

# ROS - Virtualizing Ubuntu Linux with Virtual Box

## ME 4140 - Introduction to Robotics - Fall 2019

What is a **Virtual Machine** ? :



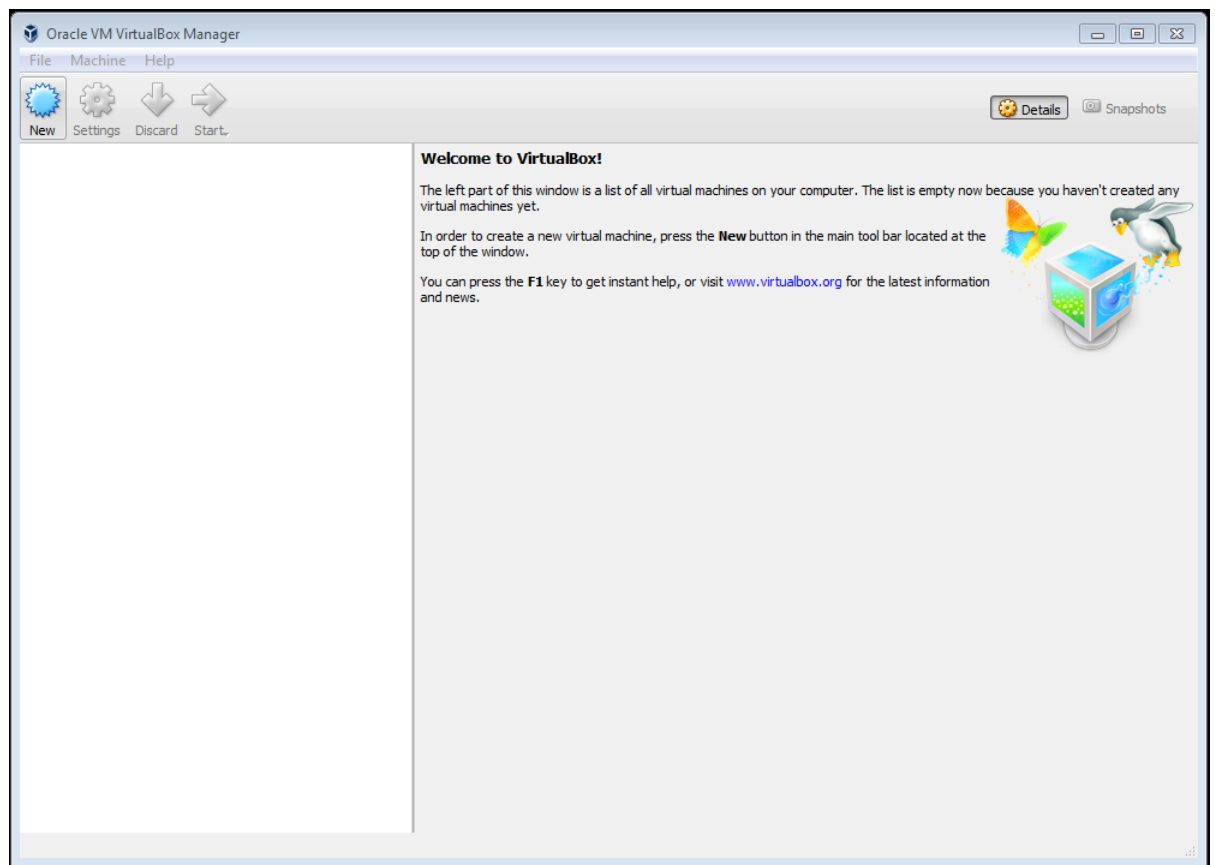
- A VM is an Operating System that is *virtualized* in your native operating system
- this is very useful for experimenting and learning
- not perfect for permanent use
- can be resource intensive
- **VirtualBox** is a popular application used for this process

### Overview of Setup Process :

1. First install VirtualBox from Oracle which is an application for *virtualizing* operating systems on top of an existing one.
  - (a) Download the install file for VirtualBox. Choose the file that matches your computer.
  - (b) Click the file and install VirtualBox on your computer.
2. Next setup a virtual operating system to use as an environment to learn ROS.
  - (a) Download or copy the .iso file for Ubuntu 18.04 LTS
  - (b) Using VirtualBox install Ubuntu 18.04 LTS as a virtual operating system on your hard drive.
  - (c) Briefly test your new OS. The internet must work.
3. Install ROS Melodic
  - (a) This is done in the *terminal* in Ubuntu. Follow the step by step instructions carefully.

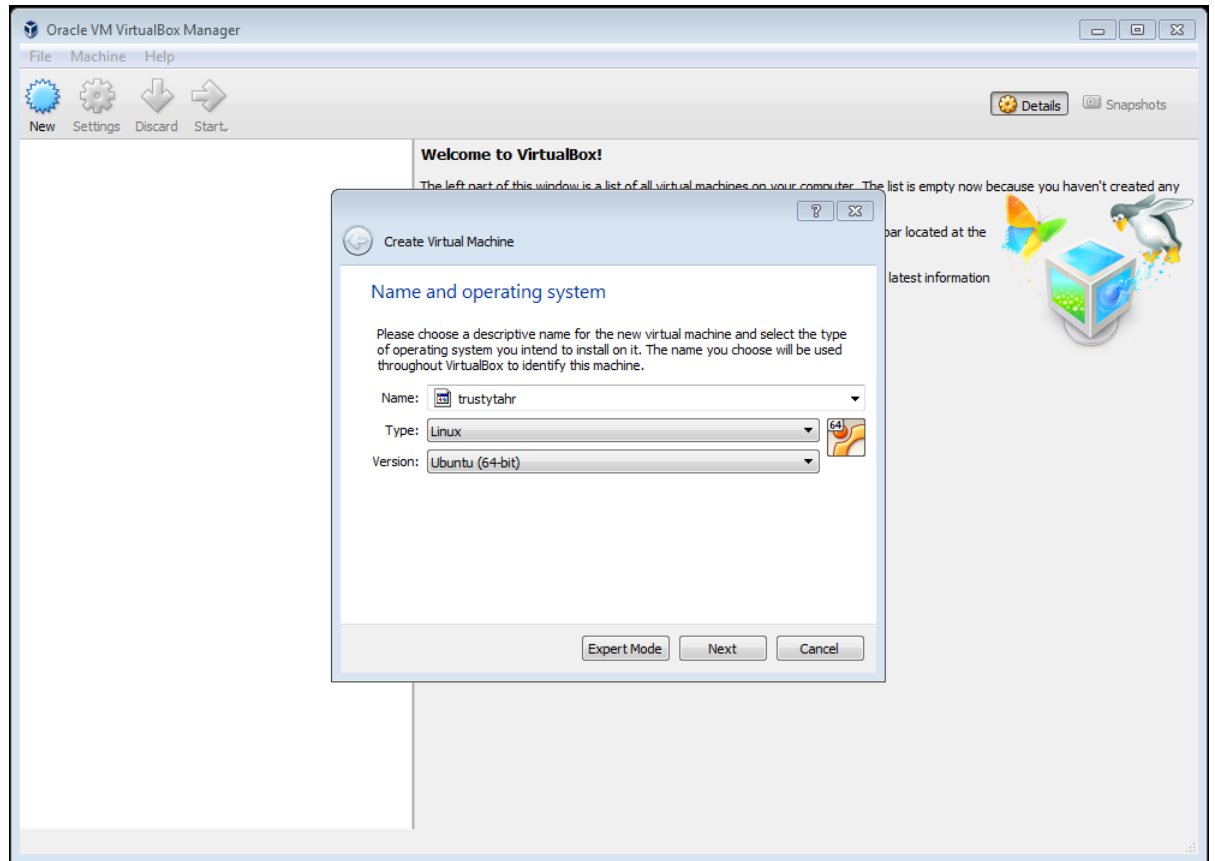
**Virtual Box Installation :**

1. Acquire Needed Files ( VirtualBox + Ubuntu ) :
2. Install VirtualBox Application:
3. Open VirtualBox:



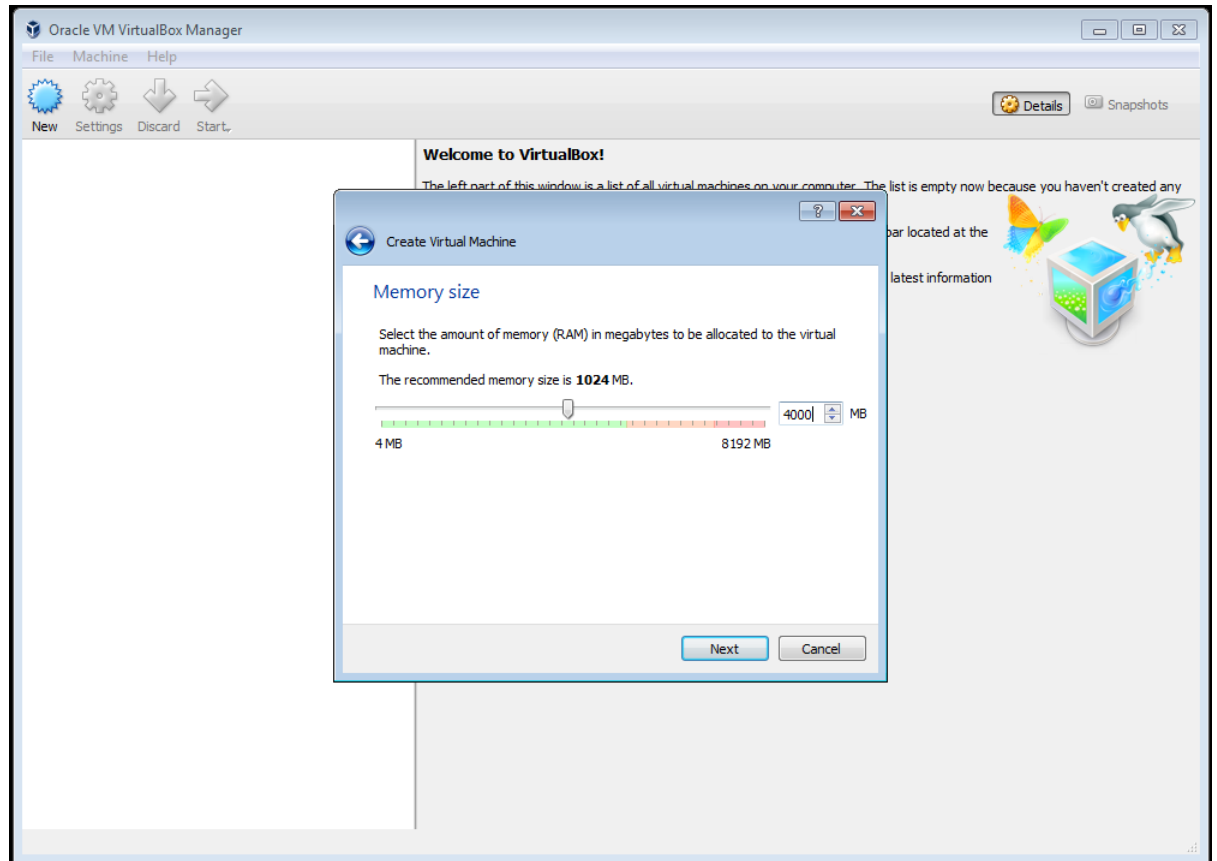
- if you have never used this before the list on the left should be empty
- before you start you should make sure you have an internet connection
- before you start you should make sure you have access to a power supply or battery

## 4. Create New Virtual Machine:



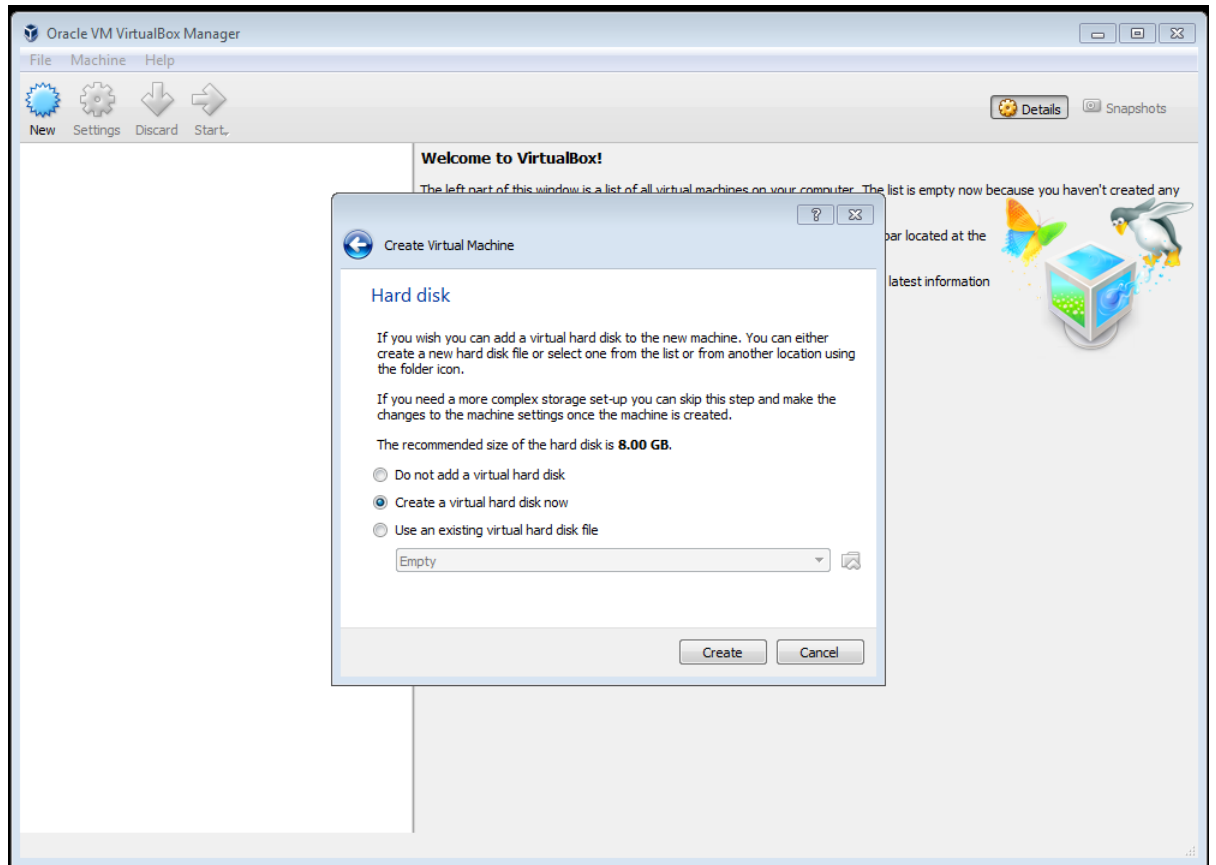
- press the **new** button
- choose a **computer name** (this is your choice but remember it!)
- choose an **operating system** type (Linux)
- choose a **version**, this depends on your physical machine This is probably Ubuntu 64-bit but possibly Ubuntu 32-bit)

## 5. Define Virtual Machine Parameters:



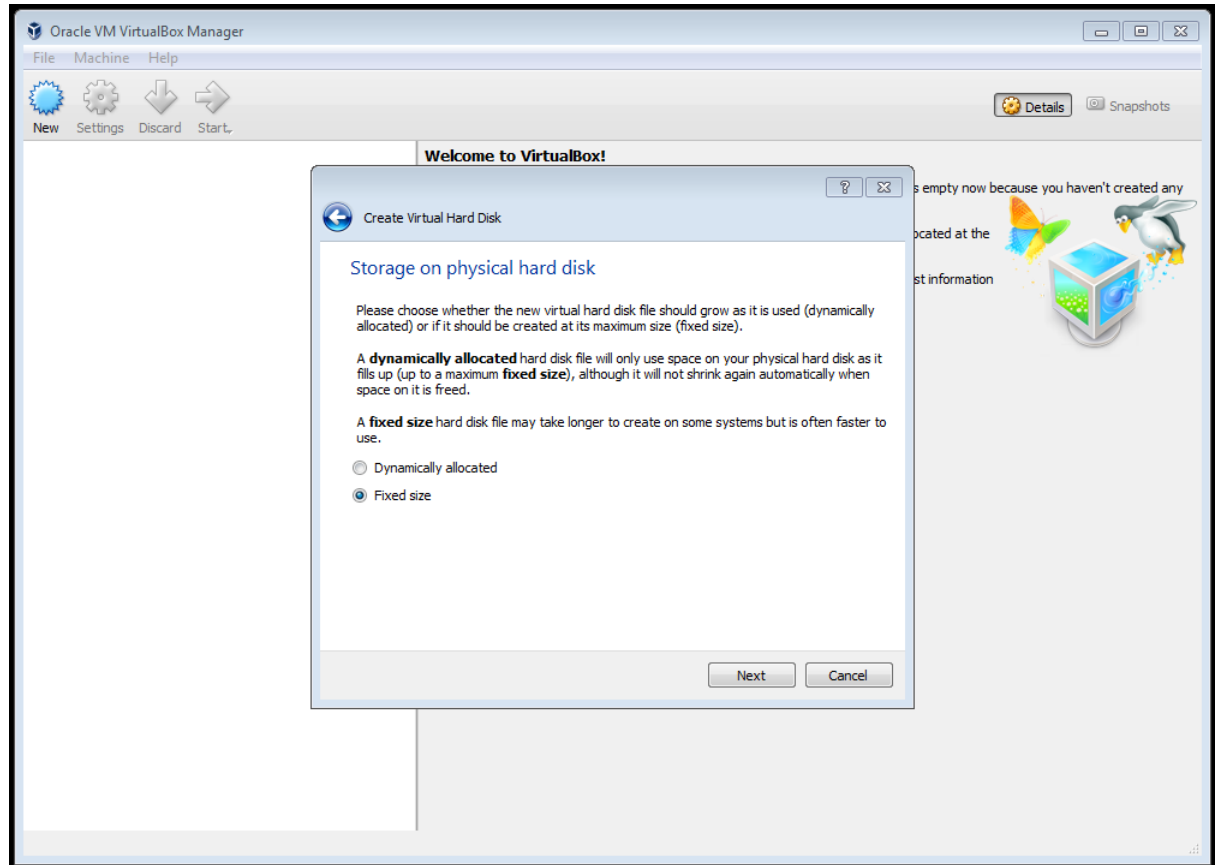
- Choose the amount of RAM you want to allocate to the VM
- This number is based on your available resources. More is better but it helps to leave some for windows. If your computer has 8GB total I suggest no more than 6GB for for VM.

## 6. Define Virtual Hard Drive Parameters:



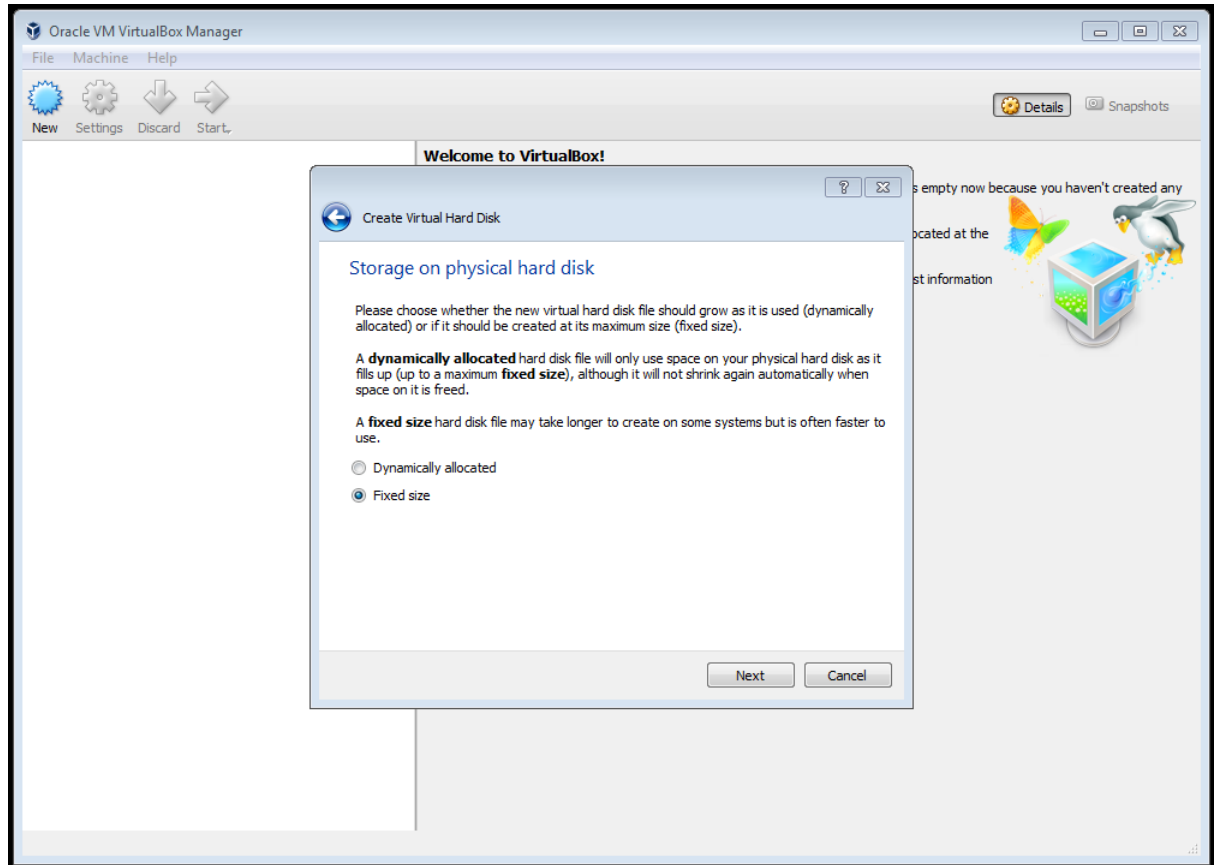
- You must have enough space on your hard drive to virtualize linux and install ROS.
- **create a virtual hard drive now**

## 7. Virtual Hard Drive Setup:



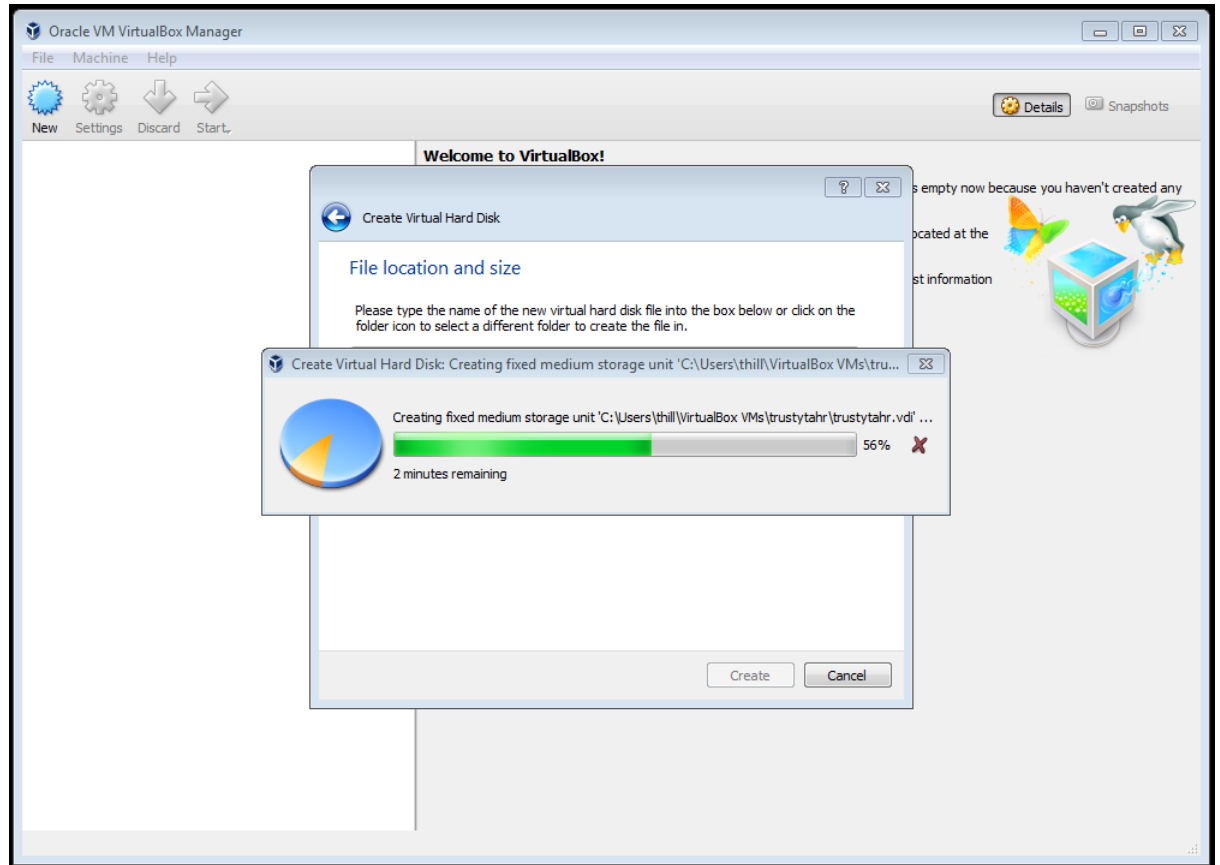
- Create a **fixed size** virtual hard drive.

## 8. Virtual Hard Drive Setup:



- Choose the virtual hard drive type.
- VDI is recommended.

## 9. Virtual Hard Drive Setup :

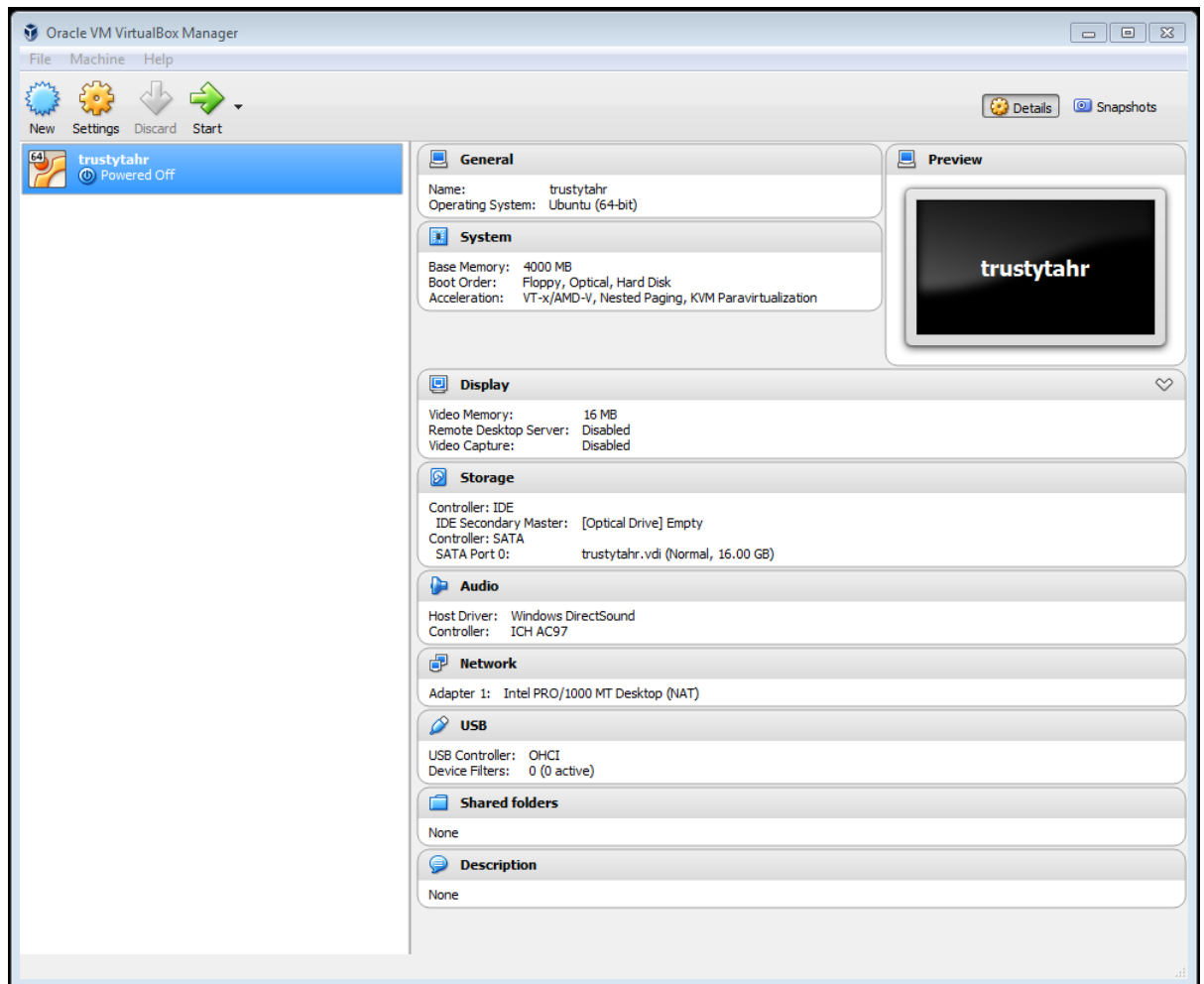


- choose the size of your virtual hard drive
- to virtualize Ubuntu and install ROS it is recommended to make a 16 GB VDI
- you can experiment with 'lighter versions'
  - lubuntu
  - many more
  - I am working on this



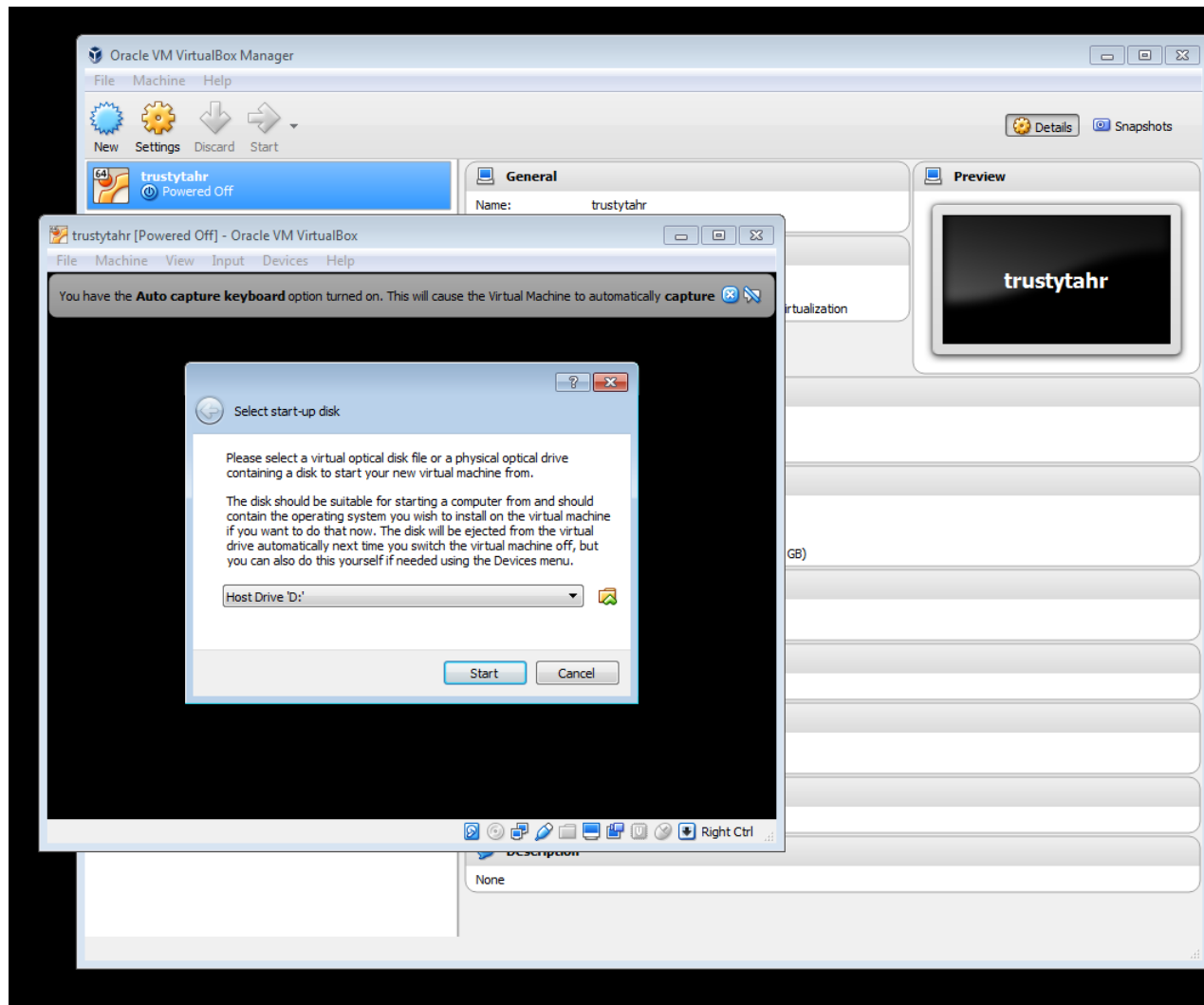
**Ubuntu OS Installation and Setup :**

1. Start the VM for the first time:



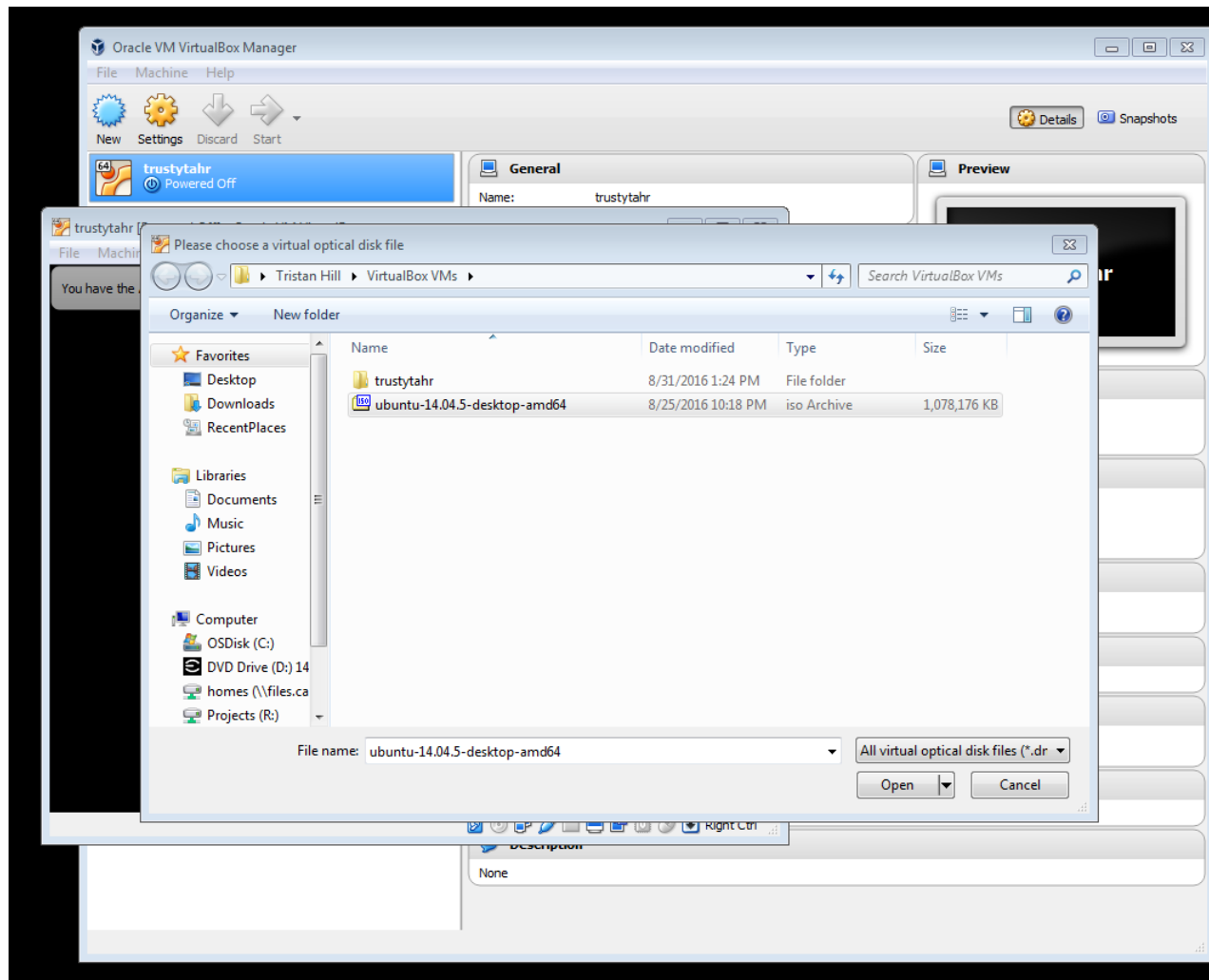
- select your newly created VM
- press the green start button
- wait for it...

2. Start the VM for the first time:



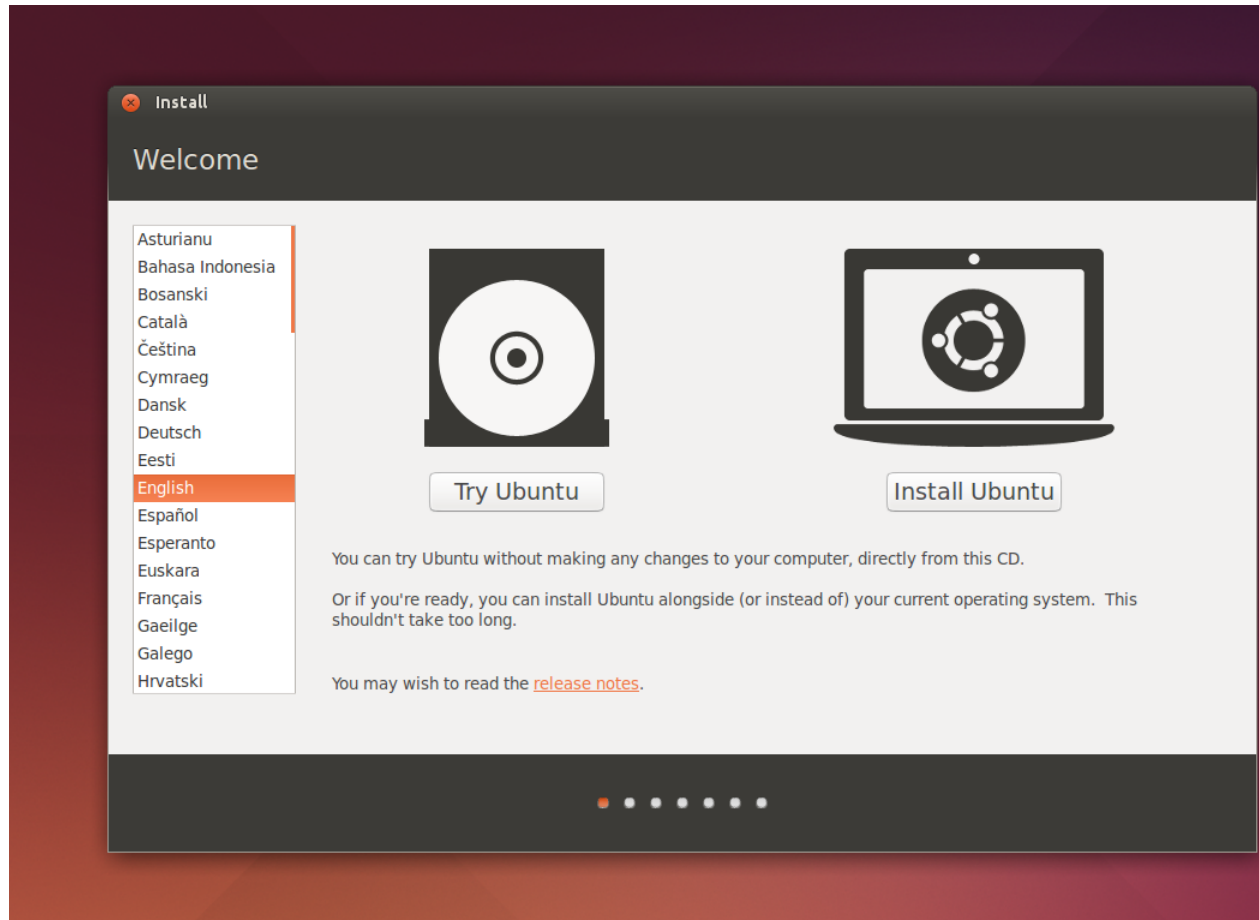
- choose to select media from a local folder
- wait for it...

3. Start the VM for the first time:



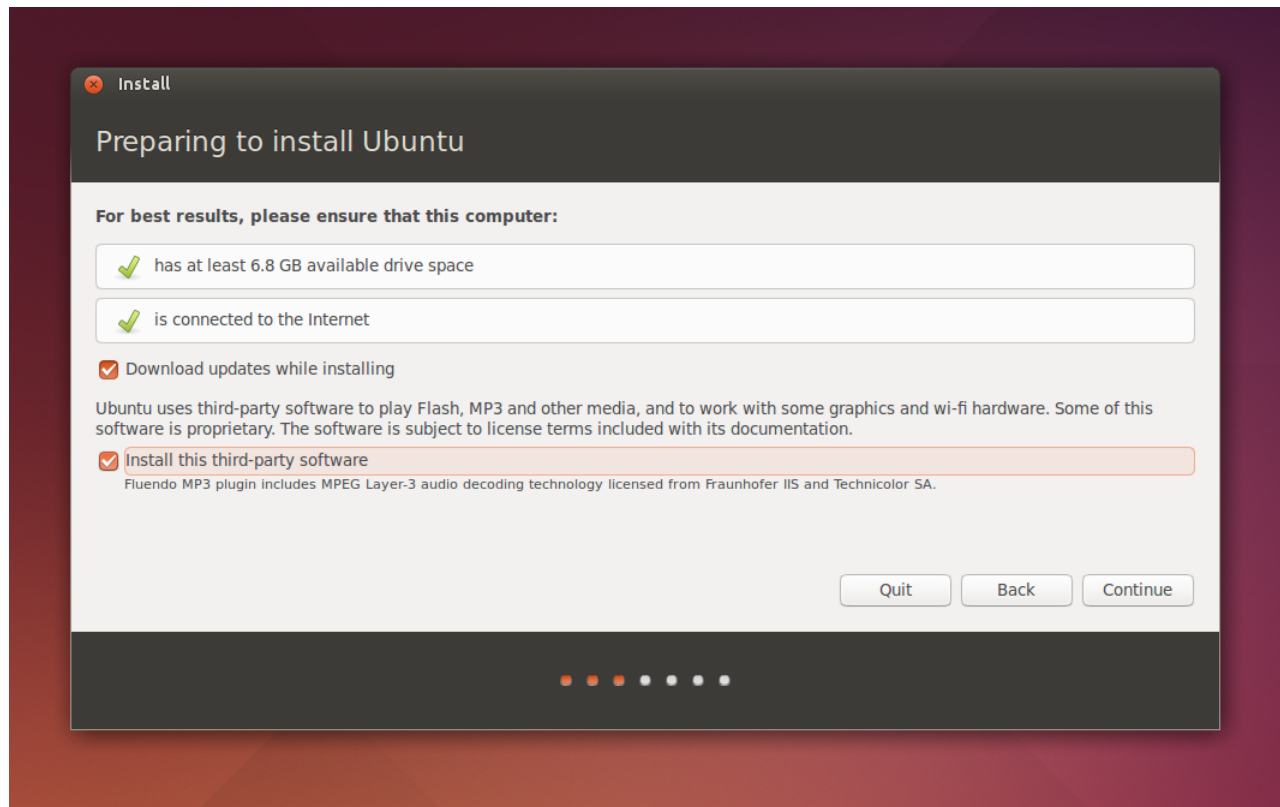
- choose the Ubuntu .iso file that you acquired
- it is recommended that the media is on the local machine
- wait for it...

## 4. Ubuntu Installation:



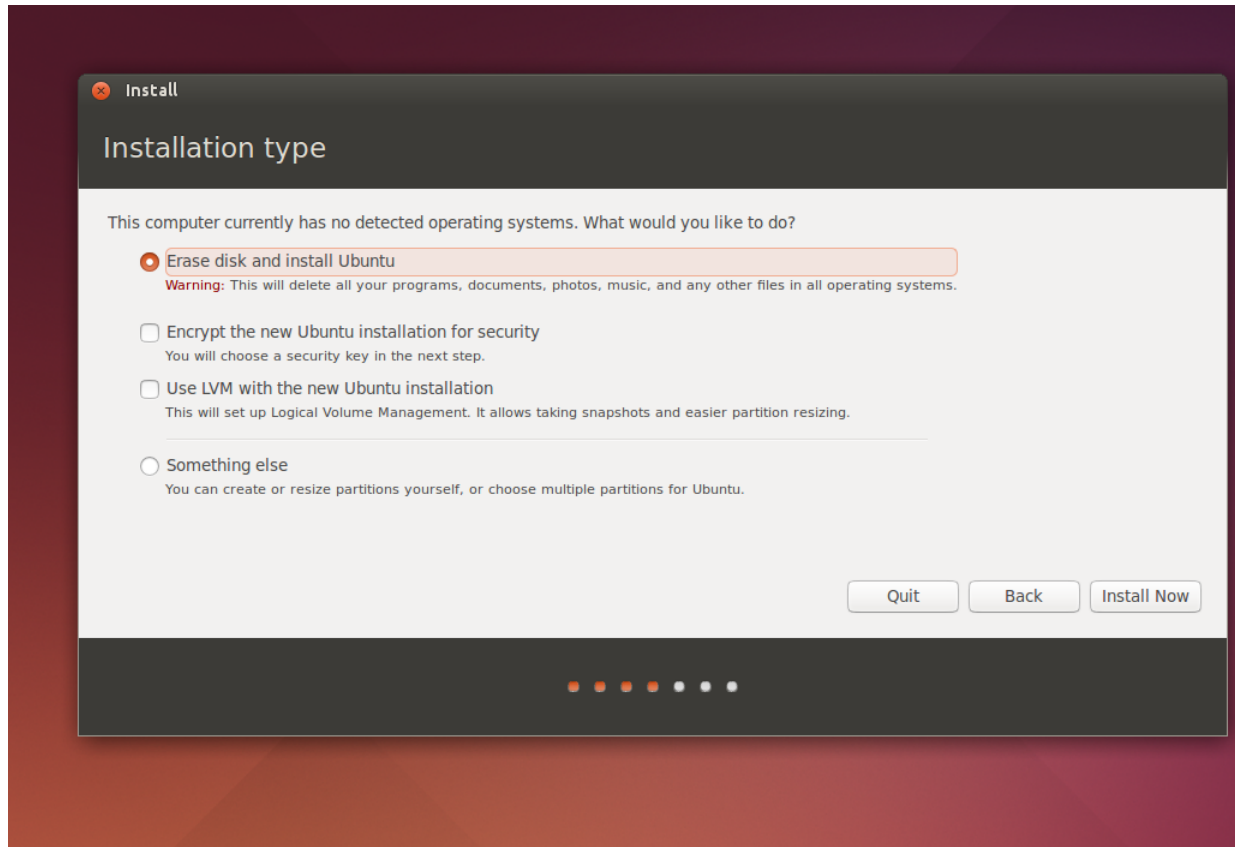
- **Install Ubuntu** (harmless if using VirtualBox)
- try is just temporary (single session)
- wait for it...

## 5. Ubuntu Installation:



- check that you meet the requirements
- click the two check boxes for proprietary drivers

## 6. Ubuntu Installation:

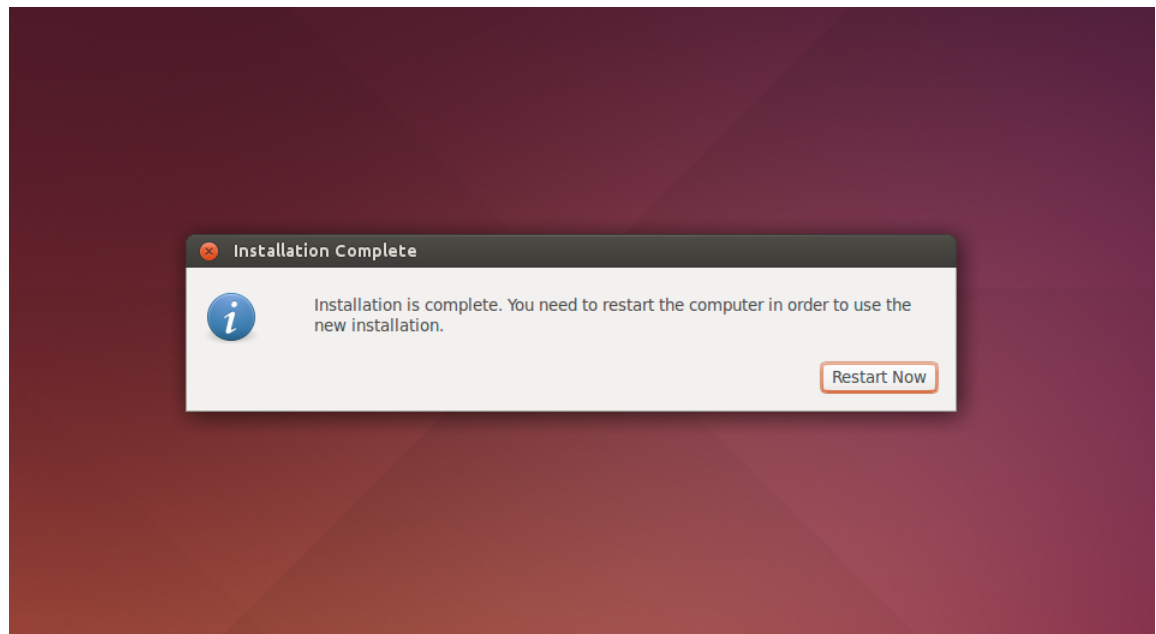


- **Erase Everything and Install Ubuntu** (harmless if using VirtualBox)
- DANGEROUS AND PERMANENT IF NOT USING VIRTUALBOX
- wait for it...

7. Wait Wait Wait:

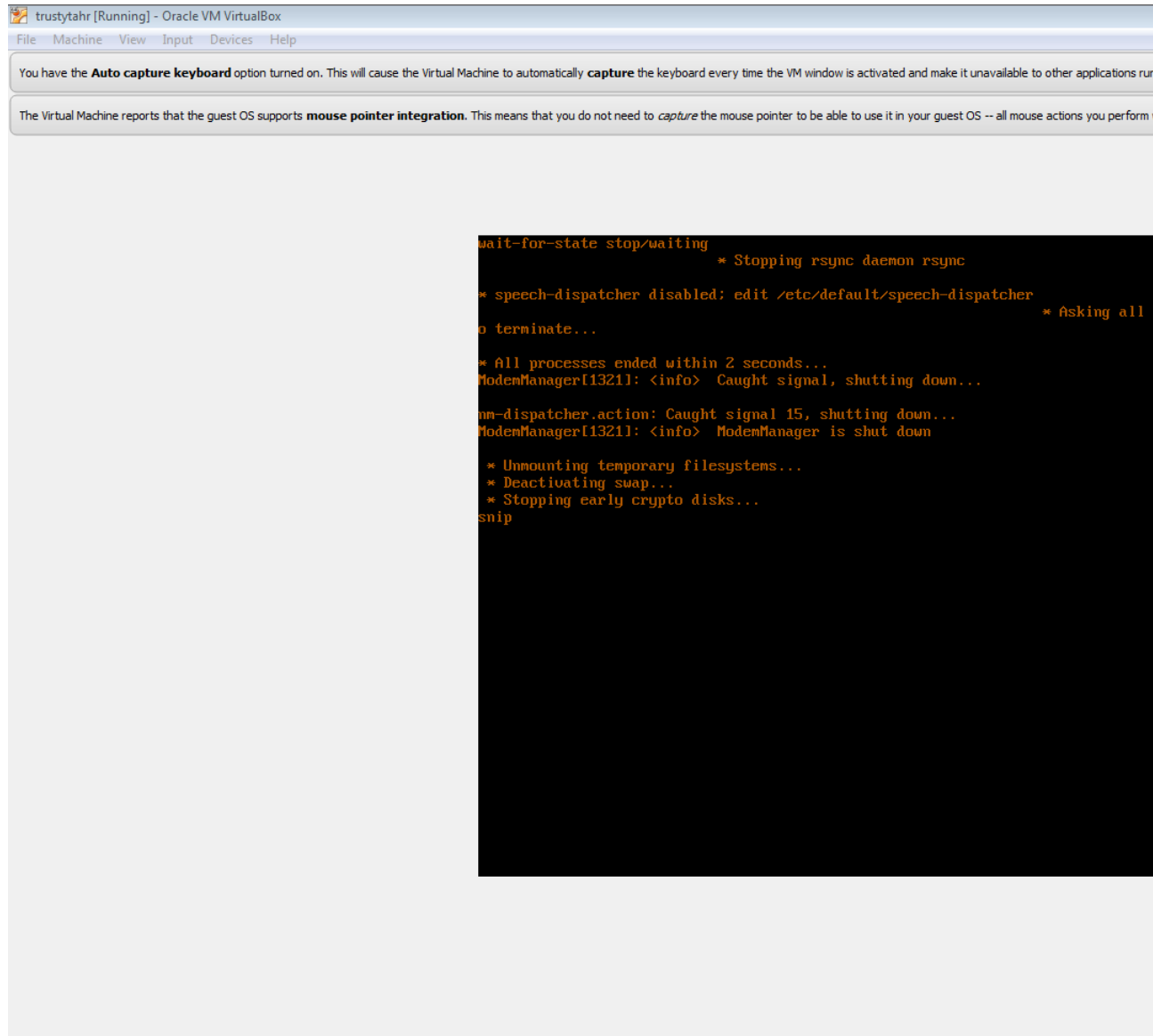


8. Shut Down The VM:





## 9. Shut Down The VM:

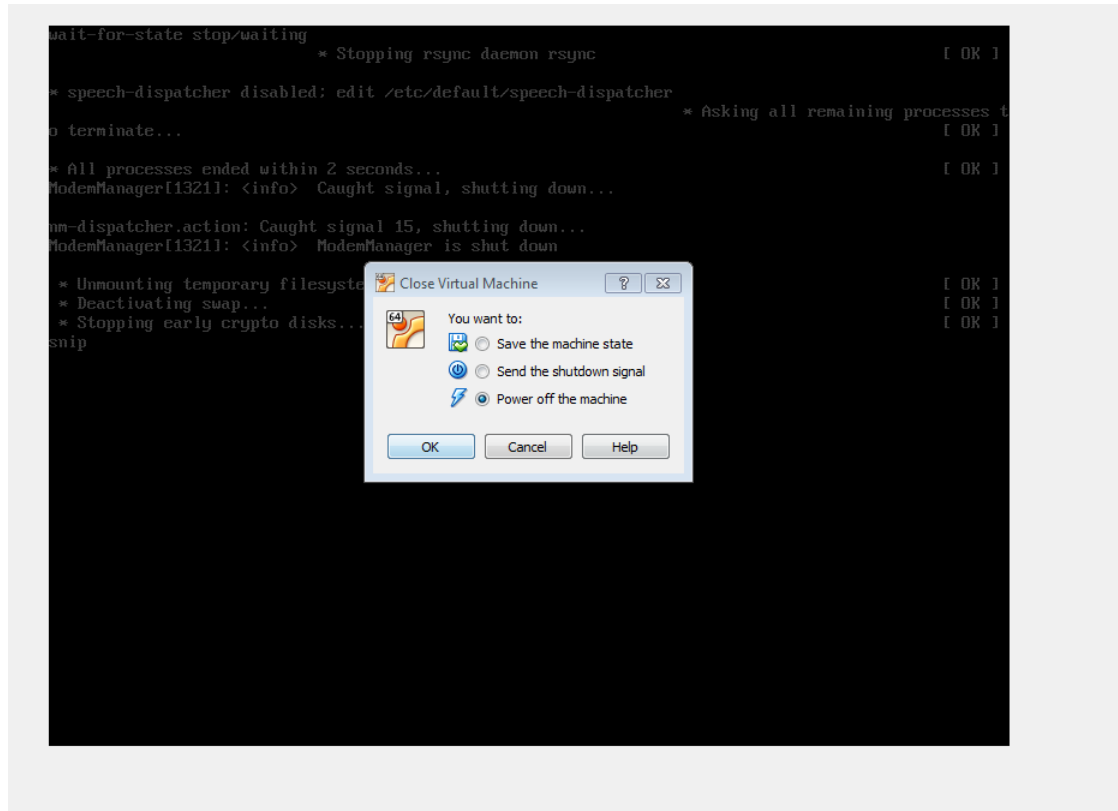


The screenshot shows the Oracle VM VirtualBox interface. The title bar reads 'trustyahr [Running] - Oracle VM VirtualBox'. Below the title bar is a menu bar with 'File', 'Machine', 'View', 'Input', 'Devices', and 'Help'. Two informational messages are displayed: 'You have the **Auto capture keyboard** option turned on. This will cause the Virtual Machine to automatically **capture** the keyboard every time the VM window is activated and make it unavailable to other applications running on the host.' and 'The Virtual Machine reports that the guest OS supports **mouse pointer integration**. This means that you do not need to *capture* the mouse pointer to be able to use it in your guest OS -- all mouse actions you perform will be sent directly to the guest OS.' The main display area shows a terminal window with the following output:

```
wait-for-state stop/waiting
* Stopping rsync daemon rsync
* speech-dispatcher disabled; edit /etc/default/speech-dispatcher
o terminate... * Asking all
* All processes ended within 2 seconds...
ModemManager[13211]: <info> Caught signal, shutting down...
nm-dispatcher.action: Caught signal 15, shutting down...
ModemManager[13211]: <info> ModemManager is shut down
* Unmounting temporary filesystems...
* Deactivating swap...
* Stopping early crypto disks...
snip
```

- wait for it...
- after waiting a few moments you may have to close the window of the VM

10. Finally!:



- POWER OFF the Machine

11. Now restart the VM!!!:

- the VM you made should be in the left list
- select it and click start
- the Ubuntu OS should appear