

# Studio6 Report

## STUDIO6

### Step1:

- Bingxin Liu

### Step2:

```
pi@lbxpi:~/modules $ sudo dmesg --clear
pi@lbxpi:~/modules $ sudo insmod vfs_module.ko
pi@lbxpi:~/modules $ sudo rmmod vfs_module
pi@lbxpi:~/modules $ dmesg
[ 2295.815161] Loaded vfs module
[ 2295.816380] kernel thread vfs created.
[ 2295.816399] task_struct->fs = 060522c4
[ 2295.816411] task_struct->files = 2f6c292b
[ 2295.816423] task_struct->nsproxy = 358fb8f4
[ 2299.173094] Unloaded vfs module
pi@lbxpi:~/modules $
```

### Step3:

```
pi@lbxpi:~/modules $ sudo dmesg --clear
pi@lbxpi:~/modules $ sudo insmod vfs_module.ko
pi@lbxpi:~/modules $ sudo rmmod vfs_module
pi@lbxpi:~/modules $ dmesg
[ 702.951816] Loaded vfs module
[ 702.953448] kernel thread vfs created.
[ 702.953472] task_struct->fs = 060522c4
[ 702.953483] task_struct->files = 2f6c292b
[ 702.953494] task_struct->nsproxy = 358fb8f4
[ 702.953507] fs->pwd->mnt = 8b06e64e
[ 702.953518] fs->root->mnt = 8b06e64e
[ 705.789759] Unloaded vfs module
pi@lbxpi:~/modules $
```

As observed, the pwd and the root directory are indeed part of the same mounted filesystem. This is because, I think, the root is on the path to pwd, so, both the root and the pwd have the same mount point.

### Step4:

```
pi@lbxpi:~/modules $ sudo dmesg --clear
pi@lbxpi:~/modules $ sudo insmod vfs_module.ko
pi@lbxpi:~/modules $ sudo rmmod vfs_module
pi@lbxpi:~/modules $ dmesg
[ 2295.815161] Loaded vfs module
[ 2295.816380] kernel thread vfs created.
[ 2295.816399] task_struct->fs = 060522c4
[ 2295.816411] task_struct->files = 2f6c292b
[ 2295.816423] task_struct->nsproxy = 358fb8f4
[ 2295.816435] fs->pwd->mnt = 8b06e64e
[ 2295.816445] fs->root->mnt = 8b06e64e
[ 2295.816456] pwd->dentry = 08a80550
[ 2295.816467] root->dentry = 08a80550
[ 2299.173094] Unloaded vfs module
pi@lbxpi:~/modules $
```

It is true that the process' current working directory is the same as its root directory. That is because, I think, we are in the kernel, which means we are in the kernel space, not the user space, so there is no difference between root directory and pwd directory.

## Step5:

```
pi@lbxpi:~/modules $ sudo dmesg --clear
pi@lbxpi:~/modules $ sudo insmod vfs_module.ko
pi@lbxpi:~/modules $ sudo rmmod vfs_module
pi@lbxpi:~/modules $ dmesg
[ 3401.604170] Loaded vfs module
[ 3401.605475] kernel thread vfs created.
[ 3401.605497] task_struct->fs = 060522c4
[ 3401.605509] task_struct->files = 2f6c292b
[ 3401.605520] task_struct->nsproxy = 358fb8f4
[ 3401.605532] fs->pwd->mnt = 8b06e64e
[ 3401.605543] fs->root->mnt = 8b06e64e
[ 3401.605554] pwd->dentry = 08a80550
[ 3401.605564] root->dentry = 08a80550
[ 3401.605574] All of files and directories under root directory:
[ 3401.605583] lib64
[ 3401.605588] efi
[ 3401.605598] (null)
[ 3401.605607] share
[ 3401.605617] opt
[ 3401.605644] root
[ 3401.605653] .local
[ 3401.605663] forcequotacheck
[ 3401.605673] tmp
[ 3401.605683] srv
[ 3401.605692] home
[ 3401.605702] .config
[ 3401.605711] boot
[ 3401.605721] none
[ 3401.605731] forcefsck
[ 3401.605740] fastboot
[ 3401.605750] sbin
[ 3401.605759] var
[ 3401.605769] selinux
[ 3401.605779] bin
[ 3401.605788] run
[ 3401.605798] sys
[ 3401.605807] usr
[ 3401.605817] proc
[ 3401.605827] etc
[ 3401.605836] lib
[ 3401.605845] dev

[ 3405.597944] Unloaded vfs module
```

## Step6:

```
pi@lbxpi:~/modules $ sudo dmesg --clear
pi@lbxpi:~/modules $ sudo insmod vfs_module.ko
pi@lbxpi:~/modules $ sudo rmmod vfs_module
pi@lbxpi:~/modules $ dmesg
[ 77.781273] vfs_module: loading out-of-tree module taints kernel.
[ 77.781839] Loaded vfs module
[ 77.782132] kernel thread vfs created.
[ 77.782150] task_struct->fs = 478ccc88
[ 77.782162] task_struct->files = ee8ef12c
[ 77.782172] task_struct->nsproxy = 7aeaa1cf
```

```
[ 77.782185] fs->pwd->mnt = 2c99cac8
[ 77.782196] fs->root->mnt = 2c99cac8
[ 77.782206] pwd->dentry = 586e5419
[ 77.782217] root->dentry = 586e5419
[ 77.782226] All of files and directories under root directory:
[ 77.782236] lib64
[ 77.782241] efi
[ 77.782251] (null)
[ 77.782260] share
[ 77.782270] opt
[ 77.782282] root
[ 77.782291] .local
[ 77.782301] forcequotacheck
[ 77.782311] tmp
[ 77.782320] srv
[ 77.782330] home
[ 77.782339] .config
[ 77.782359] boot
[ 77.782372] none
[ 77.782381] forcefsck
[ 77.782391] fastboot
[ 77.782401] sbin
[ 77.782411] var
[ 77.782420] selinux
[ 77.782430] bin
[ 77.782439] run
[ 77.782449] sys
[ 77.782458] usr
[ 77.782468] proc
[ 77.782478] etc
[ 77.782487] lib
[ 77.782496] dev

[ 77.782515] All of subdirectories of directories under root directory:
[ 77.782525] vc
[ 77.782529] .config
[ 77.782539] .terminfo
[ 77.782548] .pam_environment
[ 77.782558] .cups
[ 77.782568] .cache
[ 77.782577] .vnc
[ 77.782586] .dcrc
[ 77.782596] namespace-dev-7leiHt
[ 77.782606]
[ 77.782615] ssh-TTqDD1leLiZs
[ 77.782625] ssh-g2695rUJOdv
[ 77.782635] filesaDUQD
[ 77.782644] .tX0-lock
[ 77.782654] .Xvnc4EE
[ 77.782663] wpa_ctrl_439-1
[ 77.782673] namespace-dev-0UBYJP
[ 77.782683] 15
[ 77.782692] .vncserver-license
[ 77.782702] ssh-TlrzdhZtat5Y
[ 77.782712] .vnc-vncservice
[ 77.782722] ssh-dgD62TecA4uk
[ 77.782731] dhcpcd-pi
[ 77.782741] .XIM-unix
[ 77.782750] .ICE-unix
[ 77.782760] .font-unix
[ 77.782769] .X11-unix
[ 77.782779] .Test-unix
[ 77.782789] .X0-lock
[ 77.782798] .X[0-9]*-lock
[ 77.782808] c4:42
[ 77.782817] c4:51
[ 77.782827] systemd-private-*
[ 77.782837] lbx
[ 77.782846] pi
[ 77.782857] insmod
[ 77.782866] dmesg
[ 77.782876] vim
```

[ 77.782885] leafpad  
[ 77.782895] xpdf  
[ 77.782905] minecraft-pi  
[ 77.782914] claws-mail  
[ 77.782924] libreoffice  
[ 77.782933] scratch  
[ 77.782943] greenfoot  
[ 77.782953] bluej  
[ 77.782962] agetty  
[ 77.782972] dcop  
[ 77.782981] sh  
[ 77.782991] xscreensaver  
[ 77.783000] mount.fusectl  
[ 77.783010] sync  
[ 77.783020] initctl  
[ 77.783030] mv  
[ 77.783039] dumpe2fs  
[ 77.783049] rm  
[ 77.783058] hostname  
[ 77.783068] plymouth  
[ 77.783078] awk  
[ 77.783088] cut  
[ 77.783098] swapon  
[ 77.783107] dc  
[ 77.783117] systemctl  
[ 77.783127] stat  
[ 77.783136] dirname  
[ 77.783146] tail  
[ 77.783156] run-parts  
[ 77.783165] dphys-swapfile  
[ 77.783175] dhcpcd5  
[ 77.783185] dhcpcd  
[ 77.783195] start-stop-daemon  
[ 77.783205] cat  
[ 77.783215] sed  
[ 77.783225] resolvconf  
[ 77.783235] ip  
[ 77.783245] grep  
[ 77.783254] wpa\_cli  
[ 77.783265] wpa\_supplicant  
[ 77.783275] iwconfig  
[ 77.783286] ethtool  
[ 77.783295] uname  
[ 77.783306] fs  
[ 77.783315] fs.d  
[ 77.783326] mount.vfat  
[ 77.783335] fsck  
[ 77.783345] fsck.fat  
[ 77.783355] fsck.vfat  
[ 77.783364] modprobe  
[ 77.783374] chmod  
[ 77.783383] chown  
[ 77.783393] mkdir  
[ 77.783403] ls  
[ 77.783412] ifquery  
[ 77.783422] ifup  
[ 77.783432] plymouthd  
[ 77.783442] mail  
[ 77.783452] swap  
[ 77.783461] spool  
[ 77.783472] tmp  
[ 77.783481] cache  
[ 77.783491] lock  
[ 77.783500] log  
[ 77.783510] run  
[ 77.783519] lib  
[ 77.783529] dmesg  
[ 77.783538] vim  
[ 77.783548] leafpad  
[ 77.783558] xpdf  
[ 77.783567] minecraft-pi  
[ 77.783577] claws-mail

[ 77.783587] libreoffice  
[ 77.783597] scratch  
[ 77.783607] greenfoot  
[ 77.783618] bluej  
[ 77.783628] hciconfig  
[ 77.783638] login  
[ 77.783647] dcop  
[ 77.783658] xscreensaver  
[ 77.783667] fusermount  
[ 77.783678] sync  
[ 77.783687] which  
[ 77.783697] tempfile  
[ 77.783707] date  
[ 77.783717] initctl  
[ 77.783726] mv  
[ 77.783736] touch  
[ 77.783745] rm  
[ 77.783755] hostname  
[ 77.783765] awk  
[ 77.783774] cut  
[ 77.783784] dc  
[ 77.783794] systemctl  
[ 77.783804] stat  
[ 77.783813] df  
[ 77.783823] dirname  
[ 77.783833] tail  
[ 77.783844] bash  
[ 77.783853] cat  
[ 77.783864] sed  
[ 77.783873] ip  
[ 77.783883] grep  
[ 77.783893] run-parts  
[ 77.783903] uname  
[ 77.783912] setupcon  
[ 77.783922] kmod  
[ 77.783931] chmod  
[ 77.783941] chown  
[ 77.783950] mkdir  
[ 77.783960] ls  
[ 77.783970] dash  
[ 77.783979] sh  
[ 77.783989] plymouth  
[ 77.783999] systemd-tmpfiles  
[ 77.784009] journalctl  
[ 77.784019] systemd-sysusers  
[ 77.784030] mount  
[ 77.784040] games  
[ 77.784050] include  
[ 77.784061] arm-linux-gnueabi  
[ 77.784085] etc  
[ 77.784102] pkg  
[ 77.784114] X11R6  
[ 77.784124] sbin  
[ 77.784133] bin  
[ 77.785005] share  
[ 77.785017] local  
[ 77.785028] lib  
[ 77.785038] terminal-colors.d  
[ 77.785048] sudoers.d  
[ 77.785072] sudoers  
[ 77.785093] sudo.conf  
[ 77.785109] gss  
[ 77.785119] hosts.deny  
[ 77.785128] hosts.allow  
[ 77.785150] pdnsd.conf  
[ 77.785173] resolv.conf.tail  
[ 77.785187] resolv.conf.head  
[ 77.785199] dpkg  
[ 77.785219] machine-info  
[ 77.785234] hostname  
[ 77.785244] inputrc  
[ 77.785257] bluetooth

[ 77.785267] bash\_completion.d  
[ 77.785277] slackware-version  
[ 77.785287] rc.d  
[ 77.785296] debian\_chroot  
[ 77.785306] bash.bashrc  
[ 77.785316] terminfo  
[ 77.785326] motd.d  
[ 77.785335] motd  
[ 77.785345] update-motd.d  
[ 77.785355] issue.d  
[ 77.785365] issue  
[ 77.785376] gtk-2.0  
[ 77.785386] fuse.conf  
[ 77.785397] profile.d  
[ 77.785408] profile  
[ 77.785429] gnupg  
[ 77.785440] gcrypt  
[ 77.785450] environment.d  
[ 77.785459] environment  
[ 77.785469] security  
[ 77.785479] shadow  
[ 77.785489] login.defs  
[ 77.785498] pam.d  
[ 77.785508] drirc  
[ 77.785519] xorg.conf  
[ 77.785529] X0.hosts  
[ 77.785539] suid-debug  
[ 77.785549] services  
[ 77.785559] cups  
[ 77.785569] gnutls  
[ 77.785578] polkit-1  
[ 77.785588] lightdm  
[ 77.785598] xdg  
[ 77.785608] mailname  
[ 77.785617] gai.conf  
[ 77.785627] exim4  
[ 77.785637] ssl  
[ 77.785646] inetd.conf  
[ 77.785659] X11  
[ 77.785669] nologin  
[ 77.785678] os-release  
[ 77.785688] vnc  
[ 77.785698] ssh  
[ 77.785708] rc.local  
[ 77.785718] lsb-base-logging.sh  
[ 77.785733] rsyncd.conf  
[ 77.785742] libblockdev  
[ 77.785752] udisks2  
[ 77.785762] libnl  
[ 77.785772] resolvconf.conf  
[ 77.785781] dhcpcd.exit-hook  
[ 77.785791] chrony.conf  
[ 77.785801] ntpd.conf  
[ 77.785811] ntp.conf  
[ 77.785821] dhcpcd.enter-hook  
[ 77.785831] dbus-1  
[ 77.785840] avahi  
[ 77.785850] rsyslog.d  
[ 77.785860] cron.d  
[ 77.785870] crontab  
[ 77.785880] dphys-swapfile  
[ 77.785890] rsyslog.conf  
[ 77.785902] dhcpcd.conf  
[ 77.785913] triggerhappy  
[ 77.785923] alternatives  
[ 77.785932] init.d  
[ 77.785942] locale.alias  
[ 77.785952] hosts  
[ 77.785962] host.conf  
[ 77.785974] resolv.conf  
[ 77.785984] adjtime  
[ 77.785994] wpa\_supplicant

```
[ 77.786004] subgid.lock
[ 77.786015] subuid.lock
[ 77.786025] group.lock
[ 77.786044] passwd.lock
[ 77.786060] shadow.lock
[ 77.786070] gshadow.lock
[ 77.786080] mtab
[ 77.786090] krb5.keytab
[ 77.786100] initrd-release
[ 77.786109] fonts
[ 77.786119] default
[ 77.786128] binfmt.d
[ 77.786139] asound.conf
[ 77.786149] alsa
[ 77.786160] console-setup
[ 77.786169] localtime
[ 77.786179] sysctl.conf
[ 77.786188] sysctl.d
[ 77.786198] network
[ 77.786208] plymouth
[ 77.786218] modprobe.d
[ 77.786227] systemd
[ 77.786239] tmpfiles.d
[ 77.786249] machine-id
[ 77.786259] nsswitch.conf
[ 77.786268] group
[ 77.786281] passwd
[ 77.786291] .pwd.lock
[ 77.786300] sysusers.d
[ 77.786310] selinux
[ 77.786319] ld.so.cache
[ 77.786340] ld.so.preload
[ 77.786355] .updated
[ 77.786376] udev
[ 77.786390] fstab
[ 77.786400] resolvconf
[ 77.786410] terminfo
[ 77.786420] libaudit.so
[ 77.786430] environment.d
[ 77.786440] libnss_db.so.2
[ 77.786449] libbd_mdraid.so.2
[ 77.786459] libbd_crypto.so.2
[ 77.786469] vfp
[ 77.786479] neon
[ 77.786488] v7l
[ 77.786498] tls
[ 77.786507] dbus-1
[ 77.786517] dhcpcd
[ 77.786527] lsb
[ 77.786536] console-setup
[ 77.786546] crda
[ 77.786556] binfmt.d
[ 77.786568] firmware
[ 77.786577] sysctl.d
[ 77.786587] modules
[ 77.786599] modprobe.d
[ 77.786609] tmpfiles.d
[ 77.786619] sysusers.d
[ 77.786629] ld-linux-armhf.so.3
[ 77.786639] udev
[ 77.786661] arm-linux-gnueabi
[ 77.786674] systemd

[ 83.827042] Unloaded vfs module
pi@lbxpi:~/modules $
```