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Red Hat Enterprise Linux Release 9.2 Manual Pages on 'arch_prctl.2' command

\$ man arch_prctl.2

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

NAME

arch_prctl - set architecture-specific thread state

SYNOPSIS

```
#include <asm/prctl.h>
```

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

```
int arch_prctl(int code, unsigned long addr);
```

```
int arch_prctl(int code, unsigned long *addr);
```

DESCRIPTION

arch_prctl() sets architecture-specific process or thread state. code selects a subfunction and passes argument addr to it; addr is interpreted as either an unsigned long for the "set" operations, or as an unsigned long *, for the "get" operations.

Subfunctions for both x86 and x86-64 are:

ARCH_SET_CPUID (since Linux 4.12)

Enable (addr != 0) or disable (addr == 0) the cpuid instruction for the calling thread. The instruction is enabled by default.

If disabled, any execution of a cpuid instruction will instead generate a SIGSEGV signal. This feature can be used to emulate cpuid results that differ from what the underlying hardware would have produced (e.g., in a paravirtualization setting).

The ARCH_SET_CPUID setting is preserved across fork(2) and clone(2) but reset to the default (i.e., cpuid enabled) on exec(2).

ecve(2).

ARCH_GET_CPUID (since Linux 4.12)

Return the setting of the flag manipulated by ARCH_SET_CPUID as the result of the system call (1 for enabled, 0 for disabled).

addr is ignored.

Subfunctions for x86-64 only are:

ARCH_SET_FS

Set the 64-bit base for the FS register to addr.

ARCH_GET_FS

Return the 64-bit base value for the FS register of the calling thread in the unsigned long pointed to by addr.

ARCH_SET_GS

Set the 64-bit base for the GS register to addr.

ARCH_GET_GS

Return the 64-bit base value for the GS register of the calling thread in the unsigned long pointed to by addr.

RETURN VALUE

On success, arch_prctl() returns 0; on error, -1 is returned, and errno is set to indicate the error.

ERRORS

EFAULT addr points to an unmapped address or is outside the process address space.

EINVAL code is not a valid subcommand.

EPERM addr is outside the process address space.

ENODEV ARCH_SET_CPUID was requested, but the underlying hardware does not support CPUID faulting.

CONFORMING TO

arch_prctl() is a Linux/x86-64 extension and should not be used in programs intended to be portable.

NOTES

arch_prctl() is supported only on Linux/x86-64 for 64-bit programs currently.

The 64-bit base changes when a new 32-bit segment selector is loaded.

ARCH_SET_GS is disabled in some kernels.

Context switches for 64-bit segment bases are rather expensive. As an optimization, if a 32-bit TLS base address is used, arch_prctl() may use a real TLS entry as if set_thread_area(2) had been called, instead of manipulating the segment base register directly. Memory in the first 2 GB of address space can be allocated by using mmap(2) with the MAP_32BIT flag.

Because of the aforementioned optimization, using arch_prctl() and set_thread_area(2) in the same thread is dangerous, as they may overwrite each other's TLS entries.

As of version 2.7, glibc provides no prototype for arch_prctl(). You have to declare it yourself for now. This may be fixed in future glibc versions.

FS may be already used by the threading library. Programs that use ARCH_SET_FS directly are very likely to crash.

SEE ALSO

mmap(2), modify_ldt(2), prctl(2), set_thread_area(2)

AMD X86-64 Programmer's manual

COLOPHON

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