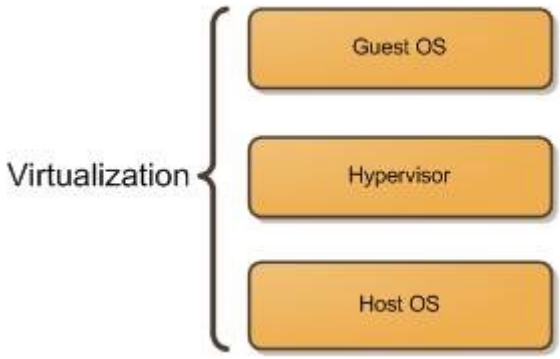
What is Virtulization?

Virtualization is the replication of hardware to simulate a virtual machine inside a physical machine. There are two general types of virtualization depending on where the virtualizing takes place, server-side or client-side. The host operating system can host one or more virtual machines and shares physical resources with them. The operating system inside a virtual machine is called the guest operating system. A hypervisor



is needed to mange one or more guest operating systems.

Types of Virtualization

- **Client side virtualization:** Software is installed on a computer to manage virtual machines. The machine can run multiple guest operating systems. The computer needs a hypersivor to manage the

guest operating systems, The computer also needs to have enough RAM and storage, and a capable

CPU to be able to host.

- **Server side Virtualization:** The process of restructuring a single server into smaller isolated servers. Servers take up a lot of space and require proper maintenance, making this option significantly more costly for organizations.

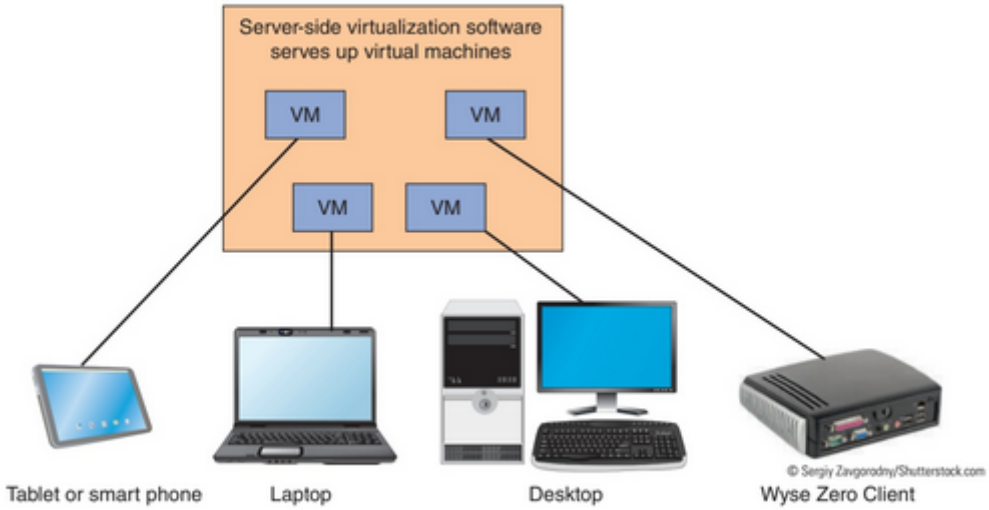
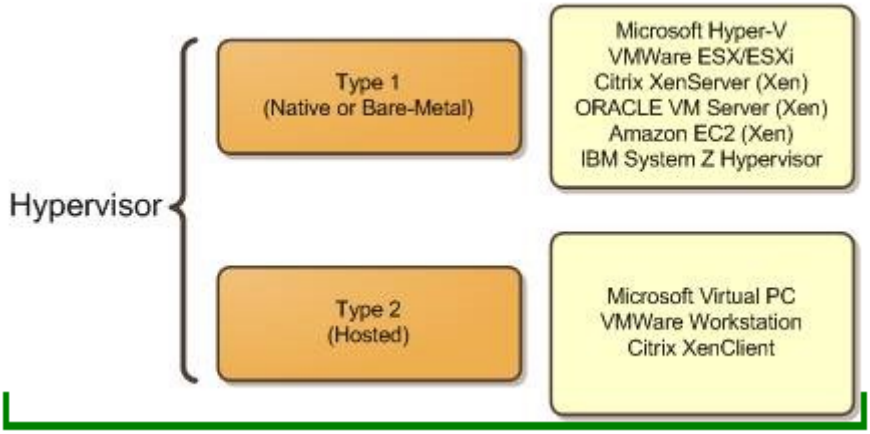


Figure 20-1 Server-side virtualization provides a virtual desktop to each user

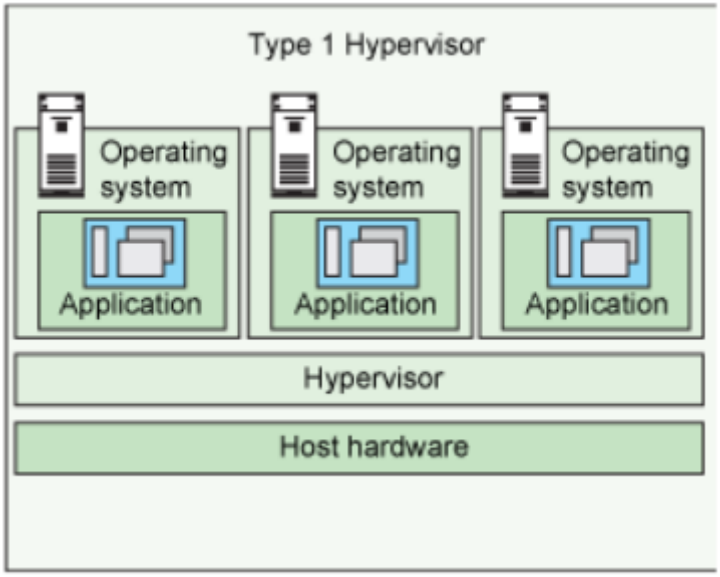
Hypervisor

Manages the virtual platform and guest operating systems. Allows you to run multiple guest operating systems shared by a single hardware host. The hypervisor handles resources and memory allocation for the

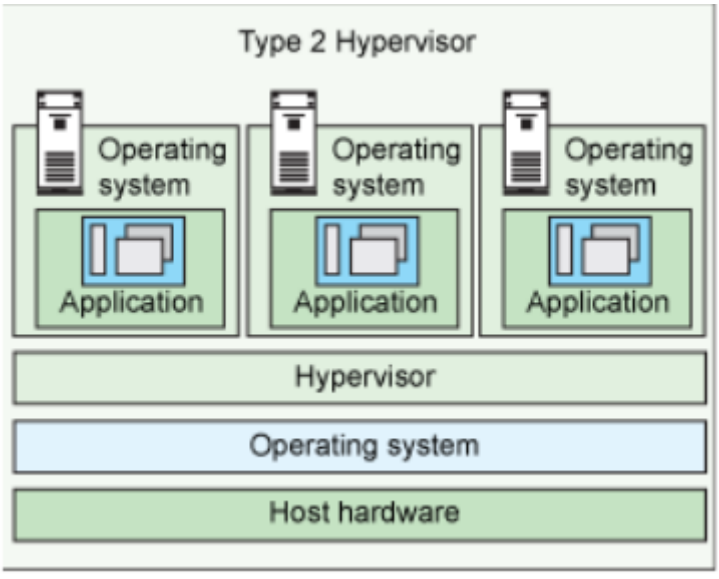
virtual machines. It also provides an interface for higher level administration and monitoring tools. There are two types.



- Type 1: Runs on hardware

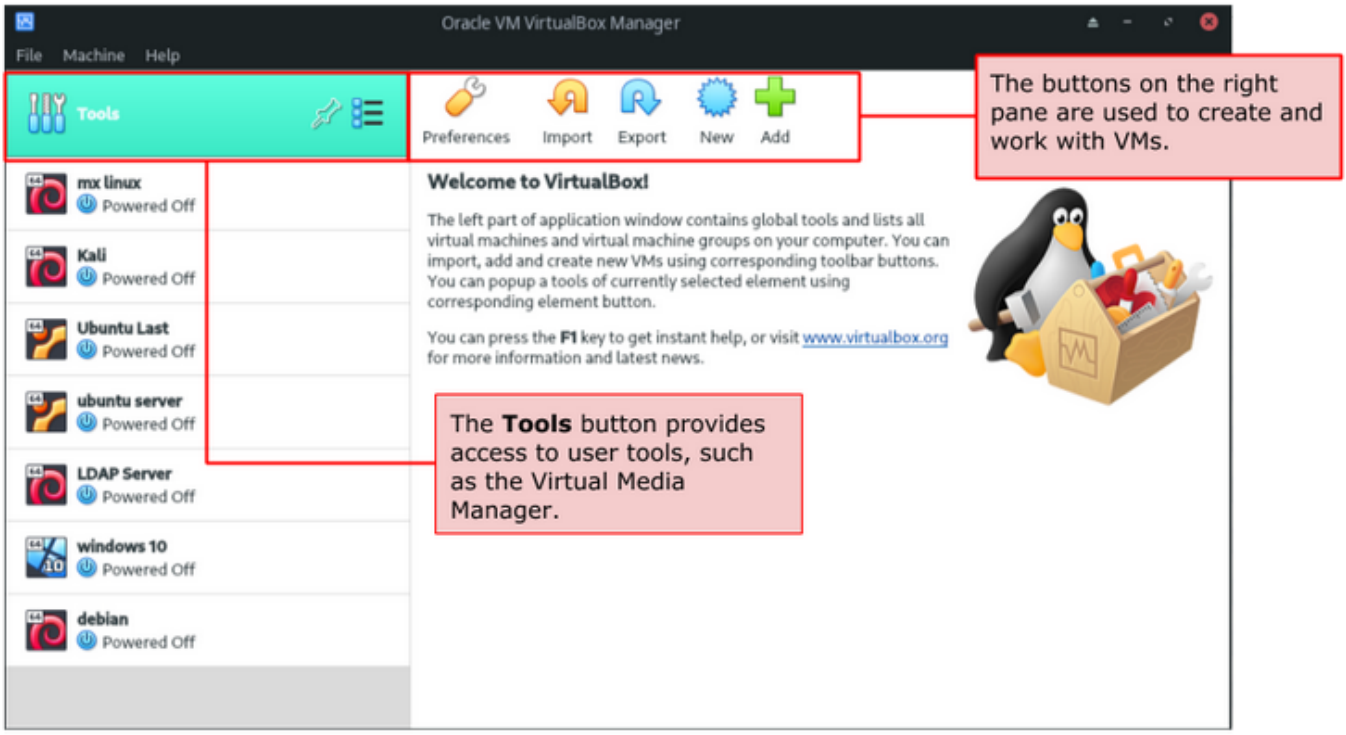


- Type 2: Runs on host operating system

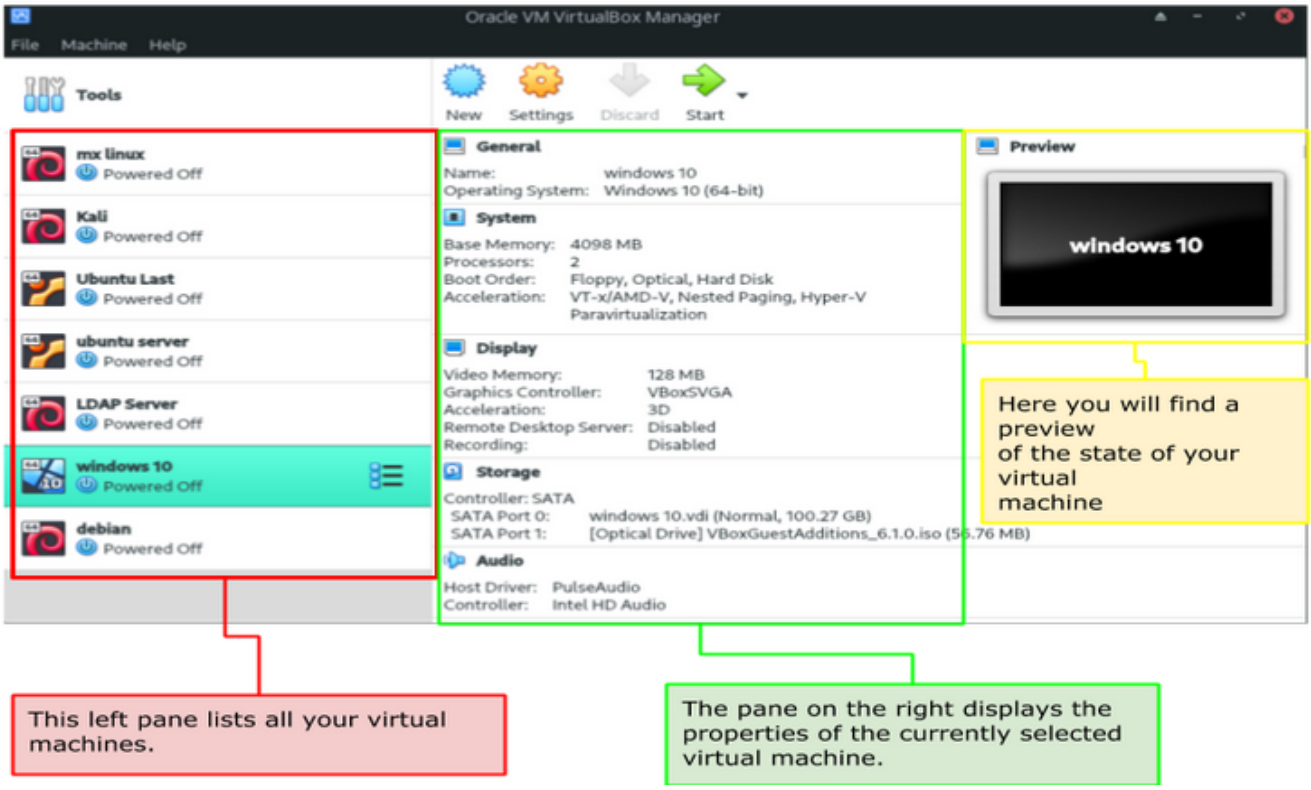


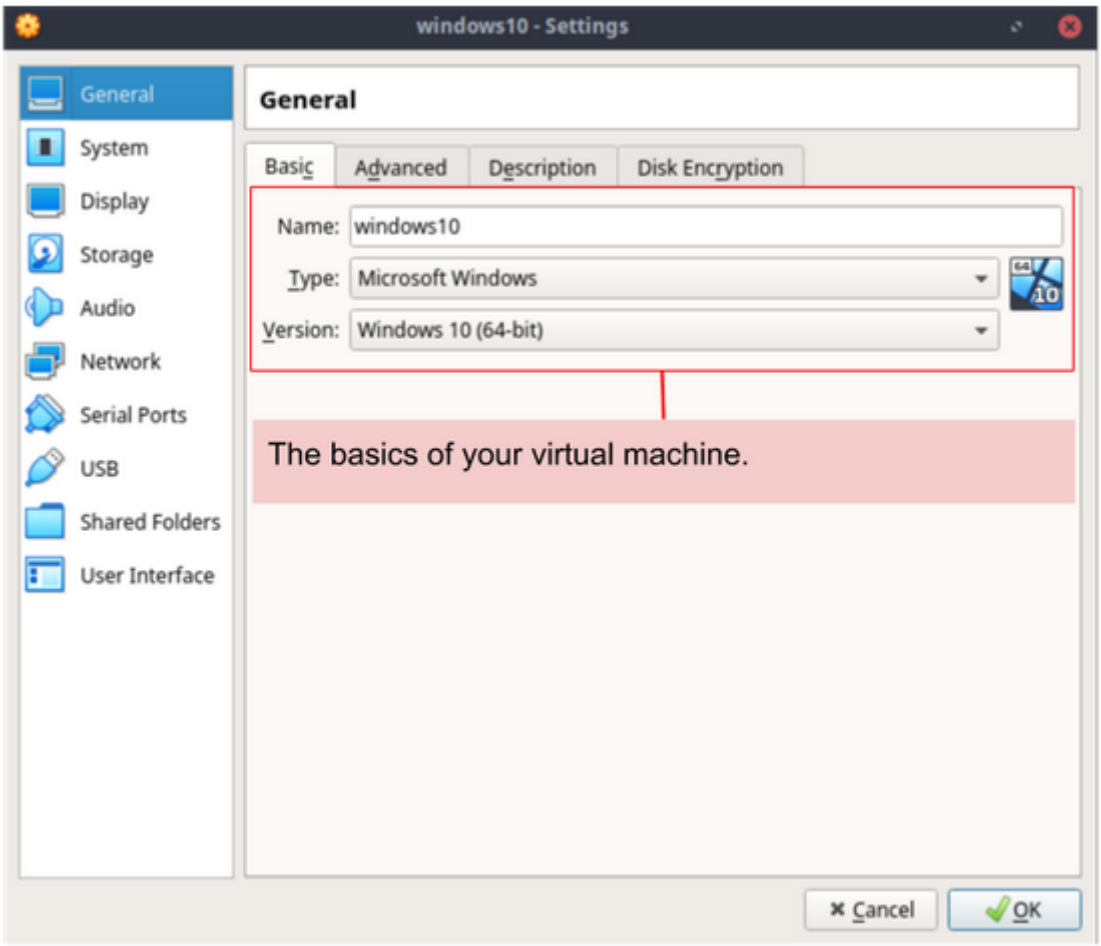
Virtualbox

VirtualBox is a type 2 virtualization product that can be used at home or enteprise. It is open source. It can run on Windows, linux, Mac, and Solaris. Supports numerous guest operating systems.



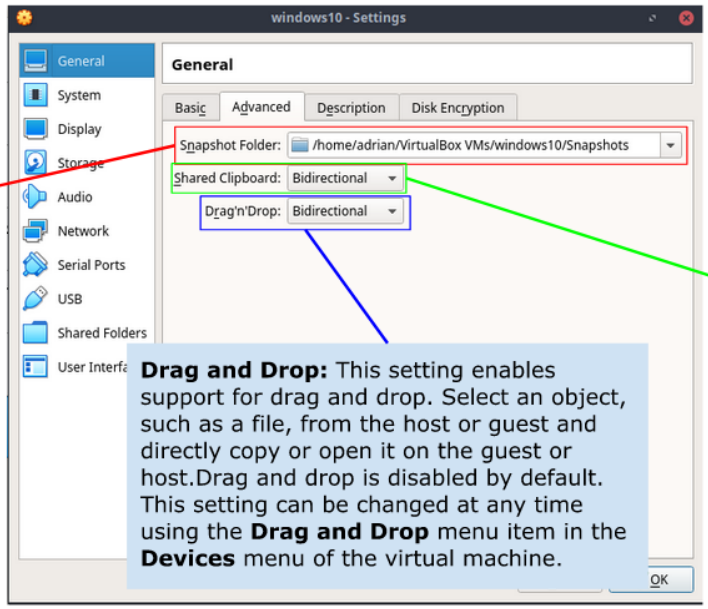
This window is called the **VirtualBox Manager**.


Oracle VM VirtualBox Manager
File Machine Help
Tools
New Settings Discard Start
mx linux Powered Off
Kali Powered Off
Ubuntu Last Powered Off
ubuntu server Powered Off
LDAP Server Powered Off
windows 10 Powered Off
debian Powered Off
General
Name: windows 10
Operating System: Windows 10 (64-bit)
System
Base Memory: 4098 MB
Processors: 2
Boot Order: Floppy, Optical, Hard Disk
Acceleration: VT-x/AMD-V, Nested Paging, Hyper-V Paravirtualization
Display
Video Memory: 128 MB
Graphics Controller: VBoxSVGA
Acceleration: 3D
Remote Desktop Server: Disabled
Recording: Disabled
Storage
Controller: SATA
SATA Port 0: windows 10.vdi (Normal, 100.27 GB)
SATA Port 1: [Optical Drive] VBoxGuestAdditions_6.1.0.iso (56.76 MB)
Audio
Host Driver: PulseAudio
Controller: Intel HD Audio
Preview
windows 10
Here you will find a preview of the state of your virtual machine
This left pane lists all your virtual machines.
The pane on the right displays the properties of the currently selected virtual machine.


windows10 - Settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
General
Basic Advanced Description Disk Encryption
Name: windows10
Type: Microsoft Windows
Version: Windows 10 (64-bit)
The basics of your virtual machine.
Cancel OK

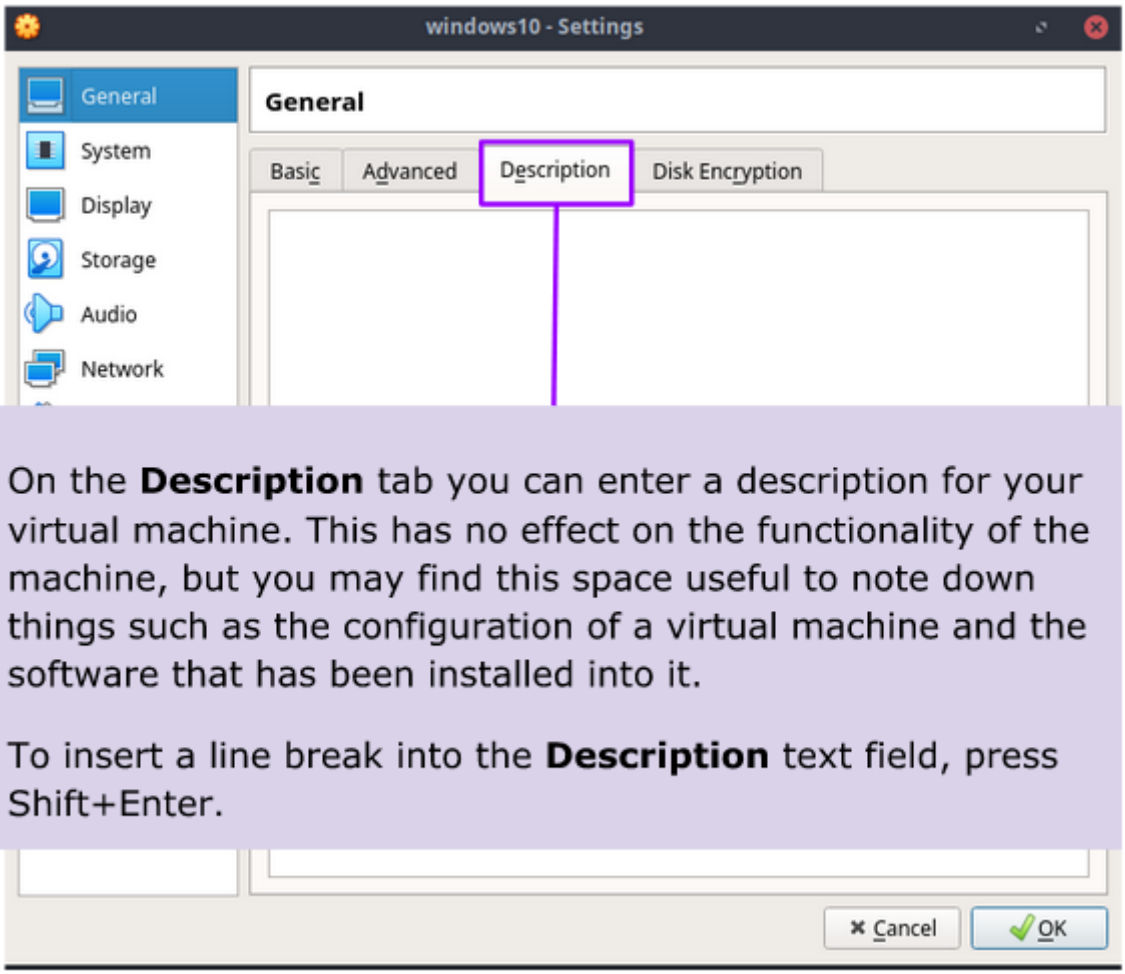
Snapshot Folder: By default, Oracle VM VirtualBox saves snapshot data together with your other Oracle VM VirtualBox configuration data. With this setting, you can specify any other folder for each VM.

A snapshot is the state of a system at a particular point in time.



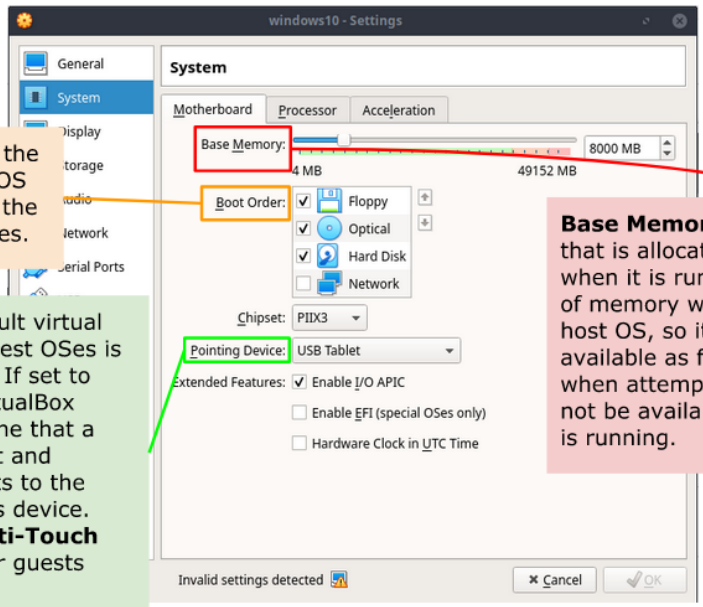
Drag and Drop: This setting enables support for drag and drop. Select an object, such as a file, from the host or guest and directly copy or open it on the guest or host.Drag and drop is disabled by default. This setting can be changed at any time using the **Drag and Drop** menu item in the **Devices** menu of the virtual machine.

Shared Clipboard: You can select here whether the clipboard of the guest OS should be shared with that of your host. If you select **Bidirectional**, then Oracle VM VirtualBox will always make sure that both clipboards contain the same data. If you select **Host to Guest** or **Guest to Host**, then Oracle VM VirtualBox will only ever copy clipboard data in one direction.



On the **Description** tab you can enter a description for your virtual machine. This has no effect on the functionality of the machine, but you may find this space useful to note down things such as the configuration of a virtual machine and the software that has been installed into it.

To insert a line break into the **Description** text field, press Shift+Enter.

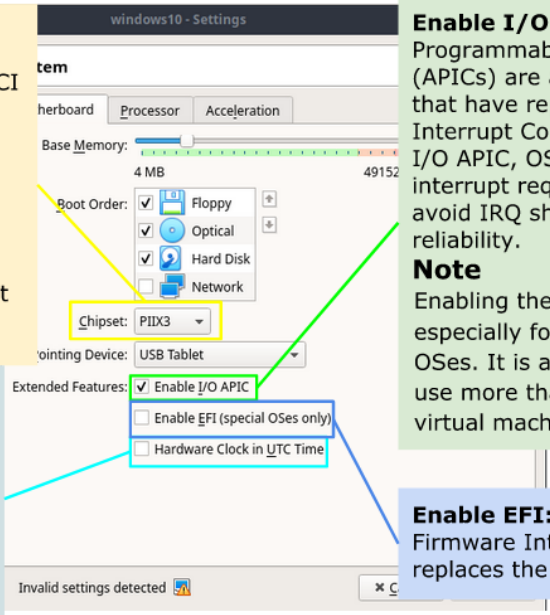


Boot Order: Determines the order in which the guest OS will attempt to boot from the various virtual boot devices.

Base Memory: Sets the amount of RAM that is allocated and given to the VM when it is running. The specified amount of memory will be requested from the host OS, so it must be available or made available as free memory on the host when attempting to start the VM and will not be available to the host while the VM is running.

Pointing Device: The default virtual pointing device for some guest OSes is the traditional PS/2 mouse. If set to **USB Tablet**, Oracle VM VirtualBox reports to the virtual machine that a USB tablet device is present and communicates mouse events to the virtual machine through this device. Another setting is **USB Multi-Touch Tablet**, which is suitable for guests running Windows 8 or later.

Chipset: PIIX3 is the default chipset for most guests. The ICH9 chipset supports PCI express, three PCI buses, PCI-to-PCI bridges and Message Signaled Interrupts (MSI). This enables modern OSes to address more PCI devices and no longer requires IRQ sharing.Note that ICH9 support is experimental and not recommended for guest OSes which do not require it.



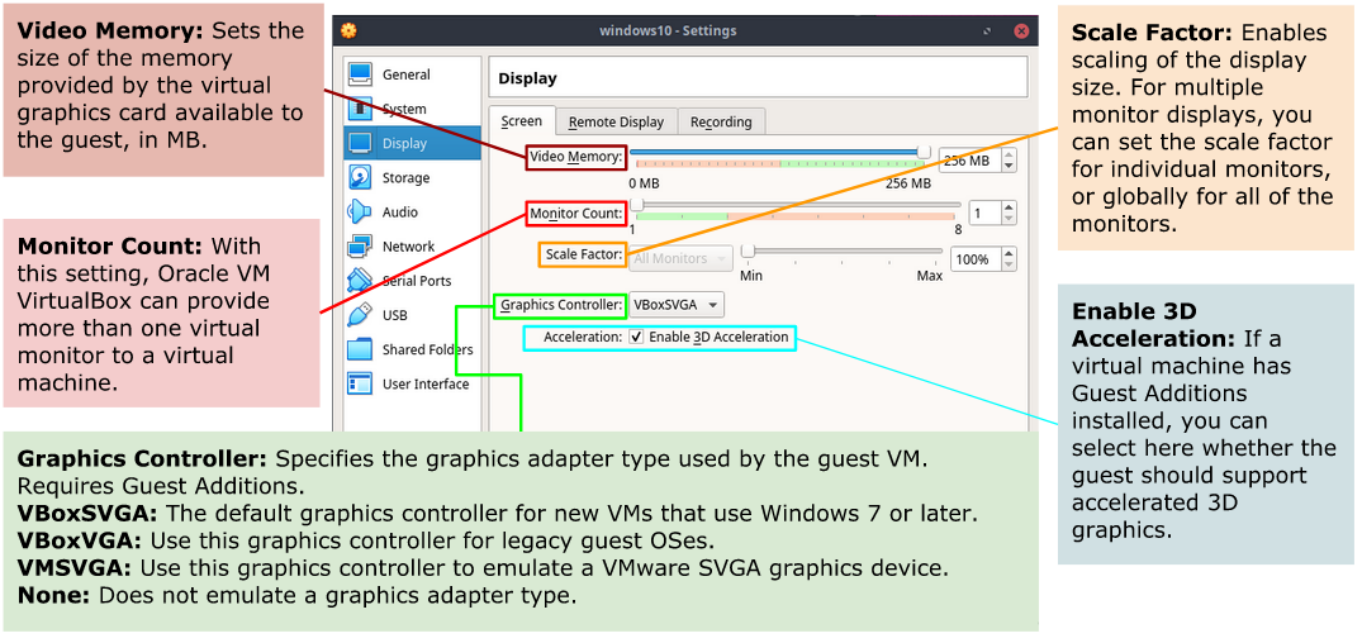
Enable I/O APIC: Advanced Programmable Interrupt Controllers (APICs) are an x86 hardware feature that have replaced Programmable Interrupt Controllers (PICs). With an I/O APIC, OSes can use more than 16 interrupt requests (IRQs) and therefore avoid IRQ sharing for improved reliability.

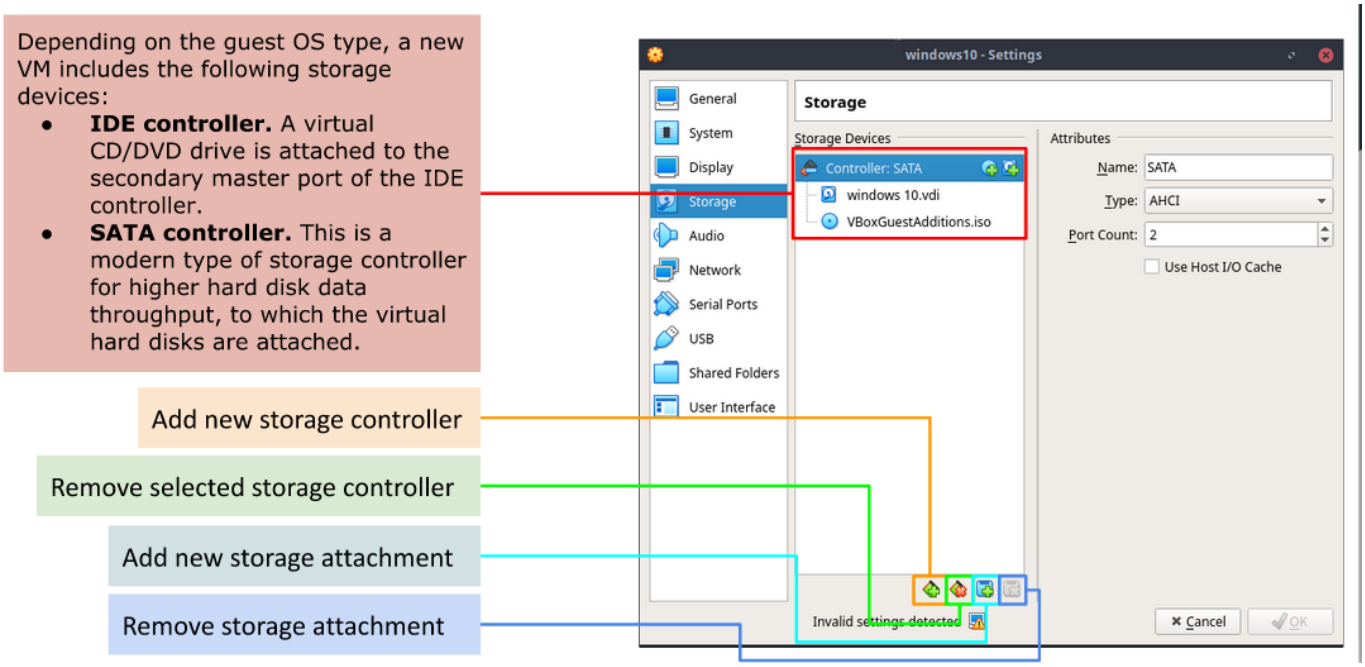
Note

Enabling the I/O APIC is *required*, especially for 64-bit Windows guest OSes. It is also required if you want to use more than one virtual CPU in a virtual machine.

Hardware Clock in UTC Time: If selected, Oracle VM VirtualBox will report the system time in UTC format to the guest instead of the local (host) time. This affects how the virtual real-time clock (RTC) operates and may be useful for UNIX-like guest OSes, which typically expect the hardware clock to be set to UTC.

Enable EFI: Enables Extensible Firmware Interface (EFI), which replaces the legacy BIOS





How to install virtualbox in Windows 10

1. Download installer from Virtualbox.org
2. Once Installer is done downloading. Install extension pack.
3. From downloads folder run installer
4. Click on next and chose location. Default is recommended and choosing desktop icon is optional.
5. Continue by clicking next and choose "yes" when warned about network interface card. Then click install and yes.
6. wait for installation to finish and launch virtualbox.

How to create a virtual machine

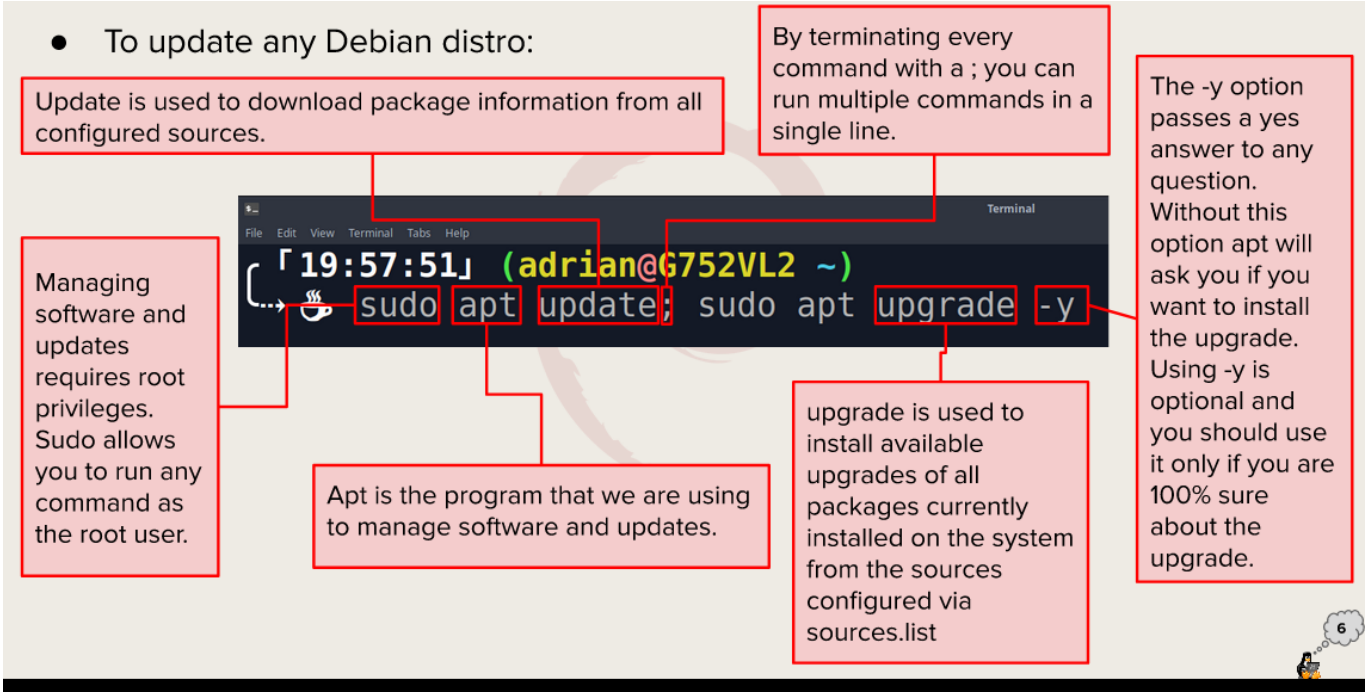
1. Make sure virtual box is installed
2. Chose operating system that you wish to run on host
3. Download files needed for guest operating system and run virtual box
4. Create new virtual machine through virtualbox and fix settings when completed.

Installing Ubuntu in Virtualbox

1. Step 1: Download Ubuntu desktop from ubuntu.com
2. Step2: open virtual box anc click on new
3. Step 3: Chose a name, make sure type is Linux, and version is Ubuntu(64-bit)
4. Step 4: chose memory size, recommended is 2048 MB and click next
5. Step 5: Hard disk screen select 'create a virtual hard disk now' and click create
6. Step 6: Hard disk file type screen select VDI and click next.
7. Step 7: Storage on physical hard disk screen select dynamically allocated and click next.
8. Step 8: File location and size screen select 50mb but depends how much space you have available and click create.
9. Step 9: adjust settings as desired and your new virtual machine is ready.

Updating Ubuntu

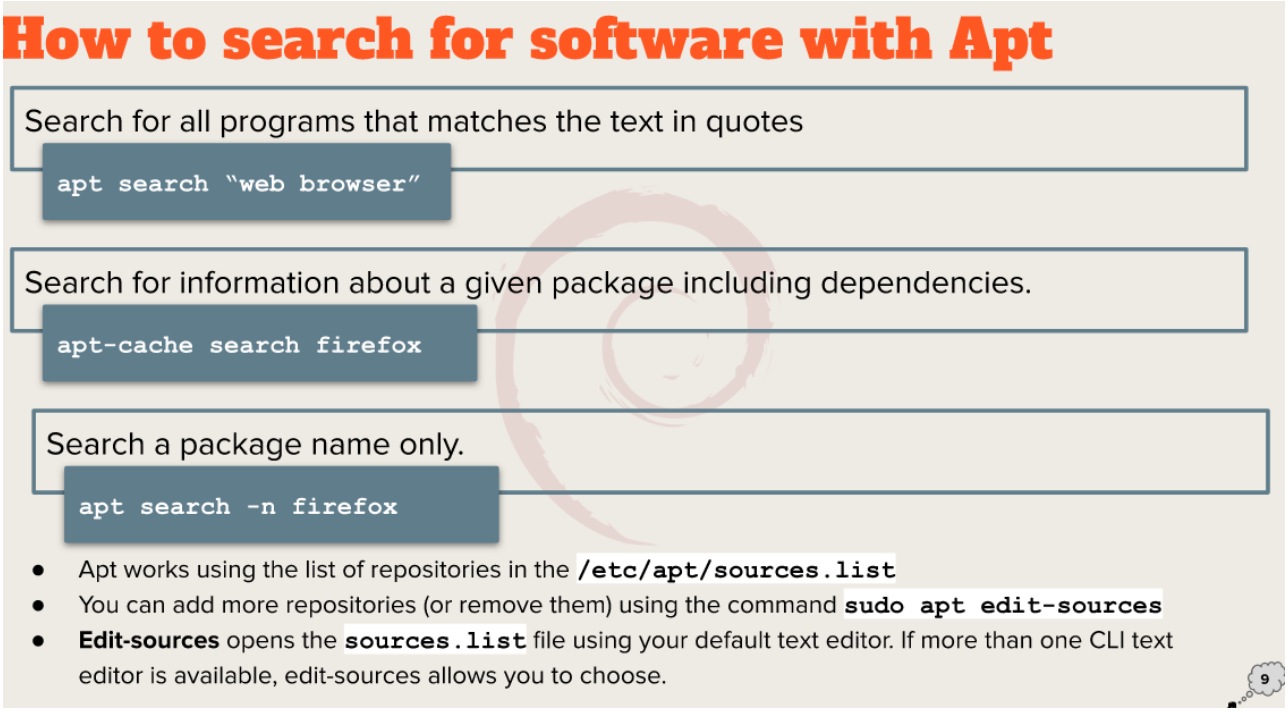
The following command is used to update Ubuntu. You need special privelegies so 'sudo' command is needed. It gives you temporary root user access. 'Apt' is the program that will be used for the update and manage software. 'Update' downloads package information from the correct sources. If you wish to run another command in the same line then we use ';' to seperate them.



Installing Software in Ubuntu

- Installing command examples the install option install the specified package

- Searching for software Use the following command to search for specific or related programs that are available to download.



- Deleting software
    - `sudo apt remove + packge name`
        - example:
            - `sudo apt remove vlc` will remove the vlc package
    - To remove and purge a packge use:

```
sudo apt remove vlc
sudo apt vlc
sudo apt autoremove
```

Basic linux commands

Navigating the filesystem

- **Alt + B** – move backward one word (or go to start of word the cursor is currently on)
- **Alt + F** – move forward one word (or go to end of word the cursor is currently on)
- **Alt + D** – delete to end of word starting at cursor (whole word if cursor is at the beginning of word)
- **Alt + C** – capitalize to end of word starting at cursor (whole word if cursor is at the beginning of word)
- **Alt + U** – make uppercase from cursor to end of word
- **Alt + I** – make lowercase from cursor to end of word

Managing files and directories

mkdir

- Description: used for creating directories.
- Usage: `mkdir + option + new directory path`
- Examples:
  - Create a directory in the present working directory
    - `mkdir Classes/`
  - create a parent directory and child directory
    - `mkdir Classes/cis/homeworks`
    - run tree command to see new folders.

touch

- Description: used for creating files
- Usage: `touch list`
- Examples: to create several files `touch list_of_cars.txt script.py names.csv`

rm

- Description: removes files
- Usage: `rm` `rm -r + directory name` removes non-empty directories
- Examples: `rm list` removes a file

rmdir

- Description: removes empty directories
- Usage: `rmdir + file path`
- Examples: `rmir Downloads/games`

mv

- Description: moves and renames directories
- Usage: `mv + source + destination'
- Examples: `mv Downloads/homeowrk.pdf Documents/`

cp

- Description: copies files/directories from a source to a destination
- Usage: `cp + files to copy + destination`
- Examples: `cp Downloads/wallpapers.zip Pictures/`

ln

- Description: data structure contains all information about a file except the file name and its content
- Usage: `-i`
- Examples: `stat script.sh`

man:

- Description: manual pages taht describe linuz shell commands, executable programs, system calls, and special files.
- Usage: `man + command`
- Examples: `man ls`

Works Cited (resources)

- https://www.cnblogs.com/popsuper1982/p/3800230.html
- https://www.netcov.com/server-virtualization-and-its-importance/