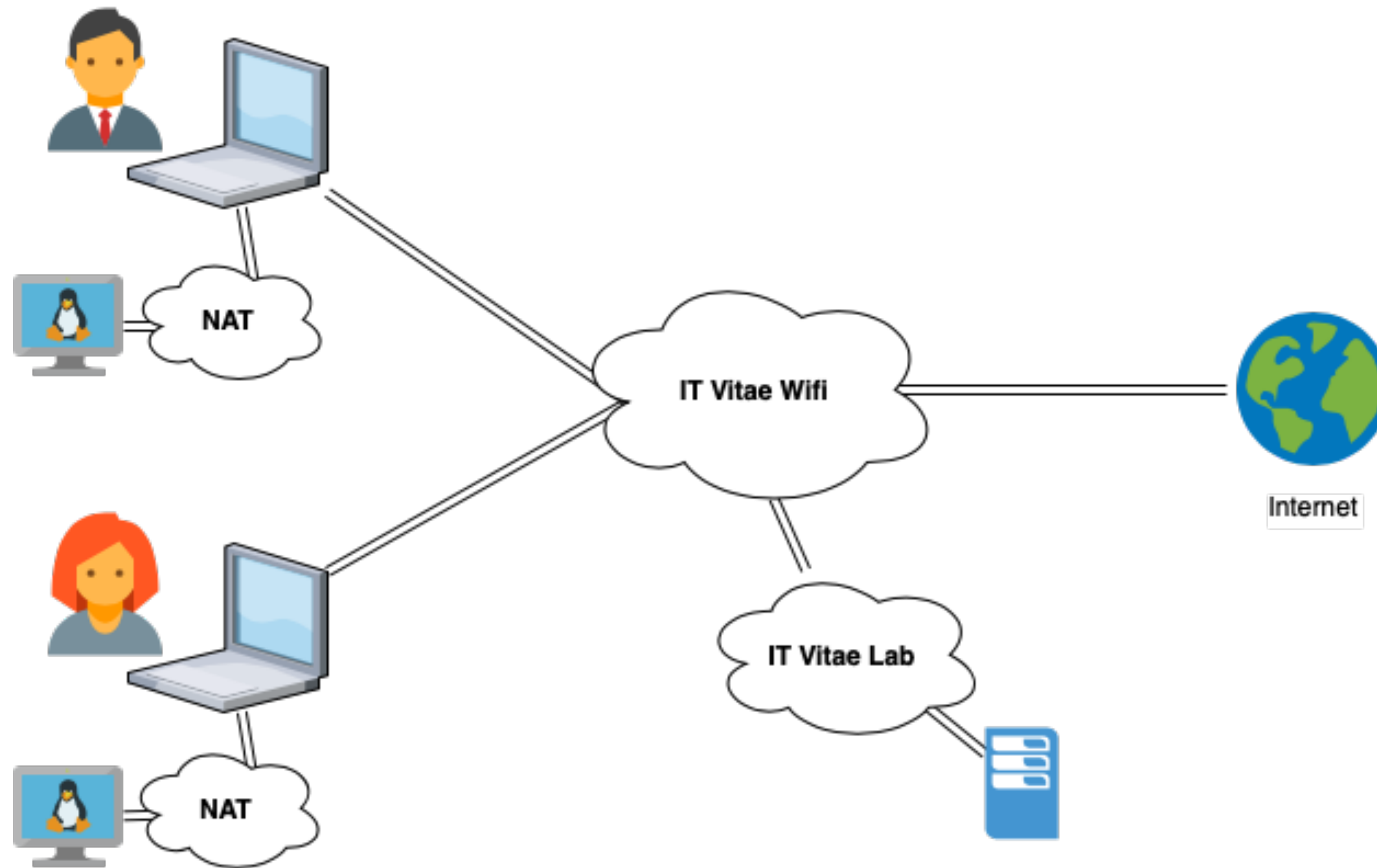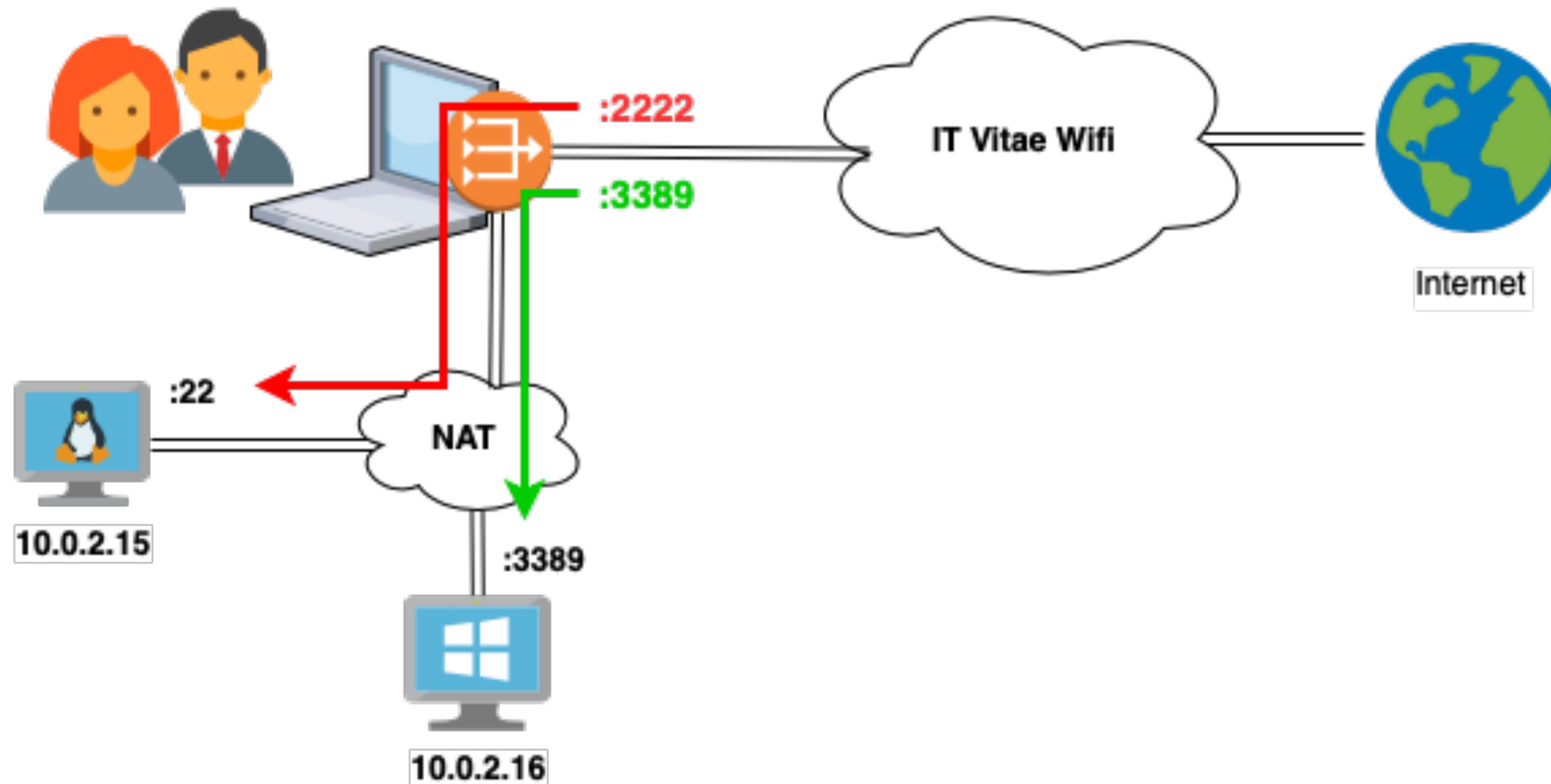# Linux, day 2

Networking and virtualization

22

What did we make?

- A "virtual machine" with Fedora,
    - And another one with Ubuntu Server,
- Running in VirtualBox on our PC,
- Connected to a "NAT" network,
    - Which provides network/Internet access.
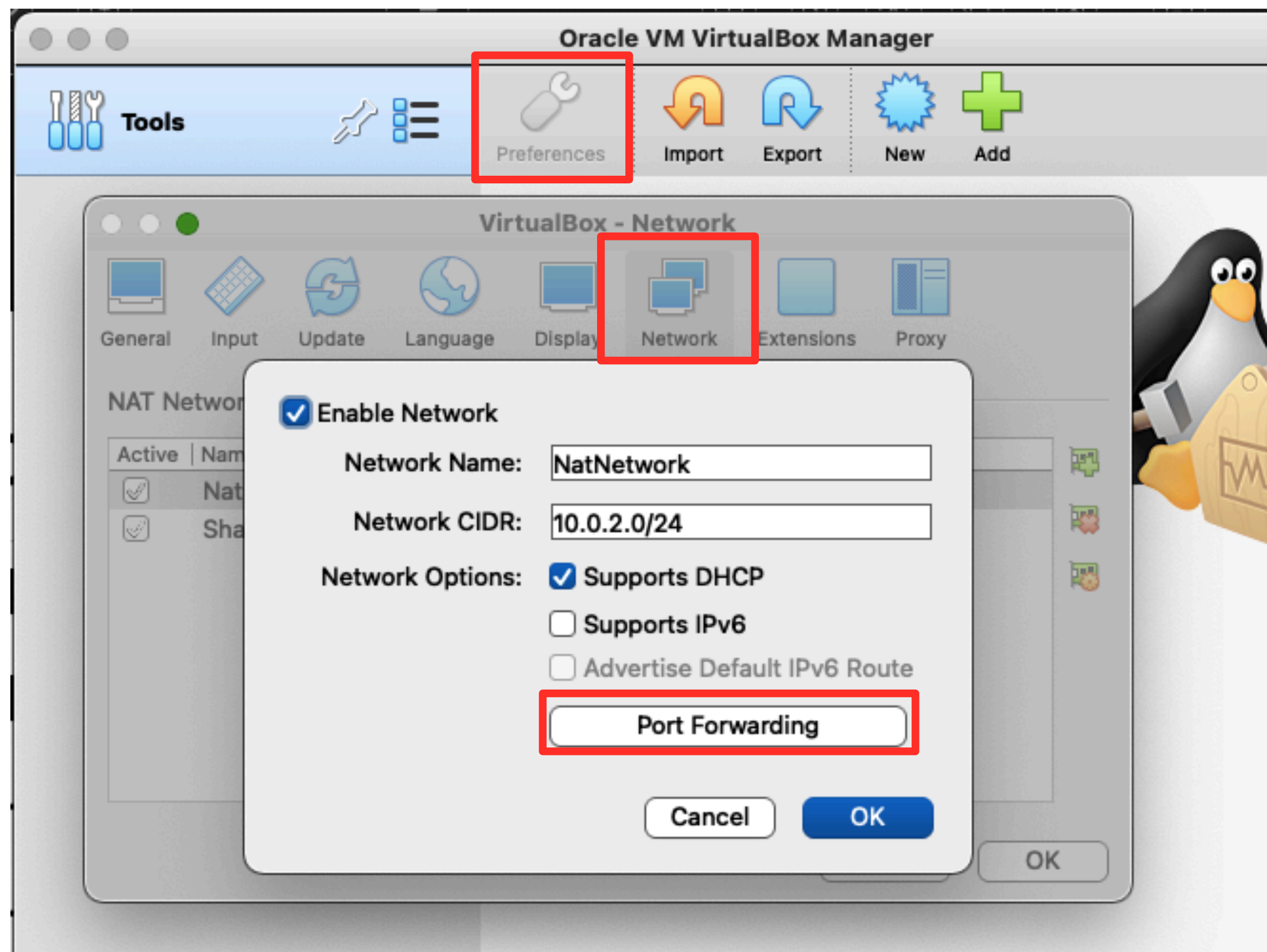
What did we make?

Port forwarding into NAT Net

You try!

- First, find your VM's IP address (10.0.2.4?)
- In the VirtualBox configuration / settings:
  - Find the shared "*NATnetwork*".
  - Add a port forward on 127.0.0.1:2222.
  - To port :22 of your VM (e.g. 10.0.2.4).

You try!

What did we just do?

- On the host OS we made a "listener" on 2222.

- This "listener" forwards all traffic,

  – Coming to port 2222 on the host OS...

  – To port 22 on the guest OS (VM).

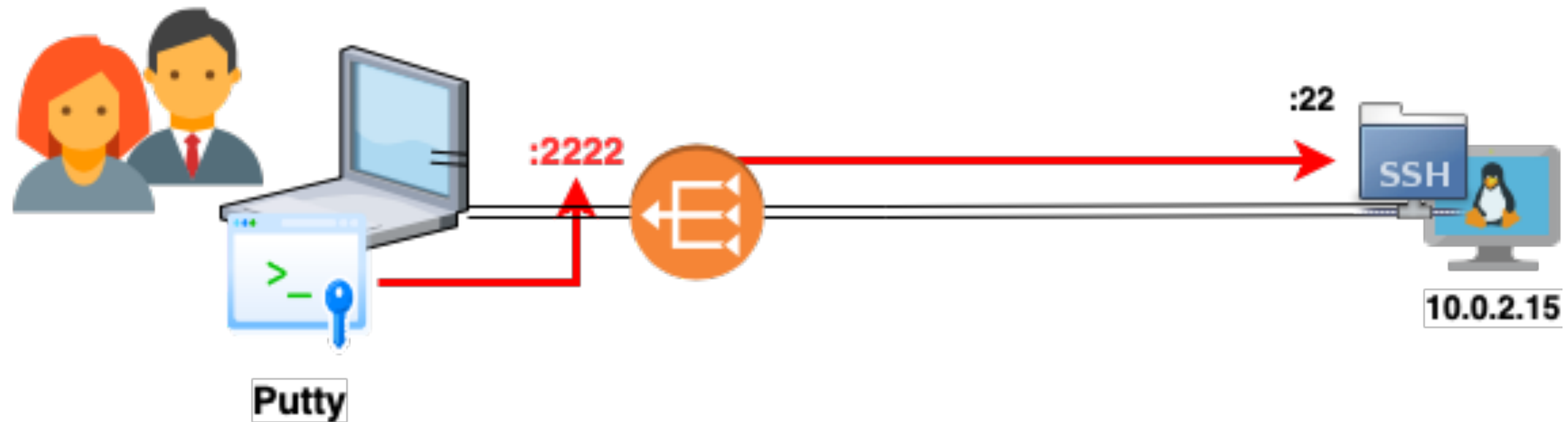- So, let's make sure something's there!

You try!

- On your guest VM, start the SSH daemon.

```
$ sudo systemctl enable sshd
$ sudo systemctl start sshd
```

- On Ubuntu it's not "sshd" but "ssh".

Using the port forward

You try!

- On your host OS, connect to 127.0.0.1:2222.
    - Windows: use *Putty.exe*, or Powershell.
    - MacOS and Linux:

```
$ ssh -p 2222 tess@127.0.0.1
```

See: Download Putty

What's the point?

- SSH allows you to work on Linux remotely.

- No graphics, but full access on the command line.

- This is how we manage our servers in real life!

Making connecting easier

- Nobody likes remembering IP addresses!
  - On your two VMs (both) run:

```
$ sudo nano /etc/hosts
```

  - This asks for YOUR password.

Making connecting easier

- Add two lines, **<u>adjusted</u>** for your IP addresses.

```
10.0.2.5 ubuntu
10.0.2.4 fedora
```

- Save and quit with <ctrl><x>.

Making connecting easier

- On the guest VMs, you can now run:

```
$ ssh tess@ubuntu

$ ssh tess@fedora
```

Making Host OS to VM connections easier

44

Oofff!

- So far, we've done this to login:

```
$ ssh -p 2222 tess@localhost
```

- That's a lot to type and to remember!
  - It's easy to mix up the ports!

/etc/hosts cannot help us

- If localhost:2222 is Fedora,
  - And if localhost:2223 is Ubuntu,
  - Then it's not the hostname that's the problem!

- We need to find a way to make aliases.

Which config file?

- All of this applies to your <u>host OS!</u>

Windows - Putty	Just use the graphical interface. 😉
Windows - Powershell	notepad $HOME\.ssh\config # Careful! No .txt extension!
Linux	nano ~/.ssh/config
MacOS	vi ~/.ssh/config

What to add?

```
Host fedoravm
   Port 2222
   Hostname localhost

Host ubuntuvm
   Port 2223
   Hostname localhost
```

Now, you can run:

```
$ ssh tess@fedoravm

$ ssh tess@ubuntuvm
```

From the host OS as well! 🥳

Transferring files

- MacOS and Linux have the tools available.

- Windows needs WinSCP.

  – Or Powershell.

- All OSes have graphical tools as well.

See: Download WinSCP

You try!

- Sending a file from Fedora, to Ubuntu

```
$ echo "Hallo" > ~/testfile
$ scp ~/testfile tess@ubuntu:/tmp


$ rm ~/testfile
```

- Note: *scp* uses -P, not -p, to indicate ports.

You try!

- SFTP is interactive. Do this from Fedora, to Ubuntu.

```
$ sftp tess@ubuntu
sftp> cd /tmp
sftp> lcd ~
sftp> lpwd
sftp> get testfile
sftp> bye
```
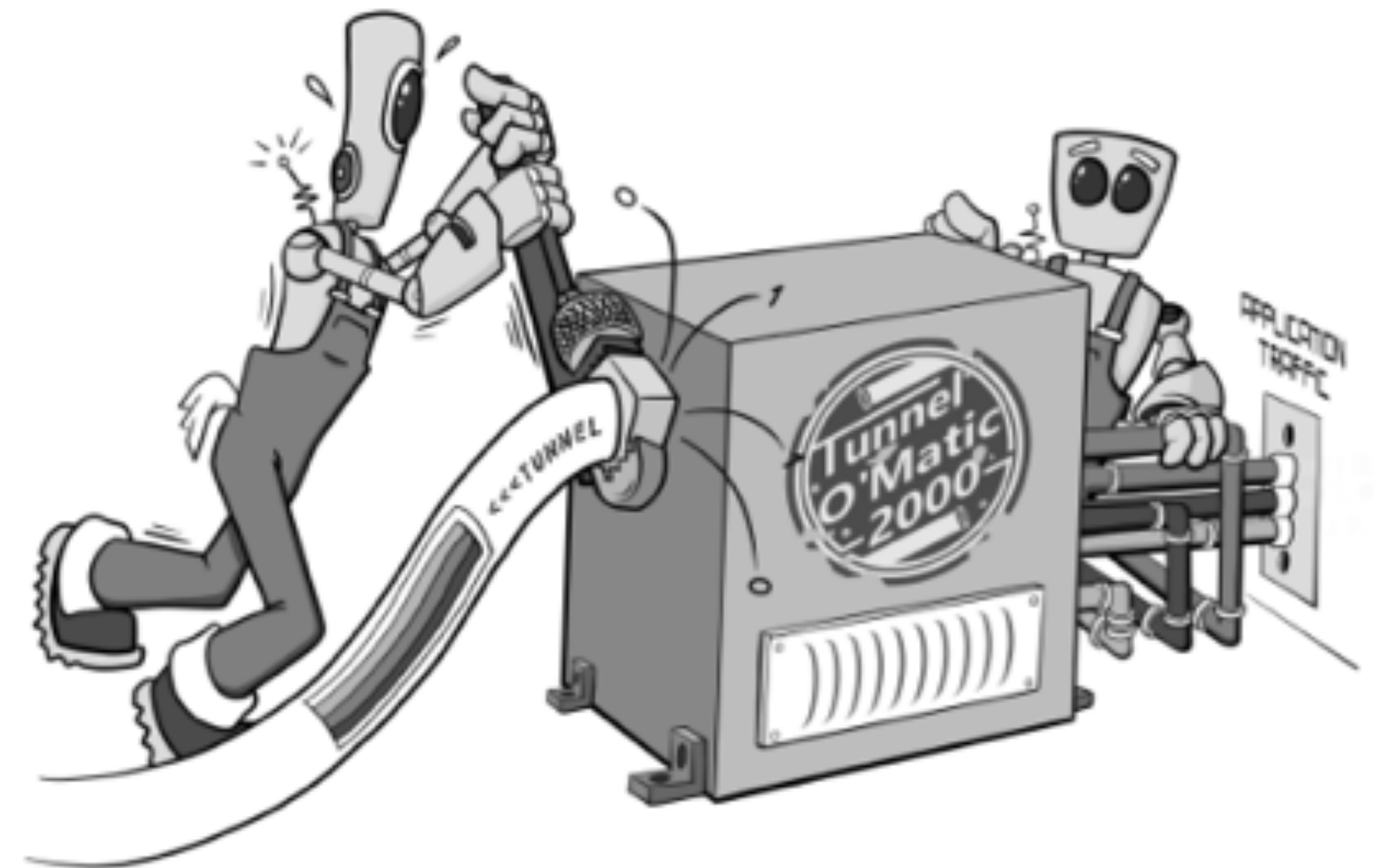
You try!

- You can run one-off commands.

```
$ ssh tess@ubuntu "ls -al /tmp"
```

- Ansible is built on this!
  - Configuration management for 1-1000+ hosts!

The SSH bible: CPH

- Brennon Thomas' awesome book.

- Now available for free!

- Explains all cool SSH options.

- See: [Cyber Plumber's Handbook](#)

LAB: Users and groups

95

Command hints

useradd	Create a new user
usermod	Modify a user
groupadd	Create a new group
id	Show identity of a user
man	MANual pages

Assignment

- Create two new groups:
  - "staff" and "dummies"
- Create another two new users:
  - "opsuser" and "dummy2"
- Add yourself and "opsuser" to "staff".
- Add "dummy" and "dummy2" to "dummies"

Assignment (spoilers)

```
$ sudo useradd -m opsuser
$ sudo useradd -m dummy2
$ sudo groupadd staff
$ sudo groupadd dummies
$ sudo usermod -a -G staff opsuser
$ sudo usermod -a -G staff $USER
$ sudo usermod -a -G dummies dummy
$ sudo usermod -a -G dummies dummy2
```

Closing

Homework

- Reading:
  - Chapter 4, page 111-116.
  - Chapter 11, page 337-341.
  - Chapter 12, page 366-368.
  - Chapter 15, page 439-448.
  - Chapter 25, page 699-705.

Reference materials

Resources

- [VirtualBox networking modes]

- [Stop making shell aliases for SSH!]

- [Download Putty]

- [Download WinSCP]

- [SSH keys for dummies]

- [Cyber Plumber's Handbook]