

8/18/2019

# Run SEED VM on VirtualBox

## User Manual

### Table of Contents

How to Use Virtualbox to Run SEED Ubuntu VM

Appendix A: Creating Multiple VMs

Appendix B: Network Configuration

Appendix C: Taking Snapshots of VM

Appendix D: Creating Shared Folder

### The account information

You will primarily use the following account:

- User ID: **seed**
- Password: **dees**

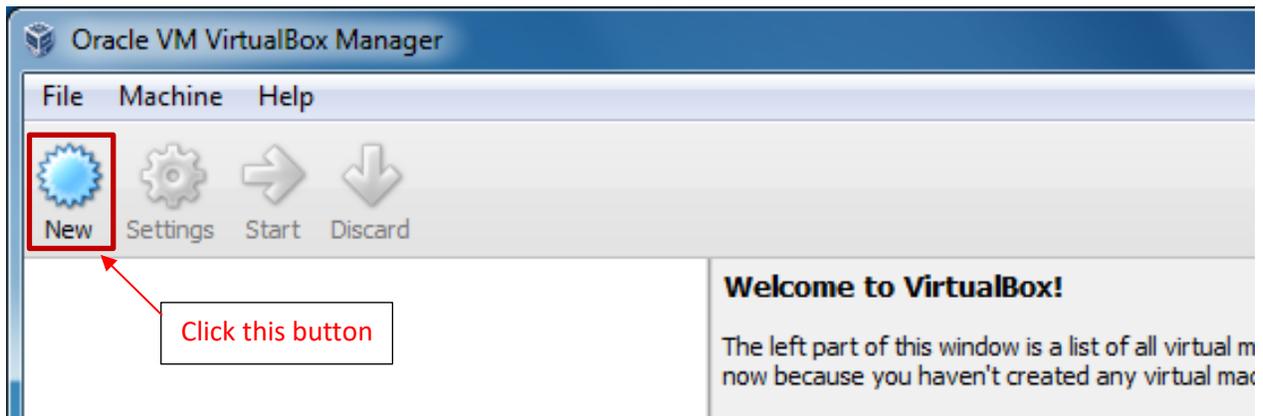
You normally don't need to log into the root account:

- User ID: **root**
- Password: **seedubuntu**

## How to use VirtualBox to Run SEED Ubuntu VM?

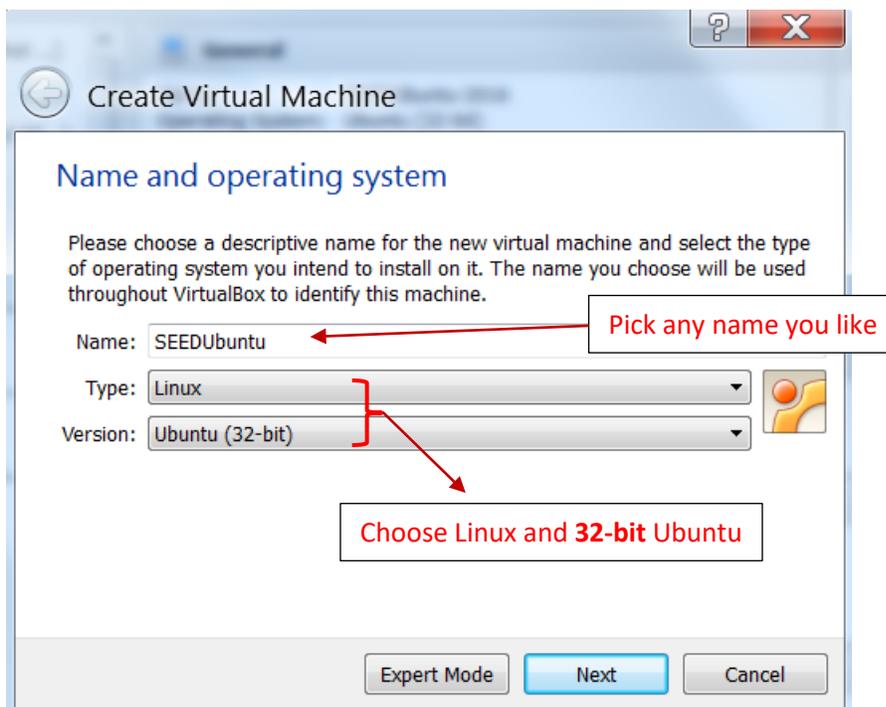
Install the free VirtualBox software first. We recommend **Version 6.0.4** (please stay away from the newer versions, as they still have some issues with our VM).

### Step 1: Create a New VM in VirtualBox

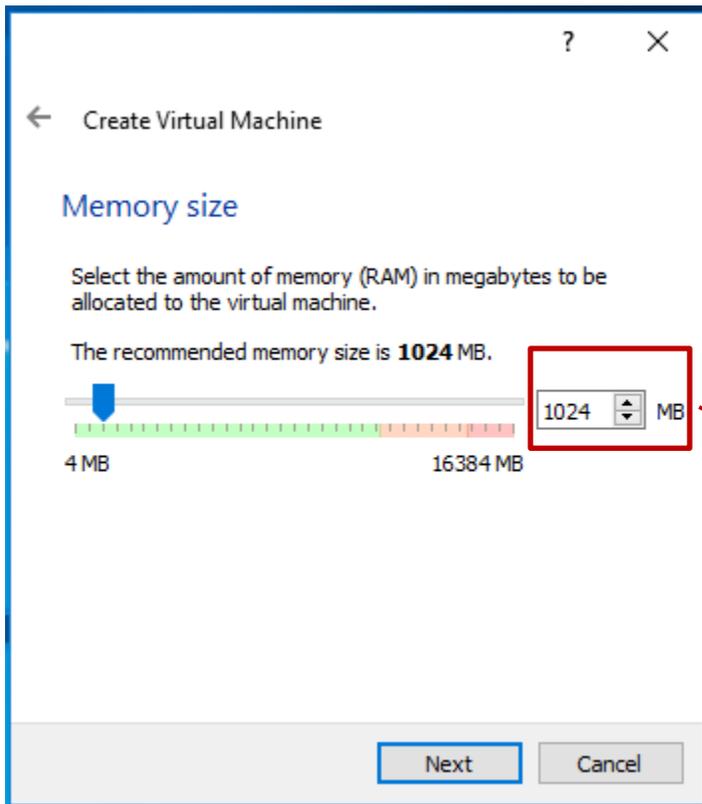


### Step 2: Provide a Name and Select the OS Type and Version

Do NOT pick Ubuntu (64-bit), even though your machine is 64 bit. Our prebuilt VM is 32-bit Ubuntu.

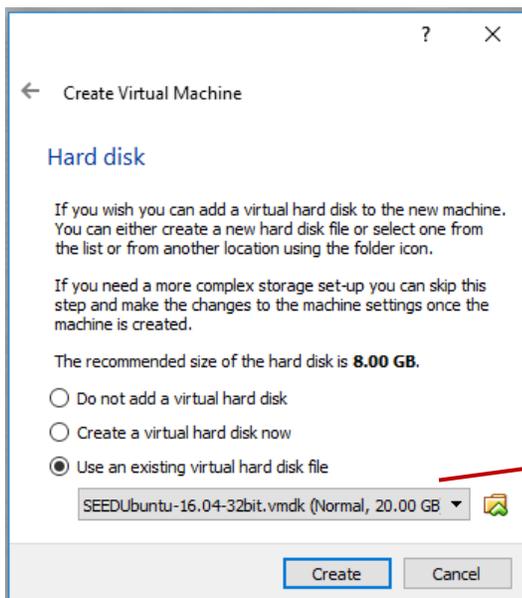


### Step 3: Set the Memory Size



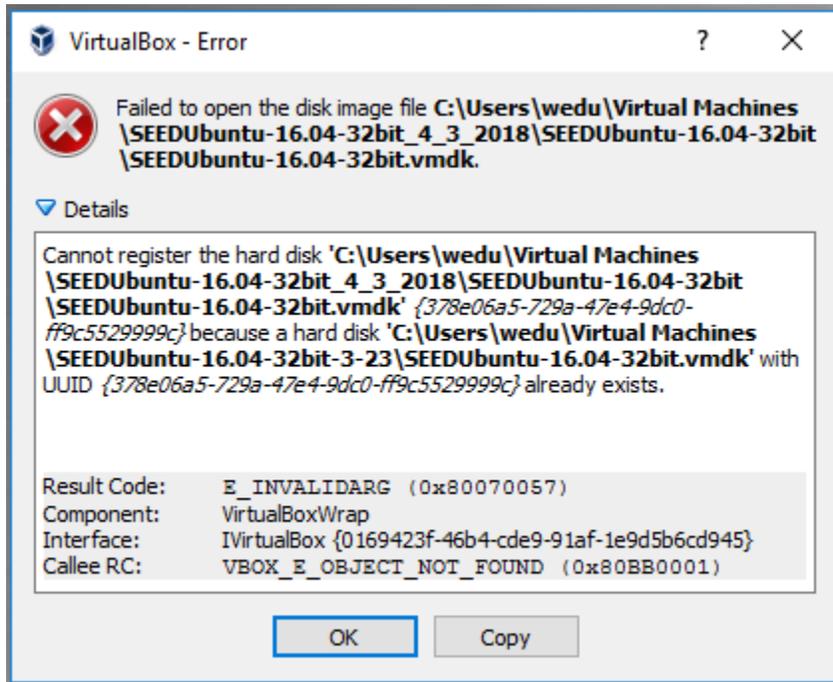
**1024 MB** should be sufficient, but we recommend **2GB**. If your computer has more RAM, you can increase accordingly. The more memory you give to the VM, the better the performance you will get.

### Step 4: Select the Pre-built VM File Provided by Us



Pick this file in the unzipped folder: **SEEDUbuntu-16.04-32bit.vmdk**. Other files in the folder have similar names (they have a postfix "-s0xx"); don't pick any of these files.

In the above step, you may encounter the following error; otherwise, directly go to Step 5.



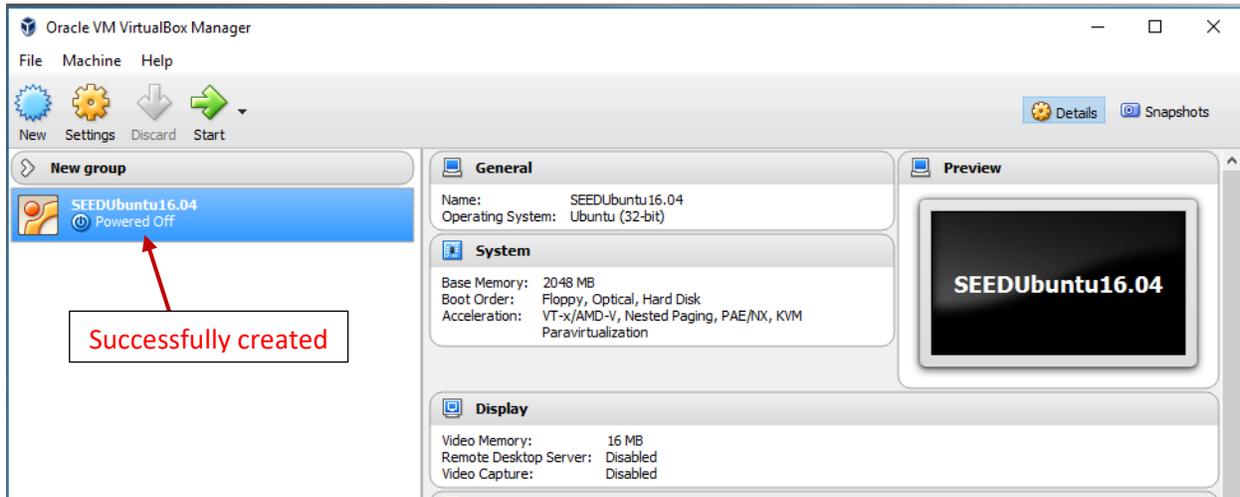
**Reason and Solution:** This is because you copied the VM files from another VM, which is already loaded into VirtualBox. These two VMs have the same UUID, which is not allowed by Virtualbox. Here are several solutions depending on your situations:

- If you plan to create multiple VMs using the same image, please use the clone mechanism (See Appendix A for details).
- If the older VM with the same UUID is no longer needed, remove it from VirtualBox will solve the problem.
- If you do want to keep the older VM, you can change the UUID of the new VM. The fastest way is to directly modify `SEEDUbuntu16.04.vmdk`, which is a text file. Search for the `ddb.uuid.image` entry, and change its value (e.g., change the last byte from 'c' to 'd')

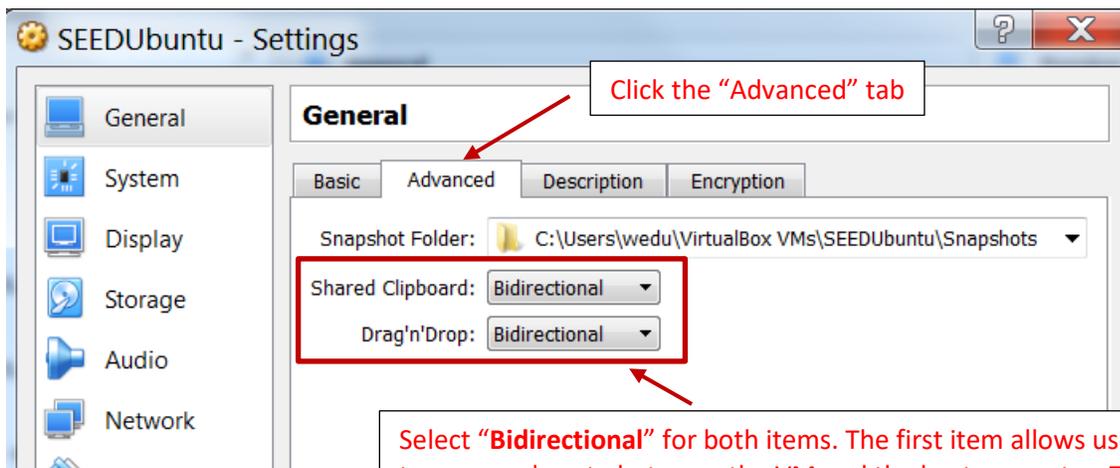
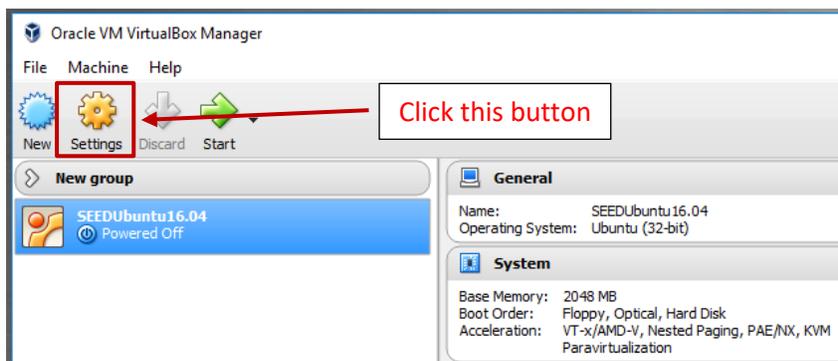
Change this entry

```
ddb.virtualHWVersion = "4"
ddb.adapterType="ide"
ddb.uuid.image="378e06a5-729a-47e4-9dc0-ff9c5529999c"
ddb.uuid.parent="00000000-0000-0000-0000-000000000000"
ddb.uuid.modification="6d1e05f4-851b-44b2-b294-db36918adc1c"
```

If there is no error (or after you fix the error), your VM will be created successfully.



## Step 5: Configure the VM



Select "Bidirectional" for both items. The first item allows users to copy and paste between the VM and the host computer. The second item allows users to transfer files between the VM and the host computer using Drag'n Drop.

SEEDUbuntu16.04 - Settings

**System**

Motherboard Processor Acceleration

Processor(s): 2

1 CPU 8 CPUs

Execution Cap: 100%

1% 100%

Extended Features:  Enable PAE/NX

Assign more CPUs to this VM if you prefer. One is sufficient.

SEEDUbuntu16.04 - Settings

**Display**

Screen Remote Display Recording

Video Memory: 16 MB

0 MB 128 MB

Monitor Count: 1

1 8

Scale Factor: All Monitors 100%

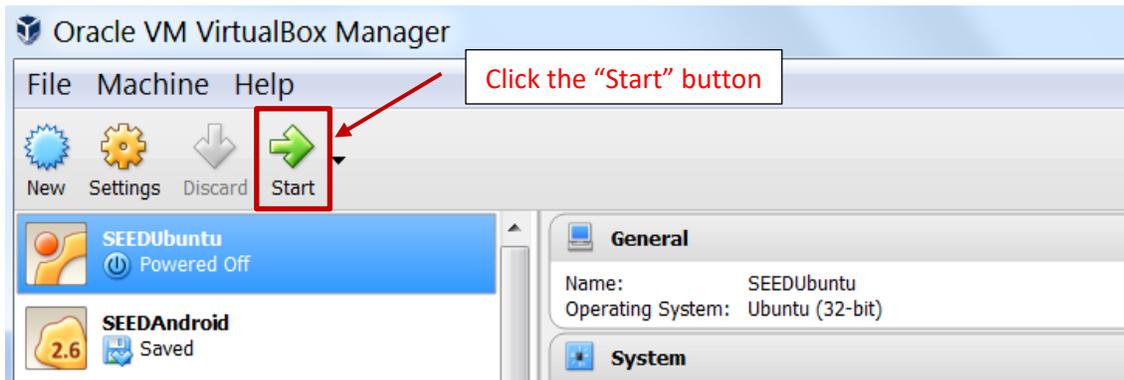
Min Max

Graphics Controller: **VBoxVGA**

Make sure the **VBoxVGA** setting is selected.

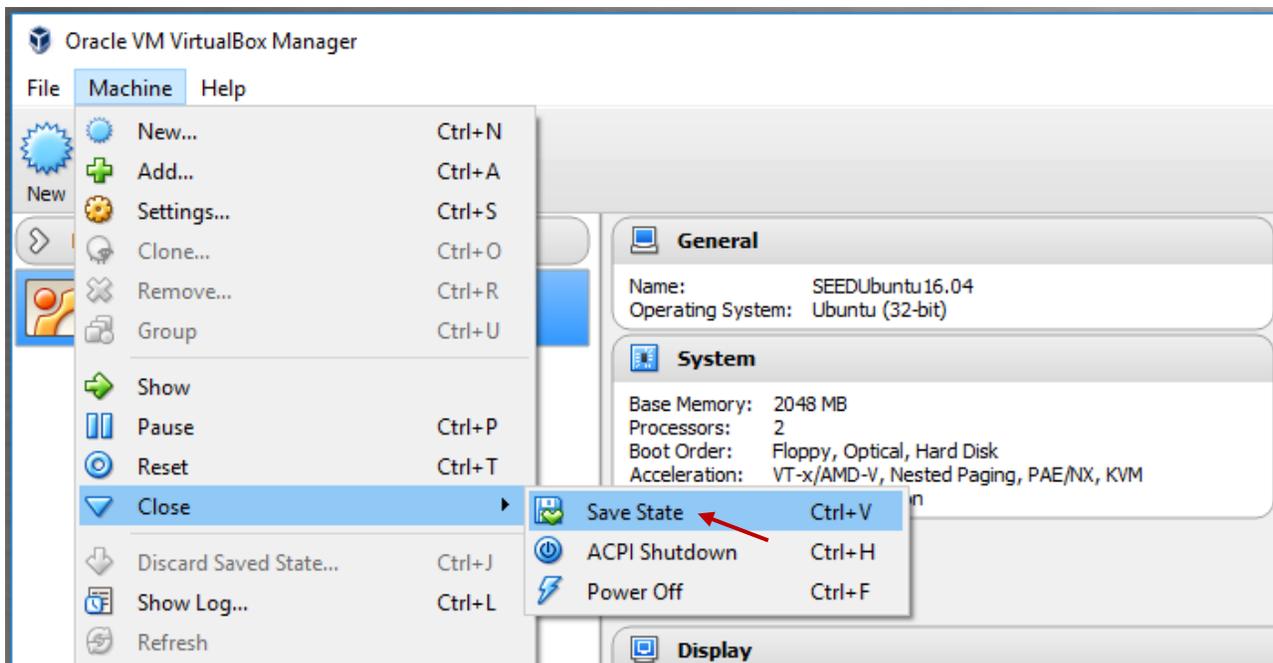
If your computer screen has a very high resolution, your VM will look too small on the screen. You can adjust the scale factor to make it larger.

## Step 6: Start the VM



## Step 7: Stop the VM or Save the VM's State

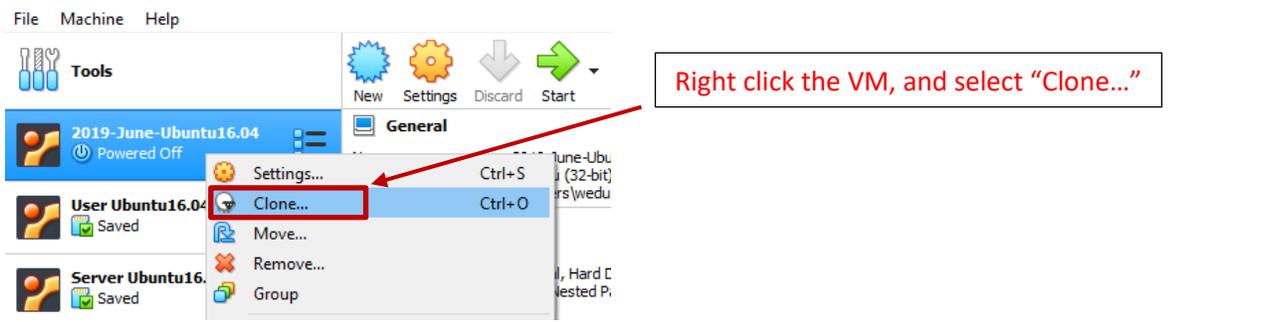
When you are done with your VM, you can always shut it down (from inside Ubuntu). A better alternative is to “freeze” the computer, so everything is saved. When you need it again, you can “unfreeze” it, and resume from where you left off. This is much faster and convenient than shutting down and rebooting the VM. To achieve this, you can use the “Save State” option.



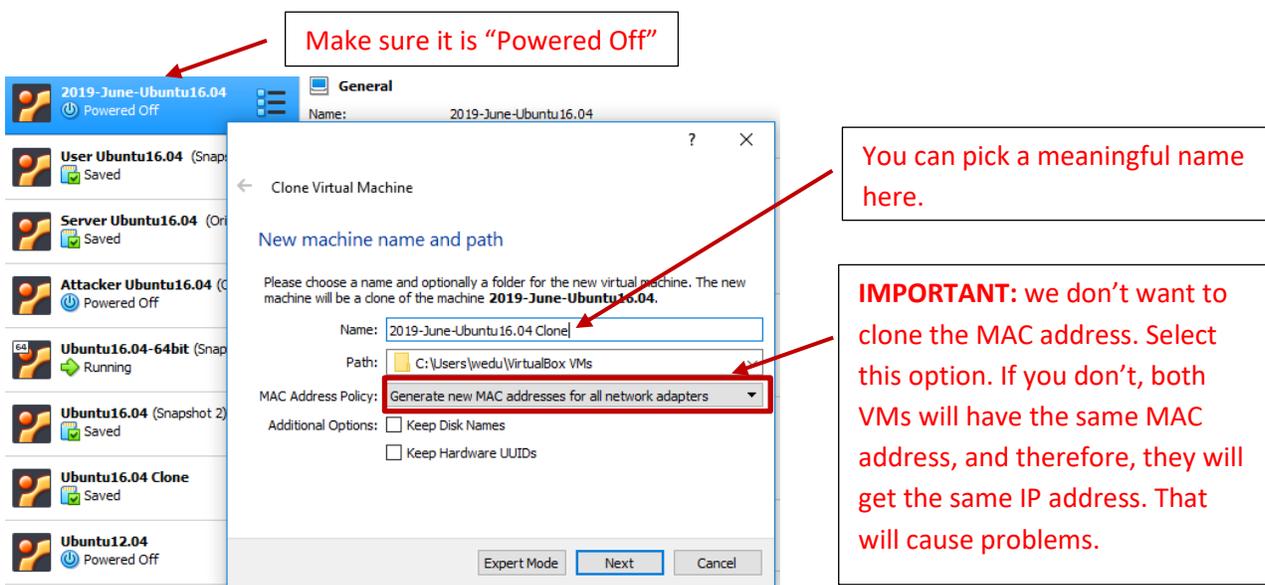
## Appendix A: Use “Clone” to create Multiple VMs

Some SEED labs require multiple VMs. The easiest way to create multiple VMs is to create one first, and then use the “Clone” mechanism to clone it. Before doing the cloning, please ensure the following:

- **IMPORTANT:** make sure that the VM is **fully shutdown** (not in a “Saved” state), or there will be all sorts of problems.
- Configure network (see Appendix B); otherwise you have to do it for each VM.
- Configure folder sharing (see Appendix D); otherwise you have to do it for each VM.



Right click the VM, and select “Clone...”

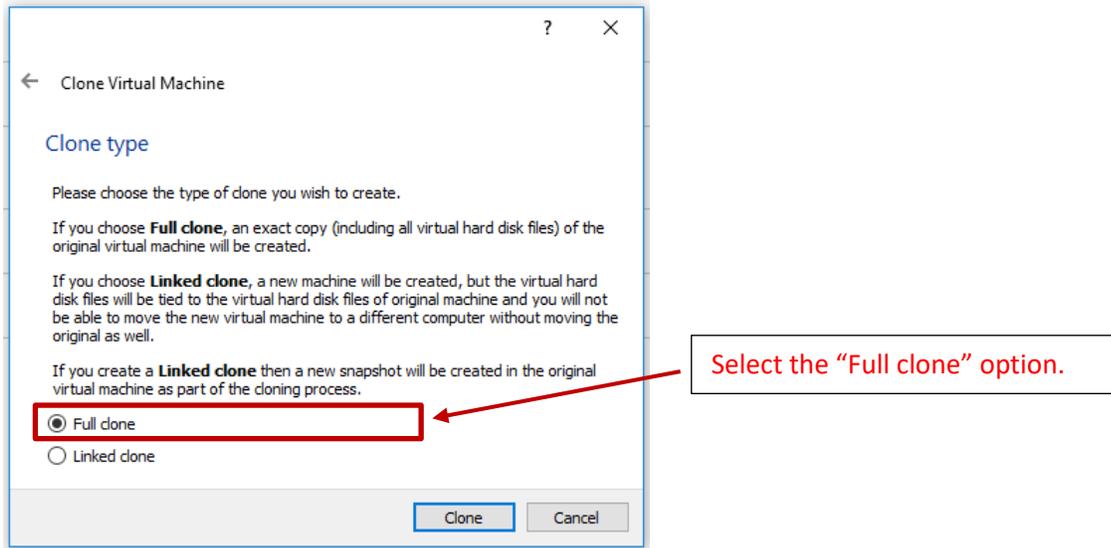


Make sure it is “Powered Off”

You can pick a meaningful name here.

**IMPORTANT:** we don’t want to clone the MAC address. Select this option. If you don’t, both VMs will have the same MAC address, and therefore, they will get the same IP address. That will cause problems.

The screenshot shows the Oracle VM VirtualBox interface. The top menu bar includes 'File', 'Machine', and 'Help'. The 'Tools' section contains icons for 'New', 'Settings', 'Discard', and 'Start'. A list of VMs is shown on the left, including '2019-June-Ubuntu16.04' (Powered Off), 'User Ubuntu16.04' (Saved), and 'Server Ubuntu16.04' (Saved). A context menu is open over the '2019-June-Ubuntu16.04' VM, with the 'Clone...' option highlighted. A red box highlights the 'Clone...' option, and a red arrow points to it from a text box that says 'Right click the VM, and select “Clone...”'. Below this, another screenshot shows the 'Clone Virtual Machine' dialog box. The 'Name' field contains '2019-June-Ubuntu16.04 Clone'. The 'Path' field contains 'C:\Users\wedu\VirtualBox VMs'. The 'MAC Address Policy' dropdown is set to 'Generate new MAC addresses for all network adapters', which is highlighted with a red box. A red arrow points to this dropdown from a text box that says 'IMPORTANT: we don’t want to clone the MAC address. Select this option. If you don’t, both VMs will have the same MAC address, and therefore, they will get the same IP address. That will cause problems.' Another red arrow points to the 'Name' field from a text box that says 'You can pick a meaningful name here.' A third red arrow points to the 'Powered Off' status of the '2019-June-Ubuntu16.04' VM from a text box that says 'Make sure it is “Powered Off”'. The dialog box has 'Expert Mode', 'Next', and 'Cancel' buttons at the bottom.

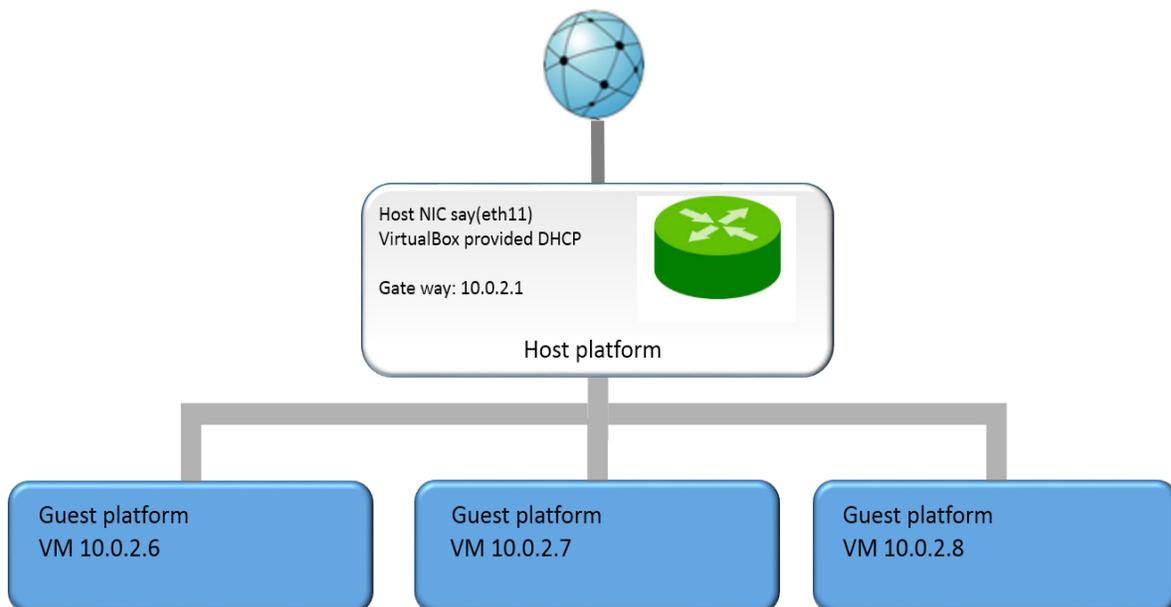


The clone will take a few minutes, depending on the speed of your computer.

## Appendix B: Network Configuration in VirtualBox for SEED Labs

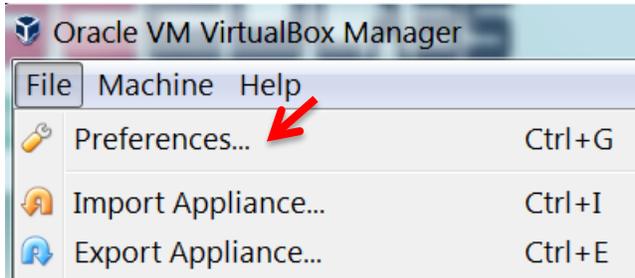
In many of the SEED labs, we need to run multiple guest VMs, and these VMs should be able to (1) reach out to the Internet, (2) communicate with each other. In Virtualbox, if we use the “NAT” setting (default setting) for each VM, we can achieve 1, but not 2, because each VM will be placed in its own private network, not on a common one; they even have the same IP address, which is not a problem because each VM is the only computer on its own private network. On the other hand, if we use the “Host-only” setting for each VM, we can achieve 2, but not 1. Using this setting, all the VMs and the host will be put on a common network, so they can communicate with each other; however, due to the lack of NAT, the VMs cannot reach out to the outside.

Therefore, in order to achieve all these 2 goals, we have to use a network adapter called “NAT Network”. The adapter works in a similar way to “local area network” or LAN. It enable VMs communication within same local network as well as the communication to the internet. All the communication goes through this single adapter. As show in Figure 1, gateway router transfers the packets among the VMs and transfers the packets from local network to Internet.

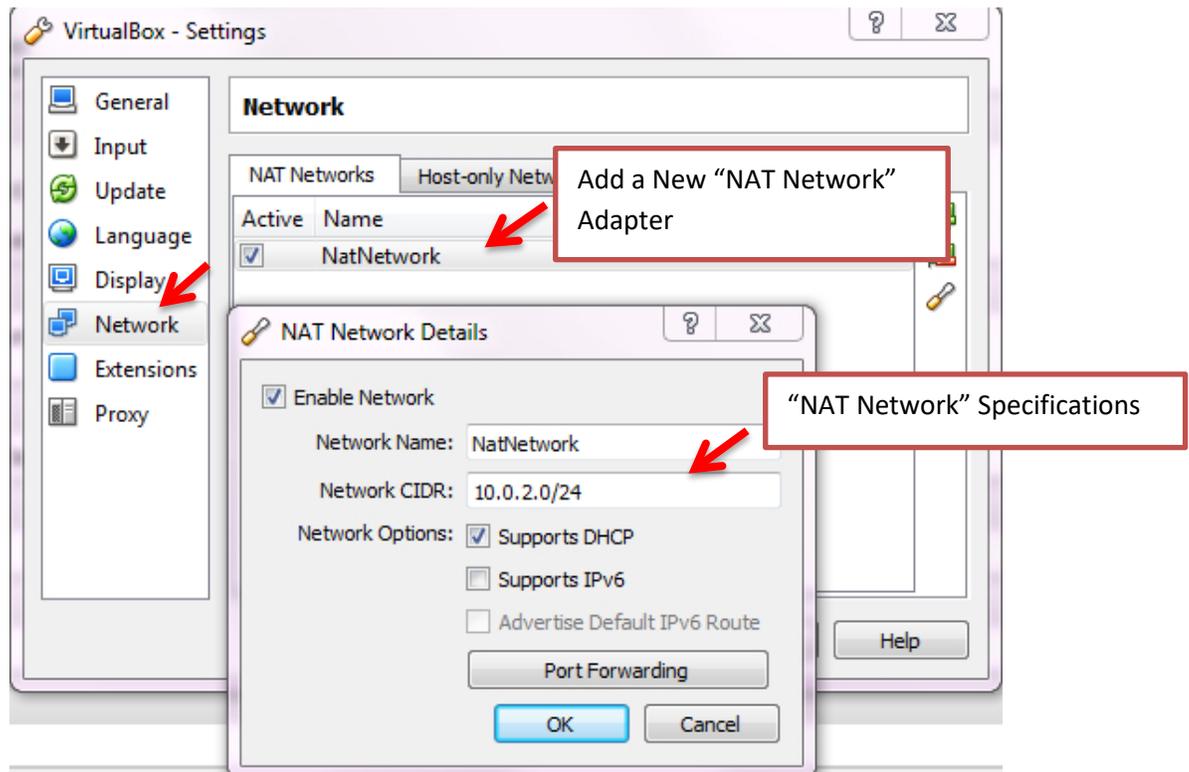


## Configuration Instruction

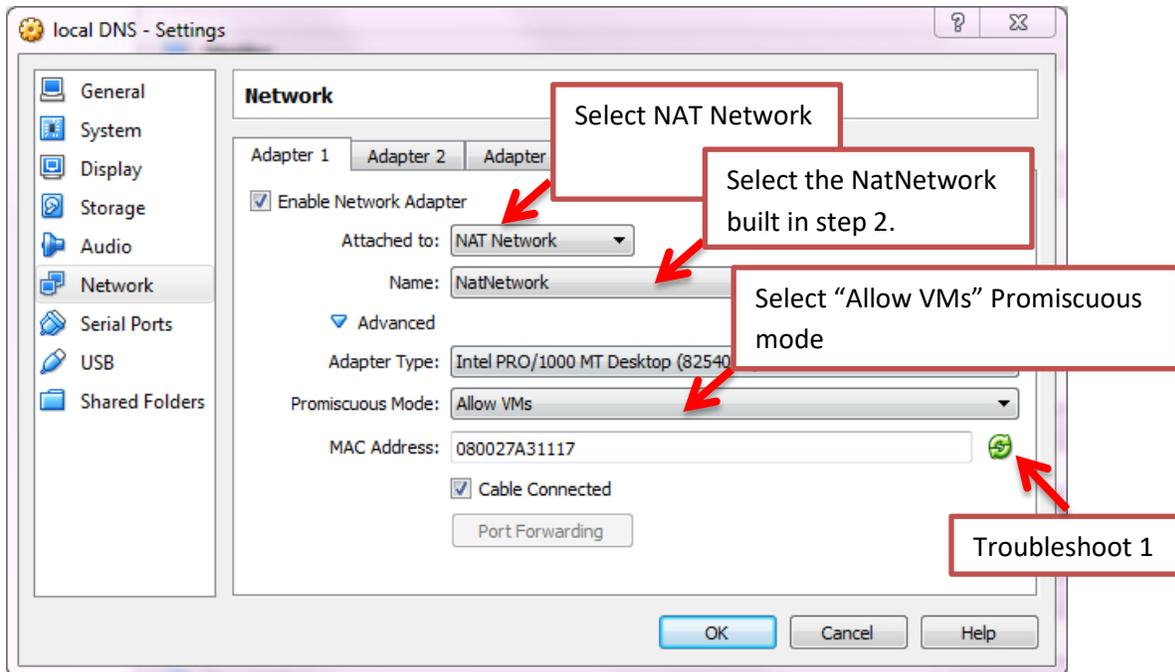
**Step 1:** Make sure you are using the most up-to-date VirtualBox. As show in the following figure, click the “File” on the top left of the VirtualBox main UI. Then choose “Preferences...” option.



**Step 2:** Click the “Network” tab on left panel. click the “+” button to create a new NAT Networks (NatNetwork) adaptor (if one does not exist). Double click on the NatNetwork, and look at its specifications. Set the specifications as the same as what is shown below.



**Step 4:** Go to VM setting, you need to power off the VM before making the following changes. Enable Adapter 1(at the same time, disable the other adapters), and choose “NAT Network”.



**Step 5:** Now power on the VM, and check the IP address.

```

seed@VM:~$ ifconfig
enp0s3  Link encap:Ethernet  HWaddr 08:00:27:f9:65:a2
        inet addr:10.0.2.34  Bcast:10.0.2.255  Mask:255.255.255.0
        inet6 addr: fe80::3b9:2676:84ea:969/64 Scope:Link
        UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
        RX packets:5 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:1070 (1.0 KB)  TX bytes:7216 (7.2 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:68 errors:0 dropped:0 overruns:0 frame:0
        TX packets:68 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1
        RX bytes:21456 (21.4 KB)  TX bytes:21456 (21.4 KB)

seed@VM:~$

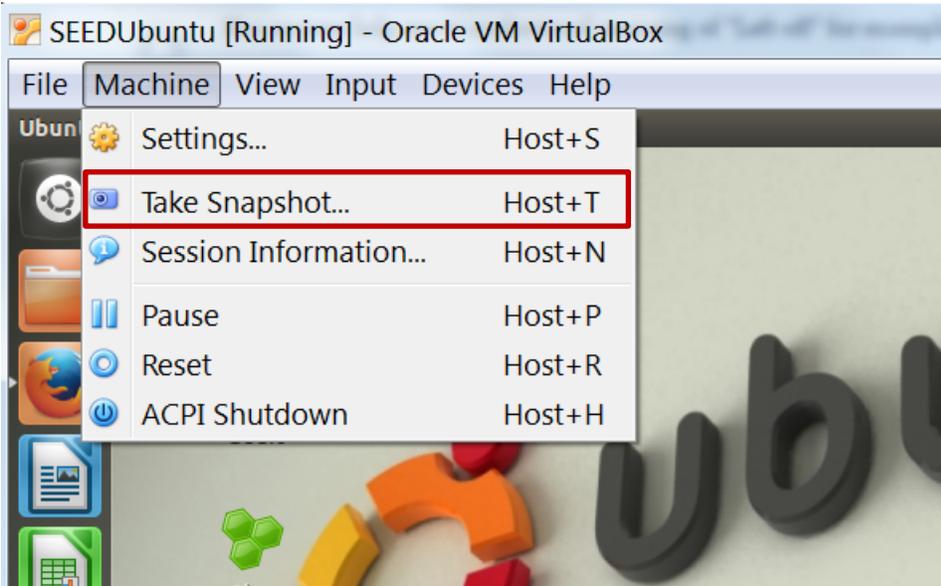
```

### Troubleshooting:

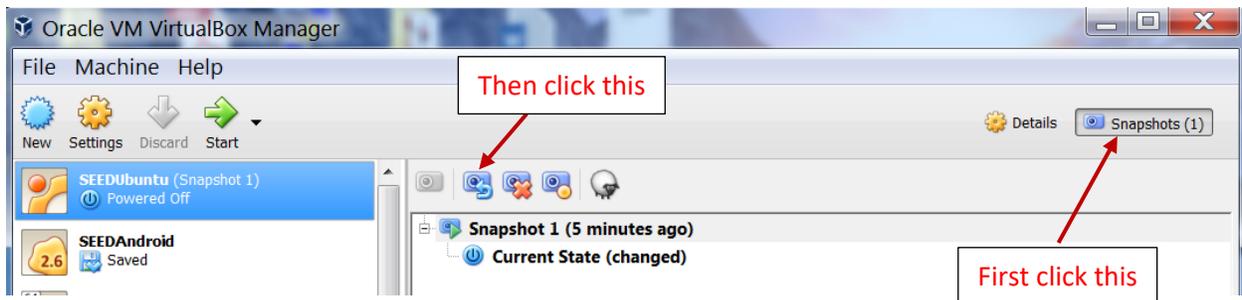
- If VMs cannot ping each other, refresh the MAC Address can resolve the issue. The way to resolve the issue is shown in figure 4, troubleshoot 1.

## Appendix C: Take Snapshots and Recover from Snapshots

For some labs, you may need to make changes to the operating system. If you make a severe mistake, your VM may not be able to boot up again, and you will lose everything inside the failed VM. To avoid such trouble, before doing anything dangerous to the OS, it is better to take a snapshot of your current VM. You can take as many snapshots as you want.



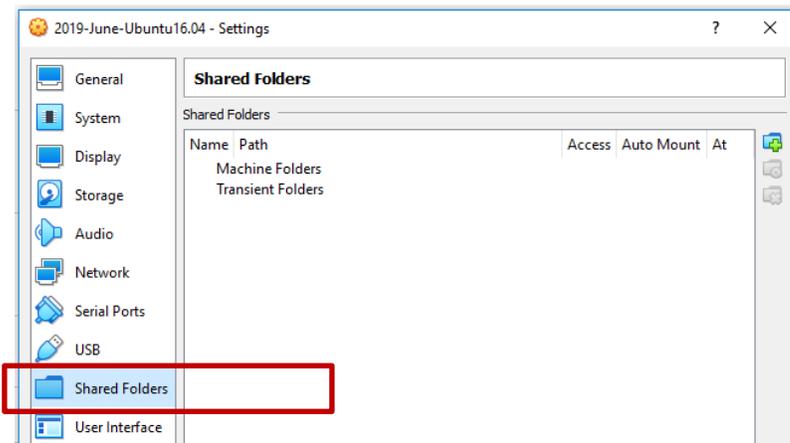
To restore from a snapshot that you have taken before, you can click the followings (you need to shut-down the VM first):



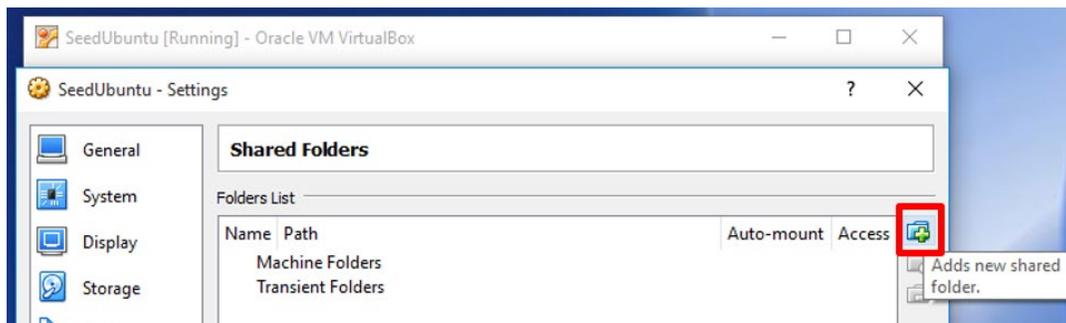
## Appendix D: Folder Sharing

Files can be shared between the host computer and the guest operating system in VirtualBox. The following steps show how to do so.

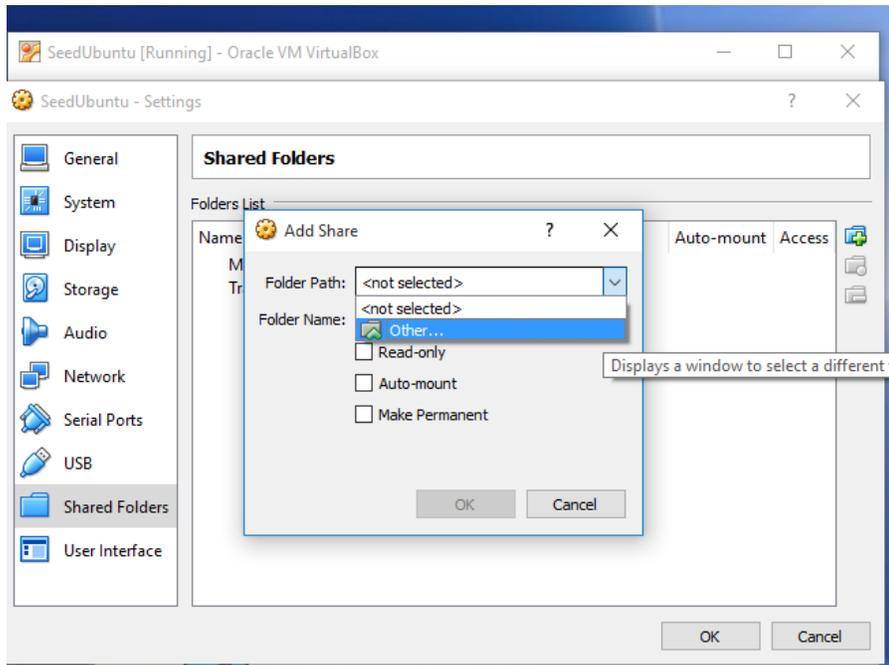
1. Create the folder to be shared on the host computer. In this tutorial we name the folder **share**.
2. Boot the Guest operating system in VirtualBox.
3. Go to the Settings popup window, and select “Shared Folders”



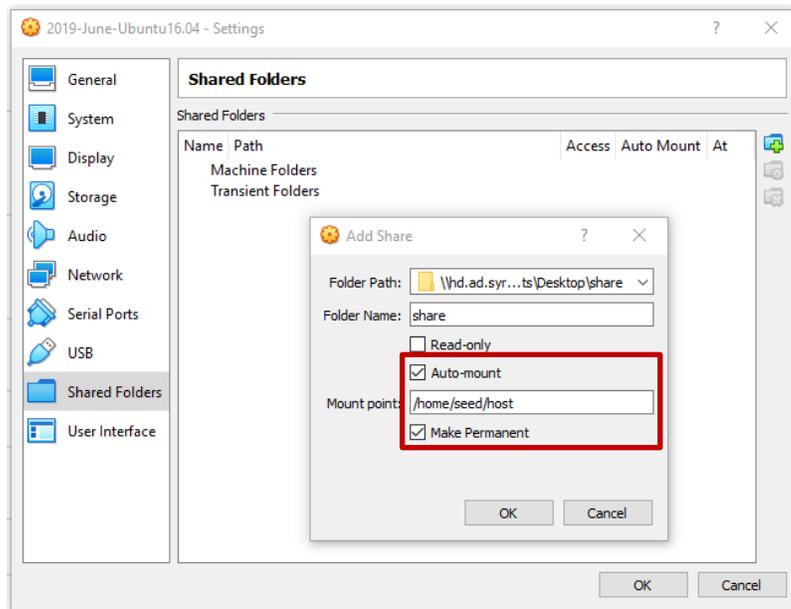
4. Choose the 'Add' button.



5. Choose "Other ...", and select a folder from the popup window.

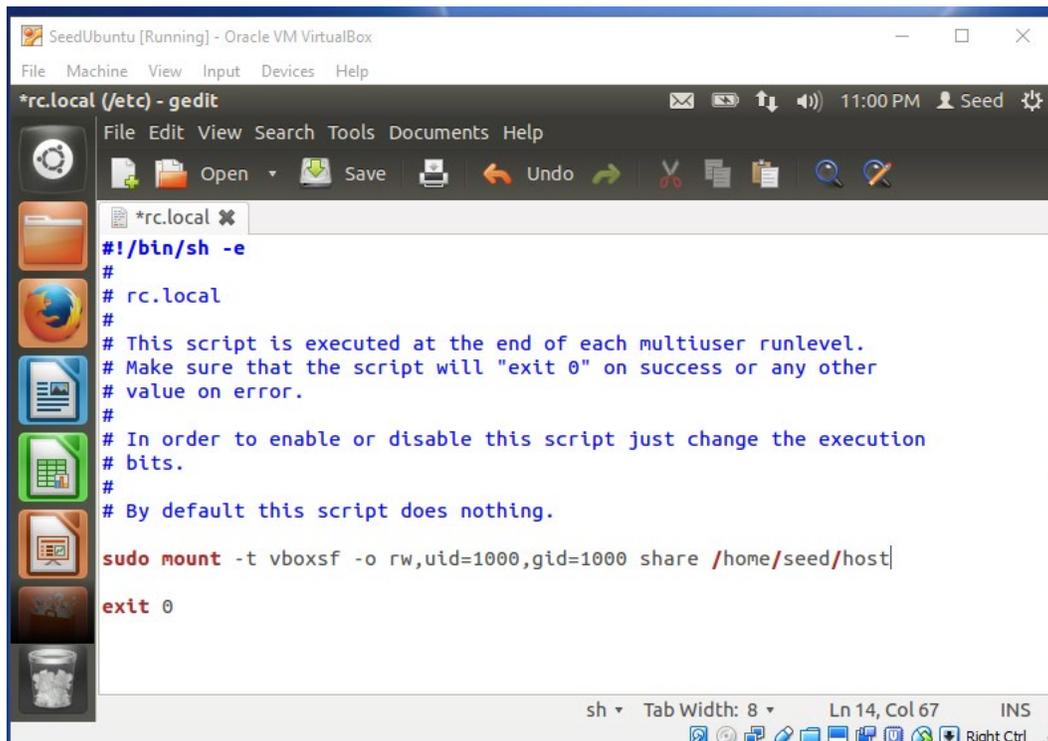


6. Select **Auto Mount** and **Make Permanent** option. Click OK. Click OK again to close the Settings Dialog.



7. Open a terminal in the VM. Make a directory and name it **host** (you can choose any name you like). Use command "**mkdir /home/seed/host**"
8. We want files in our mount point (~/host) to be owned by the current user. Also we want the mounted shared folder to persist after reboot. Hence, we will edit the `/etc/rc.local` file (using "**sudo gedit /etc/rc.local**") and add the command below (1000 is the User ID and group ID of the user `seed`):

```
sudo mount -t vboxsf -o rw,uid=1000,gid=1000 share /home/seed/host
```



The screenshot shows a gedit editor window titled "\*rc.local (/etc) - gedit" with a dark theme. The editor contains the following text:

```
#!/bin/sh -e
#
# rc.local
#
# This script is executed at the end of each multiuser runlevel.
# Make sure that the script will "exit 0" on success or any other
# value on error.
#
# In order to enable or disable this script just change the execution
# bits.
#
# By default this script does nothing.

sudo mount -t vboxsf -o rw,uid=1000,gid=1000 share /home/seed/host|

exit 0
```

The status bar at the bottom indicates "sh", "Tab Width: 8", "Ln 14, Col 67", and "INS".

9. Save the changes and reboot VM. Now anything placed in `/home/seed/host` inside the VM should be visible from the `share` folder on the host machine, and vice versa.