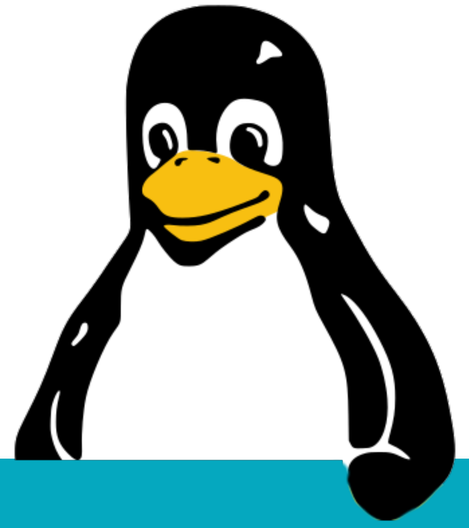
Linux, day 9



LAB: Partitioning

New disks for our VM!

- Using VirtualBox, let's add three disks!
  - Create three new, "thin provisioned" disks.
  - Each should be 100MB.
  - We will uses these in next labs & classes too!

- After we reboot, let's see if they're found!

Are they there?

- Do we see new devices in /dev?
- Does *dmesg* (or *journalctl -b*) show new disks?

```
$ journalctl -b | grep -i disk

$ ls /dev/sd* /dev/vd*
```

Partitioning: gparted

- We will need the graphical environment.
- Start the *gparted* tool.
  - The pull-down shows available disks.
  - It even helps you format the partition!
  - Changes only happen with the "APPLY" button.

Partitioning: fdisk

- "*fdisk*" does partitioning from the CLI.
  - You can use it through SSH!
- Its usage is tricky and uses one-letter commands.
- Let's demo!

fdisk commands

Command	**Function**
m	Help / list of commands
g	Create new GPT partition table.
p	Print / show the partition table.
n, d	Add, or remove, a partition.
l, t	Show partition types, set partition type.
w	Write partition table to disk ("*APPLY*").

Are they there?

- Do we see new partitions in /dev?
- Does *dmesg* (or *journalctl*) show new devices?

```
$ journalctl --since "10 minutes ago"

$ ls -lrt /dev/sd*
```

LAB: Formatting

Commands per FS type

- See what you find!
- Type "*mkfs*" and press <TAB> twice.

```
mkfs            mkfs.cramfs   mkfs.ext3
mkfs.fat        mkfs.msdos    mkfs.xfs
mkfs.btrfs      mkfs.ext2     mkfs.ext4
mkfs.minix      mkfs.vfat
```

Mount points and formatting

- Let's make mount points and format our disks.

```
$ sudo mkdir /mnt/b /mnt/c /mnt/d

$ sudo mkfs.ext4 /dev/sdb1
$ sudo mkfs.xfs /dev/sdc1
$ sudo mkfs.vfat /dev/sdd1
```

Mounting!

- We can load the file systems, but it's not permanent.

```
$ sudo mount -t ext4 /dev/sdb1 /mnt/b
$ sudo mount -t xfs /dev/sdc1 /mnt/c
$ sudo mount -t vfat /dev/sdd1 /mnt/d
```

Mounting at boot

- We can add these to "*/etc/fstab*".
  - Make a backup copy of this file first!

```
/dev/sdb1   /mnt/b   ext4   defaults 1 3
/dev/sdc1   /mnt/c   xfs    defaults 1 3
/dev/sdd1   /mnt/d   vfat   defaults 1 3
```

Re-mounting

- Let's drop the mounts and re-mount them as test.
- Reboot. Do the mounts re-appear?

```
$ sudo umount /mnt/b /mnt/c /mnt/d
$ sudo mount --all

$ sudo reboot
```

Let's break stuff!

- After making the new FS, adjust the perms!
  - Make them writable for your group/account.
  - This will fail for *vfat*. Why?

```
$ sudo chgrp tess /mnt/b /mnt/c /mnt/d
$ sudo chmod 775 /mnt/b /mnt/c /mnt/d
```

Let's break stuff

```
$ for i in {1..1000}
do touch /mnt/b/$i; done

$ ls /mnt/b/
```

Now we'll break it for real

```
$ sudo dd if=/dev/urandom of=/dev/sdb1 \
bs=1M count=100

$ ls /mnt/b/

$ journalctl --since '2 minutes ago'
```

Advance practice

- If you have some extra time:
  - Reformat the file system, repair what we broke.
  - Change the entries in */etc/fstab*, to use *by-uuid*.

LAB: FUSE and sshfs

FUSE: filesystem in userspace

- Sometimes you need a "weird" file system,
  - But don't want a kernel module for it.
  - You just want a quick integration into Linux.

- FUSE makes this possible

See also: FUSE on ArchWiki

FUSE: Some examples

- Gitfs - Git repository with auto-commit
- Sshfs - Remote directory over SSH
- Gdrivefs - Google Drive
- NTFS3G - Windows hard drives
- Adbfs - Android devices, over USB

Let's FUSE our VMs...

- On the Ubuntu VM:

```
$ sudo apt install sshfs

$ sudo mkdir /mnt/fedoratmp
```

Let's FUSE our VMs...

- On the Ubuntu VM:

```
$ sudo sshfs -o \
allow_other,default_permissions \
tess@fedora:/tmp /mnt/fedoratmp

$ ls /mnt/fedoratmp
```

Outcome

- You just mounted /tmp from Fedora,
  - Onto /mnt/fedoratmp on Ubuntu,
  - Via SSH!

- You can make files, change them, etc.
  - Without using "normal" file share protocols.

Closing

Homework

- Reading:
  - Chapter 11 and 16

Homework

- Go do:
  - Make a 5GB VirtualBox disk image,
  - Formatted as XFS,
  - Which gets mounted on */var/appdata/* at boot.