

CS314 Operating Systems Lab

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Lab Assignment 9

In this assignment, we are studying the Minix File System, and trying to implement the following only for the file system mounted at /home.

- Whenever a file is created, print “file created: <inode_number>”.
- Whenever a file is read, print “file read: <inode_number>; nbytes = <nbytes>; offset = <offset>”.
- Whenever a file is written, print “file write: <inode_number>; nbytes = <nbytes>; offset = <offset>”.
- Whenever a file is deleted, print “file deleted: <inode_number>”.

1. Creating File:

For this, the file minix/servers/vfs/open.c was changed at the common_open() function.

```
if (r == OK) {
    exist = FALSE;
    struct vmnt *vmpPath;
    vmpPath = find_vmnt(vp->v_fs_e);
    if (strcmp(vmpPath->m_mount_path, "/home") == 0) printf("file
created: %llu\n", vp->v_inode_nr);
} /* We just created the file */
```

2. Reading File:

For this, the file minix/servers/vfs/read.c was changed at the read_write() function.

```
struct vmnt *vmp;
vmp = find_vmnt(vp->v_fs_e);
if (rw_flag == READING && strcmp(vmp->m_mount_path, "/home") == 0)
    printf("file read: %llu; nbytes = %zu; offset = %llu\n",
vp->v_inode_nr, size, f->filp_pos);
```

3. Writing File:

For this, the file minix/servers/vfs/read.c was changed at the read_write() function.

```
struct vmnt *vmp;
vmp = find_vmnt(vp->v_fs_e);
if (rw_flag == WRITING && strcmp(vmp->m_mount_path, "/home") == 0)
```

```
printf("file written: %llu; nbytes = %zu; offset = %llu\n",
vp->v_inode_nr, size, f->filp_pos);
```

4. Deleting File:

For this, the file minix/servers/vfs/link.c was changed at the do_unlink() function.

```
lookup_init(&stickycheck, resolve.l_path, PATH_RET_SYMLINK, &vmp2, &vp);
stickycheck.l_vmnt_lock = VMNT_READ;
stickycheck.l_vnode_lock = VNODE_READ;
vp = advance(dirp, &stickycheck, fp);
if (strcmp(vmp->m_mount_path, "/home") == 0) printf("file deleted:
%llu\n", vp->v_inode_nr);

if (vp != NULL){
    unlock_vnode(vp);
    put_vnode(vp);
}
```

Implementation:

After copying the files to their respective destination and running make build, here is the output I'm getting while creating, reading, writing and deleting 1.txt at /home.

```
200010008 PID 27 swapped in
# ls
MINIX: PID 221 created
Time allotted = 200, Quantum used = 200
200010008 PID 196 swapped in
jaswanth
MINIX: PID 221 exited
# Time allotted = 200, Quantum used = 103
200010008 PID 27 swapped in
touch 1.txt
MINIX: PID 222 created
Time allotted = 200, Quantum used = 200
200010008 PID 197 swapped in
file created: 9
MINIX: PID 222 exited
# Time allotted = 200, Quantum used = 111
200010008 PID 27 swapped in
Time allotted = 200, Quantum used = 200
Time allotted = 200, Quantum used = 108
200010008 PID 27 swapped in
# Time allotted = 200, Quantum used = 101
200010008 PID 27 swapped in
```

```
Time allotted = 200, Quantum used = 29
200010008 PID 28 swapped in
Time allotted = 200, Quantum used = 200

# Time allotted = 200, Quantum used = 79
200010008 PID 27 swapped in
Time allotted = 200, Quantum used = 21
200010008 PID 28 swapped in
echo Time allotted = 500, Quantum used = 500
Hello worldTime allotted = 200, Quantum used = 4
200010008 PID 27 swapped in
Time allotted = 200, Quantum used = 1
200010008 PID 28 swapped in
> 1.txt
file written: 9; nbytes = 12; offset = 12
# Time allotted = 200, Quantum used = 27
200010008 PID 27 swapped in
Time allotted = 200, Quantum used = 7
200010008 PID 28 swapped in
Time allotted = 200, Quantum used = 200
Time allotted = 200, Quantum used = 61
200010008 PID 27 swapped in
Time allotted = 200, Quantum used = 19
200010008 PID 28 swapped in
```

```
200010008 PID 27 swapped in
Time allotted = 200, Quantum used = 19
200010008 PID 28 swapped in
Time allotted = 200, Quantum used = 111
200010008 PID 27 swapped in
Time allotted = 200, Quantum used = 24
200010008 PID 28 swapped in

# cat Time allotted = 200, Quantum used = 99
200010008 PID 27 swapped in
Time allotted = 200, Quantum used = 25
200010008 PID 28 swapped in
1.txt
MINIX: PID 225 created
Time allotted = 200, Quantum used = 200
200010008 PID 200 swapped in
file read: 9; nbytes = 4096; offset = 12
Hello world
file read: 9; nbytes = 4096; offset = 12
MINIX: PID 225 exited
# Time allotted = 200, Quantum used = 106
200010008 PID 27 swapped in
Time allotted = 200, Quantum used = 25
200010008 PID 28 swapped in
```

```
200010008 PID 28 swapped in
Time allotted = 200, Quantum used = 89
200010008 PID 27 swapped in
Time allotted = 200, Quantum used = 27
200010008 PID 28 swapped in

# rm 1.Time allotted = 200, Quantum used = 94
200010008 PID 27 swapped in
Time allotted = 200, Quantum used = 21
200010008 PID 28 swapped in
txt
MINIX: PID 226 created
Time allotted = 200, Quantum used = 200
200010008 PID 201 swapped in
file deleted: 9
MINIX: PID 226 exited
# Time allotted = 200, Quantum used = 101
200010008 PID 27 swapped in
Time allotted = 200, Quantum used = 23
200010008 PID 28 swapped in
Time allotted = 200, Quantum used = 83
200010008 PID 27 swapped in
Time allotted = 200, Quantum used = 20
200010008 PID 28 swapped in
```