



Linux Ubuntu 26.04 Manual Pages on command 'modify_ldt.2'

\$ man modify_ldt.2

modify_ldt(2) System Calls Manual modify_ldt(2)

NAME

modify_ldt - get or set a per-process LDT entry

LIBRARY

Standard C library (libc, -lc)

SYNOPSIS

```
#include <asm/ldt.h>           /* Definition of struct user_desc */
#include <sys/syscall.h>       /* Definition of SYS_* constants */
#include <unistd.h>

int syscall(unsigned long bytecount;
            SYS_modify_ldt, int func, void ptr[bytecount],
            unsigned long bytecount);
```

Note: glibc provides no wrapper for modify_ldt(), necessitating the use of syscall(2).

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 int  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.

STANDARDS

Linux.

NOTES

`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)`

Linux man-pages 6.17

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`modify_ldt(2)`