

NAME

dir, dirent - directory file format

SYNOPSIS

```
#include <dirent.h>
```

DESCRIPTION

Directories provide a convenient hierarchical method of grouping files while obscuring the underlying details of the storage medium. A directory file is differentiated from a plain file by a flag in its inode(5) entry. It consists of records (directory entries) each of which contains information about a file and a pointer to the file itself. Directory entries may contain other directories as well as plain files; such nested directories are referred to as subdirectories. A hierarchy of directories and files is formed in this manner and is called a file system (or referred to as a file system tree).

Each directory file contains two special directory entries; one is a pointer to the directory itself called dot '.' and the other a pointer to its parent directory called dot-dot '..'. Dot and dot-dot are valid pathnames, however, the system root directory '/', has no parent and dot-dot points to itself like dot.

File system nodes are ordinary directory files on which has been grafted a file system object, such as a physical disk or a partitioned area of such a disk. (See mount(2) and mount(8).)

The directory entry format is defined in the file <sys/dirent.h> (which should not be included directly by applications):

```
#ifndef _SYS_DIRENT_H_
#define _SYS_DIRENT_H_
```

```
#include <machine/ansi.h>
```

```
/*
```

```
* The dirent structure defines the format of directory entries returned by
* the getdirentries(2) system call.
```

```
*
```

```
* A directory entry has a struct dirent at the front of it, containing its
* inode number, the length of the entry, and the length of the name
* contained in the entry. These are followed by the name padded to a 8
* byte boundary with null bytes. All names are guaranteed null terminated.
```

```
* The maximum length of a name in a directory is MAXNAMLEN.
```

```
* Explicit pad is added between the last member of the header and
```

```
* d_name, to avoid having the ABI padding in the end of dirent on
```

```

* LP64 arches. There is code depending on d_name being last. Also,
* keeping this pad for ILP32 architectures simplifies compat32 layer.
*/

```

```

struct dirent {
    ino_t    d_fileno;        /* file number of entry */
    off_t    d_off;          /* directory offset of the next entry */
    __uint16_t d_reclen;      /* length of this record */
    __uint8_t d_type;        /* file type, see below */
    __uint8_t d_namlen;      /* length of string in d_name */
    __uint32_t d_pad0;

#ifdef __BSD_VISIBLE
#define MAXNAMLEN 255
    char    d_name[MAXNAMLEN + 1]; /* name must be no longer than this */
#else
    char    d_name[255 + 1]; /* name must be no longer than this */
#endif
};

/*
 * File types
 */
#define DT_UNKNOWN 0
#define DT_FIFO 1
#define DT_CHR 2
#define DT_DIR 4
#define DT_BLK 6
#define DT_REG 8
#define DT_LNK 10
#define DT_SOCK 12
#define DT_WHT 14

/*
 * Convert between stat structure types and directory types.
 */
#define IFTODT(mode) (((mode) & 0170000) >> 12)
#define DTTOIF(dirtype) ((dirtype) << 12)

/*
 * The _GENERIC_DIRSIZ macro gives the minimum record length which will hold

```

* the directory entry. This returns the amount of space in struct dirent
 * without the d_name field, plus enough space for the name with a terminating
 * null byte (dp->d_namlen+1), rounded up to a 8 byte boundary.
 *
 * XXX although this macro is in the implementation namespace, it requires
 * a manifest constant that is not.
 */

```
#define _GENERIC_DIRLEN(namlen) ((__offsetof(struct dirent, d_name) + namlen) + 7)
#define _GENERIC_DIRSIZ(dp) _GENERIC_DIRLEN((dp)->d_namlen)
#endif /* __BSD_VISIBLE */

#ifdef _KERNEL
#define GENERIC_DIRSIZ(dp) _GENERIC_DIRSIZ(dp)
#endif

#endif /* !_SYS_DIRENT_H_ */
```

SEE ALSO

fs(5), inode(5)

HISTORY

A **dir** file format appeared in Version 7 AT&T UNIX.

BUGS

The usage of the member d_type of struct dirent is unportable as it is FreeBSD-specific. It also may fail on certain file systems, for example the cd9660 file system.