

ASP Activity 3

Contributors

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Part 13

The screenshot shows a terminal window titled 'root@linus: /home/emmett/Desktop/activity3'. The terminal displays several log messages from the kernel and systemd. The logs include:

```
[Wed Mar 27 09:53:58 2024] workqueue: blk_mq_requeue_work hogged CPU for >10000us 8 times, consider switching to WQ_UNBOUND
[Wed Mar 27 09:56:47 2024] audit: type=1107 audit(1711547807.609:93): pid=550 uid=102 auid=4294967295 ses=4294967295 subj=unc
onfined msg='apparmor="DENIED" operation="dbus_signal" bus="system" path="/org/freedesktop/login1" interface="org.freedesktop
p.DBus.Properties" member="PropertiesChanged" name=":1.14" mask="receive" pid=2857 label="snap.firefox.firefox" peer_pid=587
peer_label="unconfined"
exe="/usr/bin/dbus-daemon" sauid=102 hostname=? addr=? terminal=?'
[Wed Mar 27 09:57:12 2024] audit: type=1107 audit(1711547833.020:94): pid=550 uid=102 auid=4294967295 ses=4294967295 subj=unc
onfined msg='apparmor="DENIED" operation="dbus_signal" bus="system" path="/org/freedesktop/login1" interface="org.freedesktop
p.DBus.Properties" member="PropertiesChanged" name=":1.14" mask="receive" pid=2857 label="snap.firefox.firefox" peer_pid=587
peer_label="unconfined"
exe="/usr/bin/dbus-daemon" sauid=102 hostname=? addr=? terminal=?'
[Wed Mar 27 09:59:50 2024] tuxdrv: loading out-of-tree module taints kernel.
[Wed Mar 27 09:59:50 2024] tuxdrv: module verification failed: signature and/or required key missing - tainting kernel
[Wed Mar 27 09:59:50 2024] CHRDEV "mycdrv" major requested (700) is greater than the maximum (511)
[Wed Mar 27 09:59:50 2024] Succeeded in registering character device mycdrv
[Wed Mar 27 10:00:19 2024] device unregistered
[Wed Mar 27 10:08:52 2024] CHRDEV "mycdrv" major requested (700) is greater than the maximum (511)
[Wed Mar 27 10:08:52 2024] emmett kogan: Succeeded in registering character device mycdrv
```

The terminal prompt is 'root@linus: /home/emmett/Desktop/activity3#'. Below the terminal window, a file manager window is partially visible, showing a sidebar with 'All My Files' and a list of folders: Office 365, Library Research, GatorEvals, Zoom Conferences, Campus Resources, and Honorlock.

Part 13 screenshot: log message prior to fixing the major number

Part 14

A screenshot of a Linux terminal window. The title bar shows 'Activities', 'Terminal', and the date 'Mar 27 10:24'. The terminal prompt is 'root@linsus: /home/emmett/Desktop/activity3'. The output shows several kernel messages: 'emmett kogan: Succeeded in registering character device mycdrv', 'emmett kogan: device unregistered', 'workqueue: blk_mq_run_work_fn hogged CPU for >10000us 256 times, consider switching to WQ_UNBOUND', 'workqueue: ata_sff_pio_task hogged CPU for >10000us 4 times, consider switching to WQ_UNBOUND', 'emmett kogan: Succeeded in registering character device mycdrv', 'OPENING device: mycdrv:', 'WRITING function, nbytes=14, pos=14', and 'CLOSING device: mycdrv:'. Below these, a user command is shown: 'root@linsus:/home/emmett/Desktop/activity3# sudo dd if=/dev/tux0 bs=14 count=1'. The output of the command is: 'Emmett Kogan', '1+0 records in', '1+0 records out', '14 bytes copied, 0.000159427 s, 87.8 kB/s', and 'root@linsus:/home/emmett/Desktop/activity3#'. The terminal window is overlaid on a desktop environment with a sidebar on the left containing icons for various applications and a file manager at the bottom.

Fixed major number bug for this part, running old version of HelloDriver prior to when I wrote the read code. Instead uses `dd` to show the effect on the internal buffer.

Part 19 (bonus)

```
root@linsus: /home/emmett/Desktop/activity3
root@linsus: /home/emmett/Desktop/activity3# ls
HelloDriver  Makefile      Module.symvers  tuxdrv.ko      tuxdrv.mod.c  tuxdrv.o
HelloDriver.c  modules.order  tuxdrv.c        tuxdrv.mod     tuxdrv.mod.o
root@linsus: /home/emmett/Desktop/activity3# rm HelloDriver
root@linsus: /home/emmett/Desktop/activity3# sudo rmmod tuxdrv
root@linsus: /home/emmett/Desktop/activity3# sudo insmod tuxdrv.ko
root@linsus: /home/emmett/Desktop/activity3# gcc HelloDriver.c -o HelloDriver
root@linsus: /home/emmett/Desktop/activity3# ./HelloDriver
/dev/tux0 fd = 3
Wrote 14 bytes to /dev/tux0
Printing what is read from the device:
Emmett Kogan
root@linsus: /home/emmett/Desktop/activity3# dd if=/dev/tux0 bs=14 count=1
Emmett Kogan
1+0 records in
1+0 records out
14 bytes copied, 0.000353412 s, 39.6 kB/s
root@linsus: /home/emmett/Desktop/activity3#
```

```
root@linsus: /home/emmett/Desktop/activity3
[Wed Mar 27 10:57:19 2024] OPENING device: mycdrv:
[Wed Mar 27 10:57:19 2024] READING function, nbytes=14, pos=14
[Wed Mar 27 10:57:19 2024] CLOSING device: mycdrv:
[Wed Mar 27 11:01:16 2024] emmett kogan: device unregistered
[Wed Mar 27 11:01:21 2024] emmett kogan: Succeeded in registering character device mycdrv
[Wed Mar 27 11:01:30 2024] OPENING device: mycdrv:
[Wed Mar 27 11:01:30 2024] WRITING function, nbytes=14, pos=14
[Wed Mar 27 11:01:30 2024] READING function, nbytes=14, pos=14
[Wed Mar 27 11:01:30 2024] CLOSING device: mycdrv:
[Wed Mar 27 11:06:16 2024] emmett kogan: device unregistered
[Wed Mar 27 11:06:20 2024] emmett kogan: Succeeded in registering character device mycdrv
[Wed Mar 27 11:06:50 2024] OPENING device: mycdrv:
[Wed Mar 27 11:06:50 2024] WRITING function, nbytes=14, pos=14
[Wed Mar 27 11:06:50 2024] READING function, nbytes=14, pos=14
[Wed Mar 27 11:06:50 2024] CLOSING device: mycdrv:
[Wed Mar 27 11:07:16 2024] OPENING device: mycdrv:
[Wed Mar 27 11:07:16 2024] READING function, nbytes=14, pos=14
[Wed Mar 27 11:07:16 2024] CLOSING device: mycdrv:
root@linsus: /home/emmett/Desktop/activity3#
```

Console output and dmesg output of the bonus. Note that after registering (where it says my name), it opens the device, writes/reads to it via **HelloDriver**, then reads again via **dd**, and this is reflected in the console output.