

## Experiment No. 6

**Title:** Installation and Configuration of a Virtual Machine with Guest OS

**Objective:** The objective of this experiment is to understand the process of installing and configuring a virtual machine (VM) with a guest operating system (OS). This will provide hands-on experience with cloud computing concepts and virtualization technology.

**Tools Used:**

- VirtualBox: A free and open-source virtualization software.
- ISO file of the guest OS (e.g., Ubuntu, Windows, etc.)

**Prerequisite:**

- A computer with sufficient memory and storage space.
- Download and install VirtualBox.
- Download the ISO file of the guest OS.

### Theory: Virtualization in Cloud Computing

Virtualization is a technology that allows the creation of a virtual version of something, such as an operating system, a server, a storage device, or network resources. In the context of cloud computing, virtualization is often used to maximize the utilization of resources.

Virtualization works by inserting a thin layer of software directly on the computer hardware or on a host operating system. This layer contains a virtual machine monitor or hypervisor that directs hardware resources.

There are two types of hypervisors:

**Type 1 hypervisors**, also known as bare-metal hypervisors, run directly on the host's hardware to control the hardware and to manage guest operating systems. Examples include Microsoft Hyper-V, VMware ESXi, and Xen.

**Type 2 hypervisors**, also known as hosted hypervisors, run on a conventional operating system just as other computer programs do. Examples include VMware Workstation and Oracle VM VirtualBox, which we are using in this experiment.

### Types of Virtualization

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There are several types of virtualization in cloud computing, including:

**Hardware Virtualization:** Also known as server virtualization, involves the creation of a virtual machine that acts like a real computer with an operating system. Software executed on these virtual machines is separated from the underlying hardware resources.

**Network Virtualization:** Involves the process of combining the available resources in a network by splitting up the available bandwidth into channels. Each channel is independent of the others and can be assigned to a specific server or device in real time.

**Storage Virtualization:** Involves the pooling of physical storage from multiple network storage devices into what appears to be a single storage device that is managed from a central console.

**Data Virtualization:** Involves the process of presenting data from different sources in a unified view to the end-users.

**Desktop Virtualization:** This type of virtualization technology separates the personal computer desktop environment from the physical machine, using the client-server model of computing.

### **Benefits of Virtualization**

Virtualization offers several benefits, including:

**Maximized Resources:** Virtualization can help to utilize the maximum amount of resources which reduces the need for additional hardware.

**Cost Savings:** With fewer servers, there is a reduction in the physical footprint, leading to less power usage and cooling, and a decrease in hardware maintenance.

**Improved Disaster Recovery:** Virtualization allows for faster recovery during an outage or disaster because the entire system – from the operating system to applications, patches, and data – is encapsulated into a single software bundle or virtual server.

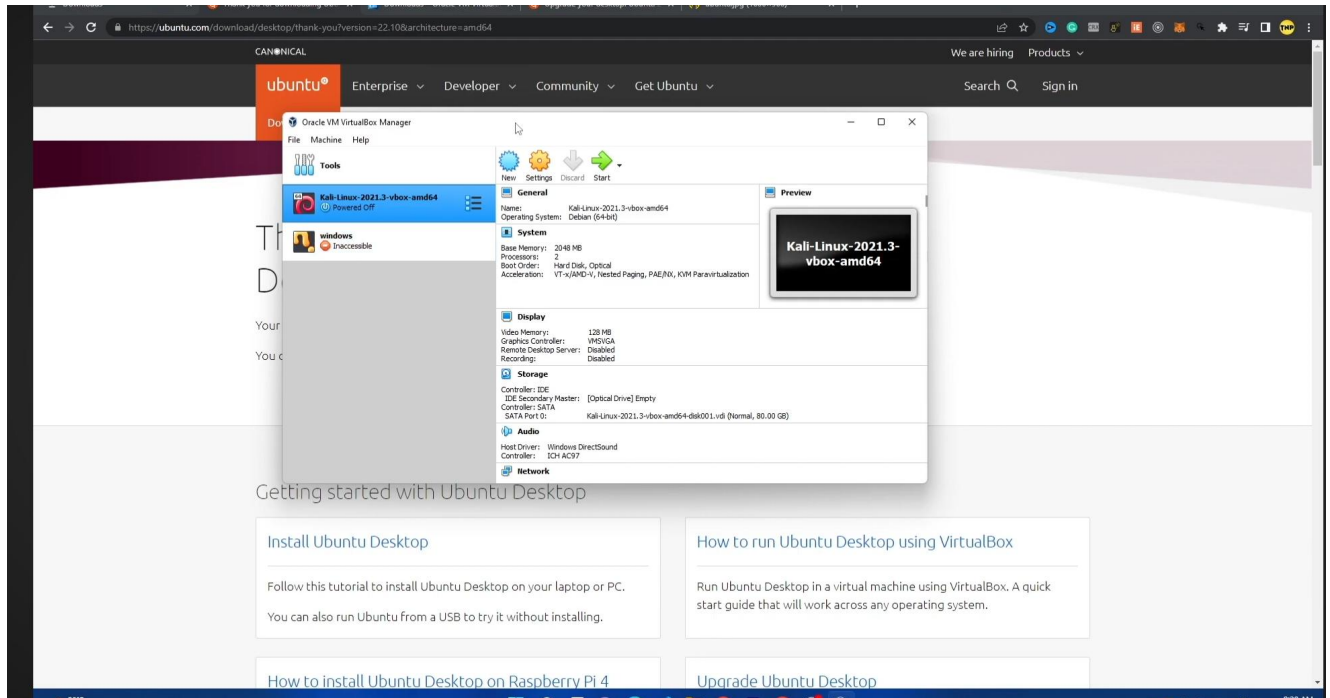
**Increased IT productivity, efficiency, agility and responsiveness:** Provisioning and deployment of applications become much faster, helping to get critical applications operational sooner.

**Faster and easier backup and restoration:** Virtualization can also automate failover during a disaster and can recover workloads to dissimilar IT infrastructure.

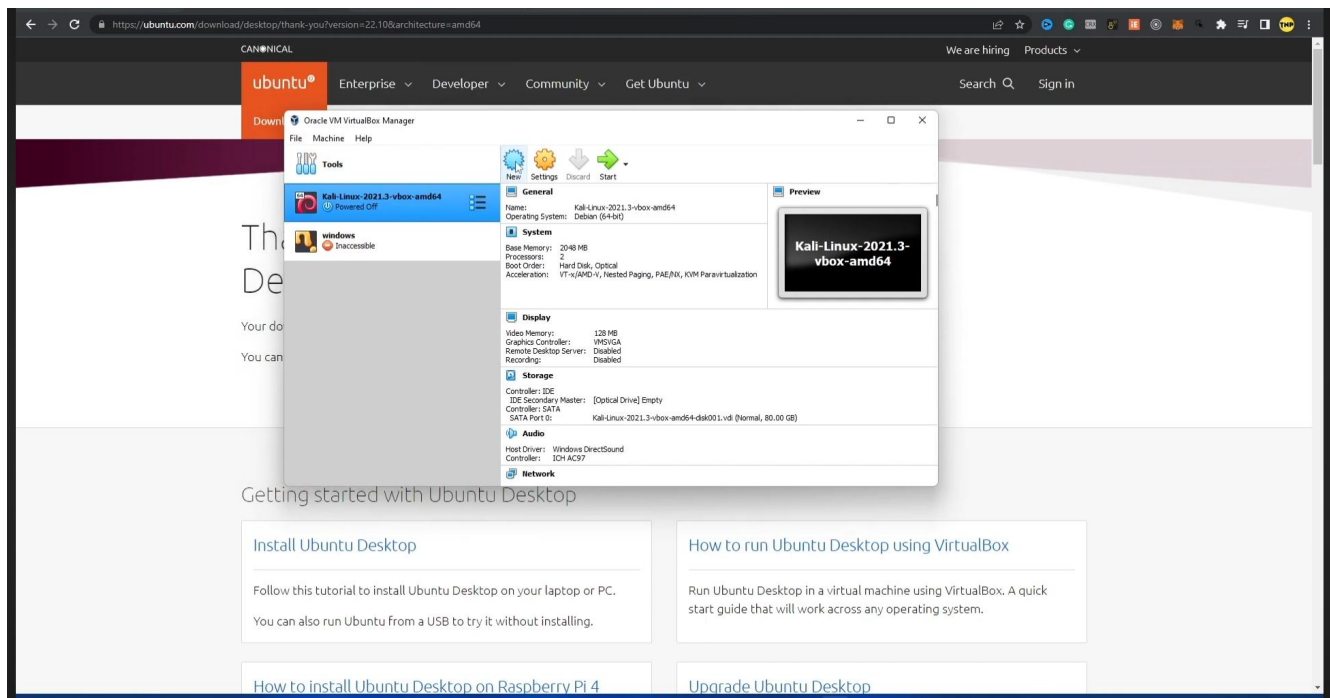
**Isolated Applications:** With software virtualization, applications are separated from the hardware and the operating system. This helps prevent application conflicts.

### **Steps to Perform the Experiment:**

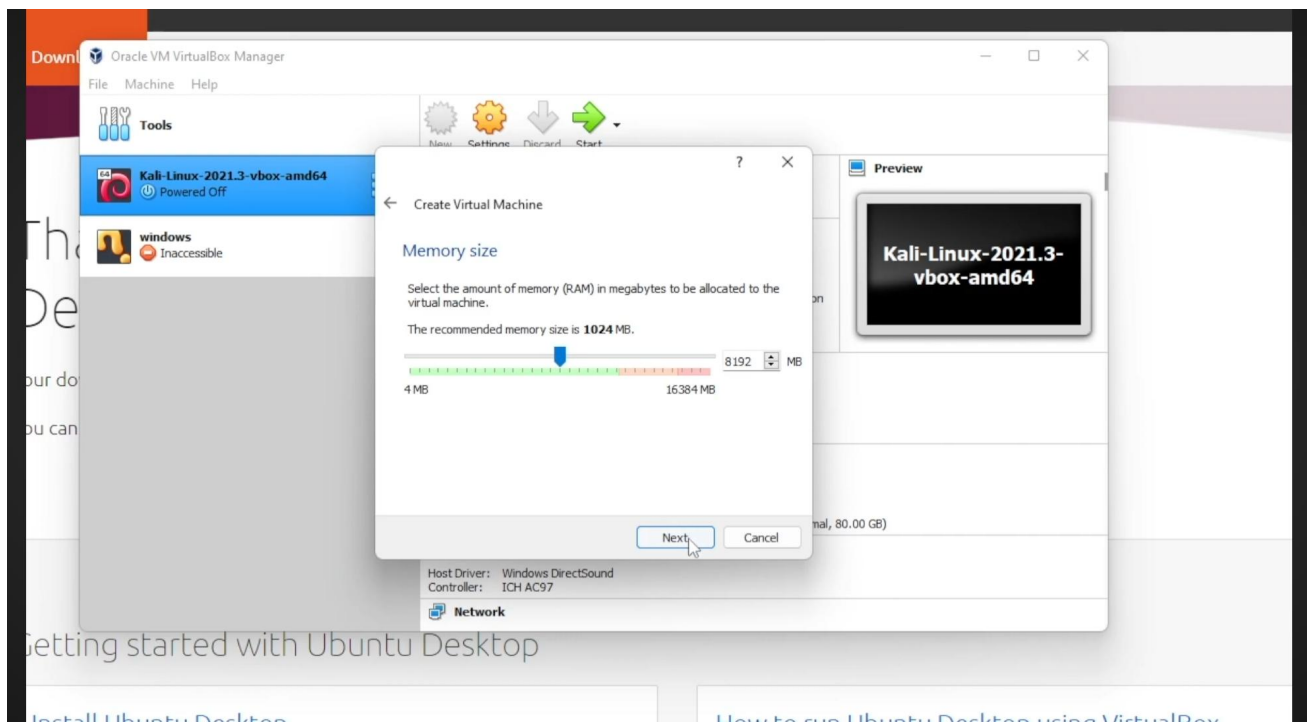
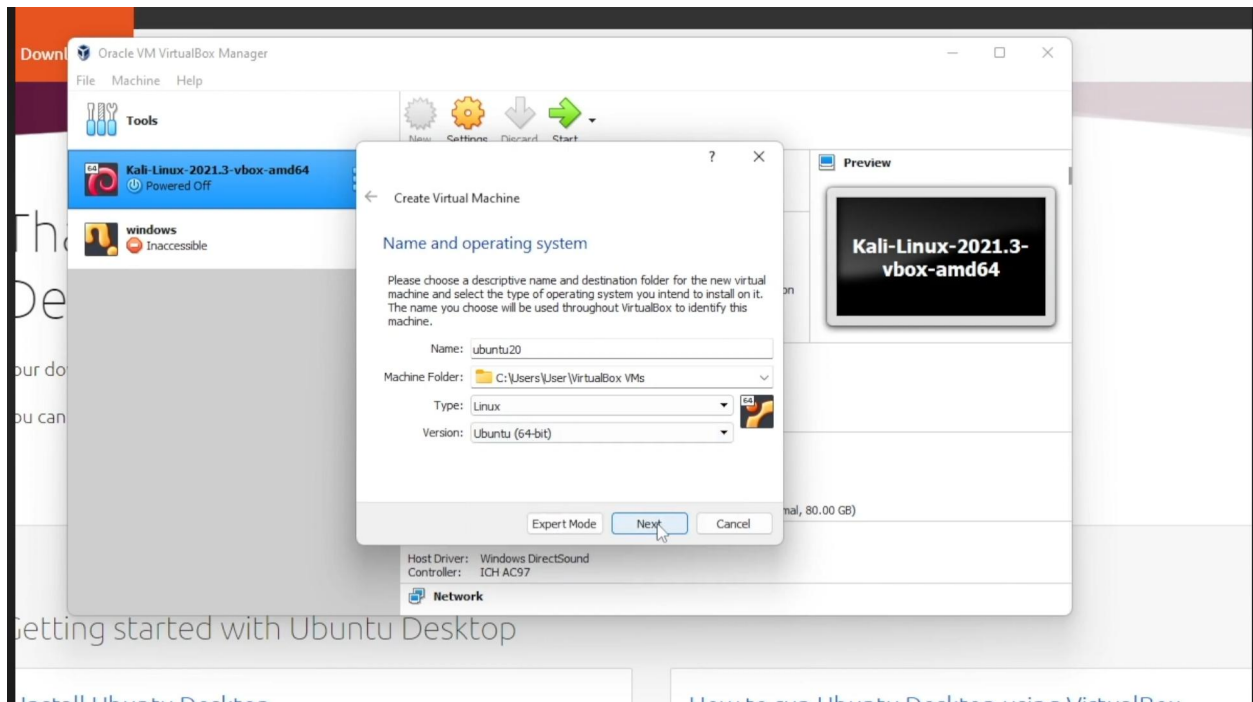
## 1. Open VirtualBox: Start the VirtualBox application on your computer.



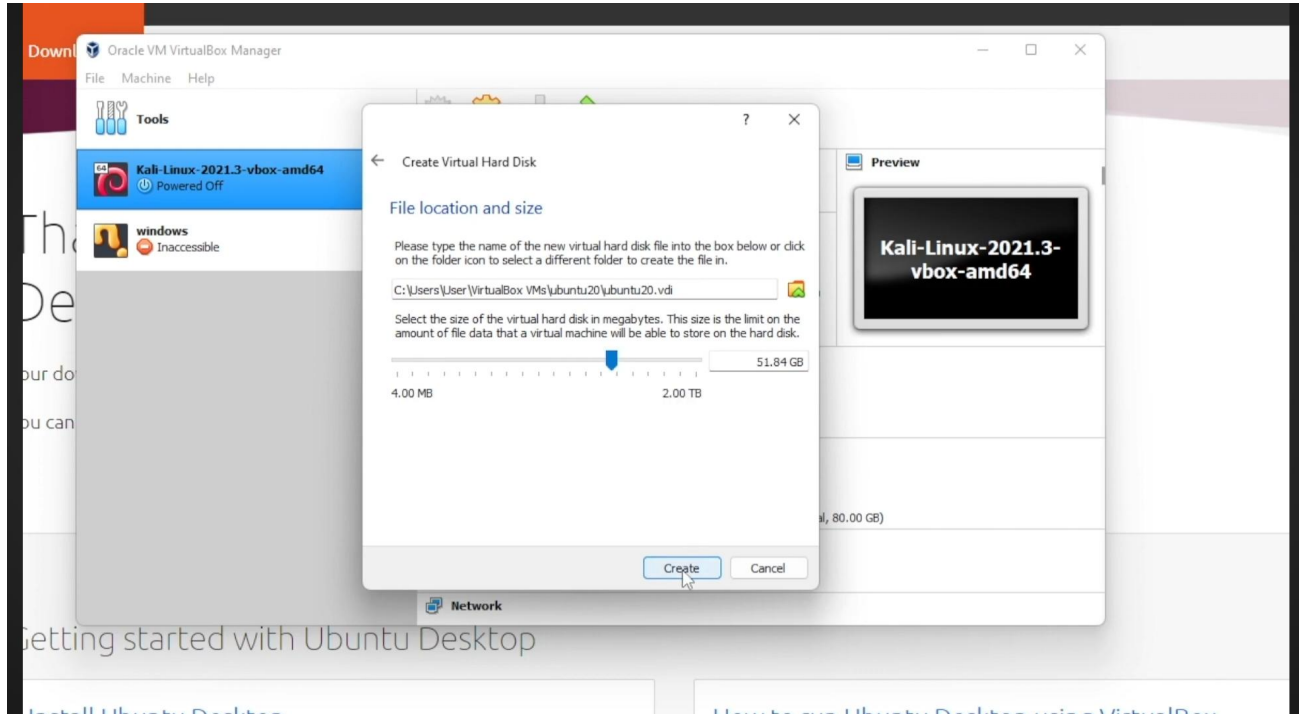
## 2. Create a New Virtual Machine: Click on “New” to start the creation of a new VM.



## 3. Provide a name for the VM, select the type and version of the OS, and allocate memory.

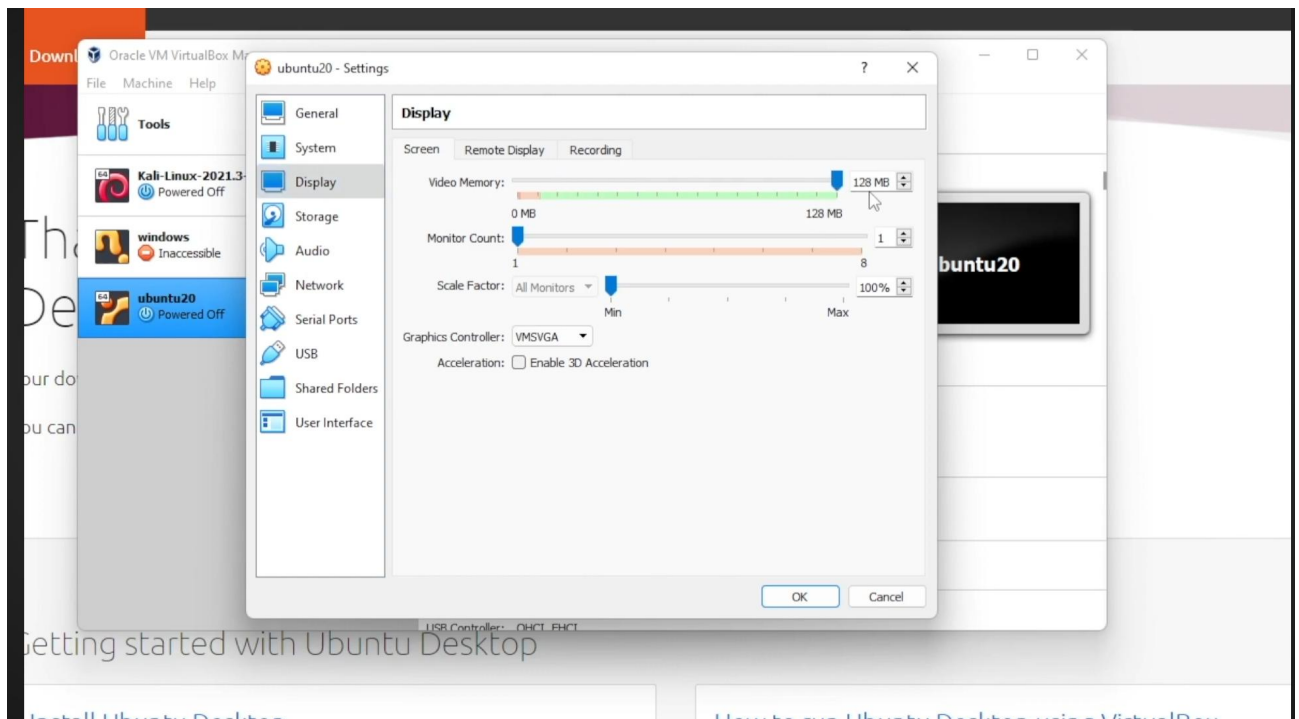
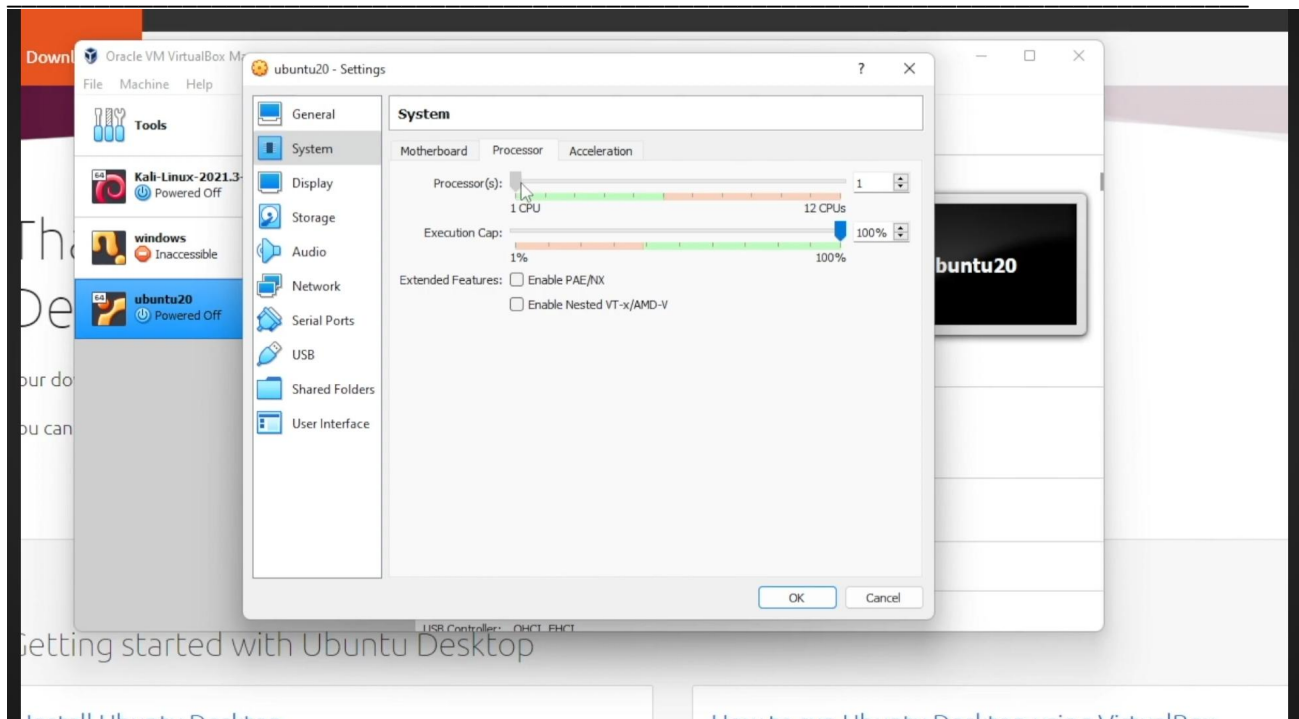


**4. Create a Virtual Hard Disk:** Select “Create a virtual hard disk now” and choose the hard disk file type. Allocate the file size.



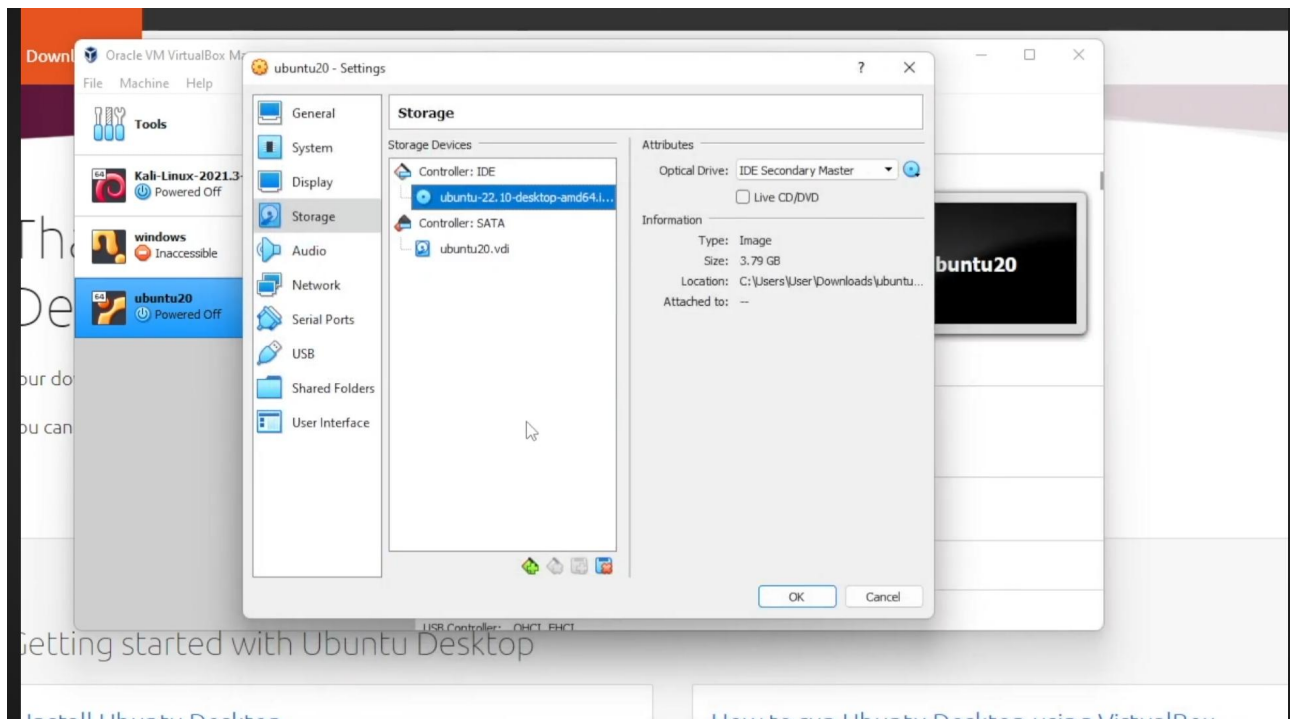
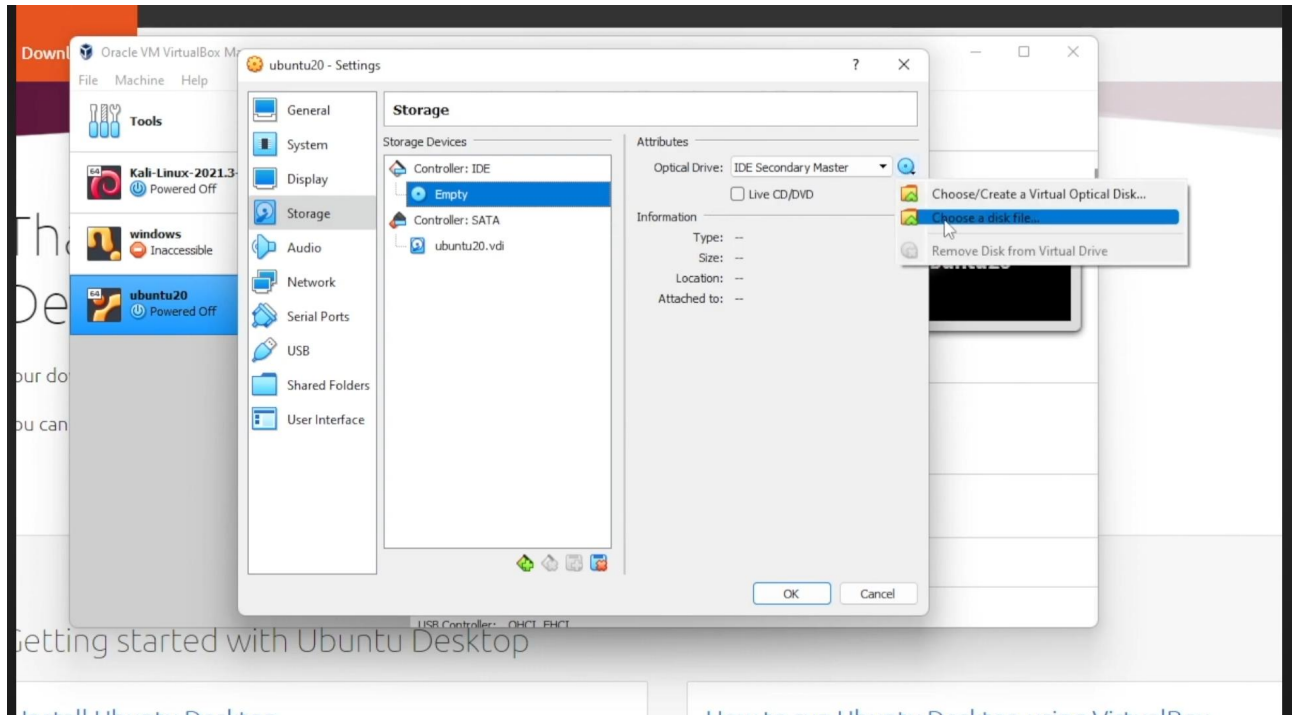
**5. Configure the VM:** Select the VM and click on “Settings”. In the system settings, you can allocate the number of CPUs. In the display settings, you can allocate video memory.

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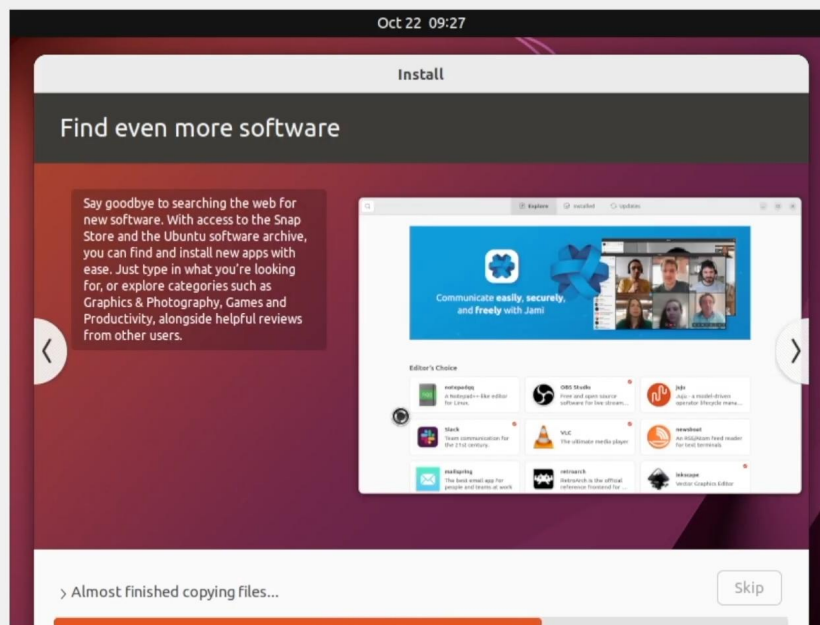
**6. Attach the ISO File:** In the storage settings, under the controller, click on the empty disk icon and then click on the disk icon on the right to choose a virtual optical disk file. Select the downloaded ISO file.



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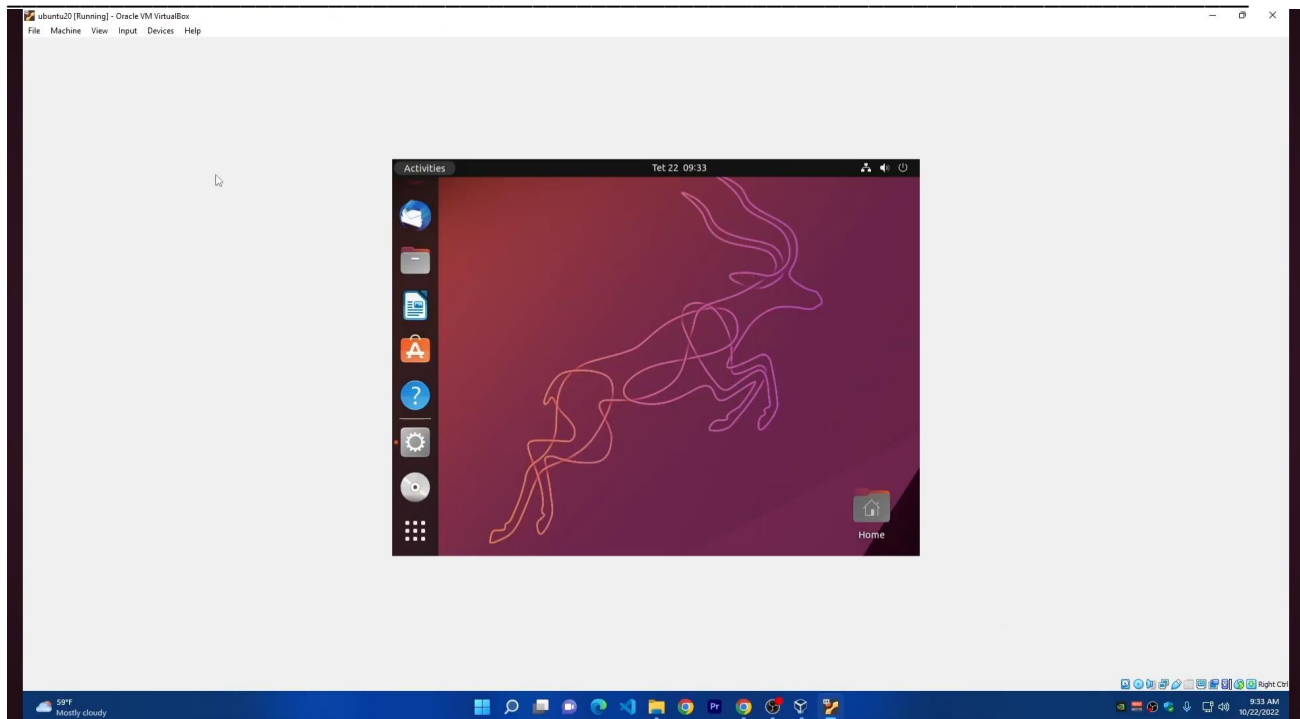
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7. **Start the VM:** Click on “Start” to boot up the VM. The guest OS installation process will begin. Follow the instructions to complete the installation.





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**Conclusion:** Upon completion of this experiment, i have a fully functional virtual machine running a guest operating system. This hands-on experience will enhance my understanding of virtualization, a key concept in cloud computing. I also gained practical skills in using virtualization software and managing virtual machines, which are essential skills in the field of cloud computing. This experiment demonstrates the power of virtualization technology and its role in enabling the flexible and efficient use of computing resources in a cloud environment.