

# Sockets Toolkit 1.5.0

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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-1.5.0.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 getaddrinfo

`addrinforesults = getaddrinfo (hostname, service, hints)` [Loadable Function]

Get addressinfo lookup for a hostname/service.

Returns an array of addressinfo structs with the following fields:

**family**        Integer family value

**socktype**      Integer socktype value

**protocol**      Integer protocol value

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



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

hints is optional with one or more fields:

**family**        Integer family value

**socktype**     Integer socktype value

**protocol**     Integer protocol value

**flags**         a integer ai flags

See the `getaddrinfo` man pages for details.

### 3.1.6 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.

### 3.1.7 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.

### 3.1.8 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.

### 3.1.9 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.

### 3.1.10 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.

### 3.1.11 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.

### 3.1.12 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.

### 3.1.13 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.

### 3.1.14 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.

### 3.1.15 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.

### 3.1.16 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 Domain family constants

#### 3.2.1.1 AF\_APPLETALK

Socket constant for `AF_APPLETALK`

#### 3.2.1.2 AF\_INET

Socket constant for `AF_INET`

#### 3.2.1.3 AF\_LOCAL

Socket constant for `AF_LOCAL`

#### 3.2.1.4 AF\_UNIX

Socket constant for `AF_UNIX`

#### 3.2.1.5 AF\_UNSPEC

Socket constant for `AF_UNSPEC`

### 3.2.2 Socket Type constants

#### 3.2.2.1 SOCK\_DGRAM

Socket constant for `SOCK_DGRAM`

#### 3.2.2.2 SOCK\_RAW

Socket constant for `SOCK_RAW`

#### 3.2.2.3 SOCK\_RDM

Socket constant for `SOCK_RDM`

### **3.2.2.4 SOCK\_SEQPACKET**

Socket constant for SOCK\_SEQPACKET

### **3.2.2.5 SOCK\_STREAM**

Socket constant for SOCK\_STREAM

## **3.2.3 Send/Recv Flag constants**

### **3.2.3.1 MSG\_DONTWAIT**

Socket constant for MSG\_DONTWAIT

### **3.2.3.2 MSG\_PEEK**

Socket constant for MSG\_PEEK

### **3.2.3.3 MSG\_WAITALL**

Socket constant for MSG\_WAITALL

## **3.2.4 Shutdown how constants**

### **3.2.4.1 SHUT\_RD**

Socket constant for SHUT\_RD

### **3.2.4.2 SHUT\_RDWR**

Socket constant for SHUT\_RDWR

### **3.2.4.3 SHUT\_WR**

Socket constant for SHUT\_WR

## **3.2.5 Set/getsockopt constants**

### **3.2.5.1 SOL\_SOCKET**

Socket constant for SOL\_SOCKET

### **3.2.5.2 SO\_BROADCAST**

Socket constant for SO\_BROADCAST

### **3.2.5.3 SO\_DONTROUTE**

Socket constant for SO\_DONTROUTE

### **3.2.5.4 SO\_KEEPALIVE**

Socket constant for SO\_KEEPALIVE

### **3.2.5.5 SO\_REUSEADDR**

Socket constant for SO\_REUSEADDR

## **3.2.6 Socket protocol constants**

### **3.2.6.1 IPPROTO\_ICMP**

Socket constant for IPPROTO\_ICMP

**3.2.6.2 IPPROTO\_IP**

Socket constant for IPPROTO\_IP

**3.2.6.3 IPPROTO\_TCP**

Socket constant for IPPROTO\_TCP

**3.2.6.4 IPPROTO\_UDP**

Socket constant for IPPROTO\_UDP

**3.2.7 Socket getaddrinfo flag constants****3.2.7.1 AI\_ADDRCONFIG**

Socket constant for AI\_ADDRCONFIG

**3.2.7.2 AI\_ALL**

Socket constant for AI\_ALL

**3.2.7.3 AI\_NUMERICSERV**

Socket constant for AI\_NUMERICSERV

**3.2.7.4 AI\_PASSIVE**

Socket constant for AI\_PASSIVE

**3.2.7.5 AI\_V4MAPPED**

Socket constant for AI\_V4MAPPED

# Appendix A GNU General Public License

Version 3, 29 June 2007

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