

Part 4 Implementation details

File: mod_s2fs/s2fs.c in s2fs_part4.tar.gz. File is common for all the following subparts.

4.1

4.1.1

Function: s2fs_create_files

Create files/directory on mounting: Lines 210-232

4.1.2

Following are the screenshots of the tree command on the mnt folder

```
[root@vl59:/home/student/oskernel/linux-4.18/mod_s2fs# tree -a ./mnt
```

```
./mnt
|-- 0
|   |-- 0
|   |-- 1
|       |-- 1
|       |-- 1049
|       |-- 1060
|       |-- 1061
|       |-- 1071
|           |-- 1071
|           |-- 14685
|               |-- 14685
|               |-- 14747
|                   |-- 14747
|                   |-- 14748
|                       |-- 14748
|                       |-- 14760
|                           |-- 14760
|                           |-- 14761
|                               |-- 14761
|                               |-- 17256
|                                   |-- 17256
|                                   |-- 17262
|                                       |-- 17262
|                                       |-- 17263
|
|       |-- 1108
|       |-- 1138
|       |-- 14687
|           |-- 14687
|           |-- 14688
|
|       |-- 483
|       |-- 508
|       |-- 525
|       |-- 530
|       |-- 566
|       |-- 882
|       |-- 903
|       |-- 904
|       |-- 905
|       |-- 906
|       |-- 907
|       |-- 916
|       |-- 917
|       |-- 918
|       |-- 922
|       |-- 938
|       |-- 952
|
|-- 2
    |-- 10
    |-- 11
    |-- 12
    |-- 13
    |-- 14
    |-- 15
    |-- 16
    |-- 17
    |-- 18
    |-- 2
    |-- 20
    |-- 21
    |-- 22
```

```

|-- 14748
|   |-- 14748
|   |-- 14760
|       |-- 14760
|       |-- 14761
|           |-- 14761
|           |-- 17256
|               |-- 17256
|               |-- 17262
|                   |-- 17262
|                   |-- 17263
|-- 1108
|-- 1138
|-- 14687
|   |-- 14687
|   |-- 14688
|-- 483
|-- 508
|-- 525
|-- 530
|-- 566
|-- 882
|-- 903
|-- 904
|-- 905
|-- 906
|-- 907
|-- 916
|-- 917
|-- 918
|-- 922
|-- 938
|-- 952
|-- 2
|   |-- 10
|   |-- 11
|   |-- 12
|   |-- 13
|   |-- 14
|   |-- 15
|   |-- 16
|   |-- 17
|   |-- 18
|   |-- 2
|   |-- 20
|   |-- 21
|   |-- 22
|   |-- 23
|   |-- 27
|   |-- 28
|   |-- 29
|   |-- 3
|   |-- 4
|   |-- 6
|   |-- 8
|   |-- 88
|   |-- 89
|   |-- 9
|   |-- 90

```

12 directories, 60 files

root@vl59:/home/student/oskernel/linux-4.18/mod_s2fs#

4.2

get_task_info function definition: Lines 26-58

4.2.2

Storing pid in inode->i_private: Line 163

4.2.3

Included s2fs_part4.tar.gz tar file.

4.2.4

Following is a screenshot of the results of all the required commands.

```
root@v159:/home/student/oskernel/linux-4.18/mod_s2fs# mkdir mnt
root@v159:/home/student/oskernel/linux-4.18/mod_s2fs# ls
1 Makefile Module.symvers mnt modules.order s2fs.c s2fs.ko s2fs.mod.c s2fs.mod.o s2fs.o
root@v159:/home/student/oskernel/linux-4.18/mod_s2fs# sudo insmod s2fs.ko
root@v159:/home/student/oskernel/linux-4.18/mod_s2fs# sudo mount -t s2fs nodev mnt
root@v159:/home/student/oskernel/linux-4.18/mod_s2fs# mount
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
udev on /dev type devtmpfs (rw,nosuid,relatime,size=471392k,nr_inodes=117848,mode=755)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,noexec,relatime,size=100856k,mode=755)
/dev/sda1 on / type ext4 (rw,relatime,errors=remount-ro)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,mode=755)
cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,release_agent=/lib/systemd/systemd-cgroups-agent,name=systemd)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpu,cpuacct)
cgroup on /sys/fs/cgroup/net_cls,net_prio type cgroup (rw,nosuid,nodev,noexec,relatime,net_cls,net_prio)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,freezer)
cgroup on /sys/fs/cgroup/pids type cgroup (rw,nosuid,nodev,noexec,relatime,pids)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf_event)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset)
cgroup on /sys/fs/cgroup/hugetlb type cgroup (rw,nosuid,nodev,noexec,relatime,hugetlb)
cgroup on /sys/fs/cgroup/blkio type cgroup (rw,nosuid,nodev,noexec,relatime,blkio)
debugfs on /sys/kernel/debug type debugfs (rw,relatime)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime,pagesize=2M)
mqueue on /dev/mqueue type mqueue (rw,relatime)
fusectl on /sys/fs/fuse/connections type fusectl (rw,relatime)
lxcfs on /var/lib/lxcfs type fuse.lxcfs (rw,nosuid,nodev,relatime,user_id=0,group_id=0,allow_other)
tmpfs on /run/user/1002 type tmpfs (rw,nosuid,nodev,relatime,size=100856k,mode=700,uid=1002,gid=1002)
nodev on /home/student/oskernel/linux-4.18/mod_s2fs/mnt type s2fs (rw,relatime)
root@v159:/home/student/oskernel/linux-4.18/mod_s2fs# cat mnt/0/1/1
Task Name: systemd
Task State: 1
Process Id: 1
CPU ID: 0
Thread Group ID(TGID): 1
Parent's PID(PPID): 0
Start Time: 20000000
Dynamic Priority: 120
Static Priority: 120
Real-time Priority: 120
Memory Map Base: 140514035011584
Virtual Memory Space: 140737488351232
Virtual Memory Usage: 12021886619
No. of virtual memory address: 79
Total Pages Mapped: 9412
root@v159:/home/student/oskernel/linux-4.18/mod_s2fs# sudo umount . /mnt
root@v159:/home/student/oskernel/linux-4.18/mod_s2fs# sudo rmmod s2fs.ko
```