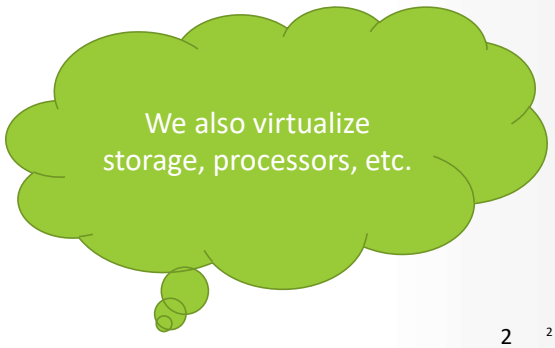
CS221
C and Systems Programming

Virtualization

VLAN = Virtual Local Area Network

- Get access to computers and services as if you are on USF campus, even if you are halfway around the world

Virtual Computer…



Virtual Computer…

…more than one **Computer Environment** running on the same computer hardware.

- This is often done for "independence" reasons, e.g when AWS sells different companies compute power on the same physical server
- Independent Operating Systems, installed SW, etc
- Independent networking, memory, CPU power, etc

Also can be done to offer different environments on the same physical server

- I have Ubuntu and Windows running on my laptop

Saves money

- 16 "virtual machines" on 1 big server costs << than 16 smaller computers

AWS = Amazon Web Services

vlab: a new Development Environment

The **vlab** computers are virtual computers operated by USF's CS department

- All have same operating system, software tools, capabilities, etc.
- They have some capabilities that we will need for several remaining labs

How do we access them?

- Through USF's GlobalProtect VLAN

Like CS dept's own public cloud

Setup step #1 – Install the VLAN

If you do not have GlobalProtect installed:

https://vpnclient.usfca.edu

…and follow instructions

Register your computer with USF ITS:

https://mylife.usfca.edu

(Need your WiFi MAC address: get from "Settings" on your computer)

https://usf.service-now.com/now/nav/ui/classic/params/target/kb_view.do%3Fsys_kb_id%3D5f51b5fd93cd42101dcb3c327cba1076

Step #2 – Connect to the VLAN

Run the GlobalProtect software.

If you are a USF employee:

- Must have "Duo Mobile" authentication app on your cellphone
- Must have "USF Account" on Duo Mobile. Visit ITS in Koret Library or in McLaren 101 if problems
- Connect to "svpn.usfca.edu"

If not:

- Connect to "vpn1.usfca.edu"

Step #3 – ssh

ssh (secure shell) is a program that lets us "log into" a different computer from our own

It is secure, so we need to set up security first. Follow these steps!

- In a BASH terminal window on your computer, run
  ssh-keygen -t rsa -b 4096
  - Store key in default location. Do NOT enter a passphrase
- On campus, copy key to **stargate** computer:
  scp ~/.ssh/id_rsa.pub YOURUSERID@stargate.cs.usfca.edu:/home/YOURUSERID/id_rsa.pub
- Default password is full student ID number

Put in your actual USF userid, not "YOURUSERID"

If no student account on stargate, email cshelp@usfca.edu.

Step #4 – more ssh setup

- Log into stargate using your USF password:
  ssh YOURUSERID@stargate.cs.usfca.edu
- On **stargate**, run:
  mkdir .ssh
  mv id_rsa.pub .ssh/authorized_keys
  ssh-keygen –t rsa –b 4096
  - Store key in default location. No passphrase
- Edit the **authorized_keys** file on **stargate**, adding the new **id_rsa.pub** key to the end of the file, and save the file.
  - Use **nano** text editor if you like

End of setup!

IF YOU ALREADY HAVE AN "authorized_keys" file, just add "id_rsa.pub" contents to the end

vlab usage

Now from anywhere on campus, you can log into **stargate** using **ssh**

The CS department doesn't want us doing work on **stargate**. Run:
rusers

This gives a list of all the **vlab** machines and who is logged into them. Just pick an empty **vlab** machine and run:
ssh vlab02 (or vlab00 or vlab07…)

Got it?

stargate and vlab machines all share the same disk drive, so have same files.

Can set up VLAN ("virtual local area network") and then can access stargate from home.

vlab usage

What tools do we have on the vlabs?

- **Bash** – set up your environment as you like
- **gcc**
- **git**
- Text editors such as **vim** and **nano**
- A capable Linux operating system
- Some other features that we will need in upcoming labs

We do not have **Eclipse, Sublime, Notepad++, etc**

We can copy files to/from stargate using "scp"