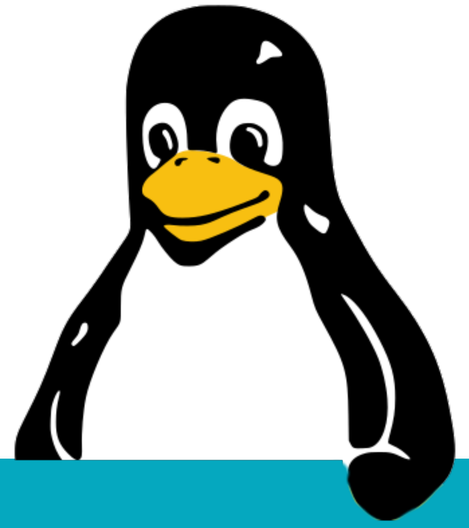
Linux, day 1



Lab prep

What will you need?

- A semi-recent (5 years) laptop, or PC.
  - Intel i5/i7, AMD Zen2, Apple ARM
  - At least 8GB RAM
  - At least 60GB of storage space

Apple ARM systems

- Students with M1/M2 CPUs need UTM or Parallels.
  - UTM lets you run x86_64 Linux.
  - Parallels will only run ARM Linux.

See: https://mac.getutm.app

Instructions before class

- My e-mail asked you to download:
  - VirtualBox installer (.exe or .dmg)
  - Fedora Workstation 37 (.iso)
  - Ubuntu Server 22.04 LTS (.iso)

- Apple ARM users need UTM, instead of VBox.
  - And ARM64 versions of Fedora and Ubuntu.

If you didn't get them

- In our “Files” on Teams / Office365,
  - VirtualBox is under “Virtualization”.

- Do not download the ISOs at school.
  - Ask me for a USB stick with ISOs.

Guided exercise: installation

Many ways to run Linux

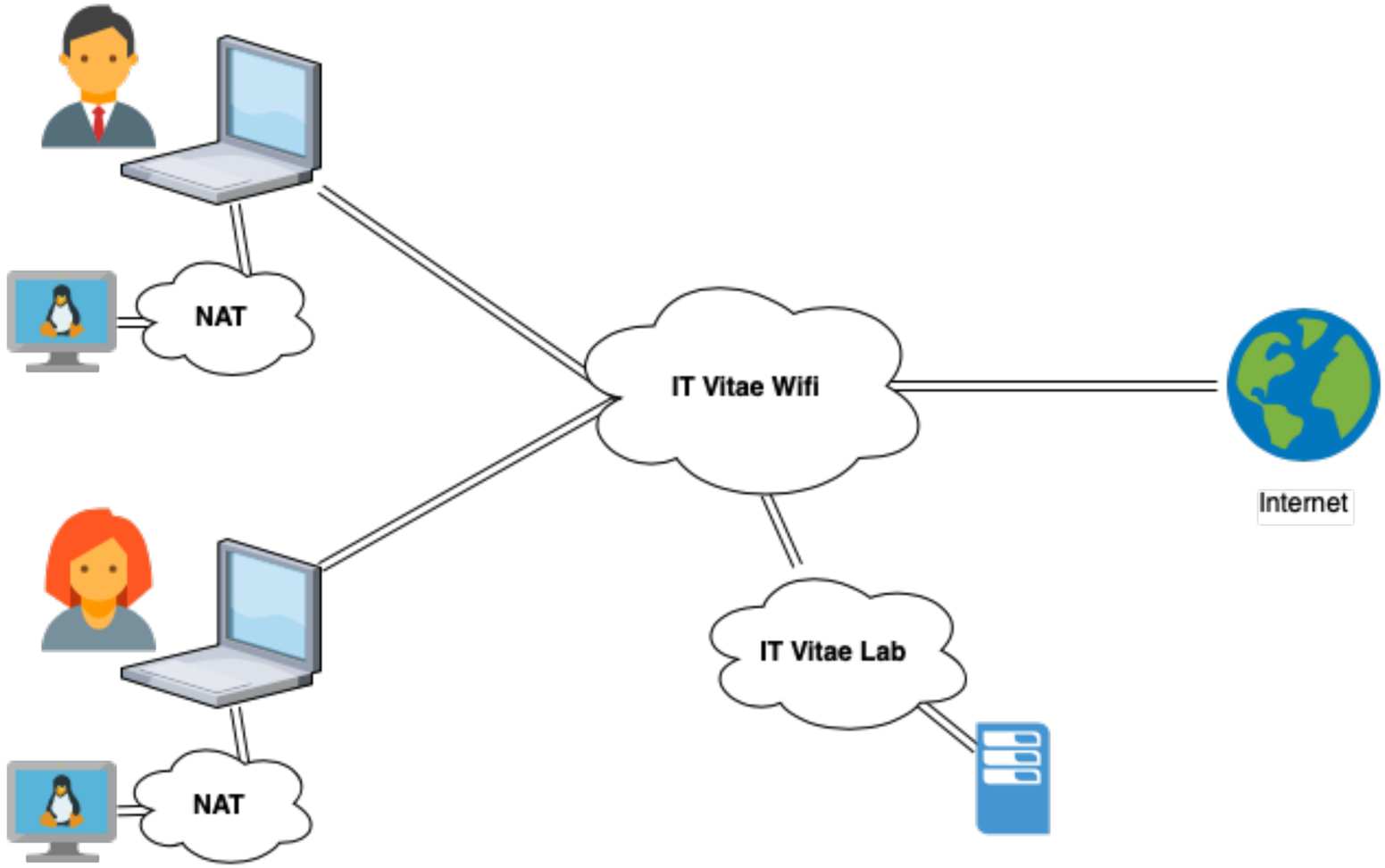
- You can run Linux "bare metal" on your computer.
- Windows offers WSL2, a "Linux inside Windows".
- VirtualBox, VMWare *et al* run "virtual machines".
- Containers let us run mini virtual environments.

What will we do?

- Two "virtual machines" with Fedora and Ubuntu,
- Running in VirtualBox on our PC,
- Connected to a "NAT" network,
  - Which provides network/Internet access.

- Want RedHat Enterprise too? Check the homework!

What will we make?



Objectives

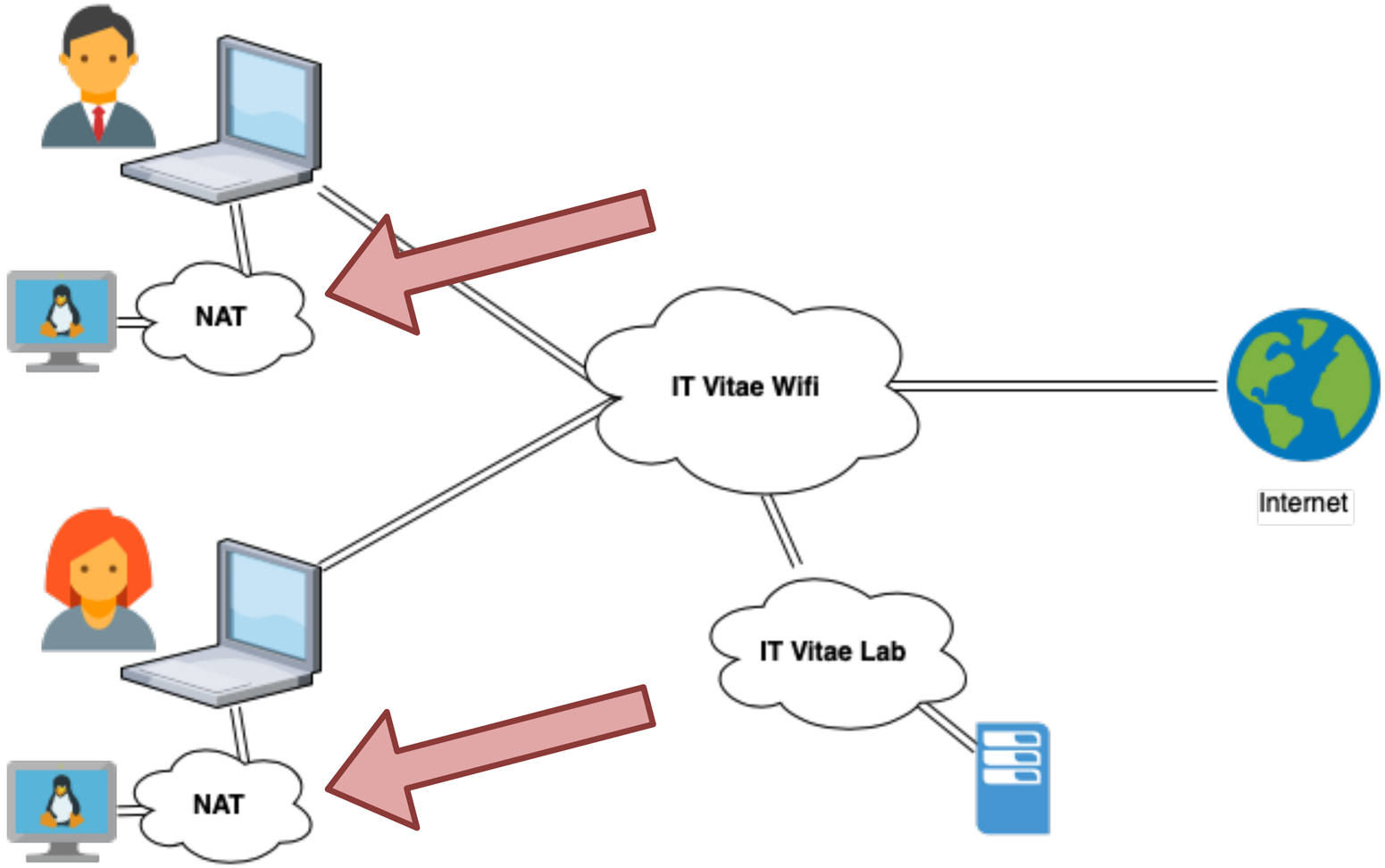
- Install VirtualBox
- Create a VM
- Install Fedora Workstation

Installing VirtualBox

- Windows? Just follow the wizard.
  - MacOS? Ditto!
  - Linux? Download the RPM or DEB and install.

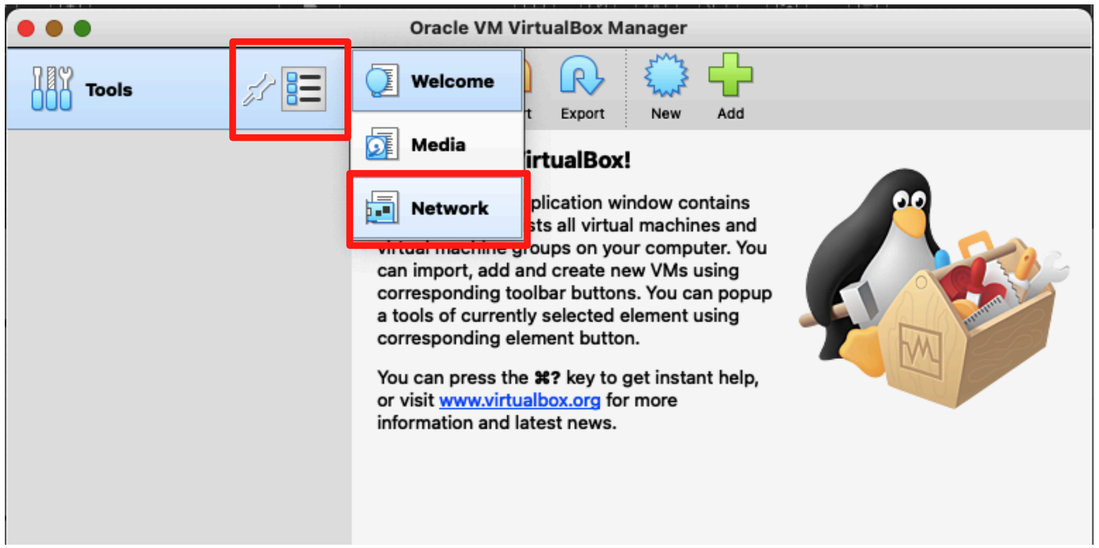
- On MacOS, you need to allow VBox kernel modules.
  - System Preferences -> Gatekeeper -> Allow

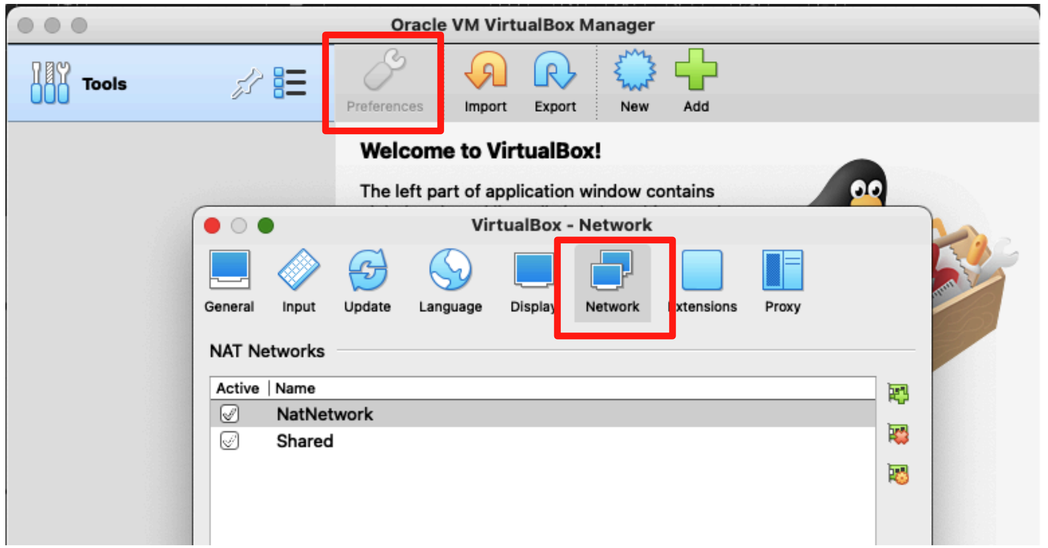
Create a NAT network



Create a NAT network

- In the VirtualBox preferences / settings:





Create a NAT network

- In the VirtualBox preferences / settings:
  - Find the “Network” settings tab.
  - Create a new NAT network “*NATnetwork*”.

Creating our VM

- Type: Linux, Fedora 35, 64-bit
- 4096 MB RAM
- Create a virtual hard disk
  - “Dynamically allocated”, 60 GB, VDI type
- Network: connect to NAT Network “*NATNetwork*”
- Connect the Fedora ISO / DVD

Install Fedora

- For now, we'll use the default disk layout.
- After the reboot, setup your user account.

You try!

- Can you double-check:
  - Where does VirtualBox store the disk image?
  - What size is the “disk” set to?
  - What size is the image file really?

Guided exercise: meet Linux

Go on! Login :)

- You have setup a user account.
- Feel free to login on your VM.

Desktop Environments

- Fedora Desktop defaults to “Gnome”.
- Again that cliché: if you don’t like it, build another!
  - Gnome, Mate, KDE, XFCE and more.
  - Combine a working environment, with tools.

You try!

- In Gnome, can you start:
  - Settings?
    - (and then adjust your screen resolution?)
  - Firefox or Chrome?
  - File browser?
  - Terminal?

Graphical or headless

- Headless is slang for “without a screen”.
  - Most servers will run “headless”.
  - Workstations usually have graphics.

A time before graphics

/dev/tty*

/dev/ttyS*

/dev/pty* and /dev/pts*

Try: <ctrl><alt><F3>

Or: <ctrl><F3> on Linux

Image: via Andrés Aravena

Local terminals to the rescue

- When your graphics are hosed,
- And your networking is dead,
- Connect to the VM console and try <ctrl><alt><F3>.
  - … or one of the other tty.

Different terminal types

- tty* are “local” virtual terminals.
- ttyS* are hardware, serial terminals (also “cua*”)
- pty* or pts* are emulated (pseudo) terminals.
  - Used when a terminal needs to be “faked” for IO.
  - Like remote logins or graphical terminal apps.

A word about prompts…

- The command prompt is configurable.
- By default:
  - “root” user has #
  - Everyone else has $ or %
- e.g.:

```
$ echo “Hello world!”
```

You try!

- Login to the graphical desktop.
- Switch to “tty2”.
- Login over there as well.
- Run:

```
$ whoami
$ who
```

Shutting down or rebooting

- In Gnome, use the top-right menu widget.
- Or from a terminal run:

```
$ sudo reboot
$ sudo shutdown -h now
```

Your first commands

echo	Output a string
who	Who (is logged in)
whoami	Who am I?
reboot	Reboot the system
shutdown	Shutdown or reboot the system

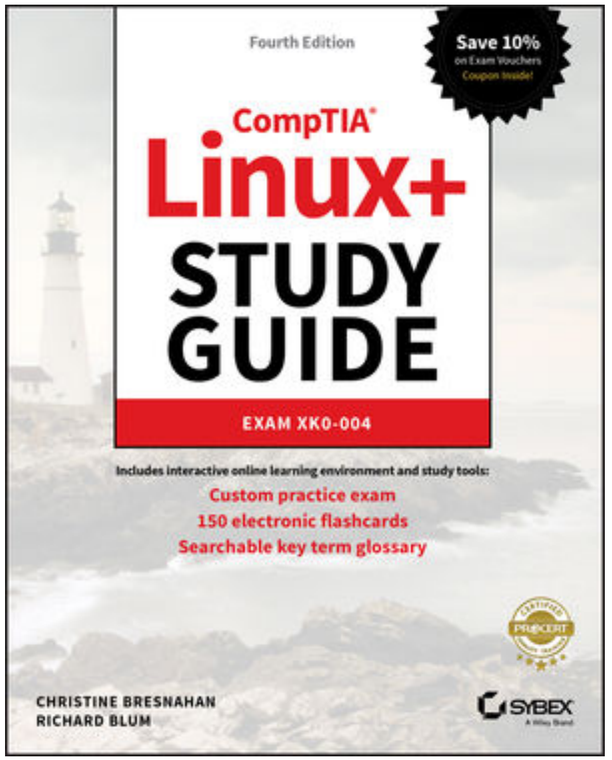
Closing

Next week

- Virtualization and networking
- Users and groups

Homework

- Reading:
  - Chapters 1 and 2
  - Chapter 10
  - Chapter 16, "Using SSH"



Homework

- Try installing the Ubuntu server VM.
  - Make sure it's in the same "*NATnetwork*".
  - It needs less RAM. You can give it 1GB.

Homework

- Q1: How do the following Linux “distributions” relate to each other?
  - Red Hat Enterprise Linux
  - Fedora Linux
  - CentOS
  - Oracle Linux

Homework

- Q2: How do the following Linux “distributions” relate to each other?
  - Debian
  - Ubuntu
  - Kali Linux

Homework

- Q3: Is “Linux” a “Unix”? Why?
- Q4: Is “MacOS” a “Linux”? Or a “Unix”?

Optional homework

- If you want to try the official RHEL, you can!
  - Red Hat offer a free “developer” license.
  - Register at https://developers.redhat.com/register

- The Red Hat Developers site also has free books!
  - And they’re *good books*!

Reference materials

Resources

- PluralSight XK0-005 learning path
- Open source: Gratis vs Libre
- History of Unix (Wikipedia)
- Linux distributions (Wikipedia)
- Linux rocks!

Resources

- Andrés Aravena - First steps on UNIX