Rocky Enterprise Linux 9.2 Manual Pages on command 'accept.2'

$ man accept.2

ACCEPT(2) Linux Programmer's Manual ACCEPT(2)

NAME

accept, accept4 - accept a connection on a socket

SYNOPSIS

#include <sys/types.h> /* See NOTES */

#include <sys/socket.h>

int accept(int sockfd, struct sockaddr *addr, socklen_t *addrlen);

#define _GNU_SOURCE /* See feature_test_macros(7) */

#include <sys/socket.h>

int accept4(int sockfd, struct sockaddr *addr,

socklen_t *addrlen, int flags);

DESCRIPTION

The accept() system call is used with connection-based socket types

(SOCK_STREAM, SOCK_SEQPACKET). It extracts the first connection re?

quest on the queue of pending connections for the listening socket,

sockfd, creates a new connected socket, and returns a new file descrip?

tor referring to that socket. The newly created socket is not in the

listening state. The original socket sockfd is unaffected by this

call.

The argument sockfd is a socket that has been created with socket(2), bound to a local address with bind(2), and is listening for connections after a listen(2).

The argument addr is a pointer to a sockaddr structure. This structure is filled in with the address of the peer socket, as known to the com? munications layer. The exact format of the address returned addr is determined by the socket's address family (see socket(2) and the re? spective protocol man pages). When addr is NULL, nothing is filled in; in this case, addrlen is not used, and should also be NULL.

The addrlen argument is a value-result argument: the caller must ini? tialize it to contain the size (in bytes) of the structure pointed to by addr; on return it will contain the actual size of the peer address.

The returned address is truncated if the buffer provided is too small; in this case, addrlen will return a value greater than was supplied to the call.

If no pending connections are present on the queue, and the socket is not marked as nonblocking, accept() blocks the caller until a connec? tion is present. If the socket is marked nonblocking and no pending connections are present on the queue, accept() fails with the error EA? GAIN or EWOULDBLOCK.

In order to be notified of incoming connections on a socket, you can use select(2), poll(2), or epoll(7). A readable event will be deliv? ered when a new connection is attempted and you may then call accept() to get a socket for that connection. Alternatively, you can set the socket to deliver SIGIO when activity occurs on a socket; see socket(7) for details.

If flags is 0, then accept4() is the same as accept(). The following values can be bitwise ORed in flags to obtain different behavior:

SOCK_NONBLOCK Set the O_NONBLOCK file status flag on the open file description (see open(2)) referred to by the new file descriptor. Using this flag saves extra calls to fc? ntl(2) to achieve the same result.

SOCK_CLOEXEC Set the close-on-exec (FD_CLOEXEC) flag on the new file descriptor. See the description of the O_CLOEXEC flag in open(2) for reasons why this may be useful.

RETURN VALUE

On success, these system calls return a file descriptor for the accepted socket (a nonnegative integer). On error, -1 is returned, errno is set appropriately, and addrlen is left unchanged.

Error handling

Linux accept() (and accept4()) passes already-pending network errors on the new socket as an error code from accept(). This behavior differs from other BSD socket implementations. For reliable operation the application should detect the network errors defined for the protocol after accept() and treat them like EAGAIN by retrying. In the case of TCP/IP, these are ENETDOWN, EPROTO, ENOPROTOOPT, EHOSTDOWN, ENONET, EHOSTUNREACH, EOPNOTSUPP, and ENETUNREACH.

ERRORS

EAGAIN or EWOULDBLOCK

The socket is marked nonblocking and no connections are present to be accepted. POSIX.1-2001 and POSIX.1-2008 allow either error or to be returned for this case, and do not require these constants to have the same value, so a portable application should check for both possibilities.

EBADF sockfd is not an open file descriptor.

ECONNABORTED

A connection has been aborted.

EFAULT The addr argument is not in a writable part of the user address space.

EINTR The system call was interrupted by a signal that was caught before a valid connection arrived; see signal(7).

EINVAL Socket is not listening for connections, or addrlen is invalid (e.g., is negative).

EINVAL (accept4()) invalid value in flags.

EMFILE The per-process limit on the number of open file descriptors has

been reached.

ENFILE The system-wide limit on the total number of open files has been reached.

ENOBUFS, ENOMEM

Not enough free memory. This often means that the memory allo? cation is limited by the socket buffer limits, not by the system memory.

ENOTSOCK

The file descriptor sockfd does not refer to a socket.

EOPNOTSUPP

The referenced socket is not of type SOCK_STREAM.

EPROTO Protocol error.

In addition, Linux accept() may fail if:

EPERM Firewall rules forbid connection.

In addition, network errors for the new socket and as defined for the protocol may be returned. Various Linux kernels can return other er? rors such as ENOSR, ESOCKTNOSUPPORT, EPROTONOSUPPORT, ETIMEDOUT. The value ERESTARTSYS may be seen during a trace.

VERSIONS

The accept4() system call is available starting with Linux 2.6.28; sup? port in glibc is available starting with version 2.10.

CONFORMING TO

accept(): POSIX.1-2001, POSIX.1-2008, SVr4, 4.4BSD (accept() first ap? peared in 4.2BSD).

accept4() is a nonstandard Linux extension.

On Linux, the new socket returned by accept() does not inherit file status flags such as O_NONBLOCK and O_ASYNC from the listening socket. This behavior differs from the canonical BSD sockets implementation. Portable programs should not rely on inheritance or noninheritance of file status flags and always explicitly set all required flags on the socket returned from accept().

NOTES

POSIX.1-2001 does not require the inclusion of <sys/types.h>, and this

header file is not required on Linux. However, some historical (BSD) implementations required this header file, and portable applications are probably wise to include it.

There may not always be a connection waiting after a SIGIO is delivered or select(2), poll(2), or epoll(7) return a readability event because the connection might have been removed by an asynchronous network error or another thread before accept() is called. If this happens, then the call will block waiting for the next connection to arrive. To ensure that accept() never blocks, the passed socket sockfd needs to have the O_NONBLOCK flag set (see socket(7)).

For certain protocols which require an explicit confirmation, such as DECnet, accept() can be thought of as merely dequeuing the next connec? tion request and not implying confirmation. Confirmation can be im? plied by a normal read or write on the new file descriptor, and rejec? tion can be implied by closing the new socket. Currently, only DECnet has these semantics on Linux.

The socklen_t type

In the original BSD sockets implementation (and on other older systems) the third argument of accept() was declared as an int *. A POSIX.1g draft standard wanted to change it into a size_t *C; later POSIX stan? dards and glibc 2.x have socklen_t * .

EXAMPLES

See bind(2).

SEE ALSO

bind(2), connect(2), listen(2), select(2), socket(2), socket(7)

COLOPHON

This page is part of release 5.10 of the Linux man-pages project. A description of the project, information about reporting bugs, and the latest version of this page, can be found at https://www.kernel.org/doc/man-pages/.