Computer Comm & Networks - ITCS 6166/ITCS 8166

Assignment - 1 **Due on: 2/6/2019 11:59pm**

Goal: This exercise will help you to install Mininet and get you familiar with Mininet VM. By completing this assignment, you should have your computer setup ready for upcoming assignments.

Discussion Topic: Mininet Installation – Post any questions and collaborate with your peers.

Mininet: It is a simulation environment that creates a realistic virtual network, running real kernel, switch and application code, on a single machine (VM, cloud or NATIVE), in seconds, with a single command:

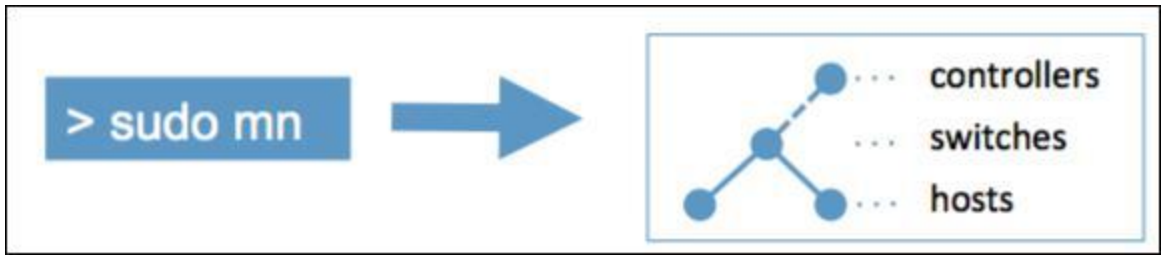


Figure 1: Mininet Virtual Environment

- **Download Mininet VM**

We recommend installing the following Mininet VM image:
(This is a 64-bit image, make sure you have enabled VT-x or any other virtualization feature in your BIOS)

https://drive.google.com/open?id=1ysti6Pz3nGGRLCeO5MeS959ERBGUq4ht

You will be prompted to verify by signing into your UNCC email to download the VM.

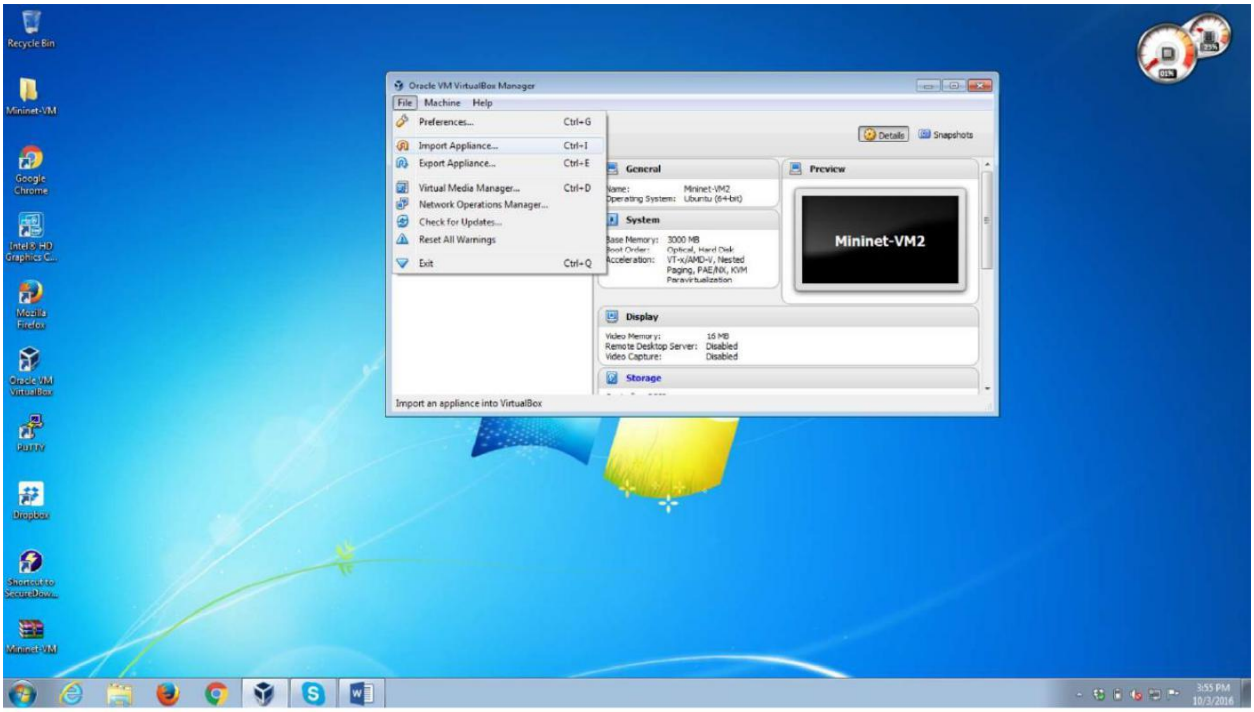
- **Download Virtualization System**

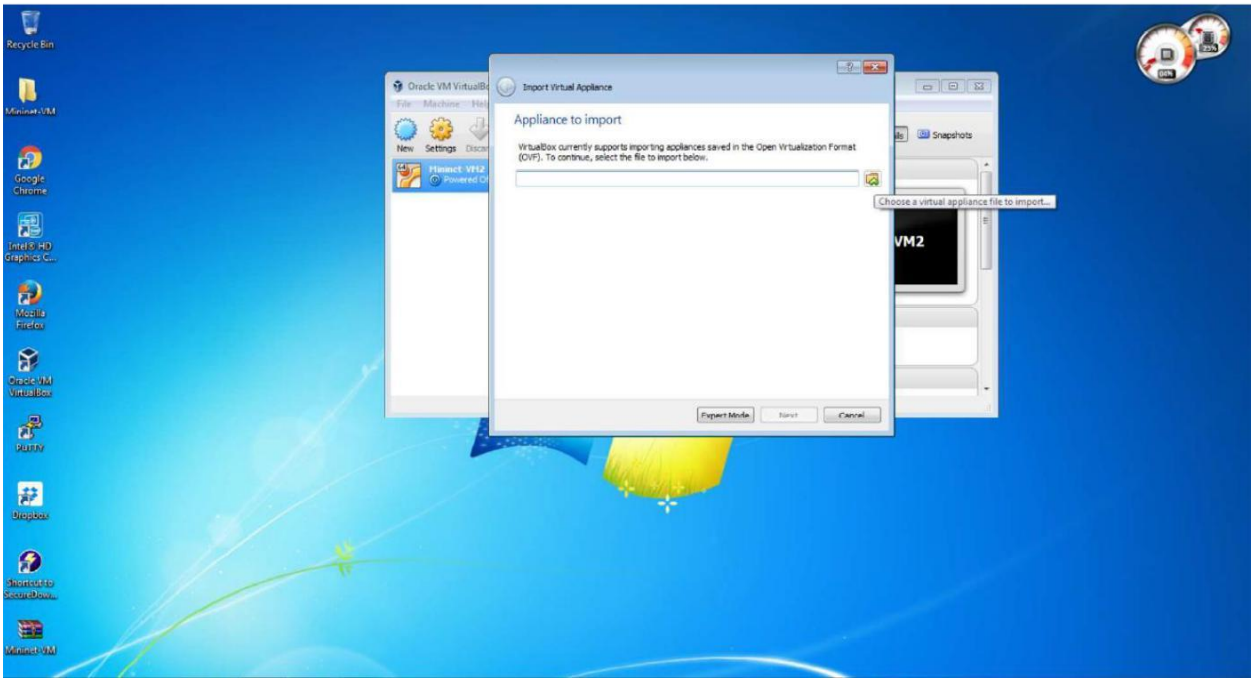
You can use any virtualization system of your choice, but we recommend installing VirtualBox. It's free and runs on Windows, Linux and OS X.
VirtualBox : https://www.virtualbox.org/wiki/Downloads
For other virtualizations systems, visit here.

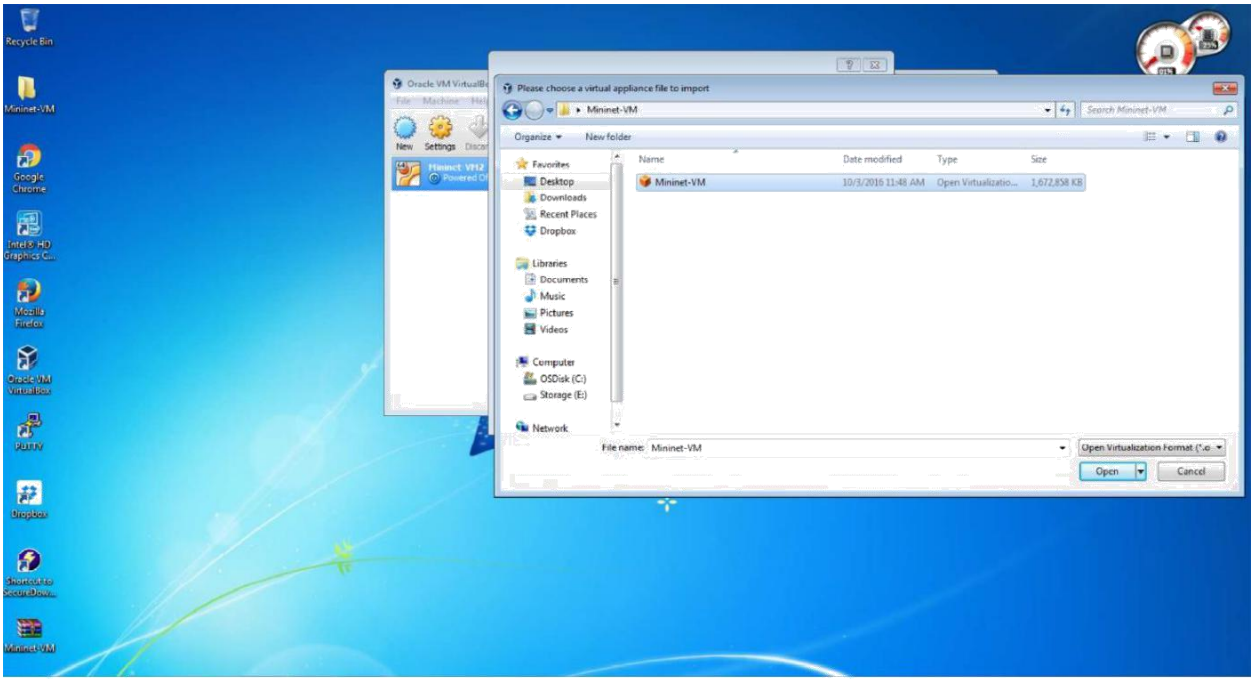
- **Download X Server and SSH capable terminal**
  - For Windows, install Xming and Putty.
  - For MAC, install XQuartz and Terminal.app (builtin)
  - Linux comes pre-installed with X server and Gnome terminal + SSH (built-in)

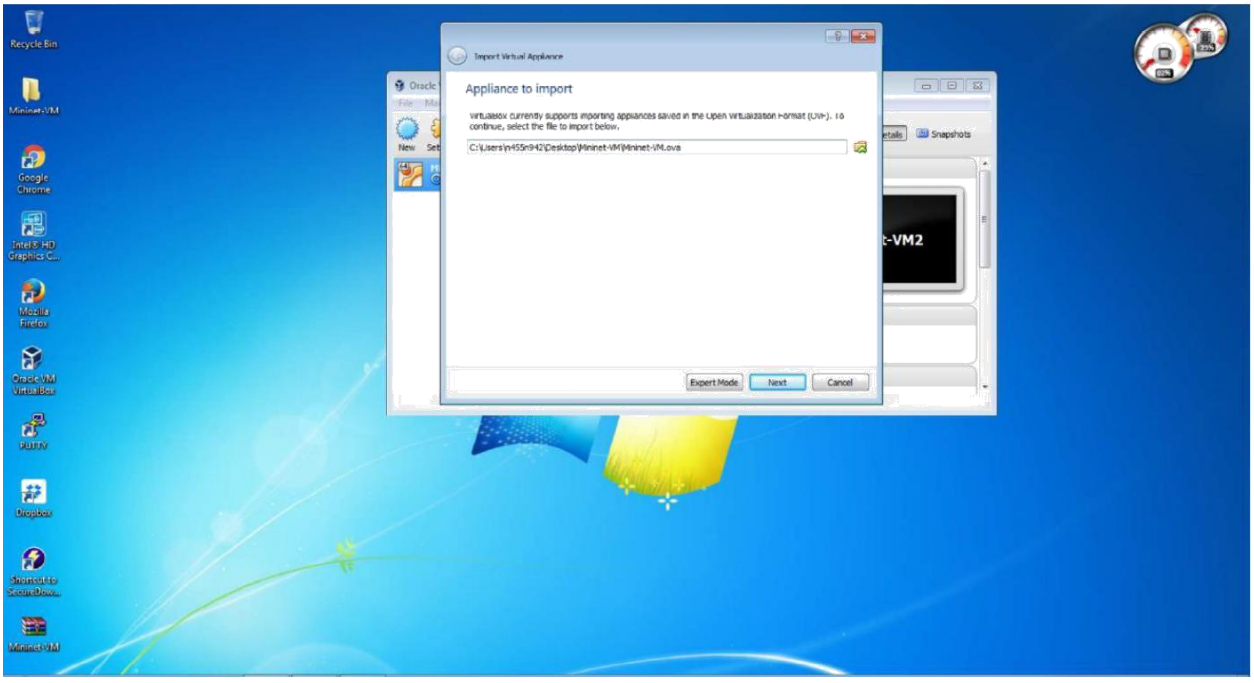
- **Setup Virtual Machine**

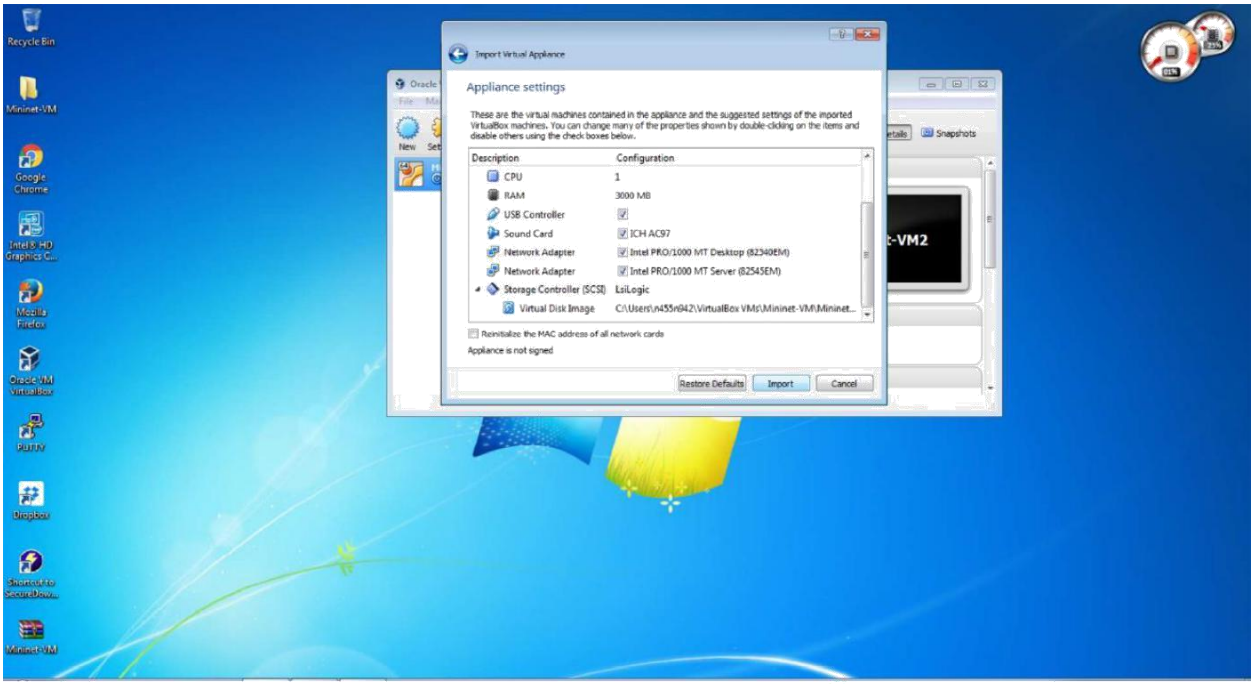
Follow the below images to get your VM up and running:

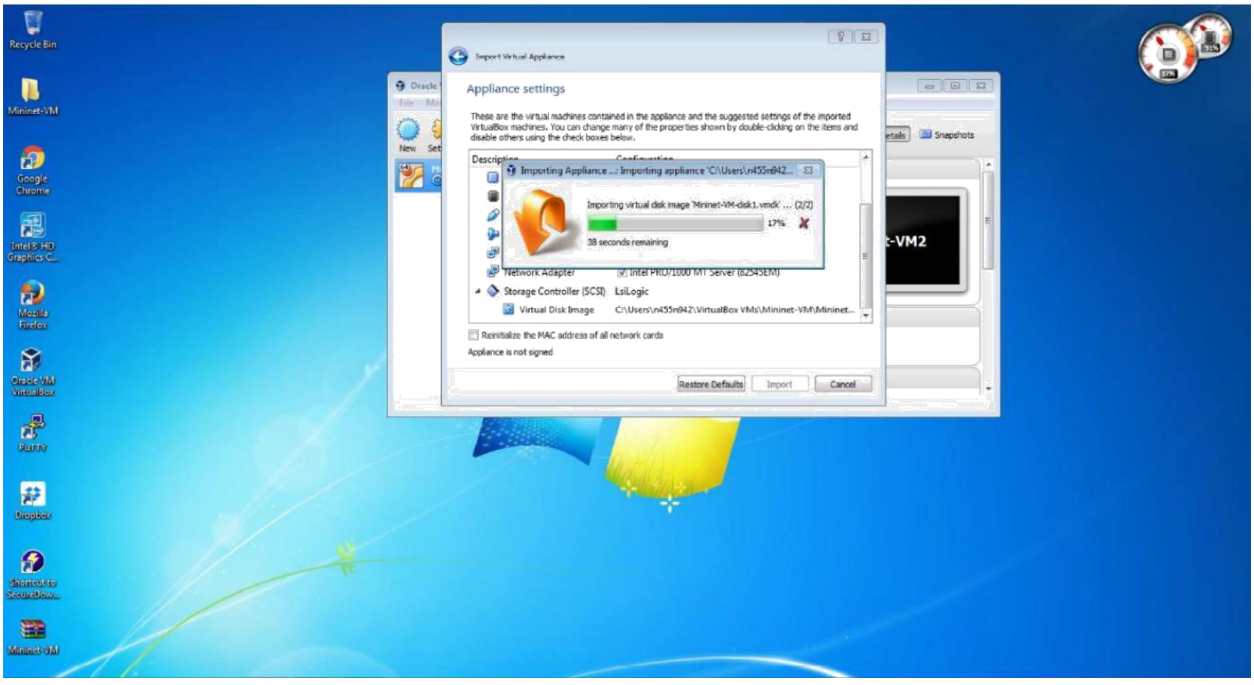


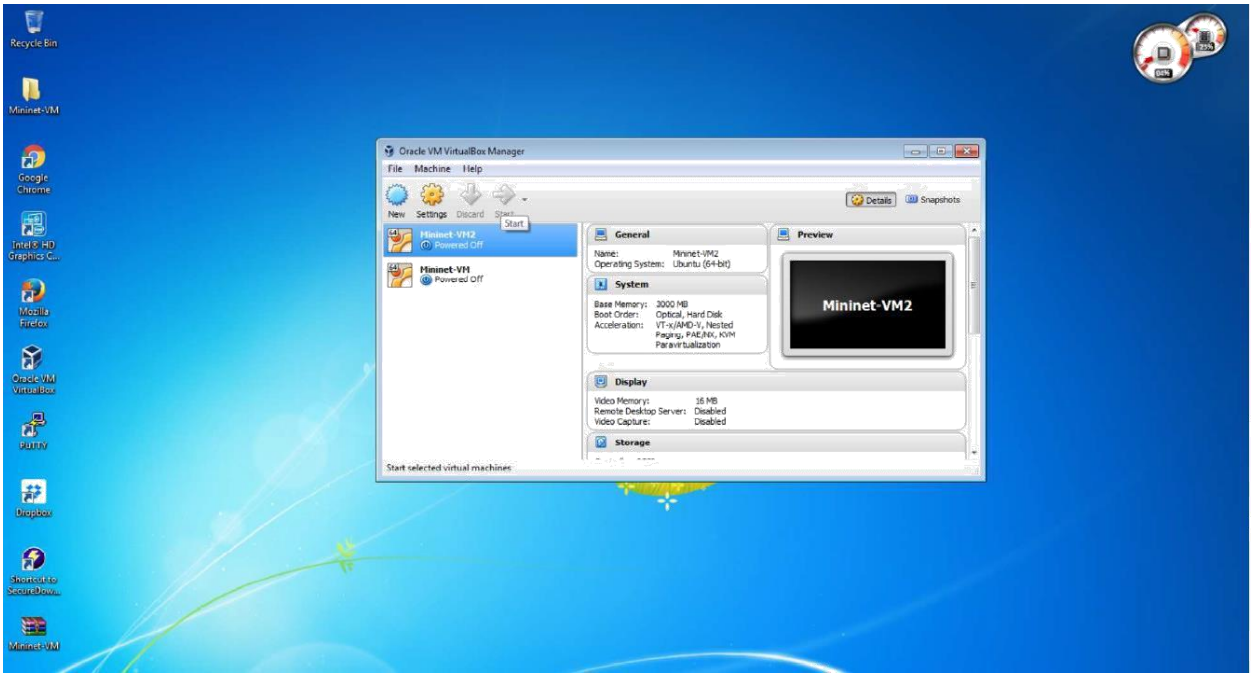



Please choose a virtual appliance file to import
Mininet-VM
Organize
New folder
Favorites
Desktop
Downloads
Recent Places
Dropbox
Libraries
Documents
Music
Pictures
Videos
Computer
OSDisk (C:)
Storage (E:)
Network
Name
Date modified
Type
Size
Mininet-VM
10/3/2016 11:48 AM
Open Virtualizatio...
1,672,858 KB
File name: Mininet-VM
Open Virtualization Format (*.o
Open
Cancel


Import Virtual Appliance
Appliance to import
VirtualBox currently supports importing appliances saved in the Open Virtualization Format (OVF). To continue, select the file to import below.
C:\Users\n455n942\Desktop\Mininet-VM\Mininet-VM.ova
Expert Mode
Next
Cancel
Snapshots


Import Virtual Appliance
Appliance settings
These are the virtual machines contained in the appliance and the suggested settings of the imported VirtualBox machines. You can change many of the properties shown by double-clicking on the items and disable others using the check boxes below.
Description
Configuration
CPU
1
RAM
3000 MB
USB Controller
Sound Card
ICH AC97
Network Adapter
Intel PRO/1000 MT Desktop (82340EM)
Network Adapter
Intel PRO/1000 MT Server (82545EM)
Storage Controller (SCSI)
LsiLogic
Virtual Disk Image
Reinitialize the MAC address of all network cards
Appliance is not signed
Restore Defaults
Import
Cancel
Snapshots


Import Virtual Appliance
Appliance settings
These are the virtual machines contained in the appliance and the suggested settings of the imported VirtualBox machines. You can change many of the properties shown by double-clicking on the items and disable others using the check boxes below.
Importing Appliance ...
Importing virtual disk image 'Mininet-VM-disk1.vmdk' ... (2/2)
17%
38 seconds remaining
Storage Controller (SCSI)
LsiLogic
Virtual Disk Image
Reinitialize the MAC address of all network cards
Appliance is not signed
Restore Defaults
Import
Cancel
Snapshots

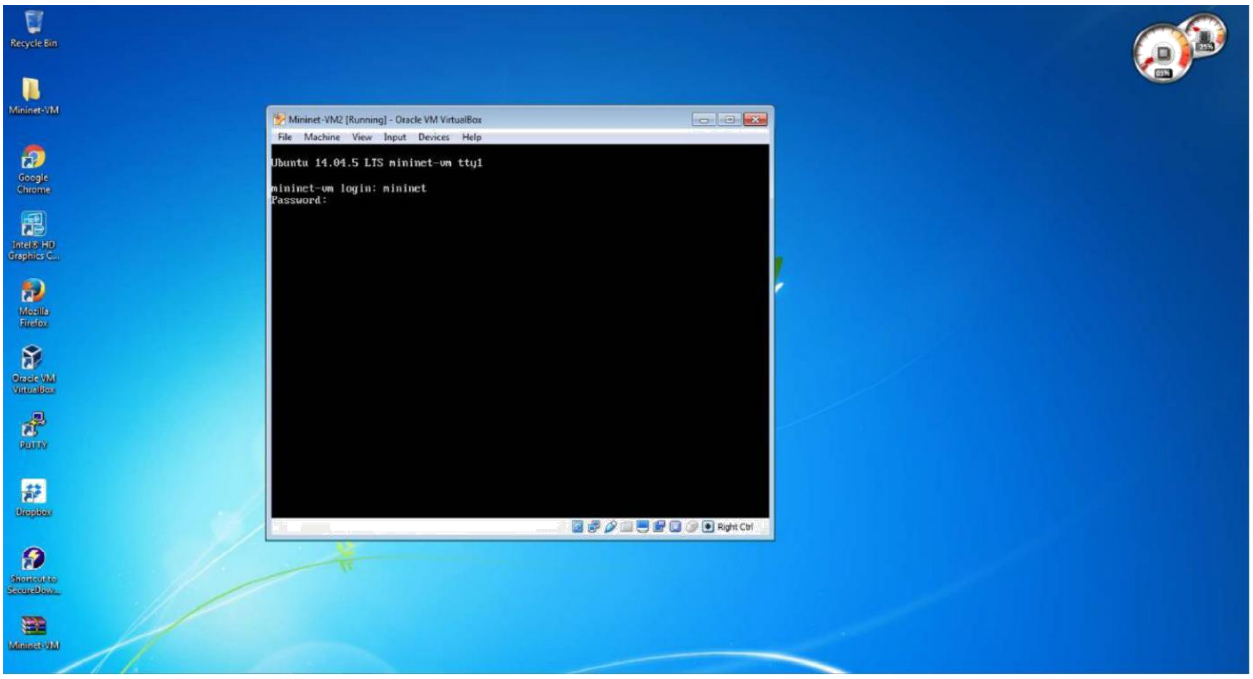


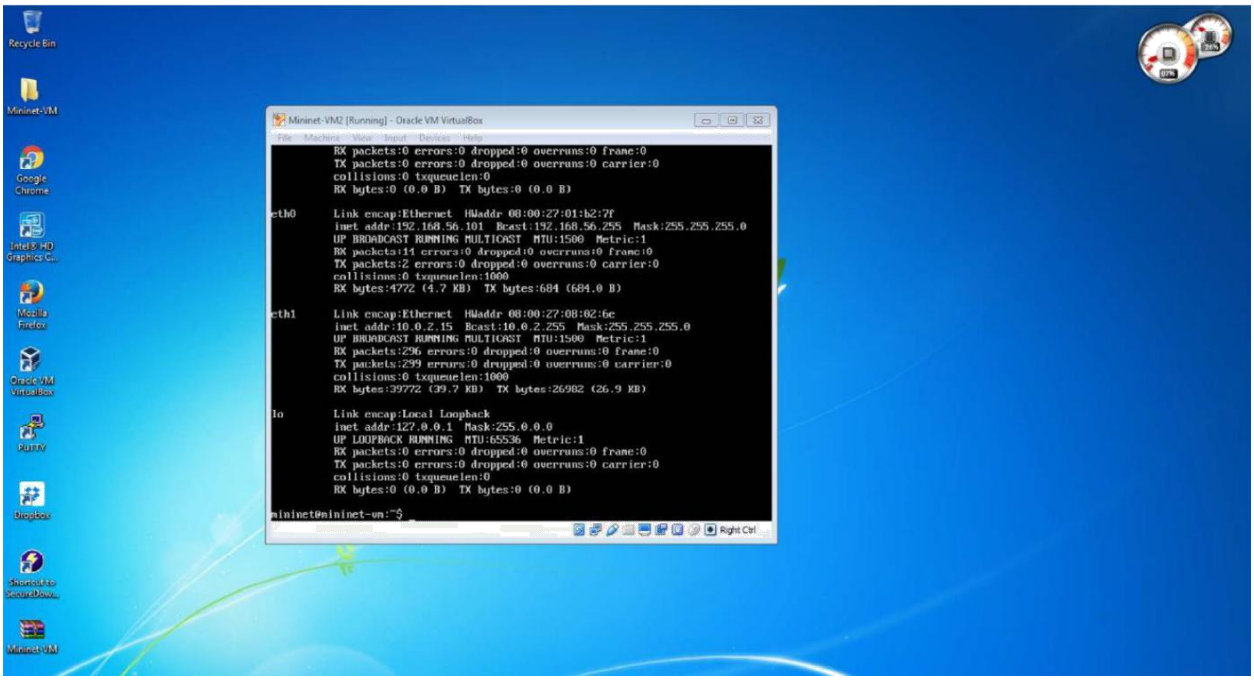
- **<u>Boot VM</u>**

At this point you should be ready to start your VM. Press the "Start" arrow icon or double-click your VM within the VirtualBox window.
In the VM console window, log in with the user name and password for your VM. The username and password for this VM are:

- User name - **mininet**
- Password - **mininet**

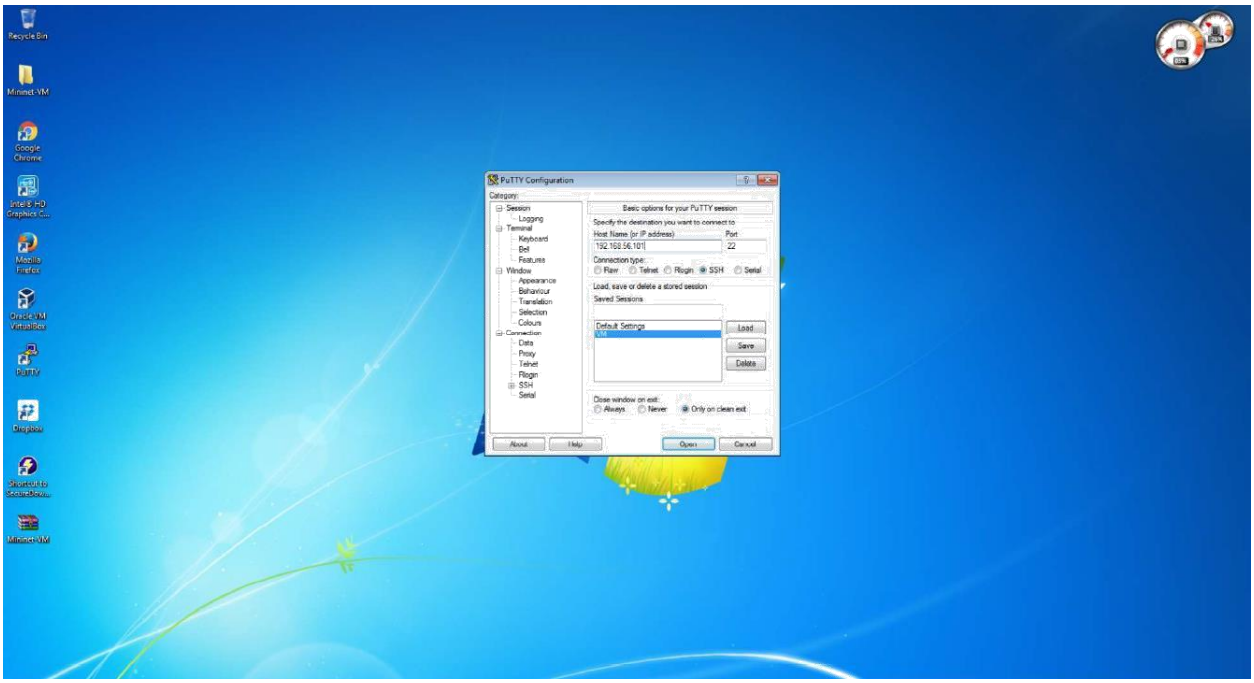
Note that this user is a sudo user, so you can execute commands with root permissions by typing *sudo command*, where *command* is the command you wish to execute with root permission.





Verify that you have an IP Address as 192.168.56.101 for eth0
Once you have verified, you can minimize the VirtualBox VM window.

Open Putty and type your hostname as 192.168.56.101 (the IP which you see in output of ifconfig for eth0) and then click on open.



- **<u>SSH from Windows</u>**

In order to use X11 applications such as xterm and wireshark, you should have Xming server running. Then, you must make an SSH connection with X11 forwarding enabled.

- **First, start Xming** (e.g. by double-clicking its icon.) No window will appear, but if you wish you can verify that it is running by looking for its process in Windows task manger.
- **Second, make an SSH connection with X11 forwarding enabled.**

To enable X11 forwarding from PUTTY's GUI, click PUTTY->Connection->SSH->X11, then click on Forwarding->"Enable X11 Forwarding", as shown below:

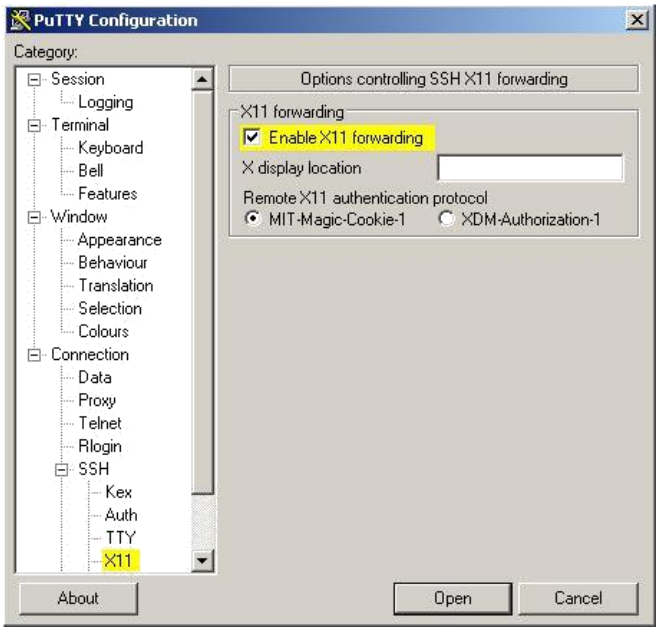


Figure 2: Putty Configuration

Alternative:
You can also run putty (with the -X option for X11 forwarding) from the Windows command line:

- Open a terminal: click the Windows 'Start' button, 'run', then enter 'cmd'.
- Change to the directory where you saved putty.

- Run:

- Replace [Guest IP Here] with the IP you just noted.
- If putty cannot connect, try pinging the VM's IP address to make sure you are connecting to the correct interface.

- Once the SSH connection succeeds or a terminal window for the VM pops up, log in to the VM. Now, type:

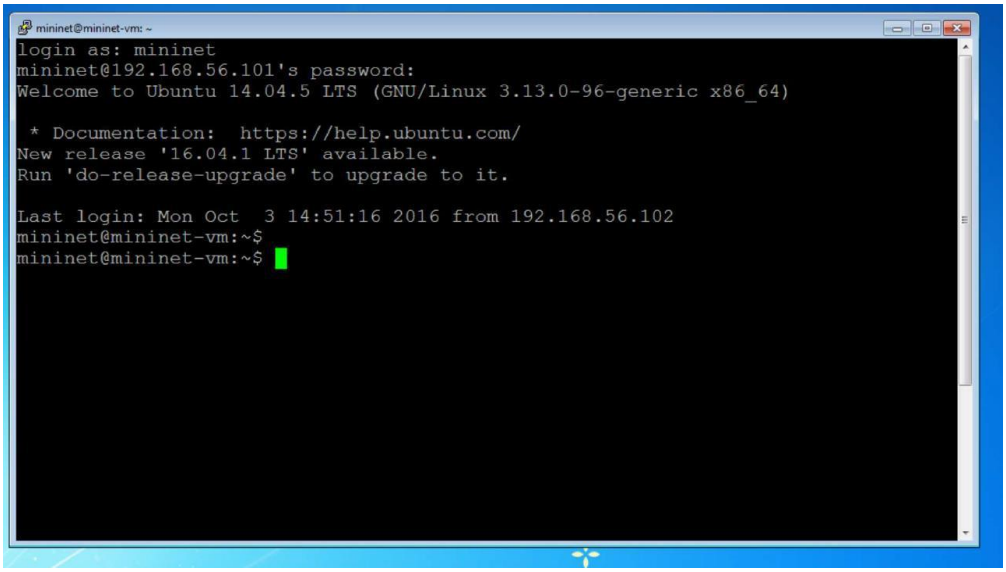
$ xterm -sb 500

to start an X terminal (the -sb 500 is optional but gives 500 lines of scrollback.)

A white terminal window should appear. If you have succeeded, you are done with the basic setup. Close the xterm.

If the xterm window does not appear, or if you get an error like "xterm: DISPLAY is not set," make sure that Xming is running in Windows and that you have correctly enabled X11 forwarding.

Now, you have the VM accessible from Windows Host Machine:



This VM will be your project platform. If you have any issues on the following instructions, please send me an email specifying the issue along with your Operating System Version.

Basic Terminologies

- ***VirtualBox console terminal:*** connects to Mininet VM. This is the one created when you started up the VM. You can't copy and paste from this page to the console terminal, so it's a bit of a pain. Minimize this NOW, if you haven't already done so. Once you've used it to set up networking, it won't be needed.
- ***SSH terminal:*** connects to Mininet VM. Created by using putty on Windows or SSH on OS X / Linux, as described in the previous section. Copy and paste should work on this terminal.
- ***xterm terminal:*** connects to a host in the virtual network. Will be labeled at the top with the name of the host.

Submission:

Submit a word file with screenshots of your installation, similar to what you see on this guide. Include the following in your word file:

1. Your name
2. Software Details
    a. Operating System version
    b. Virtualization tool name and version