Installation Guidelines

Introduction

Now, before moving on to explain how communication happens between user programs and a kernel, let's install an OS. For this course, we will be studying Linux OS and understand its functioning.

When we are saying Linux, we refer to the kernel part of the OS. The kernel must be packaged with commands and other softwares to form a usable and complete Operating System. In Linux terms, we call this complete OS a "distribution". All the Linux distributions share the same kernel lineage, but differ in other softwares that the kernel is packaged with. In the following table, we will list some of the popular distributions of Linux. However, for this course, we will be using Ubuntu distribution.

Table 1: Most popular general-purpose Linux distributions

Distribution	Website	Comments
CentOS	https://www.centos.org/	Free Analog of Red Hat Enterprise Linux
Debian	https://www.debian.org/	A popular Linux distribution composed of free and open-source software
Fedora	https://getfedora.org/	Linux distribution developed by the community-supported Fedora Project which is sponsored primarily by Red Hat
Red Hat Enterprise	https://www.redhat.com/	Linux distribution developed by Red Hat for

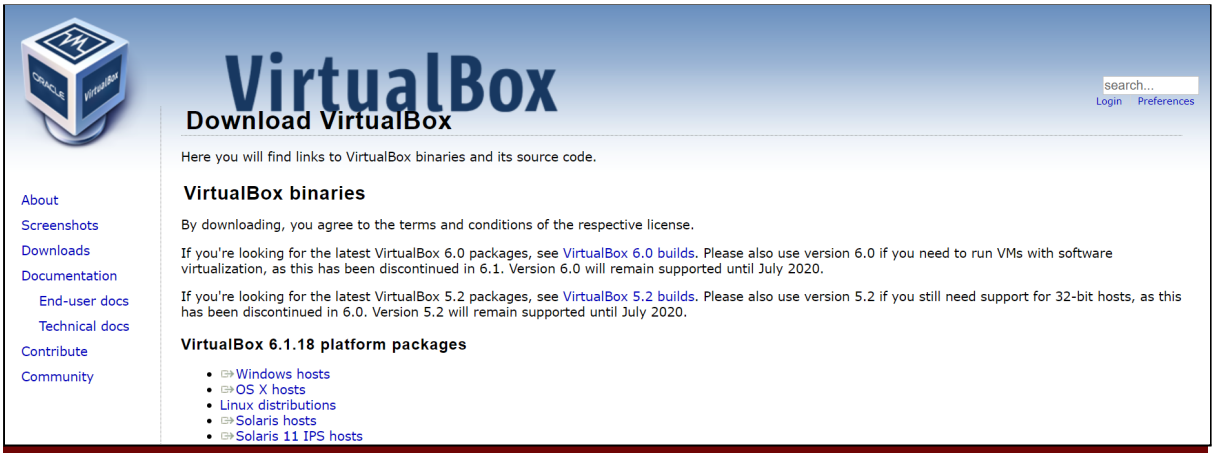
		the commercial market.
Manjaro	https://manjaro.org/	Free and open-source Linux distribution based on the Arch Linux operating system.
Ubuntu	https://ubuntu.com/	Linux distribution based on Debian distribution

Steps involved in installation

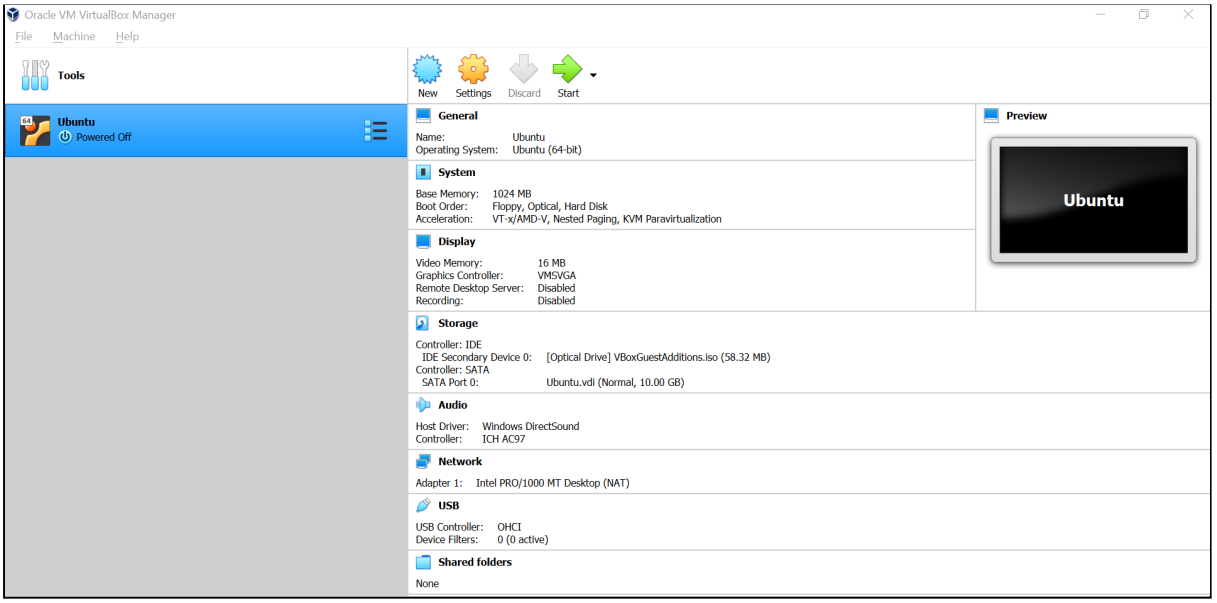
1. Installing a virtual machine
2. Downloading the ISO file of the distribution
3. Installing the distribution on the virtual machine
4. Final tuning of virtual machine

Installing a Virtual Machine

- Virtual machine is a tool which lets you run different OS virtually on your host OS. The virtual machine that we will be installing is Oracle Virtual Box. To download the executable file, visit: https://www.virtualbox.org/wiki/Downloads



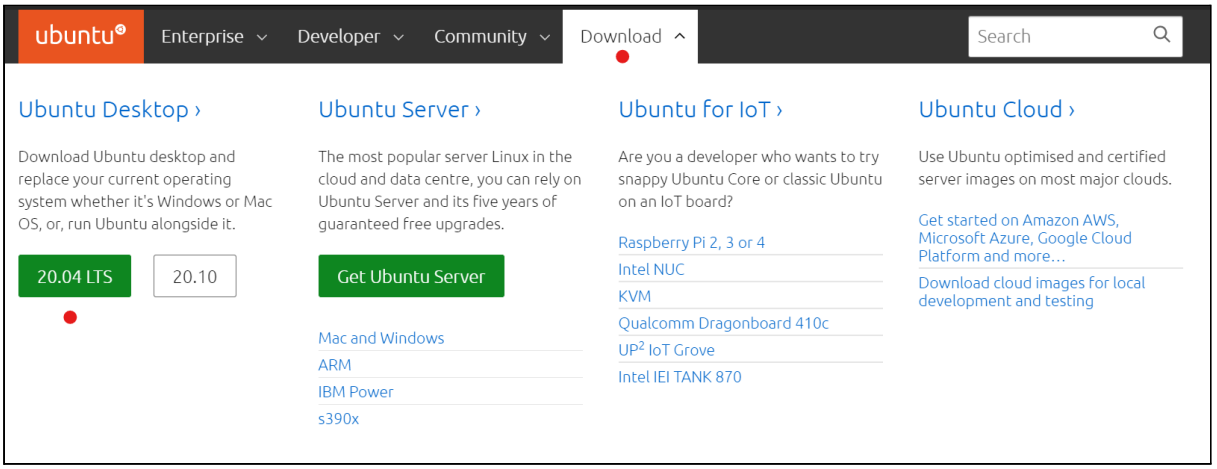
- On this webpage, click on Windows hosts (if you are on Windows OS), OS X hosts (if you are on macOS) and so on. The click results in an executable file. Execute the file to install the virtual box. The installation is easy and hence, we are not going into details. Follow the recommended path of installation and keep clicking on “Next”.
- The output after installation will look something like this:



Downloading the ISO file of the distribution

- As concluded earlier, the distribution that we are going to follow in this course will be Ubuntu. Hence, to download the ISO file of the distribution, visit: https://ubuntu.com/

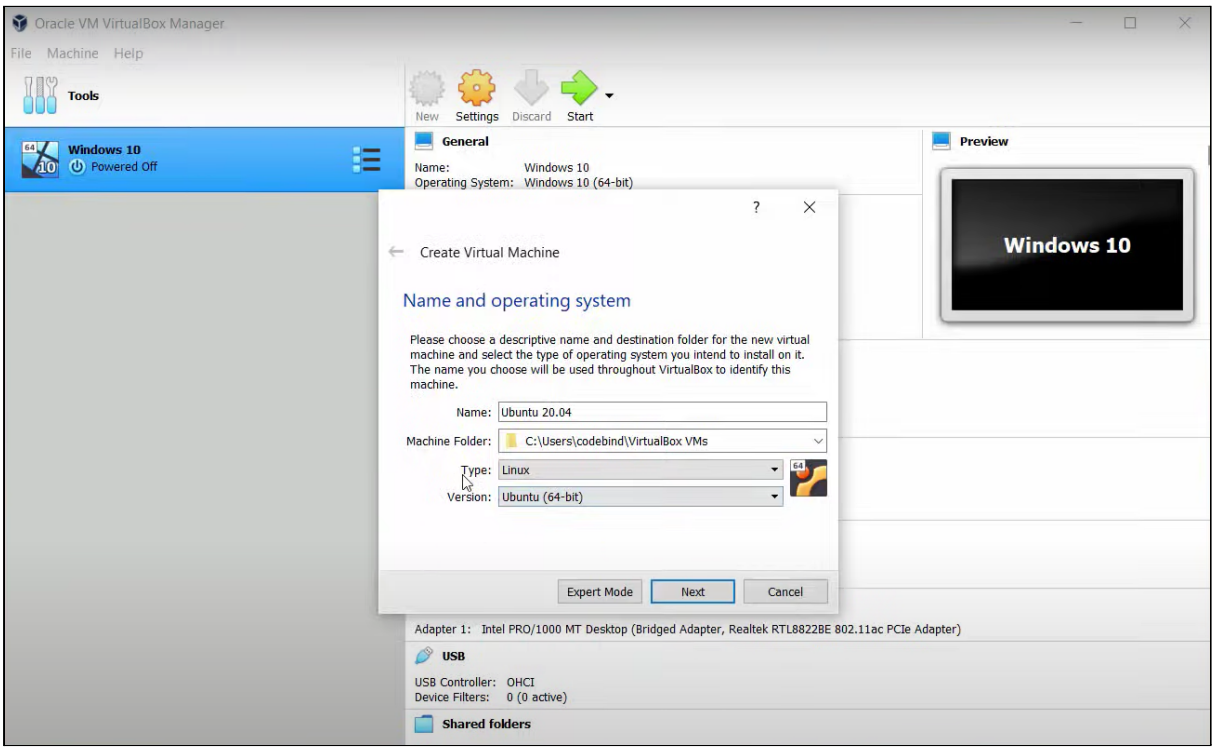
- Click on Download and then click on the latest version of Ubuntu Desktop OS with long term support (LTS). Here, it is 20.04 LTS.



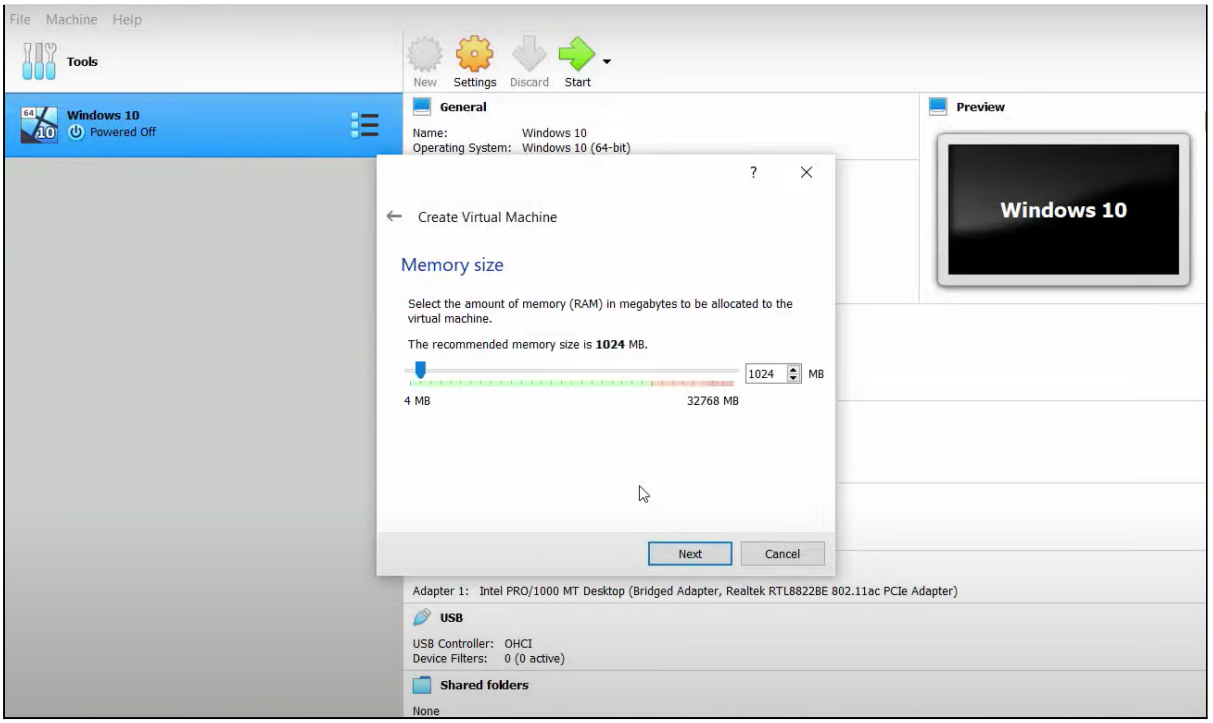
- The result of the click will be an ISO file. The ISO file will be > 2.5 GB (approx) in size. Hence, it will take time.

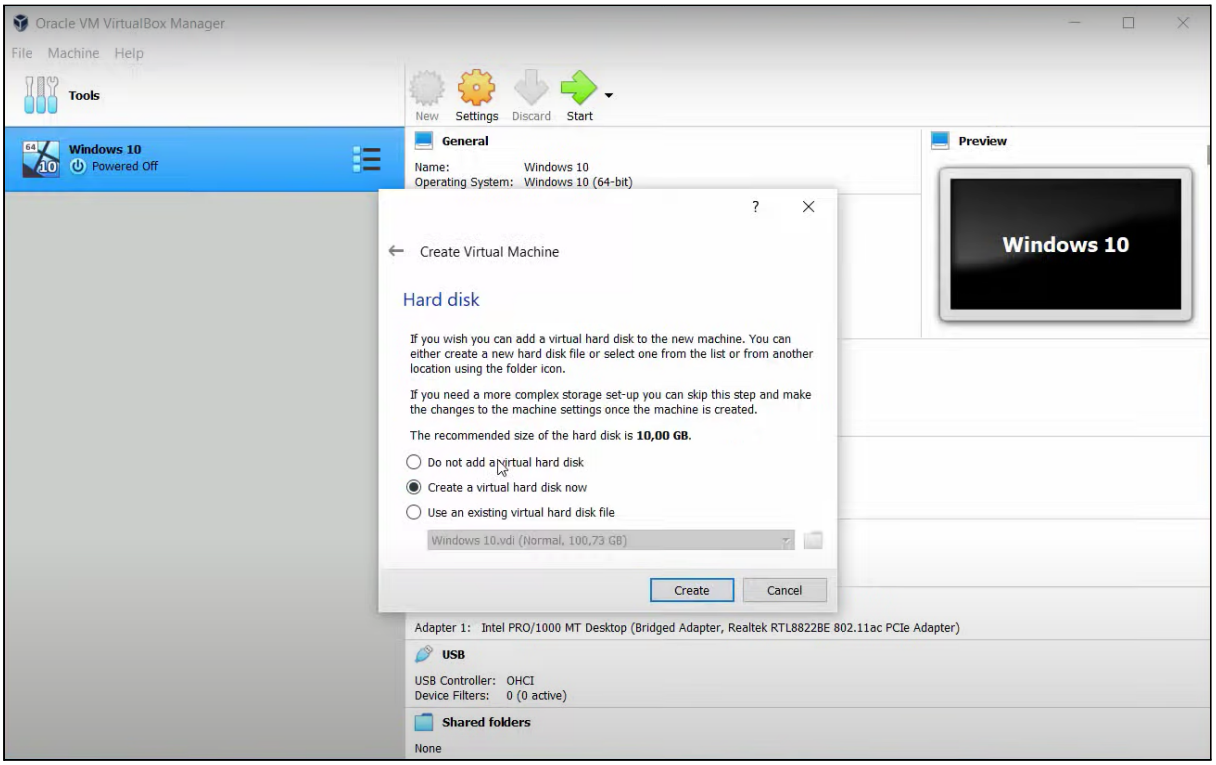
Installing the distribution on the virtual machine

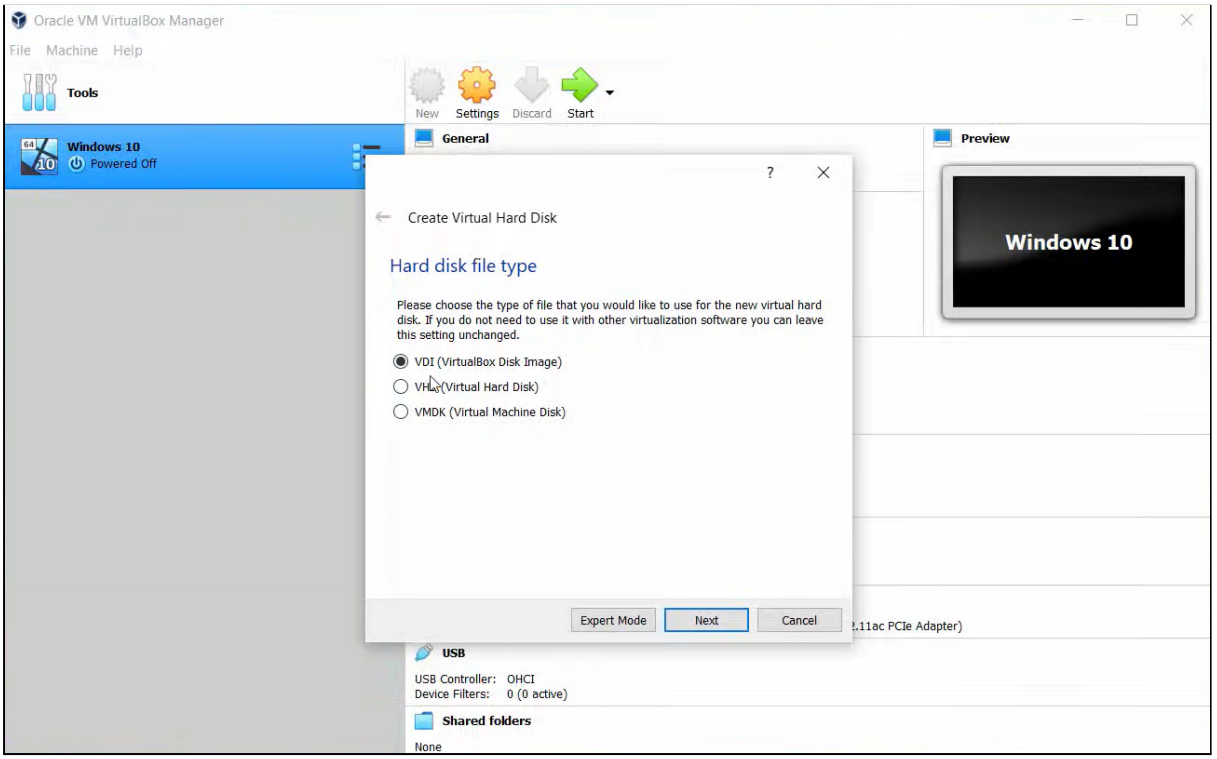
- After the download of the ISO file is complete, go to Virtual box and click on “New” and fill the required details. Please refer to the following image for details:

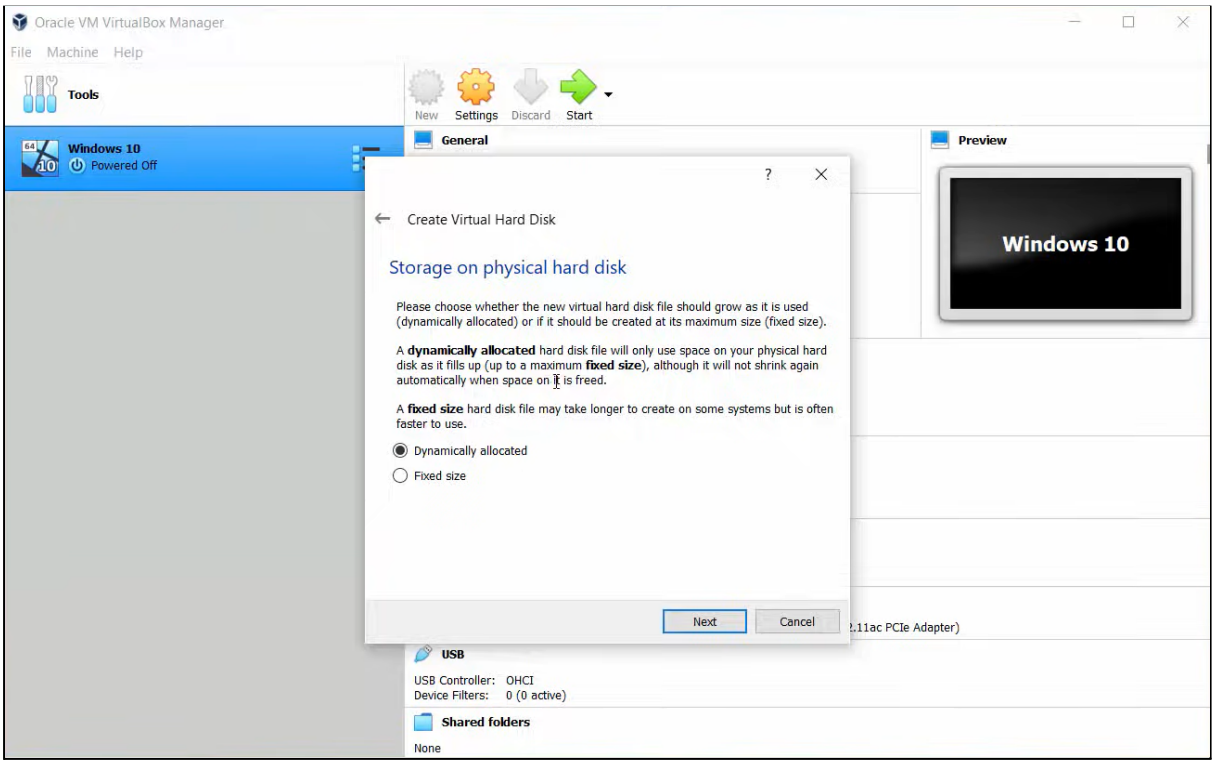


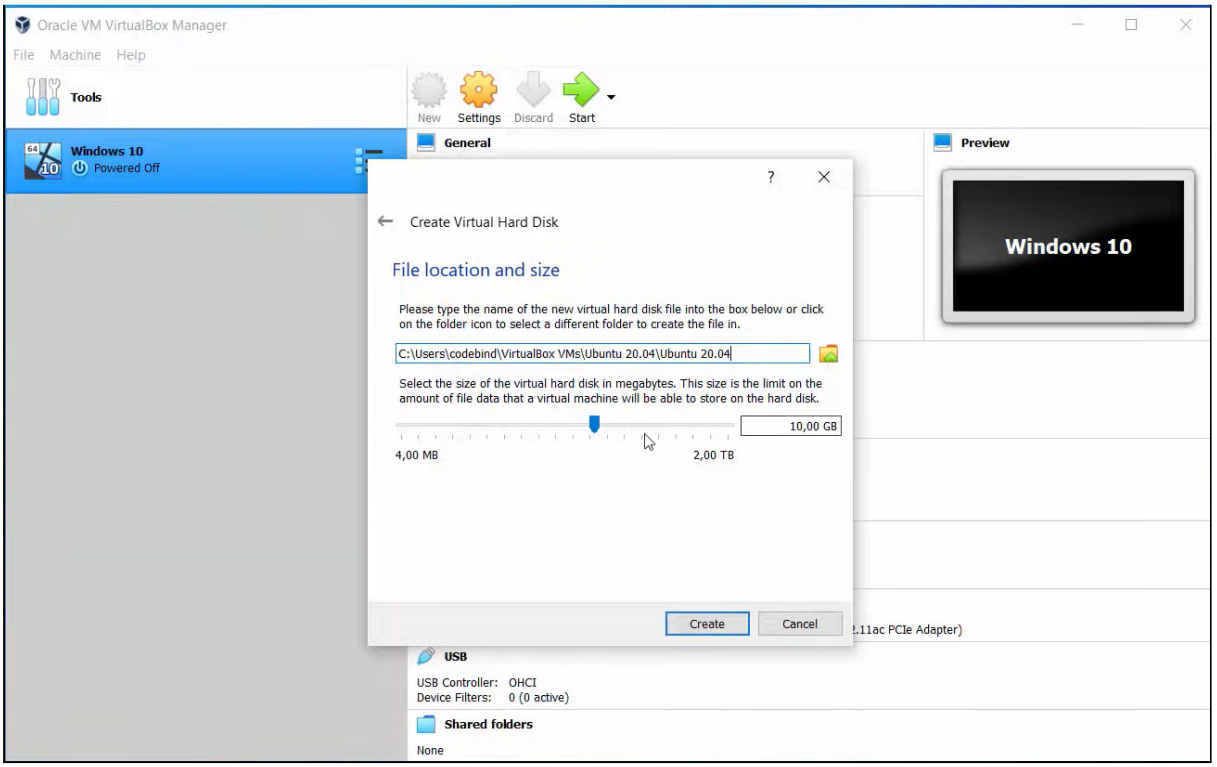
- After you click on “Next”, the following screen will appear. We have to follow the recommended steps only for installation. Please refer to the following images for the recommended path:


File Machine Help
Tools
Windows 10
Powered Off
New Settings Discard Start
General
Name: Windows 10
Operating System: Windows 10 (64-bit)
Preview
Windows 10
Create Virtual Machine
Memory size
Select the amount of memory (RAM) in megabytes to be allocated to the virtual machine.
The recommended memory size is 1024 MB.
1024 MB
4 MB
32768 MB
Next
Cancel
Adapter 1: Intel PRO/1000 MT Desktop (Bridged Adapter, Realtek RTL8822BE 802.11ac PCIe Adapter)
USB
USB Controller: OHCI
Device Filters: 0 (0 active)
Shared folders
None

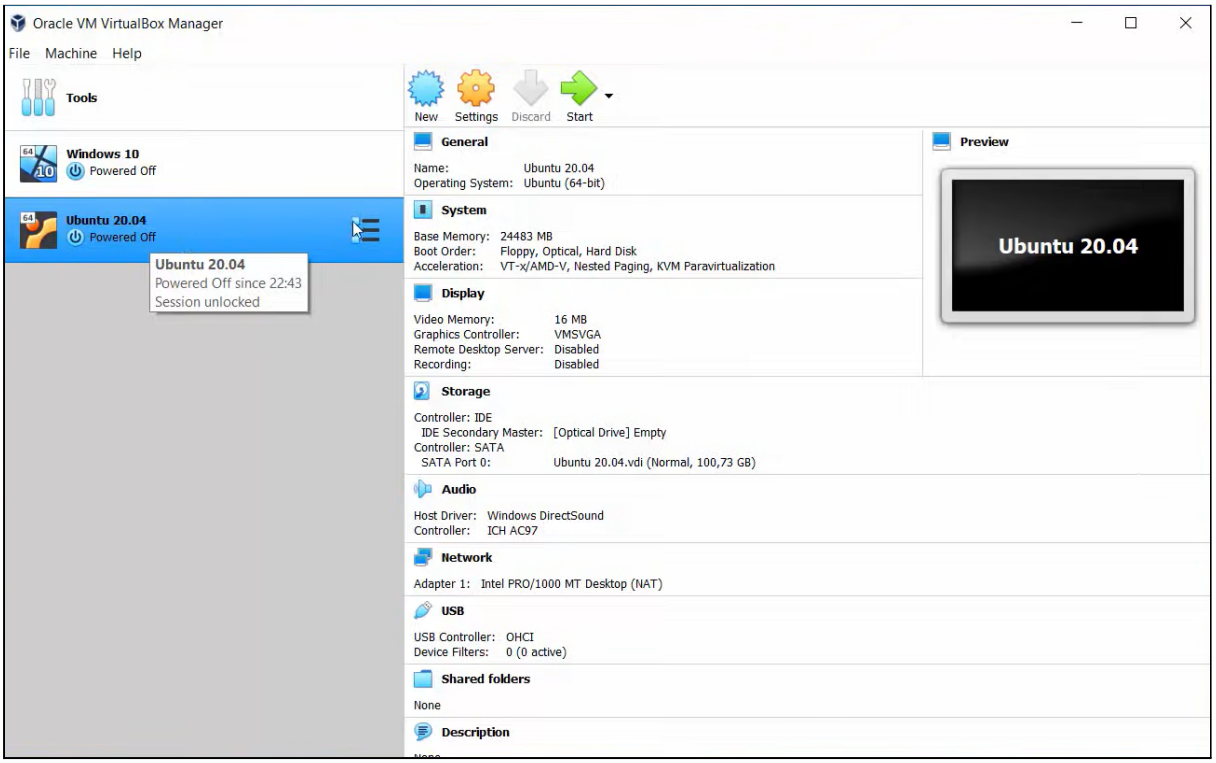

Oracle VM VirtualBox Manager
File Machine Help
Tools
Windows 10
Powered Off
New Settings Discard Start
General
Name: Windows 10
Operating System: Windows 10 (64-bit)
Preview
Windows 10
Create Virtual Machine
Hard disk
If you wish you can add a virtual hard disk to the new machine. You can either create a new hard disk file or select one from the list or from another location using the folder icon.
If you need a more complex storage set-up you can skip this step and make the changes to the machine settings once the machine is created.
The recommended size of the hard disk is 10,00 GB.
Do not add a virtual hard disk
Create a virtual hard disk now
Use an existing virtual hard disk file
Windows 10.vdi (Normal, 100,73 GB)
Create
Cancel
Adapter 1: Intel PRO/1000 MT Desktop (Bridged Adapter, Realtek RTL8822BE 802.11ac PCIe Adapter)
USB
USB Controller: OHCI
Device Filters: 0 (0 active)
Shared folders
None


Oracle VM VirtualBox Manager
File Machine Help
Tools
Windows 10
Powered Off
New Settings Discard Start
General
Preview
Windows 10
Create Virtual Hard Disk
Hard disk file type
Please choose the type of file that you would like to use for the new virtual hard disk. If you do not need to use it with other virtualization software you can leave this setting unchanged.
VDI (VirtualBox Disk Image)
VHD (Virtual Hard Disk)
VMDK (Virtual Machine Disk)
Expert Mode
Next
Cancel
USB
USB Controller: OHCI
Device Filters: 0 (0 active)
Shared folders
None

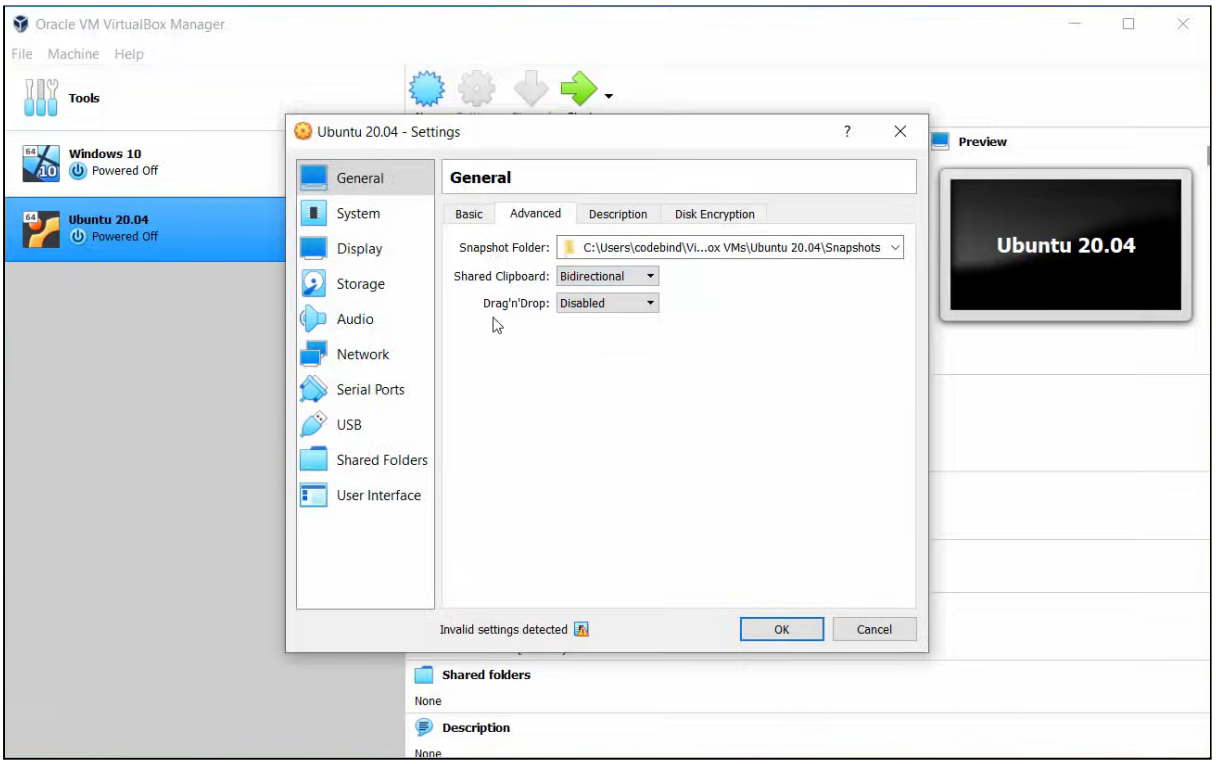

Oracle VM VirtualBox Manager
File Machine Help
Tools
Windows 10
Powered Off
New Settings Discard Start
General
Preview
Windows 10
Create Virtual Hard Disk
Storage on physical hard disk
Please choose whether the new virtual hard disk file should grow as it is used (dynamically allocated) or if it should be created at its maximum size (fixed size).
A dynamically allocated hard disk file will only use space on your physical hard disk as it fills up (up to a maximum fixed size), although it will not shrink again automatically when space on it is freed.
A fixed size hard disk file may take longer to create on some systems but is often faster to use.
Dynamically allocated
Fixed size
Next
Cancel
USB
USB Controller: OHCI
Device Filters: 0 (0 active)
Shared folders
None

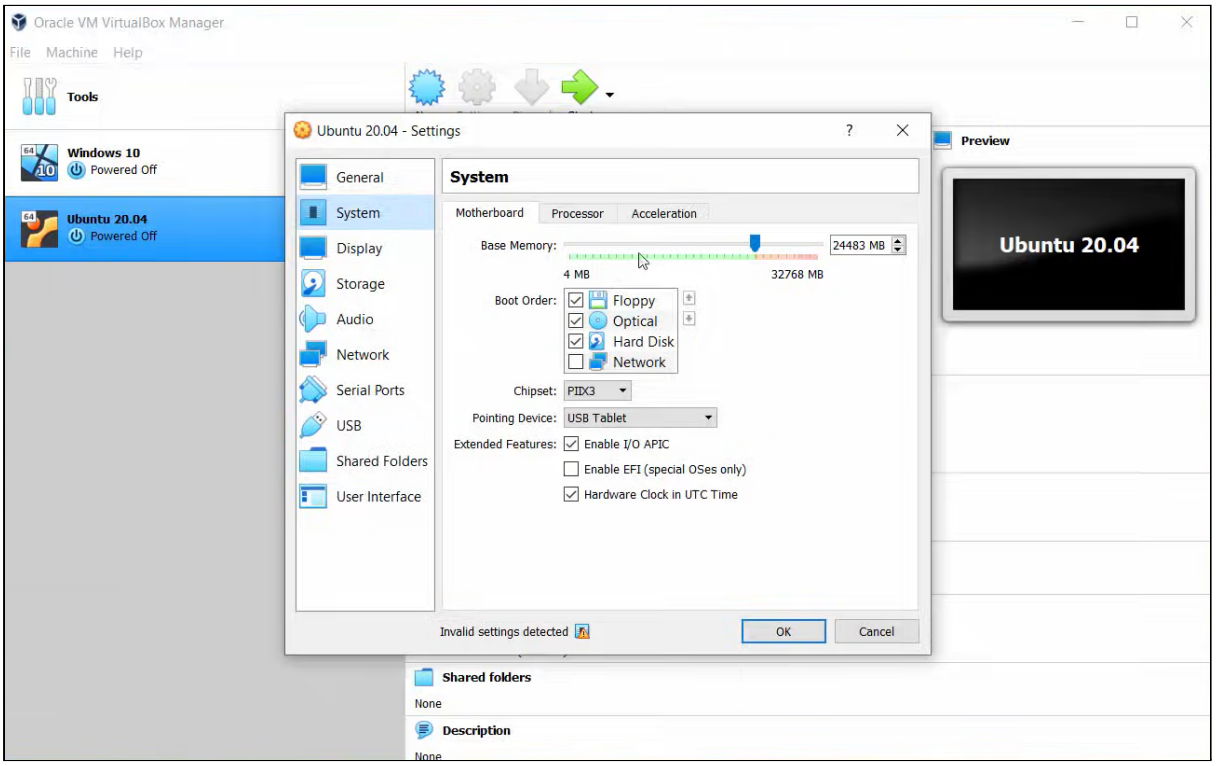


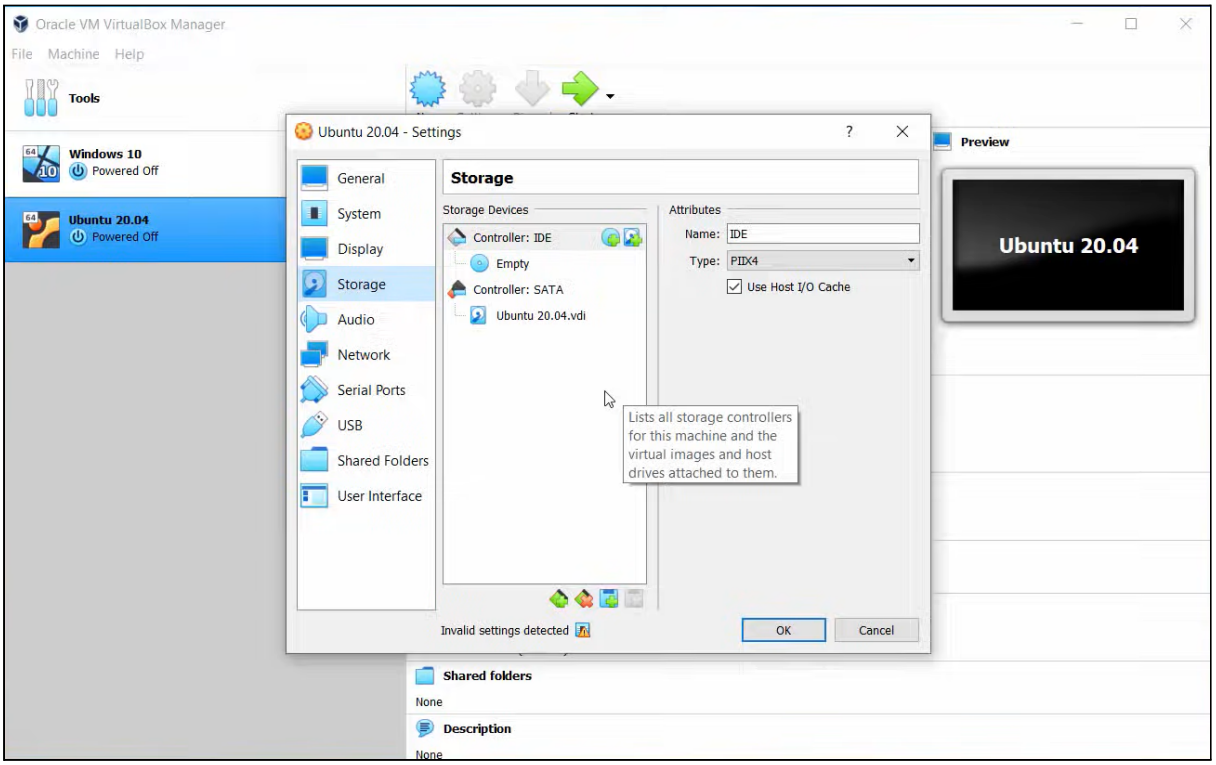
- After you click on the “Create” button on the last window, then this will complete the initial setup. We need to make a few tweaks in the “Settings”, before we begin with the installation of Ubuntu distribution. The following images will guide through those steps:

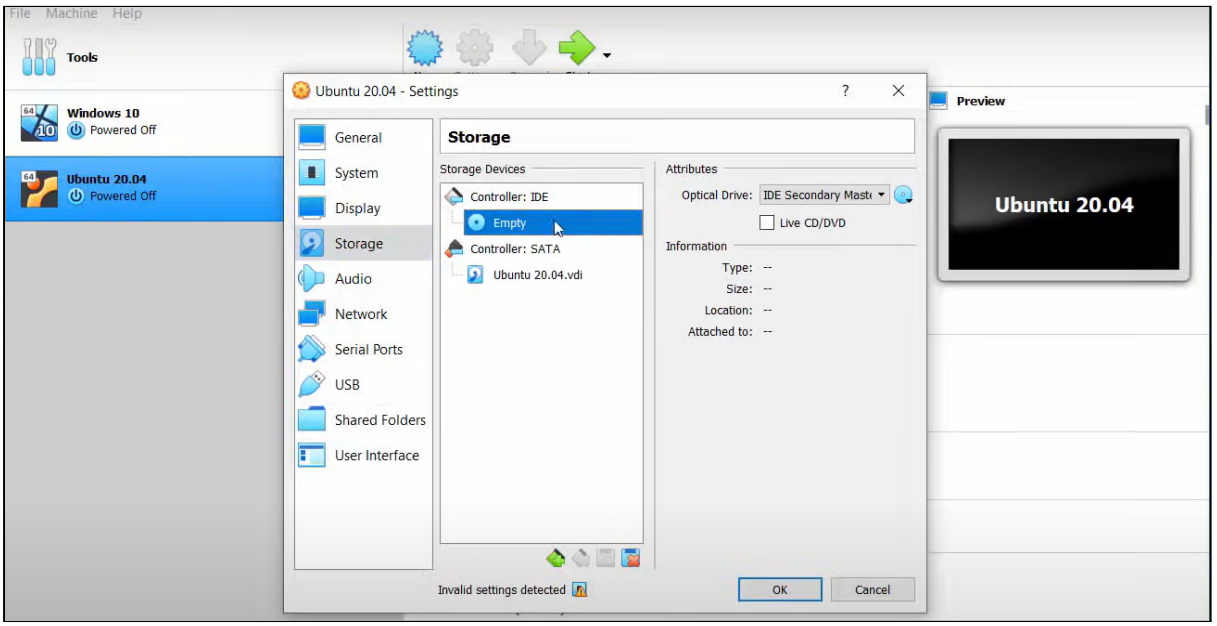


- Make sure to keep both Shared Clipboard and Drag 'n' Drop as Bidirectional. This will let you copy and paste items from host OS to virtual machine OS and vice versa.

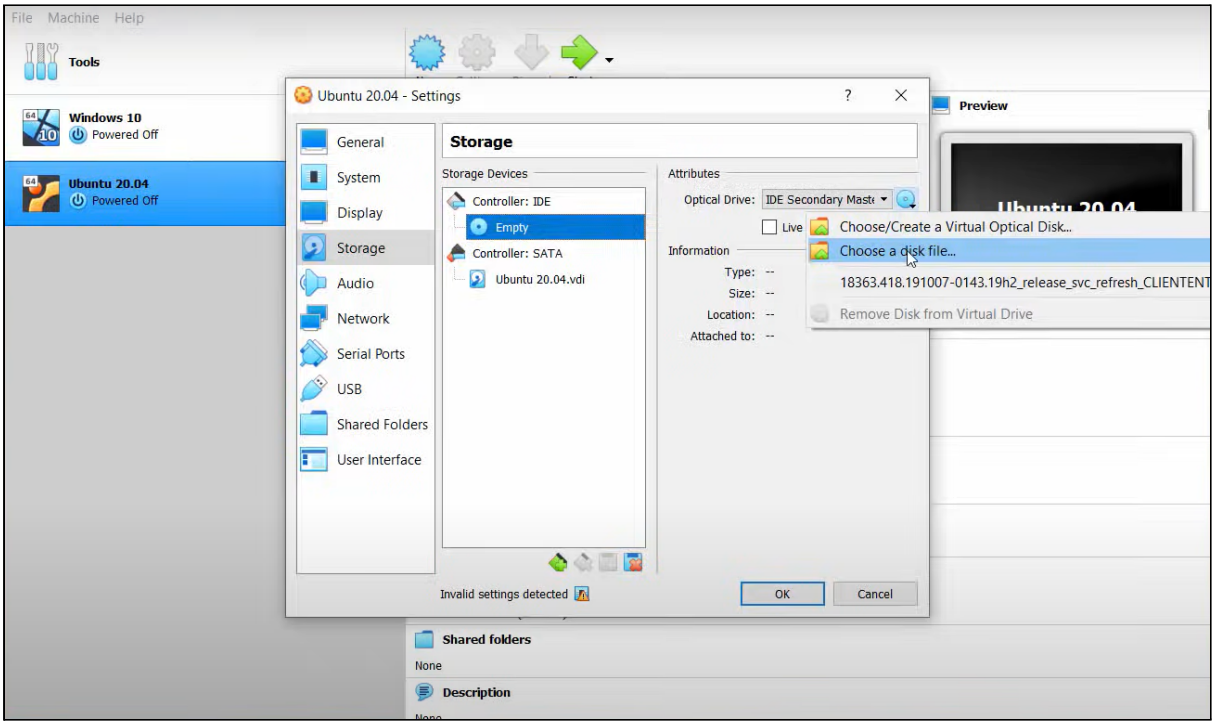



Oracle VM VirtualBox Manager
File Machine Help
Tools
Windows 10
Powered Off
Ubuntu 20.04
Powered Off
Ubuntu 20.04 - Settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
System
Motherboard
Processor
Acceleration
Base Memory:
24483 MB
4 MB
32768 MB
Boot Order:
Floppy
Optical
Hard Disk
Network
Chipset:
PIIX3
Pointing Device:
USB Tablet
Extended Features:
Enable I/O APIC
Enable EFI (special OSes only)
Hardware Clock in UTC Time
Invalid settings detected
OK
Cancel
Preview
Ubuntu 20.04
Shared folders
None
Description
None

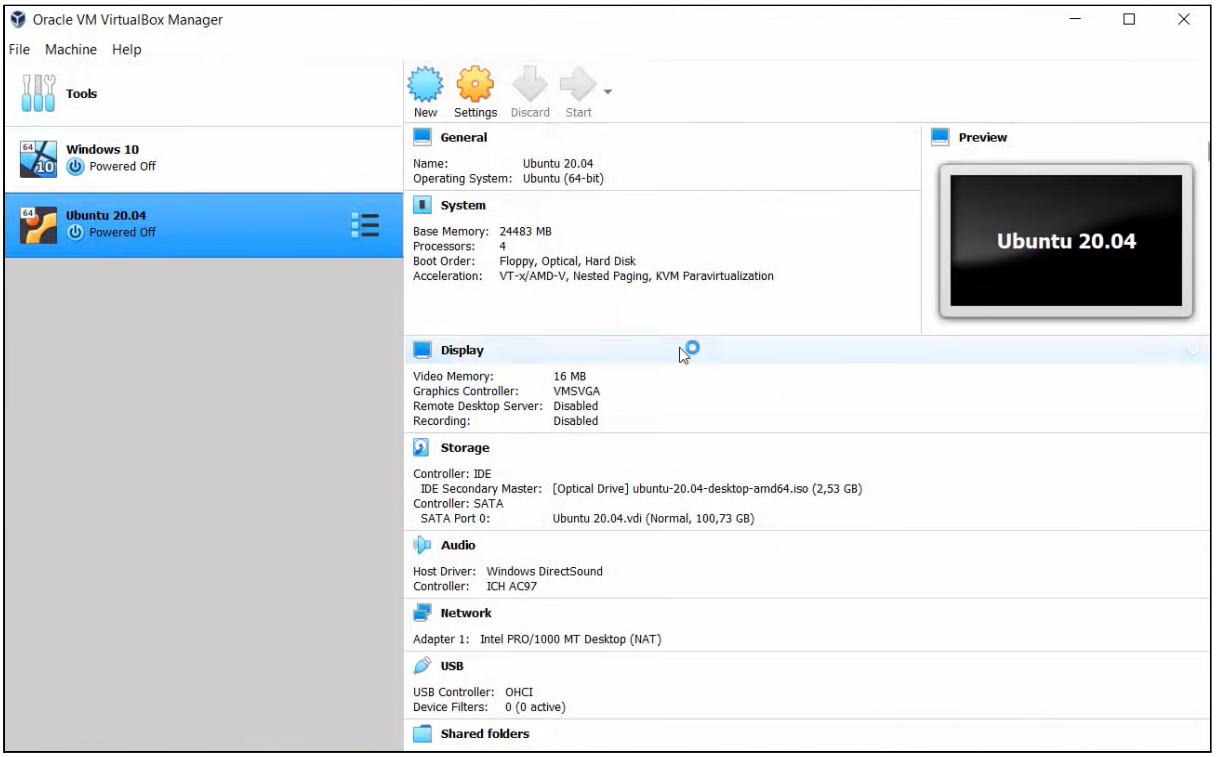

Oracle VM VirtualBox Manager
File Machine Help
Tools
Windows 10
Powered Off
Ubuntu 20.04
Powered Off
Ubuntu 20.04 - Settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
Storage
Storage Devices
Controller: IDE
Empty
Controller: SATA
Ubuntu 20.04.vdi
Attributes
Name: IDE
Type: PIIX4
Use Host I/O Cache
Lists all storage controllers for this machine and the virtual images and host drives attached to them.
Invalid settings detected
OK
Cancel
Preview
Ubuntu 20.04
Shared folders
None
Description
None

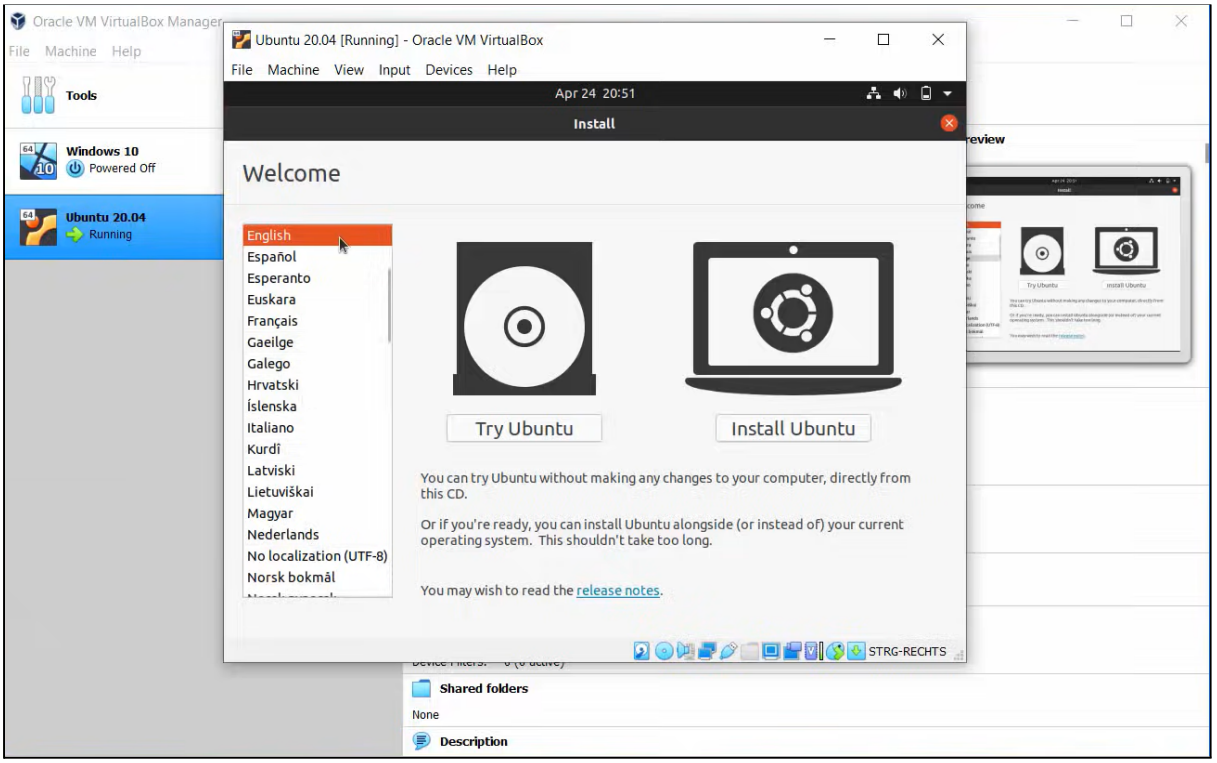


- At this step, you need to select the ISO file which you have downloaded. After you select the ISO file and click OK, then this will complete the tweaks required in the “Settings”.

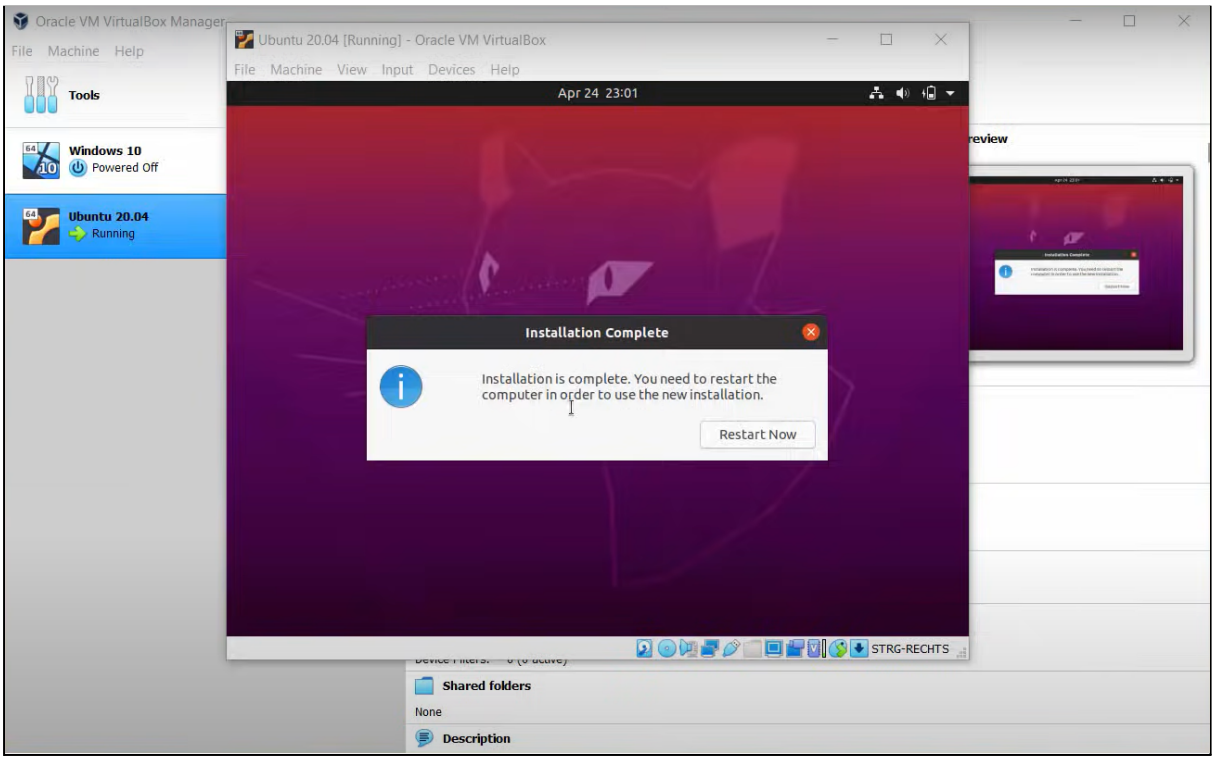


- The system is now ready to install the Ubuntu distribution. Click on the “Start” and follow the recommended path for installation. Since, the steps are self explanatory, hence, we are not going into details.



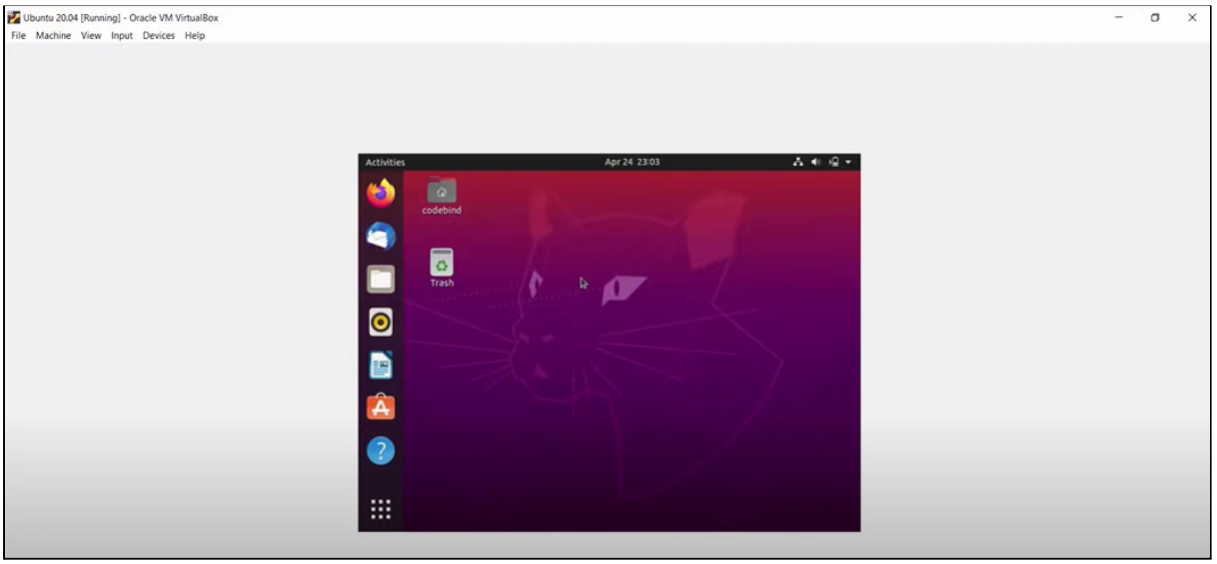


- This screen will mark the completion of the installation process. You can restart the virtual machine and start using it.



Final tuning of virtual machine

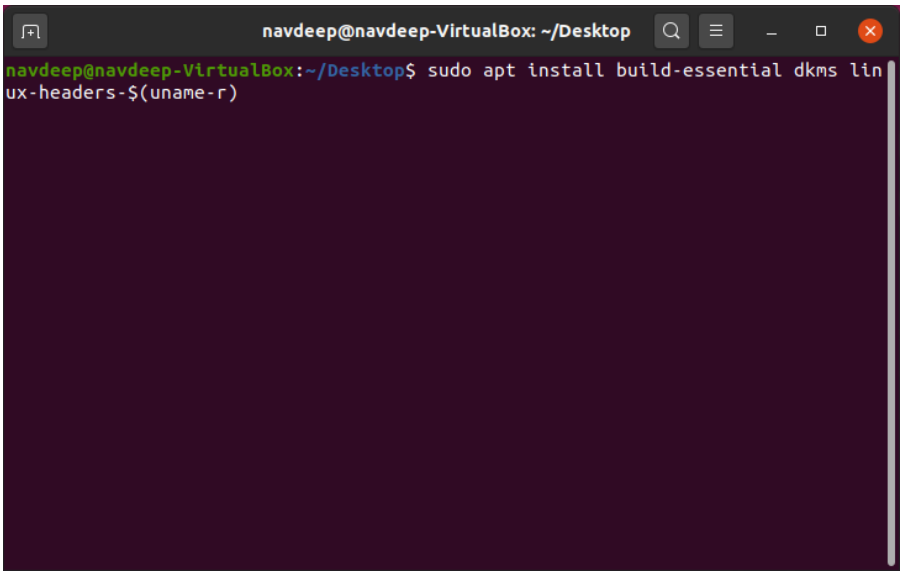
- Last but not least is making sure that when we maximize the window of the virtual machine, our guest OS's desktop window must also maximize. Currently, it looks like this image:



- For doing the needful, we have to install VirtualBox guest additions. The following command on the terminal will install the required additions.

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

Please refer to the following image for more details:



- After this is installed, you will be able to get a maximized window of guest OS's Desktop. Go ahead and get started with Linux. Happy exploration!