

**NAME**

chown, fchown, lchown, fchownat - change ownership of a file

**SYNOPSIS**

```
#include <unistd.h>

int chown(const char *pathname, uid_t owner, gid_t group);
int fchown(int fd, uid_t owner, gid_t group);
int lchown(const char *pathname, uid_t owner, gid_t group);

#include <fcntl.h> /* Definition of AT_* constants */
#include <unistd.h>

int fchownat(int dirfd, const char *pathname,
             uid_t owner, gid_t group, int flags);
```

Feature Test Macro Requirements for glibc (see [feature\\_test\\_macros\(7\)](#)):

```
fchown(), lchown():
    _BSD_SOURCE || _XOPEN_SOURCE >= 500 ||
    _XOPEN_SOURCE && _XOPEN_SOURCE_EXTENDED
    || /* Since glibc 2.12: */ _POSIX_C_SOURCE >= 200809L

fchownat():
    Since glibc 2.10:
        _XOPEN_SOURCE >= 700 || _POSIX_C_SOURCE >= 200809L
    Before glibc 2.10:
        _ATFILE_SOURCE
```

**DESCRIPTION**

These system calls change the owner and group of a file. The **chown()**, **fchown()**, and **lchown()** system calls differ only in how the file is specified:

- \* **chown()** changes the ownership of the file specified by *pathname*, which is dereferenced if it is a symbolic link.
- \* **fchown()** changes the ownership of the file referred to by the open file descriptor *fd*.
- \* **lchown()** is like **chown()**, but does not dereference symbolic links.

Only a privileged process (Linux: one with the **CAP\_CHOWN** capability) may change the owner of a file. The owner of a file may change the group of the file to any group of which that owner is a member. A privileged process (Linux: with **CAP\_CHOWN**) may change the group arbitrarily.

If the *owner* or *group* is specified as -1, then that ID is not changed.

When the owner or group of an executable file are changed by an unprivileged user the **S\_ISUID** and **S\_ISGID** mode bits are cleared. POSIX does not specify whether this also should happen when root does the **chown()**; the Linux behavior depends on the kernel version. In case of a non-group-executable file (i.e., one for which the **S\_IXGRP** bit is not set) the **S\_ISGID** bit indicates mandatory locking, and is not cleared by a **chown()**.

**fchownat()**

The **fchownat()** system call operates in exactly the same way as **chown()**, except for the differences described here.

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 **chown()** 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 **chown()**).

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

The *flags* argument is a bit mask created by ORing together 0 or more of the following values;

**AT\_EMPTY\_PATH** (since Linux 2.6.39)

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). In this case, *dirfd* can refer to any type of file, not just a directory. If *dirfd* is **AT\_FDCWD**, the call operates on the current working directory. This flag is Linux-specific; define **\_GNU\_SOURCE** to obtain its definition.

**AT\_SYMLINK\_NOFOLLOW**

If *pathname* is a symbolic link, do not dereference it: instead operate on the link itself, like **lchown()**. (By default, **fcntl()** dereferences symbolic links, like **chown()**.)

See [openat\(2\)](#) for an explanation of the need for **fchownat()**.

**RETURN VALUE**

On success, zero is returned. On error, -1 is returned, and *errno* is set appropriately.

**ERRORS**

Depending on the filesystem, errors other than those listed below can be returned.

The more general errors for **chown()** are listed below.

**EACCES**

Search permission is denied on a component of the path prefix. (See also [path\\_resolution\(7\)](#).)

**EFAULT**

*pathname* points outside your accessible address space.

**ELOOP**

Too many symbolic links were encountered in resolving *pathname*.

**ENAMETOOLONG**

*pathname* is too long.

**ENOENT**

The file does not exist.

**ENOMEM**

Insufficient kernel memory was available.

**ENOTDIR**

A component of the path prefix is not a directory.

**EPERM**

The calling process did not have the required permissions (see above) to change owner and/or group.

**EROFS**

The named file resides on a read-only filesystem.

The general errors for **fchown()** are listed below:

**EBADF**

The descriptor is not valid.

**EIO** A low-level I/O error occurred while modifying the inode.

**ENOENT**

See above.

**EPERM**

See above.

**EROFS**

See above.

The same errors that occur for **chown()** can also occur for **fchownat()**. The following additional errors can occur for **fchownat()**:

**EBADF**

*dirfd* is not a valid file descriptor.

**EINVAL**

Invalid flag specified in *flags*.

**ENOTDIR**

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

**VERSIONS**

**fchownat()** was added to Linux in kernel 2.6.16; library support was added to glibc in version 2.4.

**CONFORMING TO**

**chown()**, **fchown()**, **lchown()**: 4.4BSD, SVr4, POSIX.1-2001, POSIX.1-2008.

The 4.4BSD version can be used only by the superuser (that is, ordinary users cannot give away files).

**fchownat()**: POSIX.1-2008.

**NOTES****Ownership of new files**

When a new file is created (by, for example, [open\(2\)](#) or [mkdir\(2\)](#)), its owner is made the same as the filesystem user ID of the creating process. The group of the file depends on a range of factors, including the type of filesystem, the options used to mount the filesystem, and whether or not the set-group-ID permission bit is enabled on the parent directory. If the filesystem supports the *-o grpuid* (or, synonymously *-o bsdgroups*) and *-o nogrpuid* (or, synonymously *-o sysvgroups*) [mount\(8\)](#) options, then the rules are as follows:

- \* If the filesystem is mounted with *-o grpuid*, then the group of a new file is made the same as that of the parent directory.
- \* If the filesystem is mounted with *-o nogrpuid* and the set-group-ID bit is disabled on the parent directory, then the group of a new file is made the same as the process's filesystem GID.
- \* If the filesystem is mounted with *-o nogrpuid* and the set-group-ID bit is enabled on the parent directory, then the group of a new file is made the same as that of the parent directory.

As at Linux 2.6.25, the *-o grpuid* and *-o nogrpuid* mount options are supported by ext2, ext3, ext4, and XFS. Filesystems that don't support these mount options follow the *-o nogrpuid* rules.

**Glibc notes**

On older kernels where **fchownat()** is unavailable, the glibc wrapper function falls back to the use of **chown()** and **lchown()**. When *athname* is a relative pathname, glibc constructs a pathname based on the symbolic link in */proc/self/fd* that corresponds to the *dirfd* argument.

**NFS**

The **chown()** semantics are deliberately violated on NFS filesystems which have UID mapping enabled. Additionally, the semantics of all system calls which access the file contents are violated, because **chown()** may cause immediate access revocation on already open files. Client side caching may lead to a delay between the time where ownership have been changed to allow access for a user and the time where the file can actually be accessed by the user on other clients.

**Historical details**

The original Linux **chown()**, **fchown()**, and **lchown()** system calls supported only 16-bit user and group IDs. Subsequently, Linux 2.4 added **chown32()**, **fchown32()**, and **lchown32()**, supporting 32-bit IDs. The glibc **chown()**, **fchown()**, and **lchown()** wrapper functions transparently deal with the variations across kernel versions.

In versions of Linux prior to 2.1.81 (and distinct from 2.1.46), **chown()** did not follow symbolic links. Since Linux 2.1.81, **chown()** does follow symbolic links, and there is a new system call **lchown()** that does not follow symbolic links. Since Linux 2.1.86, this new call (that has the same semantics as the old **chown()**) has got the same syscall number, and **chown()** got the newly introduced number.

**EXAMPLE**

The following program changes the ownership of the file named in its second command-line argument to the value specified in its first command-line argument. The new owner can be specified either as a numeric user ID, or as a username (which is converted to a user ID by using [getpwnam\(3\)](#) to perform a lookup in the system password file).

**Program source**

```
#include <pwd.h>
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>

int
main(int argc, char *argv[])
{
    uid_t uid;
    struct passwd *pwd;
    char *endptr;

    if (argc != 3 || argv[1][0] == 0) {
        fprintf(stderr, "%s <owner> <file>\n", argv[0]);
        exit(EXIT_FAILURE);
    }

    uid = strtol(argv[1], &endptr, 10); /* Allow a numeric string */
    if (*endptr != 0) { /* Was not pure numeric string */
        pwd = getpwnam(argv[1]); /* Try getting UID for username */
        if (pwd == NULL) {
            perror(getpwnam);
            exit(EXIT_FAILURE);
        }
        uid = pwd->pw_uid;
    }

    if (chown(argv[2], uid, -1) == -1) {
        perror(chown);
        exit(EXIT_FAILURE);
    }

    exit(EXIT_SUCCESS);
}
```

**SEE ALSO**

[chmod\(2\)](#), [flock\(2\)](#), [path\\_resolution\(7\)](#), [symlink\(7\)](#)

**COLOPHON**

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