Lab 2

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Report Format

This report is being written as a markdown file via Obsidian

1. Get a MINIX system

Approach

In this lab, I used VirtualBox and the provided MINIX3 image.

1. Create a virtual machine using default settings following the lab document's given instructions. I did not give it a specific image, but set it up to run an Other Linux OS.
2. Go to virtual machine Settings->Storage and remove the SATA Controller and add a hard drive: the given MINIX3 disk image.
3. Start the virtual machine and boot into the MINIX3 drive.

Problems Encountered

On my first boot, MINIX3 threw an error that the mounted drive could not be found. MINIX3 did not fully boot and I could not run any commands.

Solutions

In Settings->Storage, I had to set the MINIX3 disk image to be virtual disk 0 rather than virtual disk 1.

Lessons

I had initially assumed that being disk 0 or 1 did not matter, but in minimal OS's such as this, every detail counts and no assumptions should be made about if the OS will run how I think it will run.

2. Login

Approach

I was prompted with a login, and I logged in as root
`10.0.0.1 user: root`

Problems Encountered

None

Solutions

N/A

Lessons

When the lab instructions said to login as root initially, it meant that very literally. When I first saw the login prompt, I entered `root` as a guess, but it worked.

3. Create a user account

Approach

1. Use `adduser` to add the user `jasonktov` to a group
2. Use `passwd` to set a password

Problems Encountered

`adduser` expects a few arguments: the username, group, and home directory. I had issues with each one.

- Username: I had initially wanted the username to be `jasonktov` but there was a limit of 8 characters.
- Group: The group to add to must be an existing group, so I had to figure out what the existing groups were.
- Home Directory: The home directory must be preexisting

Solutions

- Username: I shortened the username to `jasonk`. I should have done `jasont` instead or just `jason`.
- Group: I found a list of user groups and used group `operator`.
  `vi /etc/groups`
- Home Directory: Create a directory for users. There probably is one already intended for users, but I made my own.
  `mkdir /home/users`
  Commands run:
  `adduser jasonk operator /home/users`
  `passwd jasonk`

Lessons Learned

Running `man adduser` helped, however some of the arguments like `group` while clear, required me to look more to find what to enter in as an argument.

4. Create a MINIX disk image and use it to store data

Approach

1. Create a .img file outside the virtual machine using `dd if=/dev/zero of=testfloppy bs=1024 count=1440`. I used wsl to be able to run this command although I'm using Windows.
2. Link the .img file to the virtual machine by going to Settings->Storage, creating a floppy controller, and adding the .img file.
3. Format the drive in MINIX by using `format`
4. Create a file system in the drive with `mkfs`
5. Mount the drive in `/mnt/floppy`

Problems Encountered

- Finding the drive in MINIX: I didn't know how to reference the virtual floppy disk in MINIX.
- Testing to see if the drive was successfully mounted

Solutions

- Finding the drive in MINIX: By running `fd`, I learned that floppy drives should appear in `/dev` as `fd0` or `fd1`. Going to `/dev`, I ran `ls | grep fd` and found `fd0`
- I formatted this drive with `format /dev/fd0 1440`
- I created a file system with `mkfs /dev/fd0`
- I mounted the drive with `mkdir /mnt/floppy` and `mount /dev/fd0 /mnt/floppy`.
- Run `mount` to check if the file system was successfully mounted.

Lessons Learned

I learned that the terminal is very short. Running `ls /dev` resulted in a long list of files that scrolled the terminal too far to see if `fd0` was in the list. I had to use pipe operators to further and filter searches.

5. Accessing your data from outside MINIX

Approach

- Copy the testfloppy.img file to a github repo and push
- On the calpoly unix servers, pull from the repo to get the testfloppy.img
- Use the provided test programs: `minls` and `minget` to access the testfloppy.img

Problems Encountered

The unix servers are slow and I'm accessing them through the vpn.

Solutions

There isn't a way to avoid the slow unix servers beside trying to use them as little as possible and doing as much work as I can on my local machine.

Lessons Learned

I can probably use `scp` to transfer the .img file from my machine to the unix servers, however I already have a github setup, so I might as well just use that. There are many good ways to accomplish something, but there are also many good enough ways.

6. Clean up and shut down

Approach

Run `shutdown -r now` to properly shutdown the MINIX system

Problems Encountered

`shutdown` requires higher permission than what operator has access to.

Solutions

`su` to switch to root and run `shutdown`

Lessons Learned

`shutdown -r now` means to restart MINIX as well, so just `shutdown now` brings me to a different environment which I won't mess with.