

WEEK 2: VIRTUALIZATION

4.1 Introduction

In this lab we will go through installation of Turbo C in guest OS and execute C program. VirtualBox is a free and open-source software program for virtualizing the x86 computing architecture. Oracle Corporation developed it. It works as a hypervisor and develops a Virtual Machine where the user can run another operating system. The "host" OS is the operating system where VirtualBox runs.

4.2 Objective

Study and Practice on installation of Turbo C in guest OS and execute C program .

4.3 Resource/Requirements Used:

VirtualBox and Guest OS

4.4 Prelab

Students should know about basic concepts of virtualization in cloud computing environment.

4.5 Background

Virtualization is the creation of a virtual (rather than actual) version resources such as a server, a desktop, a storage device, an operating system or network resources. Creation of a virtual machine over existing operating system and hardware is known as Hardware Virtualization. A Virtual machine provides an environment that is logically separated from the underlying hardware. The machine on which the virtual machine is going to create is known as Host Machine and that virtual machine is referred as a Guest Machine.

4.6 Description/Procedure

Install Turbo C in guest OS and execute C program

Step1: Create a Virtual Machine

First job is to create a virtual machine, to do so open VirtualBox and click -New from the toolbar.

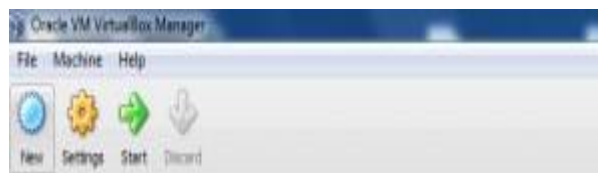


Figure 1: Oracle VM VirtualBox Manager

- Select "New" from the toolbar to create a new Virtual Machine
- Enter any name for your Virtual Machine and select the Operating System you're going to use as your GUEST OS.



Figure 2: Create New Virtual Machine

- Select the OS you are going to use inside your Virtual Machine
- Select the RAM size to be allocated to your guest OS, choose this wisely it should be equal to or more than the minimum system requirement of your guest OS at the same time if it goes more than 50% of your physical machine's RAM it'll slow down your host OS.

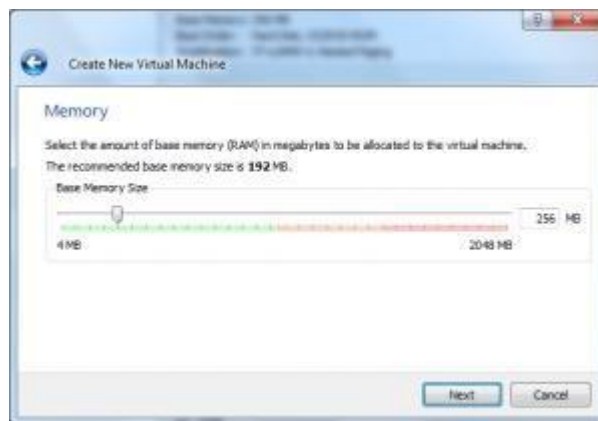


Figure 3: Create New Virtual Machine

- Select the amount of RAM to be allocated to the Virtual Machine. You need to create a Virtual Hard disk for your Virtual Machine, this is just a file with a .vdi extension which will contain all files stored inside that virtual machine. Choose a size suited for your guest OS and select the -Dynamically expanding disk if you want to save disk creation time and file size. If you choose -Fixed size disk it will take up the entire size specified but the performance of your Virtual Machine will be better. After clicking finish move on to the next step.

Step 2: Change the boot order of the VM

Right click the newly created Virtual machine and go to settings.



Figure 4: Virtual machine and go to settings

Go to the settings of your Virtual Machine

- Select storage from the left side list, select the CD icon and from the right select -Choose a virtual CD/DVD disk file, navigate to the ISO image file of the OS on your computer. Now the OS image is mounted to your Virtual machine.



Figure 5: Virtual machine Settings

The ISO image selected will be mounted in the Optical drive of your Virtual Machine. To change the boot device order of your virtual machine go to the -System- option from the left side list, select Hard Disk and click the up arrow to bring it to the top of the list. Make the CD/DVD-ROM the second device and uncheck the other devices.



Figure 6: Boot device priority for the virtual machine

Set the boot device priority for the virtual machine

Step 3: Start the Virtual machine

To start the virtual machine double-click the VM, a window opens here you can press F12 if you want to select a device of your choice to boot.



Figure 7: Starting Virtual Machine

Press F12 to select the boot device of your choice. To boot from the CD-ROM press c.

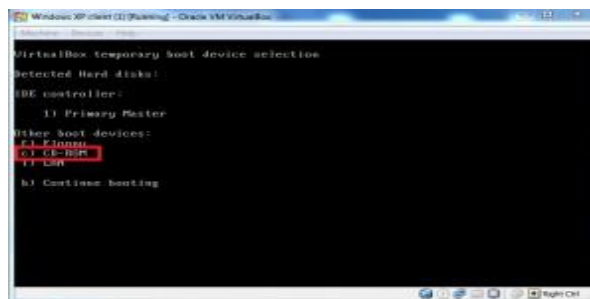


Figure 8: Boot VM from a CD image

Press c to boot the VM from a CD image. Your VM will now boot from your Operating System image file and the OS installation will start as usual. Some important shortcuts The following keyboard shortcuts can be used inside the VM to perform certain actions that might conflict with your physical machine.

[Right Ctrl] + Del – Equivalent to pressing [ctrl] + [alt] + [delete] inside the Virtual Machine. If you press ctrl+alt+del the physical machine will also be affected.

[Right Ctrl] + H – (Halt) Equivalent to pressing the power button on the physical machine.

[Right Ctrl] + R – (Reset) Equivalent to pressing the reset button, will reset your virtual machine.

[Right CTRL] + F – (Fullscreen) Toggles fullscreen

4.7 Further Probing Experiments

1. If guest OS takes the 50% of your physical machine's RAM size what happens?
2. Why to create a Virtual Hard disk for your Virtual Machine?
3. What does .vdi extension file contains inside the virtual machine?
4. Define the Dynamically expanding disk?

4.8 Viva Questions

1. What is meant guest OS?
2. What is meant by host OS?
3. Why the RAM size to be allocated to your guest OS?
4. Why to provide connectivity between guest OS and host OS?

WEEK 3: VIRTUALIZATION

5.1 Introduction

In this lab we will go through Test ping command to test the communication between the guest OS and Host OS. VirtualBox is a free and open-source software program for virtualizing the x86 computing architecture. Oracle Corporation developed it. It works as a hypervisor and develops a Virtual Machine where the user can run another operating system. The "host" OS is the operating system where VirtualBox runs. Test ping command is used to test network connectivity. In order for the guest and host machines to communicate, they need to be on the same network and by default.

5.2 Objective

Study and Practice on Test ping command to test the communication between the guest OS and Host OS.

5.3 Resource/Requirements Used:

Virtual Box, Mac OS and Ubuntu OS

5.4 Prelab

Students should know about basic concepts of network communication and virtualization.

5.5 Background

Virtualization is the creation of a virtual (rather than actual) version resources such as a server, a desktop, a storage device, an operating system or network resources. Creation of a virtual machine over existing operating system and hardware is known as Hardware Virtualization. A Virtual machine provides an environment that is logically separated from the underlying hardware. The machine on which the virtual machine is going to create is known as Host Machine and that virtual machine is referred as a Guest Machine.

5.6 Description/Procedure

On Mac OS (host):

Shutdown your VM and do:

VirtualBox > Settings > Network > Add (you will get vboxnet0)

On a terminal ifconfig will show you new interface vboxnet0

VM's Settings > System > check "Enable I/O APIC." VM's Settings > Network > Adapter 2 > host-only vboxnet0

On Ubuntu (guest):

Install OpenSSH Server

Edit /etc/network/interfaces file to append the following lines:

```
auto eth1
iface eth1 inet static
address 192.168.56.10
netmask 255.255.255.0
```

Run `sudo ifup eth1` from the Ubuntu command line. SSH server should be up and running. Switch to your host terminal and enter `ssh 192.168.56.10`

5.7 Further Probing Experiments

- 1.How to Configure Virtual Machine Network Settings?
- 2.Why to create a Virtual Hard disk for your Virtual Machine?
- 3.What does .vdi extension file contains inside the virtual machine?
- 4.Define SSH Server?

5.8 Viva Questions

1. What is meant guest OS?
2. What is meant by host OS?
3. Why to use test ping command?
4. Why to provide connectivity between guest OS and host OS?