Virtual Box
Ubuntu 18.04 LTS Virtual Machine – Installation Instructions

1 .0 Introduction

This installation guide will provide step-by-step examples for the installation of VirtualBox Virtual Machine software and the Ubuntu 18.04 LTS Operating System. The installation is performed on a Ubuntu machine. However, the installation process will be very similar for different operating systems (such as Windows 10 or MAC OS).

1.1 Virtual Machines

A virtual machine is a software package that will allow a virtual or 'guest' operating system to be executed as an application under a 'host' operating system. This guide uses VirtualBox Virtual Machine (VM) and assumes the host operating system is Windows. VirtualBox VM will work under Mac or other Linux hosts.

1.2 Background

This document assumes a basic knowledge of Internet, browsers, and a Windows or MAC OS based operating system. This includes an understanding of file manipulation, downloading files, and the directory hierarchy.

1.3 Text Editors

A text editor will be required to create and edit program source files. The Ubuntu Operating System supports a number of different text editors. This includes standard simple text editors such as ***gedit*** to very powerful complex Integrated Development Environments (IDEs) such as CodeBlocks. An IDE will not be required, however it may be useful (for later classes).

1.3.1 Text Editor

The basic text editor ***Text Editor*** is pre-installed and a popular choice. For writing programs it will be useful to display the line number. The line number display is an option which is off by default. To turn the line number display on, use the Text Editor → Preferences → Display line numbers (a check box).

1.3.2 Other Editors

Other text editors, such as emacs, vim, or sublime, can be installed. Refer to section 9.0 for additional information.

1.4 Ubuntu References

There is a significant amount of Ubuntu Operating System 18.04 reference information available on the Internet. One simple guide is named Getting Started with Ubuntu 18.04 and is available free on-line at http://ubuntu-manual.org/ (in PDF format).

2 .0 Ubuntu Virtual Machine – Set-up Instructions

The following instructions will provide detailed guidance for installing VirtualBox VM software and then installing the Ubuntu Operating System within VirtualBox. Before getting started, you should download the required software:

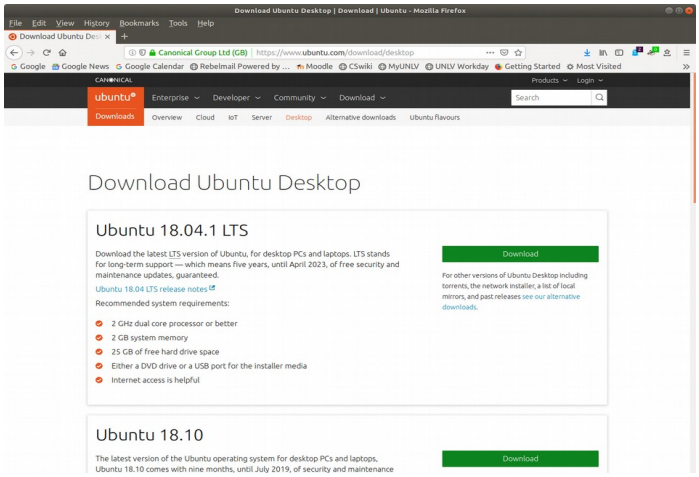
- VirtualBox Virtual Machine
  - http://www.virtualbox.org/wiki/Downloads
    - File Name: VirtualBox-5.2.24.???-Win.exe OR VirtualBox-6.0.???-Win.exe
    - File Name: VirtualBox-5.2.24.???-OSX.dmg OR VirtualBox-6.0.???-OSX.dmg

- Ubuntu 18.04 LTS Operating System (64 bit version)
  - http://www.ubuntu.com/ (main page)
  - https://www.ubuntu.com/download/desktop (download page)
    - File Name (or similar): ubuntu-18.04-desktop-amd64.iso

Additionally, administer rights will be required in order to perform this (or any) software installations on the host machine.

VirtualBox Download Page:

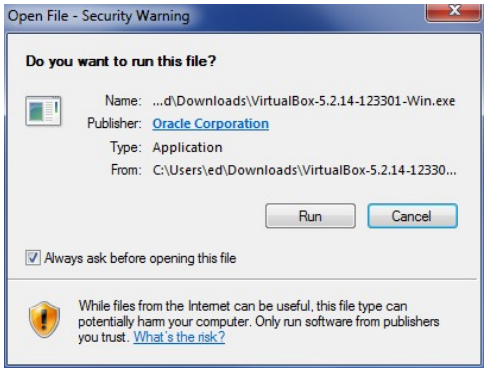
Ubuntu Download Page:



Note, the visual appearance of these page changes routinely.

3 .0 VirtualBox Software Installation

- Begin the VirtualBox VM installation by double-clicking on the downloaded file.
- For Windows hosts, when the Security Warning message appears, click on **Run**.



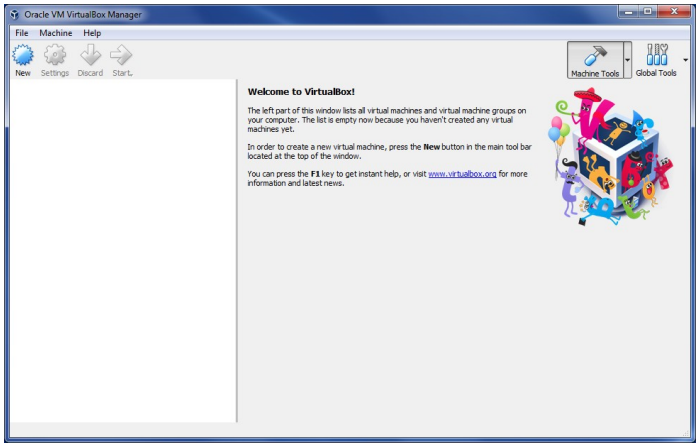
- The standard Setup Wizard will appear. For most users, it will be best to click on Next and accept the default installation options. Version 5 or version 6 installation are similar.

- The installation requires Administrator privileges. If prompted, click on Yes
- During the installation, the 'Windows Security ' message will appear multiple times. Each time it appears, click on the **Install**. You may choose to trust the software from Oracle which will suppress further prompts.

- This completes the VirtualBox software installation.

4 .0 Ubuntu Operating System Installation → Create New Empty Virtual Machine

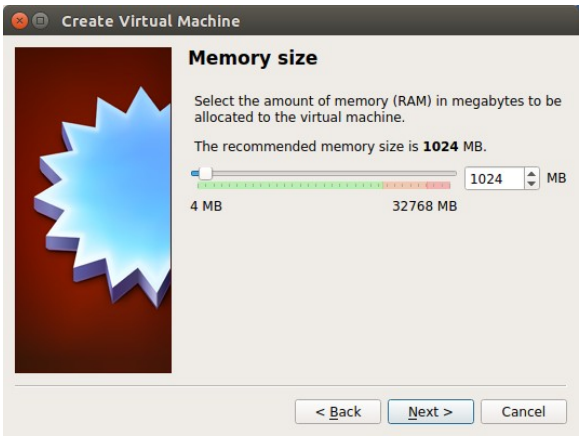
- Once the installation has completed, start the VirtualBox application.
  - After a successful installation, the VirtualBox start screen will appear as follows:



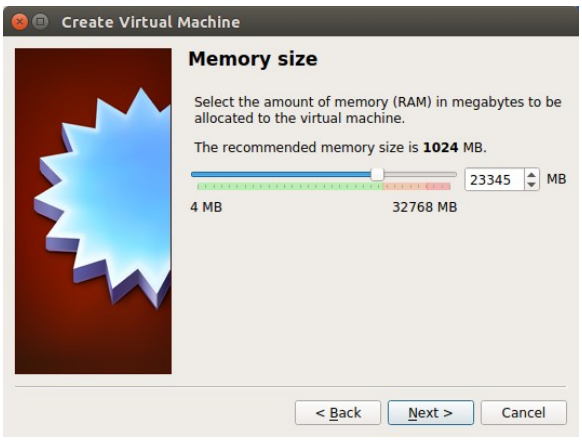
- To start the installation click on the **New** icon (upper left corner of the VirtualBox screen). The following screen will be displayed. Click on the Next button (bottom right)
- The following screen (or something very similar) will be displayed.

- Enter an appropriate name for the virtual machine (i.e., Ubuntu 18.04 LTS) and ensure the Operating System Type changes to Linux (it should be automatic). Also ensure the Version is Ubuntu (64 bit). It should appear similar to the below image. When done, click **Next t**o continue.

- The optimal memory selection (automatically selected) will be based on your machine. As such, it is safe to use the default (but limiting). Click **Next** to continue.



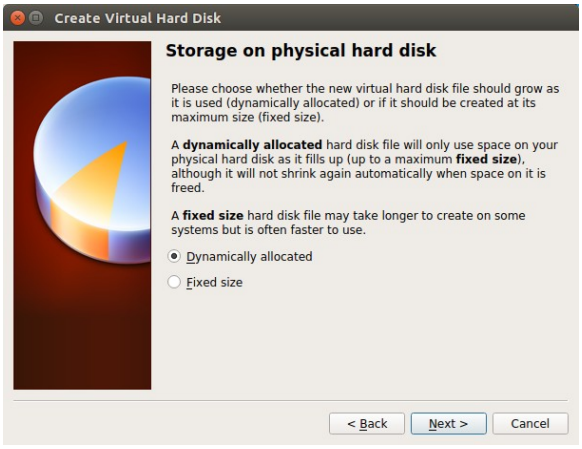
- It is recommended, it increase the memory limit to the maximum (up to the red, but not past) as shown below.



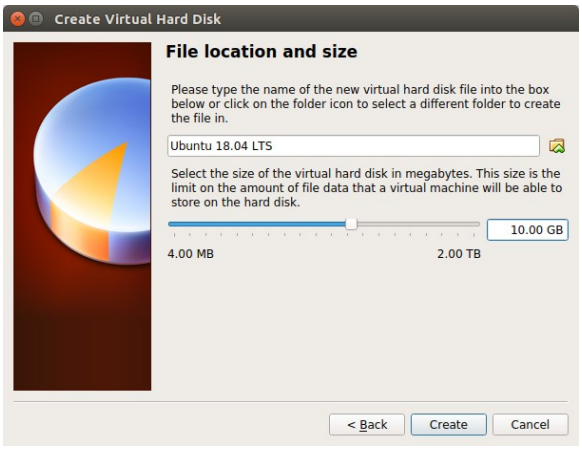
- The 'hard disk' for the VM is also virtual. For a new installation (as this is), the default 'Create new hard disk' is appropriate. The recommended hard disk size will be based on your machine. Click on **Next** to continue.

- The 'Create Virtual Disk' Screen will be displayed. Accept the default 'VirtualBox Disk Image' option. Click on **Next** to continue.

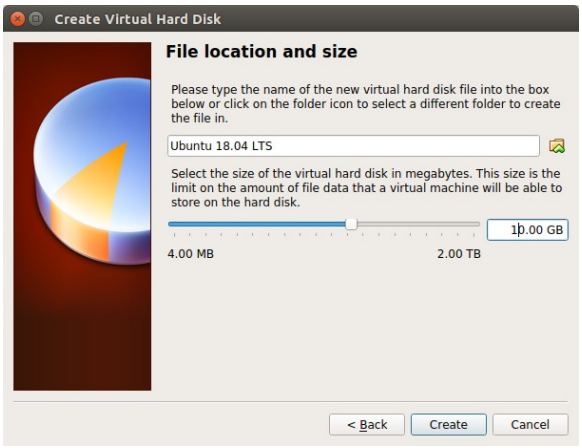
- The default of Dynamically expanding storage is an appropriate default. Click on **Next** to continue.



- The file location and size screen will be displayed as follows:



- It is recommended to increase the default size from 10 GB to 40 GB as shown below (unless the available hard-disk space is very limited). The VirtualBox will only use the amount of the disk space actually needed, up to the provided limit. When done, click 'Create'.



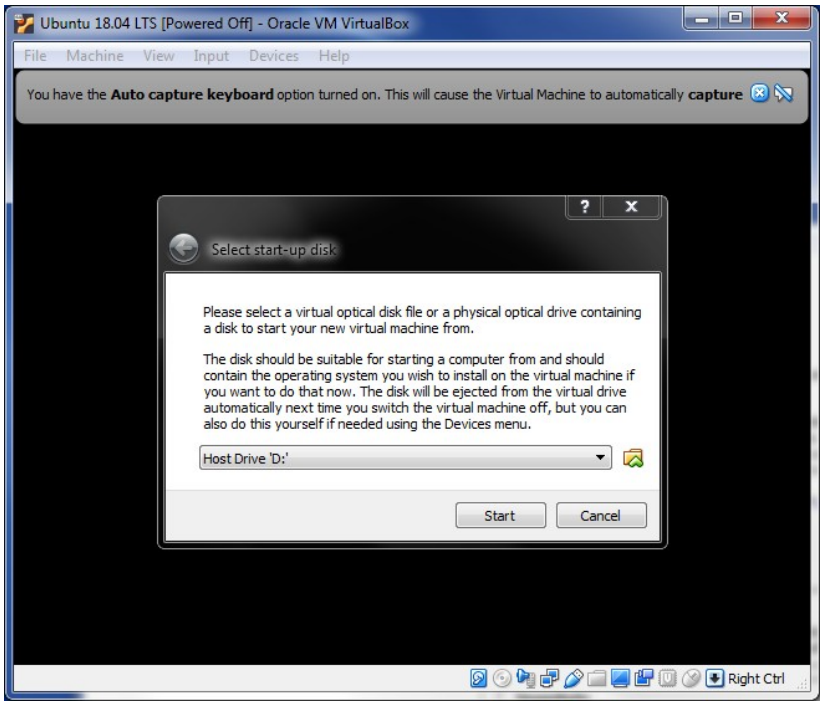
- *Note*, at this point, this is a blank VM (i.e., with no operating system installed).

- The VB main screen will be displayed showing the new, empty at this point, virtual machine on the left (as shown).

5 .0 Ubuntu Operating System Installation → Operating System Installation

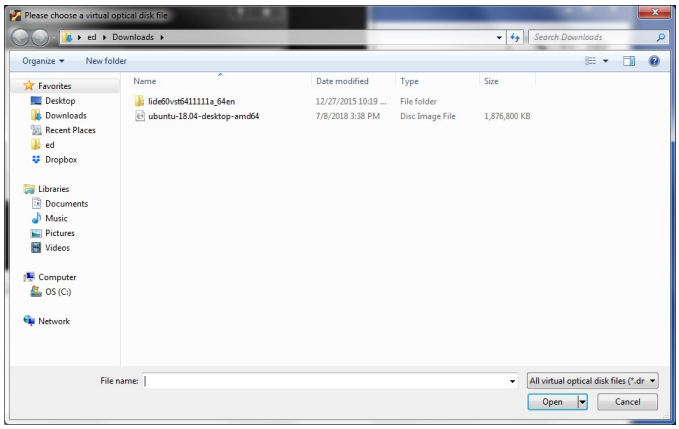
- VirtualBox will display the empty Virtual Machine similar to the following image.
- Click on the **Start** icon (top, left side with green arrow) to start the blank VM.

- Depending on the specific hardware configuration, the Auto capture keyboard message may be displayed. It is safe to ignore this screen or click on the blue x (upper right corner).
- The 'Select start-up Disk' prompt for the Installation Media location will be displayed



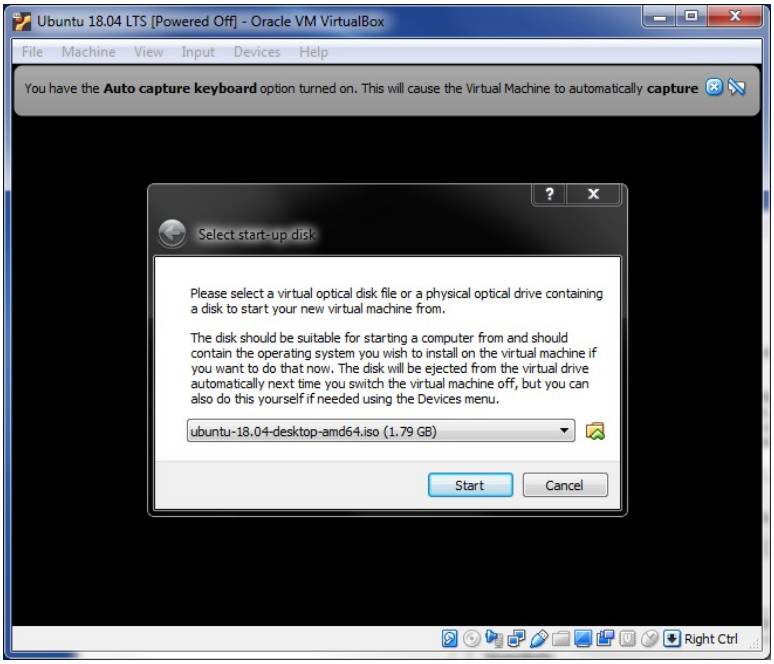
- Click on the file icon (with green up carrot, right side of Select start-up disk screen).

- A standard file open dialog will be displayed (as per the appropriate OS). Navigate to the location of the Ubuntu image file (previously downloaded from the Ubuntu web site). Navigate to the location where the Ubuntu 18.04 ISO file was downloaded and select.



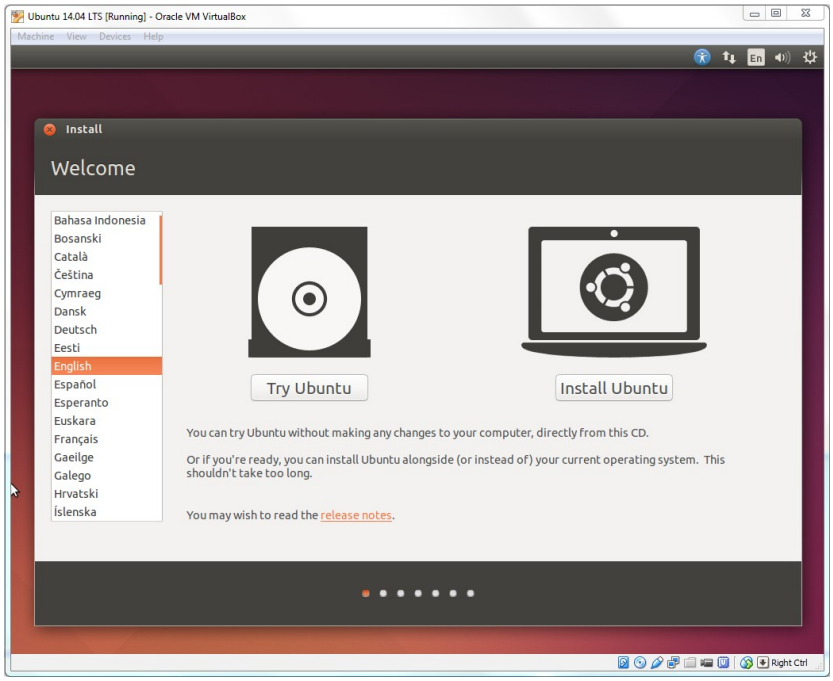
- Select the file (i.e., something like 'ubuntu-18.04.1-desktop-amd64') and then click **Open**.

- When done, the Ubuntu media should be shown on the screen as follows:

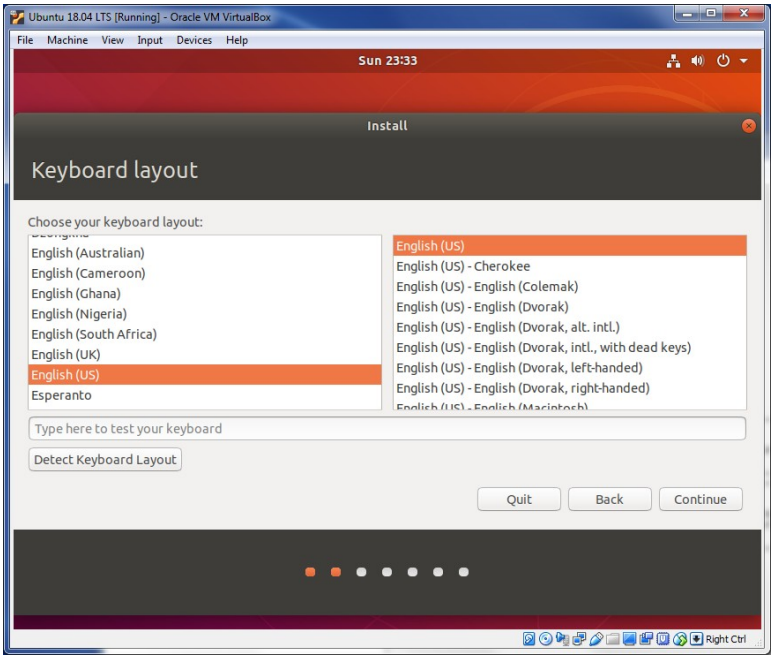


- When ready, click on the Start button.
- It may take a few minutes to load.

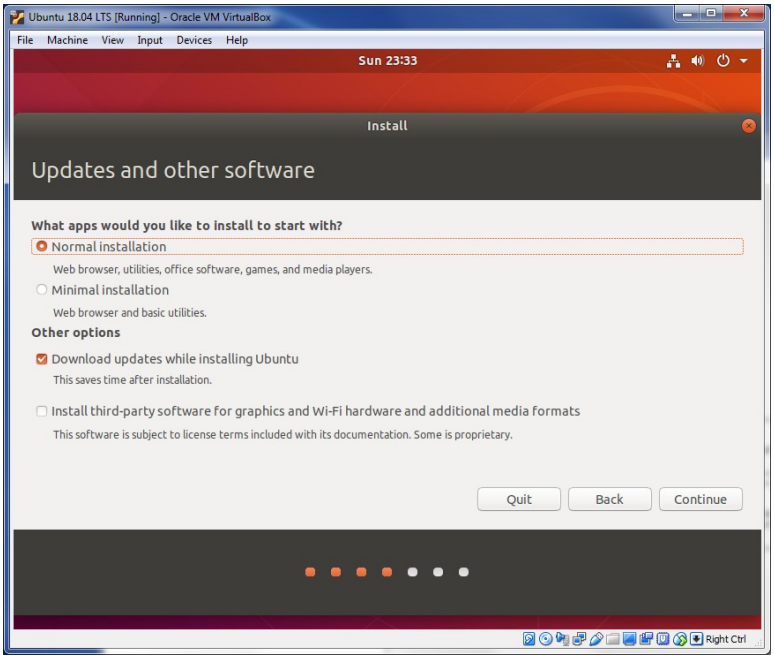
- At this point, the Ubuntu operating system installation will begin. An image similar to the following will be displayed. Click **Install Ubuntu** (right side) to begin the installation.



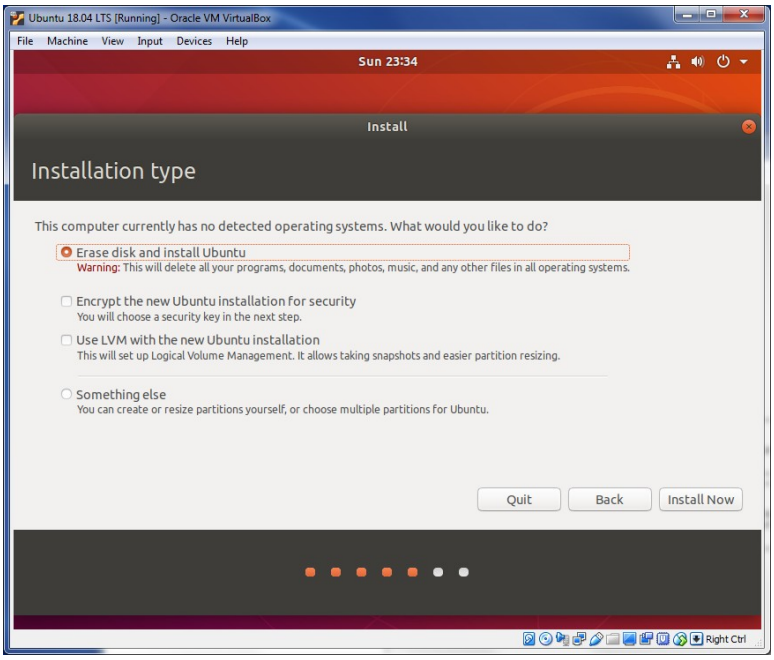
- The keyboard layout selection screen will be shown. The default selection of USA keyboard is appropriate. Click on **Continue** to continue.



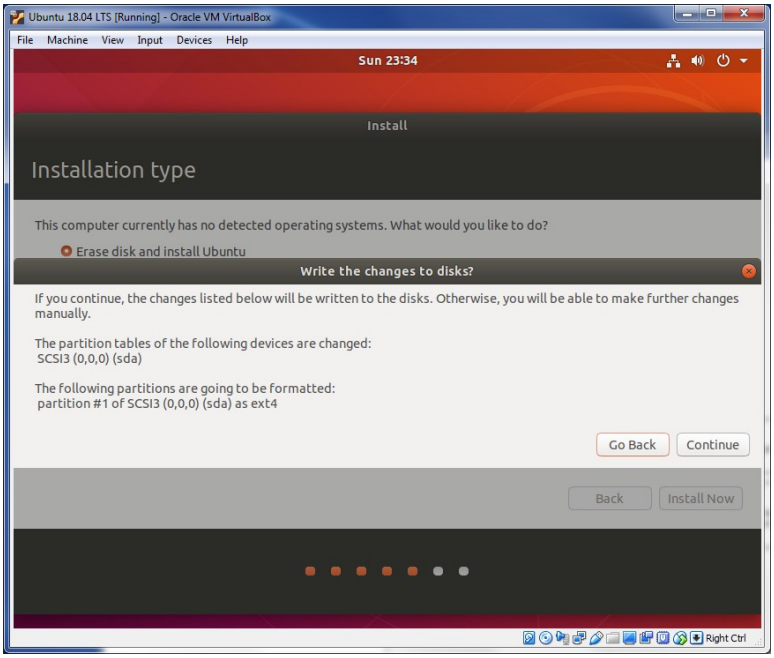
- The Updates and Other software screen will be displayed. The default selections are appropriate. You should be connected to the Internet. Click on **Continue** to continue.



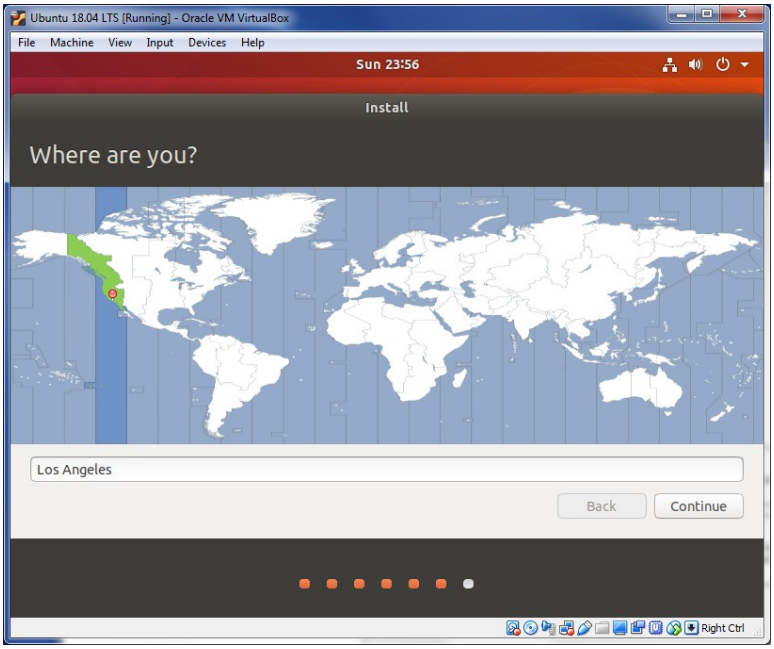
- The Installation Type selection screen will be displayed. Select the installation type, which for our purposes, it is appropriate to erase disk.
- *Note* that the 'entire disk' in this case is the virtual disk, not the host OS hard disk.
  Click **Continue** to continue.



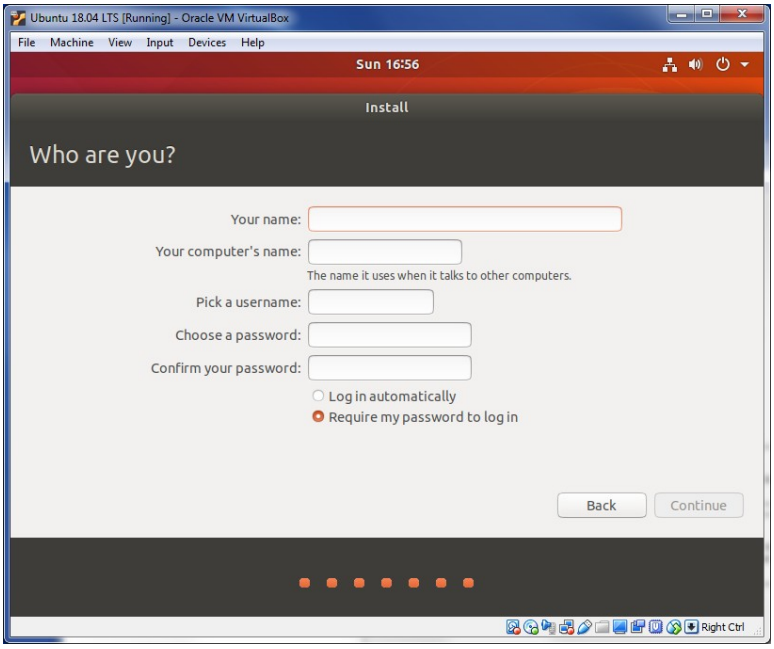
- The confirmation screen will be displayed. Click **Continue** to continue.



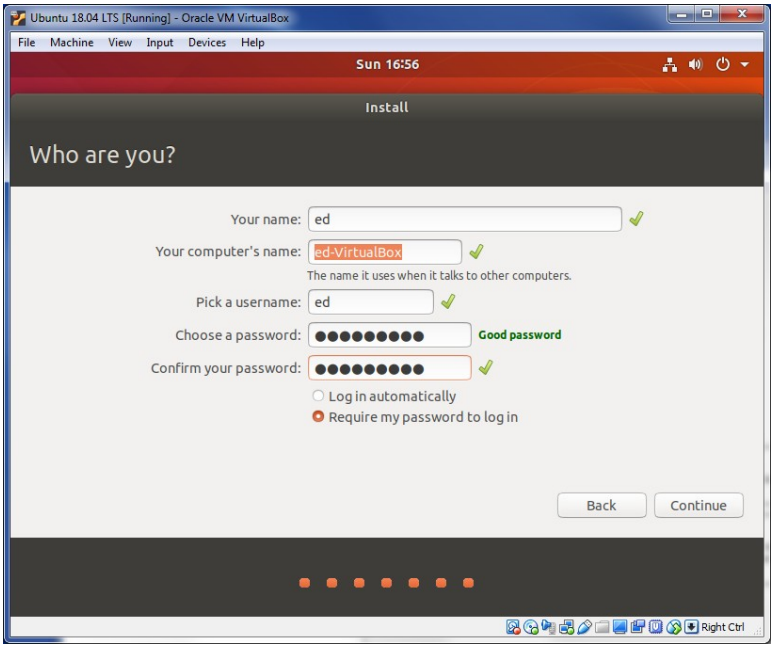
- After a few moments, the Where are you? screen will be displayed. Select the appropriate time zone (Los Angeles for our timezone in Las Vegas) and click on **Continue** to continue.



- The Who are you? Screen will be displayed.

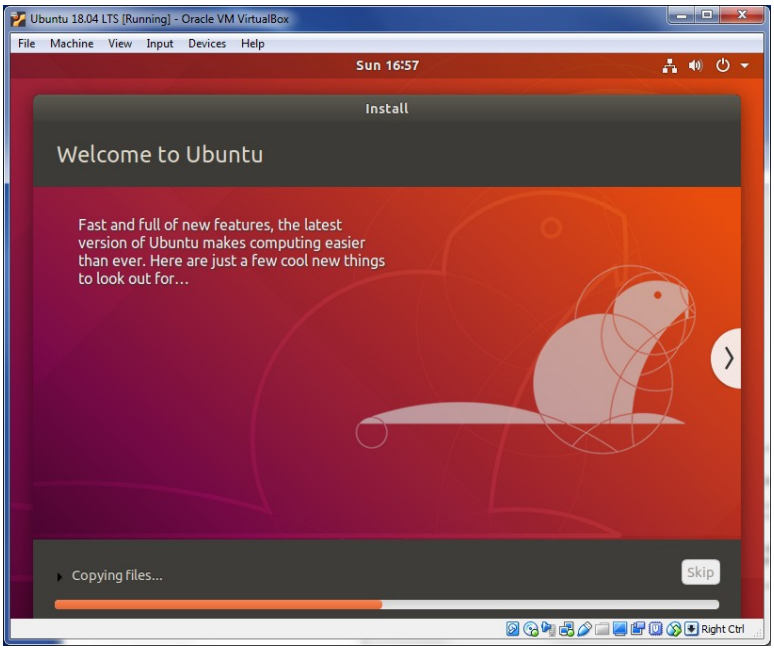


- Enter your name, user name, password, and computer name. This user name and password will be used to login when the installation is completed. *Note*, if you forget this information, a re-install will be required.

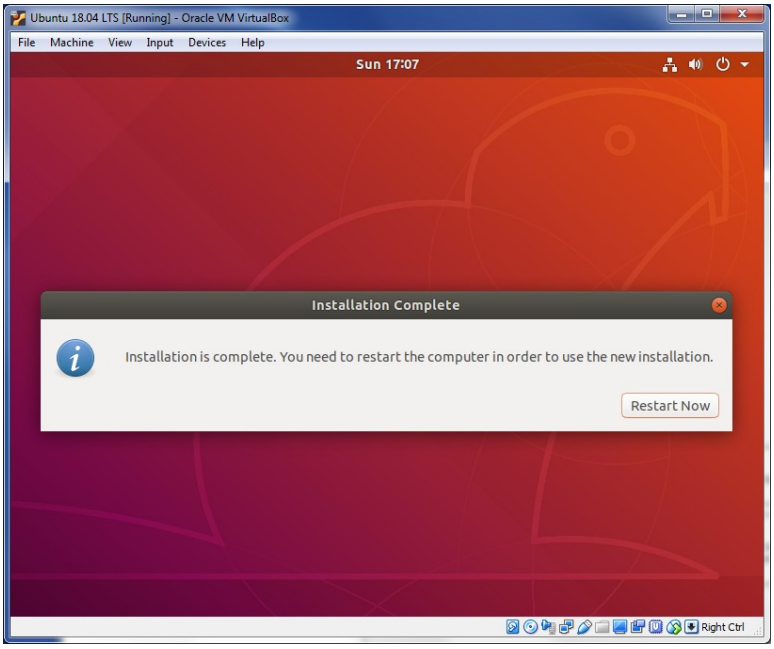


- When the information is entered, click **Continue** to continue.

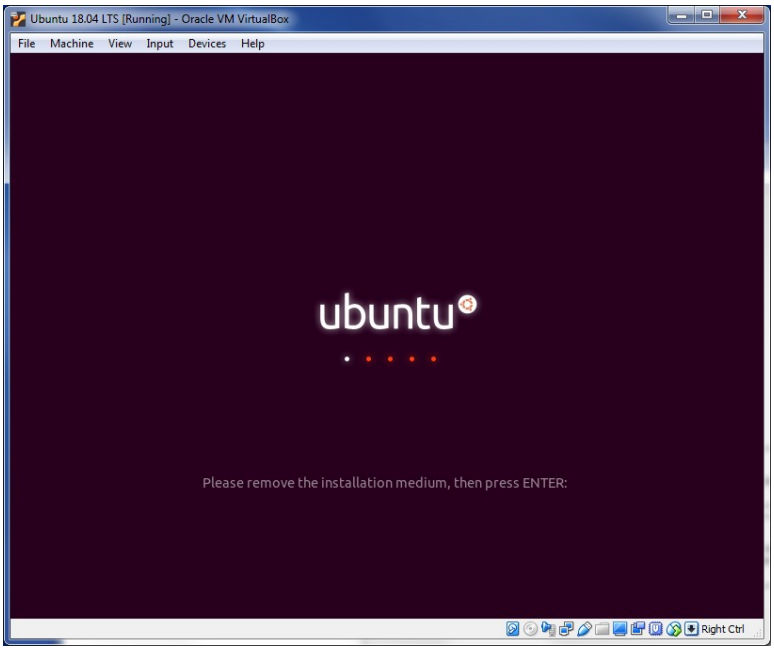
- At this point, the installation will proceed. Progress will be displayed.
- *Note*, depending on the hardware, this may take a while. No further action is required until the installation is completed.



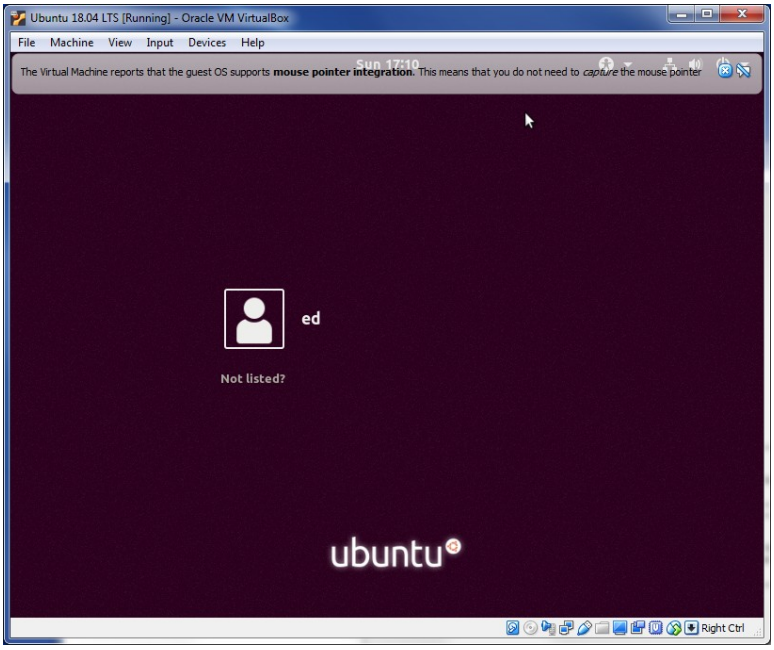
- When the installation is complete, click on **Restart Now** to reboot the Virtual Machine.



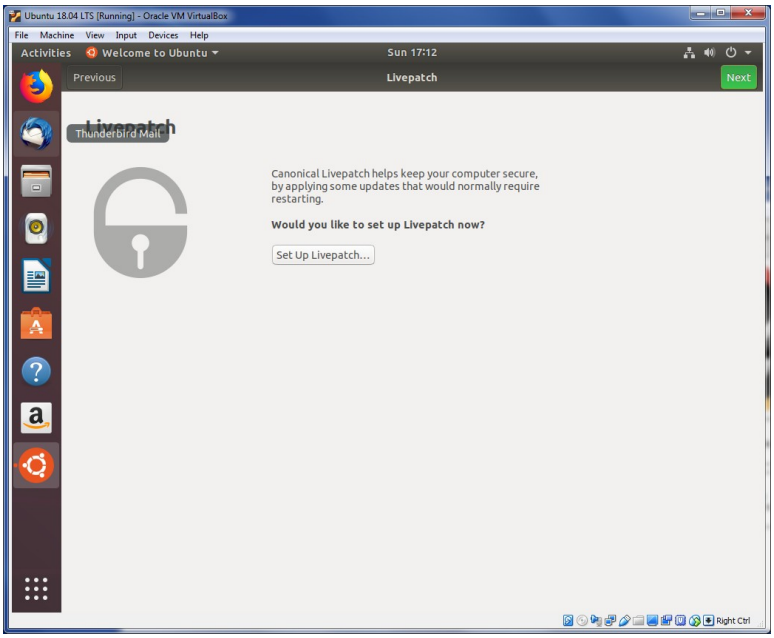
- When the VM reboots, you may be prompted remove the installation media. For a physical install, this would require removing the installation media (i.e., CD, USB Disk, etc.). For the virtual install, nothing is required. Ensure that the window is selected and type the enter key.

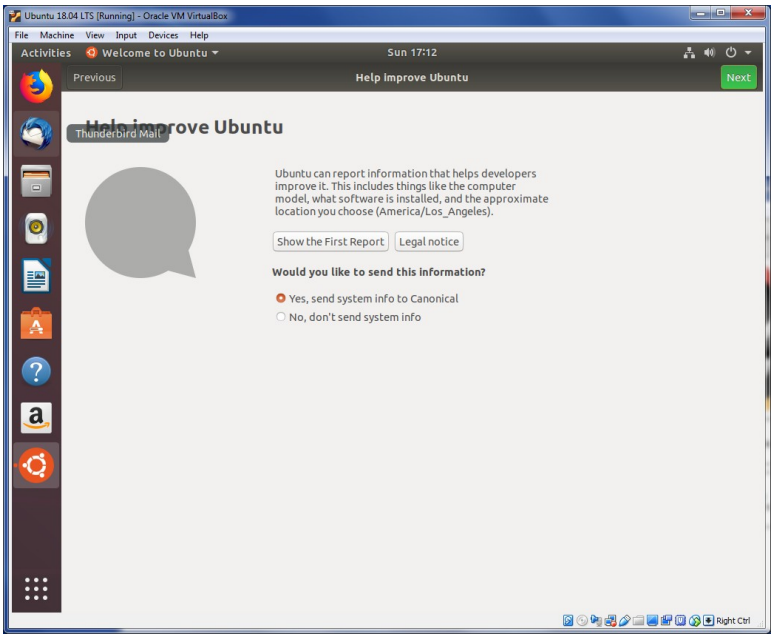


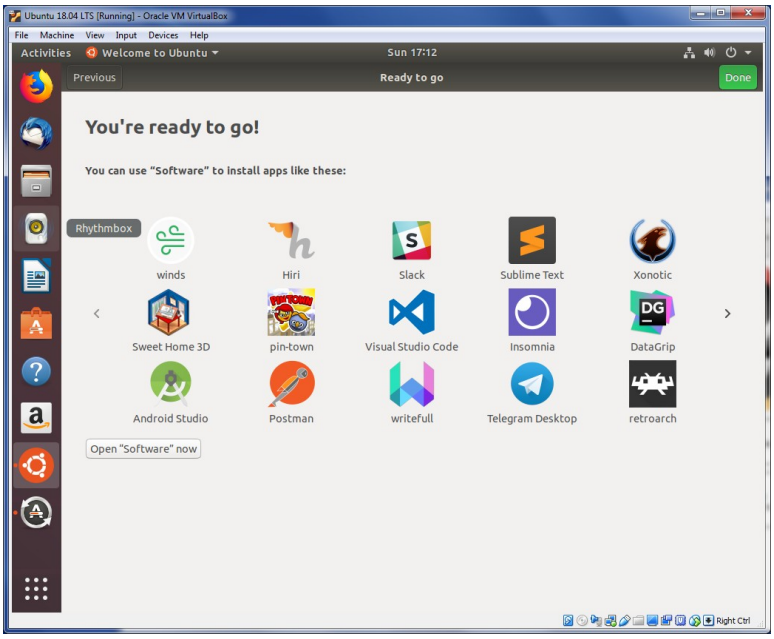
- When the VM reboots, you will be prompted to login.
- Depending on the specific hardware configuration, the mouse integration screen may be displayed again. You can click on blue x (upper right corner) to acknowledge the message.
- Login using the login credentials previously provided.



- A series of Ubuntu informational screen will be displayed. Review as desired and when ready, click **Next** (upper right hand corner, shaded in green).

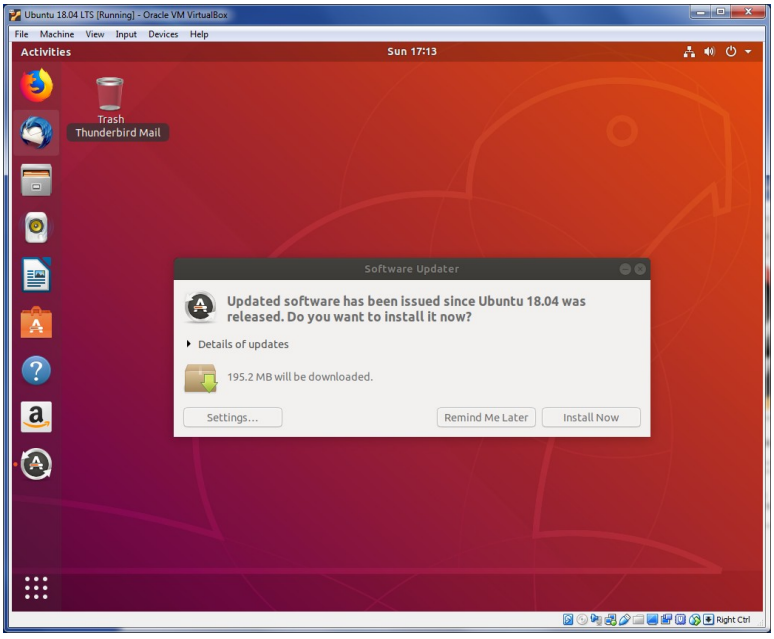




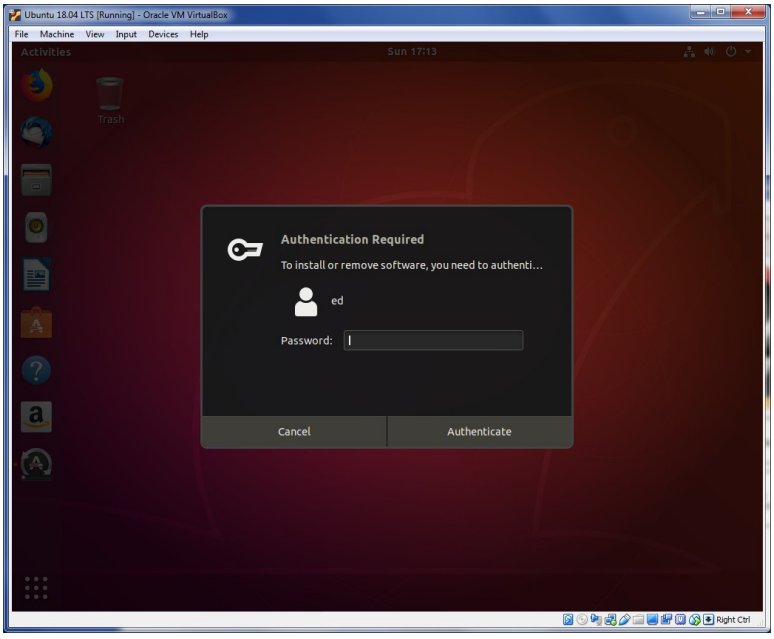


- When the last screen is displayed, click Done (upper right hand corner, shaded in green).

- The latest updates will be ready for installation. Select Install Now (right side).

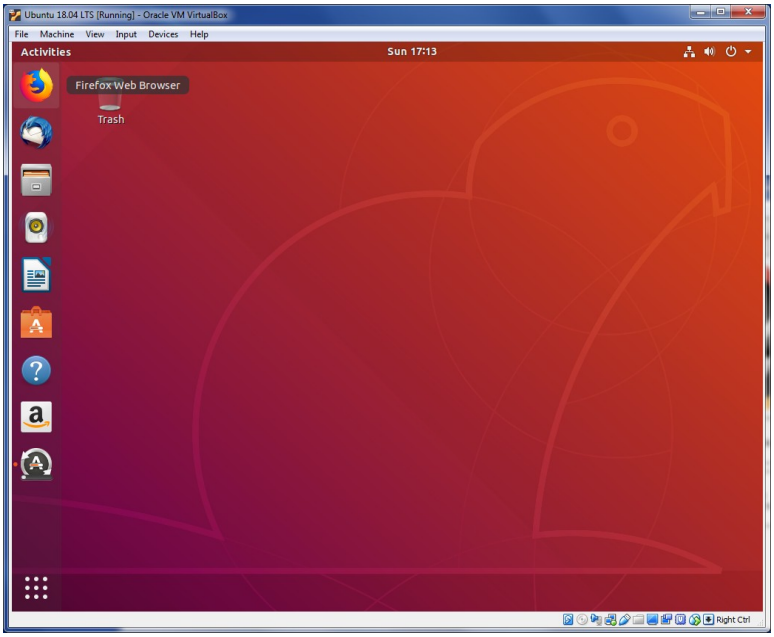


- You will may be prompted for the password.

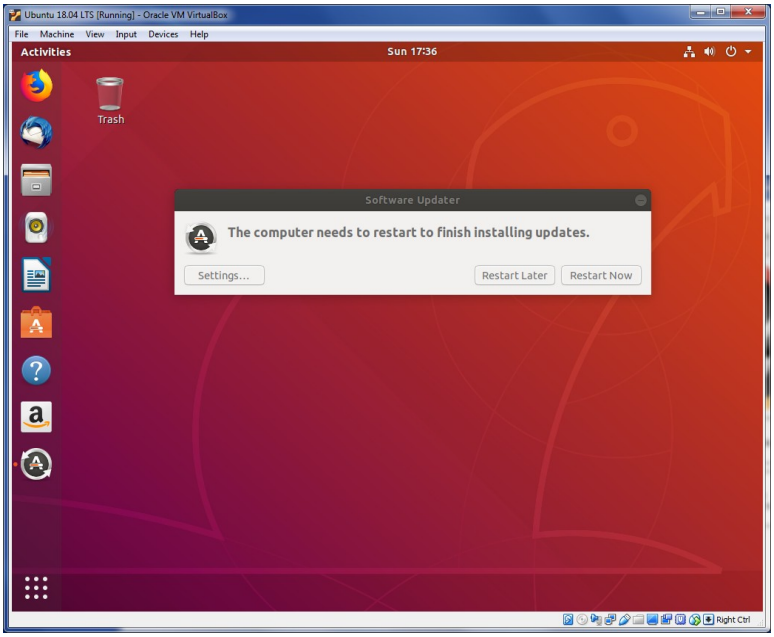


- Based on the specific hardware and Internet connection, the installation of the Updates may take several minutes (or more).

- When done, the final screen will appear as follows during the update process. To show the status, select the Software Update icon (A in black circle, bottom of left-hand side).



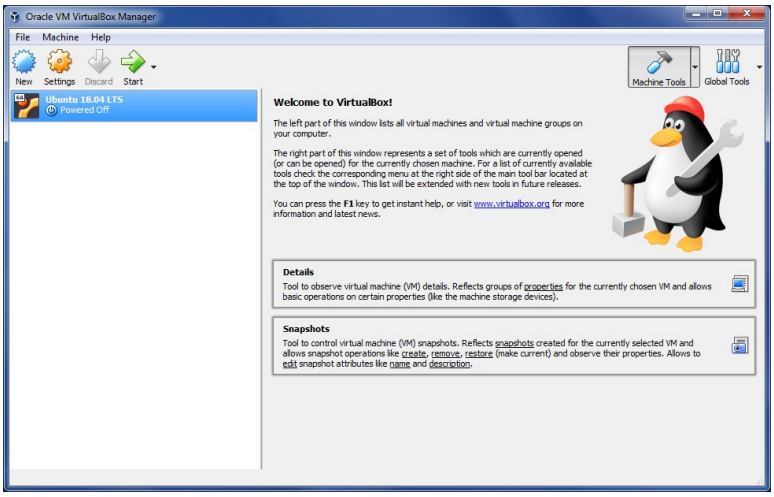
- When completed, the VM must be restarted. Select the Restart Now icon (right side).



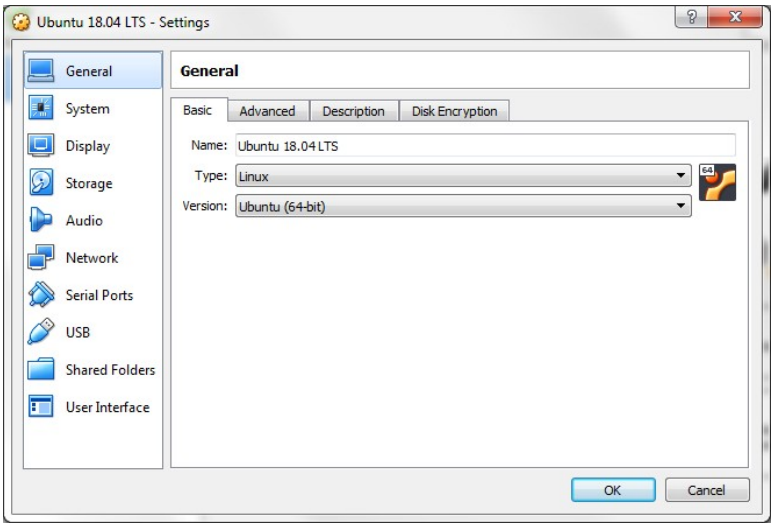
- When completed, login.
- This completes the basic installation process.

6 .0 Virtual Box Settings → Recommended Modifications

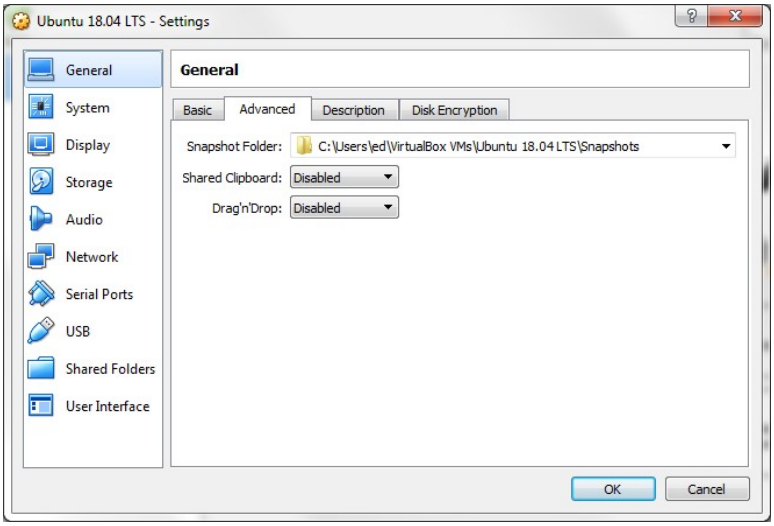
- There are a series of Virtual Machine settings that should be modified to improve performance.
- In order to modify the setting the VM must be shutdown.
- Once shutdown, select the Setting icon (second on left, in orange).

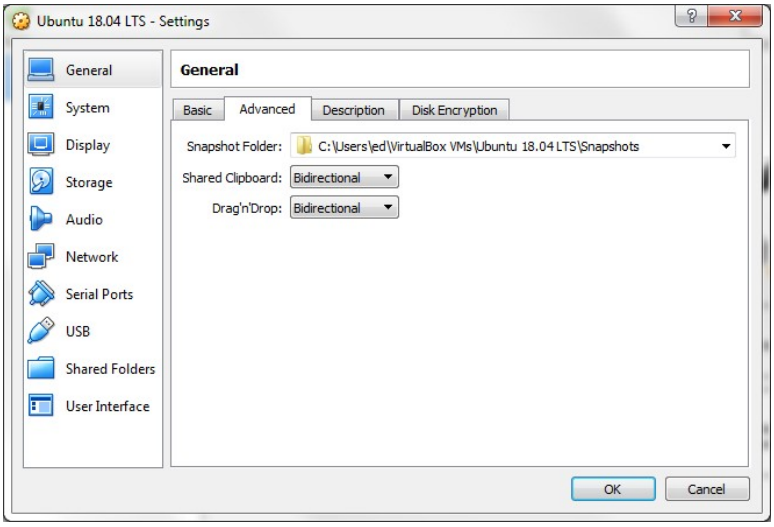


- The settings Window will be displayed.

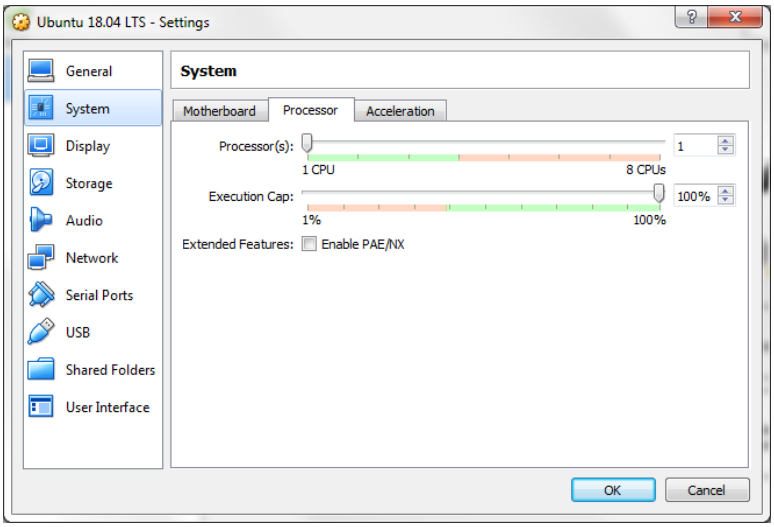


- Select the Advanced Tab.
- If desired, it is possible to allow interaction (shared clipboard and drag-and-drop) between the host machine and the guest machine (Ubuntu 18).

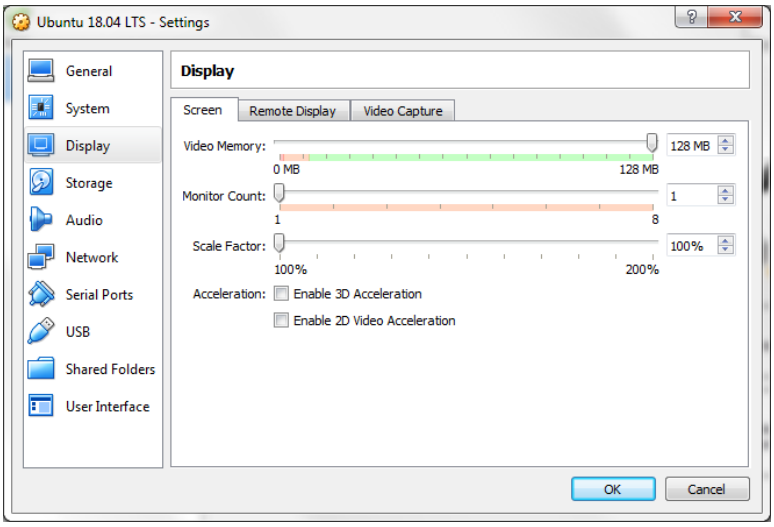




- Select the System selection (left column).
- Select the Processor tab and increase the number of CPU cores that the Virtual machine is allowed to use. The specific settings will depend on the specific hardware of the host machine.



- Select the Display selection (left column).
- Increase the Video Memory selection to **128 MB** (as shown).

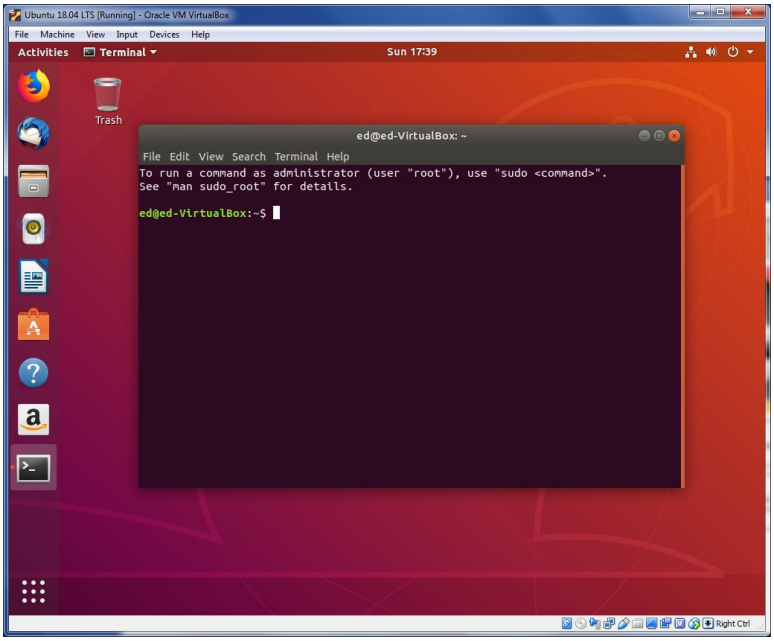


- Once completed, the Virtual machine can be restarted.

7 .0 Ubuntu Operating System Installation → Application Software Installation

- Some additional software is required for class assignments:
  - G++ (the C++ compiler)
  - YASM assembler (only needed for assembly programming)
  - DDD debugger

- To install the software through the terminal press ctrl+alt+t to bring up the terminal. This will appear as follows:

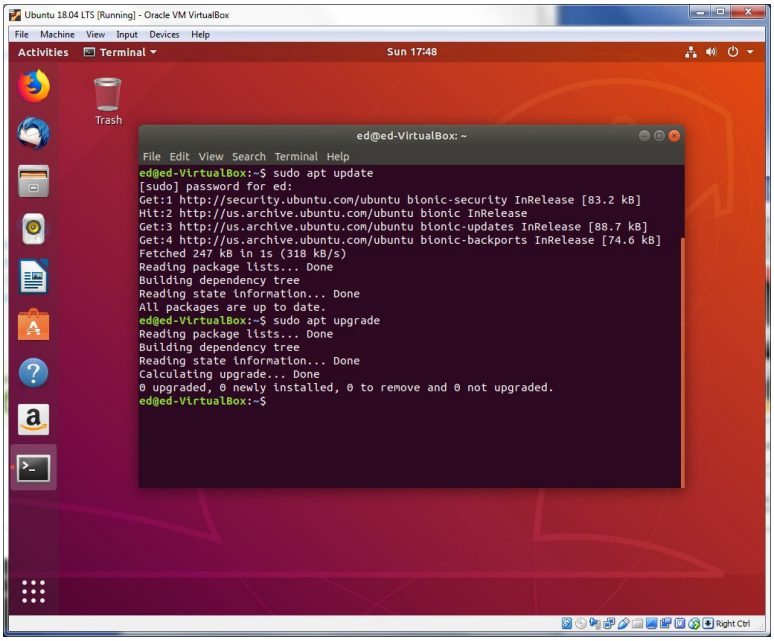


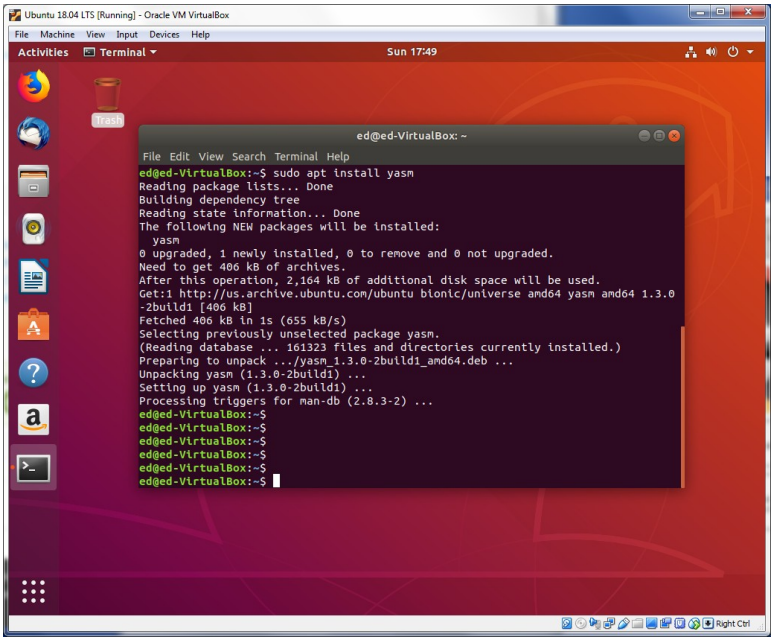
- Once the terminal is up type and enter:

  - `sudo apt update`
  - `sudo apt upgrade`
  - `sudo apt install ddd`
  - `sudo apt install yasm`
  - `sudo apt install g++`

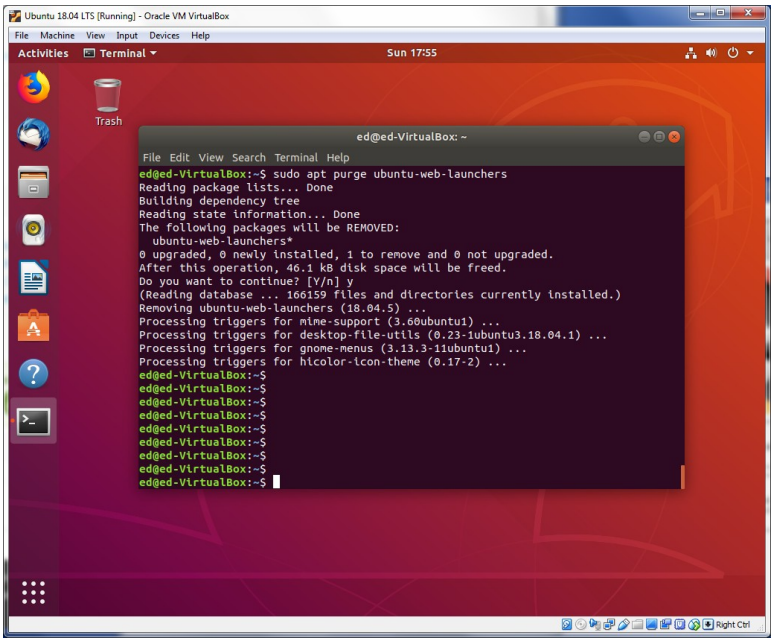
You may wish to install other software such as emacs or CodeBlocks.

- *Note,* when prompted to enter your password enter the password you use to login.
- When prompted to assign extra disc space type Y for yes and press enter to confirm.





- If you wish to remove the Amazon application, type the following:
  - **`sudo apt purge ubuntu-web-launchers`**

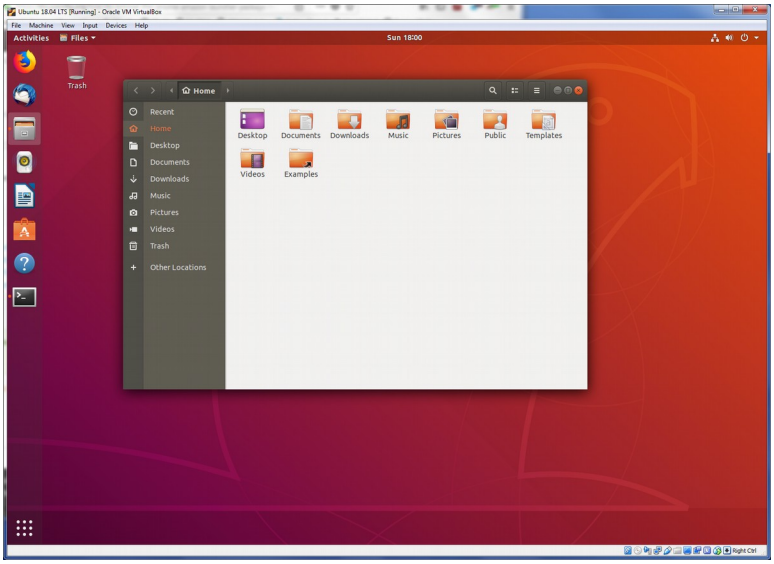


- *Note*, there are a significant number of additional applications available for Ubuntu.
- Feel free to explore and install additional software.
- The installation process will be similar.

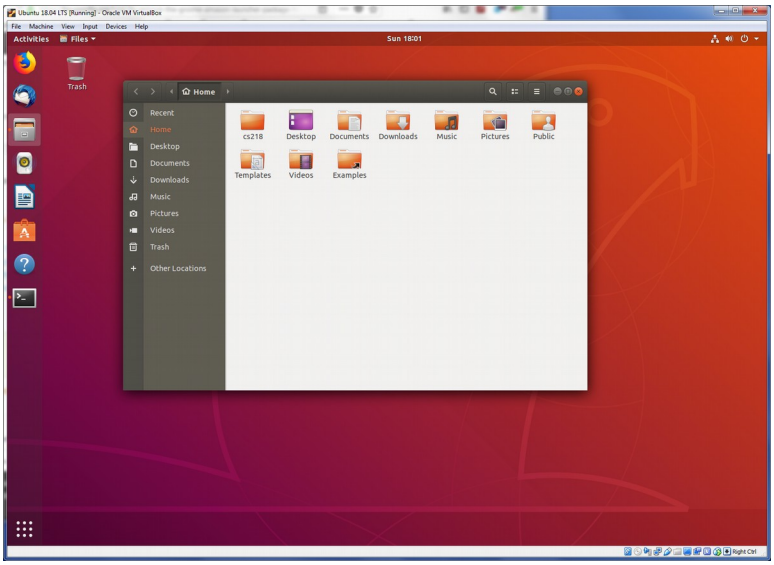
- This completes the required software installations.

8 .0 Ubuntu Operating System → Folders

- The Home Folder is the primary location for user files.
- From the left menu select the Files icon (shown below with the gray label for reference).



- The Home Folder screen will be displayed showing the current folder contents.
- Create a working directory (for source files and executable files).
- Right click anywhere in the screen and select the 'New Folder' menu option.
- Provide a folder name, such as cs218 (or whatever you would like to use).



- You may create additional folders within the new folder and at the same level (as desired).
- The Home window can be closed by clicking on the **x** (upper right hand corner). When clicked, the window will close and the screen will be removed.