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OSSP Individual Assignment

System Call Implementation

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Section – B

System Call – ***fdatasync()***

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1. System Call Implementation Example

1.1 *fdatasync()* in user space *(glibc)*

When you call fdatasync(fd) in C, you're using the **glibc wrapper** for the system call. That wrapper looks like this:

C

```
#include <unistd.h>
#include <sys/syscall.h>
#include <errno.h>

int fdatasync(int fd) {
    return syscall(SYS_fdatasync, fd);
}
    return ret;
}
```

This wrapper just uses the ***syscall()*** function to invoke the actual kernel system call.

1.2 Kernel space: The actual system call

In the **Linux kernel source code**, the implementation is inside the ***fs/sync.c*** file. Here's a simplified breakdown of what it does:

C

```
SYSCALL_DEFINE1(fdatasync, int, fd)
{
    struct fd f = fdget(fd);
    int ret = -EBADF;

    if (f.file) {
        ret = vfs_fsync(f.file, 1);
        fdput(f);
    }

    return ret;
}
```

Here's what happens:

- fdget(fd) – Gets the struct file * for the file descriptor.
- vfs_fsync(file, datasync) – Calls the VFS (Virtual File System) sync function.
- The second argument 1 indicates it's a **data-only** sync (fdatasync), not a full sync.
- fdput(f) – Releases the file descriptor reference.

1.3 Under the hood: vfs_fsync

```c
int vfs_fsync(struct file *file, int datasync)
{
    if (!file->f_op->fsync)
        return -EINVAL;

    return file->f_op->fsync(file, file->f_path.dentry, datasync);
}
```

This delegates to the file system's ***fsync*** method (***ext4, xfs***, etc.), passing along the ***datasync*** flag. File systems will then decide how to flush data and whether to skip metadata.

Summary

Layer	Function	Role
User space	fdatasync(int fd)	glibc wrapper that calls syscall()
Syscall entry	SYSCALL_DEFINE1(fdatasync)	Kernel syscall interface
VFS layer	vfs_fsync()	Generic sync logic
File system	ext4_fsync(), etc.	Filesystem-specific implementation