Virtualization

What is it?

- A virtual machine (VM) provides a layer, emulating one or more operating systems (guests) on top of a single operating system (host)
- Guest thinks it is running on top of hardware
- Host thinks guests are just regular applications
- Examples
  - VMware
  - VirtualBox
  - Virtual PC
  - Xen

Advantages

- Distributing a preconfigured OS
- Can take snapshots of current state
  - A rollback if there's a problem
- Easily portable
  - VM abstracts hardware and host OS details
  - Guest image is a handful of files and can be moved
- Provides a sandbox
  - Problems in guest do not affect host
- Can access remotely over network

Why Should I Care?

- Project 2 is required to be implemented on lab machines
  - You will give your demo on the assigned machine
- Optionally, you can also implement in a VM
  - Make sure to give yourself time to port to lab machine!
- This allows you to quickly recover from kernel errors by recovering a snapshot
  - Seconds for a snapshot recovery
  - Minutes for system reboot
- Also allows for more portability
  - Can work when the lab is unavailable

VM Settings

- Use VirtualBox
  - You can use others but this is the only one I’m familiar with
- CPU
  - Set the execution cap to 80% or lower
- Memory
  - Leave at least 1GB for host
- Disk
  - Make a virtual hard drive
  - Point the CD drive to the install image
- Uses one of the following to transfer files
  - Network (e.g. email, ftp)
  - Shared files
    - Requires guest additions and mounting a virtual drive
  - USB
    - Requires guest additions and installing a virtualbox extension

Using VMs

- First, create settings within the VM
- Then, launch the newly created guest
  - Install image as you would a typical OS
- If you need to switch back to host, you'll need to type a special command to leave the guest
  - In VirtualBox the host key defaults to right ctrl
- Setup a means of outside communication using one or more of
  - External devices (usb)
  - Network (ssh)
  - Shared files (host)

SSH Setup

- This will allow you to remote into your VM from the host
  - Allows you to work on host machine which is likely already set up how you like it
  - Also needed if you want to work remotely from the machine (ssh into host and then ssh into guest)
    - Should be setup but talk with the systems group if you want to do this on the lab machines

- Guest
  - Set VM network port forwarding rule
    - Name=SSH
    - Host port = 2222
    - Guest port = 22
  - Issue commands (once)
    - sudo apt-get install openssh-server
    - sudo restart ssh
- Host
  - Issue command to connect
    - ssh -p 2222 username@127.0.0.1