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

\$ man sync_file_range.2

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

NAME

sync_file_range - sync a file segment with disk

SYNOPSIS

```
#define __GNU_SOURCE /* See feature_test_macros(7) */  
  
#include <fcntl.h>  
  
int sync_file_range(int fd, off64_t offset, off64_t nbytes,  
                    unsigned int flags);
```

DESCRIPTION

sync_file_range() permits fine control when synchronizing the open file referred to by the file descriptor fd with disk.

offset is the starting byte of the file range to be synchronized.

nbytes specifies the length of the range to be synchronized, in bytes;

if nbytes is zero, then all bytes from offset through to the end of

file are synchronized. Synchronization is in units of the system page

size: offset is rounded down to a page boundary; (offset+nbytes-1) is

rounded up to a page boundary.

The flags bit-mask argument can include any of the following values:

SYNC_FILE_RANGE_WAIT_BEFORE

Wait upon write-out of all pages in the specified range that have already been submitted to the device driver for write-out before performing any write.

SYNC_FILE_RANGE_WRITE

Initiate write-out of all dirty pages in the specified range which are not presently submitted write-out. Note that even this may block if you attempt to write more than request queue size.

SYNC_FILE_RANGE_WAIT_AFTER

Wait upon write-out of all pages in the range after performing any write.

Specifying flags as 0 is permitted, as a no-op.

Warning

This system call is extremely dangerous and should not be used in portable programs. None of these operations writes out the file's meta-data. Therefore, unless the application is strictly performing overwrites of already-instantiated disk blocks, there are no guarantees that the data will be available after a crash. There is no user interface to know if a write is purely an overwrite. On filesystems using copy-on-write semantics (e.g., btrfs) an overwrite of existing allocated blocks is impossible. When writing into preallocated space, many filesystems also require calls into the block allocator, which this system call does not sync out to disk. This system call does not flush disk write caches and thus does not provide any data integrity guarantees with volatile disk write caches.

Some details

SYNC_FILE_RANGE_WAIT_BEFORE and SYNC_FILE_RANGE_WAIT_AFTER will detect any I/O errors or ENOSPC conditions and will return these to the caller.

Useful combinations of the flags bits are:

SYNC_FILE_RANGE_WAIT_BEFORE | SYNC_FILE_RANGE_WRITE

Ensures that all pages in the specified range which were dirty when sync_file_range() was called are placed under write-out.

This is a start-write-for-data-integrity operation.

SYNC_FILE_RANGE_WRITE

Start write-out of all dirty pages in the specified range which are not presently under write-out. This is an asynchronous

flush-to-disk operation. This is not suitable for data integrity operations.

SYNC_FILE_RANGE_WAIT_BEFORE (or SYNC_FILE_RANGE_WAIT_AFTER)

Wait for completion of write-out of all pages in the specified range. This can be used after an earlier SYNC_FILE_RANGE_WAIT_BEFORE | SYNC_FILE_RANGE_WRITE operation to wait for completion of that operation, and obtain its result.

SYNC_FILE_RANGE_WAIT_BEFORE | SYNC_FILE_RANGE_WRITE |
SYNC_FILE_RANGE_WAIT_AFTER

This is a write-for-data-integrity operation that will ensure that all pages in the specified range which were dirty when sync_file_range() was called are committed to disk.

RETURN VALUE

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

ERRORS

EBADF fd is not a valid file descriptor.

EINVAL flags specifies an invalid bit; or offset or nbytes is invalid.

EIO I/O error.

ENOMEM Out of memory.

ENOSPC Out of disk space.

ESPIPE fd refers to something other than a regular file, a block device, or a directory.

VERSIONS

sync_file_range() appeared on Linux in kernel 2.6.17.

CONFORMING TO

This system call is Linux-specific, and should be avoided in portable programs.

NOTES

sync_file_range2()

Some architectures (e.g., PowerPC, ARM) need 64-bit arguments to be aligned in a suitable pair of registers. On such architectures, the call signature of sync_file_range() shown in the SYNOPSIS would force a

register to be wasted as padding between the fd and offset arguments.

(See [syscall\(2\)](#) for details.) Therefore, these architectures define a different system call that orders the arguments suitably:

```
int sync_file_range2(int fd, unsigned int flags,  
                     off64_t offset, off64_t nbytes);
```

The behavior of this system call is otherwise exactly the same as [sync_file_range\(\)](#).

A system call with this signature first appeared on the ARM architecture in Linux 2.6.20, with the name `arm_sync_file_range()`. It was renamed in Linux 2.6.22, when the analogous system call was added for PowerPC. On architectures where glibc support is provided, glibc transparently wraps `sync_file_range2()` under the name `sync_file_range()`.

SEE ALSO

[fdatasync\(2\)](#), [fsync\(2\)](#), [msync\(2\)](#), [sync\(2\)](#)

COLOPHON

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