

NAME

`modify_ldt` – get or set a per-process LDT entry

SYNOPSIS

```
#include <sys/types.h>
```

```
int modify_ldt(int func, void *ptr, unsigned long bytecount);
```

Note: There is no glibc wrapper for this system call; see NOTES.

DESCRIPTION

modify_ldt() reads or writes the local descriptor table (LDT) for a process. The LDT is an array of segment descriptors that can be referenced by user code. Linux allows processes to configure a per-process (actually per-mm) LDT. For more information about the LDT, see the Intel Software Developer's Manual or the AMD Architecture Programming Manual.

When *func* is 0, **modify_ldt()** reads the LDT into the memory pointed to by *ptr*. The number of bytes read is the smaller of *bytecount* and the actual size of the LDT, although the kernel may act as though the LDT is padded with additional trailing zero bytes. On success, **modify_ldt()** will return the number of bytes read.

When *func* is 1 or 0x11, **modify_ldt()** modifies the LDT entry indicated by *ptr->entry_number*. *ptr* points to a *user_desc* structure and *bytecount* must equal the size of this structure.

The *user_desc* structure is defined in *<asm/ldt.h>* as:

```
struct user_desc {
    unsigned int    entry_number;
    unsigned long   base_addr;
    unsigned int    limit;
    unsigned int    seg_32bit:1;
    unsigned int    contents:2;
    unsigned int    read_exec_only:1;
    unsigned int    limit_in_pages:1;
    unsigned int    seg_not_present:1;
    unsigned int    useable:1;
};
```

In Linux 2.4 and earlier, this structure was named *modify_ldt_ldt_s*.

The *contents* field is the segment type (data, expand-down data, non-conforming code, or conforming code). The other fields match their descriptions in the CPU manual, although **modify_ldt()** cannot set the hardware-defined "accessed" bit described in the CPU manual.

A *user_desc* is considered "empty" if *read_exec_only* and *seg_not_present* are set to 1 and all of the other fields are 0. An LDT entry can be cleared by setting it to an "empty" *user_desc* or, if *func* is 1, by setting both *base* and *limit* to 0.

A conforming code segment (i.e., one with *contents*==3) will be rejected if *func* is 1 or if *seg_not_present* is 0.

When *func* is 2, **modify_ldt()** will read zeros. This appears to be a leftover from Linux 2.4.

RETURN VALUE

On success, **modify_ldt()** returns either the actual number of bytes read (for reading) or 0 (for writing). On failure, **modify_ldt()** returns -1 and sets *errno* to indicate the error.

ERRORS**EFAULT**

ptr points outside the address space.

EINVAL

ptr is 0, or *func* is 1 and *bytecount* is not equal to the size of the structure *user_desc*, or *func* is 1 or 0x11 and the new LDT entry has invalid values.

ENOSYS

func is neither 0, 1, 2, nor 0x11.

CONFORMING TO

This call is Linux-specific and should not be used in programs intended to be portable.

NOTES

Glibc does not provide a wrapper for this system call; call it using **syscall(2)**.

modify_ldt() should not be used for thread-local storage, as it slows down context switches and only supports a limited number of threads. Threading libraries should use **set_thread_area(2)** or **arch_prctl(2)** instead, except on extremely old kernels that do not support those system calls.

The normal use for **modify_ldt()** is to run legacy 16-bit or segmented 32-bit code. Not all kernels allow 16-bit segments to be installed, however.

Even on 64-bit kernels, **modify_ldt()** cannot be used to create a long mode (i.e., 64-bit) code segment. The undocumented field "lm" in *user_desc* is not useful, and, despite its name, does not result in a long mode segment.

BUGS

On 64-bit kernels before Linux 3.19, setting the "lm" bit in *user_desc* prevents the descriptor from being considered empty. Keep in mind that the "lm" bit does not exist in the 32-bit headers, but these buggy kernels will still notice the bit even when set in a 32-bit process.

SEE ALSO

arch_prctl(2), **set_thread_area(2)**, **vm86(2)**

COLOPHON

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