

Sockets Toolkit 1.4.1

Socket functions for GNU Octave.

The Octave-Forge community

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1 Installing and loading

The Sockets 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 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 Sockets package can be installed from octave-forge using the following command within GNU Octave:

```
pkg install -forge sockets
```

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

1.2 Off-line install

With the Sockets 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 sockets-1.4.1.tar.gz
```

1.3 Loading

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

```
pkg load sockets
```

The toolkit must be loaded on each GNU Octave session.

2 Basic Usage Overview

The sockets toolkit attempts to use function names similar to the standard UNIX socket function naming, so functions such as `socket`, `connect`, `bind`, `read`, `write` etc are available and in general would follow the same flow as if being programmed in C.

```
# example socket connect and request a HTML page info
```

```
s = socket(AF_INET, SOCK_STREAM, 0);
if s < 0
    error ("Could not create a socket")
endif

addr = struct("addr", "google.com", "port", 80);
if connect(s, addr) < 0
    error ("Could not create a socket")
endif
```

```
# html request
send(s, "HEAD / HTTP/1.0\r\n\r\n")
```

```
# read data back
[d, l] = recv(s, 2000);
if d == -1
    error ("Error reading data");
endif
```

```
# display the data in human readable form
char(d)
```

```
# disconnect socket
disconnect(s);
```

3 Function Reference

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

3.1 Sockets functions

3.1.1 accept

`[client, info] = accept (s)` [Loadable Function]

Accept incoming connection on specified socket.

Accepts an incoming connection on the socket *s*. The newly created socket is returned in *client*, and associated information in a struct *info*.

See the `accept` man pages for further details.

3.1.2 bind

`bind (s, portnumber)` [Loadable Function]

Bind specific socket to port number.

See the `bind` man pages for further details.

3.1.3 connect

`connect (s, serverinfo)` [Loadable Function]

Connect socket.

Connects the socket *s* following the information in the struct *serverinfo* which must contain the following fields:

addr a string with the host name to connect to

port the port number to connect to (an integer)

On successful connect, the returned status is zero.

See the `connect` man pages for further details.

3.1.4 disconnect

`disconnect (s)` [Loadable Function]

Disconnect socket.

Disconnects the socket *s*. If successful, `disconnect` returns 0, otherwise, it returns -1.

Since we can't call `fclose` on the file descriptor directly, use this function to disconnect the socket.

3.1.5 gethostbyname

`ipaddress = gethostbyname (hostname)` [Loadable Function]

Return IP address for host name.

For example:

```
gethostbyname ("localhost")
⇒ 127.0.0.1
```

See the `gethostbyname` man pages for details.

3.1.6 getsockopt

`[data, status] = getsockopt (s, level, optname)` [Loadable Function]

Get a socket option value from a socket.

Returns the value of *level optname* from the socket *s*.

Data type depends on the option used. *status* returns as 0 if no error.

See the `getsockopt` man pages for further details.

3.1.7 listen

`listen (s, backlog)` [Loadable Function]

Listen on socket for connections.

Listens on socket *s* for connections. *backlog* specifies how large the queue of incoming connections is allowed to grow.

On success, zero is returned.

See the `listen` man pages for further details.

3.1.8 recv

`[data, count] = recv (s, len)` [Loadable Function]

`[data, count] = recv (s, len, flags)` [Loadable Function]

Read data from specified socket.

Requests reading *len* bytes from the socket *s*. The optional integer *flags* parameter can be used to modify the behaviour of `recv`.

The read data is returned in the uint8 array *data*. The number of bytes read is returned in *count*.

You can get non-blocking operation by using the flag `MSG_DONTWAIT` which makes the `recv()` call return immediately. If there is no data, -1 is returned in count.

See the `recv` man pages for further details.

3.1.9 recvfrom

`[data, count, src_info] = recvfrom (s, len)` [Loadable Function]

`[data, count, src_info] = recvfrom (s, len, flags)` [Loadable Function]

Read data from specified socket.

Requests reading *len* bytes from the socket *s*. The optional integer *flags* parameter can be used to modify the behaviour of `recvfrom`.

The read data is returned in the uint8 array *data*. The number of bytes read is returned in *count* and a structure with fields *addr* and *port* contain the source of the data.

You can get non-blocking operation by using the flag `MSG_DONTWAIT` which makes the `recvfrom()` call return immediately. If there is no data, -1 is returned in count.

See the `recvfrom` man pages for further details.

3.1.10 select

`[status, rfdset, wfdset, efdset] = select (nfds, rfdset, wfdset, efdset, timeout)` [Loadable Function]

Wait for socket activity on selected sockets.

The fdsets are vectors of fds to check, for example [1 2 3]. Empty vectors equate to null.

nfds tests file descriptions in the range of 0 - *nfds*-1.

Timeout is can be either an real value for number of seconds, a struct with a `tm_sec` and `tm_usec` fields, or empty set for null.

status returns as 0 if timeout, or number of waiting sockets if ok.

See the `select` man pages for further details.

3.1.11 send

`retval = send (s, data)` [Loadable Function]

`retval = send (s, data, flags)` [Loadable Function]

Send data on specified socket.

Sends data on socket *s*. *data* should be an uint8 array or a string.

See the `send` man pages for further details.

3.1.12 sendto

`retval = sendto (s, data, dest_info)` [Loadable Function]

`retval = sendto (s, data, flags, dest_info)` [Loadable Function]

Send data on specified socket.

Sends data on socket *s* to destination. *data* should be an uint8 array or a string.

The `dest_info` struct *dest_info* must contain the following fields:

`addr` a string with the host name to send to

`port` the port number to send to (an integer)

See the `sendto` man pages for further details.

3.1.13 setsockopt

`status = setsockopt (s, level, optname, optvalue)` [Loadable Function]

Set a socket option value on a socket.

status returns as 0 if no error.

See the `setsockopt` man pages for further details.

3.1.14 shutdown

`shutdown (s, how)` [Loadable Function]

Shutdown all or part of a connection of a socket.

On success, zero is returned.

See the `shutdown` man pages for further details.

3.1.15 socket

`sock = socket ()` [Loadable Function]

`sock = socket (domain)` [Loadable Function]

`sock = socket (domain, type)` [Loadable Function]

`sock = socket (domain, type, protocol)` [Loadable Function]

Creates a socket.

domain is an integer, where the value `AF_INET` can be used to create an IPv4 socket.

type is an integer describing the socket. When using IP, specifying `SOCK_STREAM` gives a TCP socket.

protocol is currently not used and should be 0 if specified.

If no input arguments are given, default values `AF_INET` and `SOCK_STREAM` are used.

See the local `socket` reference for more details.

3.2 Socket constants

3.2.1 AF_APPLETALK

Socket constant for AF_APPLETALK

3.2.2 AF_INET

Socket constant for AF_INET

3.2.3 AF_LOCAL

Socket constant for AF_LOCAL

3.2.4 AF_UNIX

Socket constant for AF_UNIX

3.2.5 MSG_DONTWAIT

Socket constant for MSG_DONTWAIT

3.2.6 MSG_PEEK

Socket constant for MSG_PEEK

3.2.7 MSG_WAITALL

Socket constant for MSG_WAITALL

3.2.8 SHUT_RD

Socket constant for SHUT_RD

3.2.9 SHUT_RDWR

Socket constant for SHUT_RDWR

3.2.10 SHUT_WR

Socket constant for SHUT_WR

3.2.11 SOCK_DGRAM

Socket constant for SOCK_DGRAM

3.2.12 SOCK_RAW

Socket constant for SOCK_RAW

3.2.13 SOCK_RDM

Socket constant for SOCK_RDM

3.2.14 SOCK_SEQPACKET

Socket constant for SOCK_SEQPACKET

3.2.15 SOCK_STREAM

Socket constant for SOCK_STREAM

3.2.16 SOL_SOCKET

Socket constant for SOL_SOCKET

3.2.17 SO_BROADCAST

Socket constant for SO_BROADCAST

3.2.18 SO_DONTROUTE

Socket constant for SO_DONTROUTE

3.2.19 SO_KEEPALIVE

Socket constant for SO_KEEPALIVE

3.2.20 SO_REUSEADDR

Socket constant for SO_REUSEADDR

Appendix A GNU General Public License

Version 3, 29 June 2007

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