

NAME

execveat – execute program relative to a directory file descriptor

SYNOPSIS

```
#include <unistd.h>

int execveat(int dirfd, const char *pathname,
             char *const argv[], char *const envp[],
             int flags);
```

DESCRIPTION

The **execveat()** system call executes the program referred to by the combination of *dirfd* and *pathname*. It operates in exactly the same way as **execve(2)**, except for the differences described in this manual page.

If the *pathname* given in *pathname* is relative, then it is interpreted relative to the directory referred to by the file descriptor *dirfd* (rather than relative to the current working directory of the calling process, as is done by **execve(2)** for a relative *pathname*).

If *pathname* is relative and *dirfd* is the special value **AT_FDCWD**, then *pathname* is interpreted relative to the current working directory of the calling process (like **execve(2)**).

If *pathname* is absolute, then *dirfd* is ignored.

If *pathname* is an empty string and the **AT_EMPTY_PATH** flag is specified, then the file descriptor *dirfd* specifies the file to be executed (i.e., *dirfd* refers to an executable file, rather than a directory).

The *flags* argument is a bit mask that can include zero or more of the following flags:

AT_EMPTY_PATH

If *pathname* is an empty string, operate on the file referred to by *dirfd* (which may have been obtained using the **open(2)** **O_PATH** flag).

AT_SYMLINK_NOFOLLOW

If the file identified by *dirfd* and a non-NULL *pathname* is a symbolic link, then the call fails with the error **ELOOP**.

RETURN VALUE

On success, **execveat()** does not return. On error, **-1** is returned, and *errno* is set appropriately.

ERRORS

The same errors that occur for **execve(2)** can also occur for **execveat()**. The following additional errors can occur for **execveat()**:

EBADF

dirfd is not a valid file descriptor.

EINVAL

Invalid flag specified in *flags*.

ELOOP

flags includes **AT_SYMLINK_NOFOLLOW** and the file identified by *dirfd* and a non-NULL *pathname* is a symbolic link.

ENOENT

The program identified by *dirfd* and *pathname* requires the use of an interpreter program (such as a script starting with "#!"), but the file descriptor *dirfd* was opened with the **O_CLOEXEC** flag, with the result that the program file is inaccessible to the launched interpreter. See **BUGS**.

ENOTDIR

pathname is relative and *dirfd* is a file descriptor referring to a file other than a directory.

VERSIONS

execveat() was added to Linux in kernel 3.19. GNU C library support is pending.

CONFORMING TO

The **execveat()** system call is Linux-specific.

NOTES

In addition to the reasons explained in **openat(2)**, the **execveat()** system call is also needed to allow **fexecve(3)** to be implemented on systems that do not have the */proc* filesystem mounted.

When asked to execute a script file, the *argv[0]* that is passed to the script interpreter is a string of the form */dev/fd/N* or */dev/fd/N/P*, where *N* is the number of the file descriptor passed via the *dirfd* argument. A string of the first form occurs when **AT_EMPTY_PATH** is employed. A string of the second form occurs when the script is specified via both *dirfd* and *pathname*; in this case, *P* is the value given in *pathname*.

For the same reasons described in **fexecve(3)**, the natural idiom when using **execveat()** is to set the close-on-exec flag on *dirfd*. (But see **BUGS**.)

BUGS

The **ENOENT** error described above means that it is not possible to set the close-on-exec flag on the file descriptor given to a call of the form:

```
execveat(fd, "", argv, envp, AT_EMPTY_PATH);
```

However, the inability to set the close-on-exec flag means that a file descriptor referring to the script leaks through to the script itself. As well as wasting a file descriptor, this leakage can lead to file-descriptor exhaustion in scenarios where scripts recursively employ **execveat()**.

SEE ALSO

execve(2), **openat(2)**, **fexecve(3)**

COLOPHON

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