

Terna Engineering College
Computer Engineering Department
Program: Sem VI

Course: Cloud Computing Lab (CSL603)

Faculty: Pradnya Jadhav

PART A

(PART A: TO BE COMPLETED BY STUDENTS)

Experiment No. 2B

A.1 Aim:

Implement virtualization using Virtual box

A.2 Prerequisite:

Knowledge of Networking, Distributed Computing and knowledge of Software architectures.

A.3 Objective:

Understand different types of virtualizations, Host and bare metal hypervisors and create and run virtual machines

A.4 Outcome: (LO2)

After successful completion of this experiment student will be able to

- understand the Virtualization
- Create Virtual machines using various hypervisors available

A.5 Theory:

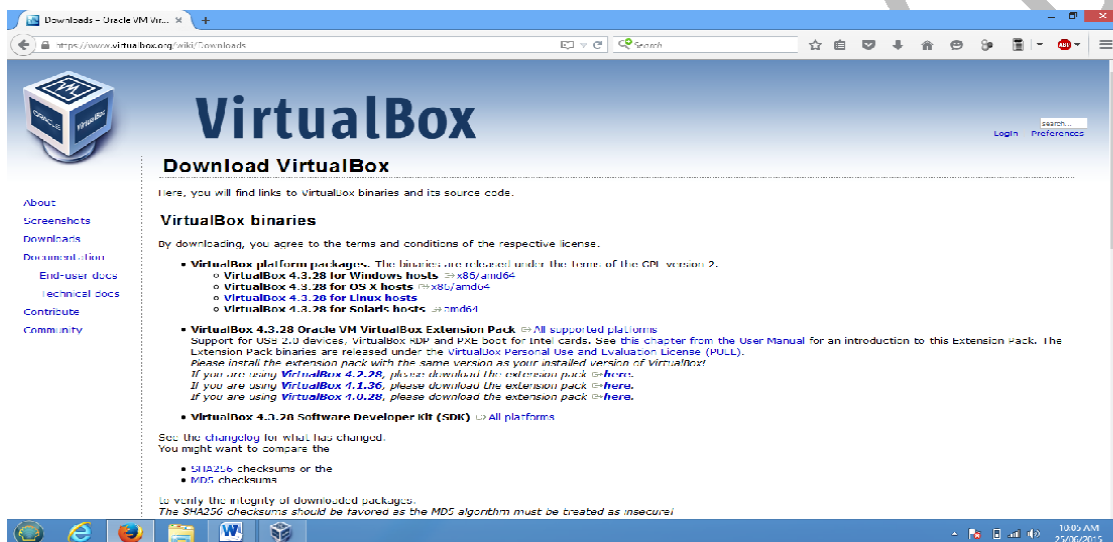
Steps: Creating and running virtual machines on Hosted Hypervisor like Virtual Box and KVM

2B

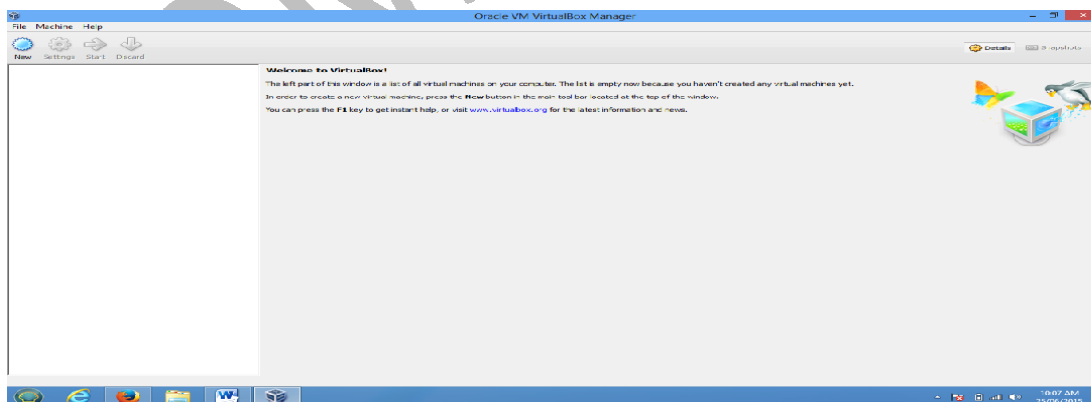
Creating and running virtual machines on Hosted Hypervisor like Virtual Box and KVM

1) Hosted Virtualization on Oracle Virtual Box Hypervisor

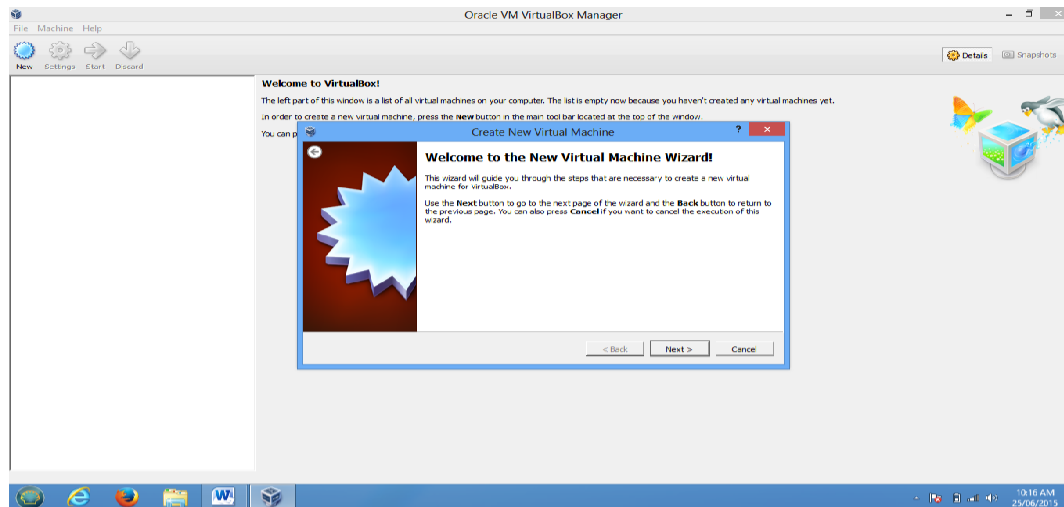
Step 1: Download Oracle Virtual box from <https://www.virtualbox.org/wiki/Downloads>



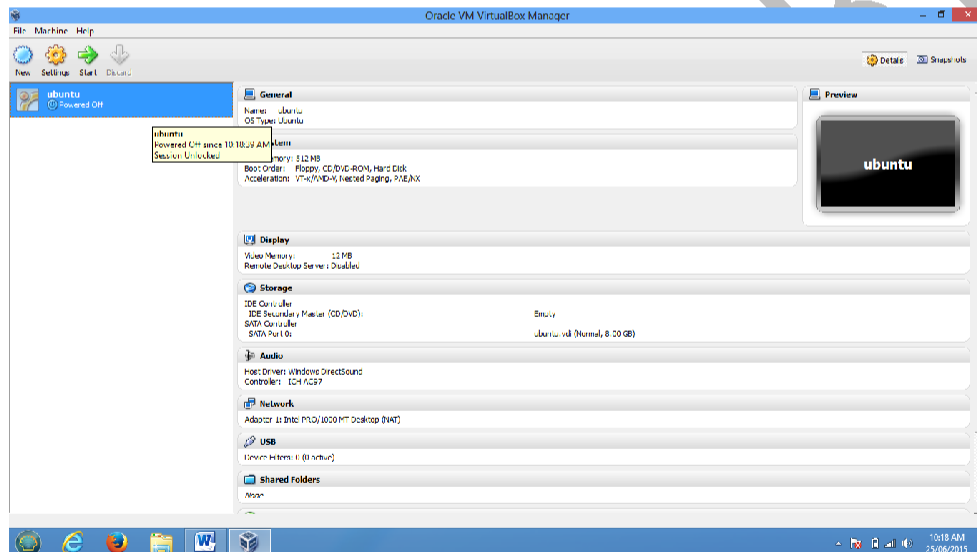
Step 2: Install it in Windows, Once the installation has done open it.



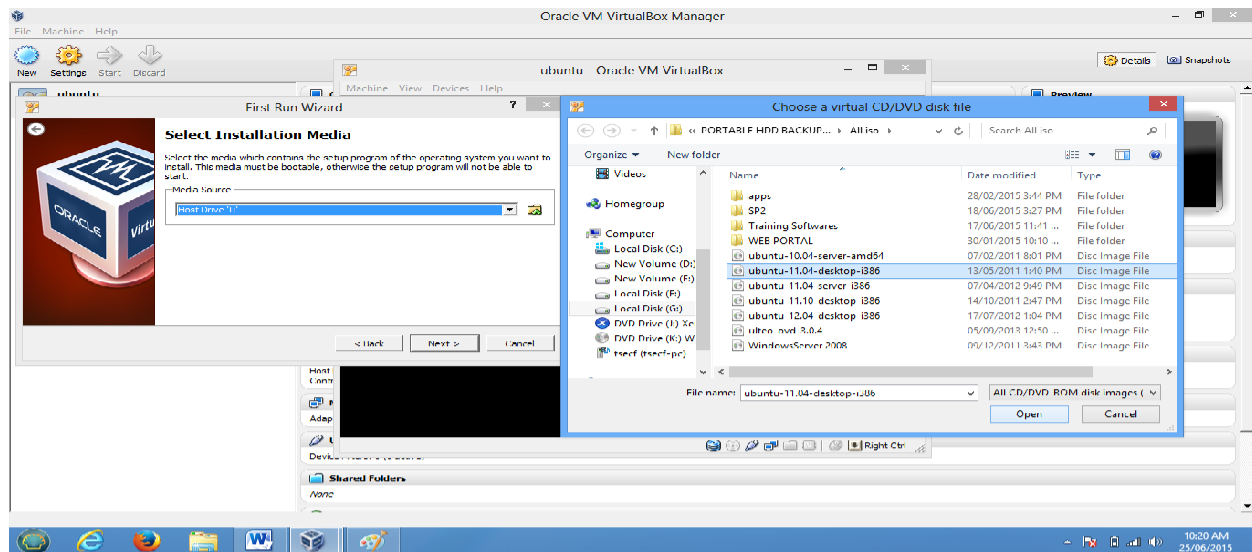
Step 3:-Create Virtual Machine by clicking on New



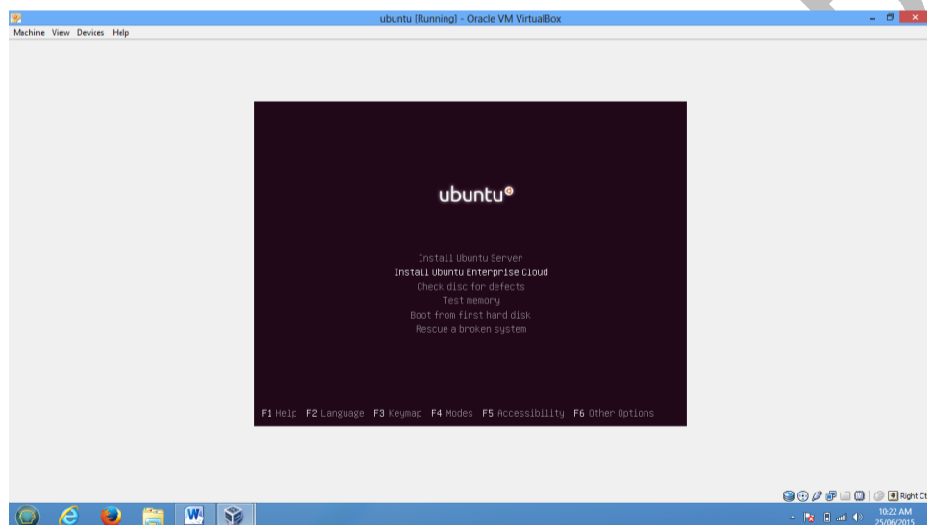
Step 4-: Specify RAM Size, HDD Size, and Network Configuration and Finish the wizard



Step 4-: To Select the media for installation Click on start and browse for iso file

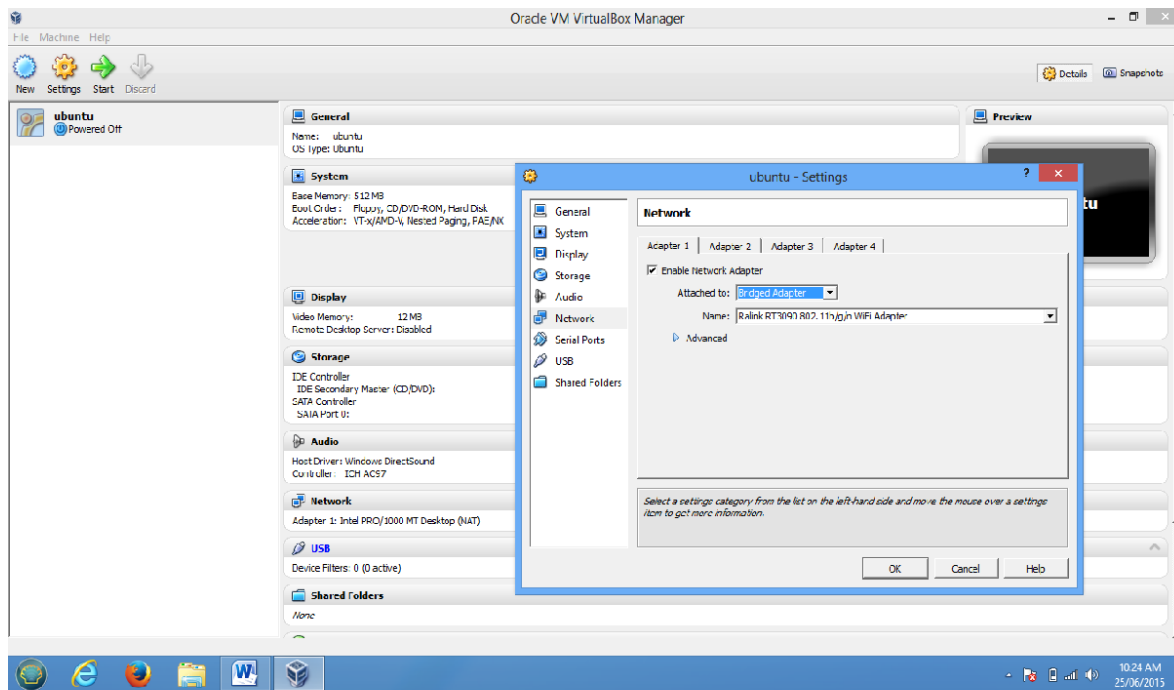


Step 5: Complete the Installation and use it.



Step 5: Complete the Installation and use it.

Step 6: To Connect OS to the network change network Mode to Bridge Adaption



```
root@ubuntu:/home/tsec# sudo grep -c "svm\|vmx" /proc/cpuinfo
3
root@ubuntu:/home/tsec#
```

PART B

(PART B: TO BE COMPLETED BY STUDENTS)

(Students must submit the soft copy as per following segments within two hours of the practical. The soft copy must be uploaded on the ERP or emailed to the concerned lab in charge faculties at the end of the practical in case there is no ERP access available)

Roll No. B 28	Name: Mausam Yadav
Class : TE-B	Batch : B2
Date of Experiment: 20-01-2025	Date of Submission: 4/02/2025
Grade :	

B.1 Question of Curiosity:

(To be answered by student based on the practical performed and learning/observations)

Q.1: Write down steps to install Virtual Box

ANS: 1. Download VirtualBox from <https://www.virtualbox.org/>.

2. Select your host platform and download the installer.
3. Run the installer.
4. Follow the installation wizard.
5. Install the VirtualBox Extension Pack (optional).
6. Create a new virtual machine in VirtualBox.
7. Install an operating system on the virtual machine.
8. Install VirtualBox Guest Additions (optional).
9. Start and use your virtual machine.

Q2: Write down steps to create virtual machines

ANS: 1. Open VirtualBox.

2. Click "New."
3. Enter a name for the virtual machine and choose the OS type.
4. Choose the OS version.
5. Allocate RAM for the virtual machine.
6. Create a virtual hard disk.
7. Choose the hard disk file type.

8. Choose the storage type (dynamically allocated or fixed size).
9. Specify the file location and size for the virtual hard disk.
10. Click "Create."
11. Optionally, configure additional settings in the virtual machine settings.
12. Insert the OS installation media (ISO file or physical disc).
13. Start the virtual machine.
14. Follow the on-screen instructions to install the operating system.
15. Finish the installation and start using the virtual machine.

Q3: Discuss various advantages of virtual machines.

ANS: - Resource Isolation: VMs provide isolated environments, ensuring that applications running in one VM do not affect others.

- Hardware Independence: VMs abstract from physical hardware, allowing flexibility to run on different host machines.

- Snapshot and Cloning: VMs can be easily cloned or snapshotted, facilitating quick backups and replication.

- Efficient Resource Utilization: Multiple VMs can run on a single physical machine, optimizing hardware resources.

- Security Isolation: VMs enhance security by isolating applications and operating systems from each other.

- Easy Migration: VMs can be moved or migrated between different hosts with minimal effort.

- Fault Isolation: Issues in one VM typically don't affect others, enhancing system reliability.

- Testing and Development: VMs provide a sandbox for testing and development without impacting the host system.

- Scalability: VMs allow for easy scaling, adding or removing VMs based on workload demand

Q4: Differentiate between Xen, KVM, VMware hypervisors.

ANS: Xen:

- Type: Xen is a type-1 hypervisor, meaning it runs directly on the hardware.

- Virtualization Approach: Xen uses paravirtualization, where the guest operating system is modified to be aware of the hypervisor.
- Performance: Generally good performance due to paravirtualization.
- Open Source: Xen is open-source and maintained by the Xen Project.

KVM (Kernel-based Virtual Machine):

- Type: KVM is a type-1 hypervisor when paired with a suitable Linux kernel, but it can also function as a type-2 hypervisor.
- Virtualization Approach: KVM relies on hardware virtualization extensions (Intel VT or AMD-V) and is a full virtualization solution.
- Performance: Excellent performance due to hardware virtualization support.
- Open Source: KVM is open-source and integrated into the Linux kernel.

VMware:

- Type: VMware offers both type-1 (ESXi) and type-2 (Workstation, Fusion) hypervisors.
- Virtualization Approach: ESXi uses hardware-assisted virtualization, while Workstation and Fusion may use a mix of software and hardware virtualization.
- Performance: ESXi provides excellent performance, and VMware is well-regarded for its performance in enterprise environments.
- Commercial Products: VMware offers commercial products such as vSphere for enterprise-level virtualization.

Key Differences:

- Virtualization Approach: Xen uses paravirtualization, KVM uses hardware virtualization extensions, and VMware uses a mix of software and hardware virtualization.
- Type of Hypervisor: Xen and KVM are primarily type-1 hypervisors, while VMware offers both type-1 and type-2 options.
- Open Source vs. Commercial: Xen and KVM are open-source, whereas VMware offers both open-source (ESXi) and commercial (vSphere) solutions.
- Integration: KVM is integrated into the Linux kernel, while Xen and VMware are

separate hypervisor solutions.

- Target Audience: Xen and KVM are often used in open-source and Linux-centric environments, while VMware is widely used in enterprise environments.

B.2 Conclusion:

Virtualization using VirtualBox enables running multiple operating systems on a single machine. By creating and configuring virtual machines, attaching OS installation media, and optionally enhancing functionality with features like Guest Additions, VirtualBox provides an efficient and flexible environment for software testing, development, and training.