CS454/554 – FALL 2021 - ASSIGNMENT #1 20 POINTS

Name: _____ Due: September 06, 2021

PROJECT GOAL

To create two VMs in VirtualBox and have those VMs communicate with each other over an internal network.

Overview:

For this project, you are to work individually. All of the PCs in the PC classroom (N327) and in the PC lab (N329) should have virtual box already installed on them. If your home computer has enough memory (at least 4GB), you can also obtain virtual box from oracle and install it. However, the virtual network adaptor may not be configured as it is in the lab, so you may need to add it manually to your personal setup.

PROJECT INSTRUCTIONS

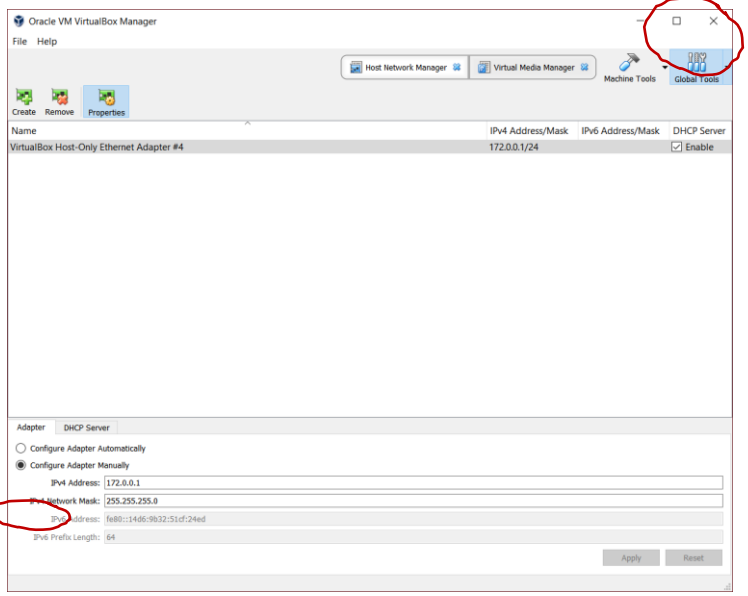
1. Using virtual box, create a new machine to run Linux. There is a copy of the Ubuntu installation disk and a set of screenshots in the folder **K:\Courses\CS454-CS554** that will guide you through the basic Ubuntu 16.04 server installation steps. Keep track of your username/password that you use to create your login for this installation.

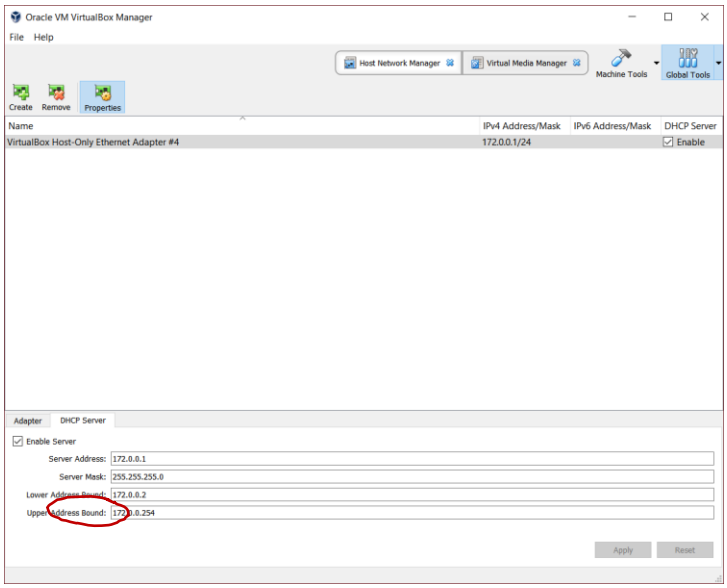
   PLEASE NOTE, THESE SCREENSHOTS are configuring a system with much larger resources than we need. You should be able to get away with 1GB for the RAM and 10GB for your disk size.

2. Create a second Linux machine and repeat the installation steps. Please use a different username for the login to this machine.

3. Next, you are going to configure your machines to use an internal network managed by VirtualBox to communicate between your machines. Shut your machines down before performing this configuration.

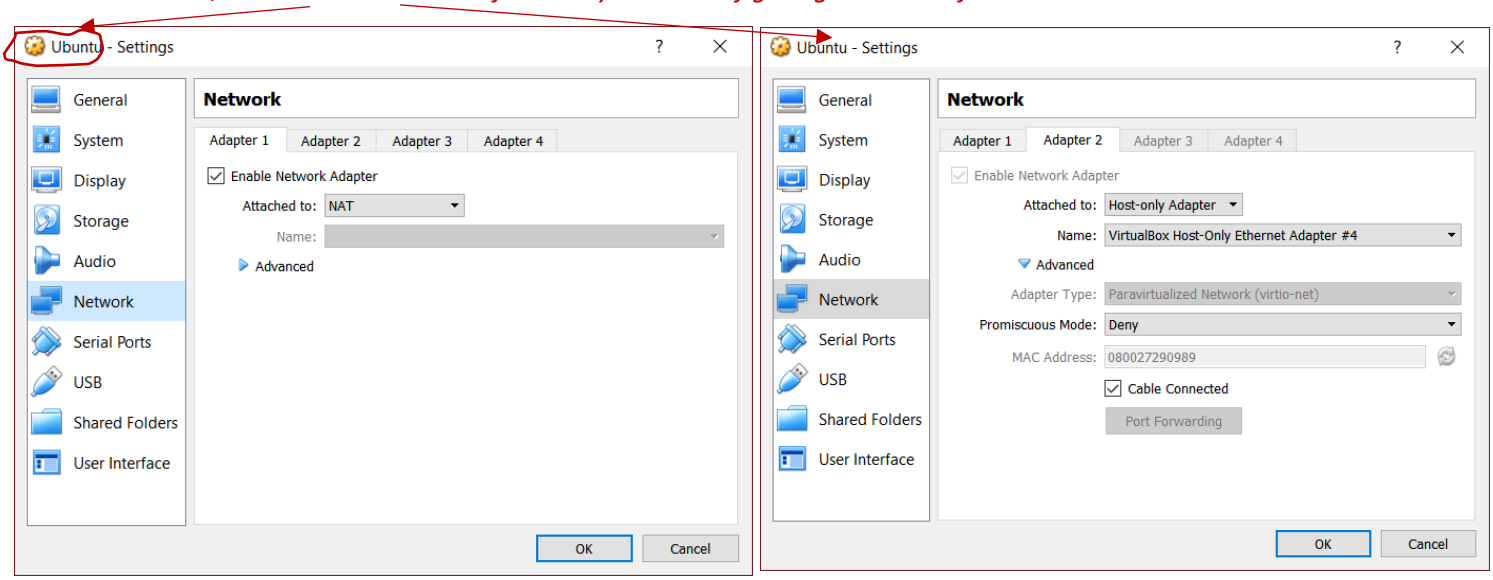
   In virtual box, you are looking for the Global Tools. These allow us to create network adaptors for our VMs to share. **In our PC labs, this is already set up for you**. Make sure you have this set up before proceeding to configure your VMs to use it.





4. Next, go to the settings for each of your VMs and set up their 1st and 2nd network adaptors. The first adaptor is used to bridge the VM to the external internet through your PC's connection to the internet. The second adaptor allows us to form a local network where each of our machines (Your PC and VM1, VM2) are connected with IP addresses specific to the virtual network, and therefore can communicate with each other via those IPs.

note, this will be the name of the vm you are configuring. Do both of them.



5. Power-up your VMs.

   Power-up and login to your machines. You will need to add two lines to the file (on each machine) stored in **/etc/network/interfaces**. You can use the simple text editor Nano to do this. To get into the editor as a privileged user

   > sudo nano /etc/network/interfaces

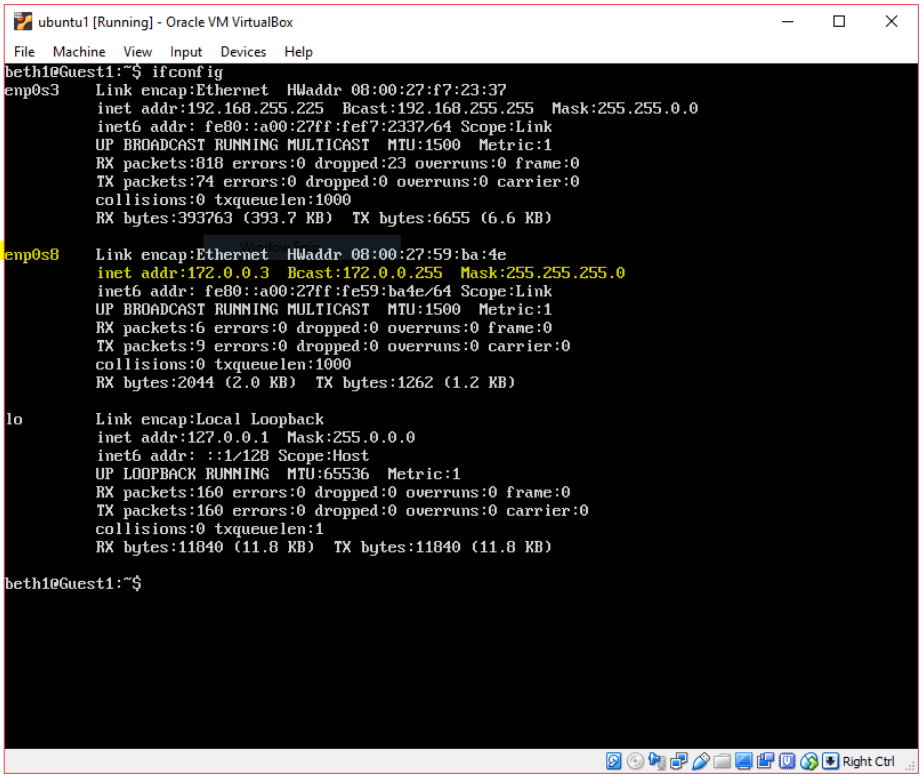
   Add these lines at the end of the file, then save the file:

   ```
   auto enp0s8
   iface enp0s8 inet dhcp
   ```

6. After editing the files, execute the command:

   ```
   sudo ifup enp0s8
   ```

7. Check that your networks are set up by executing the command ifconfig. You should see three sets of internet connection details (shown on next page). The 172.0.0.x address is the address in your virtual network. Each of these machines can communicate with each other. Also, your pc can communicate with the virtual machines via those addresses. (Use a SSH client such as putty to test this out.)



8. Research how to use the SSH command in Linux to remote login from one machine to another from a command line. Use SSH to login to machine 1 from machine 2 and vice versa.

9. Use Putty to login to one of your VMs from your PC as well.

To Turn In for this Exercise

1. Turn in a screenshot that shows all of your systems running (see example on next page. I've blocked out my command to SSH. I want you to look that up.) I want to see both VMs, I want to see that you can remote in from one VM to the other, and I want to see that you can remote in from your own PC.

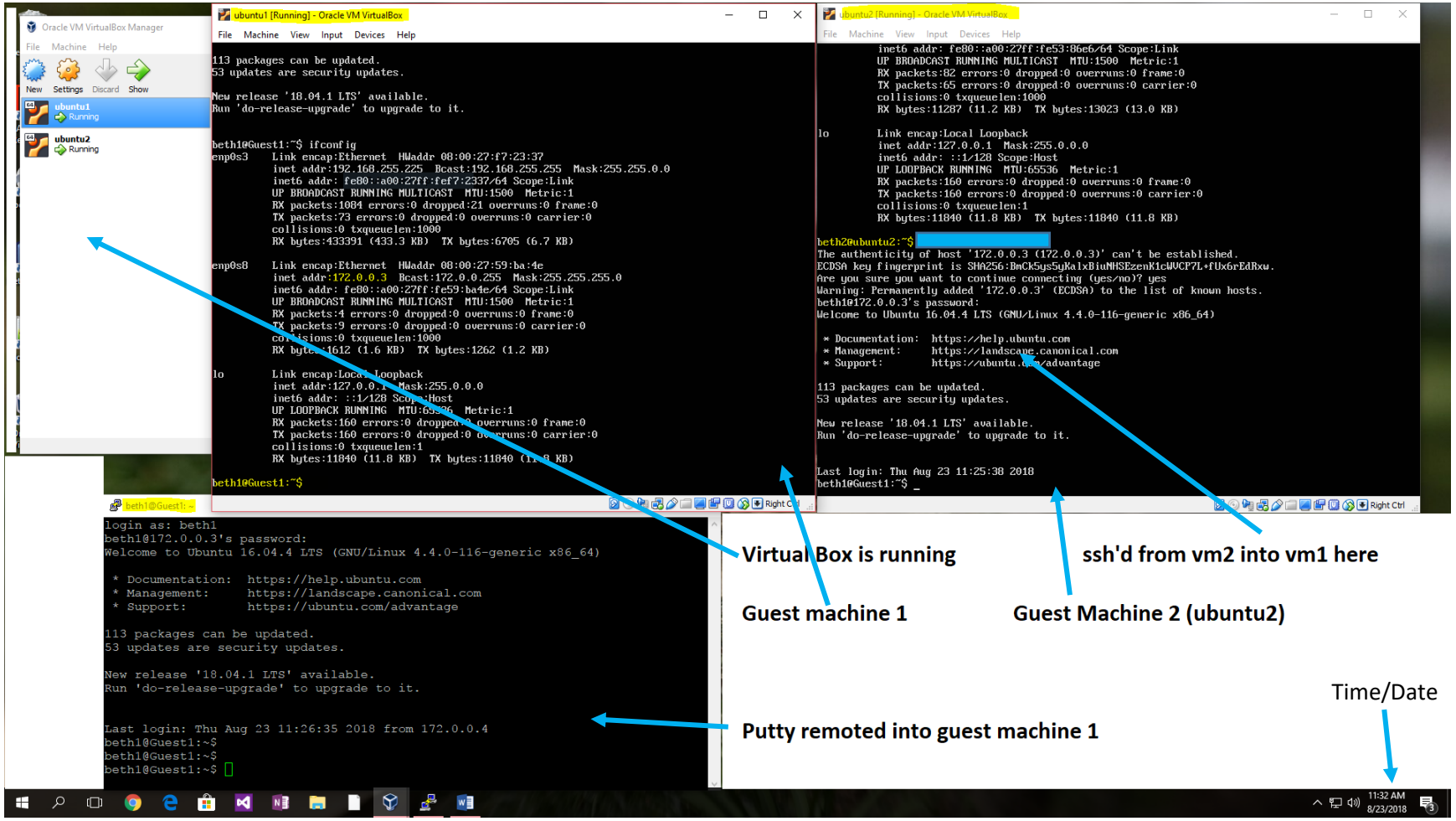
2. Turn in answers to the following questions:

    a. Find the command to show IP configuration for your personal machine. What IPv4 addresses show up in there?

    b. What does it mean for the VMs IP addresses to start with 172.x.x?

    c. How many tries did it take for you to get this working?

    d. Research "prepackaged" Virtual Box VMs that you can download and use (you don't have to download any). Tell me about one that you find useful or interesting.


Oracle VM VirtualBox Manager
File Machine Help
New Settings Discard Show
ubuntu1 Running
ubuntu2 Running
ubuntu1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
113 packages can be updated.
53 updates are security updates.
New release '18.04.1 LTS' available.
Run 'do-release-upgrade' to upgrade to it.
beth1@Guest1:~$ ifconfig
enp0s3 Link encap:Ethernet HWaddr 08:00:27:f7:23:37
inet addr:192.168.255.225 Bcast:192.168.255.255 Mask:255.255.0.0
inet6 addr: fe80::a00:27ff:fef7:2337/64 Scope:Link
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:1084 errors:0 dropped:21 overruns:0 frame:0
TX packets:73 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:433391 (433.3 KB) TX bytes:6705 (6.7 KB)
enp0s8 Link encap:Ethernet HWaddr 08:00:27:59:ba:4e
inet addr:172.0.0.3 Bcast:172.0.0.255 Mask:255.255.255.0
inet6 addr: fe80::a00:27ff:fe59:ba4e/64 Scope:Link
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:4 errors:0 dropped:0 overruns:0 frame:0
TX packets:9 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:1612 (1.6 KB) TX bytes:1262 (1.2 KB)
lo Link encap:Local Loopback
inet addr:127.0.0.1 Mask:255.0.0.0
inet6 addr: ::1/128 Scope:Host
UP LOOPBACK RUNNING MTU:65536 Metric:1
RX packets:160 errors:0 dropped:0 overruns:0 frame:0
TX packets:160 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1
RX bytes:11840 (11.8 KB) TX bytes:11840 (11.8 KB)
beth1@Guest1:~$
ubuntu2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
inet6 addr: fe80::a00:27ff:fe53:86e6/64 Scope:Link
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:82 errors:0 dropped:0 overruns:0 frame:0
TX packets:65 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:11287 (11.2 KB) TX bytes:13023 (13.0 KB)
lo Link encap:Local Loopback
inet addr:127.0.0.1 Mask:255.0.0.0
inet6 addr: ::1/128 Scope:Host
UP LOOPBACK RUNNING MTU:65536 Metric:1
RX packets:160 errors:0 dropped:0 overruns:0 frame:0
TX packets:160 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1
RX bytes:11840 (11.8 KB) TX bytes:11840 (11.8 KB)
beth2@ubuntu2:~$
The authenticity of host '172.0.0.3 (172.0.0.3)' can't be established.
ECDSA key fingerprint is SHA256:BmCk5ys5yKalxBiuMHSEzenK1cWUCP7L+fUx6rEdRxw.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '172.0.0.3' (ECDSA) to the list of known hosts.
beth1@172.0.0.3's password:
Welcome to Ubuntu 16.04.4 LTS (GNU/Linux 4.4.0-116-generic x86_64)
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/advantage
113 packages can be updated.
53 updates are security updates.
New release '18.04.1 LTS' available.
Run 'do-release-upgrade' to upgrade to it.
Last login: Thu Aug 23 11:25:38 2018
beth1@Guest1:~$
beth1@Guest1: ~
login as: beth1
beth1@172.0.0.3's password:
Welcome to Ubuntu 16.04.4 LTS (GNU/Linux 4.4.0-116-generic x86_64)
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/advantage
113 packages can be updated.
53 updates are security updates.
New release '18.04.1 LTS' available.
Run 'do-release-upgrade' to upgrade to it.
Last login: Thu Aug 23 11:26:35 2018 from 172.0.0.4
beth1@Guest1:~$
beth1@Guest1:~$
beth1@Guest1:~$
Virtual Box is running
ssh'd from vm2 into vm1 here
Guest machine 1
Guest Machine 2 (ubuntu2)
Time/Date
Putty remoted into guest machine 1
11:32 AM
8/23/2018