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Rocky Enterprise Linux 9.2 Manual Pages on command 'modify_ldt.2'

\$ man modify_ldt.2

MODIFY_LDT(2) Linux Programmer's Manual MODIFY_LDT(2)

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 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.

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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