3.13 ZMQ_LAST_ENDPOINT

ZMQ_LAST_ENDPOINT

Constant for getsockopt last endpoint value option

See also: zmq_getsockopt.

4.3.14 ZMQ_MECHANISM

ZMQ_MECHANISM

Constant for getsockopt and setsockopt MECHANISM value option

See also: zmq_getsockopt, zmq_setsockopt.

4.3.15 ZMQ_PLAIN_PASSWORD

ZMQ_PLAIN_PASSWORD

Constant for getsockopt and setsockopt PLAIN_PASSWORD value option

See also: zmq_getsockopt, zmq_setsockopt.

4.3.16 ZMQ_PLAIN_SERVER

ZMQ_PLAIN_SERVER

Constant for getsockopt and setsockopt PLAIN_SERVER value option

See also: zmq_getsockopt, zmq_setsockopt.

4.3.17 ZMQ_PLAIN_USERNAME

ZMQ_PLAIN_USERNAME

Constant for getsockopt and setsockopt PLAIN_USERNAME value option

See also: zmq_getsockopt, zmq_setsockopt.

4.3.18 ZMQ_PRIORITY

ZMQ_PRIORITY

Constant for getsockopt and setsockopt SO_PRIORITY value option in linux only.

See also: zmq_getsockopt, zmq_setsockopt.

4.3.19 ZMQ_RATE

ZMQ_RATE

Constant for getsockopt and setsockopt value option

Sets the data rate of multicast sockets in kilobits

See also: zmq_getsockopt, zmq_setsockopt.

4.3.20 ZMQ_RCVMORE

ZMQ_RCVMORE

Constant for getsockopt RCVMORE value option

See also: zmq_getsockopt.

4.3.21 ZMQ_ROUTING_ID

ZMQ_ROUTING_ID

Constant for getsockopt and setsockopt IDENTITY value option

See also: zmq_getsockopt, zmq_setsockopt.

4.3.22 ZMQ SOCKS_PROXY

ZMQ SOCKS_PROXY

Constant for getsockopt and setsockopt SOCKS_PROXY value option

See also: zmq_getsockopt, zmq_setsockopt.

4.3.23 ZMQ_SUBSCRIBE

ZMQ_SUBSCRIBE

Constant for setsockopt subscribe option

See also: zmq_setsockopt, ZMQ_UNSUBSCRIBE.

4.3.24 ZMQ_TYPE

ZMQ_TYPE

Constant for getsockopt TYPE value option

See also: zmq_getsockopt.

4.3.25 ZMQ_UNSUBSCRIBE

ZMQ_UNSUBSCRIBE

Constant for setsockopt unsubscribe option

See also: zmq_setsockopt, ZMQ_SUBSCRIBE.

4.4 ZeroMQ ZMQ_EVENTS flags

4.4.1 ZMQ_POLLIN

ZMQ_POLLIN

Constant bitmask value for getsockopt EVENTS value option

See also: zmq_getsockopt.

4.4.2 ZMQ_POLLOUT

ZMQ_POLLOUT

Constant bitmask value for getsockopt EVENTS value option

See also: zmq_getsockopt.

4.5 ZeroMQ receive send options

4.5.1 ZMQ_DONTWAIT

ZMQ_DONTWAIT

Constant for recv flag DONTWAIT

See also: zmq_recv.

4.5.2 ZMQ_SNDMORE

ZMQ_SNDMORE

Constant for send flag SNDMORE

See also: zmq_send.

4.6 ZeroMQ ZMQ_MECHANISM values

4.6.1 ZMQ_CURVE

ZMQ_CURVE

Constant value for getsockopt MECHANISM value option

See also: zmq_getsockopt.

4.6.2 ZMQ_GSSAPI

ZMQ_GSSAPI

Constant value for getsockopt MECHANISM value option

See also: zmq_getsockopt.

4.6.3 ZMQ_NULL

ZMQ_NULL

Constant value for getsockopt MECHANISM value option

See also: zmq_getsockopt.

4.6.4 ZMQ_PLAIN

ZMQ_PLAIN

Constant value for getsockopt MECHANISM value option

See also: zmq_getsockopt.

Appendix A GNU General Public License

Version 3, 29 June 2007

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