

**NAME**

`strerror`, `strerror_r`, `strerror_l` – return string describing error number

**SYNOPSIS**

```
#include <string.h>

char *strerror(int errnum);

int strerror_r(int errnum, char *buf, size_t buflen);
/* XSI-compliant */

char *strerror_r(int errnum, char *buf, size_t buflen);
/* GNU-specific */

char *strerror_l(int errnum, locale_t locale);
```

Feature Test Macro Requirements for glibc (see `feature_test_macros(7)`):

**strerror\_r():**

The XSI-compliant version is provided if:  
 (`_POSIX_C_SOURCE`  $\geq$  200112L) && ! `_GNU_SOURCE`  
 Otherwise, the GNU-specific version is provided.

**DESCRIPTION**

The `strerror()` function returns a pointer to a string that describes the error code passed in the argument *errnum*, possibly using the `LC_MESSAGES` part of the current locale to select the appropriate language. (For example, if *errnum* is `EINVAL`, the returned description will be "Invalid argument".) This string must not be modified by the application, but may be modified by a subsequent call to `strerror()` or `strerror_l()`. No other library function, including `perror(3)`, will modify this string.

**strerror\_r()**

The `strerror_r()` function is similar to `strerror()`, but is thread safe. This function is available in two versions: an XSI-compliant version specified in POSIX.1-2001 (available since glibc 2.3.4, but not POSIX-compliant until glibc 2.13), and a GNU-specific version (available since glibc 2.0). The XSI-compliant version is provided with the feature test macros settings shown in the SYNOPSIS; otherwise the GNU-specific version is provided. If no feature test macros are explicitly defined, then (since glibc 2.4) `_POSIX_C_SOURCE` is defined by default with the value 200112L, so that the XSI-compliant version of `strerror_r()` is provided by default.

The XSI-compliant `strerror_r()` is preferred for portable applications. It returns the error string in the user-supplied buffer *buf* of length *buflen*.

The GNU-specific `strerror_r()` returns a pointer to a string containing the error message. This may be either a pointer to a string that the function stores in *buf*, or a pointer to some (immutable) static string (in which case *buf* is unused). If the function stores a string in *buf*, then at most *buflen* bytes are stored (the string may be truncated if *buflen* is too small and *errnum* is unknown). The string always includes a terminating null byte (`'\0'`).

**strerror\_l()**

`strerror_l()` is like `strerror()`, but maps *errnum* to a locale-dependent error message in the locale specified by *locale*. The behavior of `strerror_l()` is undefined if *locale* is the special locale object `LC_GLOBAL_LOCALE` or is not a valid locale object handle.

**RETURN VALUE**

The `strerror()`, `strerror_l()`, and the GNU-specific `strerror_r()` functions return the appropriate error description string, or an "Unknown error nnn" message if the error number is unknown.

The XSI-compliant `strerror_r()` function returns 0 on success. On error, a (positive) error number is returned (since glibc 2.13), or `-1` is returned and *errno* is set to indicate the error (glibc versions before 2.13).

POSIX.1-2001 and POSIX.1-2008 require that a successful call to `strerror()` or `strerror_l()` shall leave *errno* unchanged, and note that, since no function return value is reserved to indicate an error, an application that wishes to check for errors should initialize *errno* to zero before the call, and then check *errno* after the

call.

## ERRORS

### EINVAL

The value of *errnum* is not a valid error number.

### ERANGE

Insufficient storage was supplied to contain the error description string.

## VERSIONS

The **strerror\_l()** function first appeared in glibc 2.6.

## ATTRIBUTES

For an explanation of the terms used in this section, see **attributes(7)**.

Interface	Attribute	Value
<b>strerror()</b>	Thread safety	MT-Unsafe race:strerror
<b>strerror_r()</b> , <b>strerror_l()</b>	Thread safety	MT-Safe

## CONFORMING TO

**strerror()** is specified by POSIX.1-2001, POSIX.1-2008, C89, and C99. **strerror\_r()** is specified by POSIX.1-2001 and POSIX.1-2008.

**strerror\_l()** is specified in POSIX.1-2008.

The GNU-specific **strerror\_r()** function is a nonstandard extension.

POSIX.1-2001 permits **strerror()** to set *errno* if the call encounters an error, but does not specify what value should be returned as the function result in the event of an error. On some systems, **strerror()** returns NULL if the error number is unknown. On other systems, **strerror()** returns a string something like "Error nnn occurred" and sets *errno* to **EINVAL** if the error number is unknown. C99 and POSIX.1-2008 require the return value to be non-NULL.

## NOTES

The GNU C Library uses a buffer of 1024 characters for **strerror()**. This buffer size therefore should be sufficient to avoid an **ERANGE** error when calling **strerror\_r()**.

## SEE ALSO

**err(3)**, **errno(3)**, **error(3)**, **perror(3)**, **strsignal(3)**, **locale(7)**

## COLOPHON

This page is part of release 5.05 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/>.