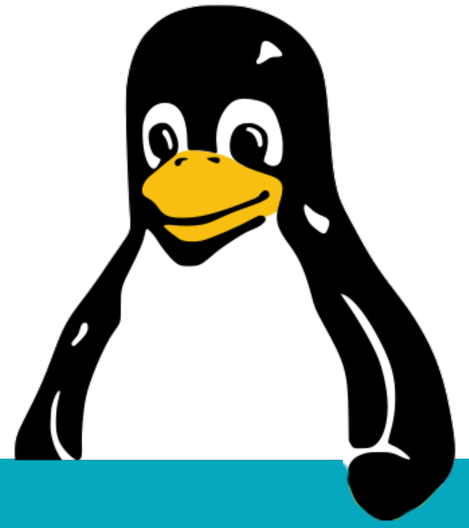
Linux, day 9



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*
```

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	Add a new partition.
l	Show partition types.
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 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!
  - Apply one of the groups that you made.

```
$ 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

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

$ ls /mnt/b/

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

Closing

Homework

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

Reference materials

Resources

- PowerCert NAS vs SAN (YouTube)
- Standard RAID levels (Wikipedia)
- Synology RAID calculator
- Setting up raw devices for Oracle
- An introduction to storage terminology
- RHEL 8: XFS Copy-on-write

Resources

- Snapshots 101: CoW vs RoW
- Changing a file system's UUID
- Persistent block device naming
- A Linux user's guide to LVM