

## **Virtualization and system cloning**

### **1. What is Virtualization**

Virtualization in terms of Computers is the duplicity of hardware as well as software. The main concept behind virtualization to proper utilization of hardware as well as Processor. Virtualization does nothing but creates separate Platform with Hardware which acts as another machine.

### **Types of Virtualization**

Mainly Virtualization is divided into two categories and they are.

1. Hardware Virtualization
2. Software Virtualization

1. **Hardware Virtualization:** - these types of virtualization offers you to make a copy of your hardware like volatile Memory, non volatile memory, sharing of processor and give you a Virtual hardware that will act as a Separate Machine and after that you can utilize that hardware for installing operating system and storage device.

2. **Software virtualization:** - This type of virtualization offer to virtual system software, operating System, Application software and other third party Services. Instead of purchasing multiple licenses for software, take Single License and make Software virtualization and install it in multiple virtualized Operating systems.

### **2. Need and Benefits of Virtualization**

1. Run multiple Systems with instant access to each.
2. Proper Utilization of hardware and processor
3. Snapshots facilities for easy backup
4. Sharing of folders , Devices like USB, Camera etc
5. Cloning of system
6. Dynamic Allocation of Memory
7. Virtual networking

### **3. VirtualBox**

Virtual Box is very powerful product from Oracle Corporation for virtualization. It supports x86 and amd64 architecture. It is freely available for both home and enterprise users and you can download it directly from its official website <https://www.virtualbox.org/> and run in different Operating system.



Following Platforms are supportable for VirtualBox

1. Windows
2. Linux
3. Mac OS X
4. Solaris
5. Open Solaris
6. OpenBSD

### **Working with VirtualBox**

VirtualBox is very easy to handle. It provides simple GUI Platform with ease of accessibility

## Installation

### 1. Installation For windows Users

Installation is very easy just follows the instructions as below.

1. Download VirtualBox Application form its website

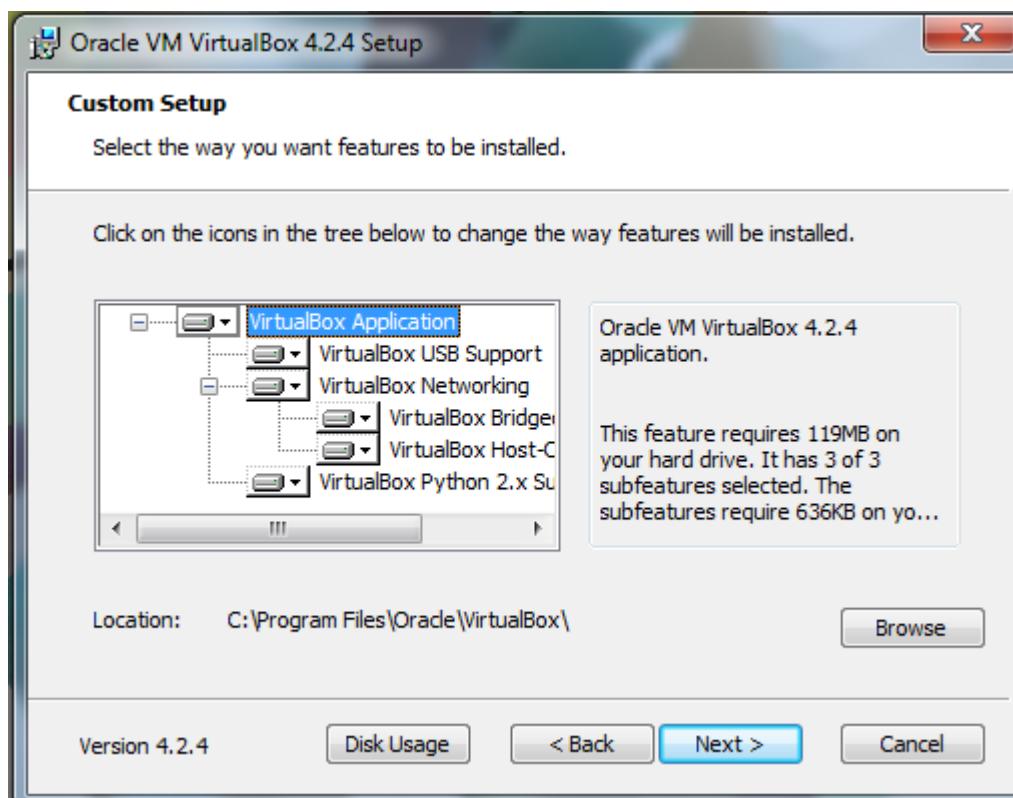
<https://www.virtualbox.org/wiki/Downloads>

2. Install VirtualBox Application by double clicking on that.

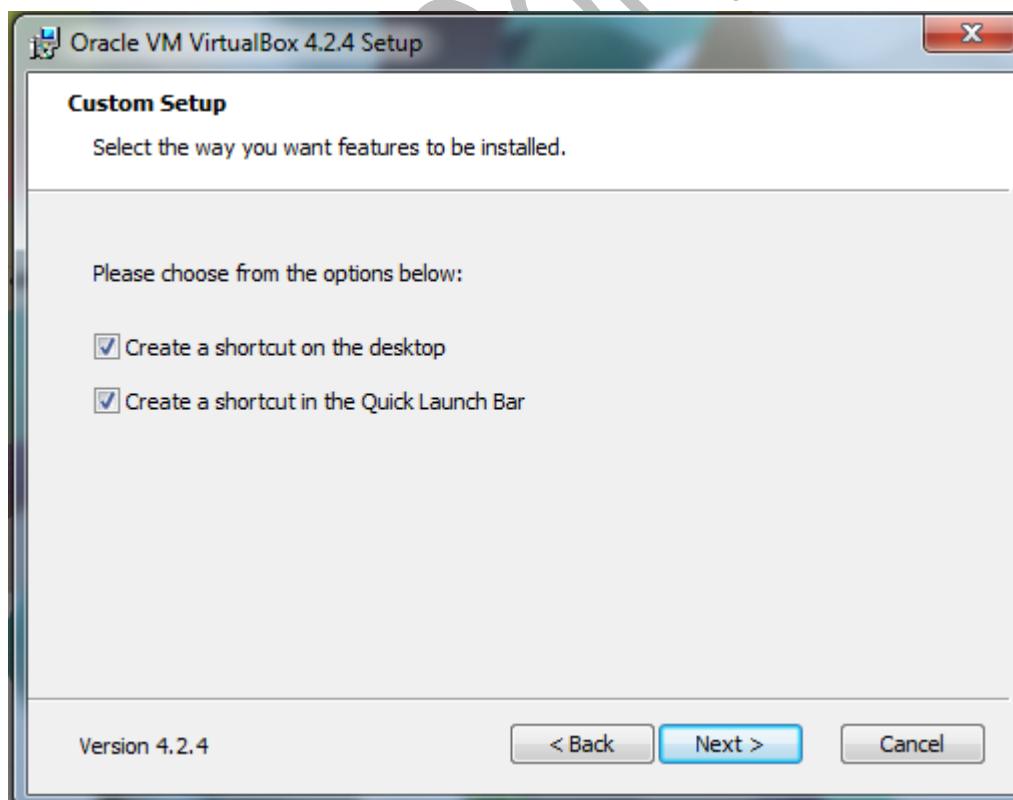
A Welcome wizard will open that will ask you to follows its Instructions



3. Click on Next. Next screen will come to ask you what features to be installed



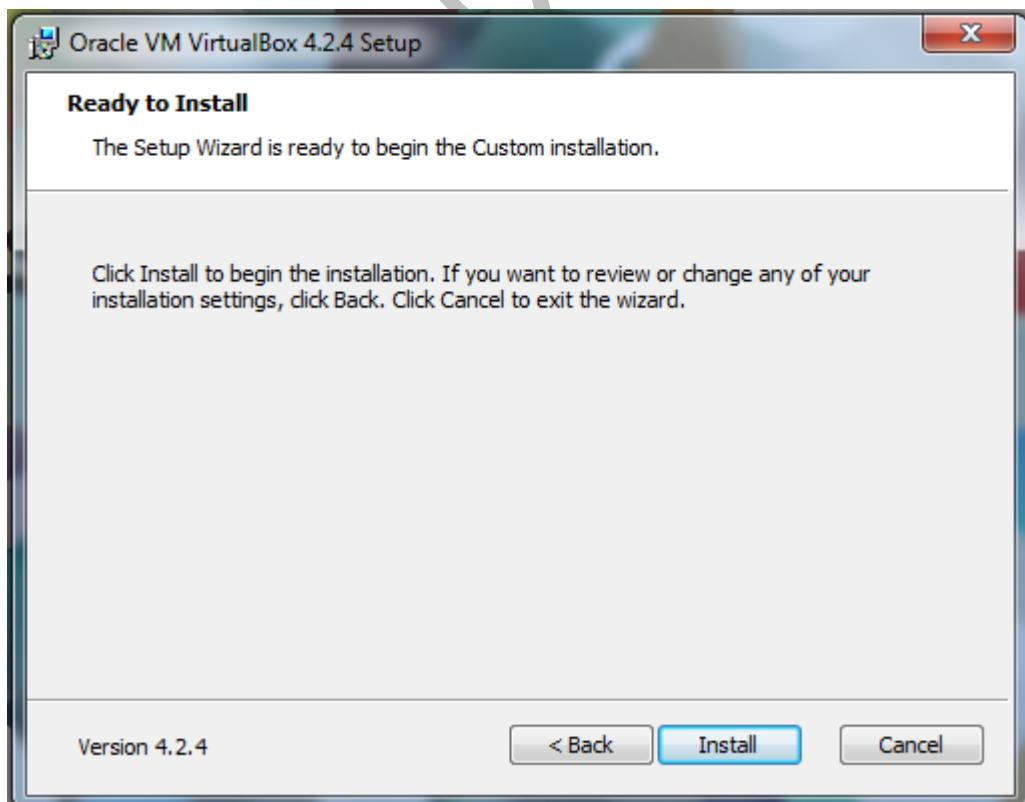
4. Keep default Setting and proceed with clicking on Next



5. Choose here whether you want to create shortcut for Desktop or Quick Launch Bar and then Click Next to proceed.



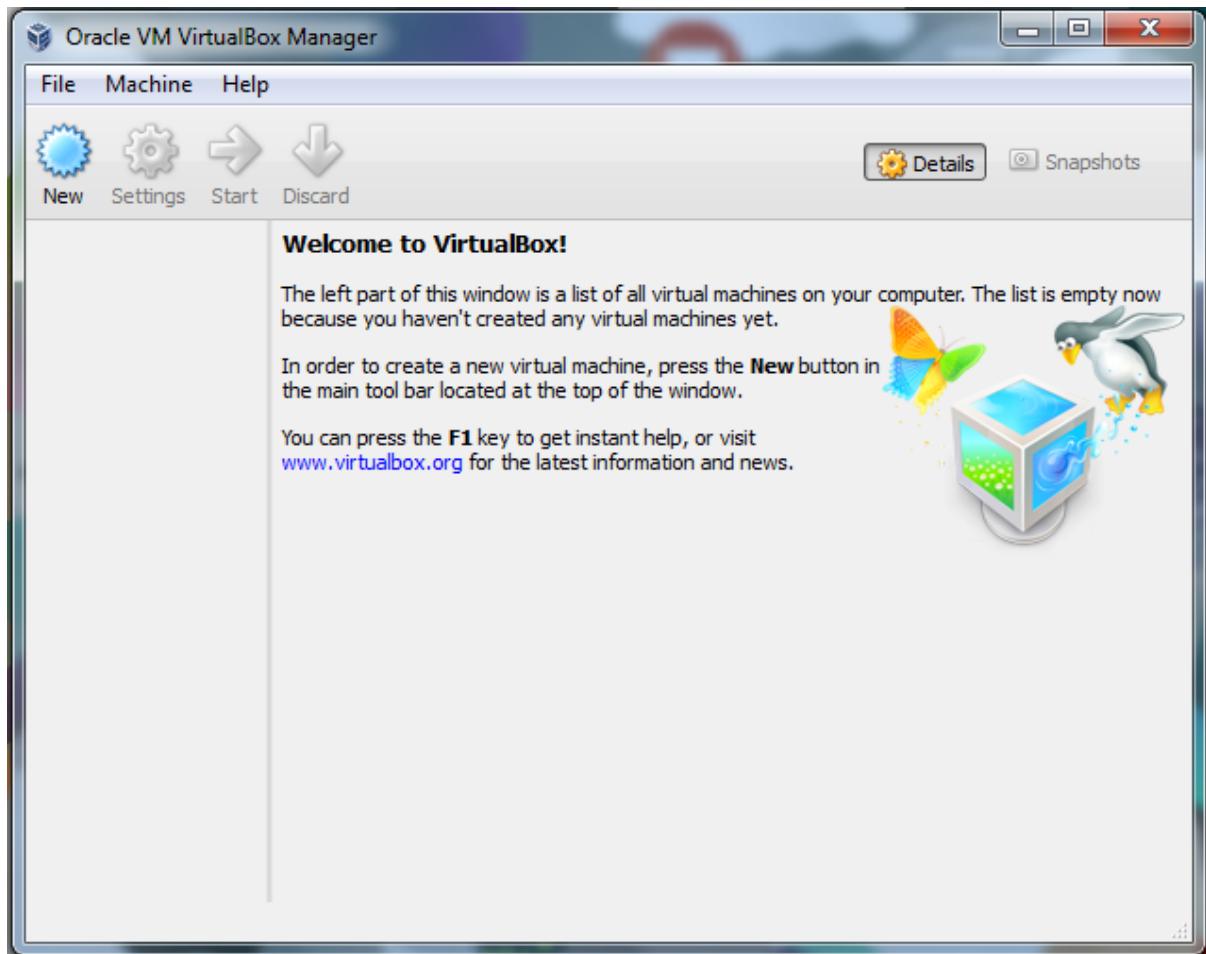
6. Next it will give you a warning that network may go down to install virtualbox networking interface. Click on YES to proceed.



7. Now click on Install to start installation process



8. Once Done with installation click on Finish

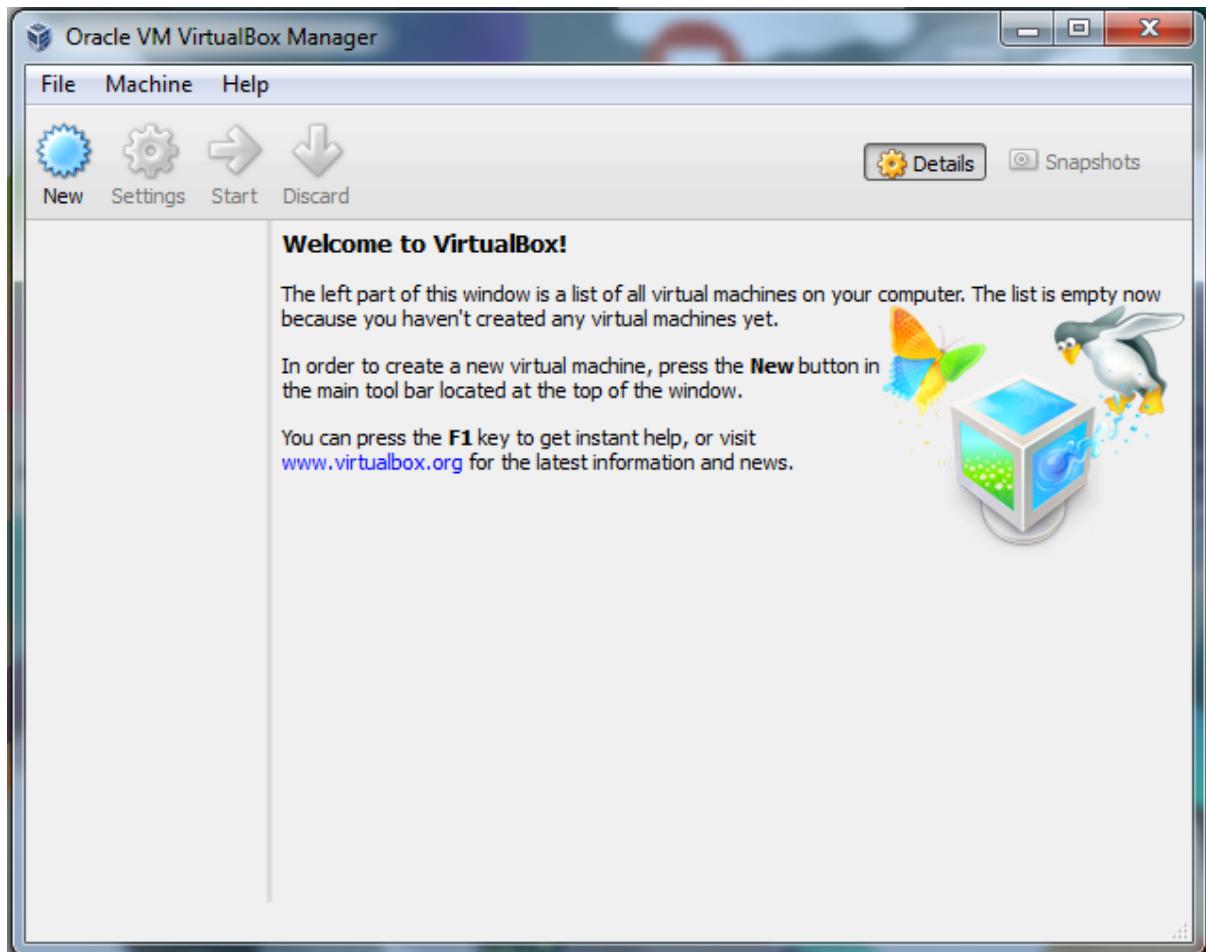


9. If installed successfully it will create a shortcut on Desktop. Click on that Shortcut to start VirtualBox. VirtualBox will start working and here is the Screenshot of VirtualBox main Screen.

### Installation of VirtualBox in Linux

For Debian Based System like Ubuntu, linux mint, Bactrack etc.

1. Open terminal
2. Run cmd → Sudo apt-get install virtualbox
3. You are done with installation.

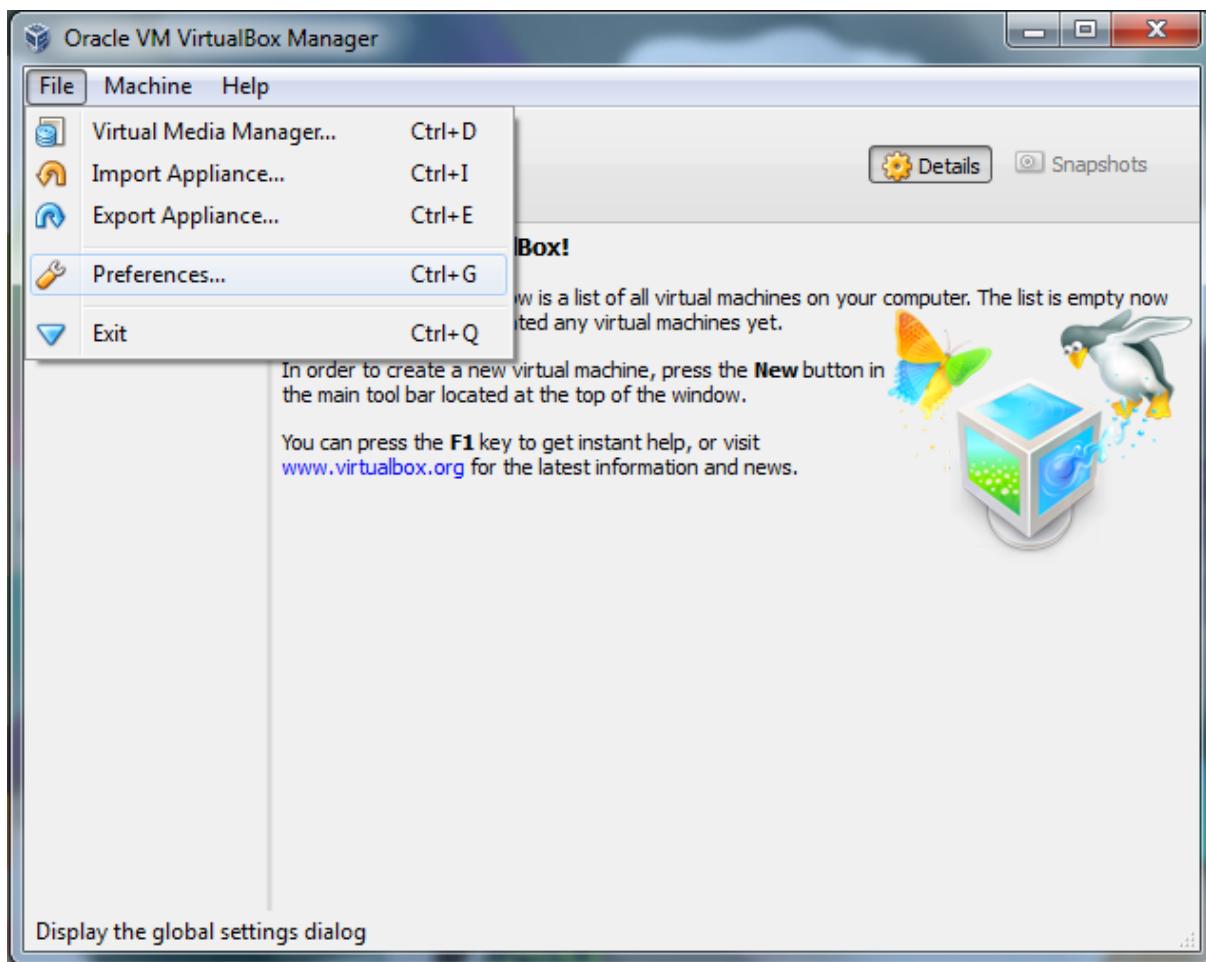


## Configuration of VirtualBox

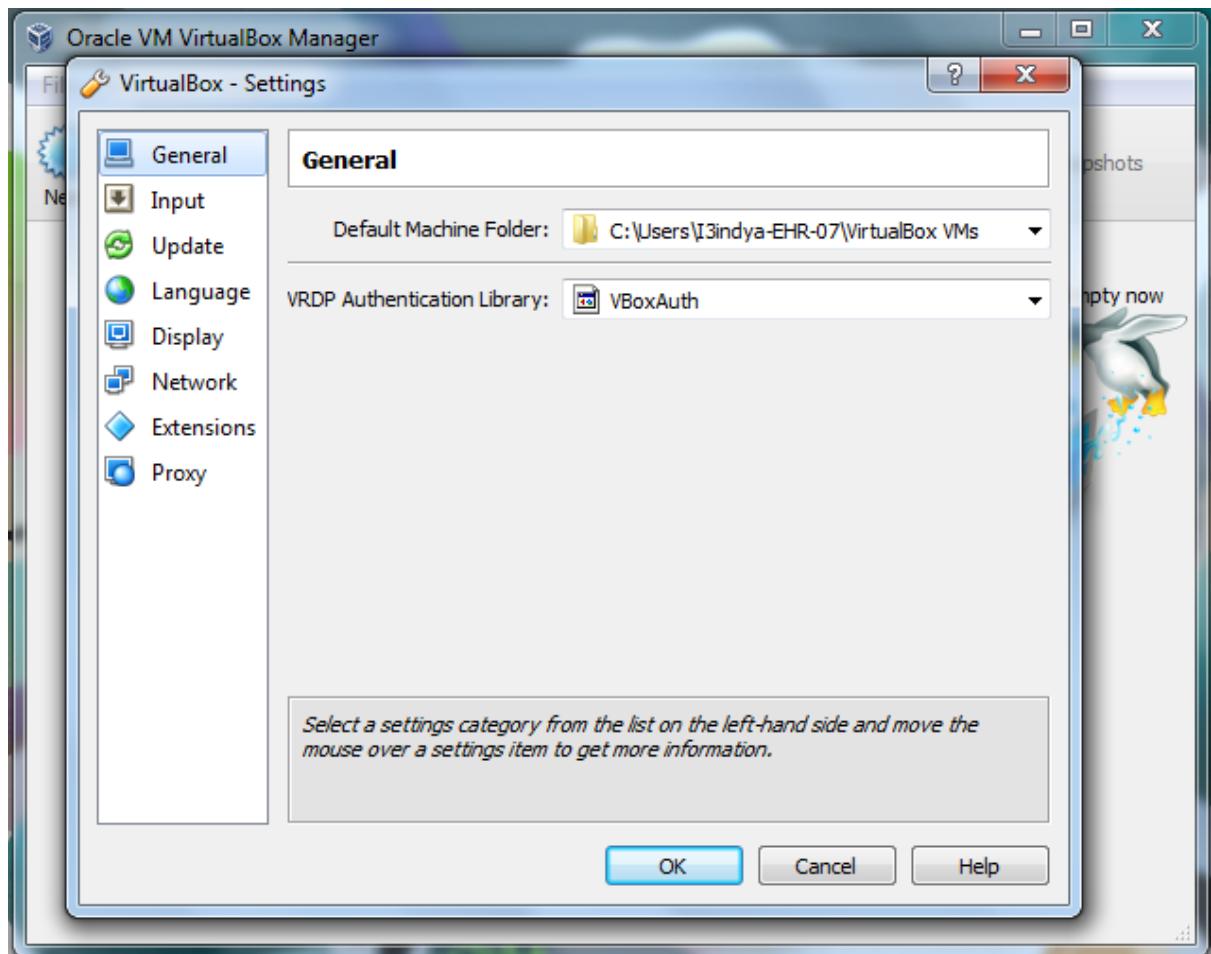
If you want to make some changes in VirtualBox like change language, add or remove network interface card, use of proxy, Change Display Setting etc.

Here are some steps to configure above settings.

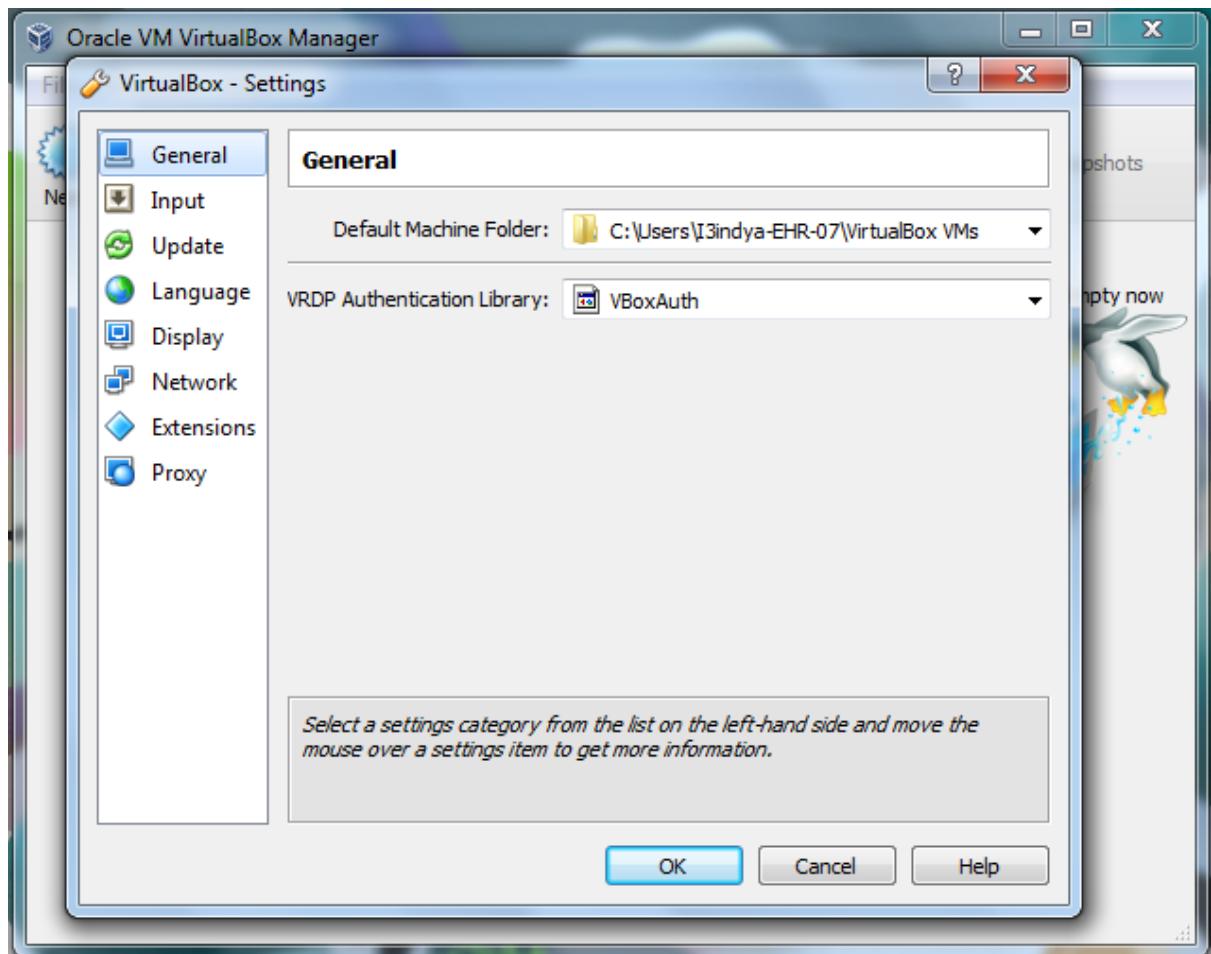
1. Open VirtualBox → File → Preferences



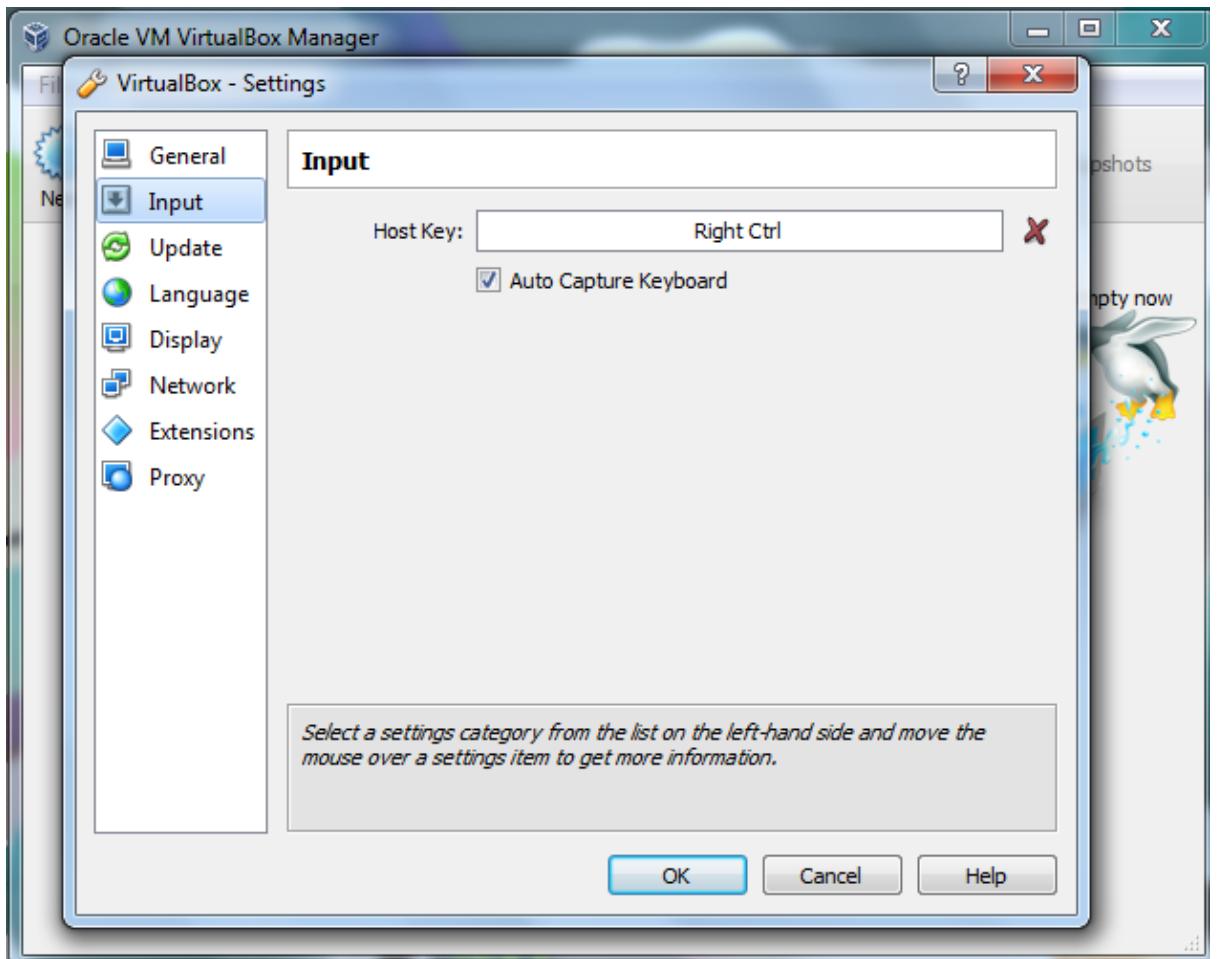
2. VirtualBox Setting Screen will come that will guide you to configure your custom settings.



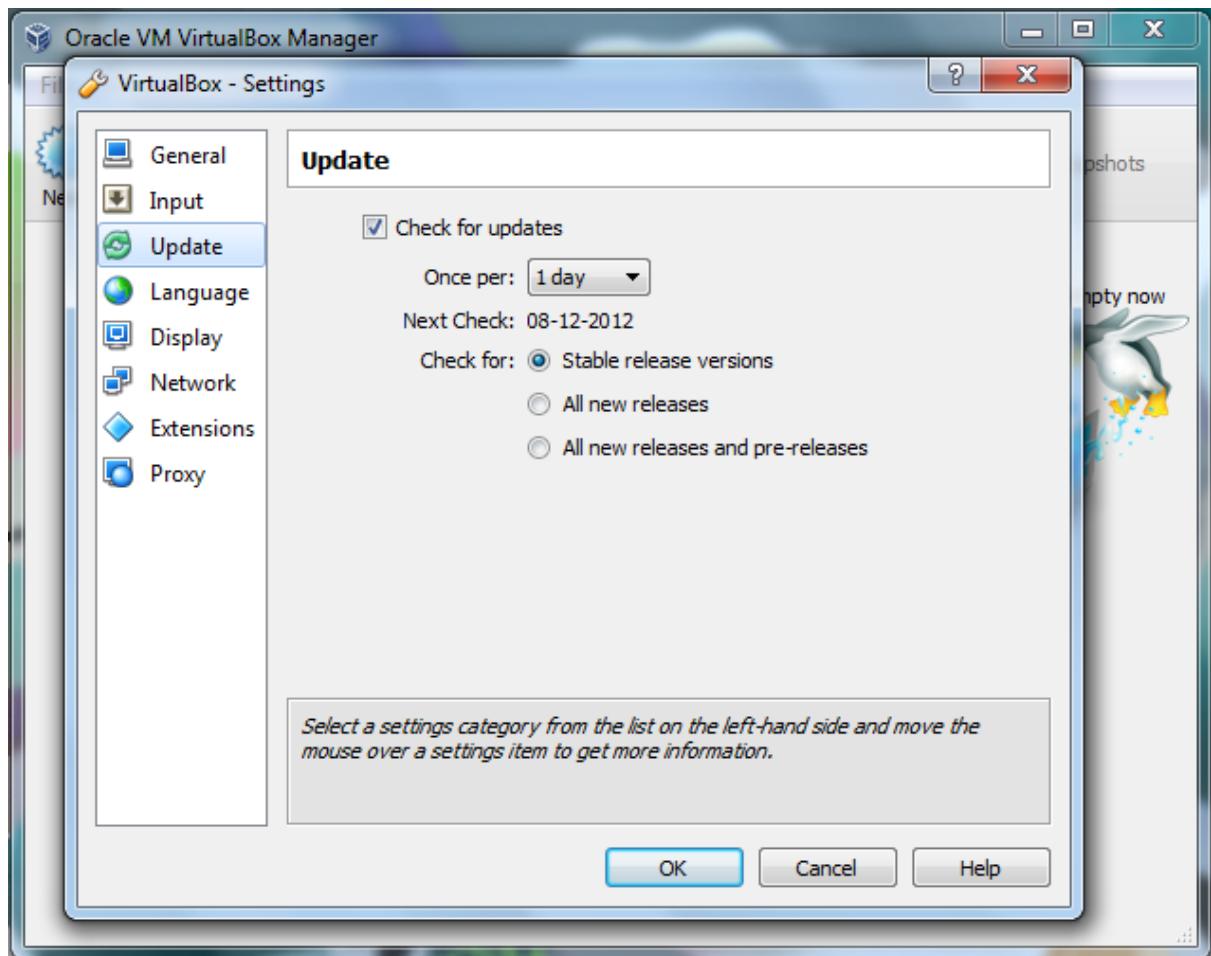
3. **General setting:** - it will let you to change the Destination Folder where you have to keep all your Virtual System Image



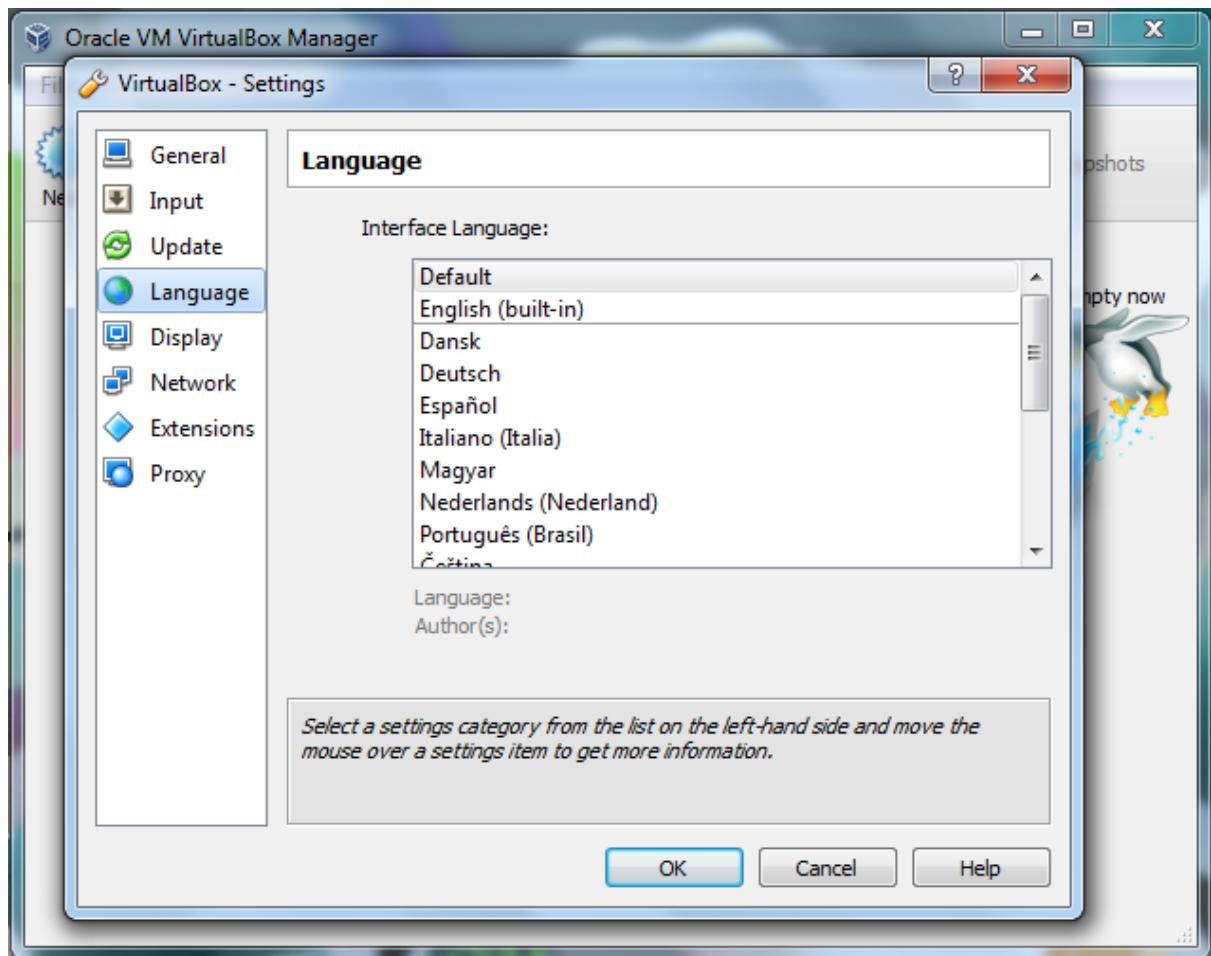
4. **Input:** - It will Activate or De-activate Keyboard Captures. If activated when you open Virtual Machine all Keyboard strokes will automatically directed to virtual Machine. If it is De- activated you need to press Hotkey to activate or deactivate.



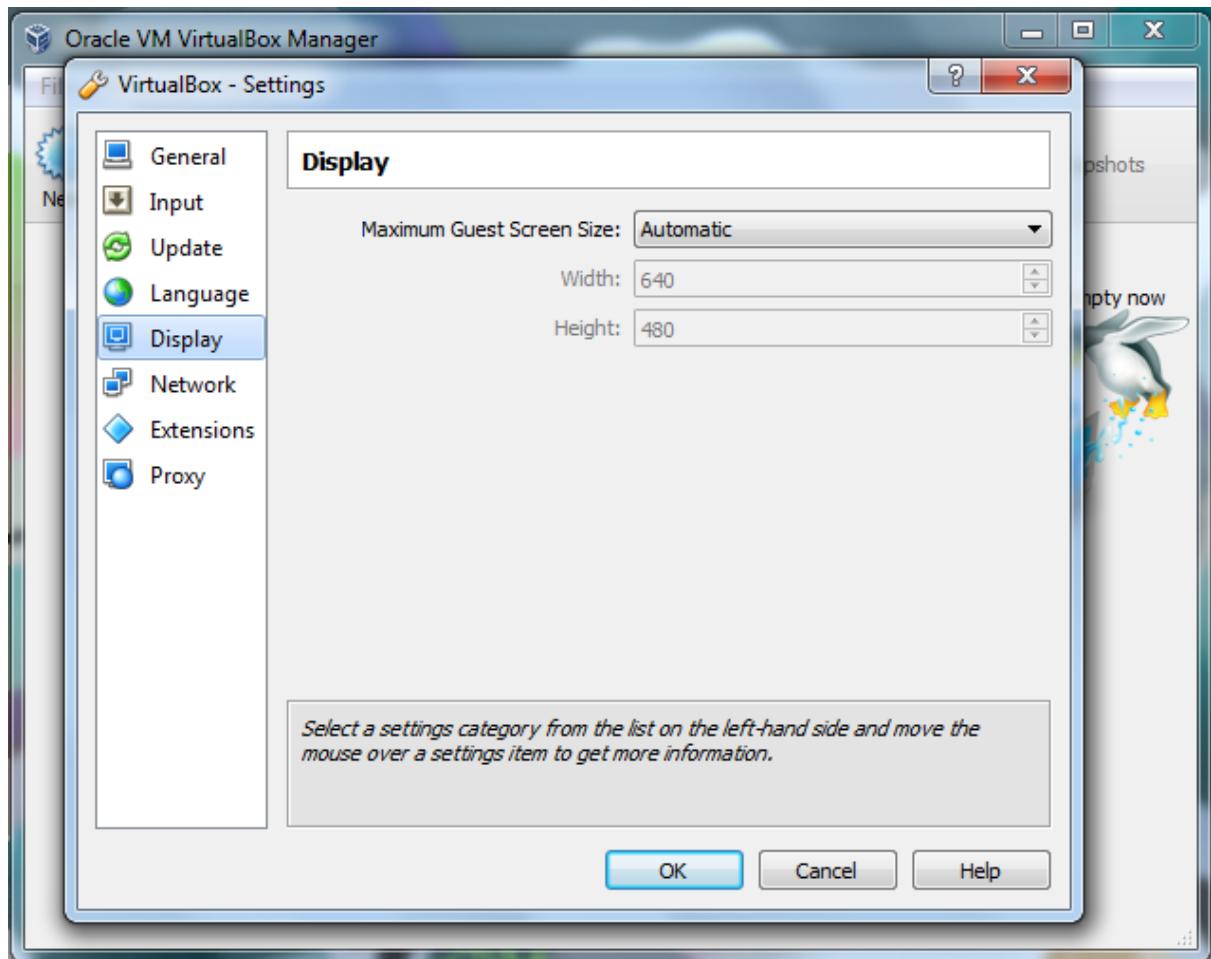
5. **Update:** - here you can set when it has to check for updates and what type of updates i.e. stable release or non stable release you want. By Default is recommended.



6. Choose Language.

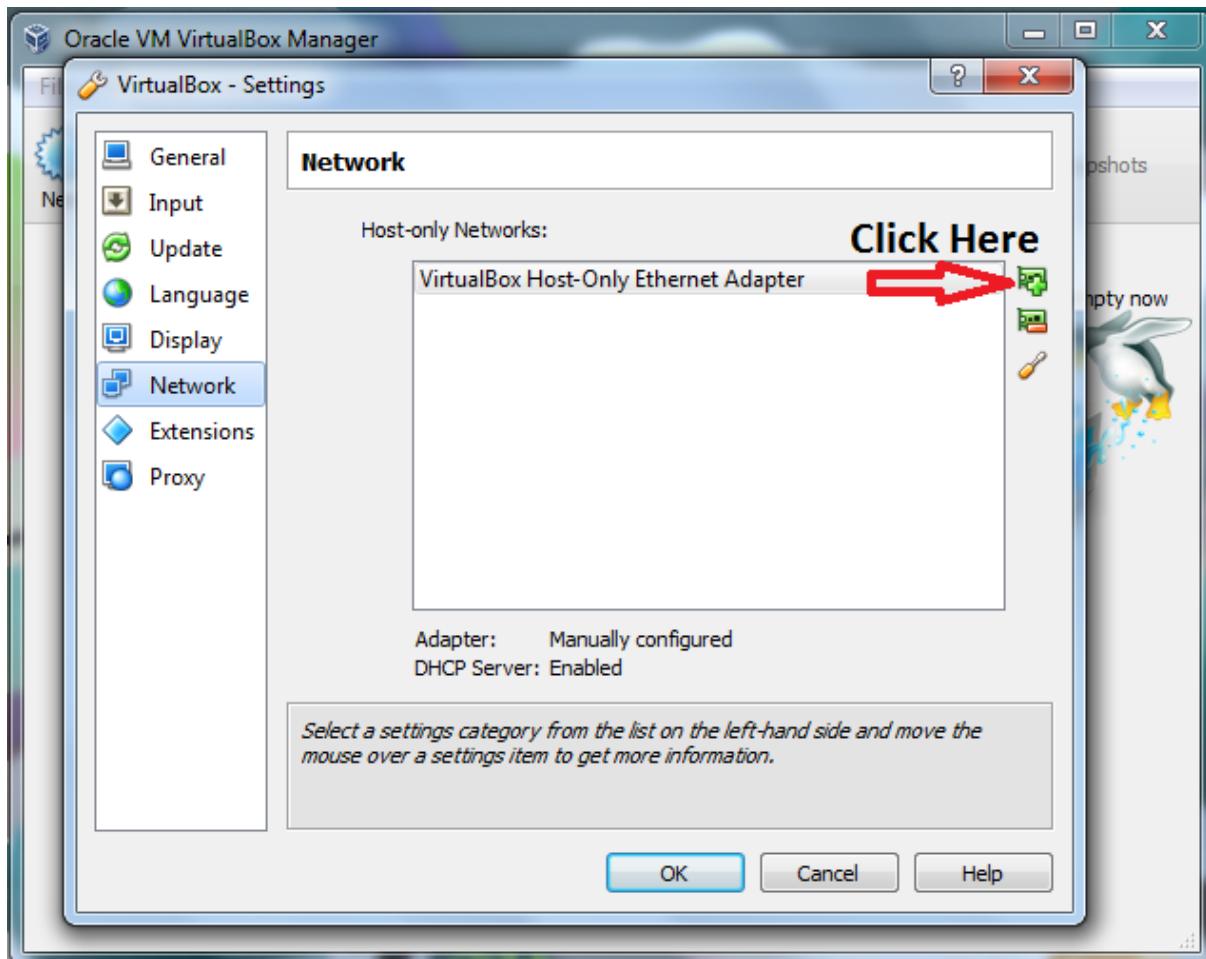


7. Display Setting. By Default is recommended.



8. **Network Setting:** - By Default only 1 network interface will be installed. You can install multiple network interfaces. To do so just click on the "+" sign at right hand side of the Box as shown in Figure.

This will installed another network interface card.



9. **Extensions:** - This is an additional package for VirtualBox for better support of USB Devices, VirtualBox RDP and PXE boot for Intel cards.

**To install Extensions Pack follow these steps**

1. Download Extension Package of same version of VirtualBox you installed in your PC from its official Website i.e. <https://www.virtualbox.org/wiki/Downloads>

# VirtualBox

## Download VirtualBox

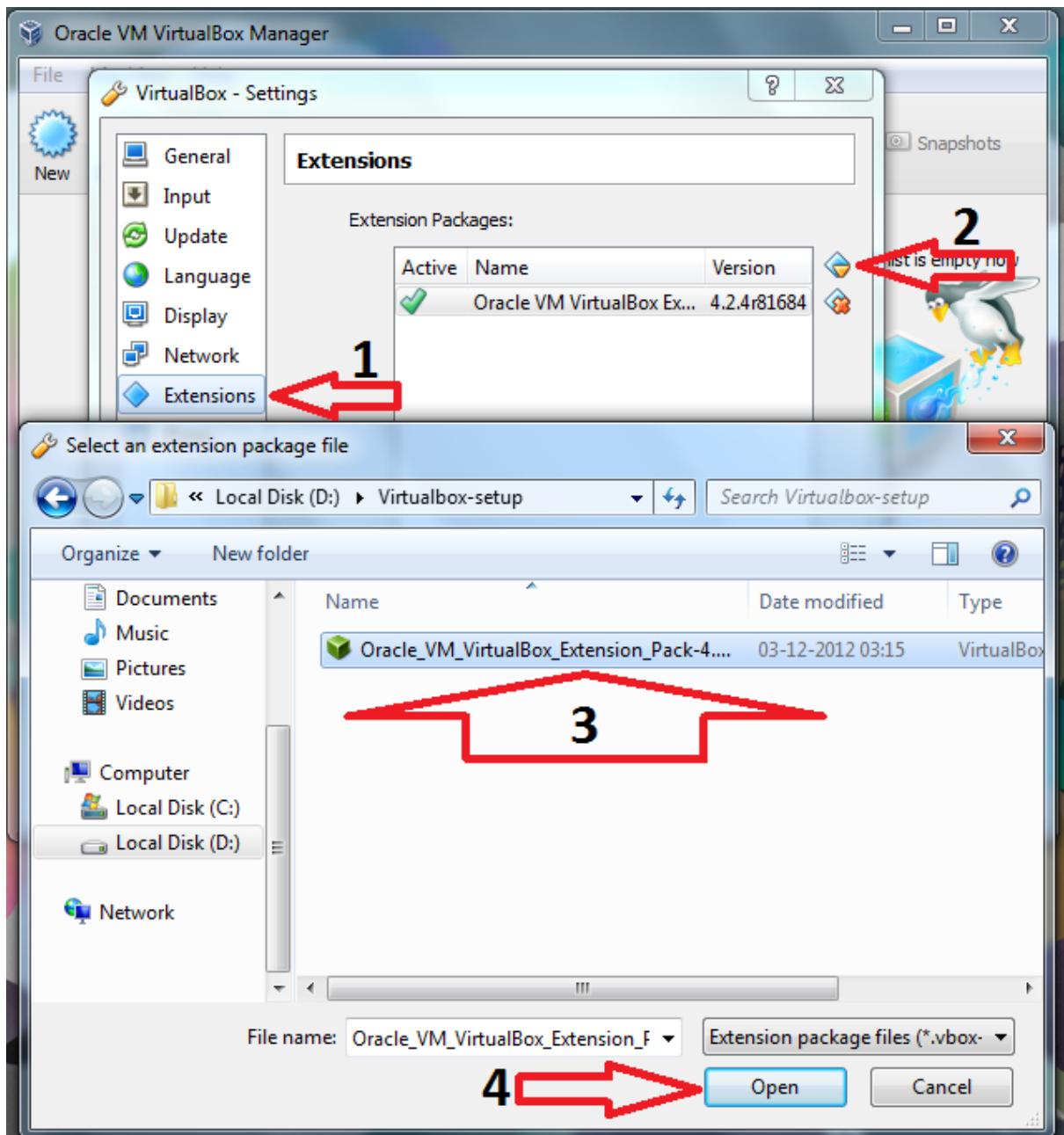
Here, you will find links to VirtualBox binaries and its source code.

### VirtualBox binaries

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

- **VirtualBox platform packages.** The binaries are released under the terms of the GPL version 2.
  - [VirtualBox 4.2.4 for Windows hosts](#) ↗x86/amd64
  - [VirtualBox 4.2.4 for OS X hosts](#) ↗x86/amd64
  - [VirtualBox 4.2.4 for Linux hosts](#)
  - [VirtualBox 4.2.4 for Solaris hosts](#) ↗x86/amd64
- **VirtualBox 4.2.4 Oracle VM VirtualBox Extension Pack** ↗All supported platforms   
Support for USB 2.0 devices, VirtualBox RDP and PXE boot for Intel cards. See [this chapter](#) from the User Manual for an introduction Extension Pack. The Extension Pack binaries are released under the [VirtualBox Personal Use and Evaluation License \(PUEL\)](#).  
*Please install the extension pack with the same version as your installed version of VirtualBox!*  
*If you are using [VirtualBox 4.1.22](#), please download the extension pack [here](#).*  
*If you are using [VirtualBox 4.0.16](#), please download the extension pack [here](#).*

2. Once Download complete, there are two way to install Extension
  1. Simply Double click on that and install
  2. Another way to install Extension → Open VirtualBox → File → Preferences → Extensions



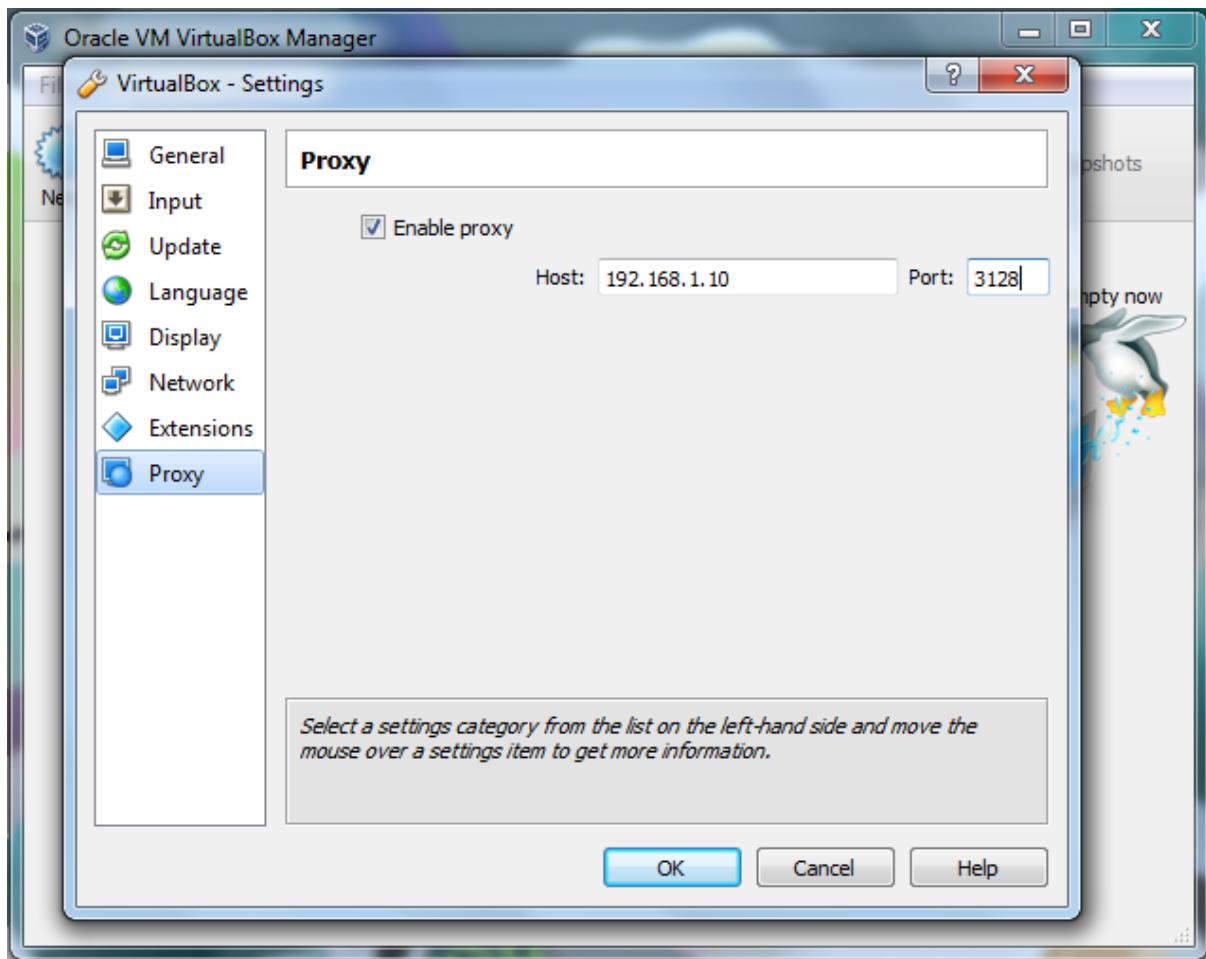
Follow the Steps as shown in figure.

**10. Proxy:** - If you have Proxy, you can use with VirtualBox.

Click on Enable Proxy and fill Proxy IP Address and Port Number.

Follow this Link to get free online Proxy <http://www.hidemyass.com/proxy-list/>.

\*\*Note: - Some of the Proxy may not work in the Above Link. Use above proxy at own risk.



**Conclusion:** - Above configuration of VirtualBox is just additional or user Defined. Or else one can continue with By Default Settings also.

Maintenance Tip: - Keep Update VirtualBox for better performance and Additional Features.

### Installing Operating System in VirtualBox

Almost All Operating you can install in VirtualBox. But By Default it support the following Platform

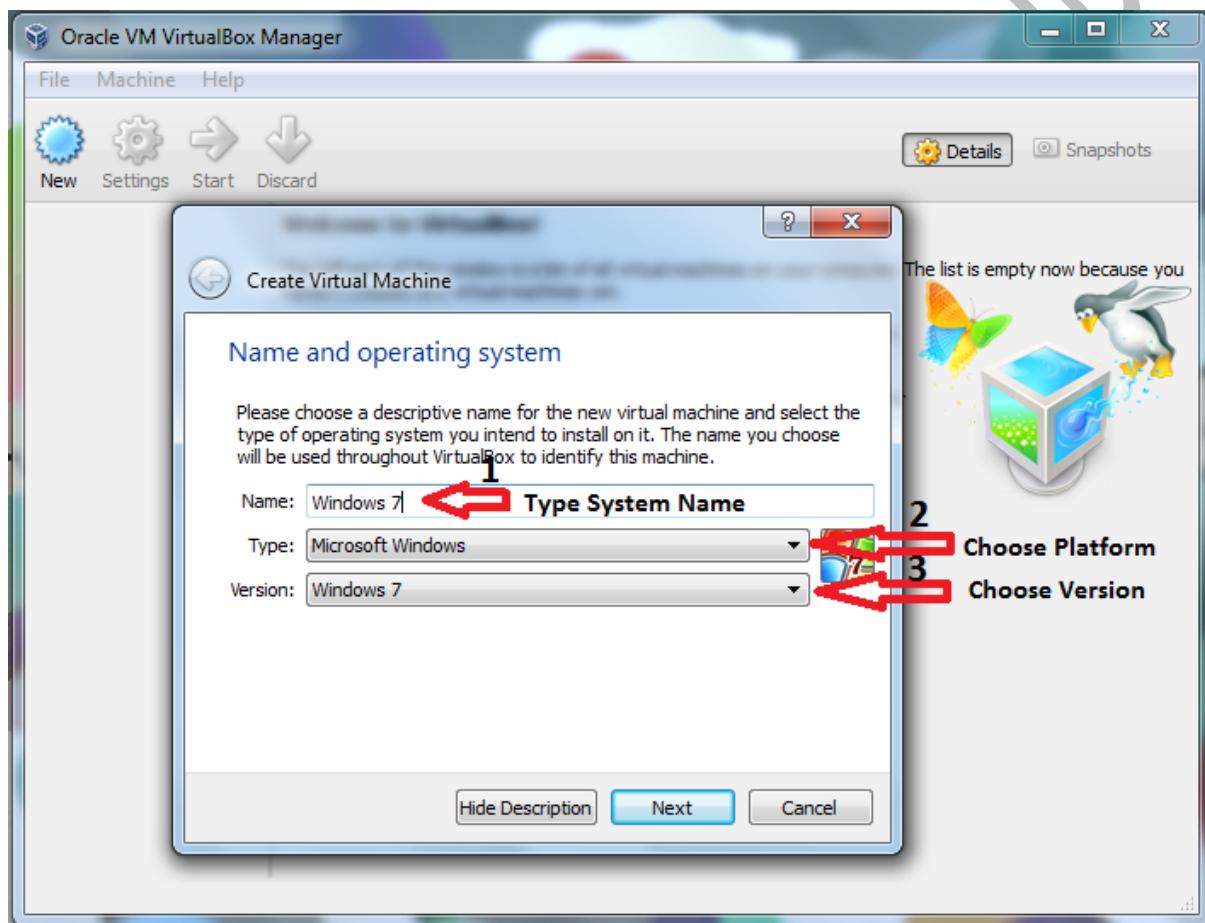
1. Windows
2. Linux
3. Solaris
4. BSD
5. IBM OS/2

6. Mac OSX

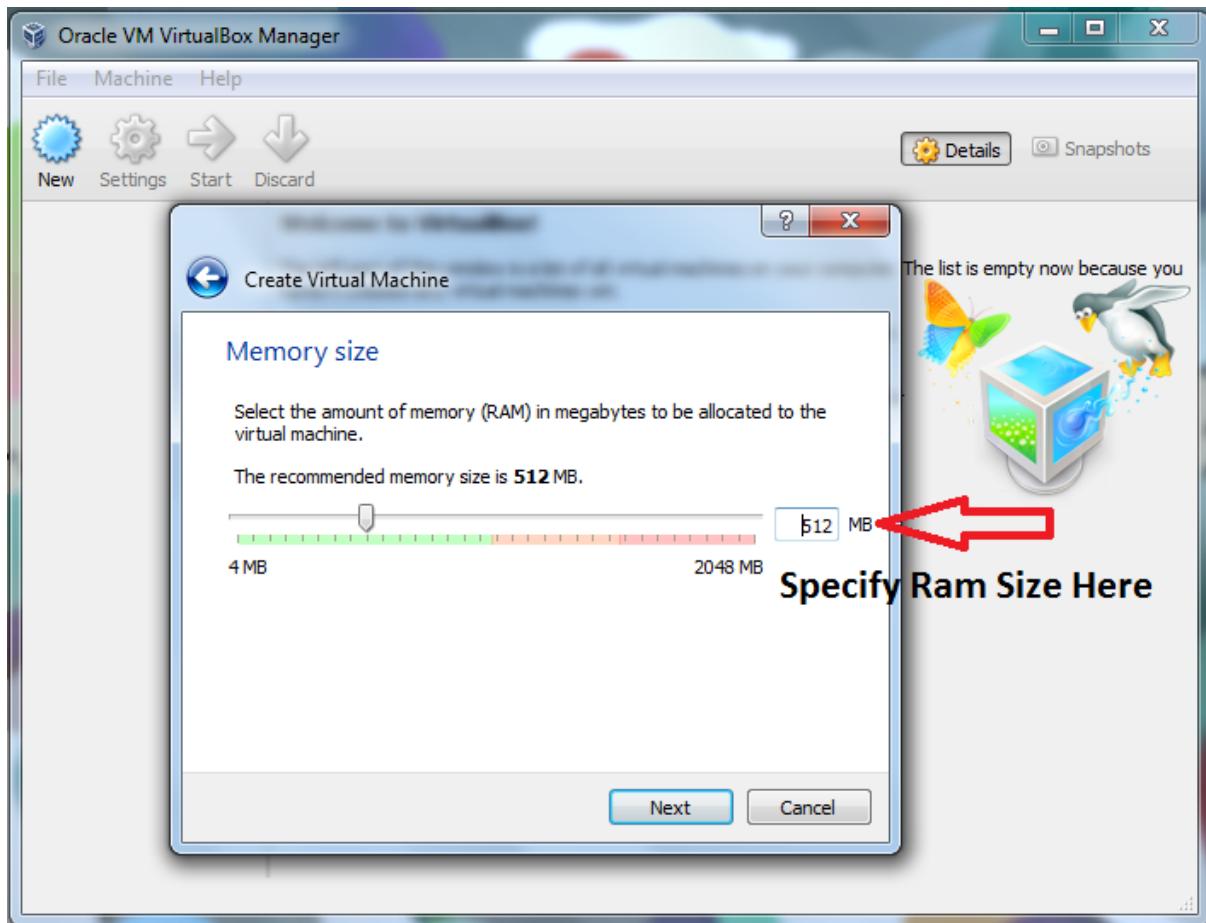
7. **Others:** - This Category will let you to install any other platform like Android, Mobile OS also etc but won't get full feature of VirtualBox. It may create resolution problem, USB support etc.

Step by step guide.

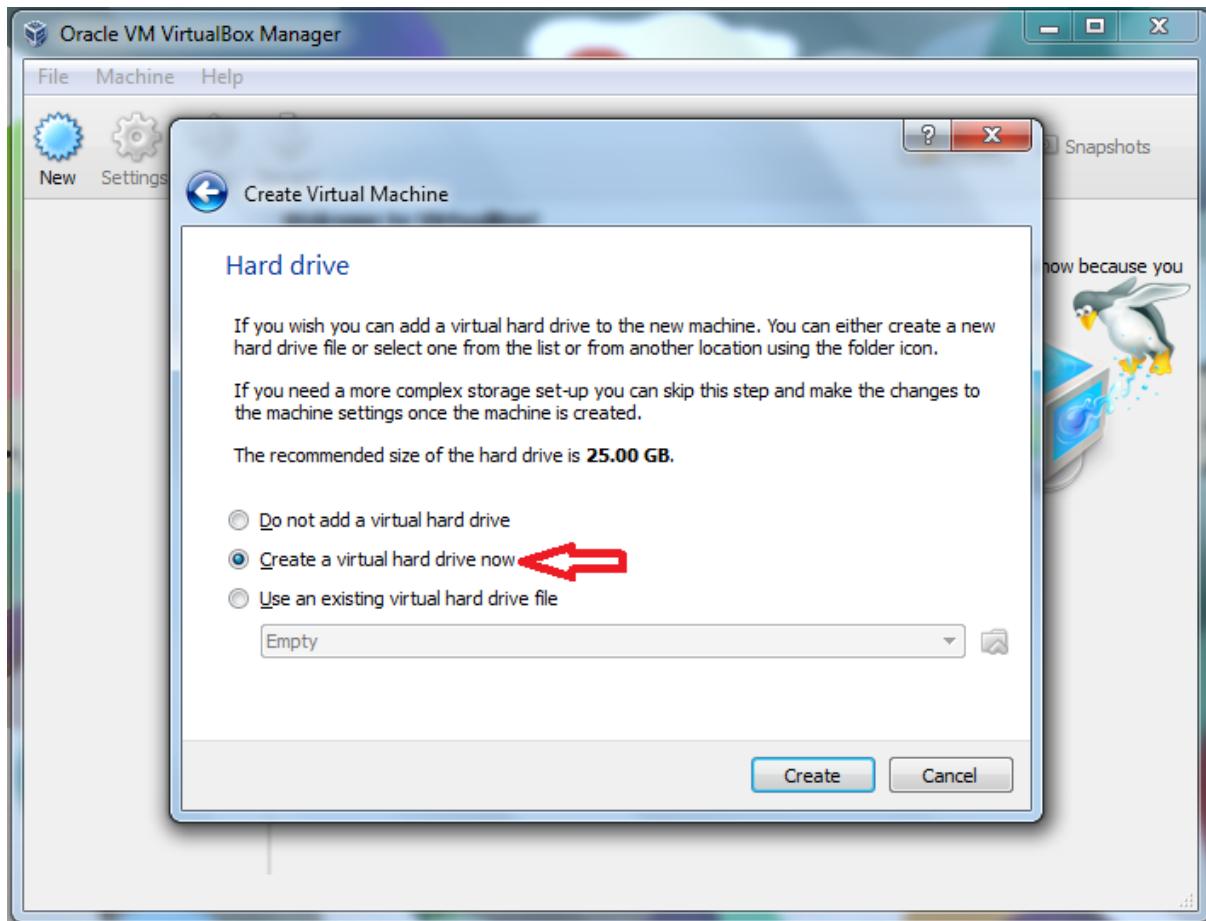
1. Open VirtualBox → Machine → New
2. Type Name of The system, Example-“Windows 7”, and type of system as well as version to install after that click next.



3. Type the size of RAM in MB you want to give, Example-“512”

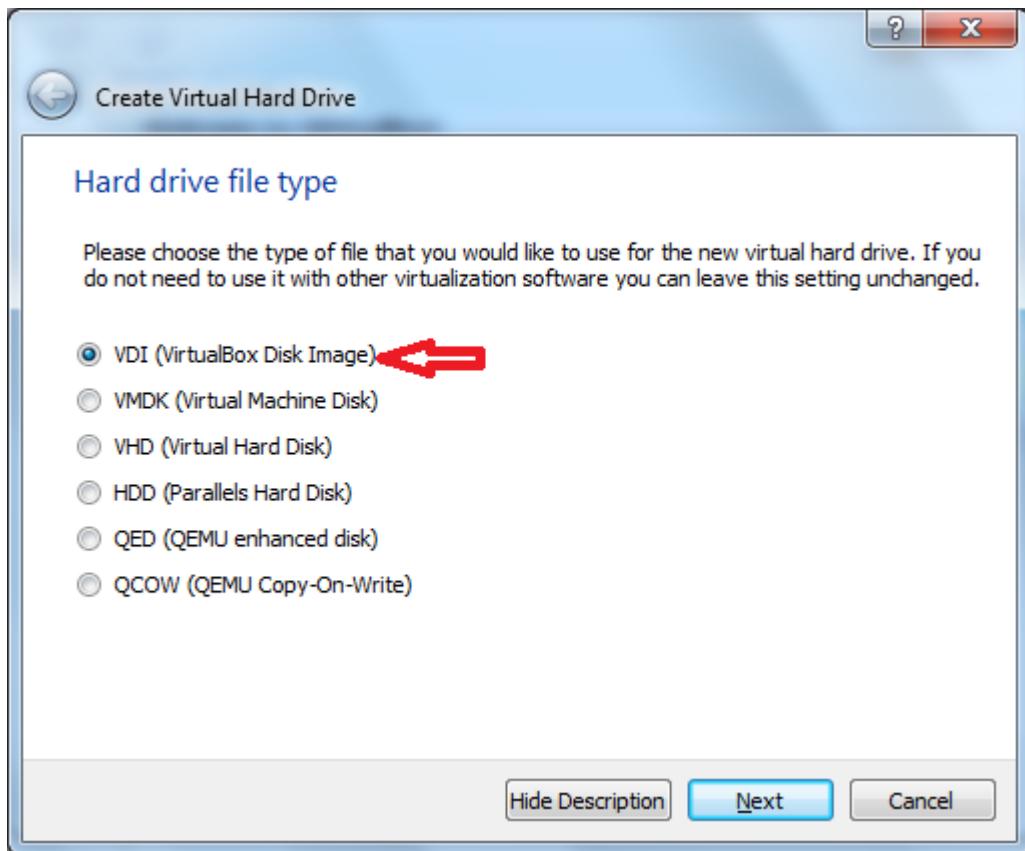


4. Choose Create a Virtual Hard Drive Now and click on Create.

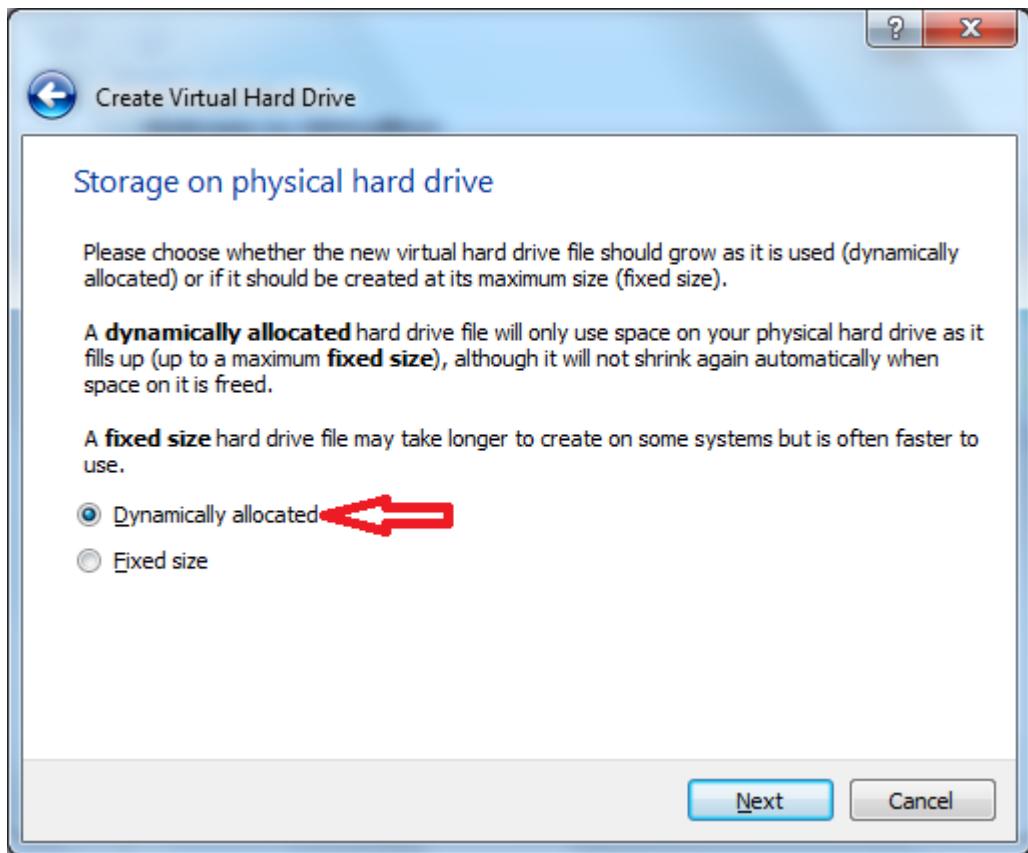


5. Choose type Of Hard drive you want to create. If you don't know much about the type of hard drive, keep continue with Default type and click on next.

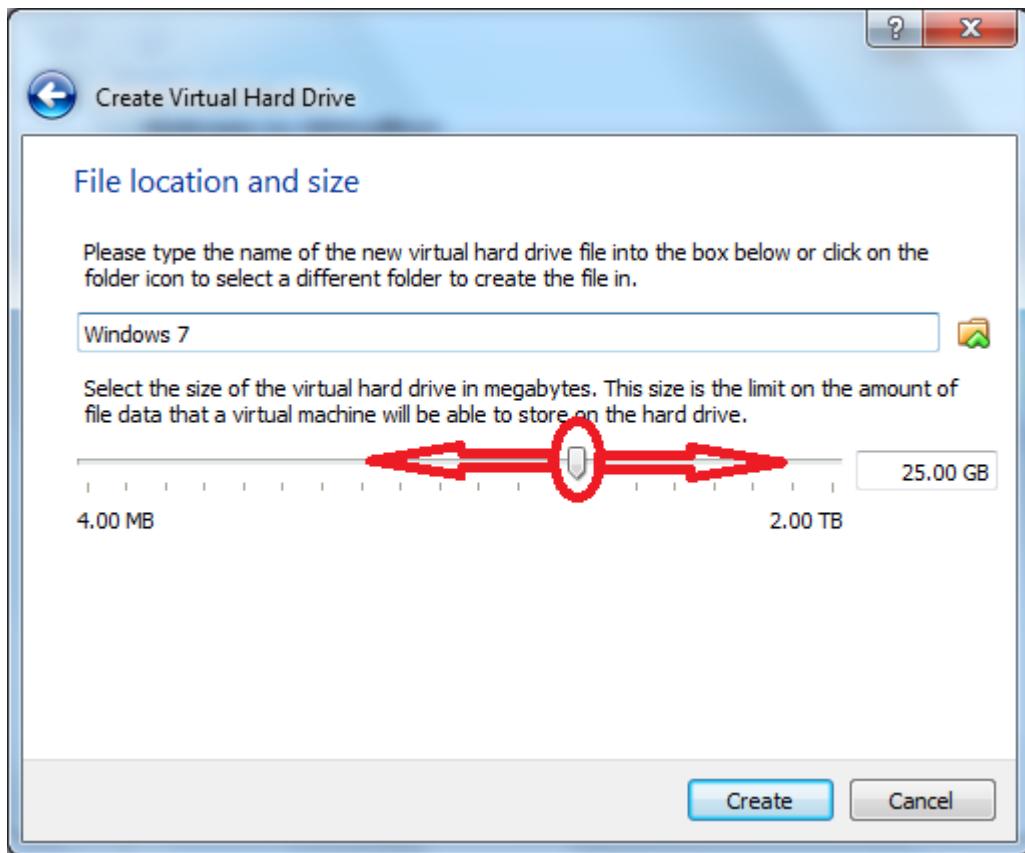
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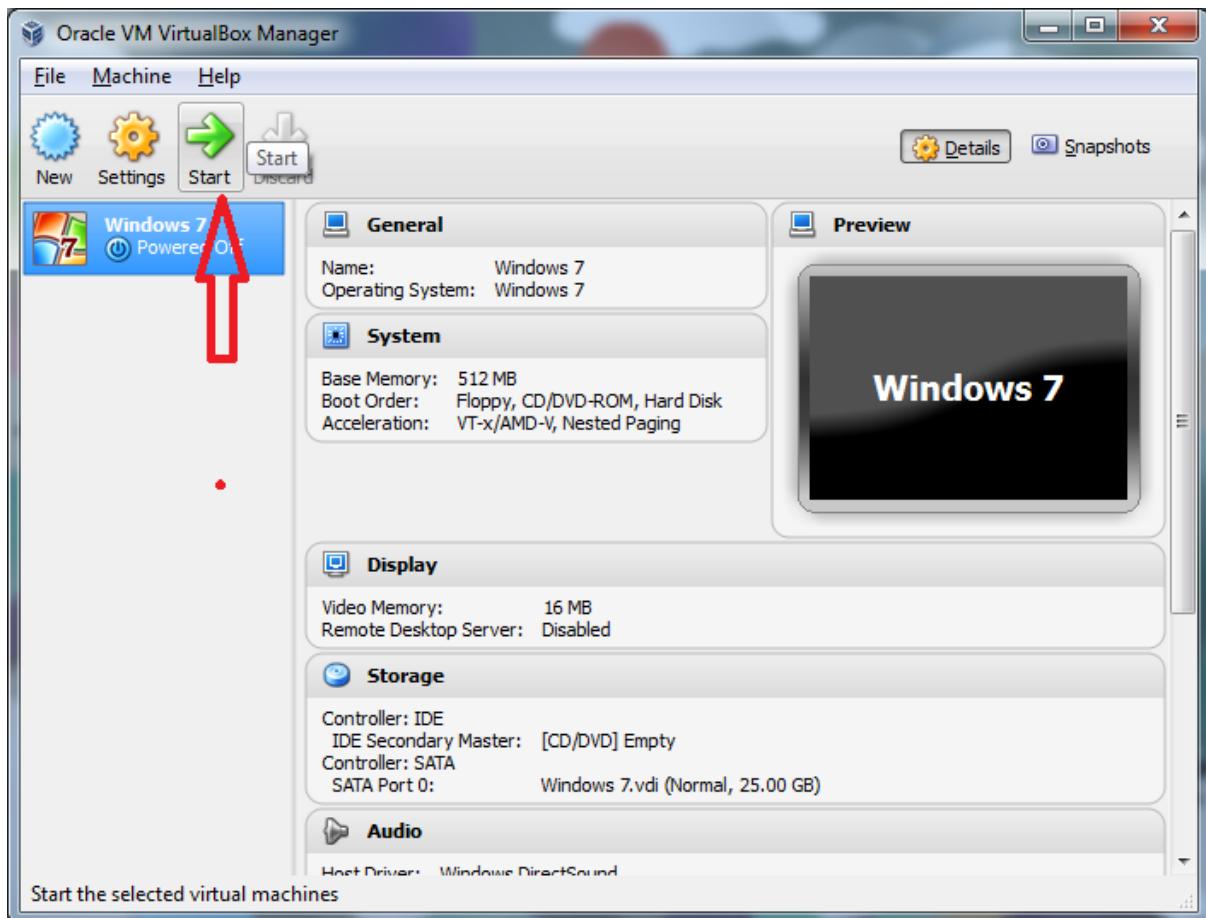
6. Now specify memory allocation type. It offers two type but default is recommended.
  1. Dynamically allocated:- will vary according to the size occupied
  2. Fixed Size: - Fixed in size all time.



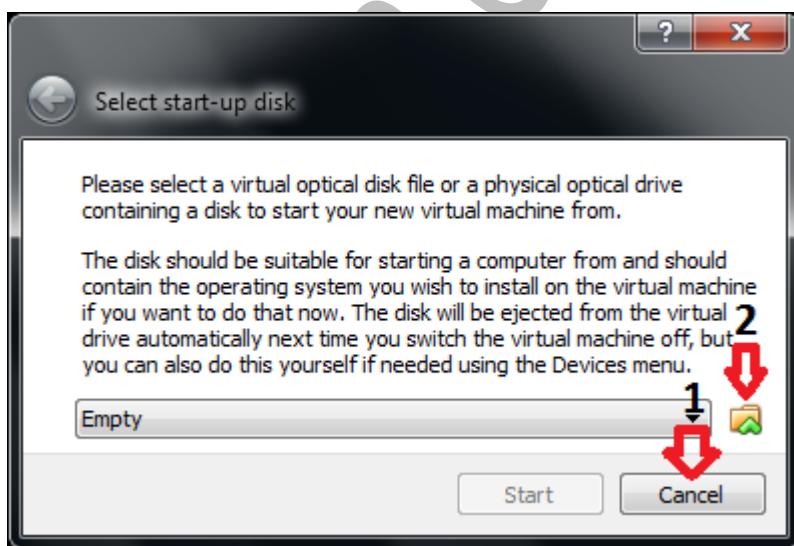
7. Specify size of Hard disk and click on create.



8. Now you Virtual machine are ready. It's time to install operating system into it. Click start to run Virtual machine.

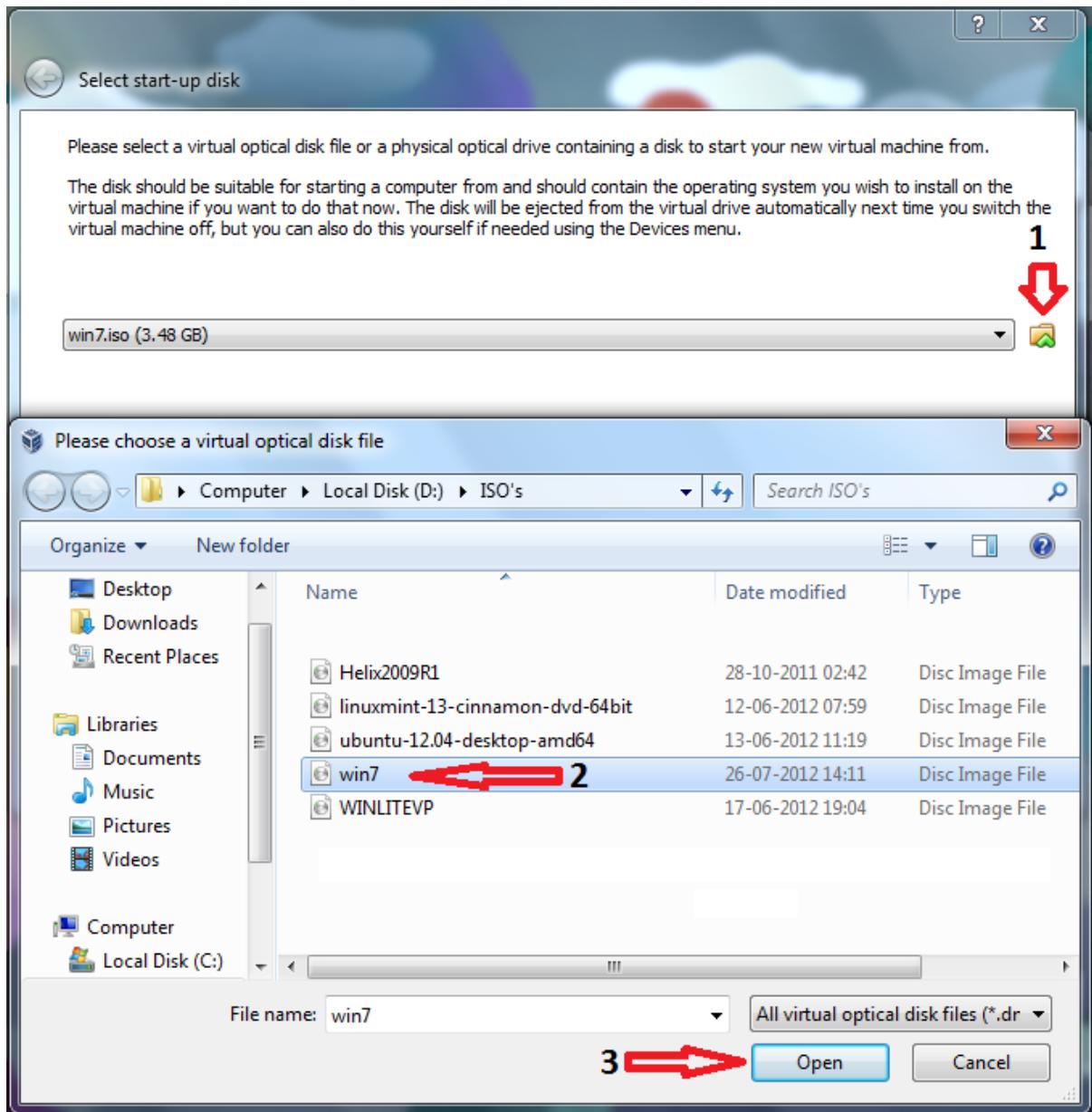


9. When start it will prompt you for bootable disk of OS you want to install.

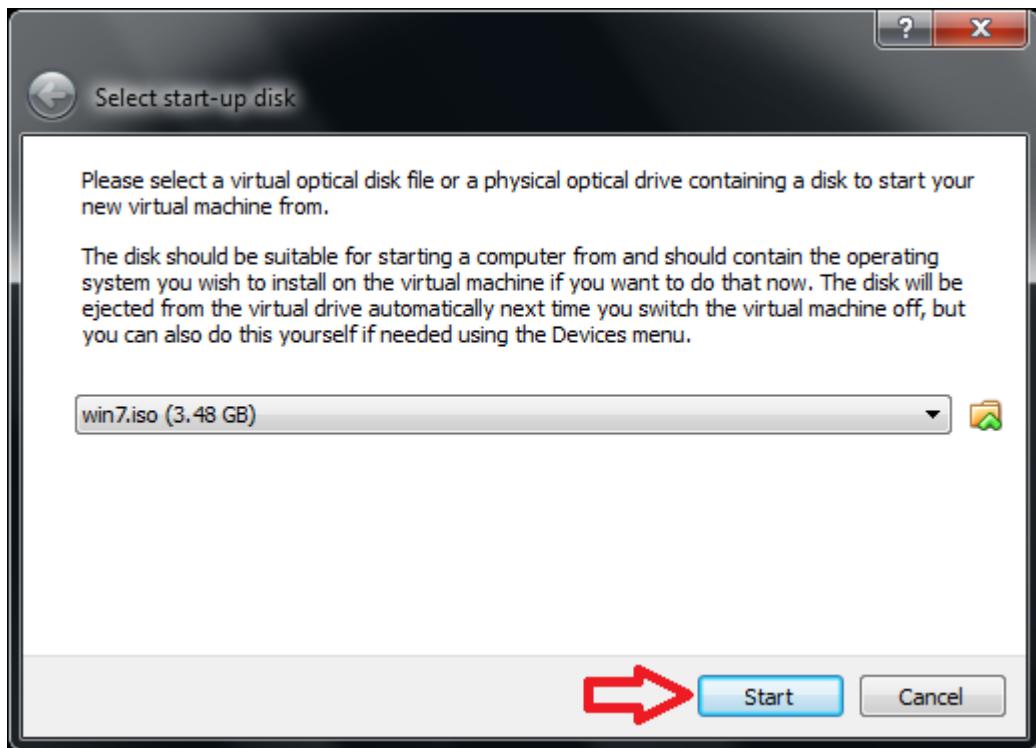


\*\*Choose 1 to install from Bootable CD/DVD. Just Put Bootable CD/DVD into CD/DVD writer and install.

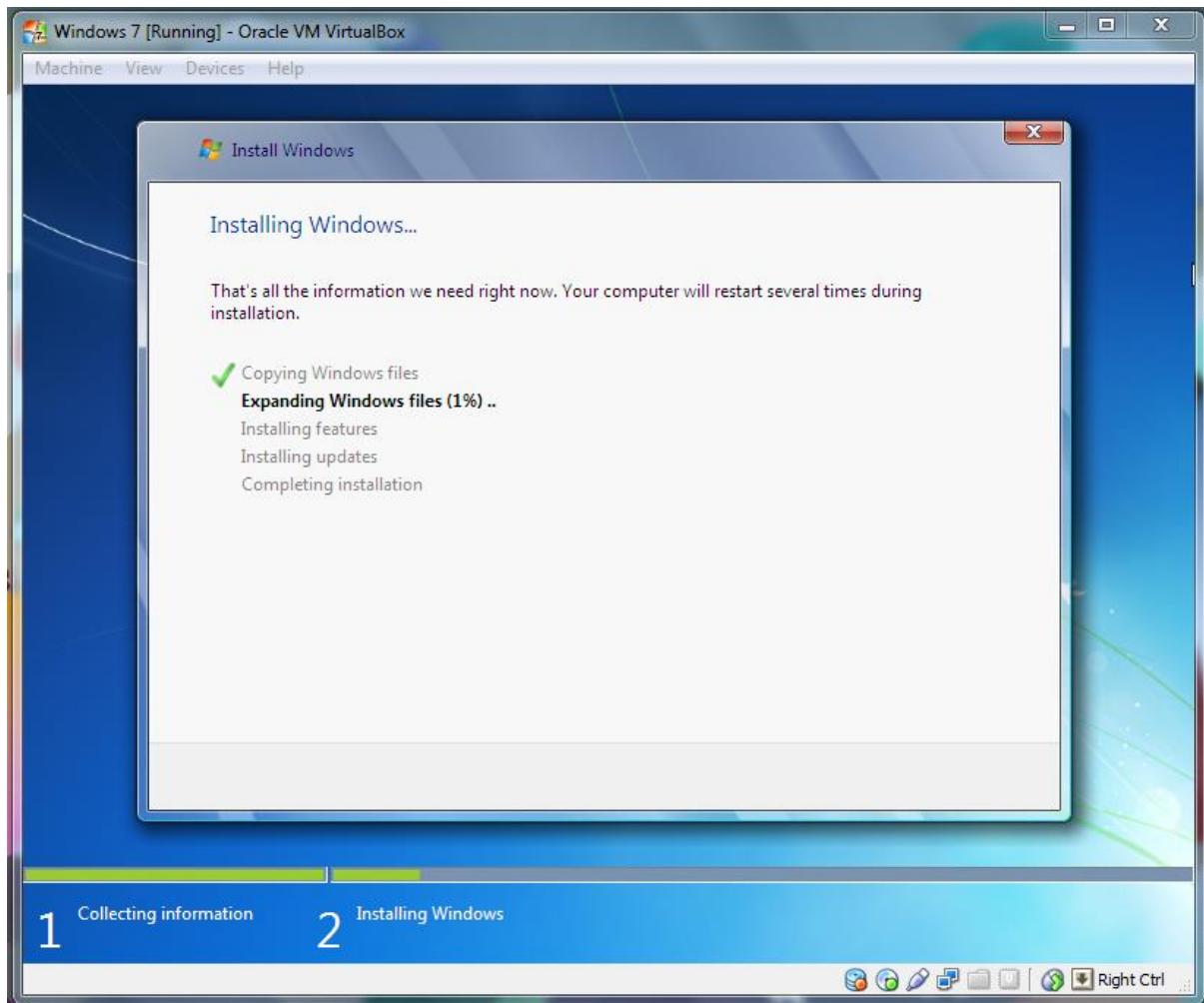
\*\*\* choose 2 to install from ISO image of Operating system. To install from ISO See Below figure



10. Once Specified the ISO image file path click on Start.



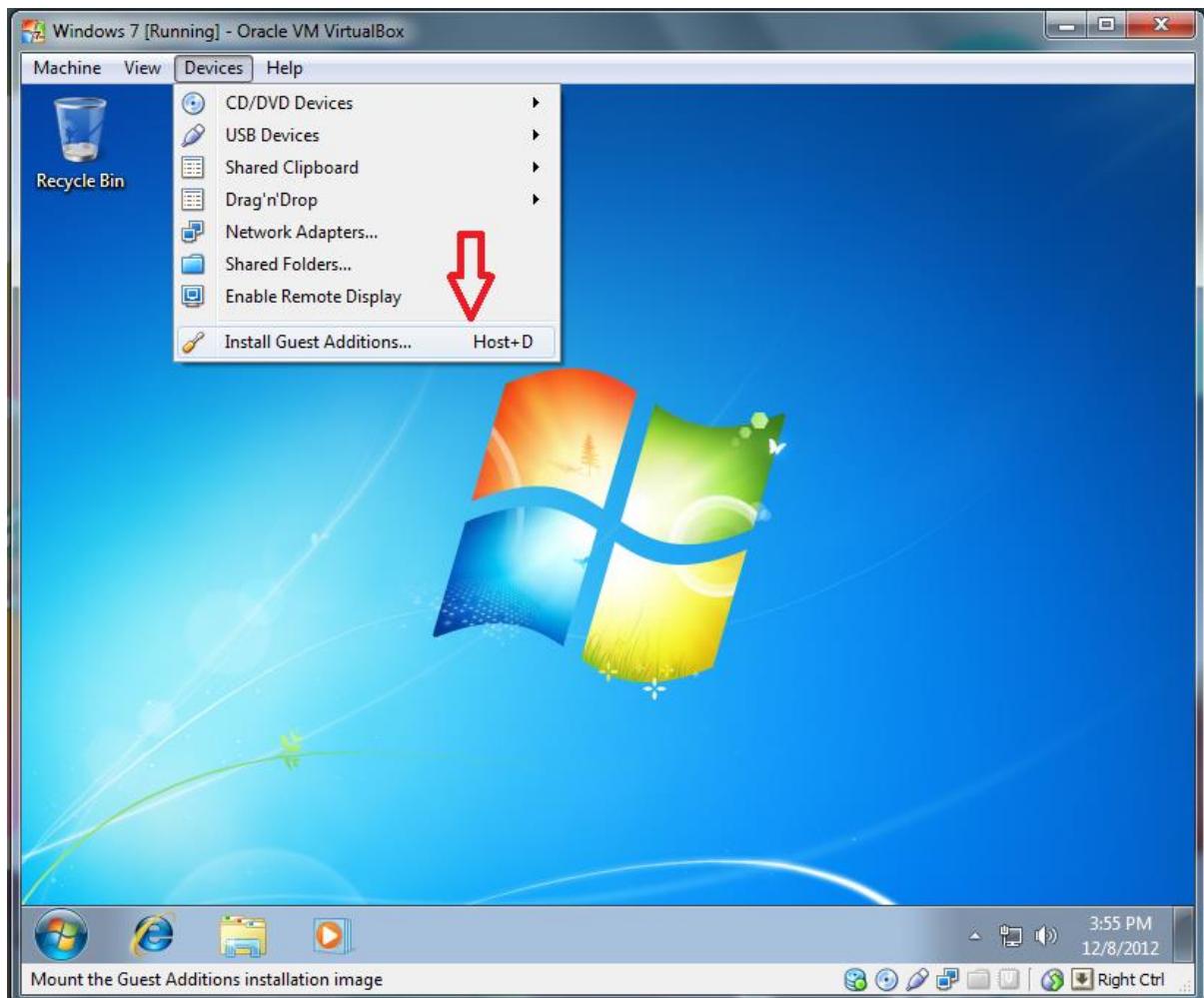
11. After this system will start installing as it installs in physical Machine. Follow the steps to install operating system.



12. Once finishing the installation. Press CTRL+F to switch to full screen. But it won't work until guest additions are not installed. To install Guest additions follow the steps.

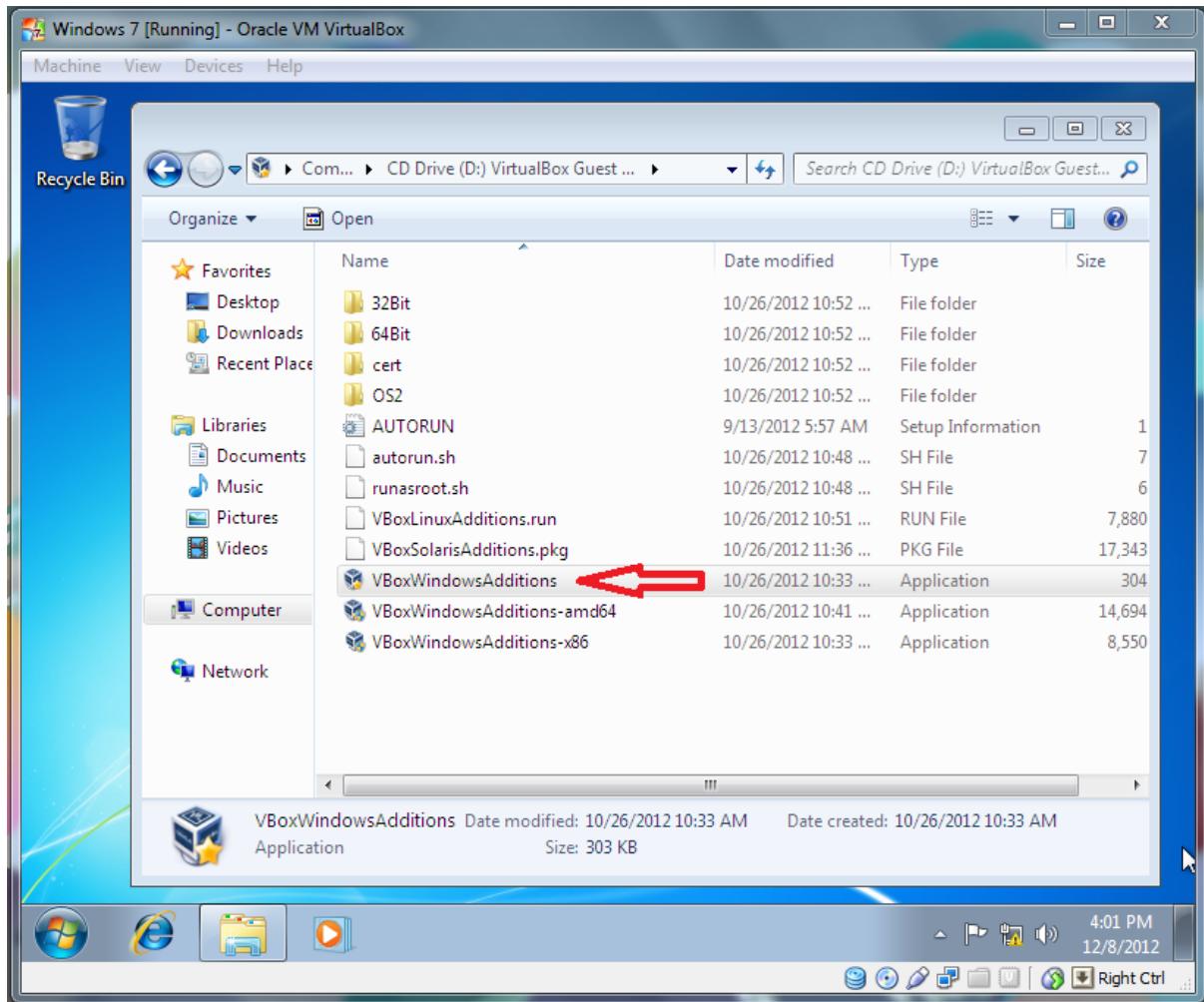
First Method

Menubar → Devices → click on Install Guest Additions.



### Second Method

Start → Computer → Go to VirtualBox Guest Additions Drive (May be D, E, F any) → click on Install "VBoxWindowsAdditions".



After successful installation of guest additions press right CTRL+F for full screen size.

13. Now system is ready to operate.

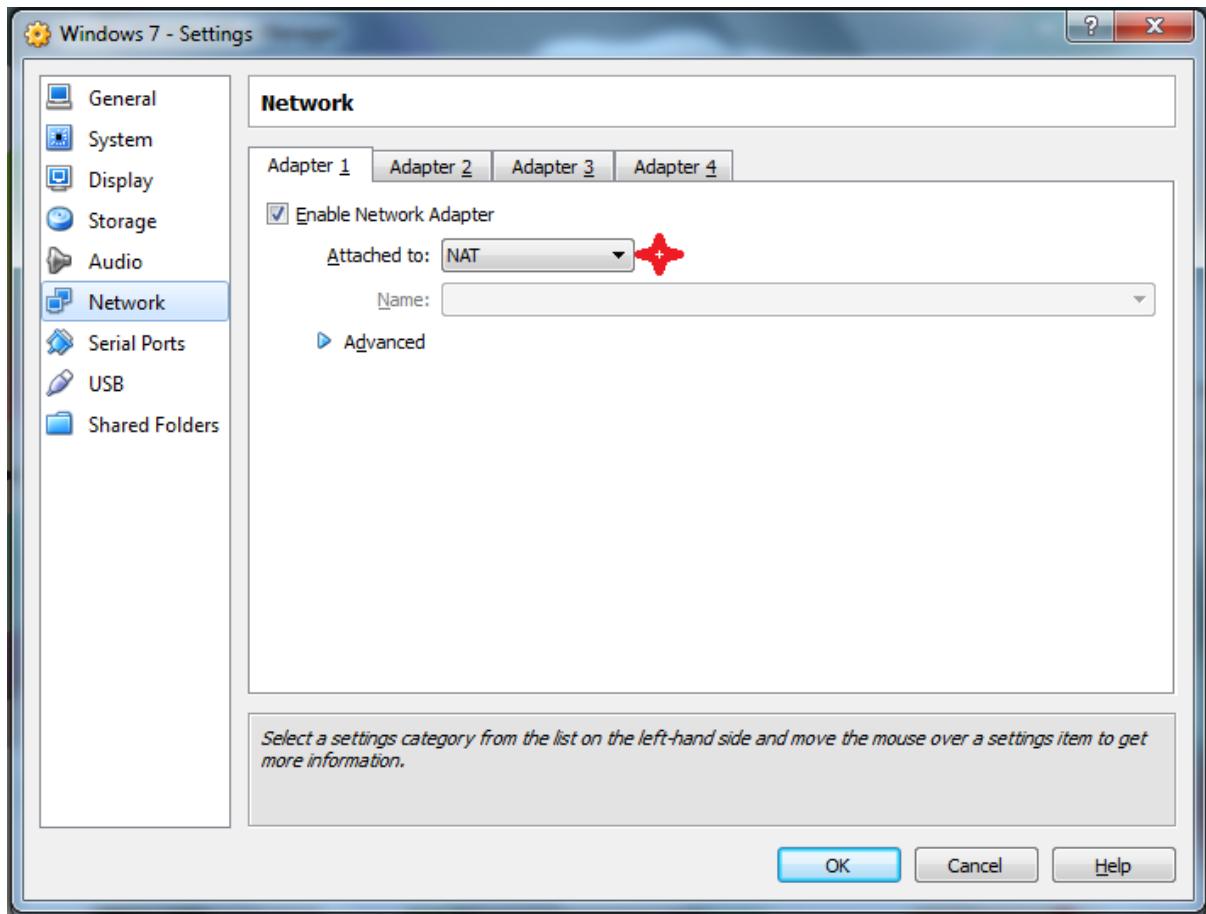
## Networking in Virtual Machines

### Add Multiple Network Adaptor

To Add Multiple Network Adaptor Follow Instruction given in "Configuration of VirtualBox step 8 above.

### Configure Network Adaptor

1. VirtualBox → Machine → Setting → Network

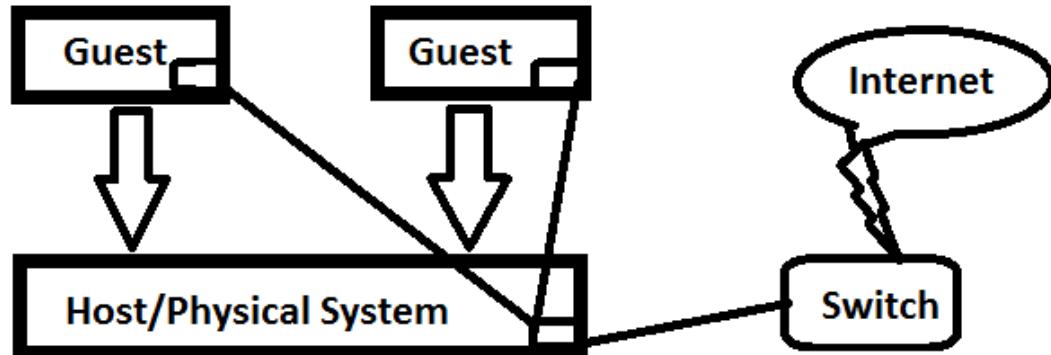


\*\*Note "Enable Network Adaptor" should check always.

The Virtual Adaptor Offers' to communication with Outside world via NAT and Bridge Connection.

**What is NAT?**

## NAT(Network Address Translation)

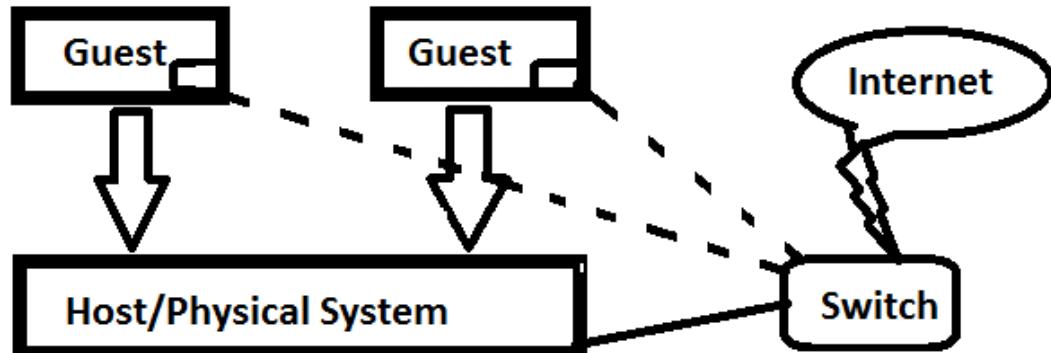


In NAT network adaptor uses Host System IP to communicate with Outside World. Here All the Guest System will be having the same IP and will be NATed to Host IP address.

\*\* Use NAT when you want to share Internet to all Guest system by an Internet Dongle or Mobile Internet because there is no DHCP server available to allocate IP to each System.

## What is Bridge?

### Bridge Network



In Bridge connection all guests as well Host System uses their own IP address may be set manually or allocated by DHCP Server.

\*\* Use Bridge Connection when you are connected with Switch Offering DHCP Server to allocate multiple IPAddresses.

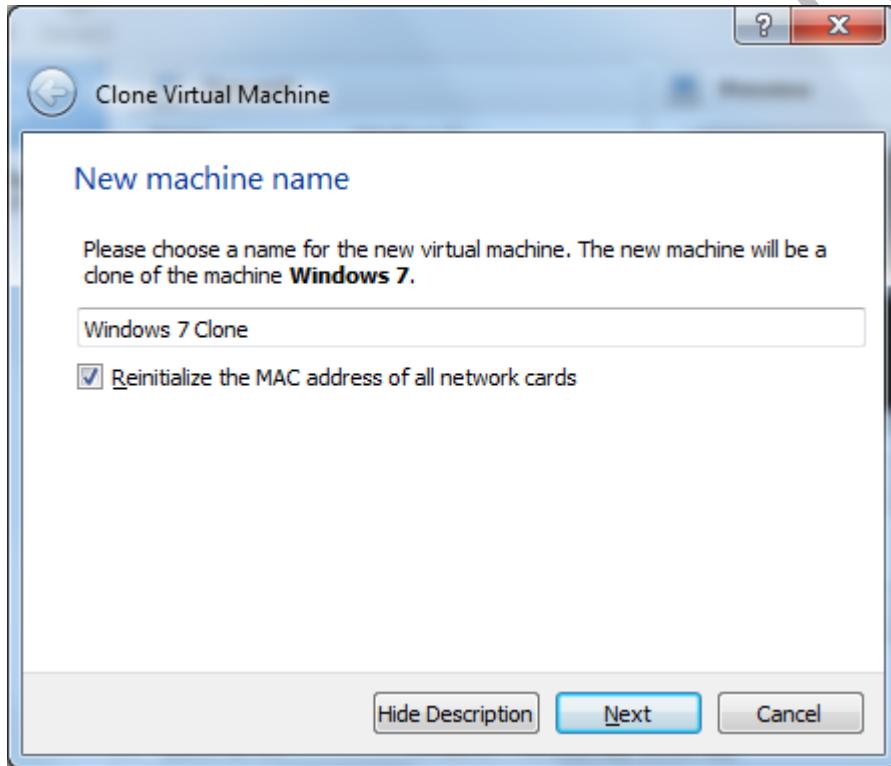
## System Cloning

Cloning is the process of making a same copy of an operating system. It is helpful when want to work with multiple system without going for installation again and again.

For cloning just install a system and the necessary Software, drivers etc. follows the steps below.

\*\*\*Important: - Shutdown the Virtual System whose going to be cloned.

1. VirtualBox→Machine→Click on Clone.

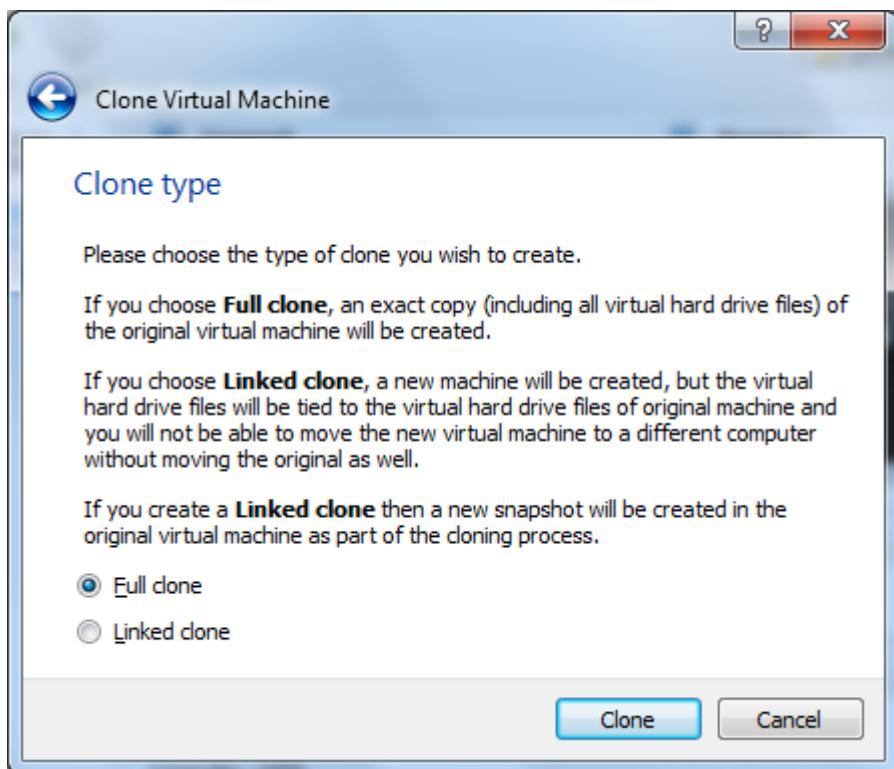


Here give a name to Cloned System, example: "Windows 7 clone"

IMPORTANT:- Do click On "Reinitialize the MAC address of all network cards", if not then It will use the same MAC address to all Cloned System ant create problem in communicating with each other.

Click on next

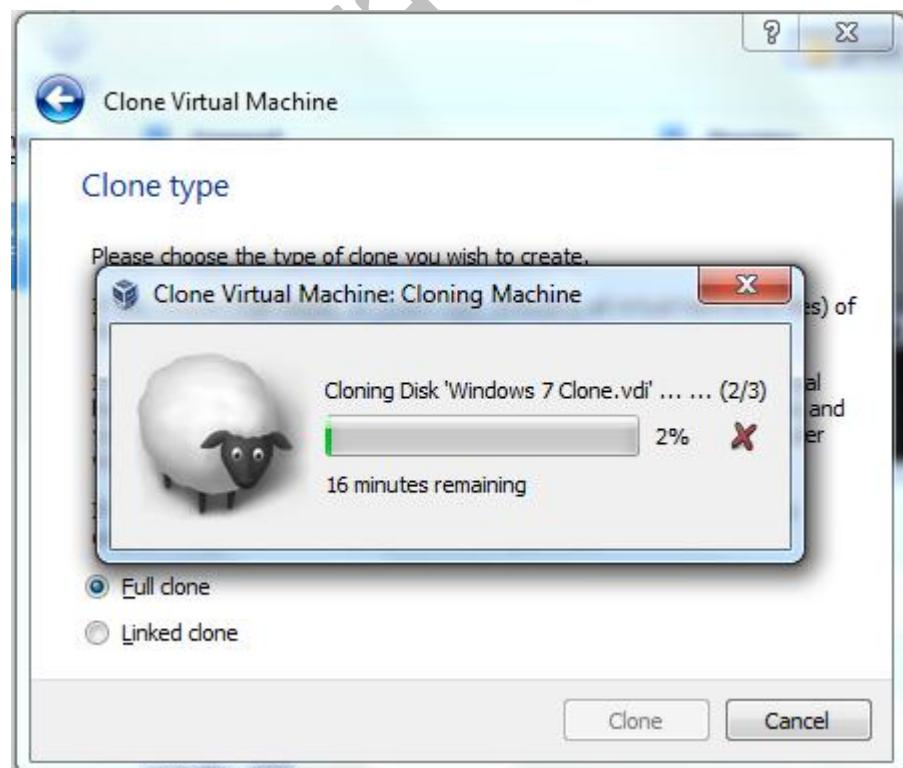
2. Choose the type of Clone



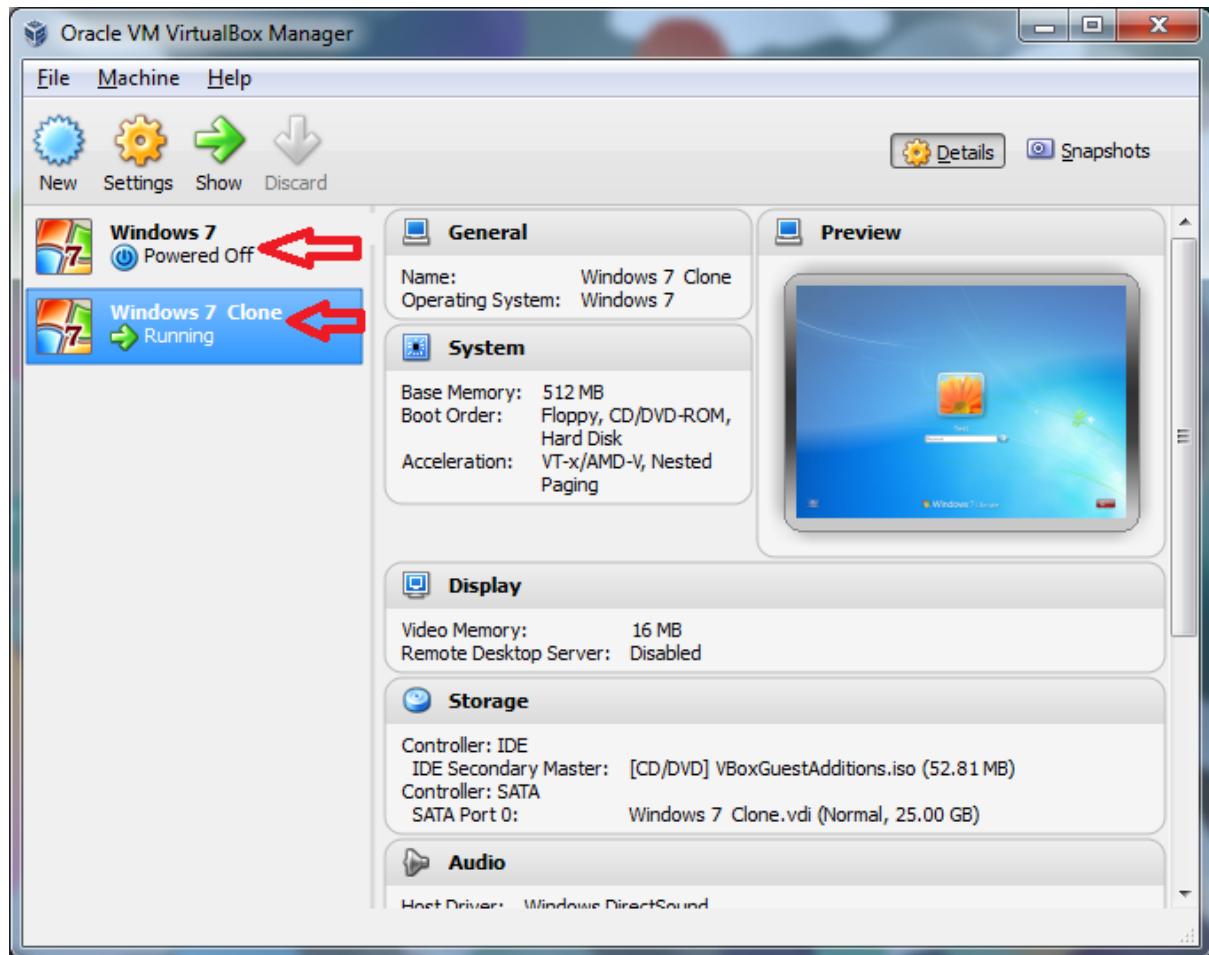
Recommended is Full Clone. In Linked Clone it will just create a Soft link to the original system.

Click on Clone

3. Wait for some time, Cloning will take time.



- Once done, now you will be having two systems one is original system and another is cloned system. both will be having same configuration with same username and password. You can change it later.



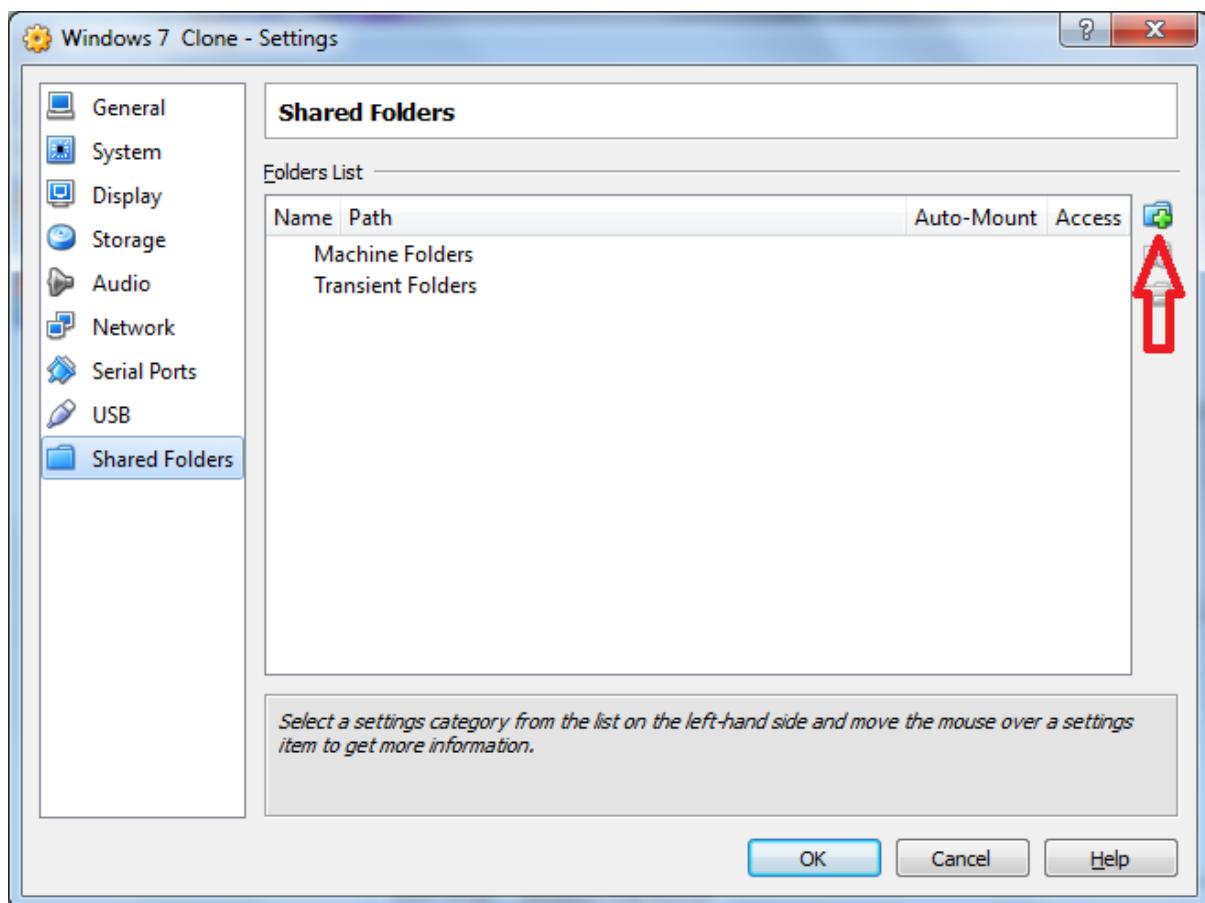
Choose "Windows 7 clone" and click on Start. New cloned system is ready to work without installation of it.

## Troubleshooting

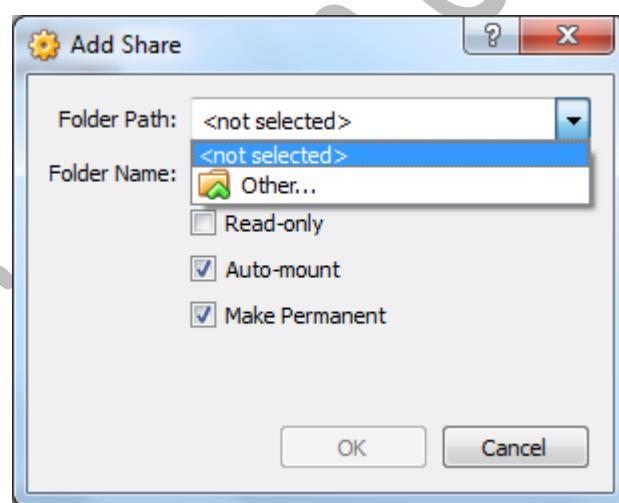
- How to access Host system files directly

This can be done by sharing folders. To do so follow the steps

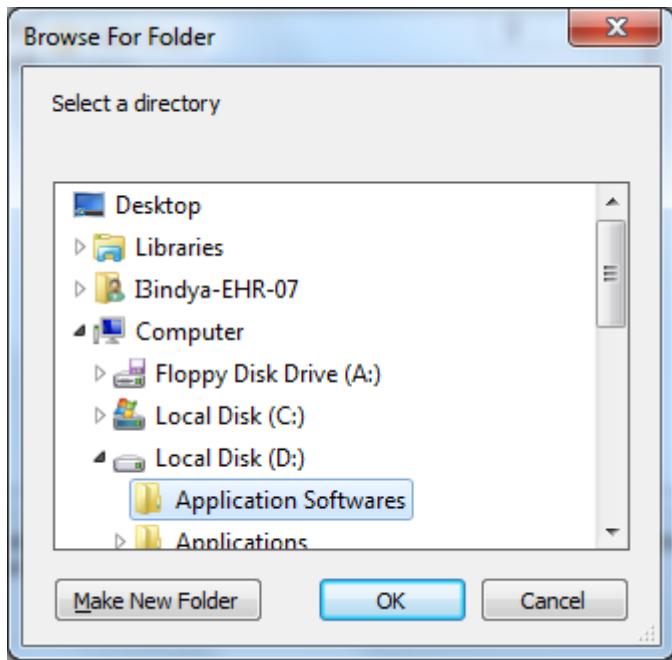
- Virtualbox → choose system (if multiple are installed) → Machine → Settings → choose shared folders



2. Click on “+” sign at the right upper corner directed by arrow as shown in figure. A screen will open that will allow you to choose which folder of host machine to share.



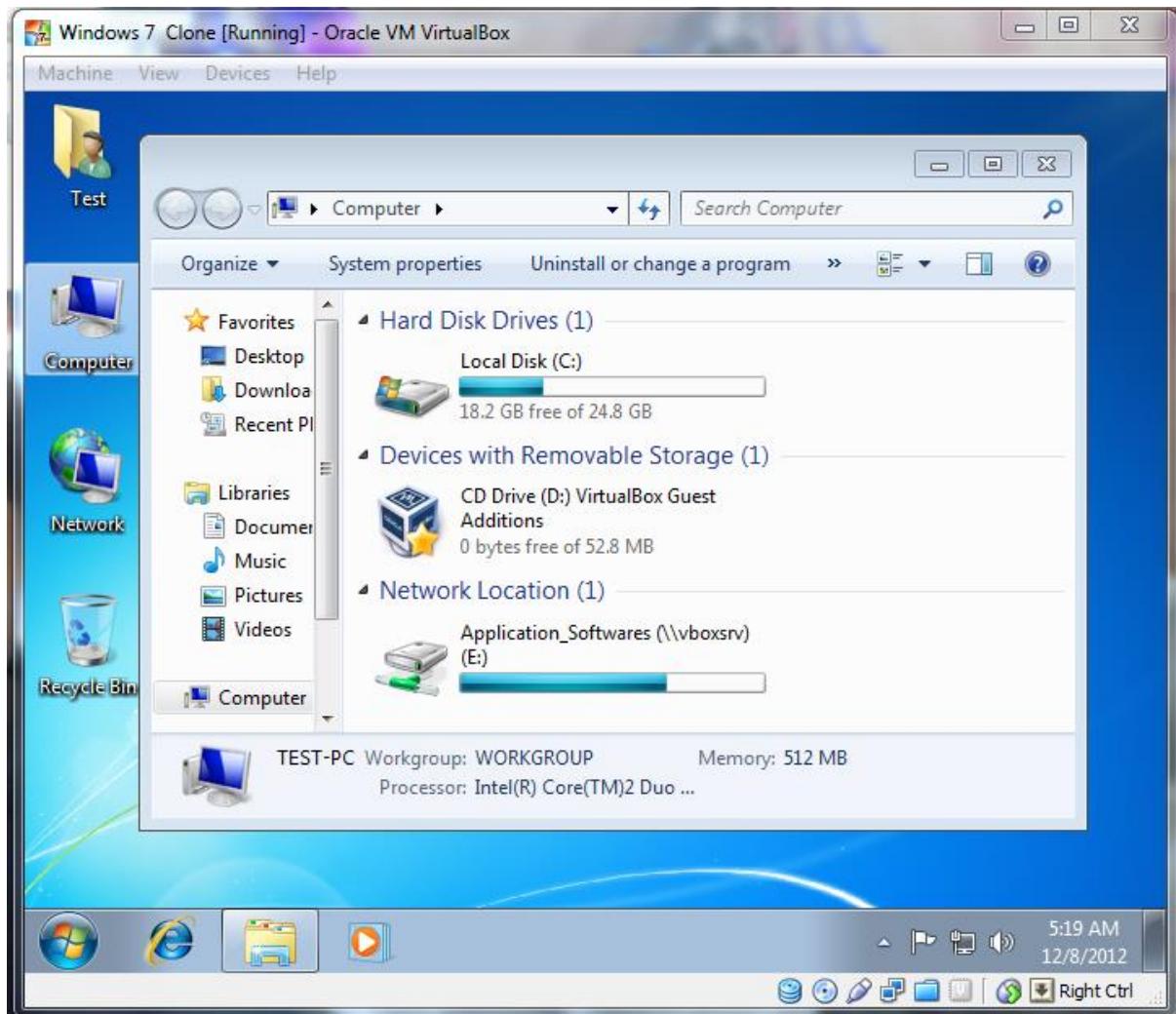
3. Check both Auto mount and Make Permanent. After that choose Folder path



4. Choose a folder to share. Click ok and ok and again ok. Now folder is shared in VirtualBox.
5. To Access this shared folder at Guest machine do this
  1. Login to Guest system.
  2. Open Computer. You will find Network location Drive

OR

i3indya OoPpSs Group



3. If not available then right click on computer → map network drive → choose a drive letter from list → and Specify shared directory path and refresh
4. Now share folder will be available.

## USB Not Detecting

### In Windows

\*\* Install Extension pack → just follow the instruction as written in “Configuration of VirtualBox Step 9”

### In Linux

1. Install Extension Pack as installed above
2. Open terminal → run the following commands

```
# sudo usermod -G vboxusers -a <logged in username>
```

Example

```
# sudo usermod -G vboxusers -a Test
```

3. Reboot system.

## **Others Applications and Tools for virtualization**

### **Commercial Virtualization Software's**

1. Vmware workstation
2. Vmware Player
3. Parallels Workstations
4. Paralles
5. Virtuozzo
6. Simics

### **Freeware virtualization software**

1. VirtualBox
2. Microsoft Virtual Pc
3. Virtual Iron
4. PearPC
5. Bochs
6. QEMU