ComS 252 Homework 3: Buy a new disk

Group assignment (with 5% penalty per group member)

Due September 21, 2021

1 Objectives

For this assignment, you will upgrade a system that has a new disk attached. This will be done *without* re-installing Linux.

2 Download

Download the virtual machine `Hw03.ova`. Accounts are `root`, `alice`, `bob`, and `chuck`, with the usual passwords (`rootpw`, etc.).

3 Current configuration

The machine currently has two disks. The first disk, `/dev/sda`, is the original disk for the system. You will notice that the `/home` partition on this disk is rather full. The second disk, `/dev/sdb`, was recently "purchased" and attached to the system, and the goal is to move the `/home` partition here. Obviously, we want to do this without any loss of data and without having to reinstall Linux. When we have finished, users `alice`, `bob`, and `chuck` should not notice any changes, except for more disk space under `/home`.

4 Desired final configuration

Your system should boot up into the following configuration.

- The original `/` paritition is the same as before[1].
- The new (second) disk is mounted at `/home` and contains an *identical* (with file attributes such as the owner, group, and modification time preserved), but *larger* (with more free disk space), copy of the original `/home` filesystem.
- The original `/home` and swap partitions have been merged into a larger swap partition. Be sure that all the swap space is being utilized (hint: check the output of `top`).

Once this is the case, you are ready to submit your work.

5 Steps to perform

Roughly, you will need to do the following (or something similar).

1. Partition the new disk, with a single partition taking all available space.
2. Create an empty `ext4` or `xfs` filesystem on the partition.
3. Temporarily mount the new partition, and move (or copy) files from the old `/home` disk to the new one.

[1] Otherwise, you would need to use another system (e.g., a rescue CD) because you cannot unmount `/`.

4. Reconfigure the system so that the new partition mounts to `/home` automatically at boot time, while the partition that previously was used for `/home` is not mounted anywhere.
5. Turn off swap space.
6. Repartition the old disk, merging the partitions that were used for `/home` and swap, taking care not to touch the partition used for `/`.
7. Format the new swap partition.
8. Activate the new swap partition.
9. Ensure that the system is configured so that the new swap partition is used automatically at boot time.

However, the steps listed above are (unfortunately) not always straightforward. In particular, note that it is easy to make mistakes that will wipe out an entire filesystem or cause your virtual machine to become unbootable. As such, in reality, you would want to back up your system before undertaking such a change. In this case, you are instead encouraged to take snapshots of the (shut down) VM frequently. The snapshots serve the same purpose as a backup: you can always (easily, in fact) revert to a working snapshot. Note that an external drive is unnecessary for this assignment, because it is possible to complete the assignment using only the drives already attached to the VM.

In addition to the file utilities that were covered in lecture, you may find the following to be useful.

- `mkfs`
- `mkswap` and `swaplabel`
- `swapoff`, `swapon`, and `free`
- `fdisk` or `parted`
- `fstab` (not a utility, but a useful `man` page entry)
- `dracut`
- `blkid`. This utility shows you the unique identifiers for your drive partitions, which you will need for entries in `/etc/fstab`. **Important!** When you reformat the swap partition, you will need to either reset the UUID to its old value (easier), or update `/etc/fstab` *and* rebuild the `initramfs` image.

Consult your `man` pages for details.

6 Submitting your work

Login as `root`, and run `Turnin yourISUusername` to automatically submit your work. If you worked in a group, run `Turnin` once with the usernames of everyone in your group. Check the `man` page for `Turnin` for more information.