NAME

minherit - control the inheritance of pages

LIBRARY

Standard C Library (libc, -lc)

SYNOPSIS

#include <sys/mman.h>

int
minherit(*void *addr, size_t len, int inherit*);

DESCRIPTION

The **minherit**() system call changes the specified pages to have the inheritance characteristic *inherit*. Not all implementations will guarantee that the inheritance characteristic can be set on a page basis; the granularity of changes may be as large as an entire region. FreeBSD is capable of adjusting inheritance characteristics on a page basis. Inheritance only effects children created by **fork**(). It has no effect on **exec**(). exec'd processes replace their address space entirely. This system call also has no effect on the parent's address space (other than to potentially share the address space with its children).

Inheritance is a rather esoteric feature largely superseded by the MAP_SHARED feature of **mmap**(). However, it is possible to use **minherit**() to share a block of memory between parent and child that has been mapped MAP_PRIVATE. That is, modifications made by parent or child are shared but the original underlying file is left untouched.

INHERIT_SHARE This option causes the address space in question to be shared between parent and child. It has no effect on how the original underlying backing store was mapped.

INHERIT_NONE This option prevents the address space in question from being inherited at all. The address space will be unmapped in the child.

INHERIT_COPY This option causes the child to inherit the address space as copy-on-write. This option also has an unfortunate side effect of causing the parent address space to become copy-on-write when the parent forks. If the original mapping was MAP_SHARED, it will no longer be shared in the parent after the parent forks and there is no way to get the previous shared-backing-store mapping without unmapping and remapping the address space in the parent.

INHERIT_ZERO This option causes the address space in question to be mapped as new anonymous pages, which would be initialized to all zero bytes, in the child process.

RETURN VALUES

The **minherit**() function returns the value 0 if successful; otherwise the value -1 is returned and the global variable *errno* is set to indicate the error.

ERRORS

The **minherit**() system call will fail if:

[EINVAL] The virtual address range specified by the *addr* and *len* arguments is not valid.

[EACCES] The flags specified by the *inherit* argument were not valid for the pages specified by the *addr* and *len* arguments.

SEE ALSO

fork(2), madvise(2), mincore(2), mprotect(2), msync(2), munmap(2), rfork(2)

HISTORY

The **minherit**() system call first appeared in OpenBSD and then in FreeBSD 2.2.

The INHERIT_ZERO support first appeared in OpenBSD 5.6 and then in FreeBSD 12.0.

BUGS

Once you set inheritance to MAP_PRIVATE or MAP_SHARED, there is no way to recover the original copy-on-write semantics short of unmapping and remapping the area.