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CS 453
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1/16/2025
Lab 2

Introduction:

In this lab we set up a minix3 instance on virtual box on a windows machine. This involved creating a new VM, configuring network parameters, adding users, creating a file system, ultimately to be able to transfer files between our main machine and the minix instance.

1. Getting Minix

Approach:

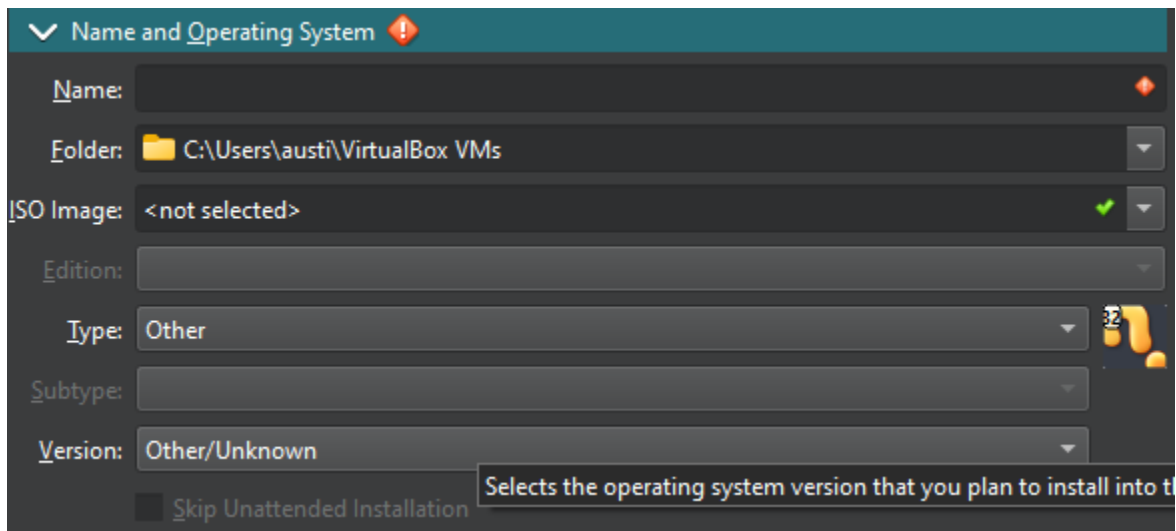


Fig 1: New virtual machine setup operating system selection

We used virtualbox on a windows machine to complete this lab. For this section, it was recommended to select a type: "Linux" then "Other Linux" for version however "Other Linux" did not appear as an option, only "Oracle Linux" appeared, and when trying to boot with these selected it failed. For this reason, we switched to Type: "Other" and Version: "Other/Unknown" and this seemed to be successful

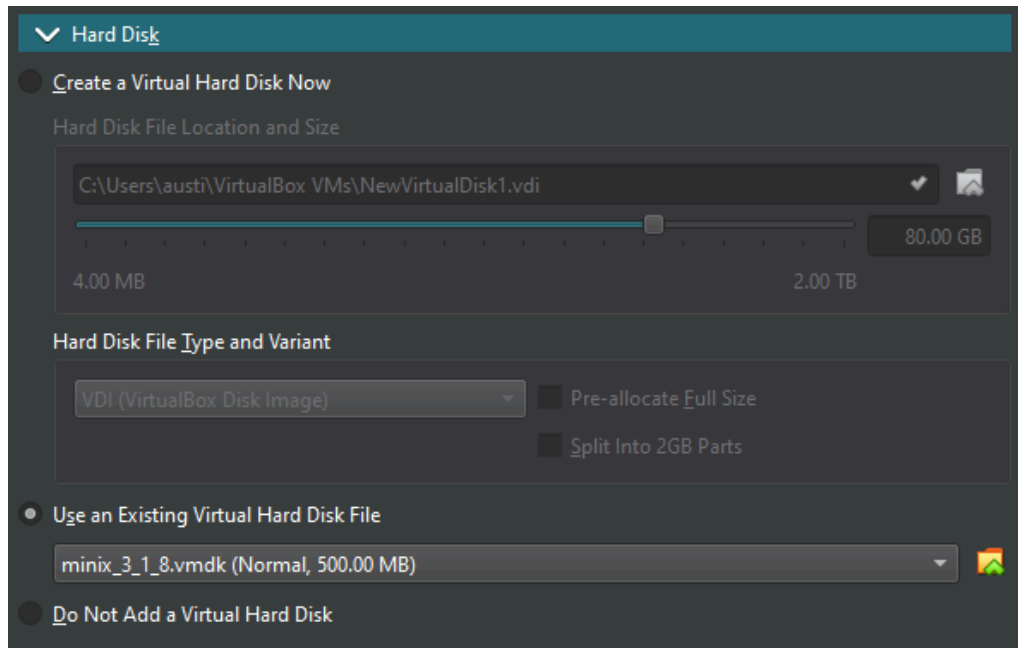
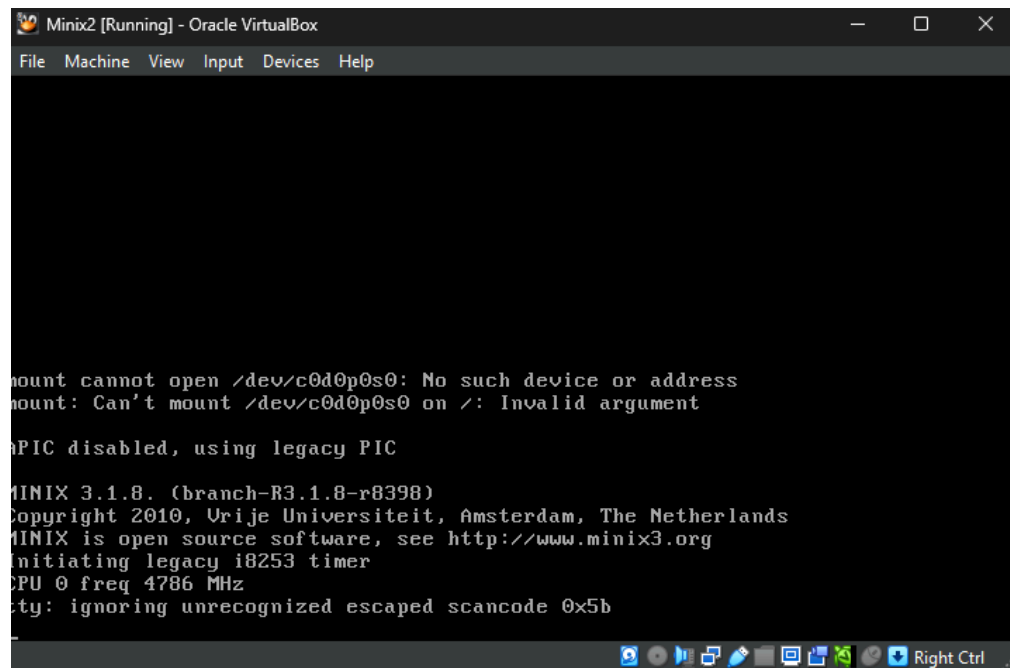


Fig 2: Hard Disk selection for new virtual machine

Here we selected the .VMDK image file as instructed.

Problems Encountered:

When attempting to set the type as Linux, we were unable to boot successfully using the VMDK file. Specifically, we got an error that `/dev/...` could not mount.



Solutions:

The solution was instead telling Virtualbox that it was of type other and version other and letting it figure it out itself.

Lessons Learned:

When setting something up, don't always trust the guides wholeheartedly, experiment and find what works for your specific system and version.

2. Log in

Approach:

- a. Logged in as root when prompted

Problems encountered:

We encountered no problems in this section.

3. Create a user account

Approach:

- a. Run `# netconf`

```
# netconf
MINIX 3 currently supports the following Ethernet cards. PCI cards detected
by MINIX are marked with *. Please choose:

0.  No Ethernet card (no networking)
1.  Intel Pro/100
2.  3Com 501 or 3Com 509 based card
3.  Realtek 8139 based card (also emulated by KVM)
4.  Realtek 8169 based card
5.  Realtek 8029 based card (also emulated by Qemu)
6.  NE2000, 3com 503 or WD based card (also emulated by Bochs)
7.  * AMD LANCE (also emulated by VMWare and VirtualBox)
8.  Intel PRO/1000 Gigabit
9.  Attansic/Atheros L2 FastEthernet
10. DEC Tulip 21140A in VirtualPC
11. Different Ethernet card (no networking)
```

Fig 3: Network config options

- b. Selected the detected method AMD LANCE and opted for DHCP, then reboot system
- c. Run `# adduser austin operator /home/austin` to add a user account without superuser privs
- d. Run `# passwd austin` to set a password for new account
- e. Run `# login austin` to test new account

Problems Encountered:

When adding a new user, we were unsure of what group we should be considered as new users, so we attempted to add a new group type to the `/etc/group` file. Here we realized we did not have the best understanding of VI compared to VIM. Attempting to add new lines and delete characters was not working as it does in VIM.

Solution:

I had to refer to online manuals and Professor Nico to learn how to correctly navigate VI. This did not end up being important as we decided to make our user accounts part of the operator group.

Lessons learned:

How to use the VI editor.

4. Adding Floppy Drive**Approach:**

- a. Power off the VM
- b. Open Linux distribution on main PC (WSL for me)
- c. Run **#dd if=/dev/zero of=testfloppy.img bs=1024 count=1440** to create a floppy disk image
- d. Go to VM settings in virtual box and add a floppy disk controller and the floppy disk just created'
- e. Start the vm and login as root
- f. Run **# format /dev/fd0 1440** since that is the first floppy disk and the size of the disk
- g. Run **# mkfs /dev/fd0** to add a file system on this drive
- h. Run **# mount /dev/fd0 /mnt/floppy** to mount the new drive

```
# format /dev/fd0
format: no size specified for auto floppy device /dev/fd0
Usage: format [-v] <device> [<media size> [<drive size>]]
# tty: ignoring unrecognized escaped scancode 0x5b
# format /dev/fd0 1440
Formatting a 1440k diskette in a 1440k drive
  Cyl. 79, Head 1
# mkfs /dev/fd0
# mkdir /mnt/floppy
# mount /dev/fd0 /mnt/floppy
/dev/fd0 is read-write mounted on /mnt/floppy
#
```

Problems encountered:

When reading the man pages for format, it was still unclear to us what the parameters were and what they meant (media size and drive size) we researched some and decided to try it with the exact size of the drive we had created which seemed to work.

Solution:

Research what the correct usage of format would be in our scenario. We ended up

Lessons learned:

Minix has a very robust community online that has lots of external resources to help us understand the operating system.

5. Accessing data from main system

Approach:

For this section we first attempted to mount the disk directly on our ubuntu instances, however my ubuntu kernel did not have compiled support for minix, so we moved on to obtaining the miniget and minls programs. For this we used scp via an SSH server to copy the executables from unix1 to our local machine. Once we had them on our local linux distribution, we ran **chmod +x minls miniget** to allow them to be executable. Once this was done we could see and get the contents of the file system from our minix VM.

Problems encountered:

When trying to mount our floppy drives directly, we came across the error that “minix is not a recognized file system” and after finding out that tools to support interacting with minix must be compiled into the kernel.

Solution:

Our final solution was to switch to method b, while modifying ubuntu could be done it required recompiling kernel code which we did not have enough confidence to do yet. Method b uses minls and miniget as programs to view the contents of a floppy disk image from the local linux instance.

Lessons learned:

After finding out that support for minix needed to be compiled into the kernel, we looked into it and found this was because we are trying to do filesystem interactions. This is a kernel level function, and interacting with file systems the kernel needs to know how to interpret the other type of file system, however our kernel did not have that knowledge.