

# ZeroMQ Toolkit 1.5.6

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ZeroMQ bindings for GNU Octave.

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To download a copy of the GNU Octave zeromq package, please visit <https://gnu-octave.github.io/octave-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-1.5.6.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:

<code>ZMQ_PUB</code>	Publish socket
<code>ZMQ_SUB</code>	Subscribe socket
<code>ZMQ_REQ</code>	Request socket
<code>ZMQ_REP</code>	Reply socket
<code>ZMQ_PULL</code>	Pull socket
<code>ZMQ_PUSH</code>	Push socket
<code>ZMQ_PAIR</code>	Pair socket
<code>ZMQ_DEALER</code>	Dealer socket
<code>ZMQ_ROUTER</code>	Router socket
<code>ZMQ_XPUB</code>	Publish socket
<code>ZMQ_XSUB</code>	Subscribe socket
<code>ZMQ_STREAM</code>	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.

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Version 3, 29 June 2007

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