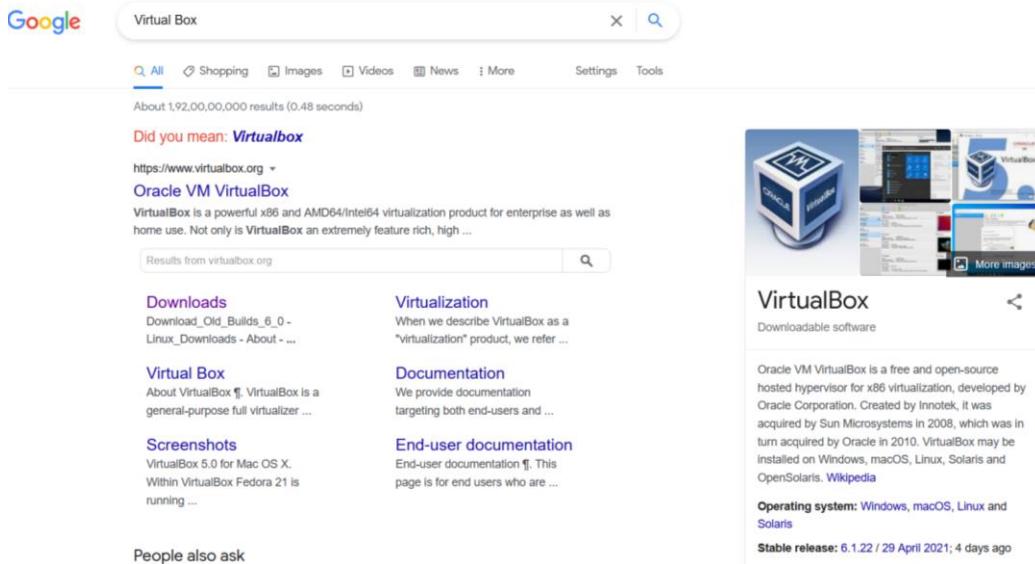


Virtual Box VM Installation

Search for Virtual Box in Google and click on “Downloads”:



Virtual Box

About 1,92,00,00,000 results (0.48 seconds)

Did you mean: [Virtualbox](#)

<https://www.virtualbox.org> • Oracle VM VirtualBox

VirtualBox is a powerful x86 and AMD64/Intel64 virtualization product for enterprise as well as home use. Not only is VirtualBox an extremely feature rich, high ...

Results from virtualbox.org

Downloads
Download_Old_Builds_6_0 - Linux_Downloads - About - ...

Virtual Box
About VirtualBox. VirtualBox is a general-purpose full virtualizer ...

Screenshots
VirtualBox 5.0 for Mac OS X. Within VirtualBox Fedora 21 is running ...

Virtualization
When we describe VirtualBox as a "virtualization" product, we refer ...

Documentation
We provide documentation targeting both end-users and ...

End-user documentation
End-user documentation. This page is for end users who are ...

VirtualBox
Downloadable software

Oracle VM VirtualBox is a free and open-source hosted hypervisor for x86 virtualization, developed by Oracle Corporation. Created by Innotek, it was acquired by Sun Microsystems in 2008, which was in turn acquired by Oracle in 2010. VirtualBox may be installed on Windows, macOS, Linux, Solaris and OpenSolaris. [Wikipedia](#)

Operating system: Windows, macOS, Linux and Solaris

Stable release: 6.1.22 / 29 April 2021; 4 days ago



VirtualBox

Download VirtualBox

Here you will find links to VirtualBox binaries and its source code.

VirtualBox binaries

By downloading, you agree to the terms and conditions of the respective license.

If you're looking for the latest VirtualBox 6.0 packages, see [VirtualBox 6.0 builds](#). Please also use version 6.0 if you need to run VMs with software virtualization, as this has been discontinued in 6.1. Version 6.0 will remain supported until July 2020.

If you're looking for the latest VirtualBox 5.2 packages, see [VirtualBox 5.2 builds](#). Please also use version 5.2 if you still need support for 32-bit hosts, as this has been discontinued in 6.0. Version 5.2 will remain supported until July 2020.

VirtualBox 6.1.22 platform packages

- Windows hosts
- OS X hosts
- Linux distributions
- Solaris hosts
- Solaris 11 IPS hosts

The binaries are released under the terms of the GPL version 2.

See the [changelog](#) for what has changed.

You might want to compare the checksums to verify the integrity of downloaded packages. *The SHA256 checksums should be favored as the MD5 algorithm must be treated as insecure!*

- [SHA256 checksums, MD5 checksums](#)

Note: After upgrading VirtualBox it is recommended to upgrade the guest additions as well.

VirtualBox 6.1.22 Oracle VM VirtualBox Extension Pack

- [All supported platforms](#)

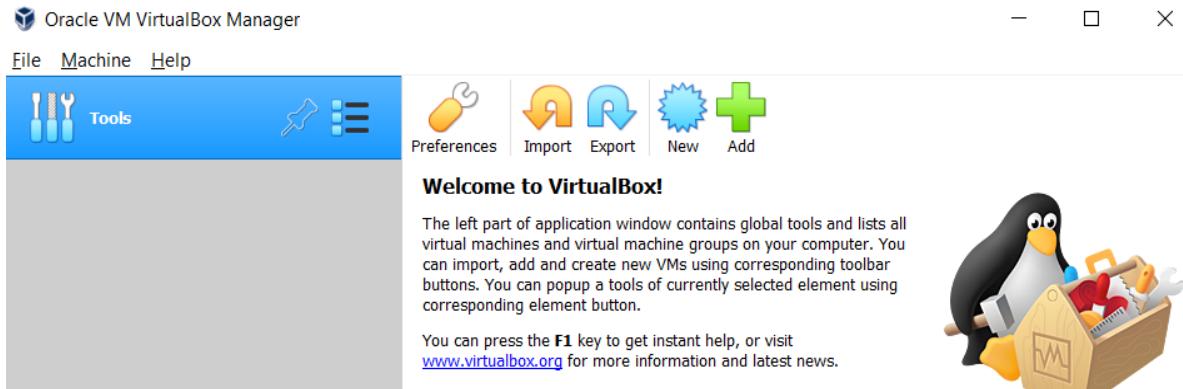
Support for USB 2.0 and USB 3.0 devices, VirtualBox RDP, disk encryption, NVMe and PXE boot for Intel cards. See [this chapter](#) from the User Manual for an introduction to this Extension Pack. The Extension Pack binaries are released under the [VirtualBox Personal Use and Evaluation License \(PUEL\)](#). Please install the same version extension pack as your installed version of VirtualBox.

Click on “Windows hosts”. We will get the Virtualbox .exe file. Save this file:

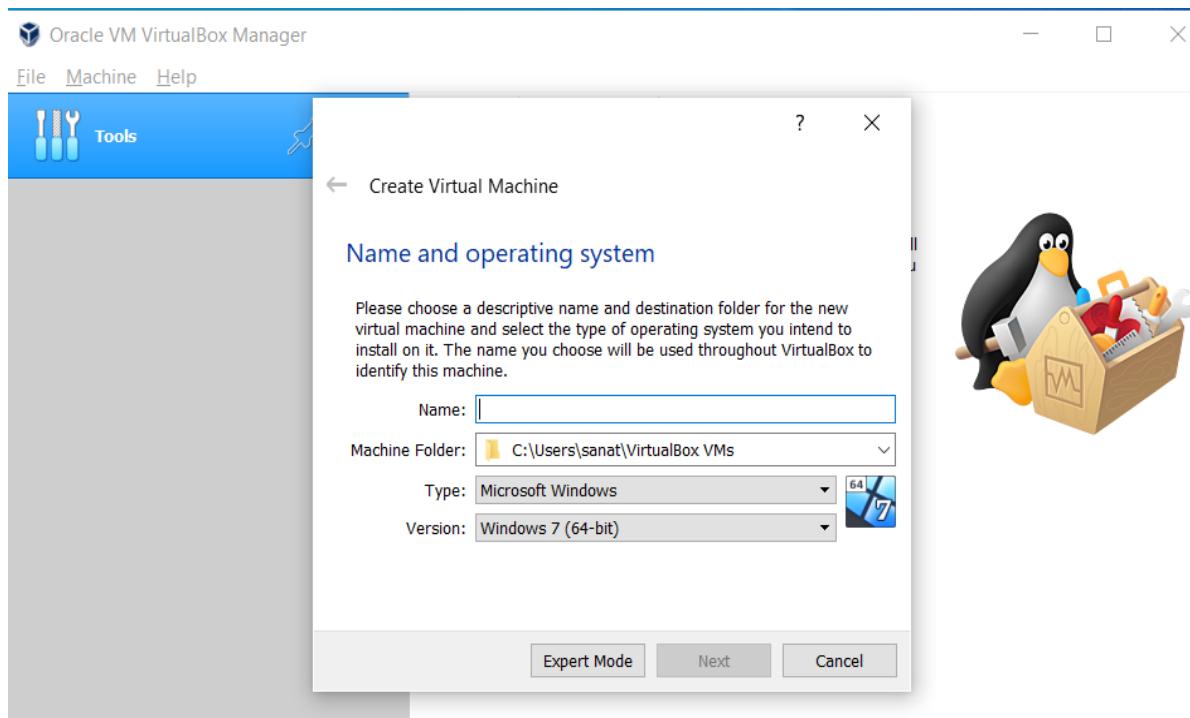
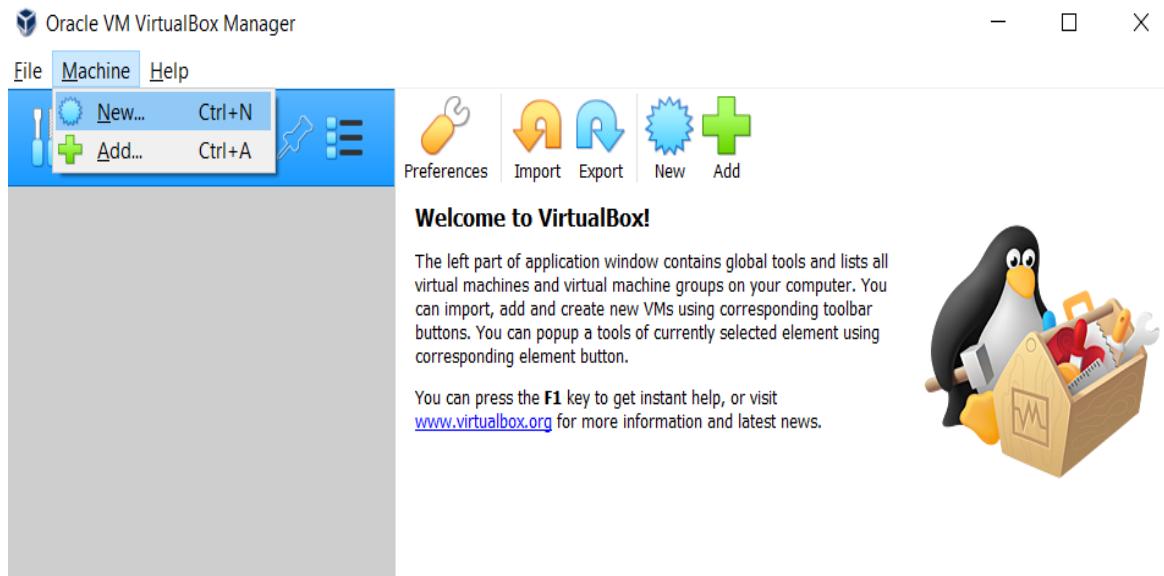
The screenshot shows the VirtualBox download page. On the right, a save dialog box is open, prompting the user to save the file "VirtualBox-6.1.22-144080-Win.exe". The dialog includes fields for "File name" (set to "VirtualBox-6.1.22-144080-Win.exe"), "Save in" (set to "Downloads"), and "Save file" and "Cancel" buttons. The main page has sections for "VirtualBox binaries" and "VirtualBox 6.1.22 platform packages", with links for Windows hosts, OS X hosts, Linux distributions, Solaris hosts, and Solaris 11 IPS hosts.

Run the Virtual Box .exe file and Click enter, enter and installation will be done

After installation we will get the window like this:

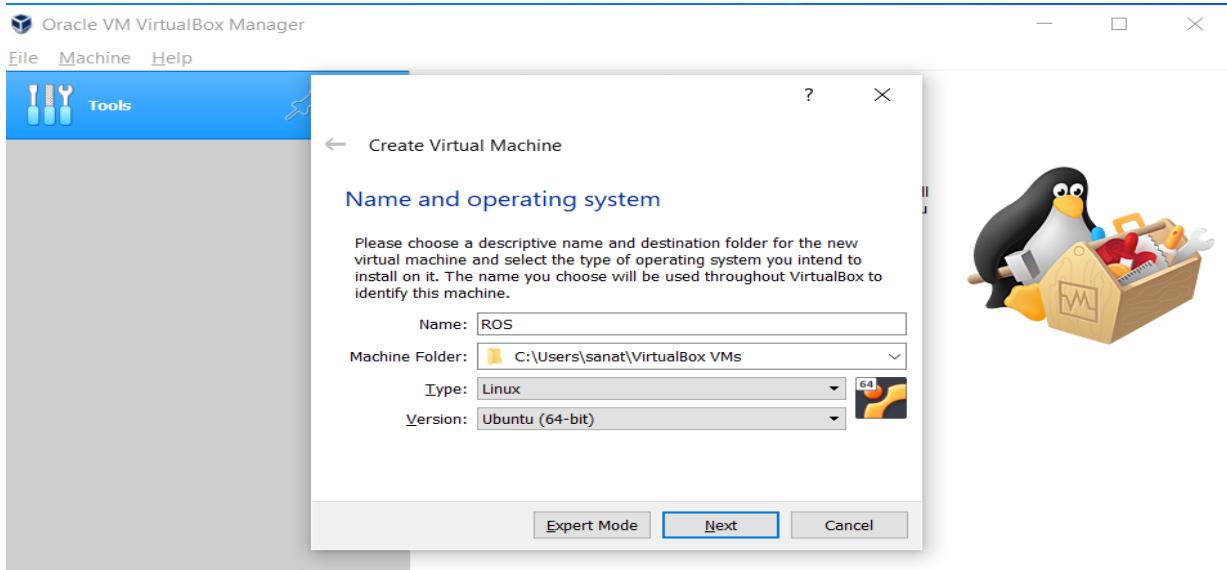


Click on Machine and select “New”:

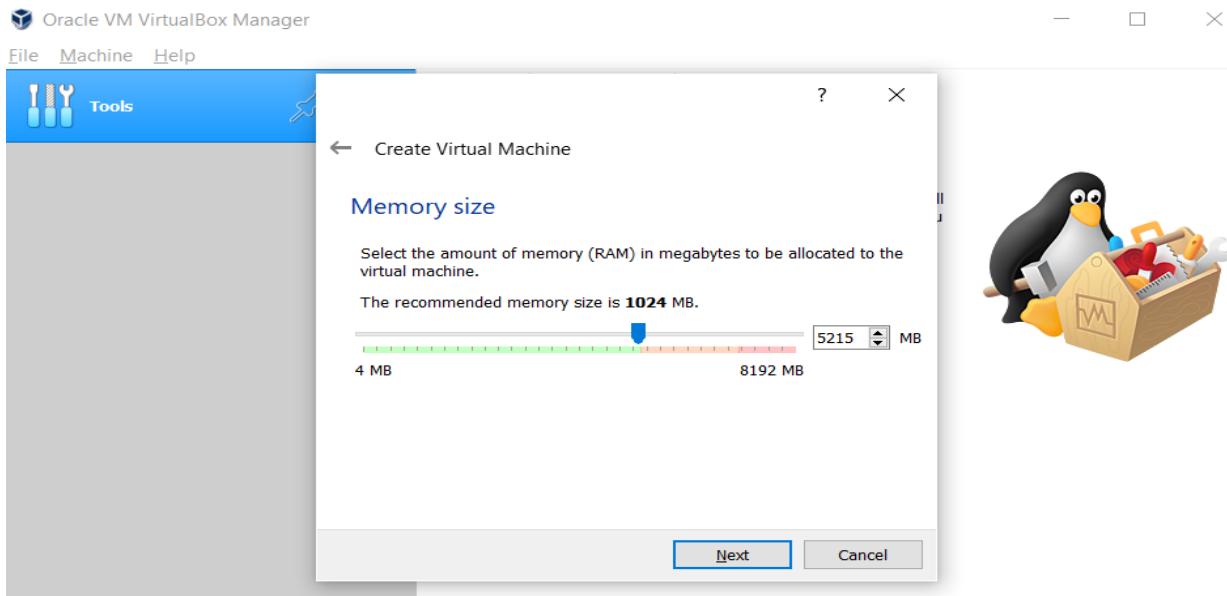


Give the Name, Type and Version:

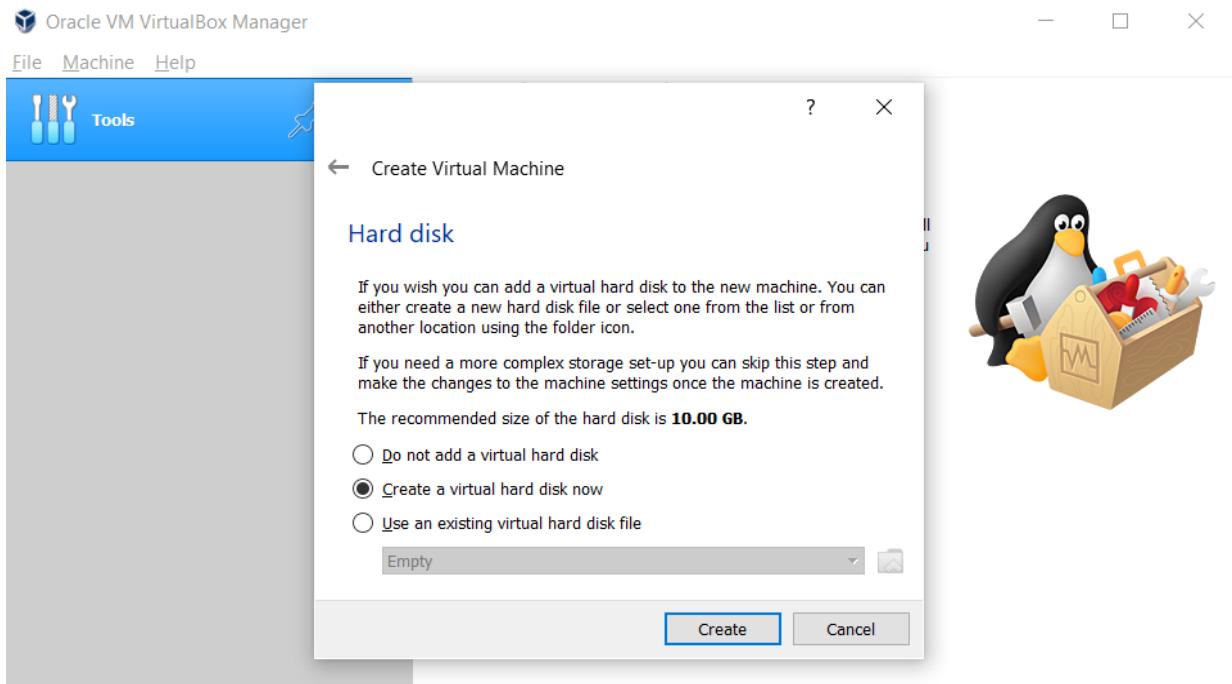
We can give any Name. Choose any OS you want to work in Type and Choose the Version corresponding to your type.



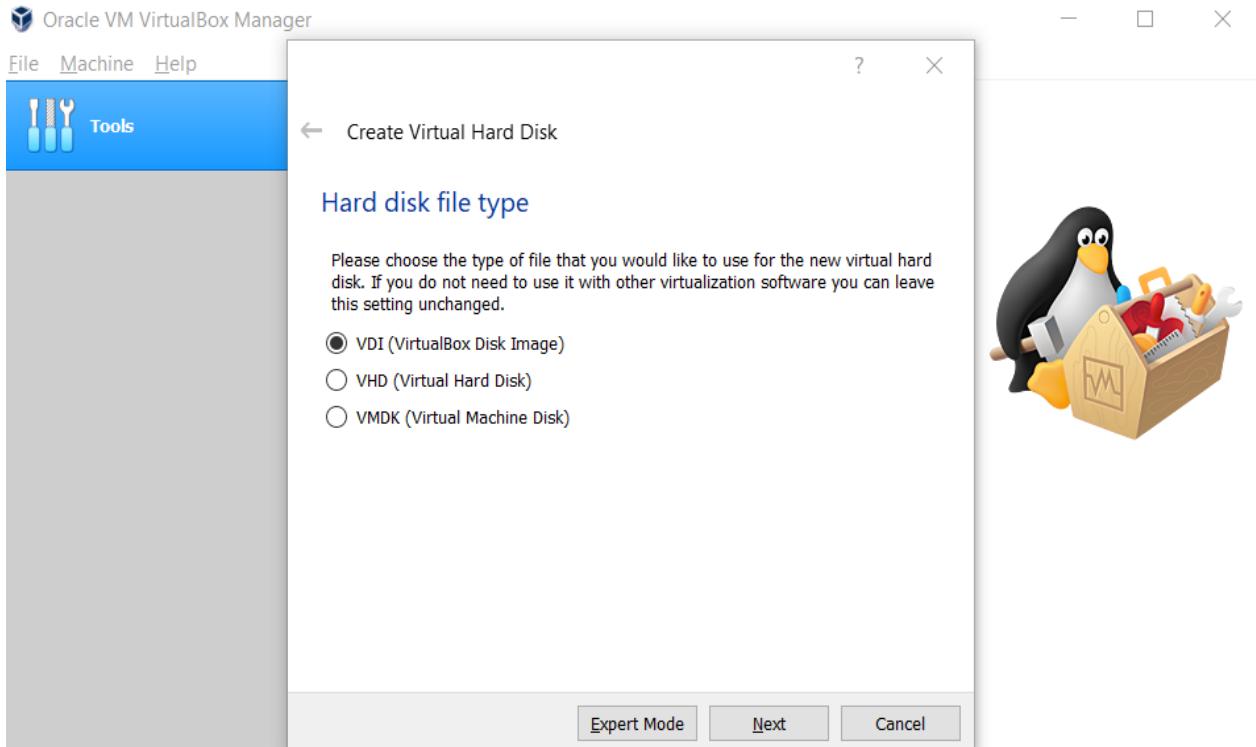
We can select till green:



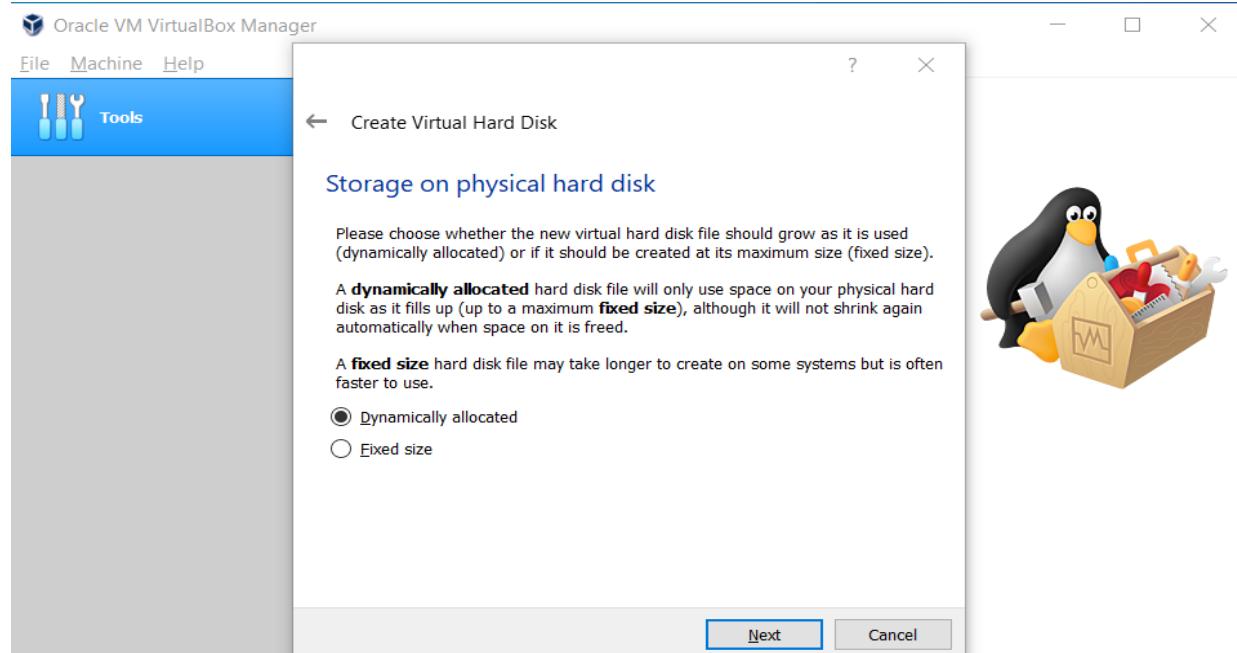
Just leave as default and click on “Create”:



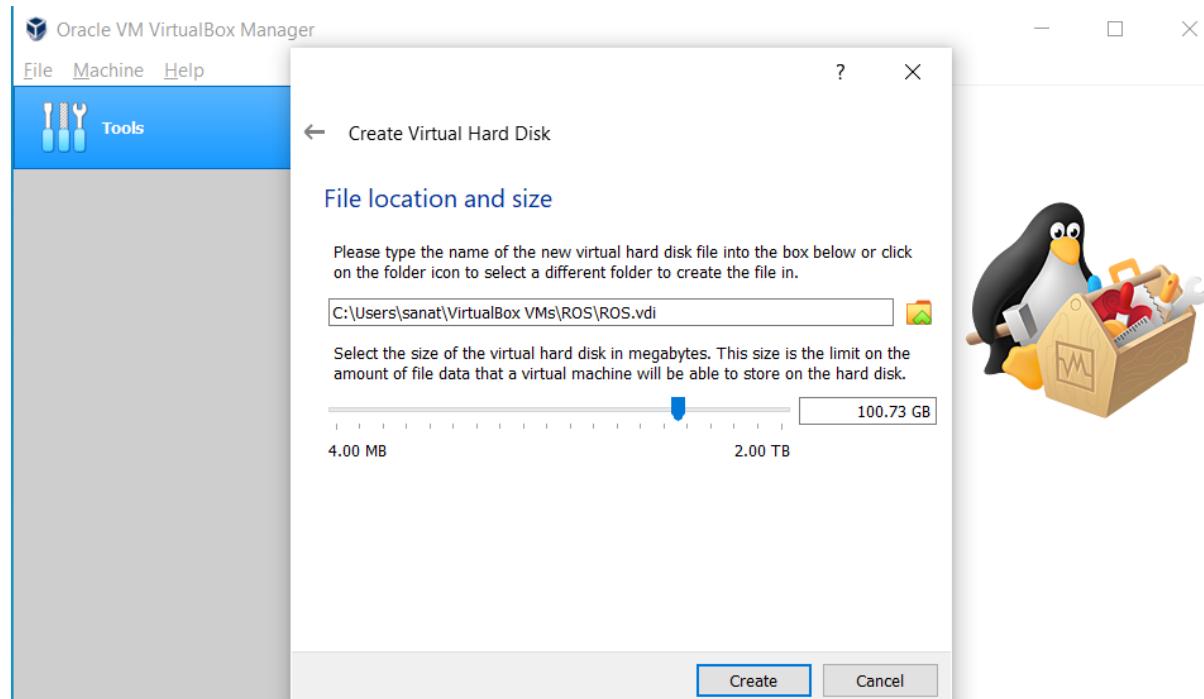
Leave as it is and click on “Next”:



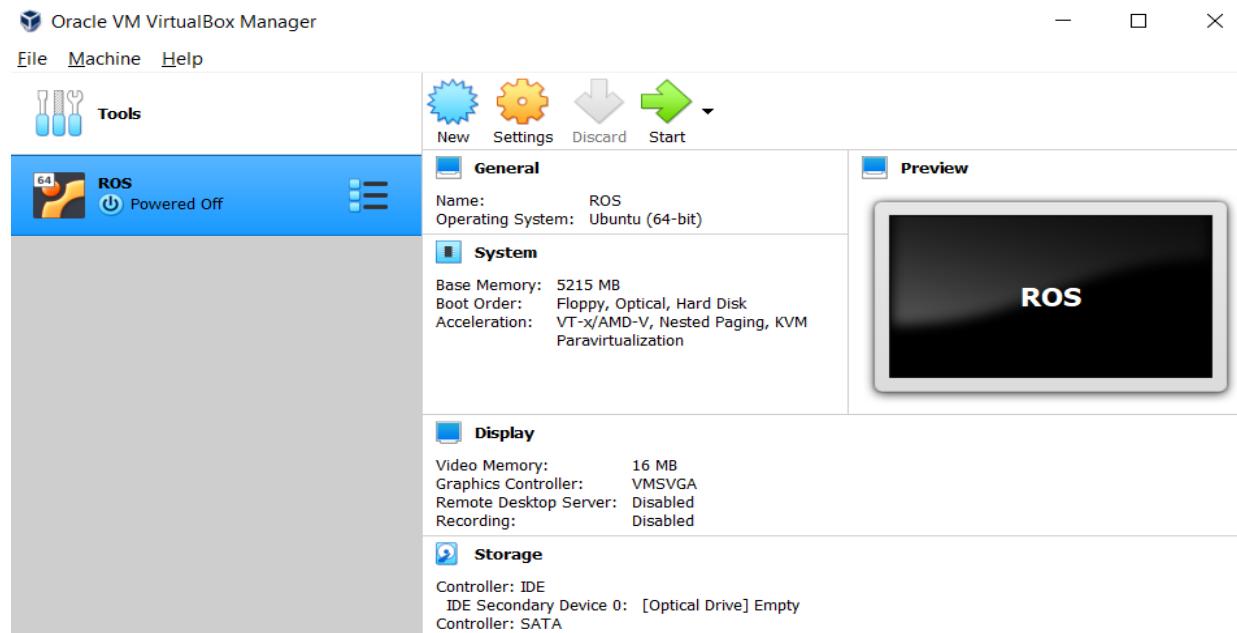
Leave as “Dynamically allocated” and Click on “Next”:



Choose the size we required and click on “Create”:

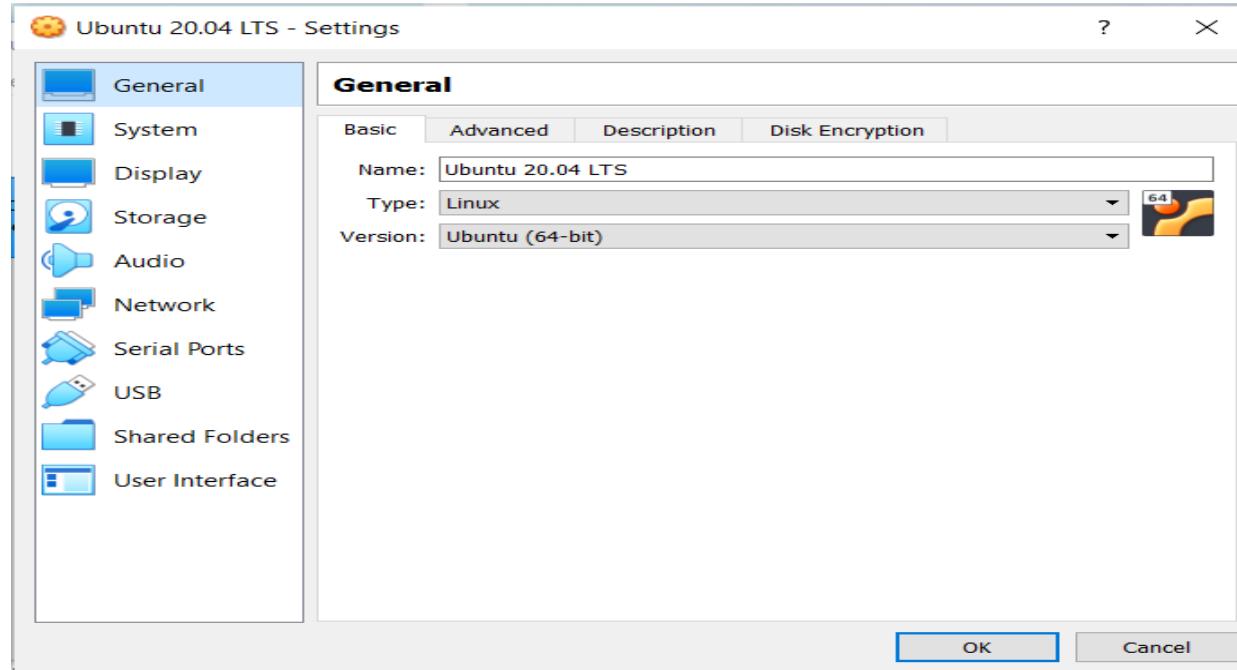


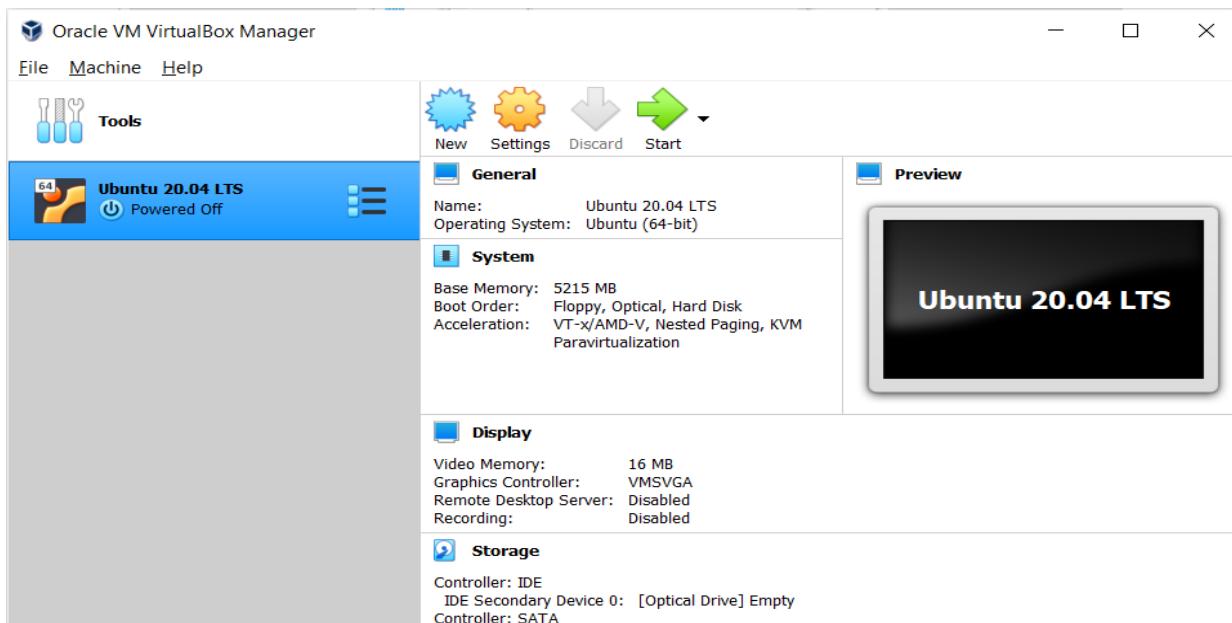
Ubuntu VM ware is installed and screen looks like this:



Optional:

We can change the name of Ubuntu from “Setting” icon:





Installing the Ubuntu on VM Ware

Downloading Ubuntu:

ubuntu

About 12,70,00,000 results (0.69 seconds)

<https://ubuntu.com> ▾

Ubuntu: Enterprise Open Source and Linux

Ubuntu is the modern, open source operating system on Linux for the enterprise server, desktop, cloud, and IoT.

Results from ubuntu.com

Download
Desktop - Ubuntu Server - Ubuntu flavours - WSL - Ubuntu Cloud

Desktop
Ubuntu for desktops · Open source. Ubuntu has always been free to ...

Get Ubuntu Server
Get Ubuntu Server one of three ways; by using Multipass on ...

Desktop for developers
Ubuntu Desktop for developers.
Whether you're a mobile app ...

Migrating to Ubuntu LTS: six ...
For example, Ubuntu 20.04 LTS comes with over 30,000 open ...

Install Ubuntu desktop
In this tutorial, we're going to install Ubuntu desktop onto your ...

Ubuntu Software

Ubuntu is a Linux distribution based on Debian and composed mostly of free and open-source software. Ubuntu is officially released in three editions: Desktop, Server, and Core for Internet of things devices and robots. All the editions can run on the computer alone, or in a virtual machine. [Wikipedia](#)

Initial release date: 20 October 2004

Default user interface: GNOME

Update method: Software Updater

OS family: Linux (Unix-like)

Programming languages: Python, Java, C, C++, C#

Click on ubuntu Downloads

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Ubuntu desktop

Ubuntu desktop

Ubuntu Desktop >

Download Ubuntu desktop and replace your current operating system whether it's Windows or macOS or run Ubuntu alongside it.

Do you want to upgrade? [Follow our simple guide](#)

Using Ubuntu in virtual machines? For a mini-cloud of instant Ubuntu VMs on Linux, Windows or macOS.

Use the Ubuntu terminal and run Linux applications on Windows.

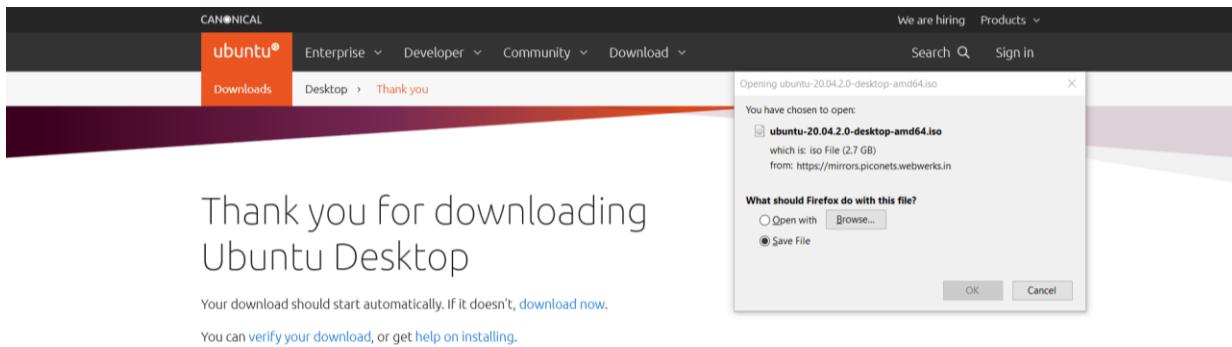
Click on Ubuntu Desktop:

The screenshot shows the Ubuntu website's download section. At the top, there's a navigation bar with links for Canonical, Enterprise, Developer, Community, Download, We are hiring, Products, Search, Sign in, Overview, Cloud, IoT, Raspberry Pi, Server, Desktop, Alternative downloads, and Ubuntu flavours. A large orange banner at the top says "Ubuntu desktop". Below it, there's a heading "Ubuntu desktop" with a link. A text block says "Download Ubuntu desktop and replace your current operating system whether it's Windows or macOS or run Ubuntu alongside it." It includes a link "Do you want to upgrade? Follow our simple guide". To the right are two cartoon cat illustrations. Below this, there are sections for "Using Ubuntu in virtual machines?" and "Use the Ubuntu terminal and run Linux applications on Windows.", each with its own icon and text.

Download the LTS file:

The screenshot shows the Ubuntu 20.04.2.0 LTS download page. At the top, there's a large button "Download Ubuntu Desktop". Below it, the page title is "Ubuntu 20.04.2.0 LTS". A text block explains what LTS means: "Download the latest LTS version of Ubuntu, for desktop PCs and laptops. LTS stands for long-term support — which means five years, until April 2025, of free security and maintenance updates, guaranteed." It includes a link to "Ubuntu 20.04 LTS release notes". A "Download" button is prominently displayed. To the right, there's a section for "Alternative Downloads" with a link. Below the main text, there's a "Recommended system requirements" section with a bulleted list of hardware needs.

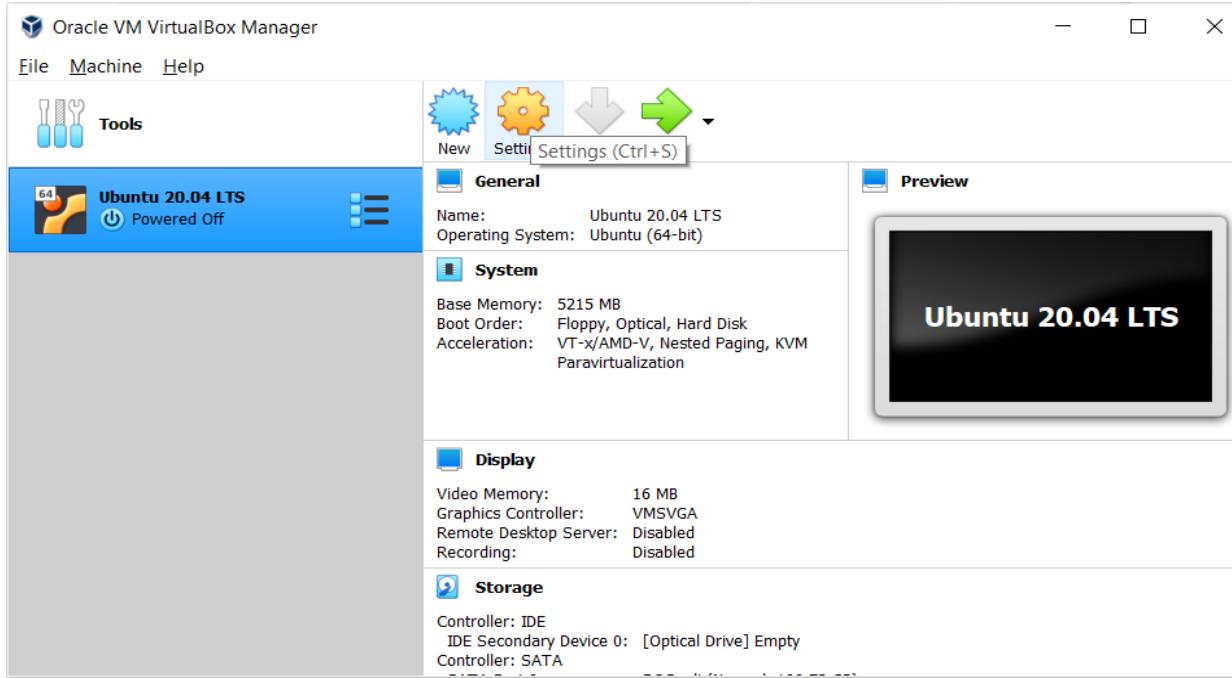
Save the file:

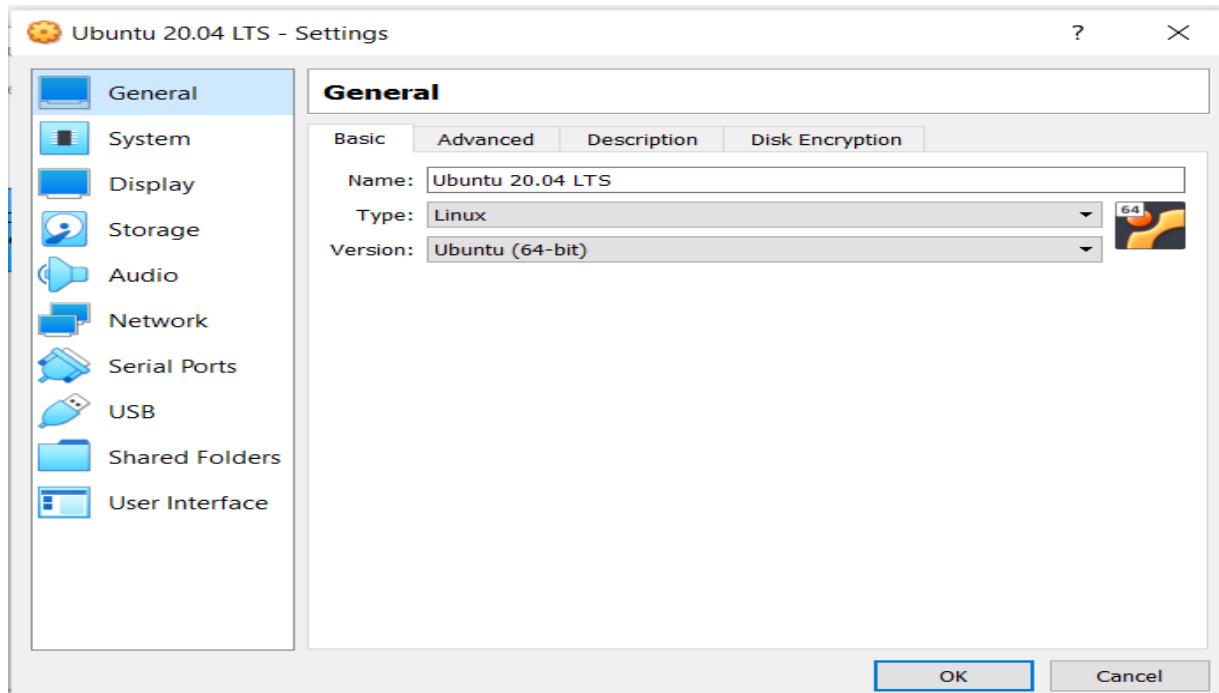


We are downloading the .iso file

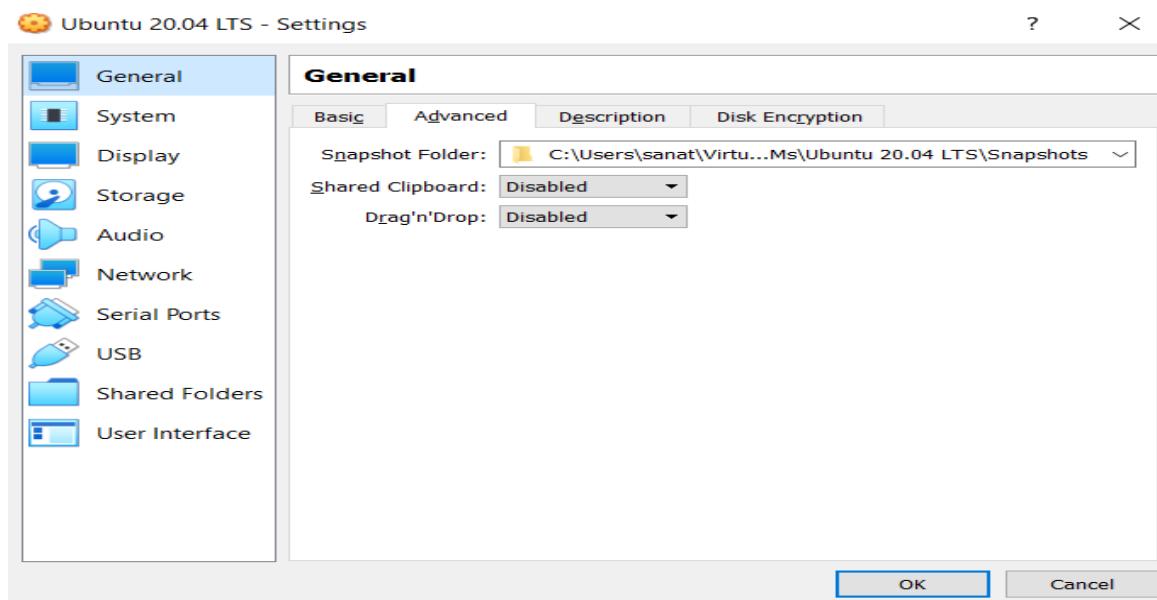
Now we can store our downloaded Ubuntu in VM ware

Click on "Settings":





Go to "Advanced" Tab:

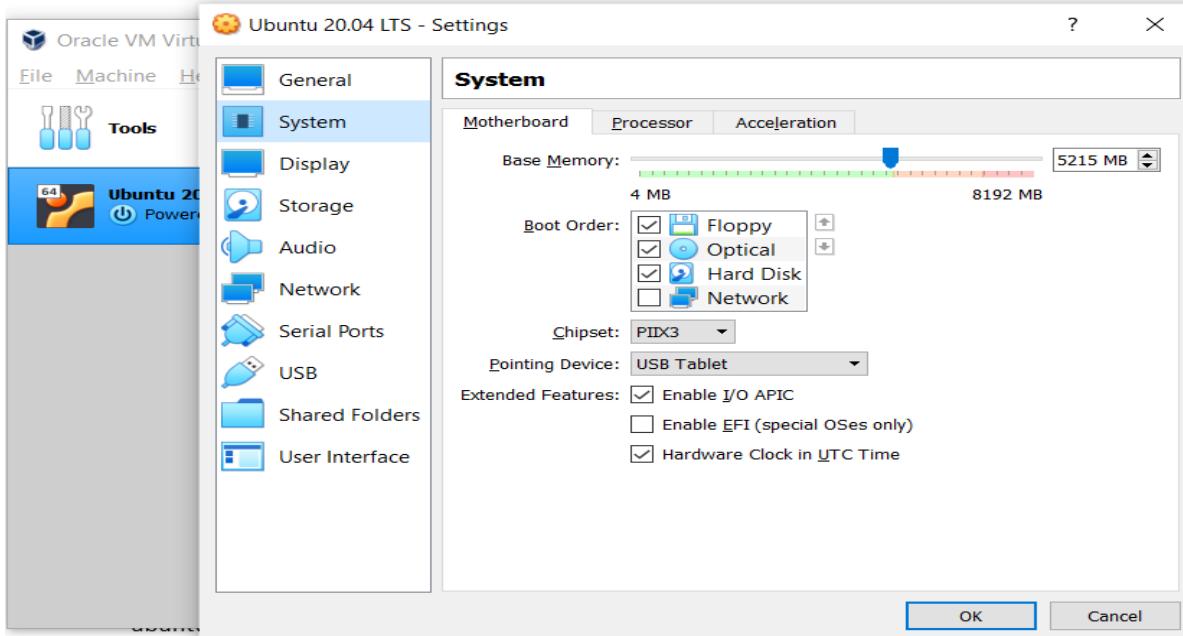


Change "Shared Clipboard and Drag'n'Drop" to "Bidirectional". So, we can copy and paste files from windows to ubuntu and Vice versa.

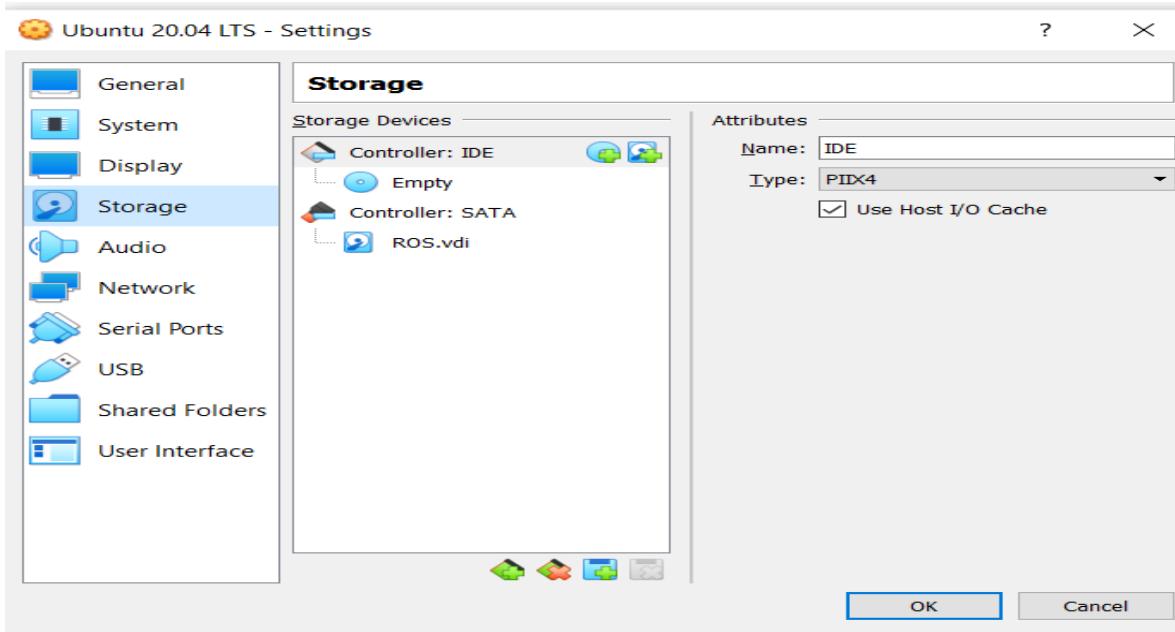
And click on "OK".

Go to “System”:

Click on “Processor” tab and we can increase the CPU size. This is optional or we can leave the as it is.

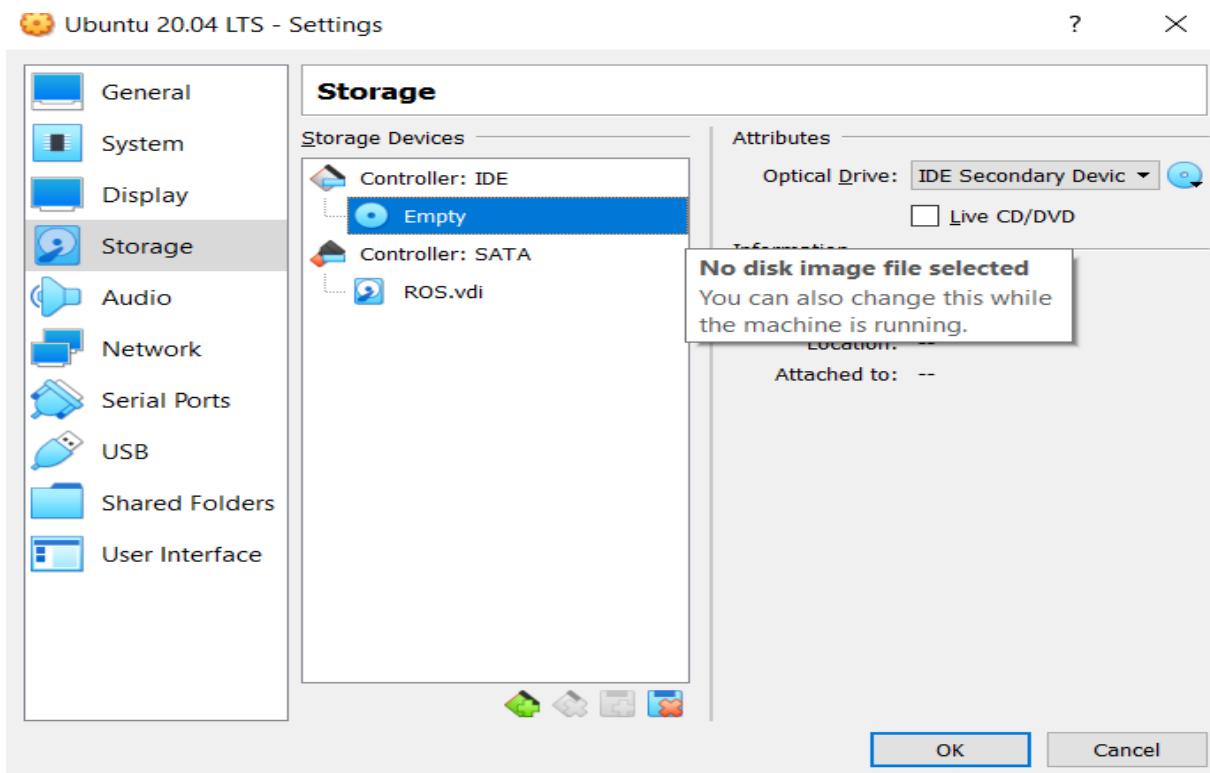


Go to Storage:

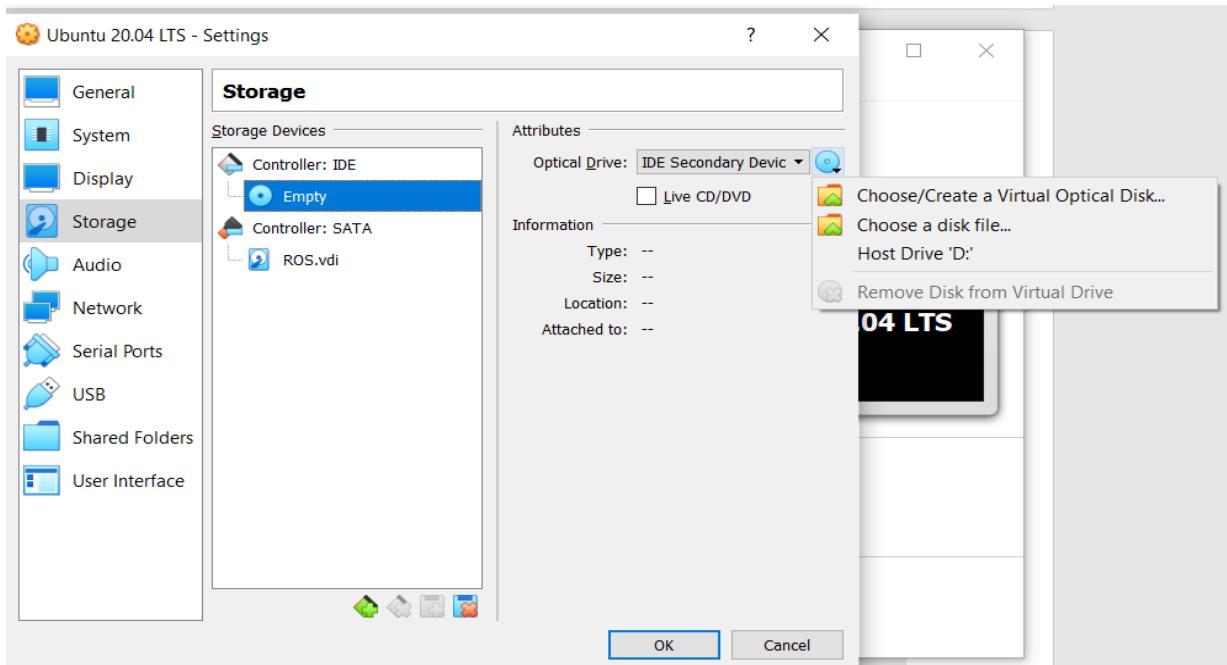


We need to give the location of our downloaded ubuntu .iso file.

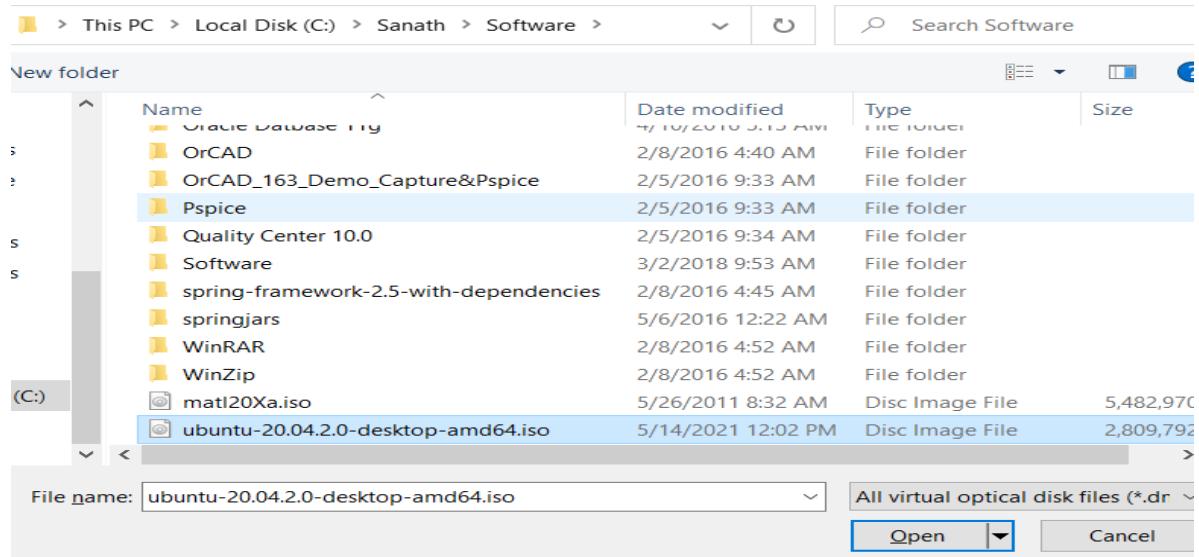
Click on “Empty”:



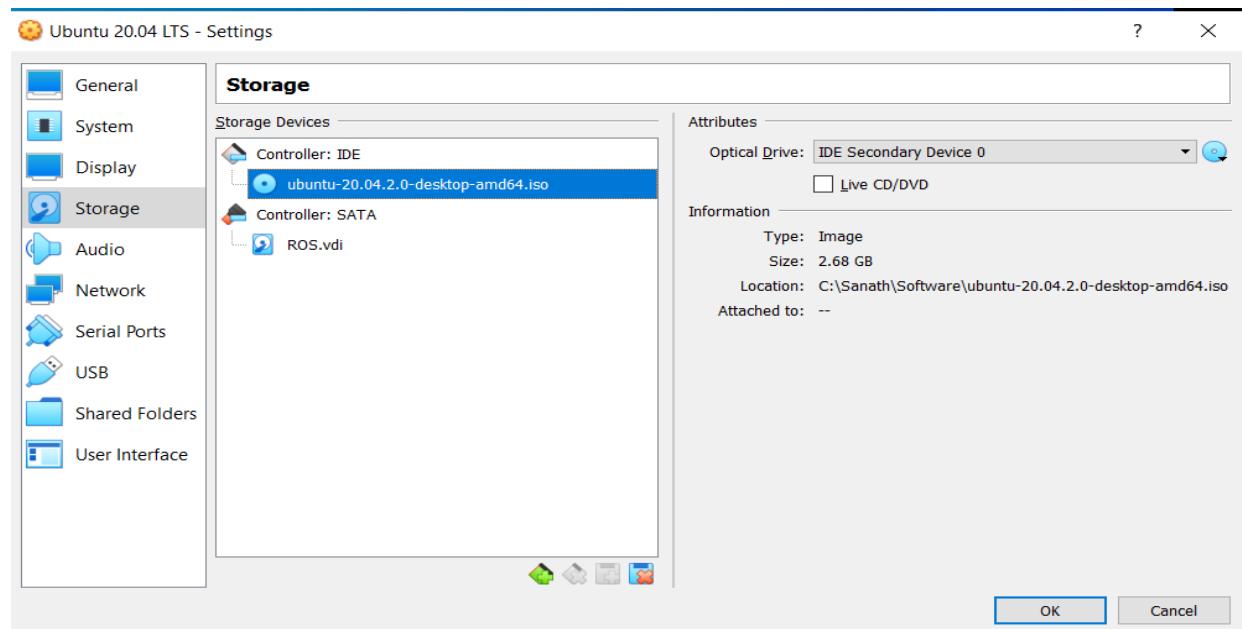
Click on “Option Drive” dropdown and select “Choose a Disk File”:



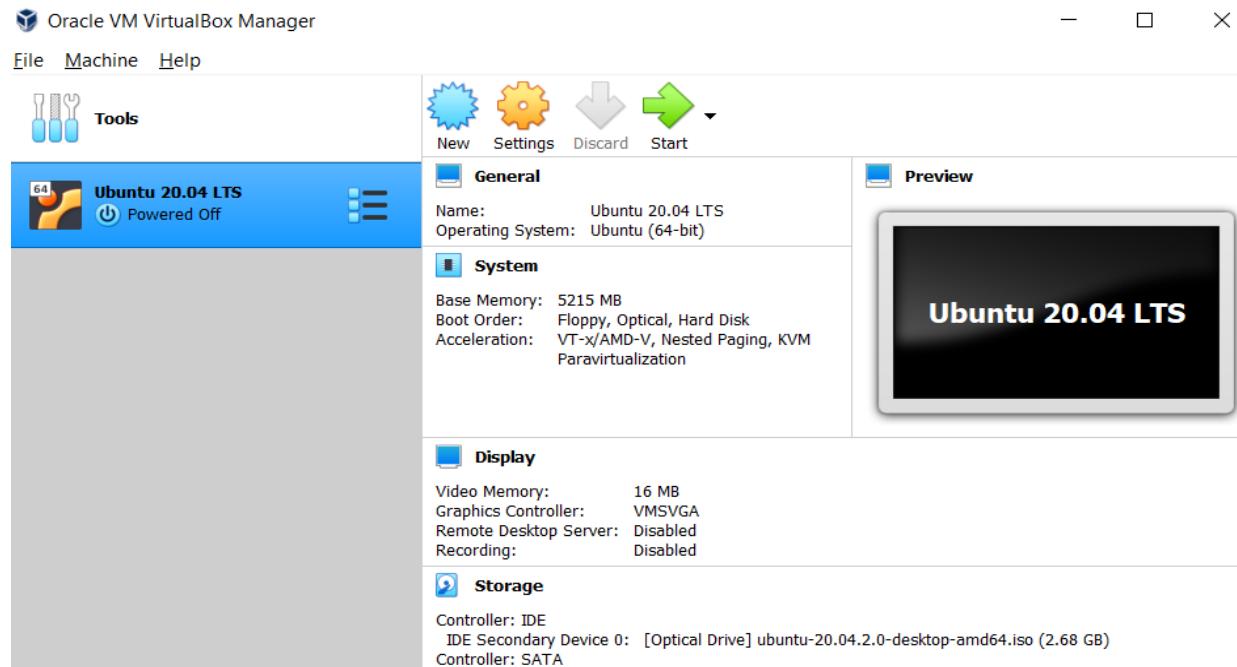
I am going to choose the location of my .iso file in my pc and click on Open:



Now we can see the name of the ".iso" file in Controller IDE and click on "OK":

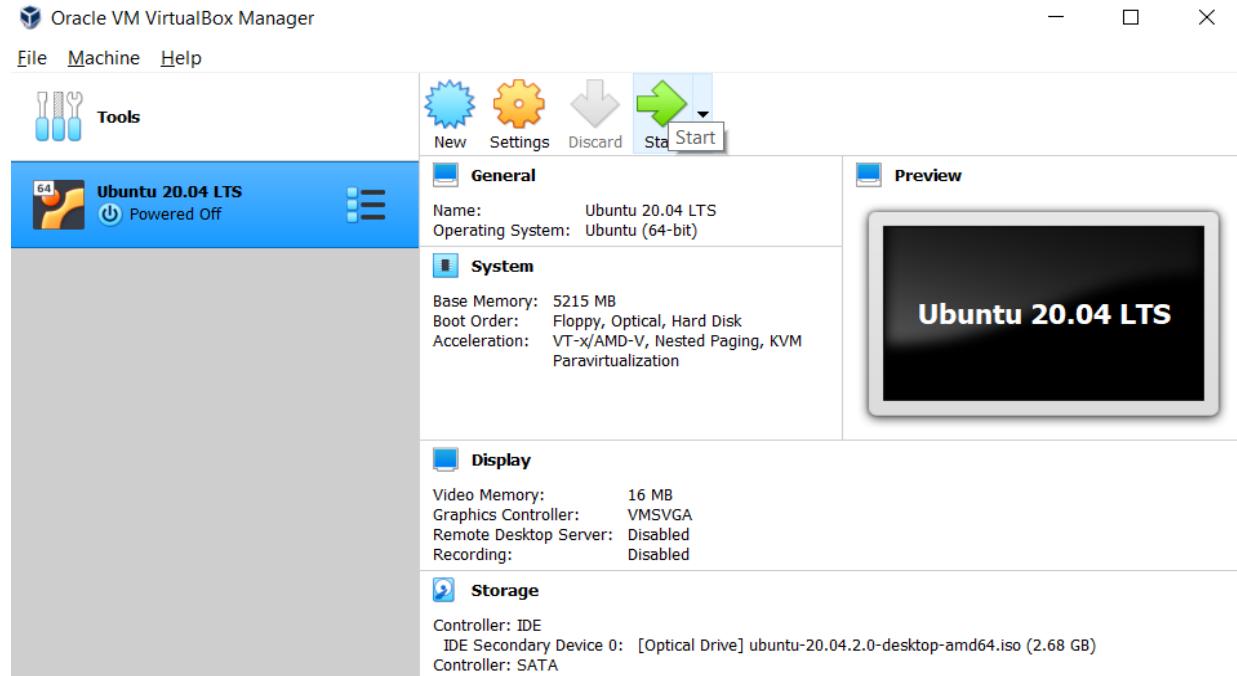


Now the screen look like this:



Now we can go for Ubuntu Installation in VM ware:

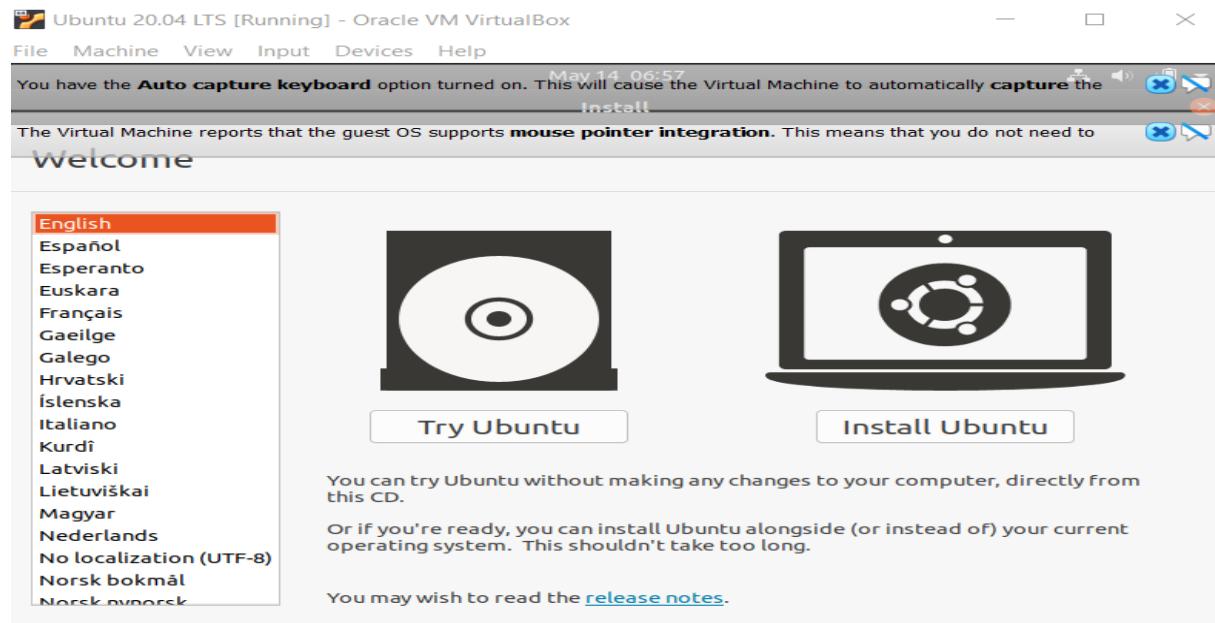
Click on "Start"



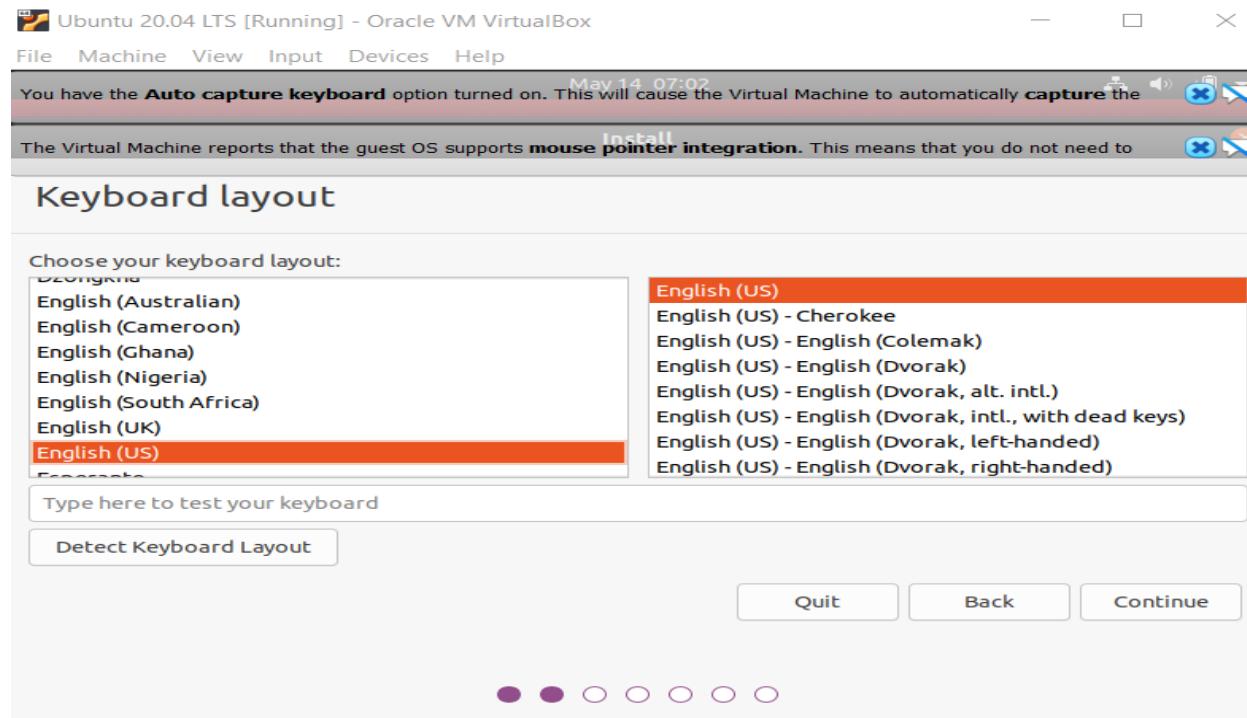
Ubuntu is start installing.

The screen looks like this:

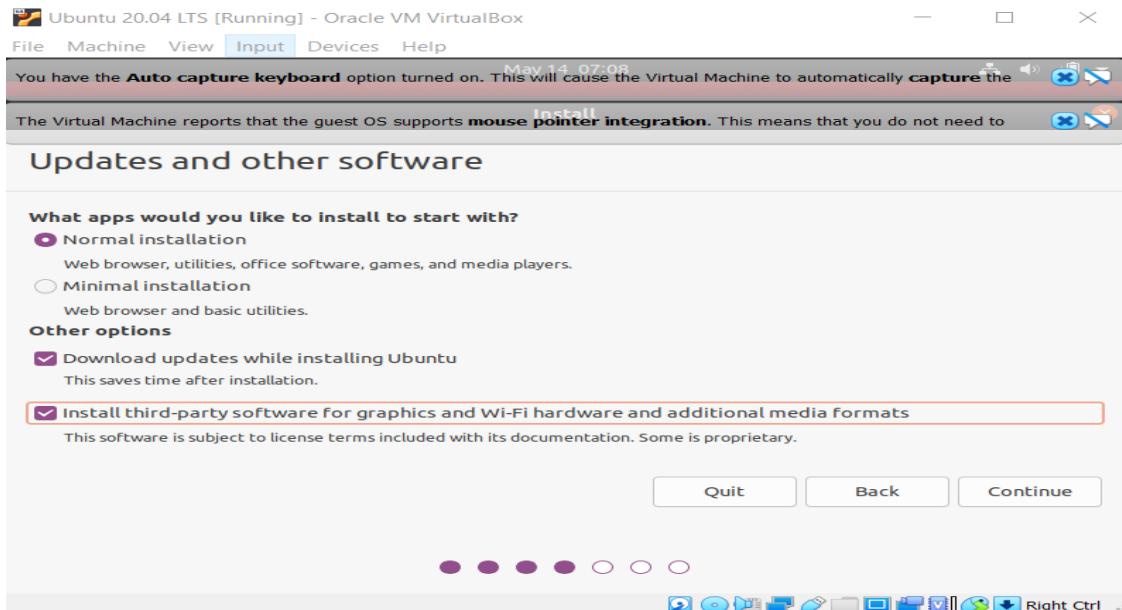
Choose the Language you need and click on “Install Ubuntu”:



Choose the Keyboard you need and click on “Continue”:

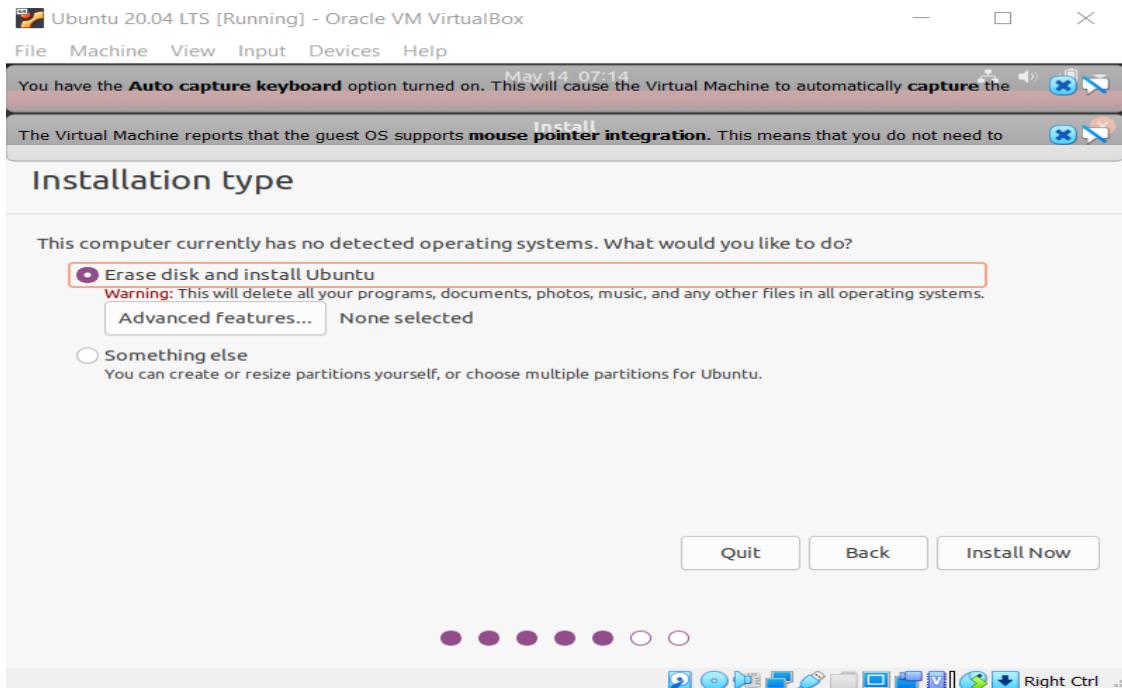


Check all the option below and click on “Continue”:

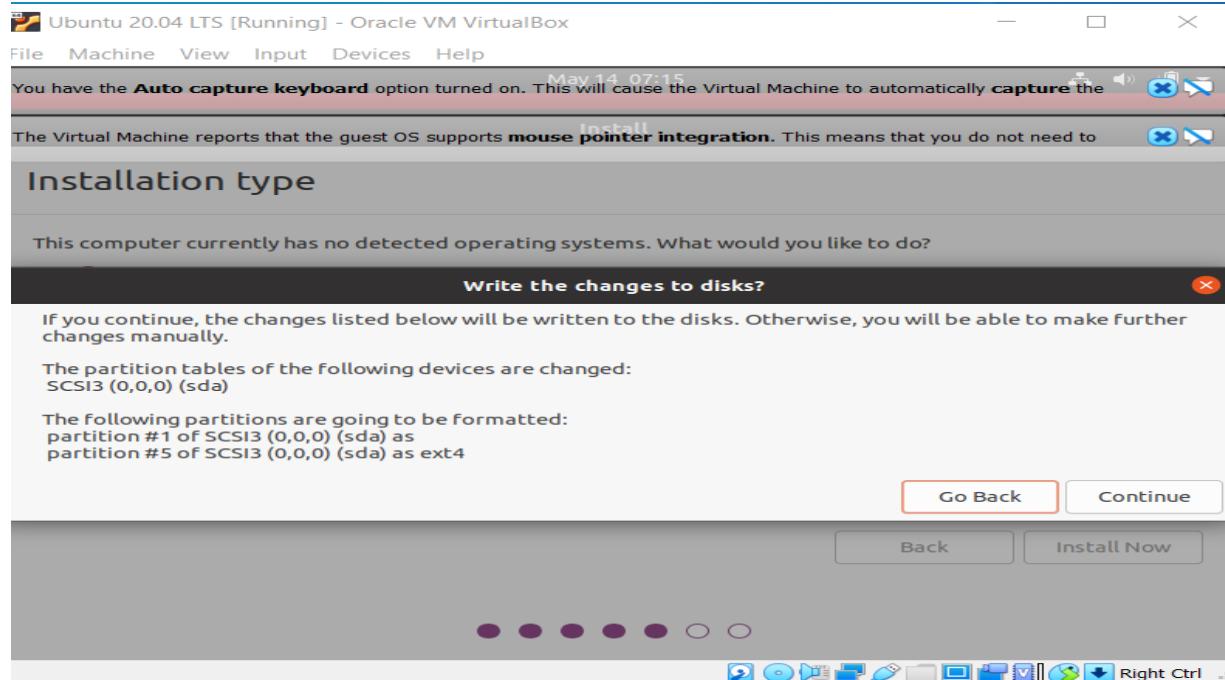


We are going to install ubuntu on VM Ware so no need to worry about “Erase disk and install Ubuntu”.

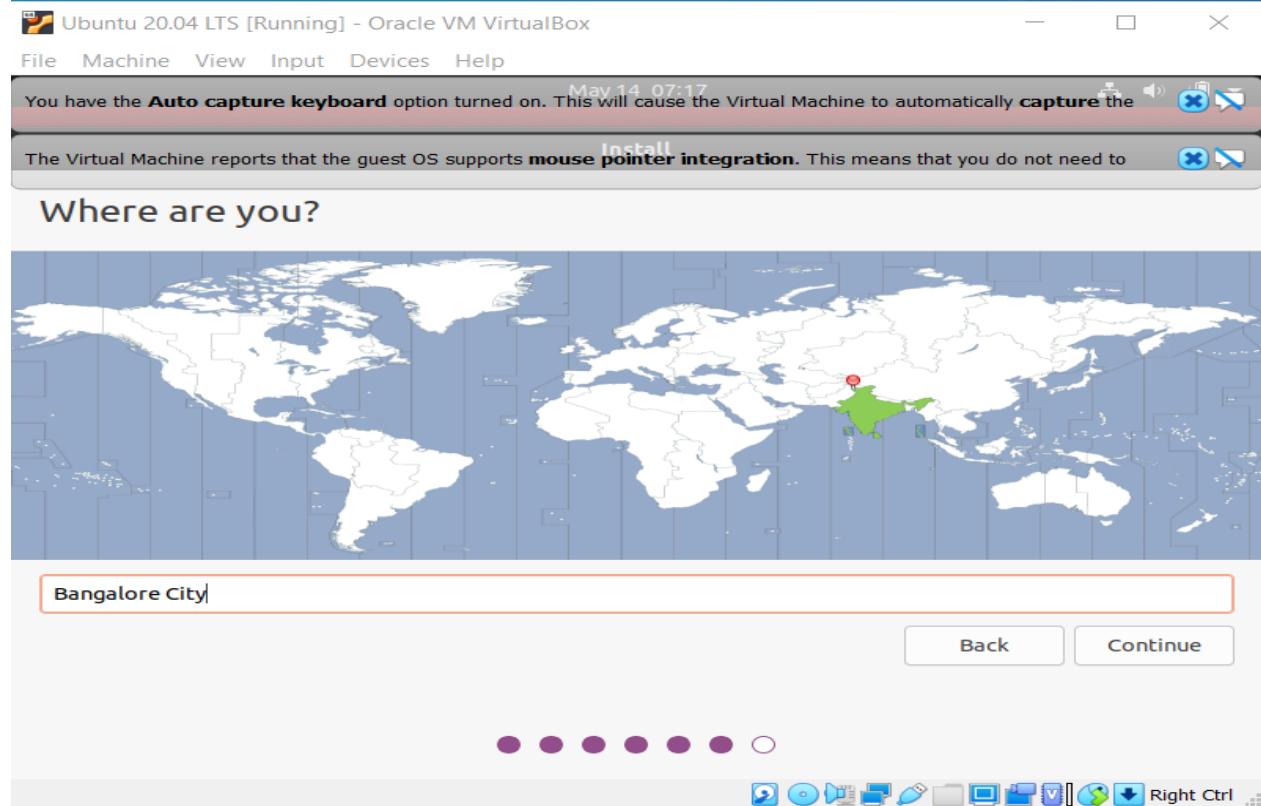
Click on “Install Now”:



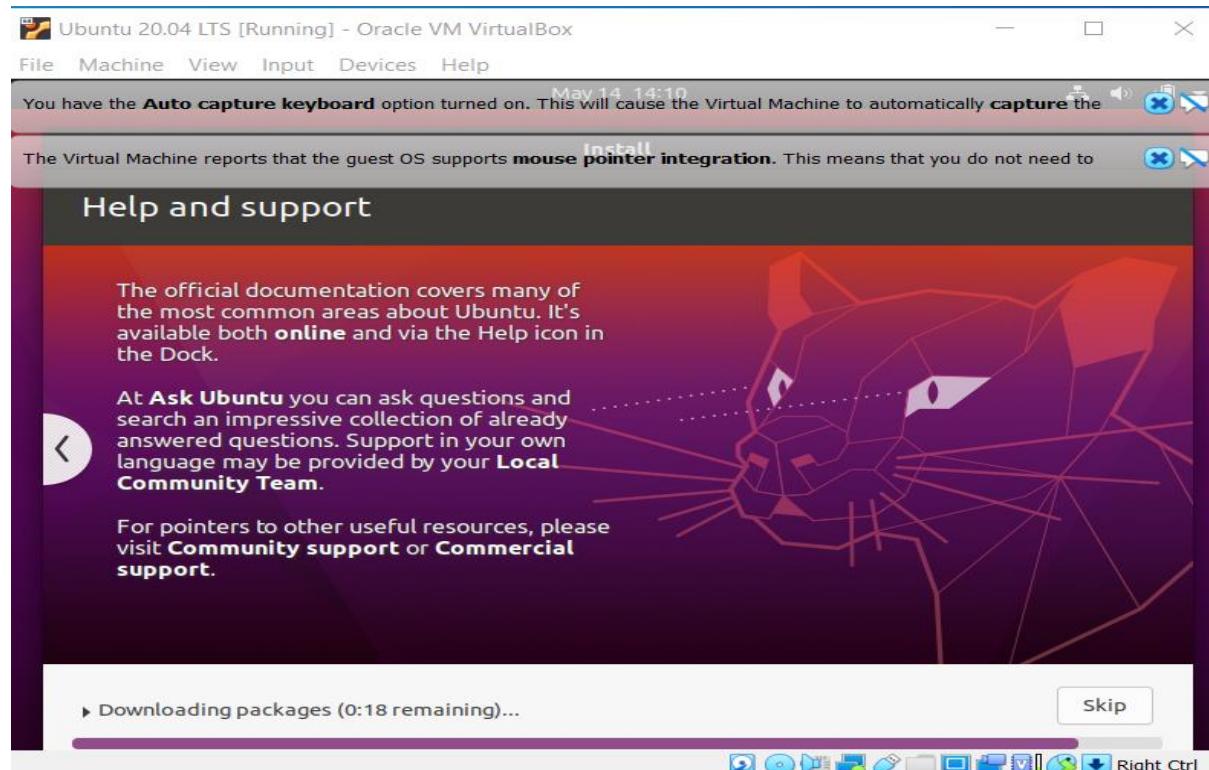
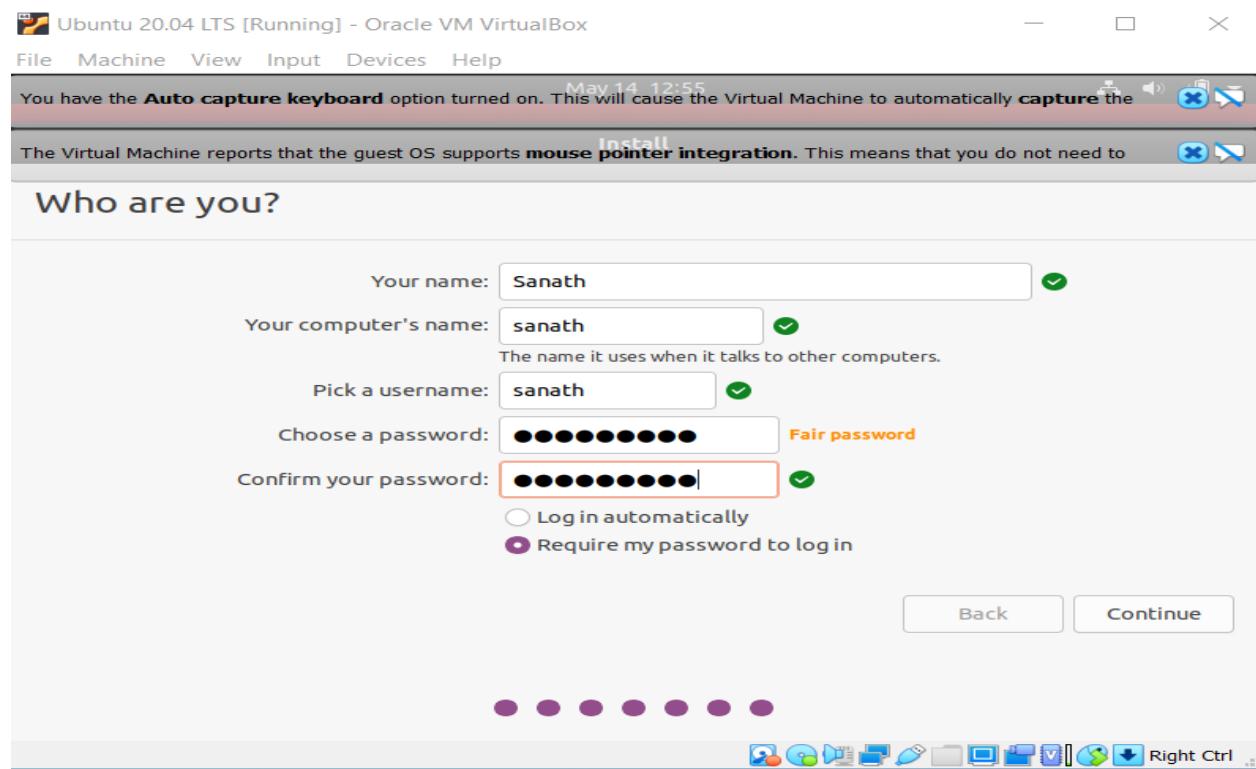
Click on the “Continue” button below:



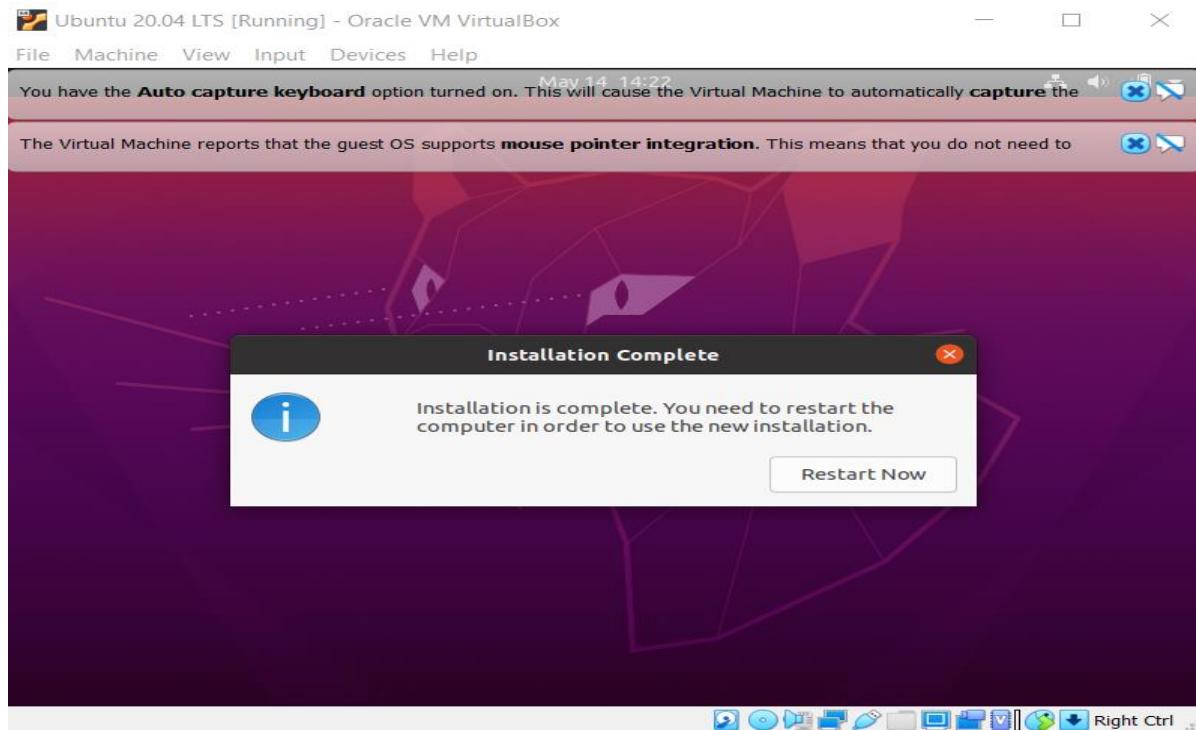
Choose your nearest Location and click on “Continue”:



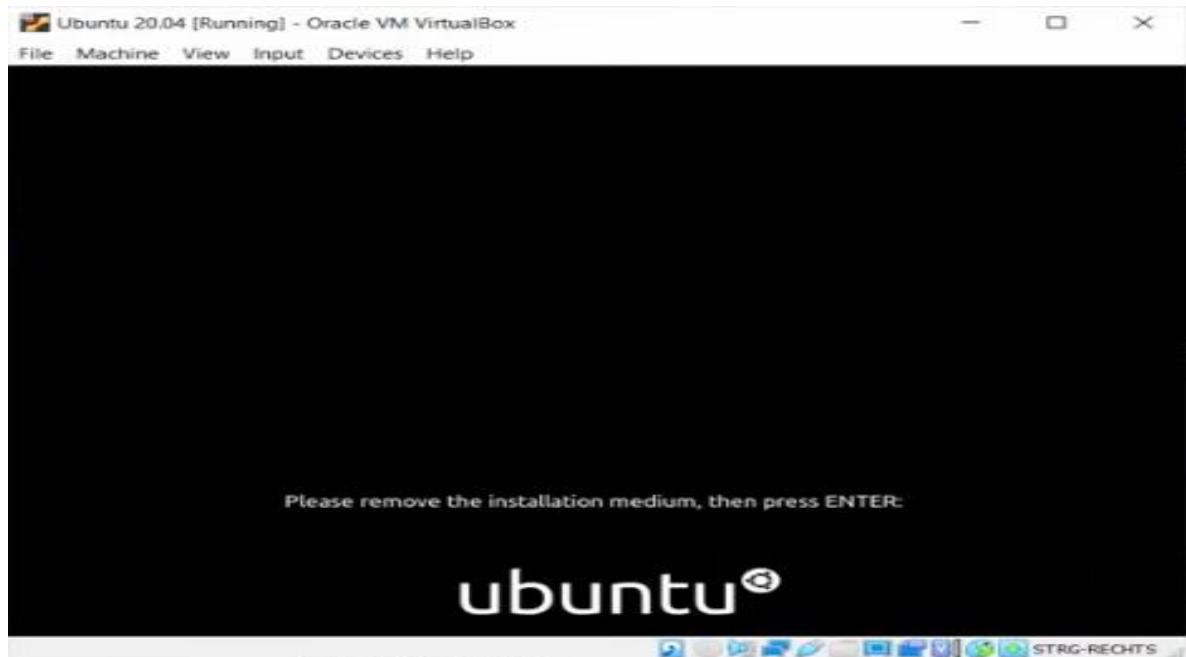
Fill the details below and click on continue:



Click on “Restart Now”:

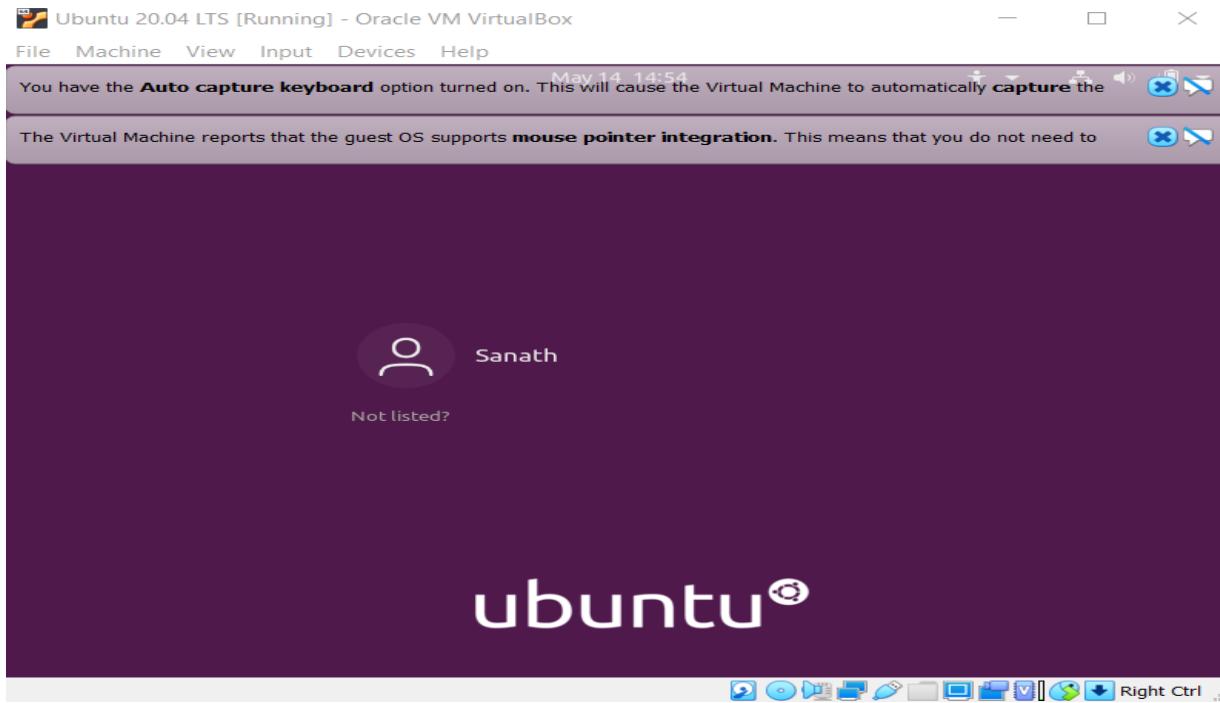


Now Ubuntu is Restarting:

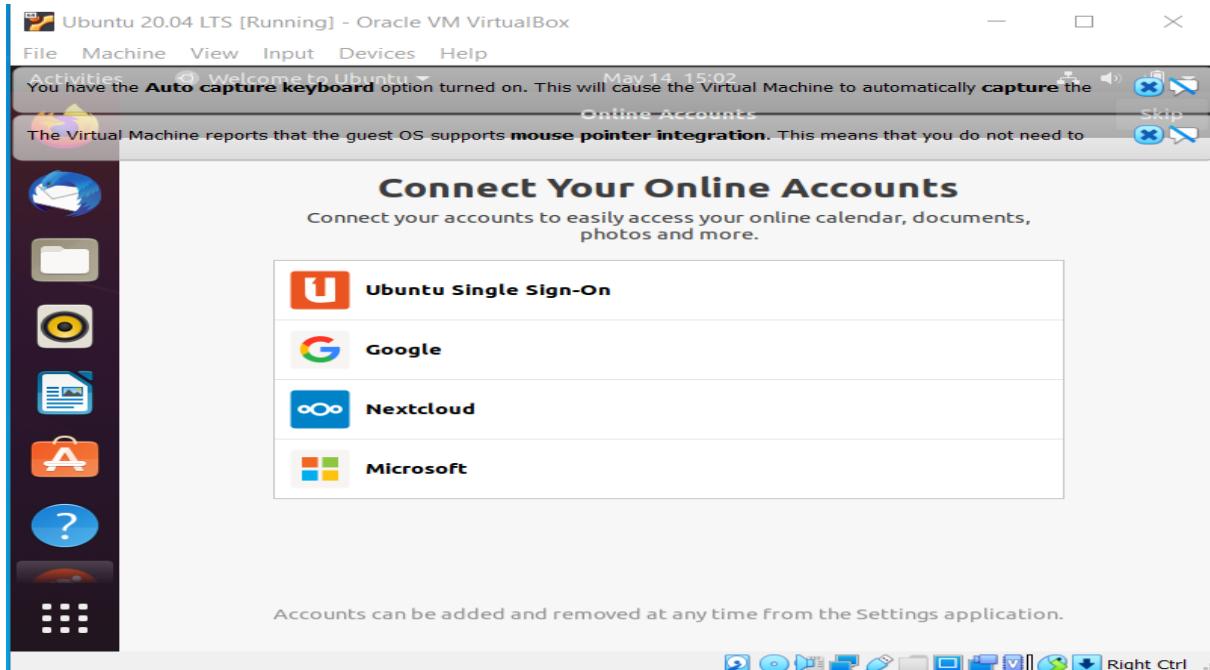


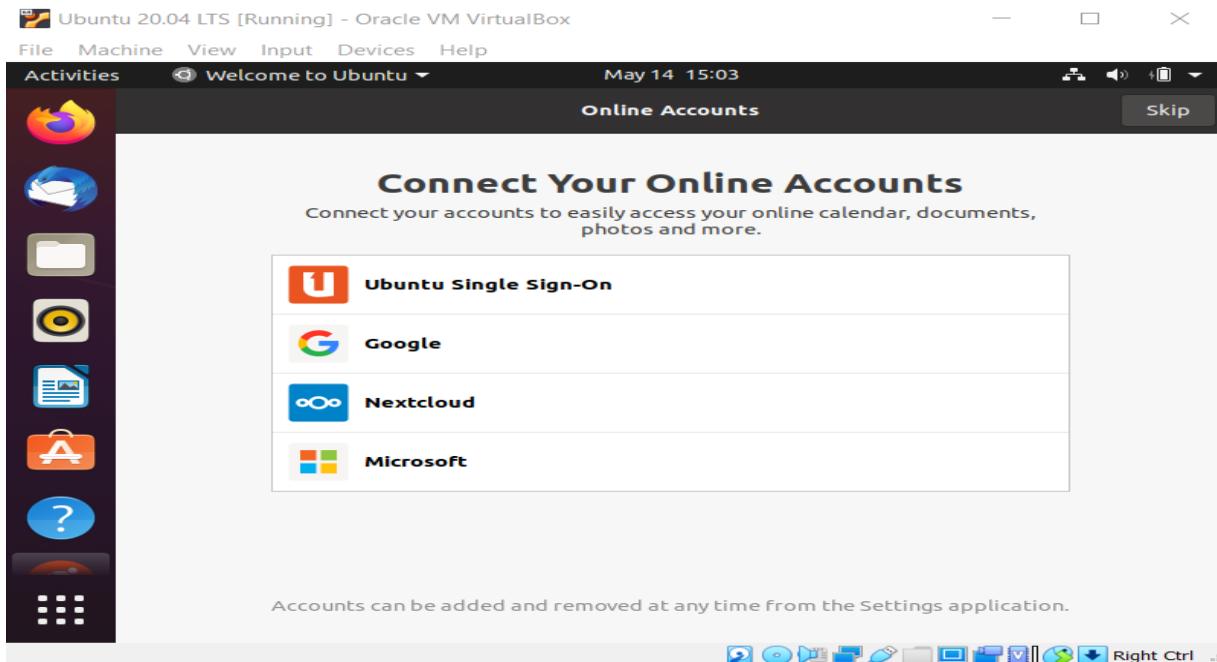
Ubuntu Screen looks like this:

Choose the “UserName” and Enter the “password” for Login”



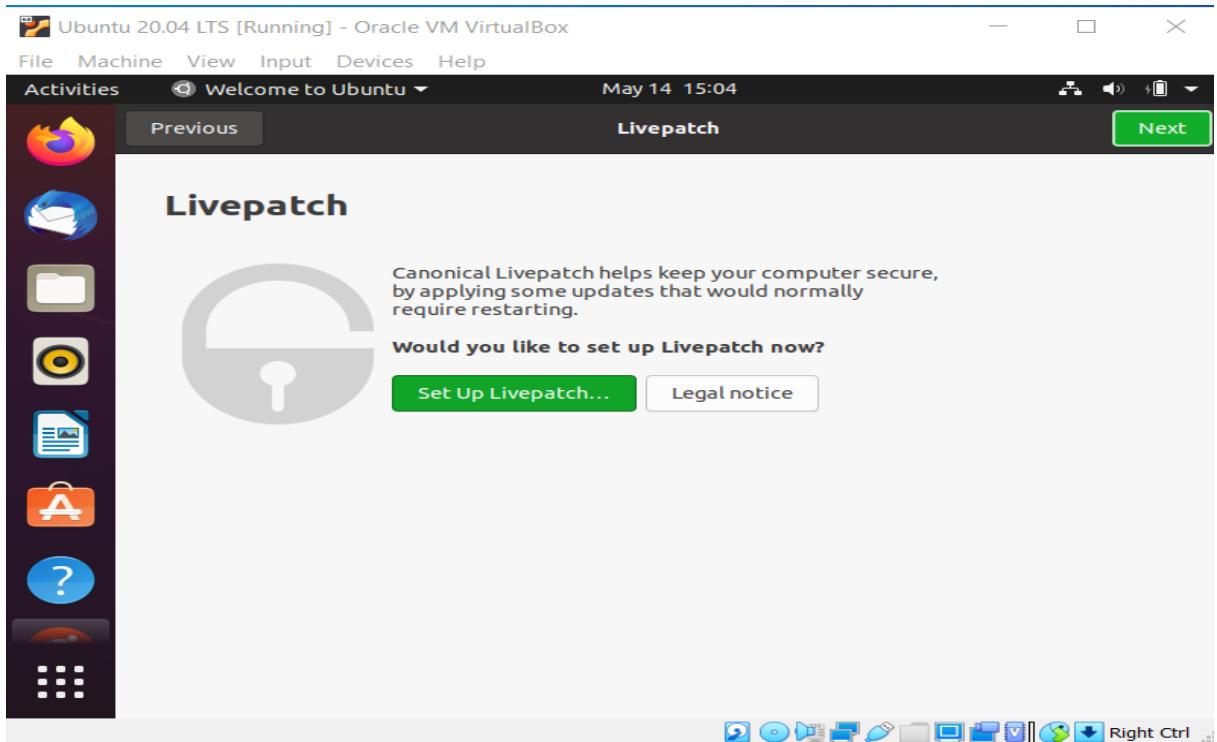
After we login, the screen looks like this:



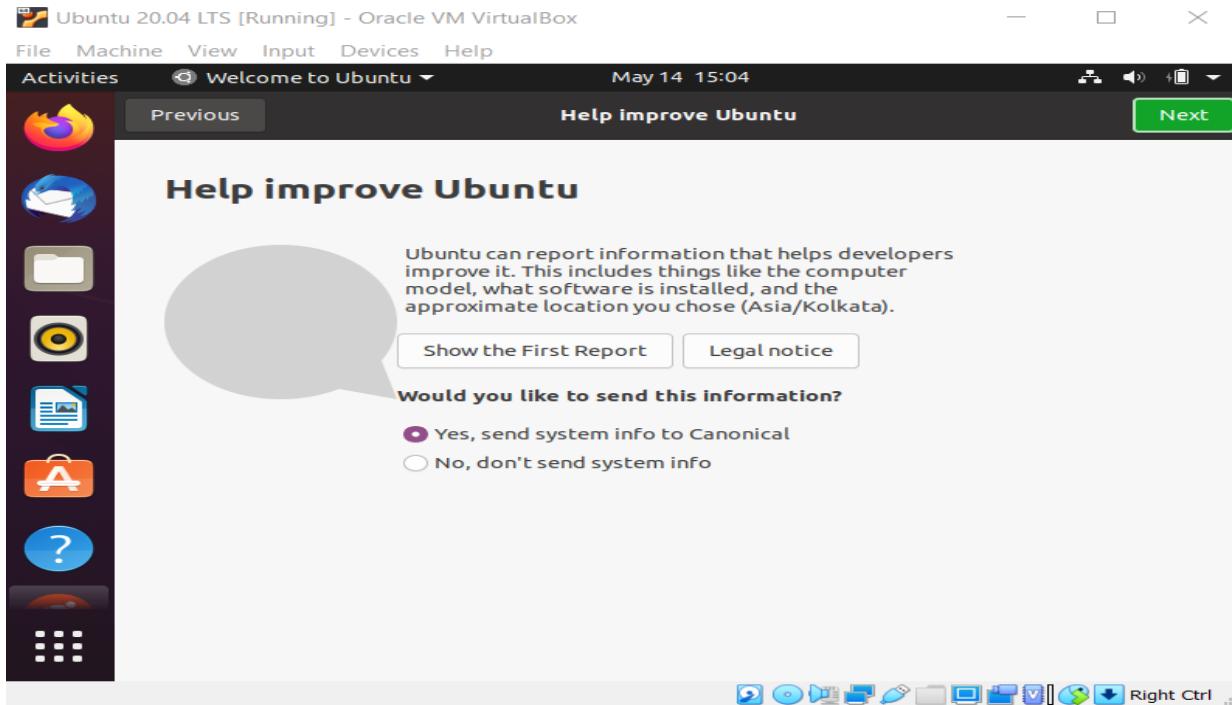


Click on the skip option on the top right of the window

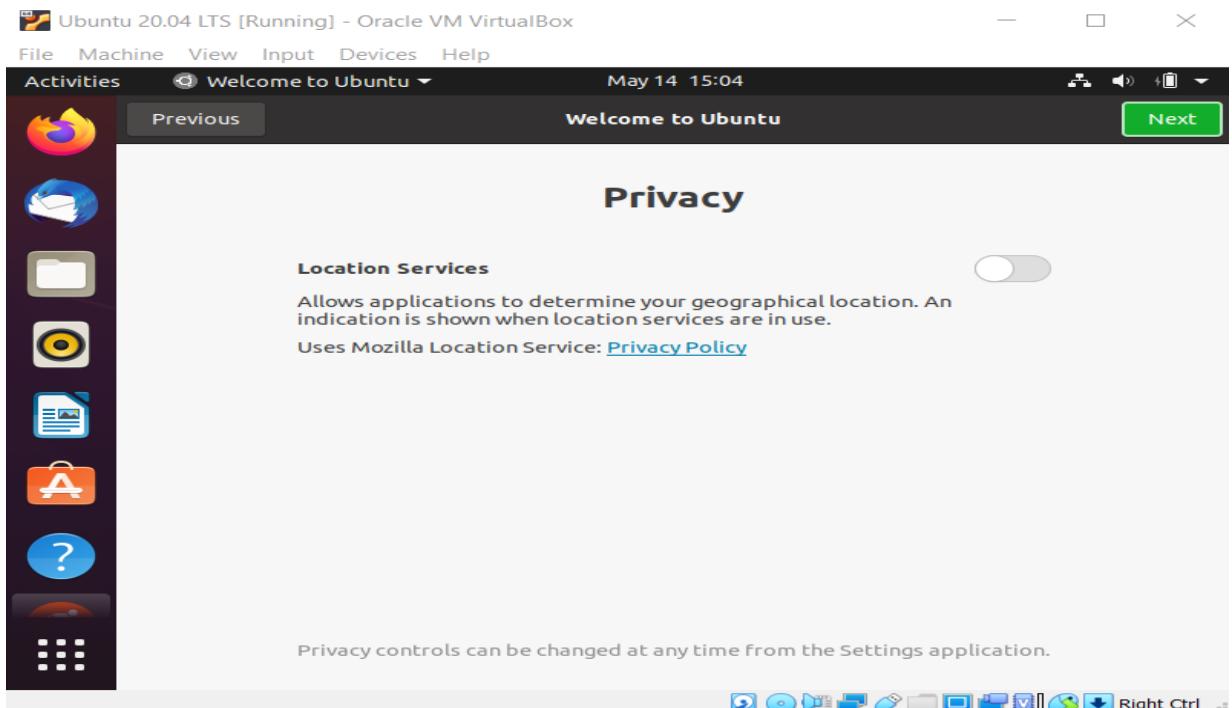
Click on Next:



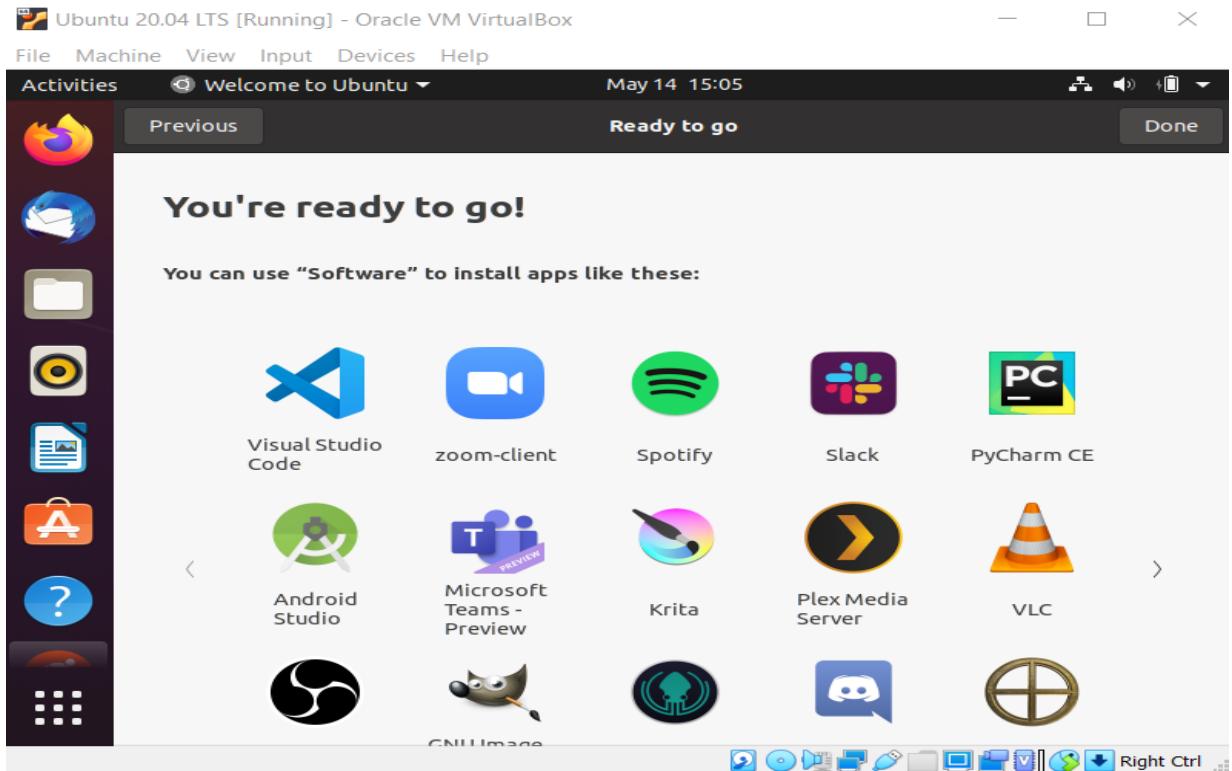
Click on Next:



Click on Next:

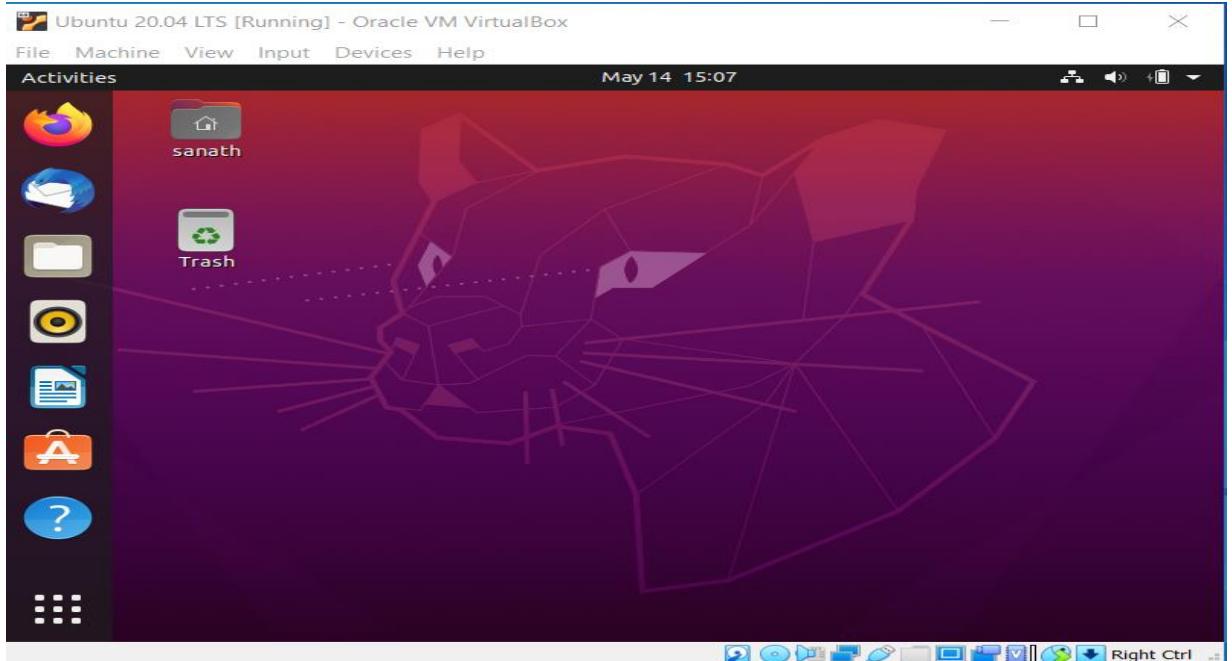


Click on Done:



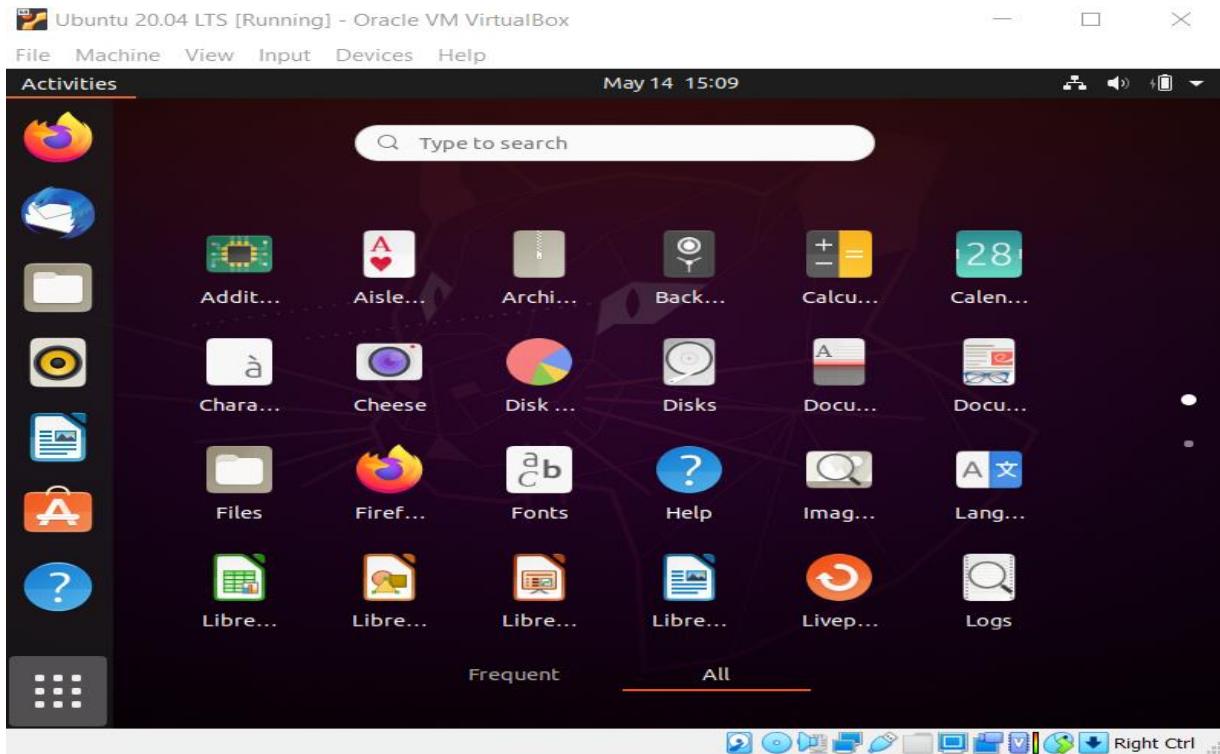
Now Ubuntu is installed on VM Ware.

Ubuntu Screen looks like this:

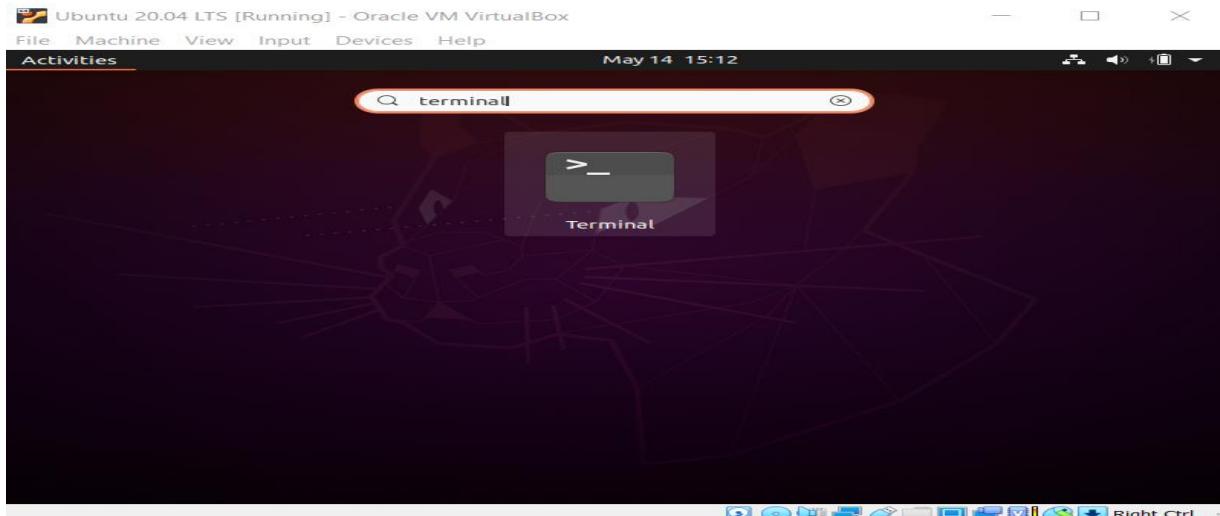


Installing Linux Box Guest Edition

Click on Show Applications, the window will be shown like this:

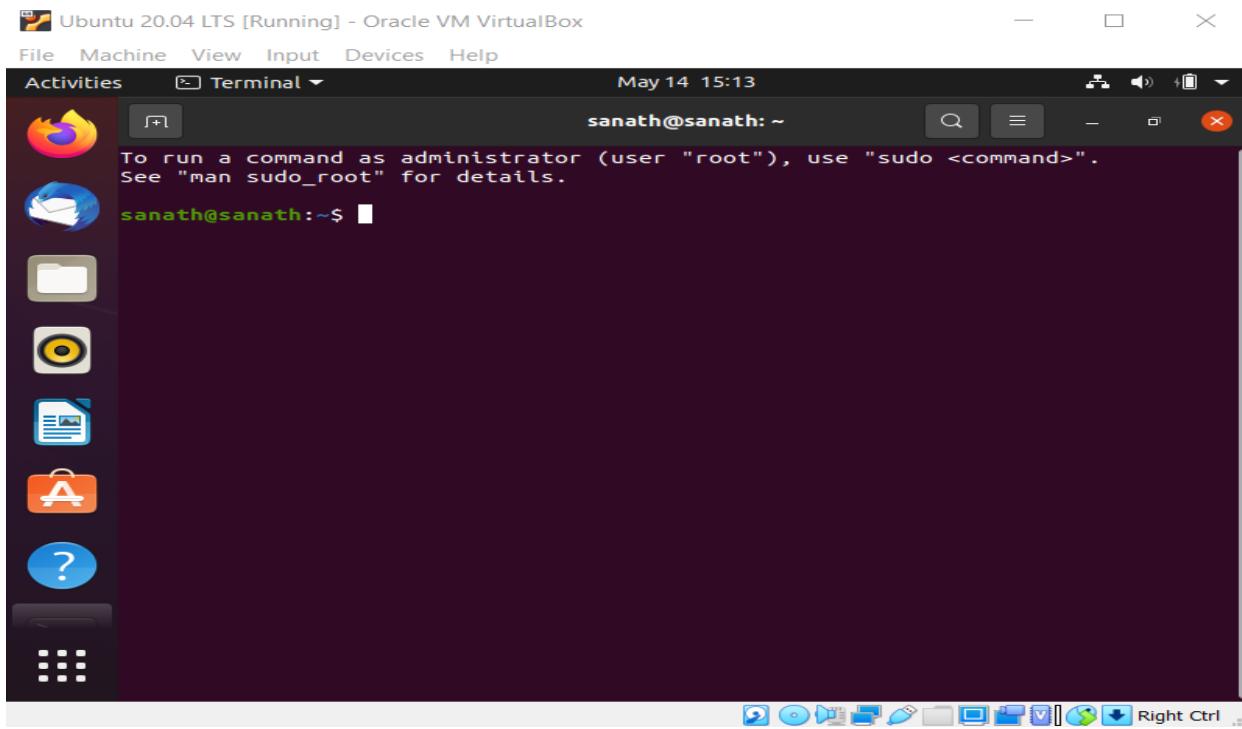


Search for “Terminal”:



Click on Enter

The Terminal window looks like this:



For installing the Linux essential type:

Enter the below commands:

```
sudo apt install build-essential dkms linux-headers-$(uname-r)
```

sudo apt-get install build-essential

sudo apt update

sudo apt upgrade

Enter the password

Ubuntu 20.04 LTS [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Activities Terminal May 14 15:42

```
sanath@sanath: ~
```

libgstreamer-plugins-good1.0-0 libhogweed5 libjavascriptcoregtk-4.0-18
libjuh-java libjurt-java libldap-2.4-2 libldap-common libldb2
libmysqclient21 libnetplan0 libnettle7 libnss-systemd libpam-systemd
libprocps8 libpython3.8 libpython3.8-minimal libpython3.8-stdlib
libreoffice-base-core libreoffice-calc libreoffice-core libreoffice-draw
libreoffice-gnome libreoffice-gtk3 libreoffice-help-common
libreoffice-help-en-us libreoffice-impress libreoffice-math
libreoffice-ogltrans libreoffice-pdfimport libreoffice-style-breeze
libreoffice-style-colibre libreoffice-style-elementary
libreoffice-style-tango libreoffice-writer libridl-javascript libseccomp2
libsmbclient libssl1.1 libsystemd0 libtiff5 libuno-cppu3
libuno-cppuhelpergcc3-3 libuno-purpenvhelpergcc3-3 libuno-sal3
libuno-salhelpergcc3-3 libunoloader-javascript libwacom-bin libwacom-common
libwacom2 libwbclient0 libwebkit2gtk-4.0-37 libwhoopsie0 libxmlb1 libzstd1
linux-firmware netplan.io openssh-client openssl openvpn procps
python3-apport python3-distupgrade python3-pil python3-problem-report
python3-software-properties python3-uno python3-update-manager python3-yaml
python3.8 python3.8-minimal samba-libs snapd software-properties-common
software-properties-gtk systemd systemd-sysv systemd-timesyncd thermald
thunderbird thunderbird-gnome-support thunderbird-locale-en
ubuntu-advantage-tools ubuntu-keyring ubuntu-release-upgrader-core
ubuntu-release-upgrader-gtk uno-libs-private update-manager
update-manager-core update-notifier update-notifier-common ure whoopsie
wpasupplicant xserver-common xserver-xephyr xserver-xorg-core
xserver-xorg-legacy xwayland
164 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 790 kB/379 MB of archives.
After this operation, 46.8 MB of additional disk space will be used.
Do you want to continue? [Y/n]

Right Ctrl

Enter Y

Ubuntu 20.04 LTS [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Activities Terminal May 14 15:44

```
sanath@sanath: ~
```

Unpacking initramfs-tools (0.136ubuntu6.4) over (0.136ubuntu6.3) ...
Preparing to unpack .../10-initramfs-tools-core_0.136ubuntu6.4_all.deb ...
Unpacking initramfs-tools-core (0.136ubuntu6.4) over (0.136ubuntu6.3) ...
Preparing to unpack .../11-initramfs-tools-bin_0.136ubuntu6.4_amd64.deb ...
Unpacking initramfs-tools-bin (0.136ubuntu6.4) over (0.136ubuntu6.3) ...
Preparing to unpack .../12-netplan.io_0.102~0ubuntu1~20.04.2_amd64.deb ...
Unpacking netplan.io (0.102~0ubuntu1~20.04.2) over (0.101~0ubuntu3~20.04.2) ...
Preparing to unpack .../13-openssl_1.1.1f-1ubuntu2.3_amd64.deb ...
Unpacking openssl (1.1.1f-1ubuntu2.3) over (1.1.1f-1ubuntu2.1) ...
Selecting previously unselected package distro-info.
Preparing to unpack .../14-distro-info_0.23ubuntu1_amd64.deb ...
Unpacking distro-info (0.23ubuntu1) ...
Preparing to unpack .../15-ubuntu-advantage-tools_27.0.2-20.04.1_amd64.deb ...
Unpacking ubuntu-advantage-tools (27.0.2-20.04.1) over (20.3) ...
Preparing to unpack .../16-bind9-dnsutils_1%3a9.16.1-0ubuntu2.8_amd64.deb ...
Unpacking bind9-dnsutils (1:9.16.1-0ubuntu2.8) over (1:9.16.1-0ubuntu2.4) ...
Preparing to unpack .../17-bind9-libs_1%3a9.16.1-0ubuntu2.8_amd64.deb ...
Unpacking bind9-libs:amd64 (1:9.16.1-0ubuntu2.8) over (1:9.16.1-0ubuntu2.4) ...
Preparing to unpack .../18-bind9-host_1%3a9.16.1-0ubuntu2.8_amd64.deb ...
Unpacking bind9-host (1:9.16.1-0ubuntu2.8) over (1:9.16.1-0ubuntu2.4) ...
Preparing to unpack .../19.openssh-client_1%3a8.2p1-4ubuntu0.2_amd64.deb ...
Unpacking openssh-client (1:8.2p1-4ubuntu0.2) over (1:8.2p1-4ubuntu0.1) ...
Preparing to unpack .../20-libatopology2_1.2.2-2.1ubuntu2.4_amd64.deb ...
Unpacking libatopology2:amd64 (1.2.2-2.1ubuntu2.4) over (1.2.2-2.1ubuntu2.3) ...
.
Preparing to unpack .../21-libasound2_1.2.2-2.1ubuntu2.4_amd64.deb ...
Unpacking libasound2:amd64 (1.2.2-2.1ubuntu2.4) over (1.2.2-2.1ubuntu2.3) ...

Progress: [28%] #####..... Right Ctrl

Ubuntu 20.04 LTS [Running] - Oracle VM VirtualBox

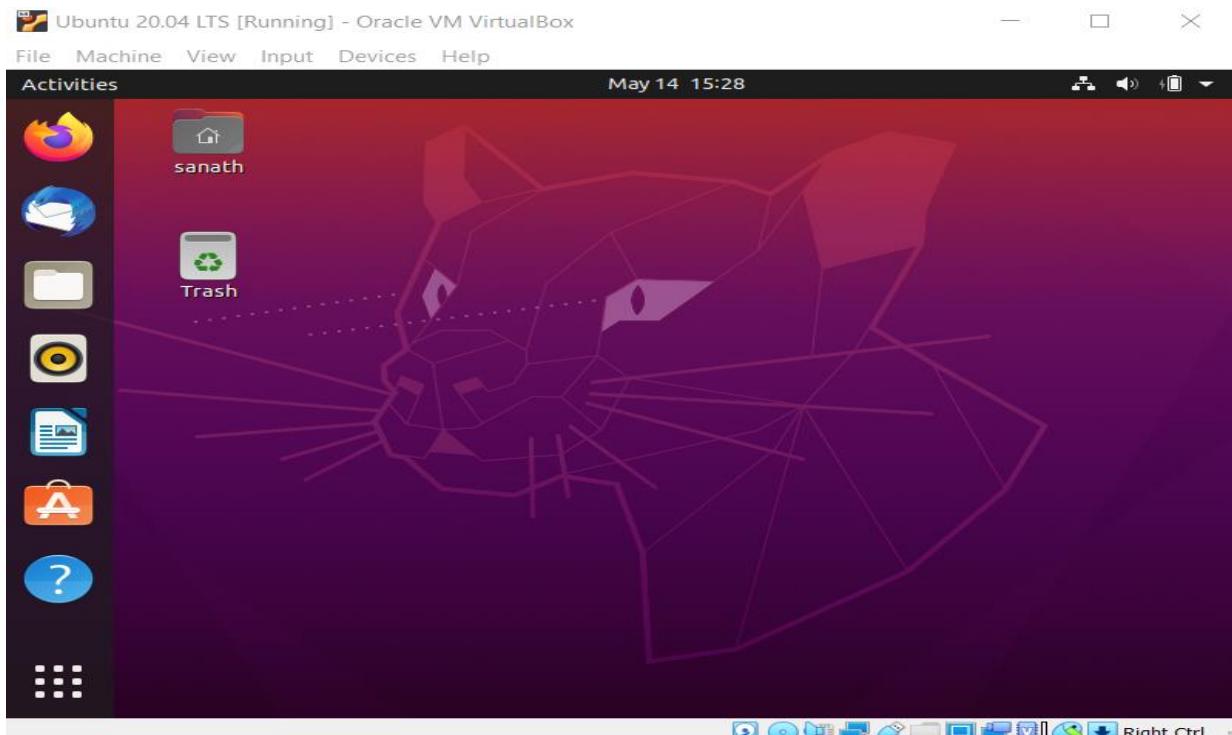
File Machine View Input Devices Help

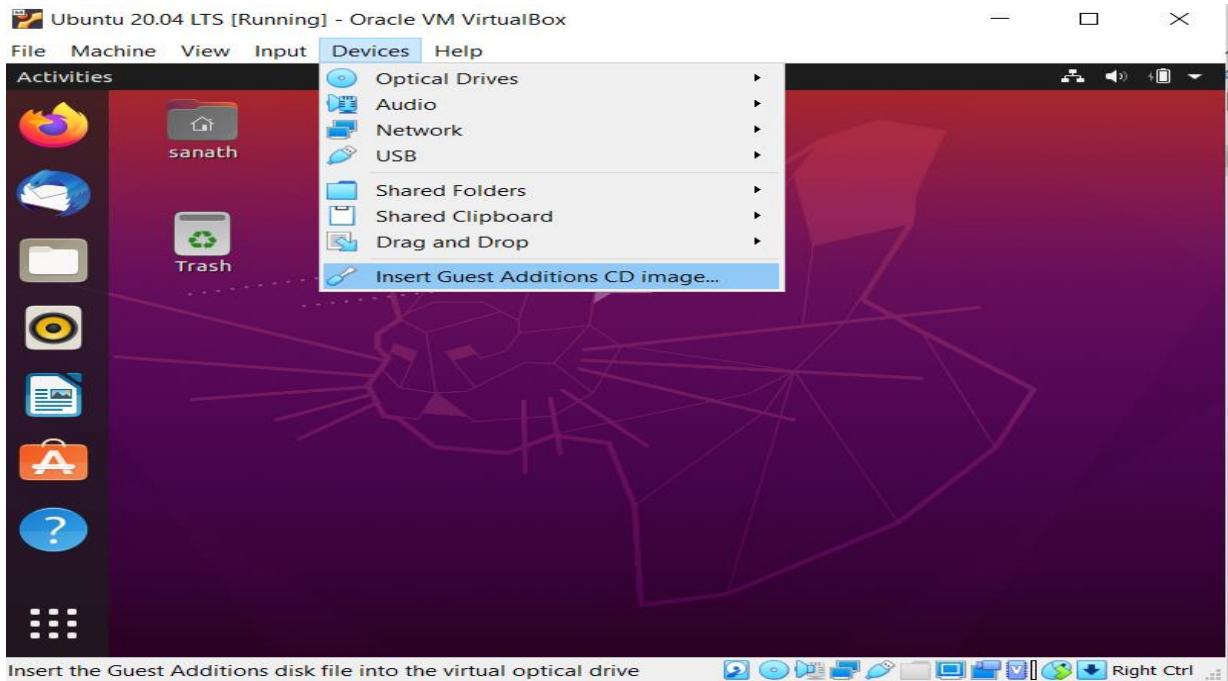
Activities Terminal May 14 16:11

```
sanath@sanath:~$ Setting up libreoffice-math (1:6.4.7-0ubuntu0.20.04.1) ...
Setting up libreoffice-gtk3 (1:6.4.7-0ubuntu0.20.04.1) ...
Setting up libreoffice-pdfimport (1:6.4.7-0ubuntu0.20.04.1) ...
Setting up libjurt-java (1:6.4.7-0ubuntu0.20.04.1) ...
Setting up libreoffice-draw (1:6.4.7-0ubuntu0.20.04.1) ...
Setting up libjuh-java (1:6.4.7-0ubuntu0.20.04.1) ...
Setting up libreoffice-gnome (1:6.4.7-0ubuntu0.20.04.1) ...
Setting up libreoffice-impress (1:6.4.7-0ubuntu0.20.04.1) ...
Setting up libreoffice-base-core (1:6.4.7-0ubuntu0.20.04.1) ...
Setting up python3-uno (1:6.4.7-0ubuntu0.20.04.1) ...
Setting up libreoffice-ogltrans (1:6.4.7-0ubuntu0.20.04.1) ...
Setting up libreoffice-calc (1:6.4.7-0ubuntu0.20.04.1) ...
Setting up libreoffice-writer (1:6.4.7-0ubuntu0.20.04.1) ...
Processing triggers for mime-support (3.64ubuntu1) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for gnome-menus (3.36.0-1ubuntu1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.2) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libreoffice-common (1:6.4.7-0ubuntu0.20.04.1) ...
Processing triggers for dbus (1.12.16-2ubuntu2.1) ...
Processing triggers for shared-mime-info (1.15-1) ...
Processing triggers for install-info (6.7.0.dfsg.2-5) ...
Processing triggers for fontconfig (2.13.1-2ubuntu3) ...
Processing triggers for desktop-file-utils (0.24-1ubuntu3) ...
Processing triggers for initramfs-tools (0.136ubuntu6.4) ...
update-initramfs: Generating /boot/initrd.img-5.8.0-53-generic
sanath@sanath:~$
```

Close the terminal

Click on Devices:



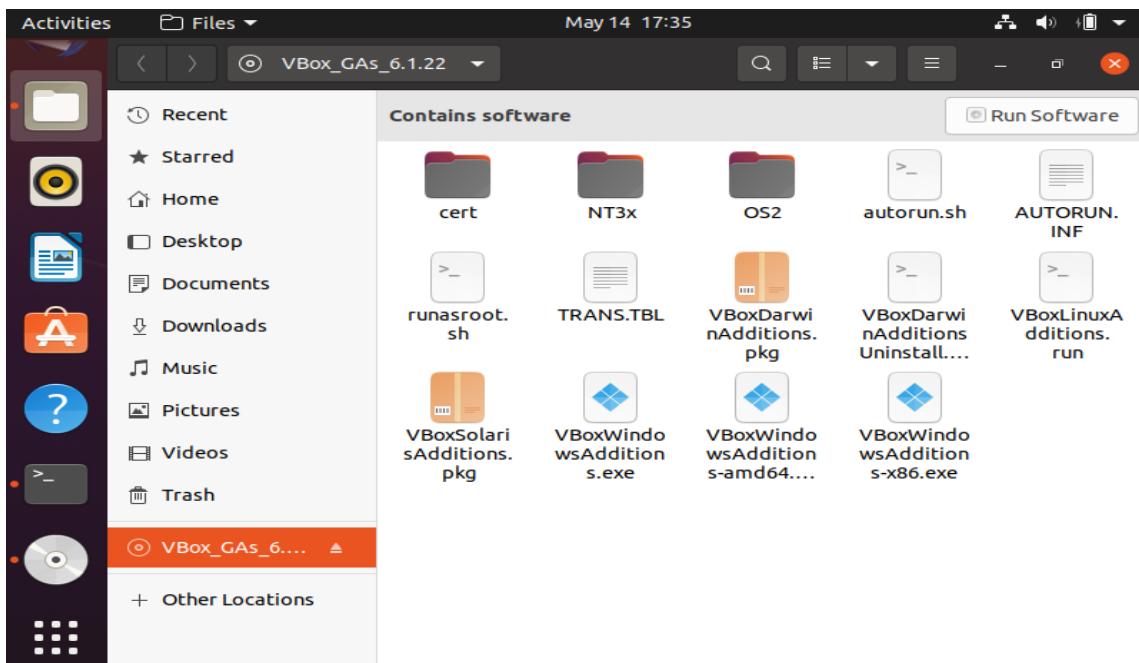


Give password. It will install all the extensions.

Note: If you face any error in the above approach when installing Linux Extension, follow the below process.

Other way to install Linux extension:

On the Home screen of Ubuntu, Select disk type image and click on the “VBox_Gas_6....”



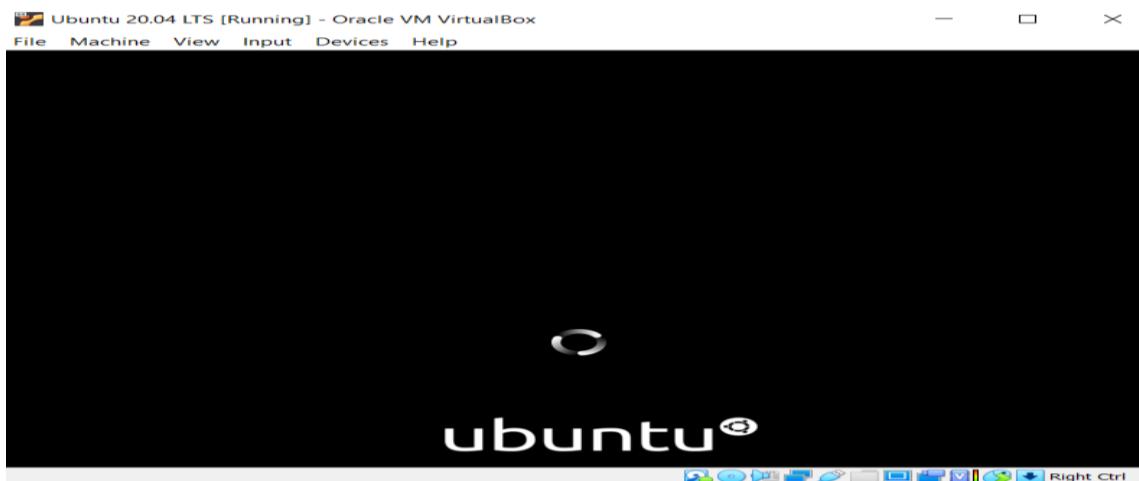
Click on “Run software” and enter the “Password”. It will install all the files.

```
Verifying archive integrity... All good.
Uncompressing VirtualBox 6.1.22 Guest Additions for Linux.....
VirtualBox Guest Additions installer
Copying additional installer modules ...
Installing additional modules ...
VirtualBox Guest Additions: Starting.
VirtualBox Guest Additions: Building the VirtualBox Guest Additions kernel
modules. This may take a while.
VirtualBox Guest Additions: To build modules for other installed kernels, run
VirtualBox Guest Additions: /sbin/rcvboxadd quicksetup <version>
VirtualBox Guest Additions: or
VirtualBox Guest Additions: /sbin/rcvboxadd quicksetup all
VirtualBox Guest Additions: Building the modules for kernel 5.8.0-53-generic.
update-initramfs: Generating /boot/initrd.img-5.8.0-53-generic
```

Now we need to restart the VM ware system. So that, all extensions will be ready to use.

Open command terminal in VM ware and enter “reboot”.

My Ubuntu is restarting:



Login with your Password.

Now, we can copy and paste the code from VMware ubuntu to other system and Vice versa.

ROS Installation

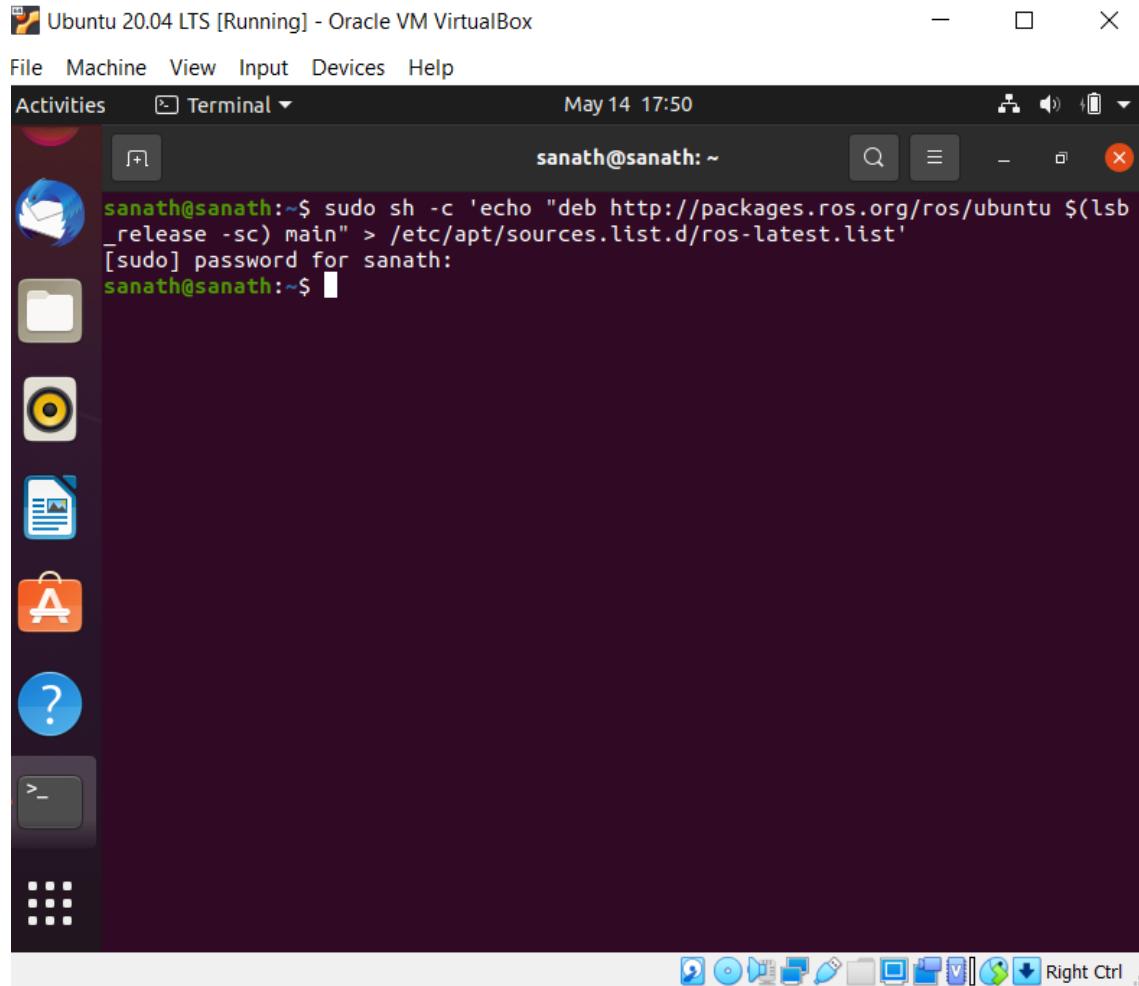
Link for ROS NOETIC code: <http://wiki.ros.org/noetic/Installation/Ubuntu>

Note: We can get below commands from the above link.

Open “Terminal” in Ubuntu

Step 1:

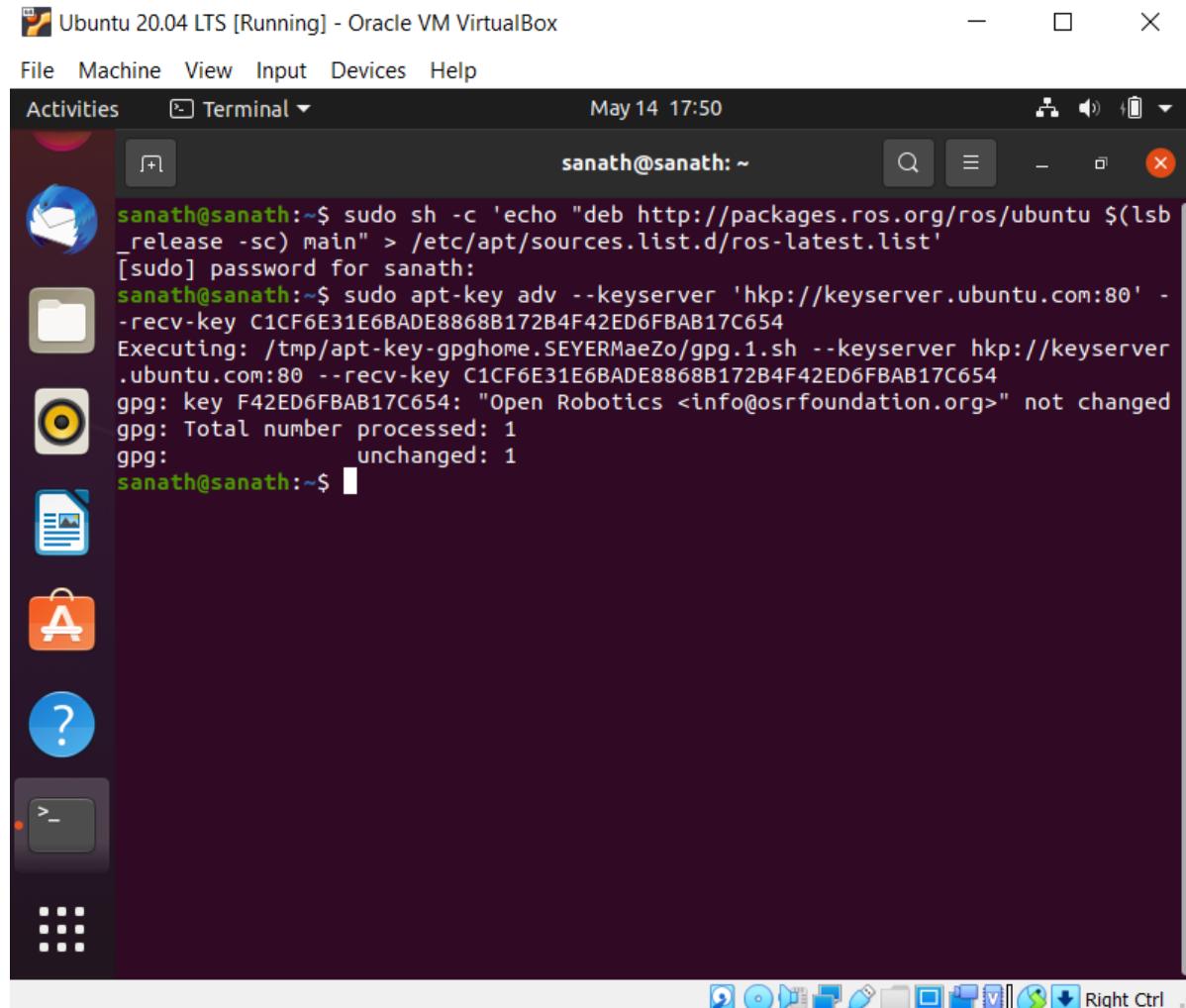
Command: sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu \$(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'



```
Ubuntu 20.04 LTS [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal May 14 17:50
sanath@sanath:~$ sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'
[sudo] password for sanath:
sanath@sanath:~$
```

Step 2: Enter the key details

Command: sudo apt-key adv --keyserver 'hkp://keyserver.ubuntu.com:80' --recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654



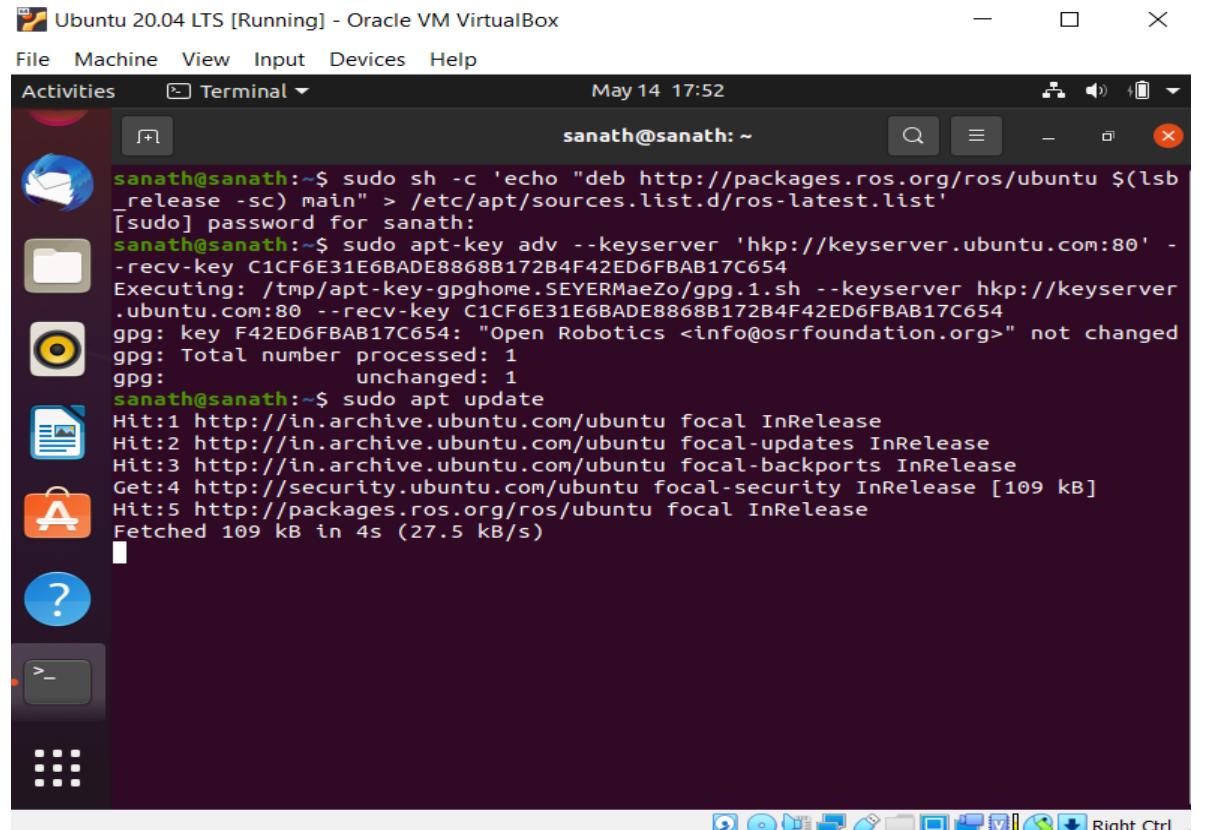
The screenshot shows a terminal window titled "Ubuntu 20.04 LTS [Running] - Oracle VM VirtualBox". The terminal session is for user "sanath" at terminal prompt "sanath@sanath: ~". The command entered was:

```
sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'
[sudo] password for sanath:
sanath@sanath:~$ sudo apt-key adv --keyserver 'hkp://keyserver.ubuntu.com:80' --recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
Executing: /tmp/apt-key-gpghome.SEYERMaZo/gpg.1.sh --keyserver hkp://keyserver.ubuntu.com:80 --recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
gpg: key F42ED6FBAB17C654: "Open Robotics <info@osrfoundation.org>" not changed
gpg: Total number processed: 1
gpg: unchanged: 1
sanath@sanath:~$
```

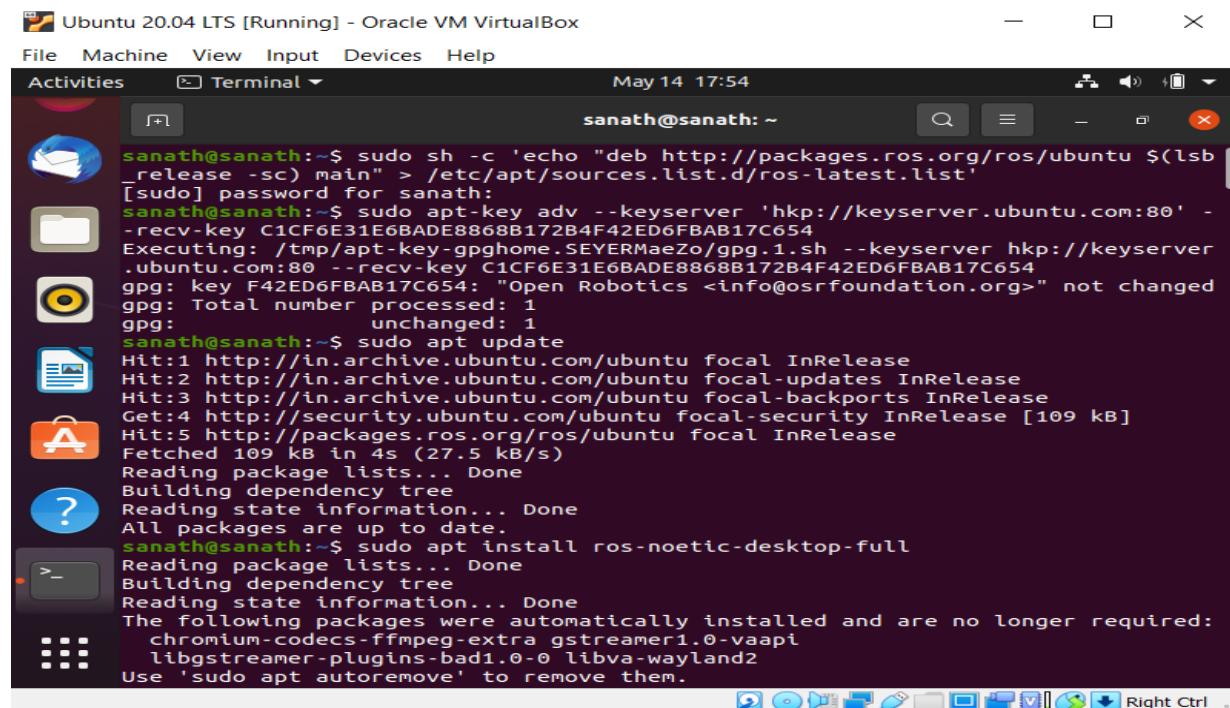
The terminal window has a dark theme with light-colored text. The background shows the Unity desktop environment with various icons for applications like Dash, Home, Activities, and Help.

Step 3: Need to update

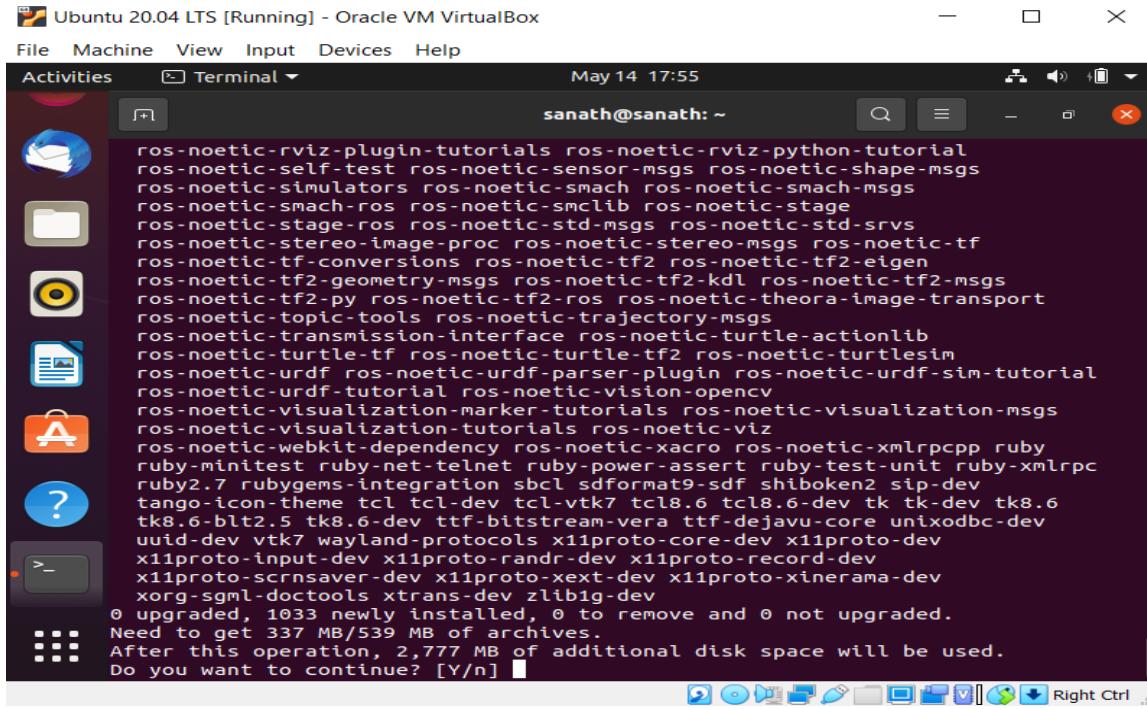
Command: sudo apt update



```
sanath@sanath:~$ sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'
[sudo] password for sanath:
sanath@sanath:~$ sudo apt-key adv --keyserver 'hkp://keyserver.ubuntu.com:80' --recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
Executing: /tmp/apt-key-gpghome.SEYERMaZo/gpg.1.sh --keyserver hkp://keyserver.ubuntu.com:80 --recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
gpg: key F42ED6FBAB17C654: "Open Robotics <info@osrfoundation.org>" not changed
gpg: Total number processed: 1
gpg: unchanged: 1
sanath@sanath:~$ sudo apt update
Hit:1 http://in.archive.ubuntu.com/ubuntu focal InRelease
Hit:2 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:3 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease
Get:4 http://security.ubuntu.com/ubuntu focal-security InRelease [109 kB]
Hit:5 http://packages.ros.org/ros/ubuntu focal InRelease
Fetched 109 kB in 4s (27.5 kB/s)
```



```
sanath@sanath:~$ sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'
[sudo] password for sanath:
sanath@sanath:~$ sudo apt-key adv --keyserver 'hkp://keyserver.ubuntu.com:80' --recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
Executing: /tmp/apt-key-gpghome.SEYERMaZo/gpg.1.sh --keyserver hkp://keyserver.ubuntu.com:80 --recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
gpg: key F42ED6FBAB17C654: "Open Robotics <info@osrfoundation.org>" not changed
gpg: unchanged: 1
sanath@sanath:~$ sudo apt update
Hit:1 http://in.archive.ubuntu.com/ubuntu focal InRelease
Hit:2 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:3 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease
Get:4 http://security.ubuntu.com/ubuntu focal-security InRelease [109 kB]
Hit:5 http://packages.ros.org/ros/ubuntu focal InRelease
Fetched 109 kB in 4s (27.5 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
All packages are up to date.
sanath@sanath:~$ sudo apt install ros-noetic-desktop-full
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi
  libgstreamer-plugins-bad1.0-0 libva-wayland2
Use 'sudo apt autoremove' to remove them.
```



The screenshot shows a terminal window in an Oracle VM VirtualBox environment. The title bar reads "Ubuntu 20.04 LTS [Running] - Oracle VM VirtualBox". The terminal window has tabs for "Activities" and "Terminal". The current tab is "Terminal". The status bar shows the date and time as "May 14 17:55". The user is running a command to install ROS Noetic desktop components. The output of the command is as follows:

```
sanath@sanath: ~
+ ros-noetic-rviz-plugin-tutorials ros-noetic-rviz-python-tutorial
+ ros-noetic-self-test ros-noetic-sensor-msgs ros-noetic-shape-msgs
+ ros-noetic-simulators ros-noetic-smach ros-noetic-smach-msgs
+ ros-noetic-smach-ros ros-noetic-smclib ros-noetic-stage
+ ros-noetic-stage-ros ros-noetic-std-msgs ros-noetic-std-srvs
+ ros-noetic-stereo-image-proc ros-noetic-stereo-msgs ros-noetic-tf
+ ros-noetic-tf-conversions ros-noetic-tf2 ros-noetic-tf2-eigen
+ ros-noetic-tf2-geometry-msgs ros-noetic-tf2-kdl ros-noetic-tf2-msgs
+ ros-noetic-tf2-py ros-noetic-tf2-ros ros-noetic-theora-image-transport
+ ros-noetic-topic-tools ros-noetic-trajectory-msgs
+ ros-noetic-transmission-interface ros-noetic-turtle-actionlib
+ ros-noetic-turtle-tf ros-noetic-turtle-tf2 ros-noetic-turtlesim
+ ros-noetic-urdf ros-noetic-urdf-parser-plugin ros-noetic-urdf-sim-tutorial
+ ros-noetic-urdf-tutorial ros-noetic-vision-opencv
+ ros-noetic-visualization-marker-tutorials ros-noetic-visualization-msgs
+ ros-noetic-visualization-tutorials ros-noetic-viz
+ ros-noetic-webkit-dependency ros-noetic-xacro ros-noetic-xmlrpcpp ruby
+ ruby-minitest ruby-net-telnet ruby-power-assert ruby-test-unit ruby-xmlrpc
+ ruby2.7 rubygems-integration sbcl sdformat9-sdf shiboken2 sip-dev
+ tango-icon-theme tcl tcl-dev tcl-vtk7 tcl8.6 tcl8.6-dev tk tk-dev tk8.6
+ tk8.6-blt2.5 tk8.6-dev ttf-bitstream-vera ttf-dejavu-core unixodbc-dev
+ uuid-dev vtk7 wayland-protocols x11proto-core-dev x11proto-dev
+ x11proto-input-dev x11proto-randr-dev x11proto-record-dev
+ x11proto-scnsaver-dev x11proto-xext-dev x11proto-xinerama-dev
+ xorg-sgml-doctools xtrans-dev zlib1g-dev
0 upgraded, 1033 newly installed, 0 to remove and 0 not upgraded.
Need to get 337 MB/539 MB of archives.
After this operation, 2,777 MB of additional disk space will be used.
Do you want to continue? [Y/n] ■
```

Enter Y

Step 4:

Command: sudo apt install ros-noetic-desktop-full (We can install desktop version also)

Note: It will take some time for installation.

Step 5:

Command A: sudo apt install python3-rosdep

Command B: sudo rosdep init

Command C: rosdep update

Step 6:

Command A: source /opt/ros/noetic/setup.bash

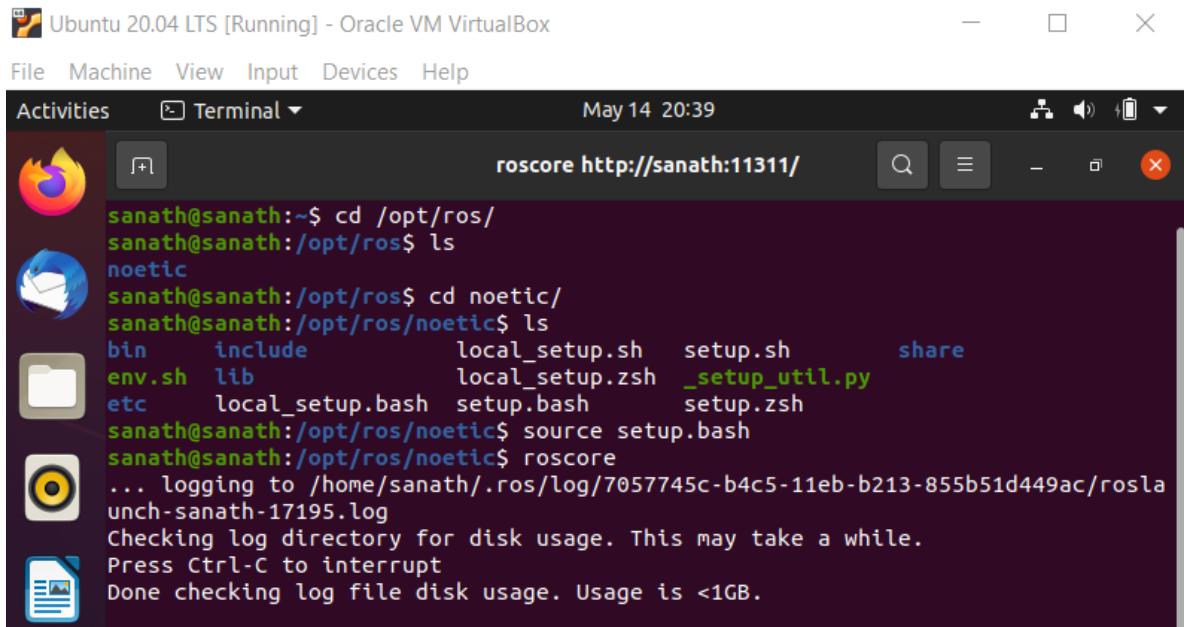
Command B: echo "source /opt/ros/noetic/setup.bash" >> ~/.bashrc

Step 7: To Check ROS has installed or not

Command: roscore

We will see the ROS start.

Step 6 and 7 is shown in the below 2 images.



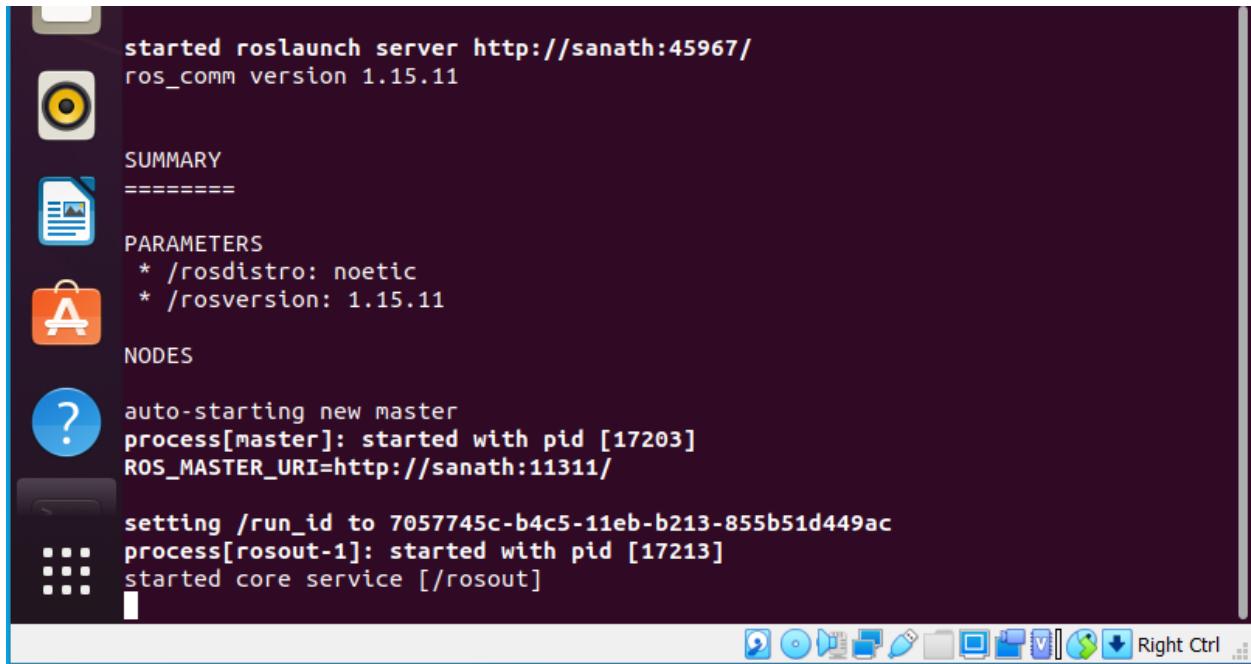
Ubuntu 20.04 LTS [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Activities Terminal May 14 20:39

roscore http://sanath:11311/

```
sanath@sanath:~$ cd /opt/ros/
sanath@sanath:/opt/ros$ ls
noetic
sanath@sanath:/opt/ros$ cd noetic/
sanath@sanath:/opt/ros/noetic$ ls
bin include local_setup.sh setup.sh share
env.sh lib local_setup.zsh _setup_util.py
etc local_setup.bash setup.bash setup.zsh
sanath@sanath:/opt/ros/noetic$ source setup.bash
sanath@sanath:/opt/ros/noetic$ roscore
... logging to /home/sanath/.ros/log/7057745c-b4c5-11eb-b213-855b51d449ac/roslaunch-sanath-17195.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.
```



```
started roslaunch server http://sanath:45967/
ros_comm version 1.15.11

SUMMARY
=====

PARAMETERS
* /rosdistro: noetic
* /rosversion: 1.15.11

NODES

auto-starting new master
process[master]: started with pid [17203]
ROS_MASTER_URI=http://sanath:11311/

setting /run_id to 7057745c-b4c5-11eb-b213-855b51d449ac
process[rosout-1]: started with pid [17213]
started core service [/rosout]
```

ROS has been started.