

How To Make The Best Use Of Live Sessions

- Please login on time
- Please do a check on your network connection and audio before the class to have a smooth session
- All participants will be on mute, by default. You will be unmuted when requested or as needed
- Please use the “Questions” panel on your webinar tool to interact with the instructor at any point during the class
- Ask and answer questions to make your learning interactive
- Please have the support phone number (US : 1855 818 0063 (toll free), India : +91 90191 17772) and raise tickets from LMS in case of any issues with the tool
- Most often logging off or rejoining will help solve the tool related issues

COURSE OUTLINE



MODULE 2

INTRODUCTION TO LINUX

INSTALLATION AND INITIALIZATION

USER ADMINISTRATION

BOOT AND PACKAGE MANAGEMENT

NETWORKING

LINUX OVERVIEW AND SCRIPTING

LINUX FOR SOFTWARE DEVELOPMENT

SECURITY ADMINISTRATION

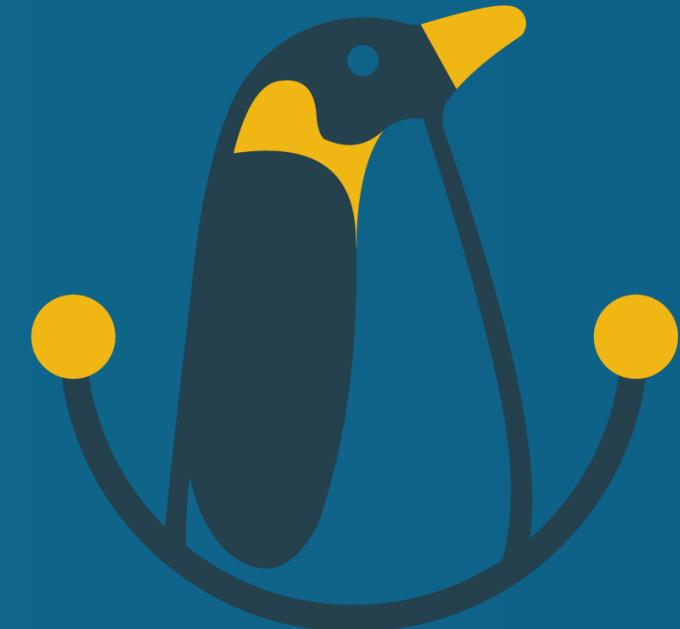
Objectives

After completing this module, you should be able to:

- Understand User Interface in Linux
- Implement basic Linux Commands and Tools
- Understand File System in the OS
- Know Hard Disk Partitioning and Multi-Boot in a system
- Learn Packaging Management in Linux



edureka!



Installation And Initialization



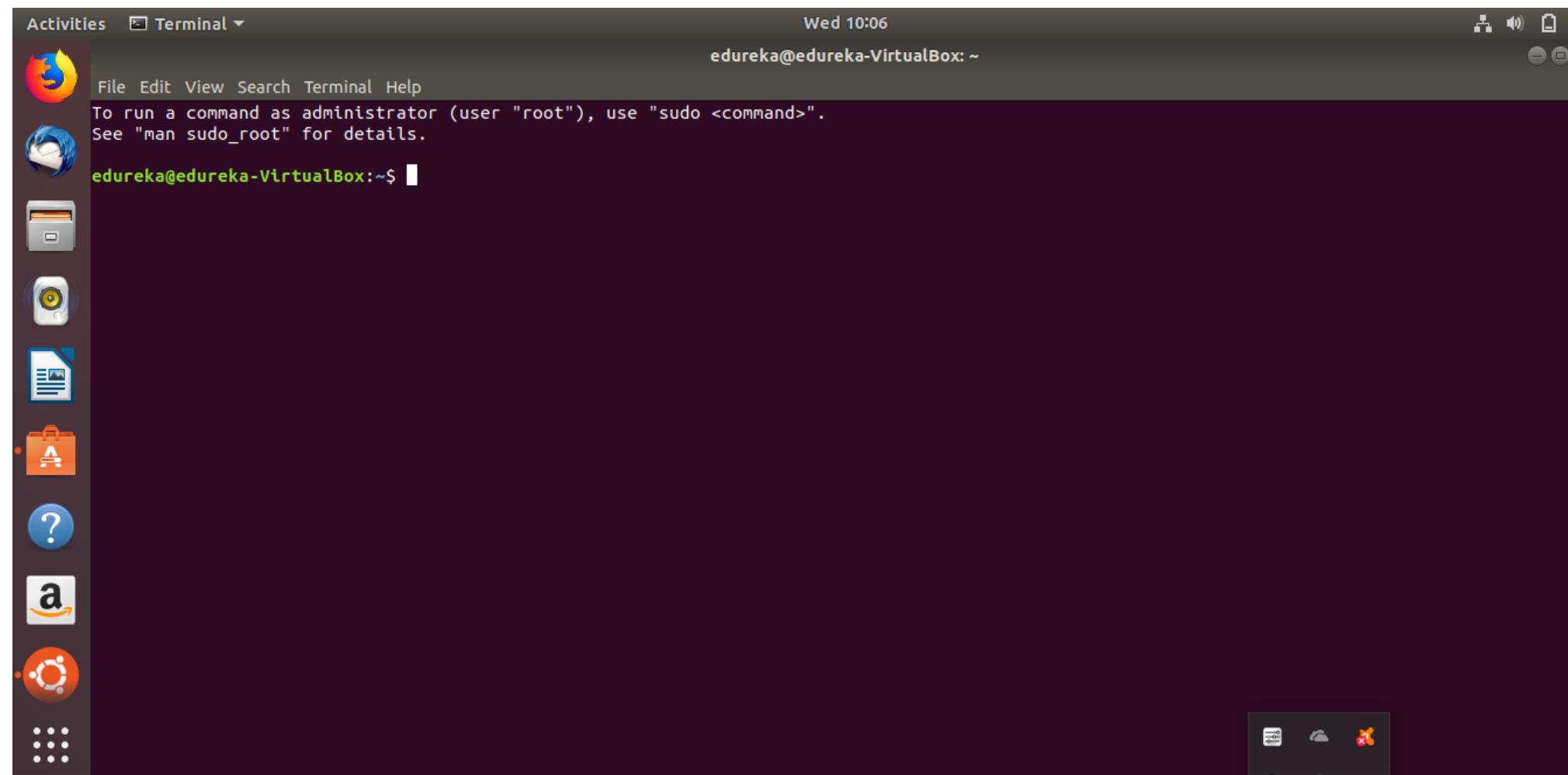
User Interface

User Interface In Linux

User Interface is a visual part of Operating System through which a user interacts with a computer or a software

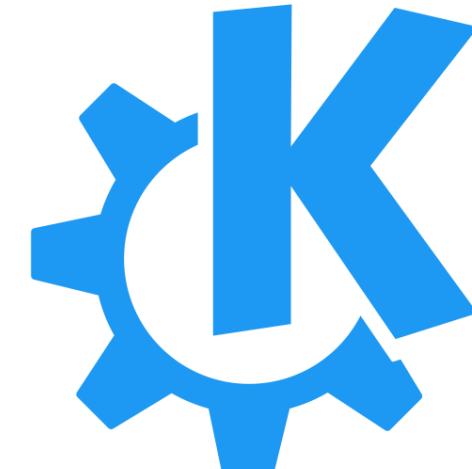
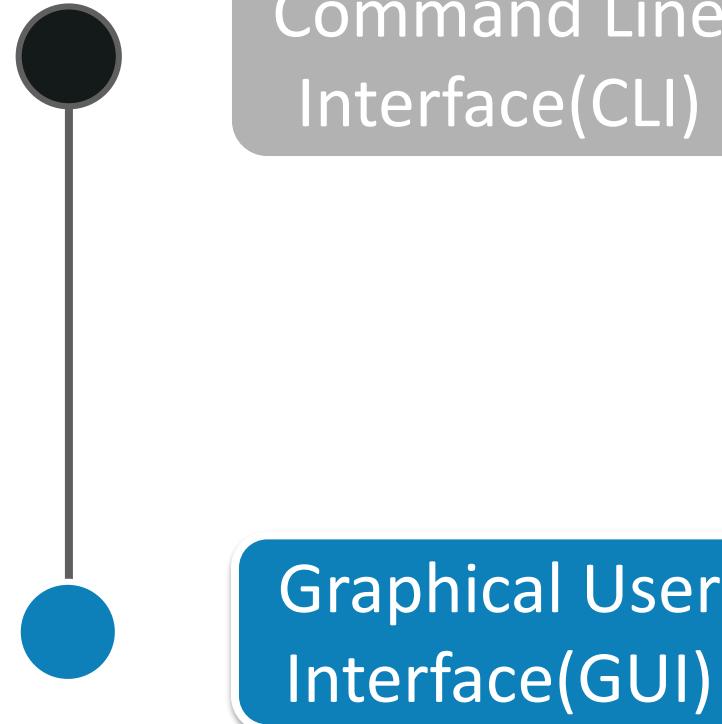
- Command Line Interface give commands in the form of lines of text to the program
- The program which handles it is called a command language interpreter

Command Line
Interface(CLI)



User Interface In Linux

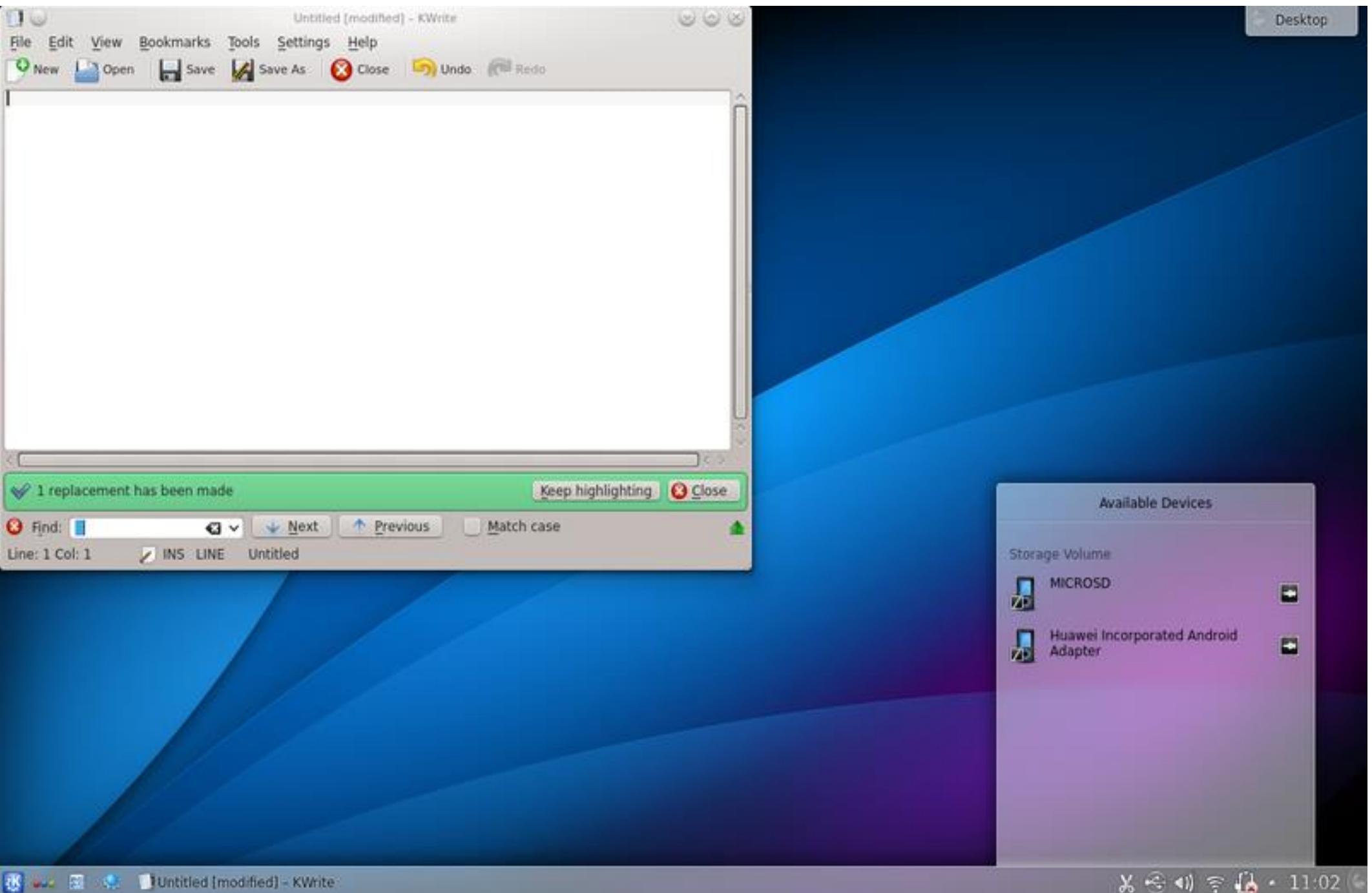
- Graphical user interface interacts with users with icons, folders, wallpapers, widgets and visual indicators to make it easier for the user to access the program
- For Linux, desktop environments are KDE, GNOME, CINNAMON, MATE, etc.



KDE Interface



- Can have multiple desktops
- Flexible to configure tools
- Freedom to customize the desktop
- Widgets for desktop
- Used in OpenSUSE, Kubuntu



GNOME Interface



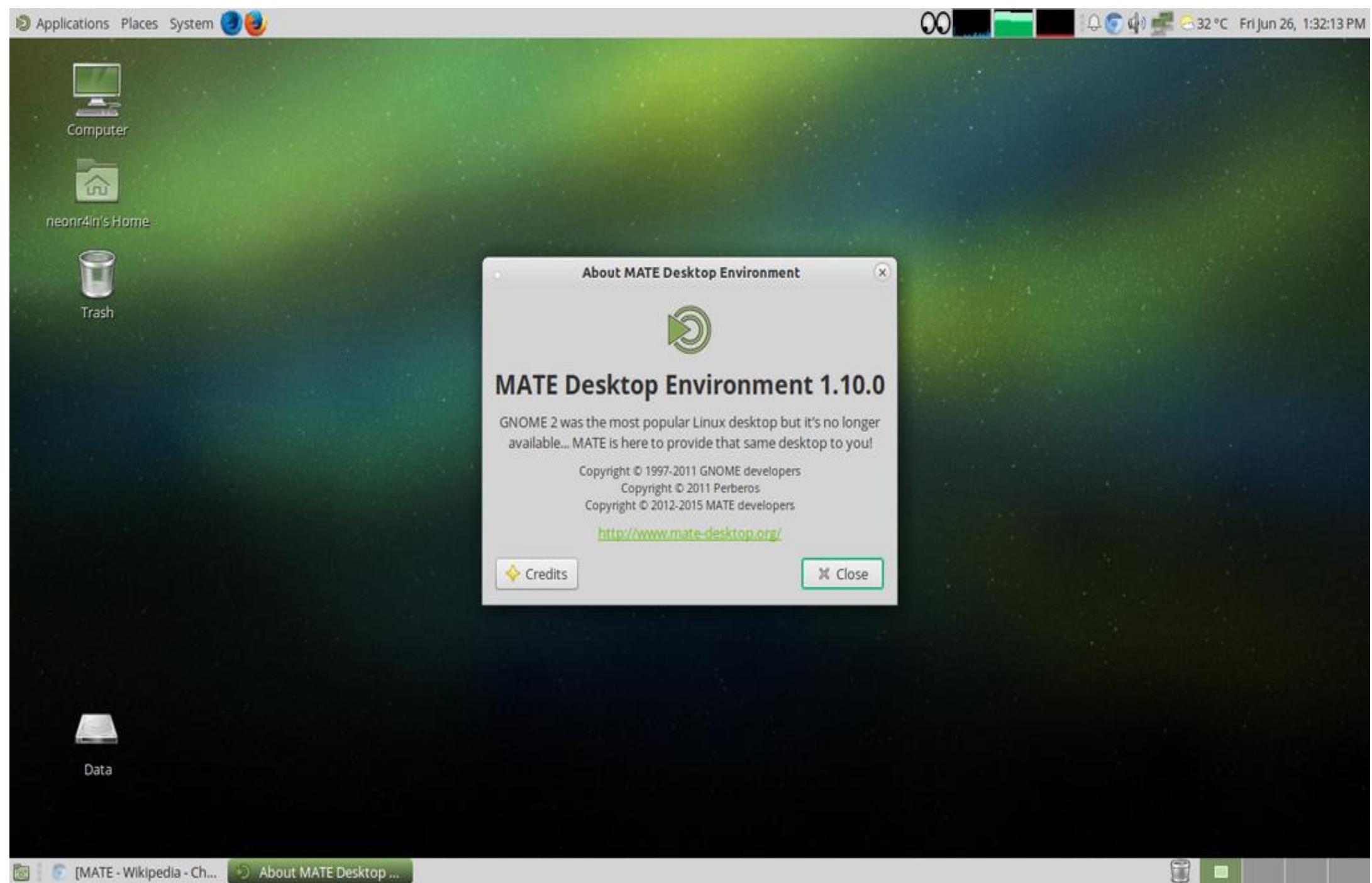
- Has the look and feel like Windows
- Stable and Reliable
- Freedom to customize the desktop
- Runs Faster
- Used in RedHat, Fedora, Ubuntu



MATE Interface



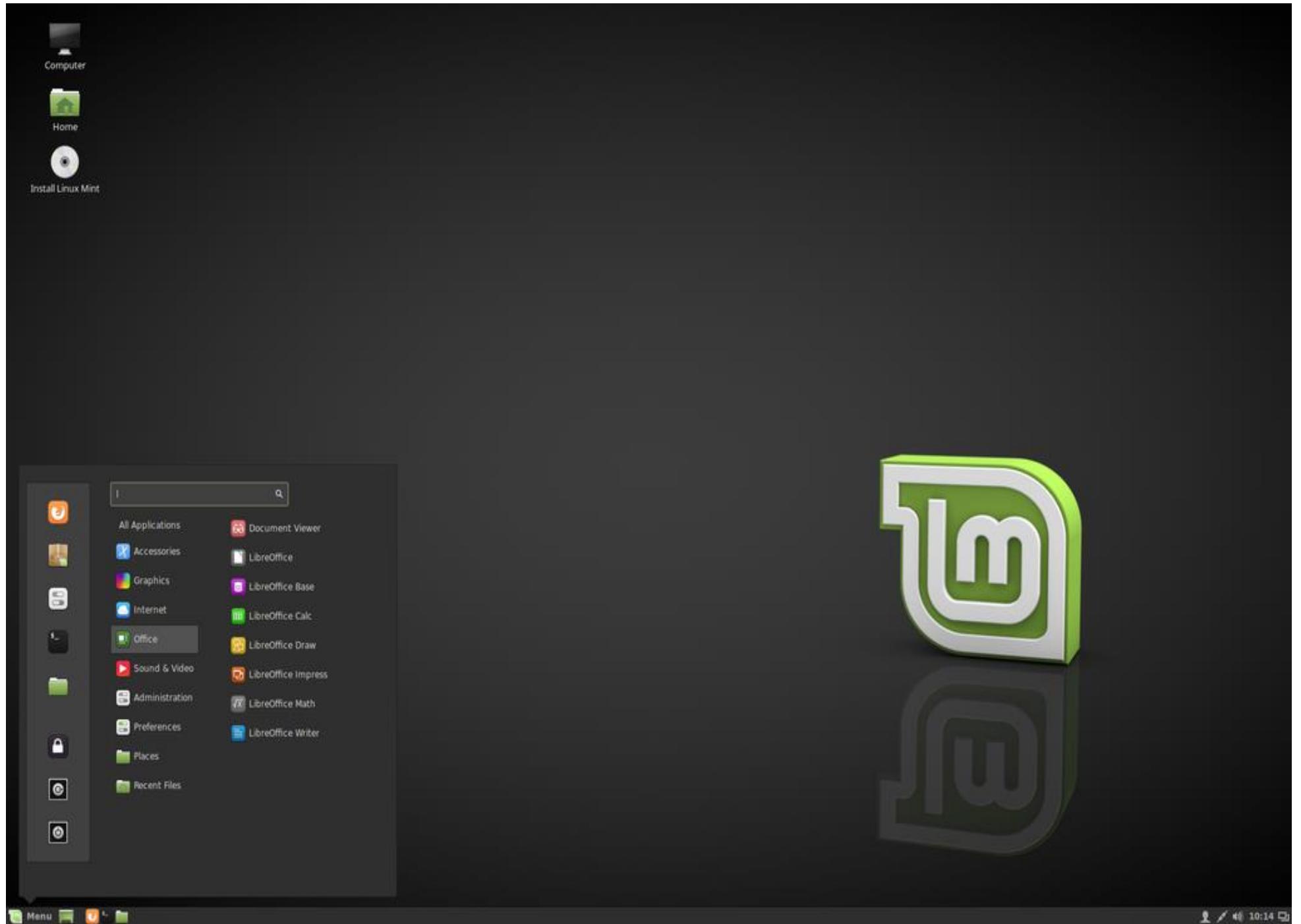
- Extremely configurable
- Lightweight
- Hardware Resource consumption is less
- Good looking Interface
- Supported in Mint, Ubuntu

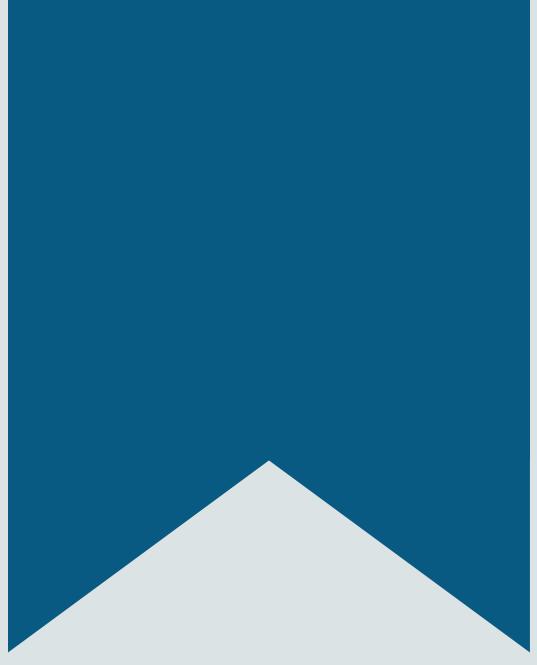


CINNAMON Interface



- Resemblance with newer Windows
- Ease of customization
- Stable and fast
- Lots of Desktop Effects
- Used in Mint





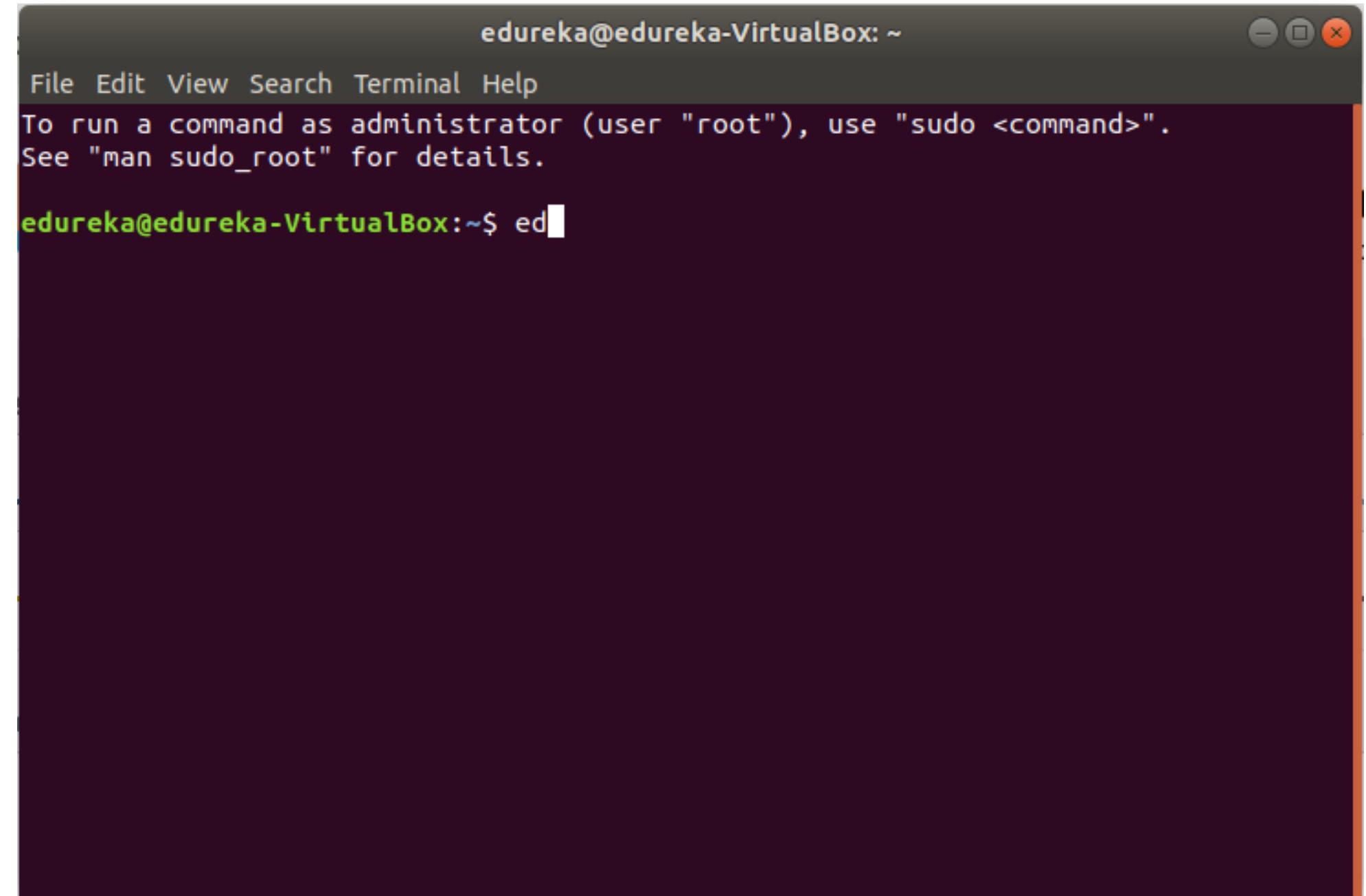
Tools And Commands

Command Execution

- One needs a terminal (CLI) to execute the command
- Multiple commands can be executed sequentially by adding “;” in between them

SYNTAX

Command <option> <arguments>



The image shows a terminal window with a dark theme. The title bar reads "edureka@edureka-VirtualBox: ~". The menu bar includes "File", "Edit", "View", "Search", "Terminal", and "Help". A message in the terminal window states: "To run a command as administrator (user "root"), use "sudo <command>". See "man sudo_root" for details." Below this, a command "edureka@edureka-VirtualBox:~\$ ed" is typed into the terminal, with the cursor at the end of the "d".

Help And Manual Command

Command Help

- To know how to use a particular command, use “command --help”
- For Example: `# grep --help`

Syntax

```
command --help
```

Manual Page

- One can use “man command” to get the manual of the command

Syntax

```
man command
```

To use <Option> and <argument> along with the command is not mandatory and can be used based on the execution of the command

Basic Linux Commands

ls

Lists down the content of a directory

mkdir

Creates a directory

mv

Moves or renames a file/directory

pwd

Shows the present working directory

rm

Removes a file/directory

cd

Enter a directory

whoami

Tell the current logged-in user

clear

Clear the screen

More Linux Commands

cat

Displays the text of a file

tail

Displays the last few lines of the file

echo

Prints a line of text

cp

Copy a file/directory

touch

Creates a file

df

Shows the available disk space

du

Shows disk space consumed by the directory and files

Demo – Linux Commands

```
ubuntu@ubuntu:~$apt-get --help
apt 1.2.15 (amd64)
Usage: apt-get [options] command
      apt-get [options] install|remove pkg1 [pkg2 ...]
      apt-get [options] source pkg1 [pkg2 ...]
```

apt-get is a command line interface for retrieval of packages and information about them from authenticated sources and for installation, upgrade and removal of packages together with their dependencies.

Most used commands:

- update - Retrieve new lists of packages
- upgrade - Perform an upgrade
- install - Install new packages (pkg is libc6 not libc6.deb)
- remove - Remove packages
- purge - Remove packages and config files
- autoremove - Remove automatically all unused packages

Demo – Linux Commands

```
edureka@edureka-VirtualBox:~$ ls
Desktop Documents Downloads examples.desktop filename Music new Pictures Public Templates Videos
edureka@edureka-VirtualBox:~$ mkdir EDUREKA
edureka@edureka-VirtualBox:~$ ls
Desktop Documents Downloads EDUREKA examples.desktop filename Music new Pictures Public Templates Videos
edureka@edureka-VirtualBox:~$ mv EDUREKA edureka123
edureka@edureka-VirtualBox:~$ ls
Desktop Documents Downloads edureka123 examples.desktop filename Music new Pictures Public Templates Videos
edureka@edureka-VirtualBox:~$ pwd
/home/edureka
edureka@edureka-VirtualBox:~$ rm -r edureka123
edureka@edureka-VirtualBox:~$ ls
Desktop Documents Downloads examples.desktop filename Music new Pictures Public Templates Videos
edureka@edureka-VirtualBox:~$ cd Downloads
edureka@edureka-VirtualBox:~/Downloads$ mkdir LINUX
edureka@edureka-VirtualBox:~/Downloads$ ls
LINUX
edureka@edureka-VirtualBox:~/Downloads$ cd
edureka@edureka-VirtualBox:~$ whoami
edureka
edureka@edureka-VirtualBox:~$ clear
```

Demo – Linux Commands

```
edureka@edureka-VirtualBox:~$ touch FILE
edureka@edureka-VirtualBox:~$ ls
Desktop  Documents  Downloads  examples.desktop  file  FILE  filename  Music  new  Pictures  Public  Templates  Videos
edureka@edureka-VirtualBox:~$ vi FILE
edureka@edureka-VirtualBox:~$ cat FILE
Hi
This is a File
edureka@edureka-VirtualBox:~$ echo "hello,Edureka"
hello,Edureka
edureka@edureka-VirtualBox:~$ cp FILE Desktop
edureka@edureka-VirtualBox:~$ ls
Desktop  Documents  Downloads  examples.desktop  file  FILE  filename  Music  new  Pictures  Public  Templates  Videos
edureka@edureka-VirtualBox:~$ ls Desktop
FILE
edureka@edureka-VirtualBox:~$ vi FILE
edureka@edureka-VirtualBox:~$ tail FILE
R
S
T
U
V
W
X
Y
Z
```

Demo – Linux Commands

```
edureka@edureka-VirtualBox:~$ df
Filesystem      1K-blocks    Used Available Use% Mounted on
udev                991168      0  991168   0% /dev
tmpfs               204116   1528  202588   1% /run
/dev/sda1        10253588 5607996  4105024  58% /
tmpfs               1020564      0  1020564   0% /dev/shm
tmpfs                  5120      4    5116   1% /run/lock
tmpfs               1020564      0  1020564   0% /sys/fs/cgroup
tmpfs               204112     28  204084   1% /run/user/120
/dev/loop0            88704  88704      0 100% /snap/core/4486
/dev/loop1            143488 143488      0 100% /snap/gnome-3-26-1604/59
/dev/loop2                1664  1664      0 100% /snap/gnome-calculator/154
/dev/loop3            12544  12544      0 100% /snap/gnome-characters/69
/dev/loop4            21504  21504      0 100% /snap/gnome-logs/25
tmpfs               204112      56  204056   1% /run/user/1000
/dev/loop5                3456  3456      0 100% /snap/gnome-system-monitor/36
/dev/loop6            89088  89088      0 100% /snap/core/4917
/dev/loop7                2432  2432      0 100% /snap/gnome-calculator/180
/dev/loop8                3840  3840      0 100% /snap/gnome-system-monitor/51
/dev/loop9            13312  13312      0 100% /snap/gnome-characters/103
/dev/loop10           14848  14848      0 100% /snap/gnome-logs/37
/dev/loop11           144384 144384      0 100% /snap/gnome-3-26-1604/70
```

Demo – Linux Commands

```
edureka@edureka-VirtualBox:~$ du
4      ./Templates
4      ./gnupg/private-keys-v1.d
16     ./gnupg
4      ./Music
4      ./Documents
132    ./Pictures
4      ./config/gnome-session/saved-session
8      ./config/gnome-session
84     ./config/pulse
12     ./config/nautilus
4      ./config/update-notifier
8      ./config/ibus/bus
12     ./config/ibus
12     ./config/dconf
8      ./config/gtk-3.0
4      ./config/goa-1.0
16     ./config/evolution/sources
20     ./config/evolution
176    ./config
8      ./Desktop
292    ./local/share/gnome-software
76     ./local/share/gvfs-metadata
8      ./local/share/icc
12     ./local/share/keyrings
1084   ./local/share/app-info/xmls
1088   ./local/share/app-info
4      ./local/share/applications
36     ./local/share/xorg
8      ./local/share/gnome-shell
4      ./local/share/ibus-table
4      ./local/share/sounds
```



Before learning further commands, first let's see what is **vim editor** and how does it works

vim Editor

- **vi** which stands for “Visual Instrument” is a screen editor
- **vim** is the improved version of **vi** editor, which is most commonly used in Linux
- It is pre-installed with Linux

STEP 1: `vi <filename>` - Open a file/ or create if it is not present

STEP 2: Press ‘i’ to go into the insert mode. It helps to insert text in the file

STEP 3: Press “Escape” button to exit the insert mode

STEP 4: Enter ‘: q’ to quit without saving

STEP 5: Enter ‘: wq’ to save and quit

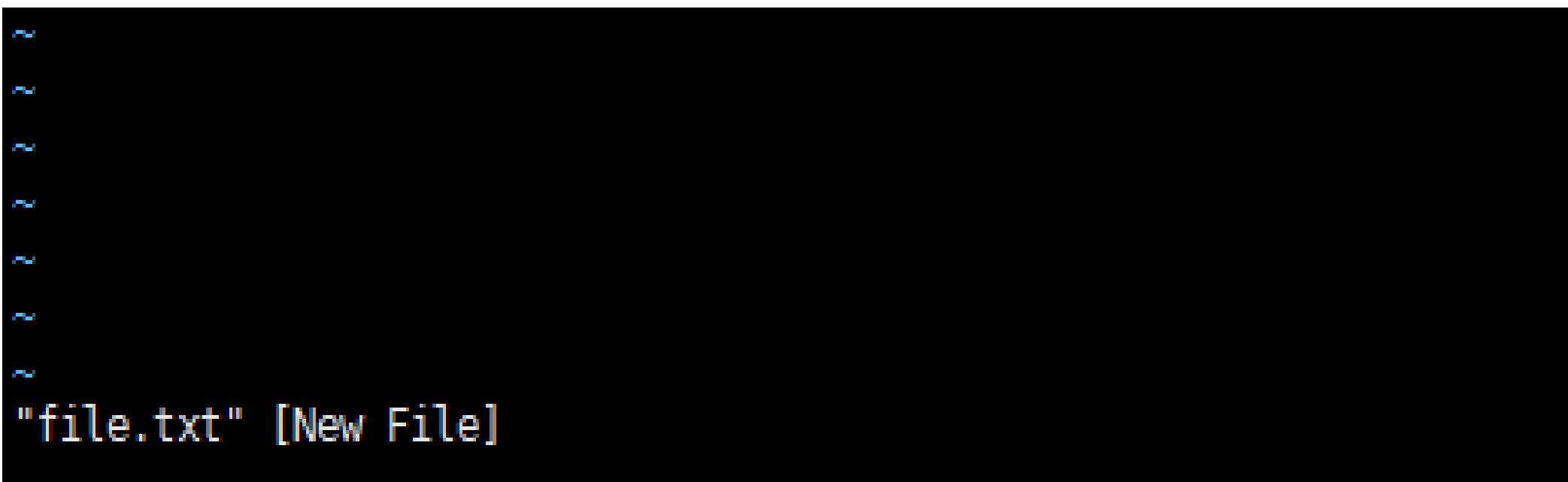
Demo – vim Editor

In this demo, first the file is created using **vim editor** and then text is inserted in the file. Later the file as well as content of file are checked using **cat** and **ls** command

```
ubuntu@ubuntu#  
ubuntu@ubuntu#ls  
dir  hello.txt  link_dir  new.txt  student  
ubuntu@ubuntu#  
ubuntu@ubuntu#vi file.txt  
ubuntu@ubuntu#  
ubuntu@ubuntu#ls  
dir  file.txt  hello.txt  link_dir  new.txt  student  
ubuntu@ubuntu#  
ubuntu@ubuntu#cat file.txt  
hi,  
this is a file.  
ubuntu@ubuntu#
```

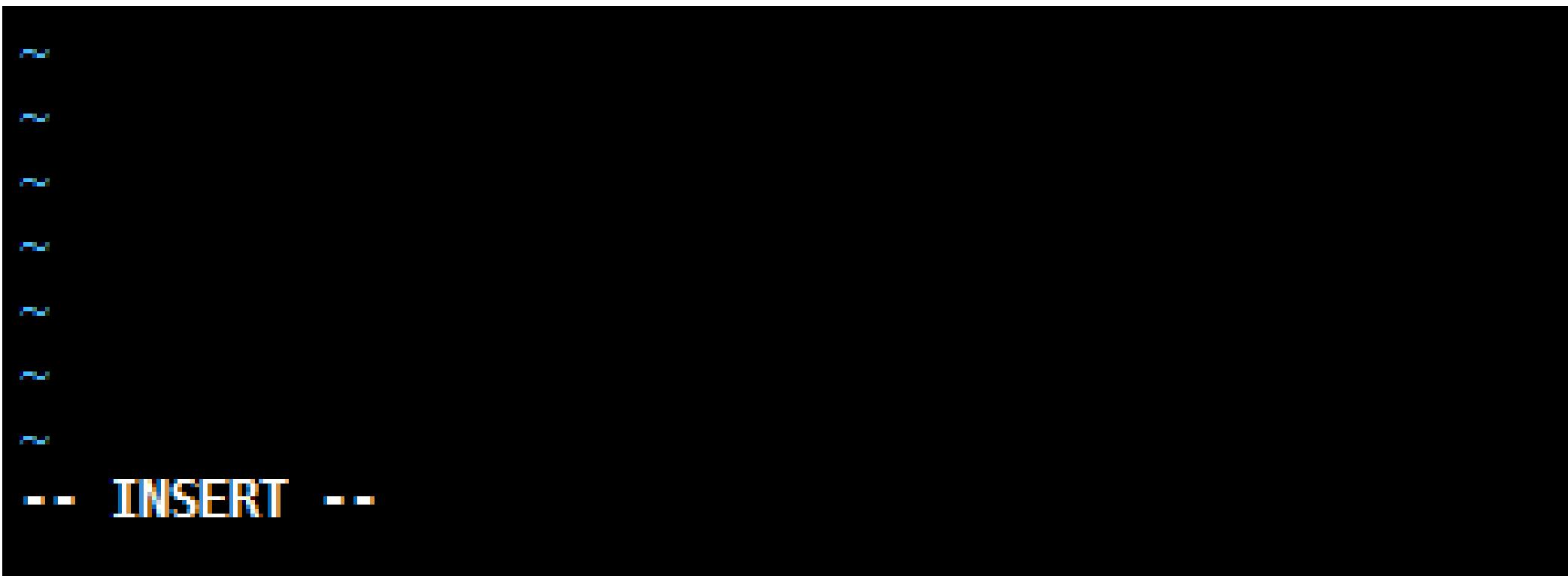
Demo – vim Editor

STEP 1 : vi file.txt



```
~
~
~
~
~
~
~
"file.txt" [New File]
```

STEP 2 : Press 'I'



```
~
~
~
~
~
~
~
-- INSERT --
```

Demo – vim Editor

STEP 3 : Insert Text

STEP 4 : Press 'Escape'

**STEP 5 : Enter ':wq' to save
and exit**

```
hi.  
this is a file.  
~  
~  
~  
~  
~  
~  
~  
:wq
```



Advanced Linux Commands

grep

grep

sed

awk

alias

history

- The command prints the lines matching with the pattern which is passed
- When a match is found, the line is copied to standard output or mode requested
- It has no restriction on the input line length other than the available memory size
- Since the new line acts as a separator so it can't be passed as a pattern to be matched
- grep has some specifications from POSIX and GNU

Syntax

```
grep <options> <pattern>  
<filename>
```

Example

```
# grep "hello" file.txt
```

grep Command – Options

grep

sed

awk

alias

history

- C Counts the number of matching lines
- n Shows the matching line and its number
- i Matches irrespective of case (upper or lower)
- H Prints the file name for each match
- v Displays line that do not match the string
- r Recursively search in directories

Demo – grep

grep

sed

awk

alias

history

grep command is printed on the display screen and then again in the text file

```
ubuntu@ubuntu#cat file.txt
hello, this is a file
this is 2nd line.
This will be 3rd line.
end of file
ubuntu@ubuntu#grep "file" file.txt
hello, this is a file
end of file
ubuntu@ubuntu#grep "file" file.txt > output.txt
ubuntu@ubuntu#cat output
output1.txt output.txt
ubuntu@ubuntu#cat output.txt
hello, this is a file
end of file
ubuntu@ubuntu#
```

sed

grep

sed

awk

alias

history

- sed is a stream editor for basic text transformations on an input stream
- sed do not require any input file and can work on input stream via piping
- sed can have one or more command combined together with -e or -f
- Example: `sed 's/hello/world/' file.txt > output.txt`

sed Command – Options

grep

sed

awk

alias

history

-f

Add the contents of script file to the commands for execution

-r

Use extended regular expressions in the script

-n

Suppress automatic printing of pattern space

-e

Add the script to the commands to be executed

-z

Separate lines by NULL characters

-s

Consider filing as separate rather than a single continuous long stream

Demo – sed

grep

sed

awk

alias

history

Reading from a file and sending output to a file

```
ubuntu@ubuntu#  
ubuntu@ubuntu#cat file.txt  
hello, this is a file  
ubuntu@ubuntu#sed 's/hello/world/' file.txt > output.txt  
ubuntu@ubuntu#cat output.txt  
world, this is a file  
ubuntu@ubuntu#
```

Reading the output from an input stream and sending output to a file

```
ubuntu@ubuntu#cat file.txt | sed 's/hello/world/' - >output1.txt  
ubuntu@ubuntu#cat output1.txt  
world, this is a file  
ubuntu@ubuntu#
```

awk

grep

sed

awk

alias

history

- It is mostly used for pattern scanning and processing
- Using this command you can split each line into multiple variables
- It performs a set of actions on the matched lines
- It is useful to create reports or transform the data files
- awk commands are easy to program as it performs with set of rules and actions

Syntax

`awk 'program' <filename>`

Example

`awk '{print}' file.txt`

awk Command – Options

grep

sed

awk

alias

history

-F fs

To specify a file separator.

-v
var=v
alue

To declare a variable

-f
file

To specify a file that contains an awk
script

\$1

For first field

\$0

For whole line

\$n

For nth field

Demo – awk

grep

sed

awk

alias

history

In the first command awk divides each line as a set of variables and then prints the value of variable 1 and 4 from each line and in the second command it prints all lines having text file

```
ubuntu@ubuntu#awk '{print $1,$4}' file.txt
hello, a
this line.
This 3rd
end
ubuntu@ubuntu#awk '/file/ {print}' file.txt
hello, this is a file
end of file
ubuntu@ubuntu#
```

alias

grep

sed

awk

alias

history

- alias tells Linux to replace one string with another string while executing a command
- It is used to provide a short name of the frequently used commands
- It can be defined by adding it in the shell's .rc file
- Don't add space between string and equal sign
- Reload bash to activate the alias

Syntax

```
alias  
<string>='<command>'
```

Example

```
# alias lk='ls -ltr'
```

Demo – alias

grep

sed

awk

alias

history

The demo of alias command is as shown below

```
ubuntu@ubuntu#
ubuntu@ubuntu#tail -3 ~/.bashrc
#if [ -f /etc/bash_completion ] && ! shopt -oq posix; then
#  . /etc/bash_completion
#fi
ubuntu@ubuntu#
ubuntu@ubuntu#vi ~/.bashrc
ubuntu@ubuntu#
ubuntu@ubuntu#tail -3 ~/.bashrc
#  . /etc/bash_completion
#fi
alias lk='ls -lrt'
ubuntu@ubuntu#
ubuntu@ubuntu#lk
lk: command not found
ubuntu@ubuntu#
ubuntu@ubuntu#bash
ubuntu@ubuntu#
ubuntu@ubuntu#lk
total 12
-rw-rw-r-- 1 ubuntu ubuntu 7 Apr 29 13:57 file.txt
-rwxr-xr-x 1 root  root 37 May  2 23:40 script.sh
drwxr-xr-x 11 root  root 4096 May  3 00:45 new
ubuntu@ubuntu#
```

Command history

grep

sed

awk

alias

history

- 01 In a shell, “history” command keeps record of all the commands used in the particular tab
- 02 You can give a number ‘n’ to print the last ‘n’ commands
- 03 You can get the list of a particular command executed along with a grep command
`# history | grep ls`
- 04 You may clear the history with the appending –c
`# history –c`
- 05 You can use up and down arrow keys to select previously executed commands

Demo – history

grep

sed

awk

alias

history

The demo of history command is as shown below

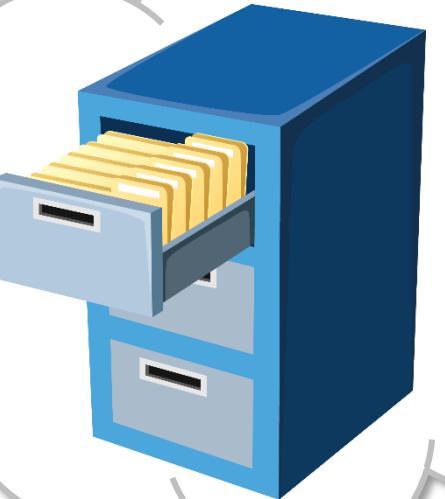
```
ubuntu@ubuntu#history 5
2011  vi new.txt
2012  ls
2013  cd student/
2014  cd ..
2015  history 5
ubuntu@ubuntu#ls
dir  file.txt  hello.txt  link_dir  new.txt  student
ubuntu@ubuntu#history 5
2013  cd student/
2014  cd ..
2015  history 5
2016  ls
2017  history 5
```



File System

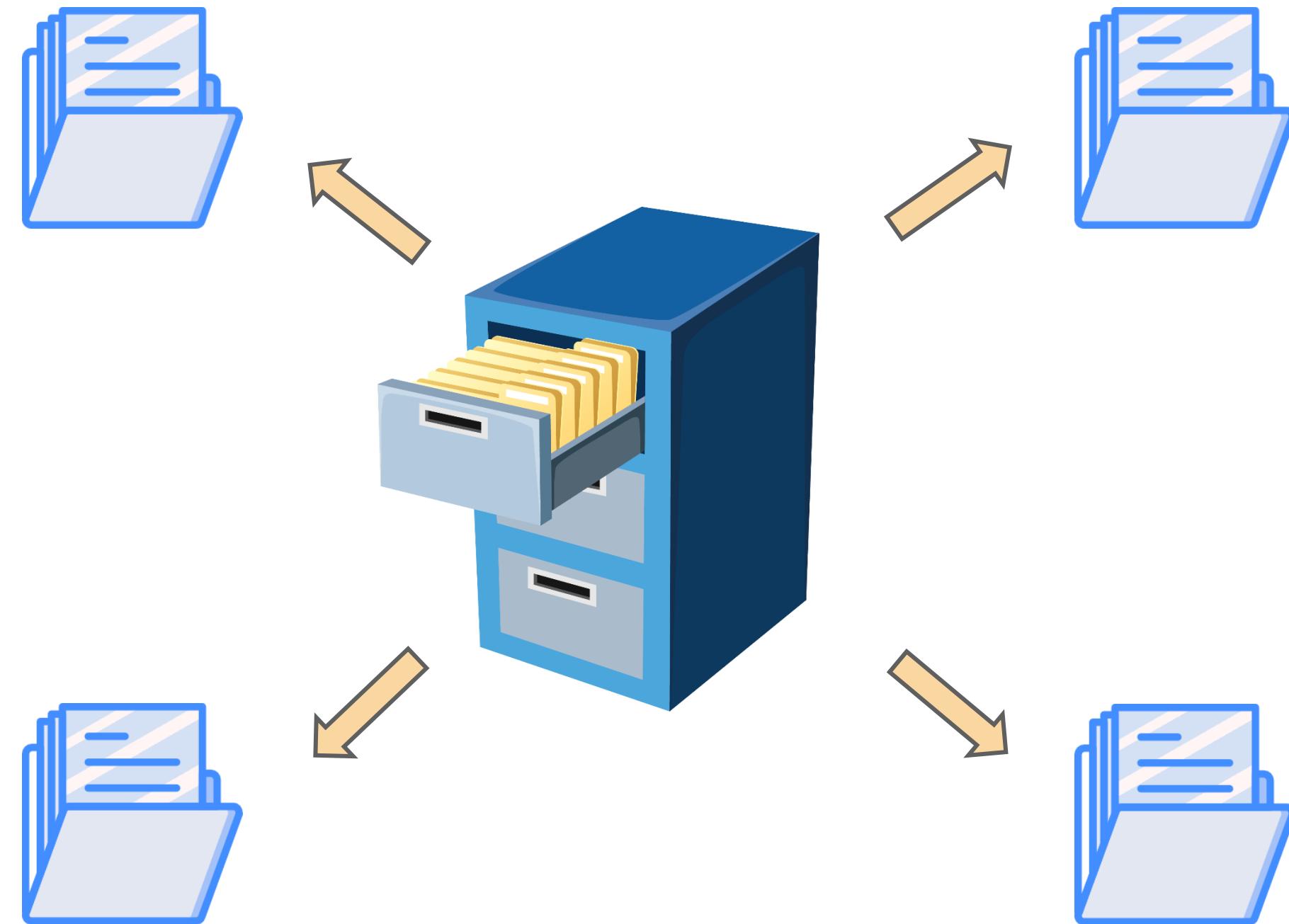


What if there is a large pool of data and I might not know from where its origin?



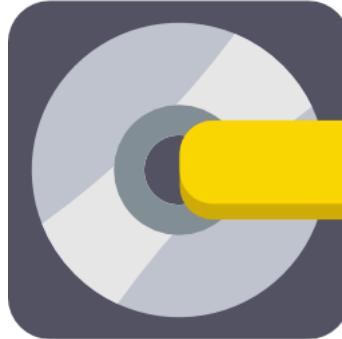
File System

The **file system** is a logical arrangement to store and retrieve data



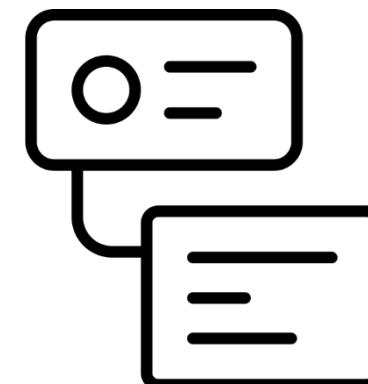
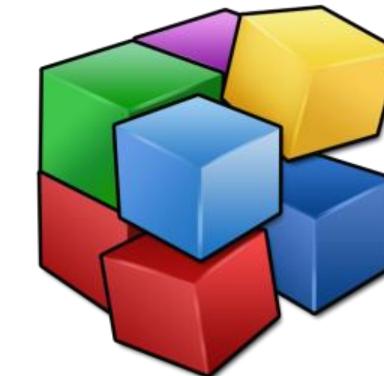
File System

The file system can be local data storage via a network protocol or virtual files



Most of the file systems use hard disks which are made of small fixed size blocks. Each block has an identifier to describe the start and end of the block

Depending upon the file system architecture, file fragmentation occurs when some files are in noncontiguous clusters or some file are deleted



Each file has a metadata consisting of size, date and time of creation, file type, access permission, owner of a file, etc.

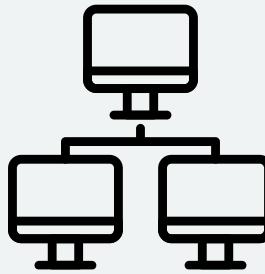
Type Of File System

Disk File System



It manages data on a permanent storage device. Accessing the data for multiple request can be handled
Ex – NTFS, FAT, etc.

Network File System



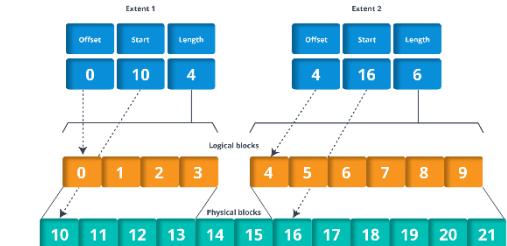
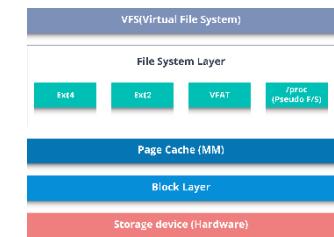
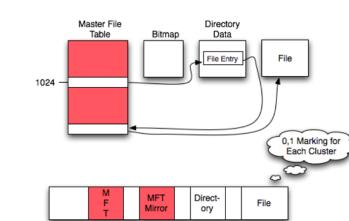
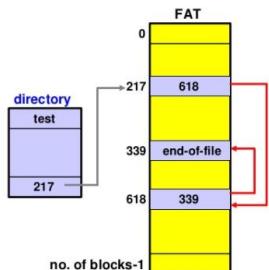
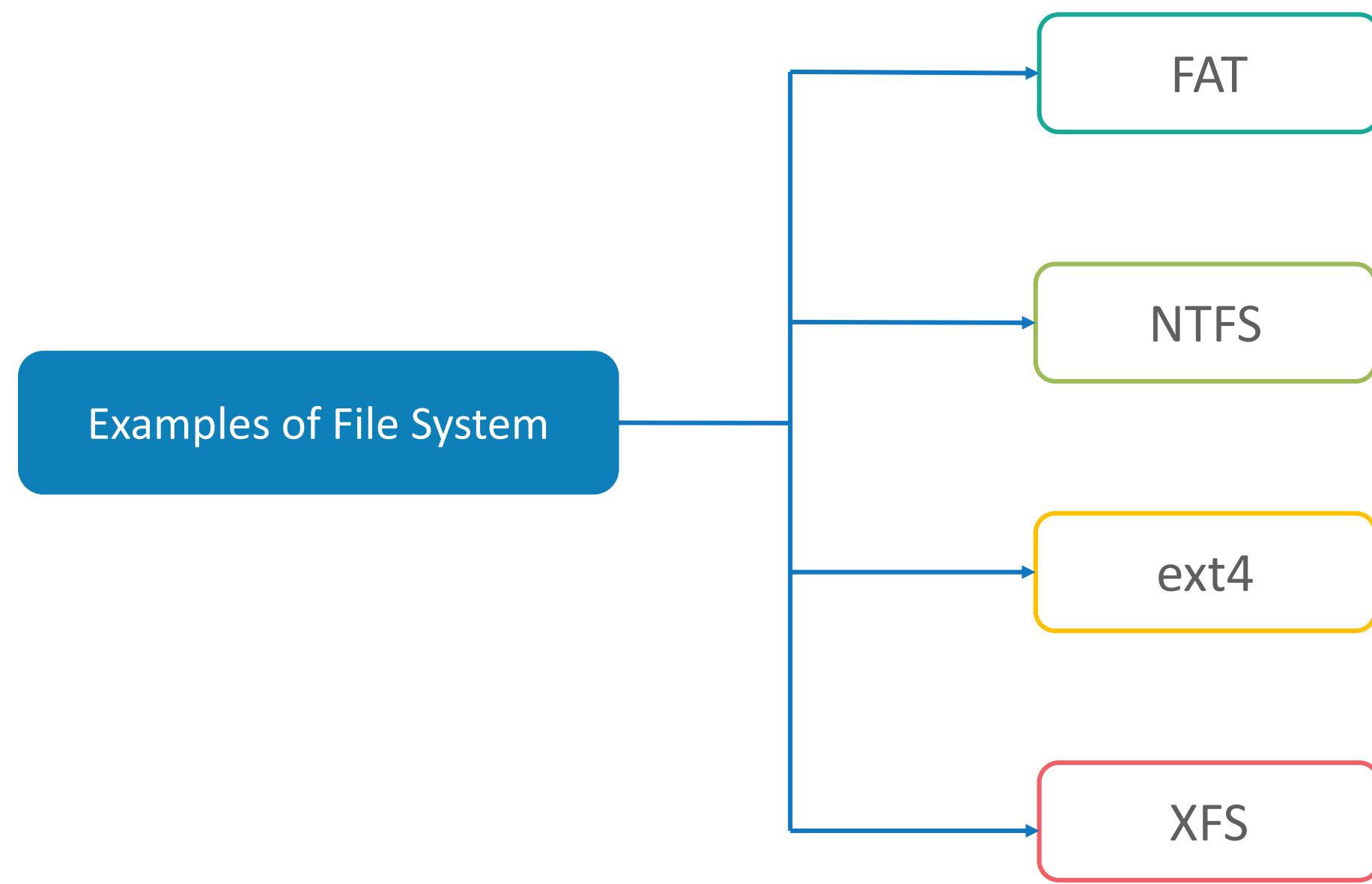
It allows a user on a client computer to access the files over a computer network using NFS protocol
Ex – AFS, SMB

Special Purpose File System



The system API/device is given a file type representation to use according with Unix OS

Examples Of File System



FAT

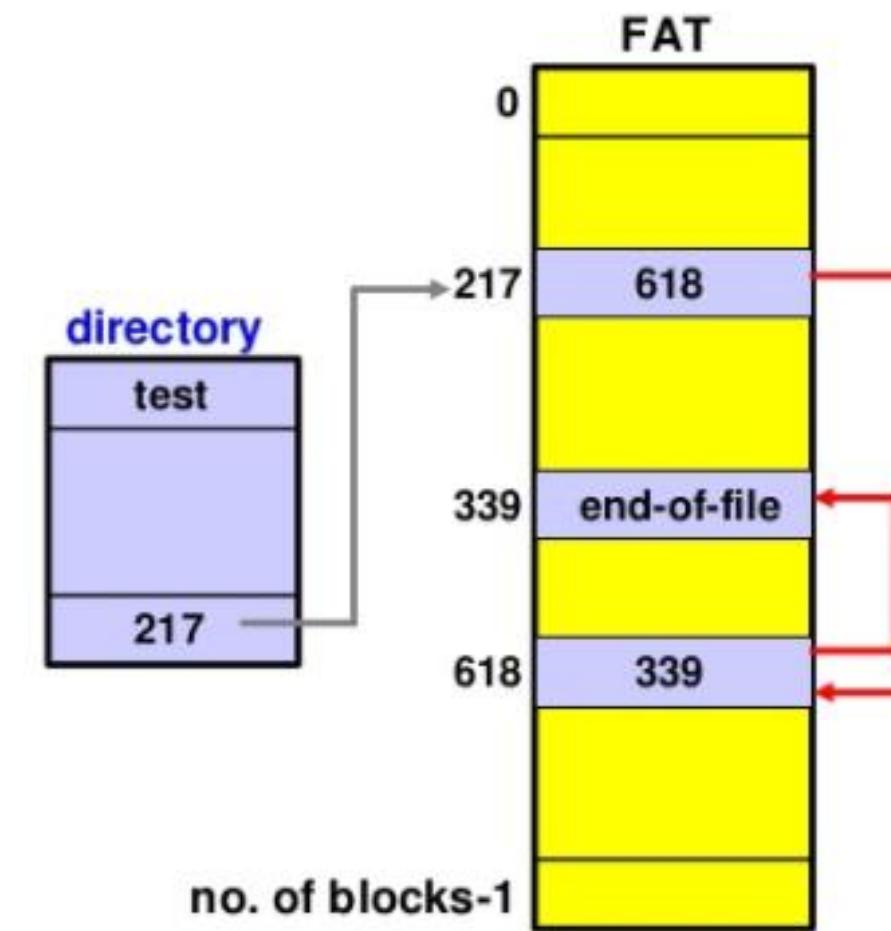
FAT

- File Allocation Table (FAT) uses indexing for a contiguous area of disk store
- Each entry has index of the next cluster or indicates end of the file
- The top directory has a number of clusters of each file in the particular directory
- FAT may lead to fragmentation and has better alternatives for larger file systems

NTFS

ext4

XFS



Comparison OF FAT Version

FAT

NTFS

ext4

XFS

Attribute	FAT12	FAT16	FAT32
Used For	Floppies, small hard drives	Small to large hard drives	Large to very large hard drives
Size of each FAT entry	12 bits	16 bits	28 bits
Maximum number of Clusters	~4,096	~65,536	~268,435,456
Supported cluster size	512 B to 4 KB	2 KB to 32 KB	4 KB to 32 KB
Maximum volume size	16,736,256 B (16MB)	2,147,123,200 B (2GB)	~2^41 B (2TB)

- There are multiple version of FAT like FAT 12, FAT 16, FAT 32 with FAT 32 more suited for device with larger memory chunks
- It is best suited for file system of smaller sizes and primarily used in floppies, cameras, media players, etc.

NTFS

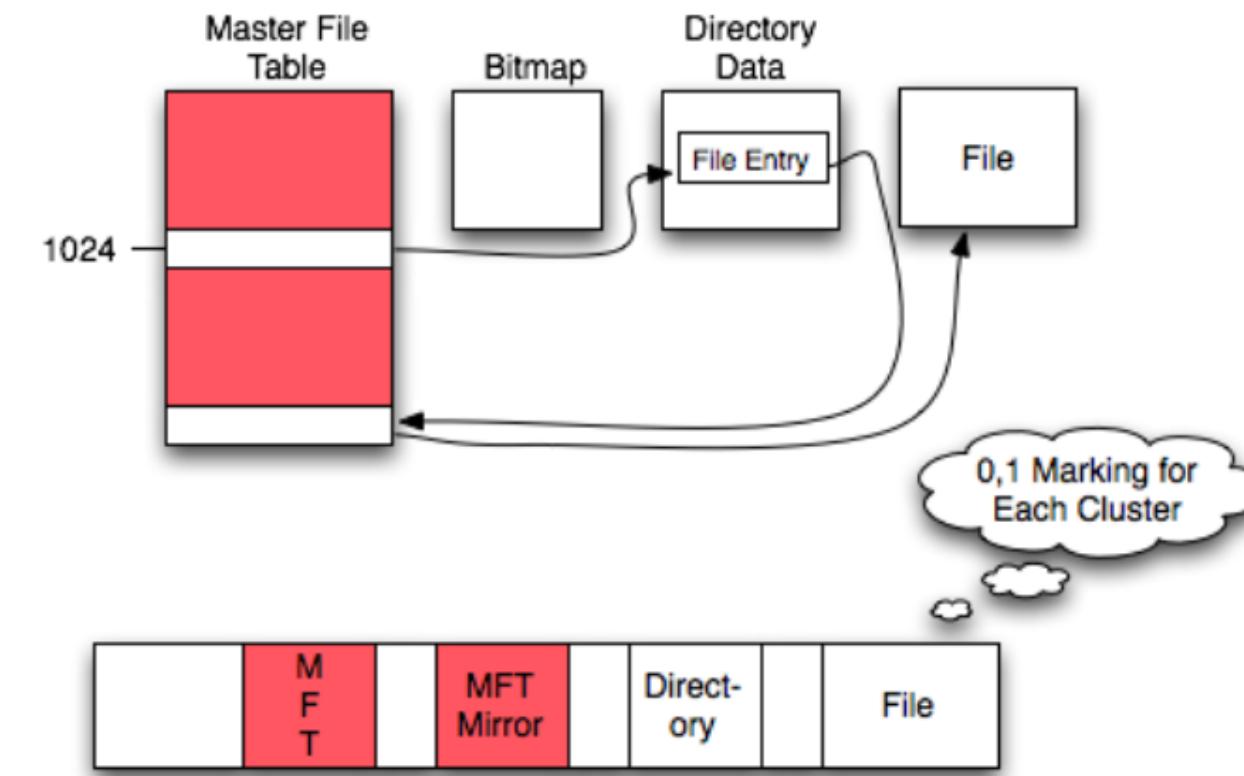
FAT

NTFS

ext4

XFS

New Technology File System (NTFS) uses advanced data structure to improve performance, reliability and disk space usage



- Each file operation is broken down into transaction so that recovery is allowed
- Whenever it is needed each file or folder can be expanded or compressed automatically

NTFS – Features

FAT

NTFS

ext4

XFS



Self Healing NTFS



ACL (Access Control List)



File Level Encryption



Disk Quotas



Reliable File System



File Compression

Detects and corrects corrupted NTFS volume or file

Determines who else can access or modify your files

Protects your file content from unauthorized access

It keeps track of disk space being used and enables administrator to limit disk space that a user may use

Automated recovery operations and checks for consistency by using transaction log and journal file

Compression of large file is allowed so that disk space is used efficiently

ext4

FAT

NTFS

ext4

XFS

- Fourth Extended File System (ext4) is designed for Linux Kernel
- It supports huge individual file size and go to TB's and almost one directory can contain 64,000 sub-directories

VFS(Virtual File System)

File System Layer

Ext4

Ext2

VFAT

/proc
(Pseudo F/S)

Page Cache (MM)

Block Layer

Storage device (Hardware)

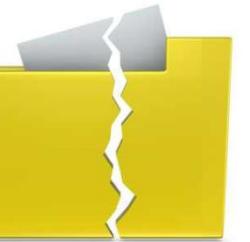
Features Of ext4

FAT

Less chances of file corruption during a crash and transparent encryption is supported



NTFS



ext4

When data is copied to disk, it supports delayed allocation and create blocks



XFS

There are very low chances of fragmentation in ext4



It is faster as it skips the unallocated blocks reducing the retrieval time

XFS

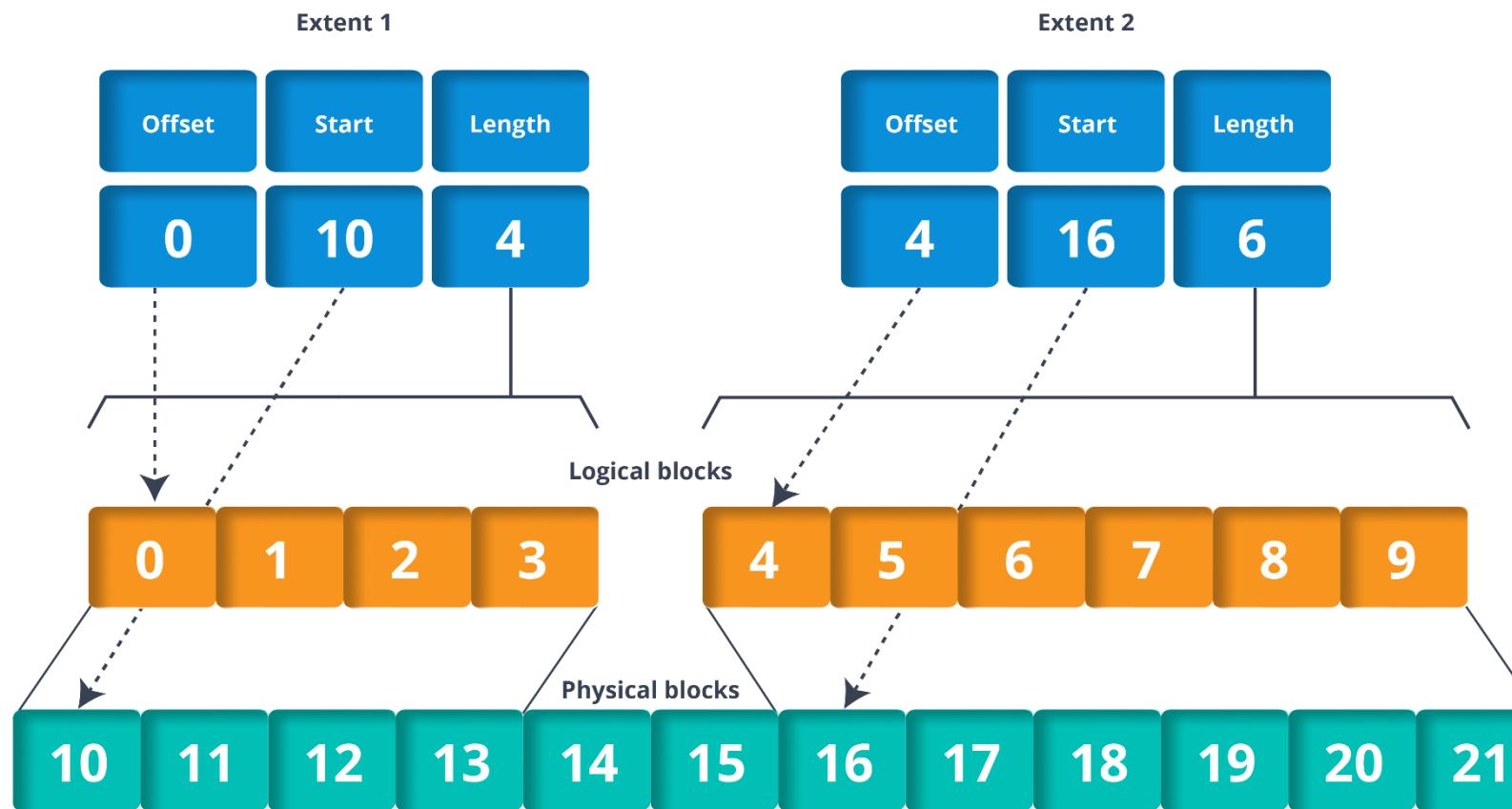
FAT

NTFS

ext4

XFS

- It is a journaling file system that uses a B-tree (balance tree) to allocate data as fast as possible
- It supports huge individual file size allocation



- It allows to reserve bandwidth and adjusts its operation based on existing reservations
- It is designed for data storage server and recommended for home systems

Comparison Of ext4 And XFS

Feature	ext4	XFS
Architecture	Hashed B-tree	B+tree
Emerged	2006	1994
Max volume size	1 Ebytes	8 Ebytes
Max file size	16 Tbytes	8 Ebytes
Max number of files	4 billion	2^{64}
Max file name size	255 bytes	255 bytes
Attributes	Yes	Yes
Transparent Compression	No	No
Transparent Encryption	Yes	No
Copy-on-Write(COW)	No	Planned
Snapshots	No	planned

File System Comparisons

Attribute	NTFS	FAT32	XFS	ext4
Max Filename Length	255	255	255	255
Max File Size	16 EB	4 GB	8 EB	16 GB – 16 EB
Max Volume Size	16 EB	512 MB – 16 TB	8 EB	1 EB
Access Control List	Yes	No	Yes	Yes
Symbolic Links	Yes	No	Yes	Yes
Filesystem-level Encryption	Yes	No	No	Yes(experimental)
Online grow	No	No	Yes	Yes
Offline grow	Yes	With third party tools	No	Yes
Transparent Compression	Yes	No	No	No
Copy on Write	No	No	Yes(On request)	No
OS Support	Windows, Linux, MAC	DOS, Windows, Linux, MAC	Linux	Linux, MAC

File Attributes

01

File name

A human readable name assigned to a file

02

File Type

Identifies the category of the application required

03

Permission

The user has the permission to access every file

04

File size

Memory allocated on the disk to store the file

05

File location

A pointer to find out the file

06

File date

Date of creation or last modification of file

07

File Owner

The user who currently has owner permission over the file

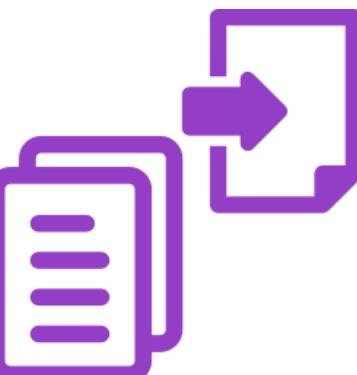
File Operations



Create: Allocate space on disk and make an entry



Read: Read the data from the file



Move: Move files to a different location



Write: Write the data in the file



Delete: Delete the file to free the allocated memory

File System Characteristics

01

Linux is a multiuser system where every file in a Linux file system belongs to a user and a group with respective permissions

02

Files in Linux may have a file extension, such as .txt and hidden files are indicated by a dot in front. Example - .hiddenfile

03

Linux distinguishes between uppercase and lowercase letters in the file system

04

Modern Linux and UNIX limits filename to 255 characters (255 bytes)

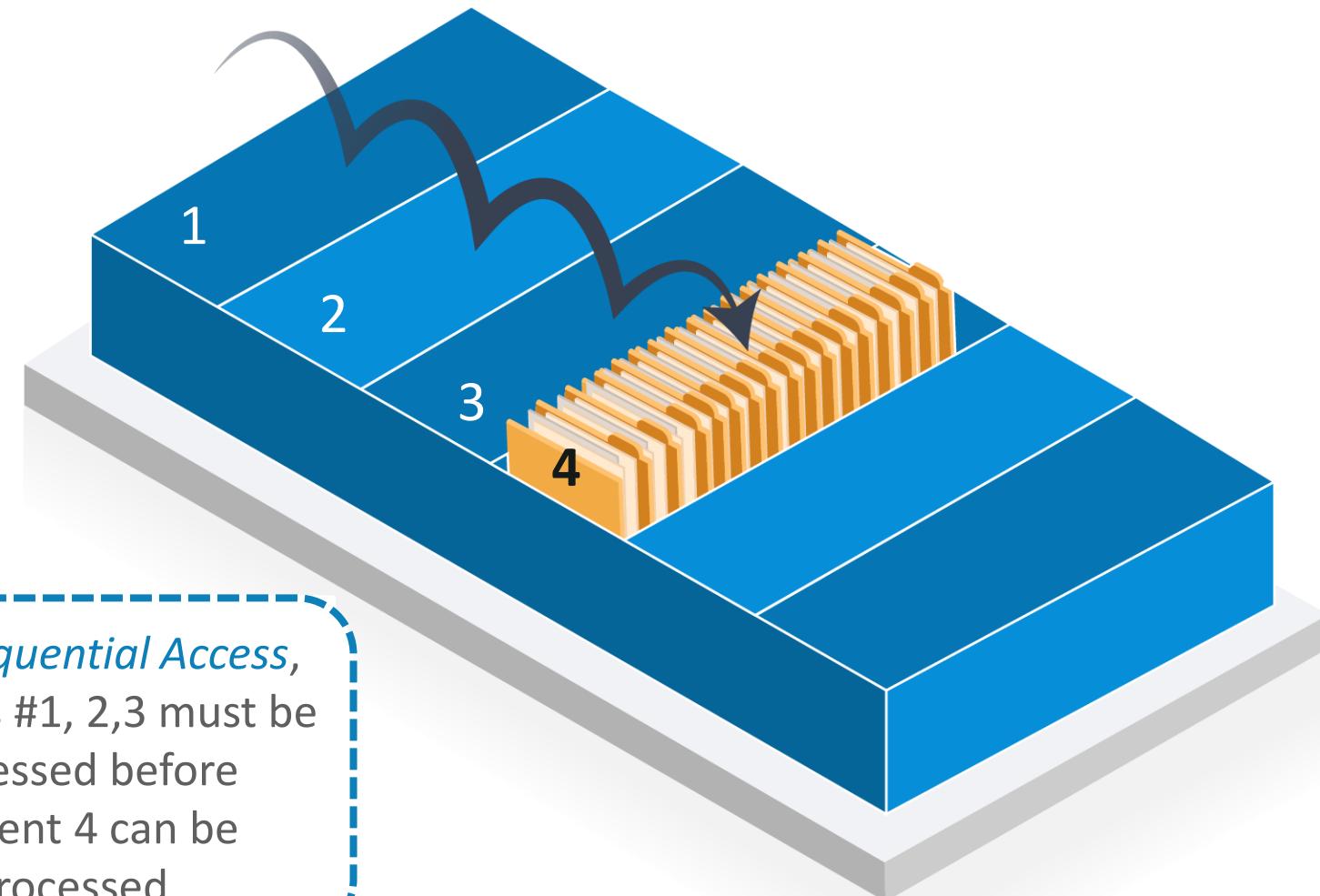
05

Linux does not use drive letters which cannot tell whether you are addressing a partition, a drive/device, a network device, etc. from pathname

File Access Methods

Sequential Access

- A file is processed in order, one record after the other
- If p is the pointer to a record, then next, record will be $p+1$



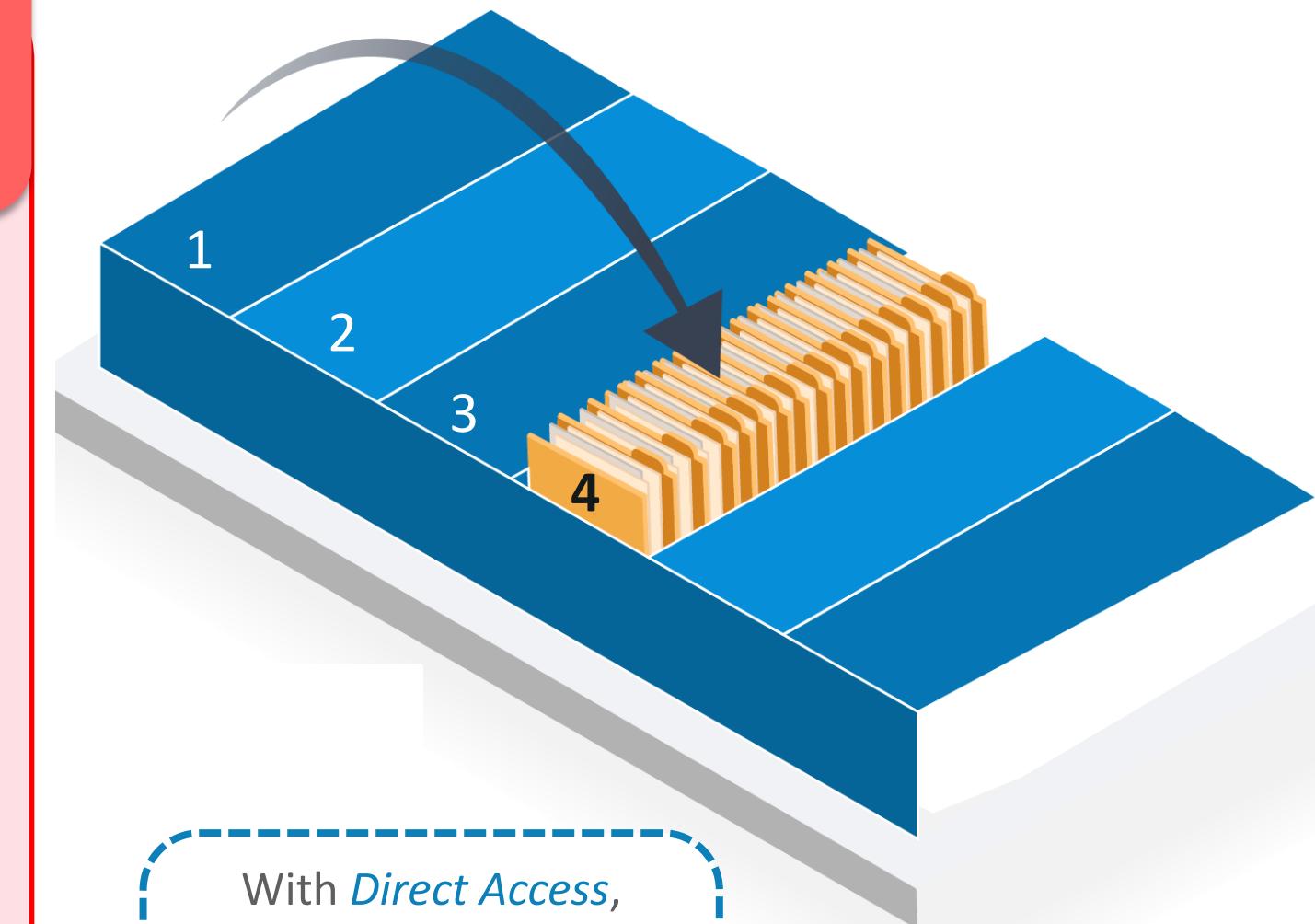
File Access Methods

Sequential Access

- A file is processed in order, one record after the other.
- If p is the pointer to a record, then next, record will be $p+1$

Direct Access

- Such files are generally made up of fixed logical length
- Reposition the pointer to a particular record number to identify each record



With *Direct Access*, elements #4 can be accessed without processing the element before it

File Access Methods

Sequential Access

- A file is processed in order, one record after the other.
- If p is the pointer to a record, then next, record will be $p+1$

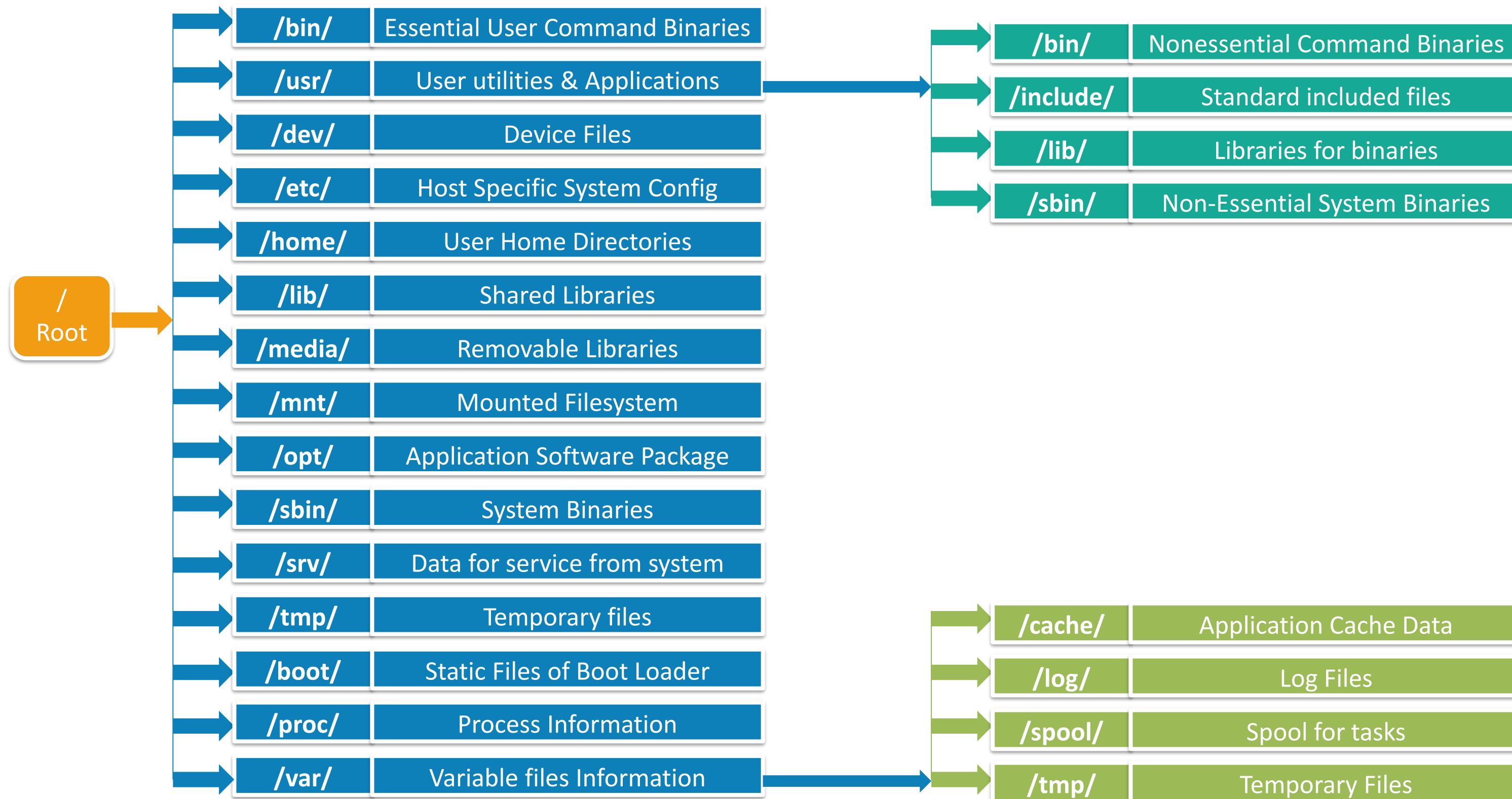
Direct Access

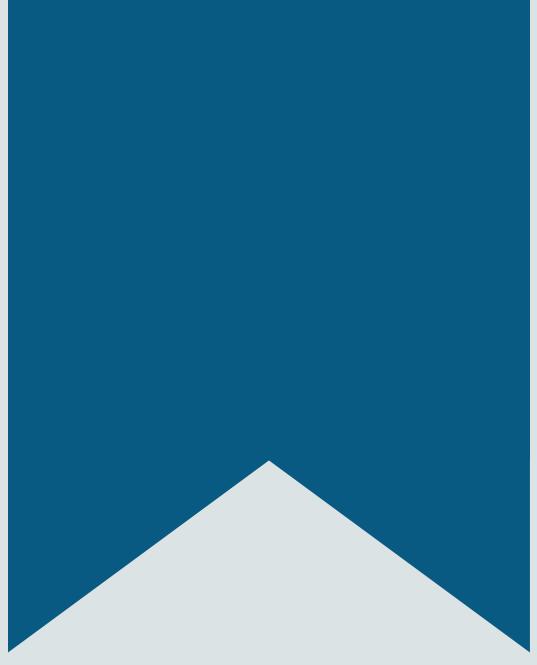
- Such files are generally made up of fixed logical lengths.
- Reposition the pointer to a particular record number to identify each record

Indexed Access

- In such files, each record has a key associated with it
- We can search the index table to locate the block that contains the desired record

Linux File Hierarchy Structure



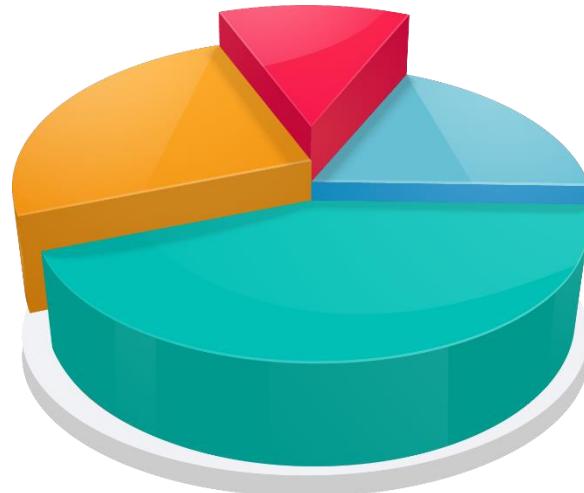


Hard Disk Partition

Formatting And Partitioning

Formatting

- Formatting is the act of creating a file system on a volume, so that the operating system can store and retrieve data on that volume
- Formatting may just de-link the available data and create a new volume or assign zero (NULL) to each data block



Partitioning

- Partitioning a disk is sub-dividing memory by assigning boundaries on the disk
- It is recommended to create a partition and then formatting to load a new OS

Why To Create Partition?

A **Partition** is a simple way to tell your computer that you want to split your hard disk into a number of logical disks

One should create a partition for:

1

In Case Of System Failure, your data Is Less likely to be affected

2

You can use Multiple Operating Systems on the same system

3

Hard disks usually work better in smaller chunks of data

4

Organizing your data is much easier

Partition Types

Primary Partition

The boot file must reside on a primary partition.

Extended Partition

May contain one Extended partition or subdivided in multiple logical partition.

Logical Partition

A machine can be divided in multiple logical partition each hosting its own OS.

Active Partition

The partition where you load your OS during the boot time.

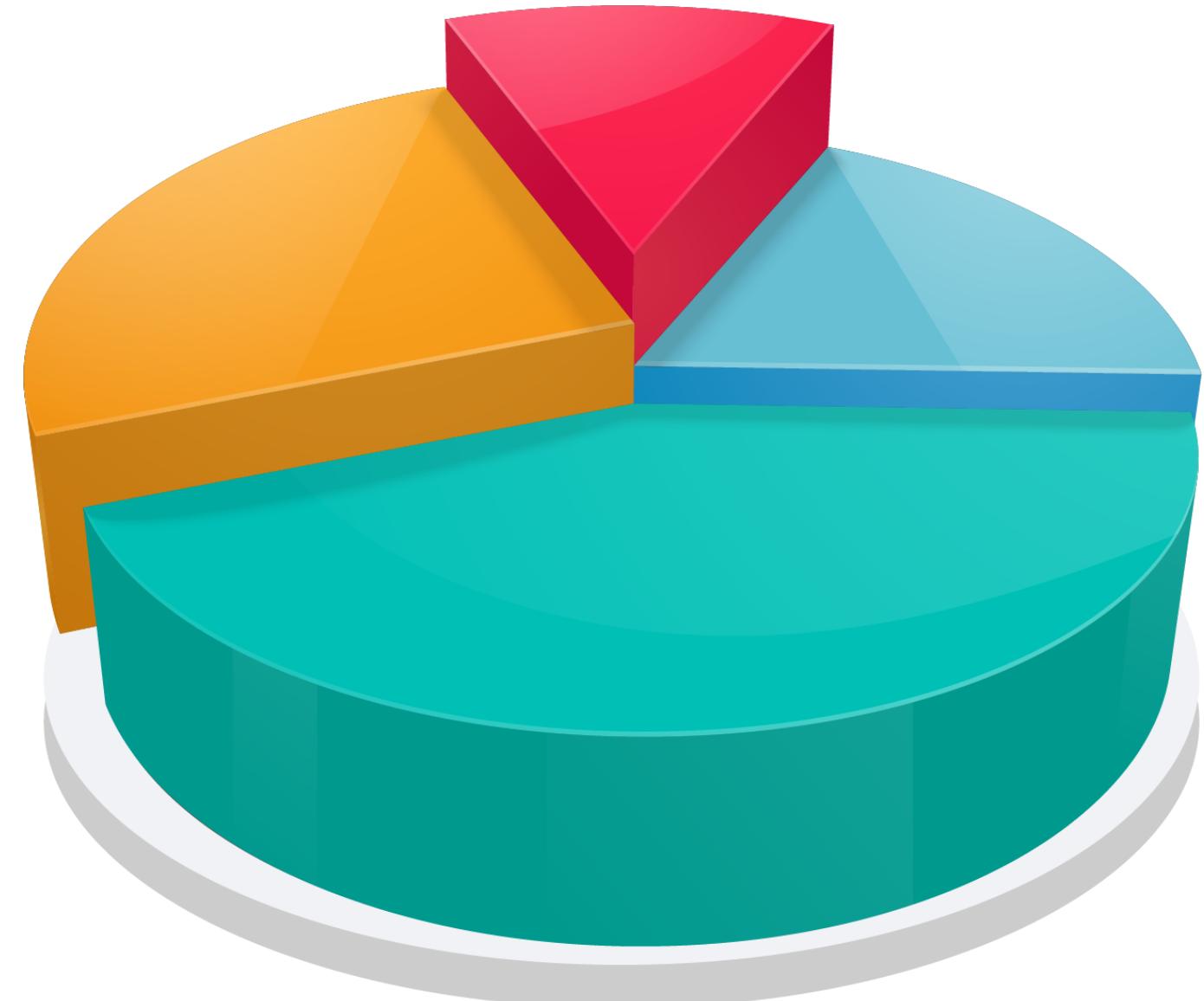
Disk Partition On Windows

- 01 Open “Disk Management” console by typing diskmgmt.msc
- 02 Right Click on a partition which you want to resize and select “Shrink Volume”
- 03 Assign the size in MB and click “Shrink” Button
- 04 Right click on unallocated memory space and click on “New Simple Volume”
- 05 Assign the size in MB and select a drive display letter
- 06 Select appropriate file system type and click finish

What Is Disk Management?

It enable users to view and manage the disk drives installed in their computer and the partitions associated with the drives

- Each drive has attributes like type, file system, status, capacity, free space, percentage memory free, etc.
- Performing certain actions on the drives or partitions will make them available or unavailable



Disk Management Tasks

Partition a drive: Divide a disk to subgroup so that each group is treated as a separate disk

Format a drive: Create a specific file system

Change a drive's letter: Change the letter by which the particular partition is represented

Shrink a partition: Decrease allocated space in a partition so that Memory could be free

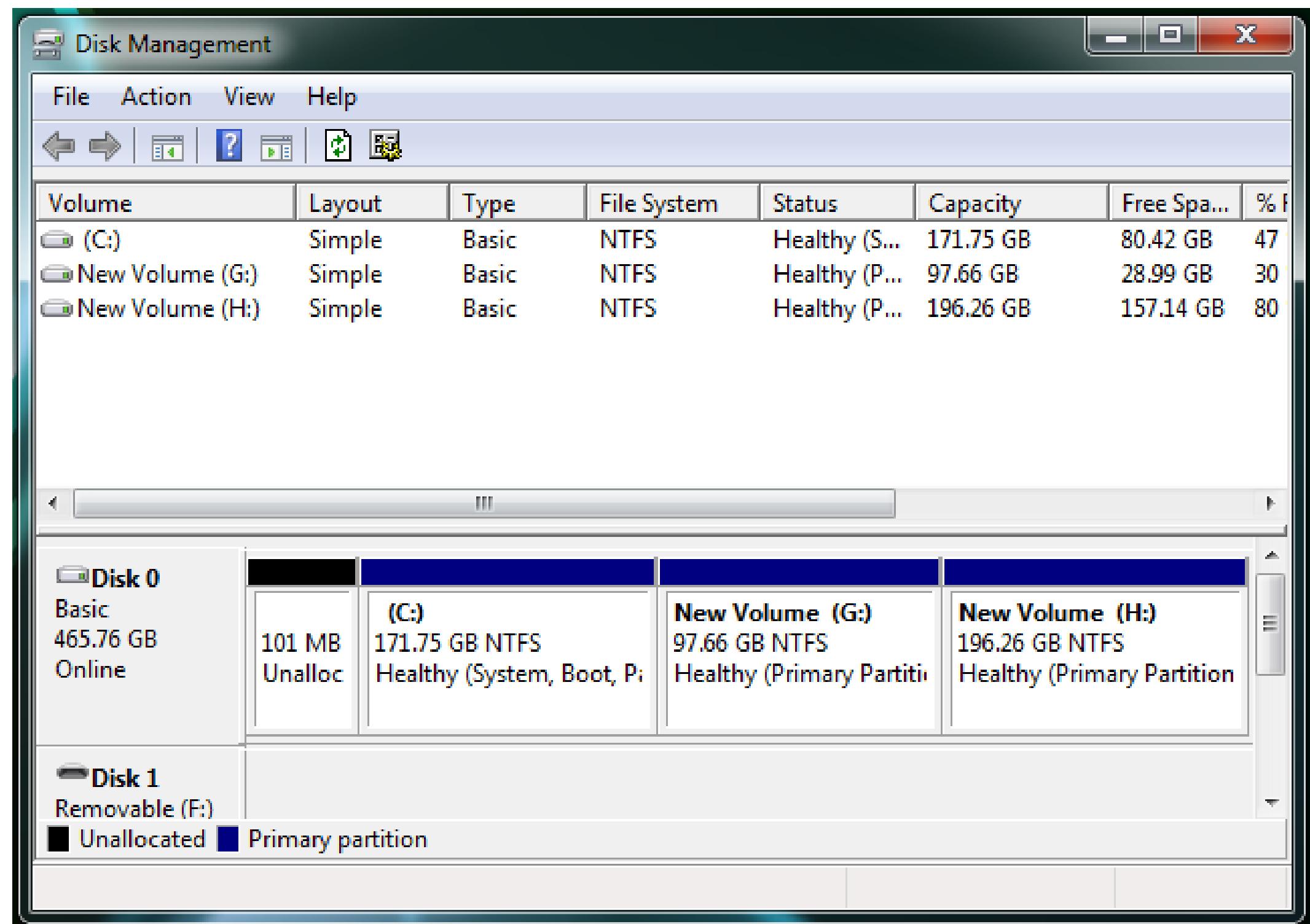
Extend a partition: Add more space to a volume of un-allocated chunk of memory

Delete a partition: De-allocate a partition to free the memory

Steps To Create A Partition

STEP 1:

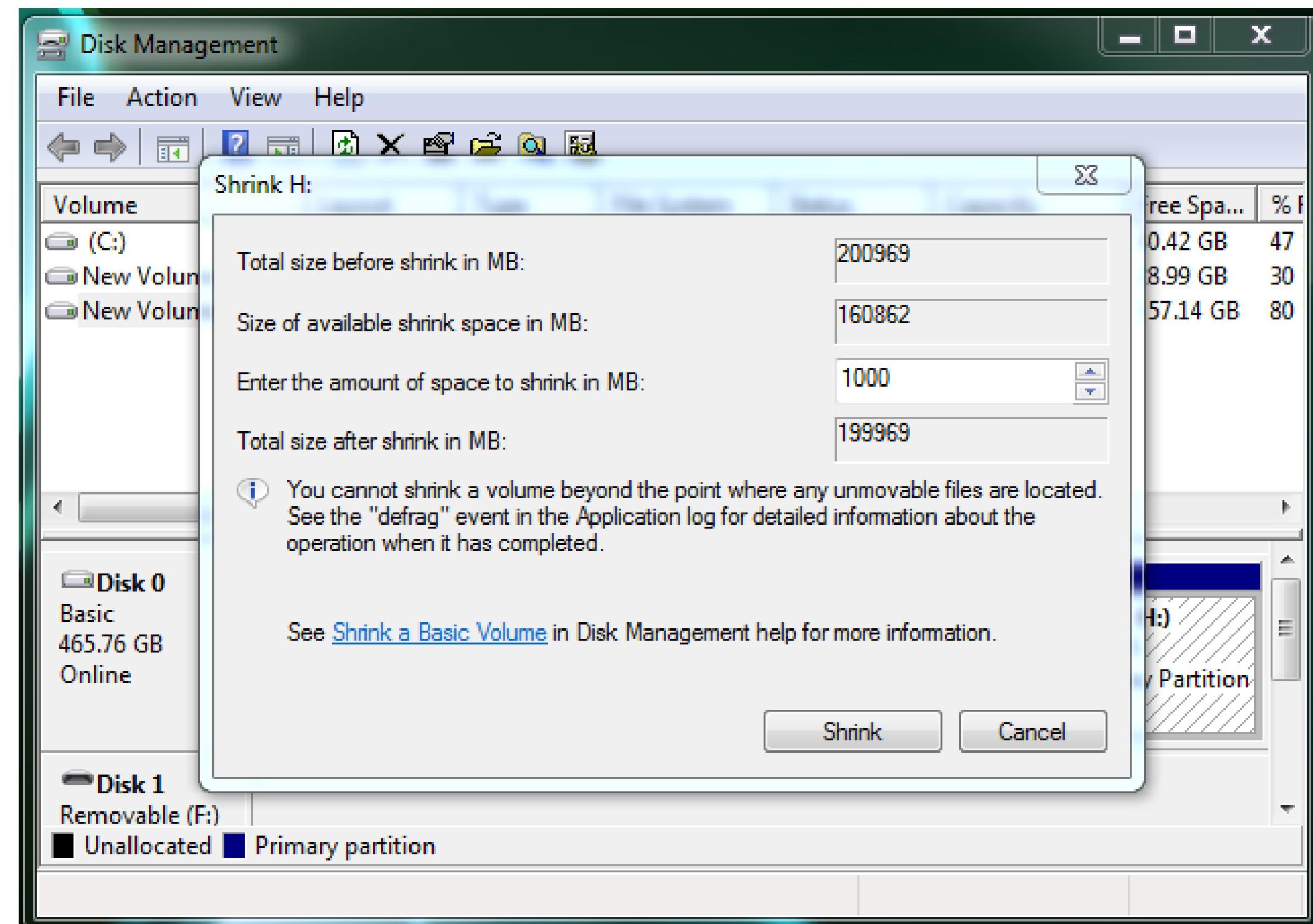
On your desktop, search for **Computer Management Tool** and click on **Disk Management Tool**, you should see all of the disks and their partitions on your computer



Steps To Create A Partition

STEP 2:

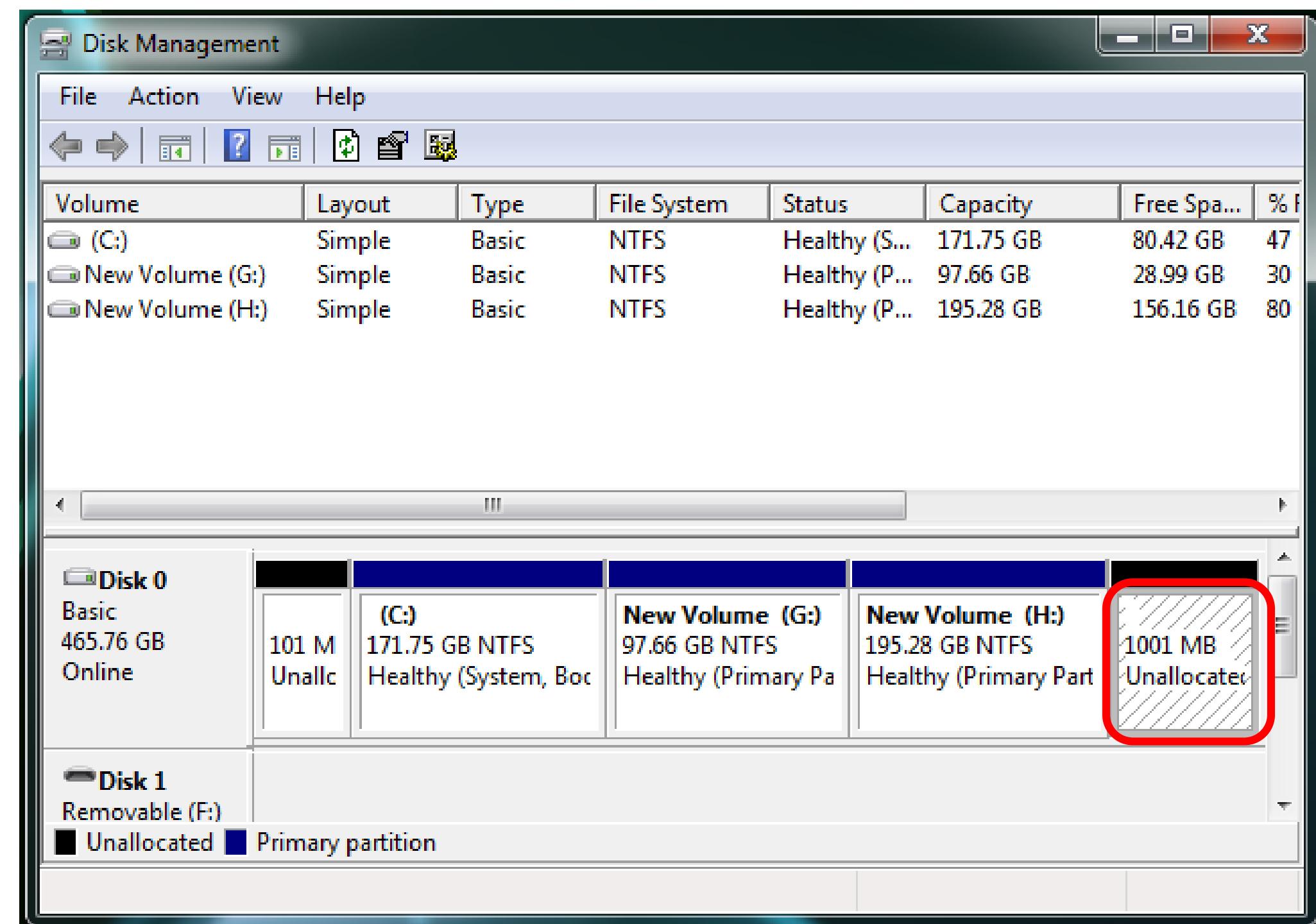
To make some space for the new partition, **right-click** on the partition you wish to re-size and select the **Shrink Volume** option



Steps To Create A Partition

STEP 3:

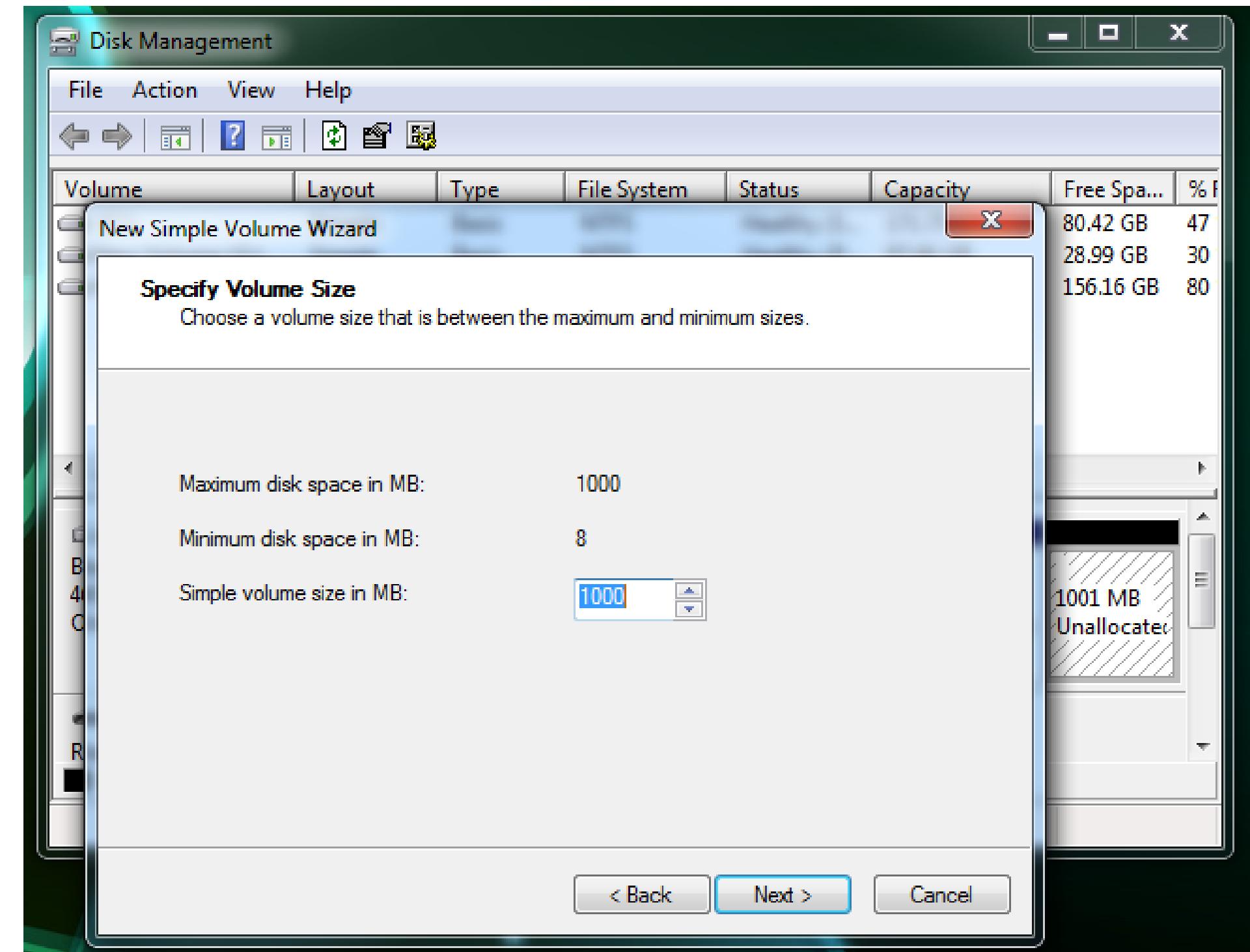
To create a new volume, you should now see a new **unallocated partition** in your Disk Management window and **right-click** on the **unallocated partition** and **select the New Simple Volume option**



Steps To Create A Partition

STEP 4:

To enter size of the new partition,
enter the amount of memory you wish
to allocate for **new partition** and click
on the **Next button**

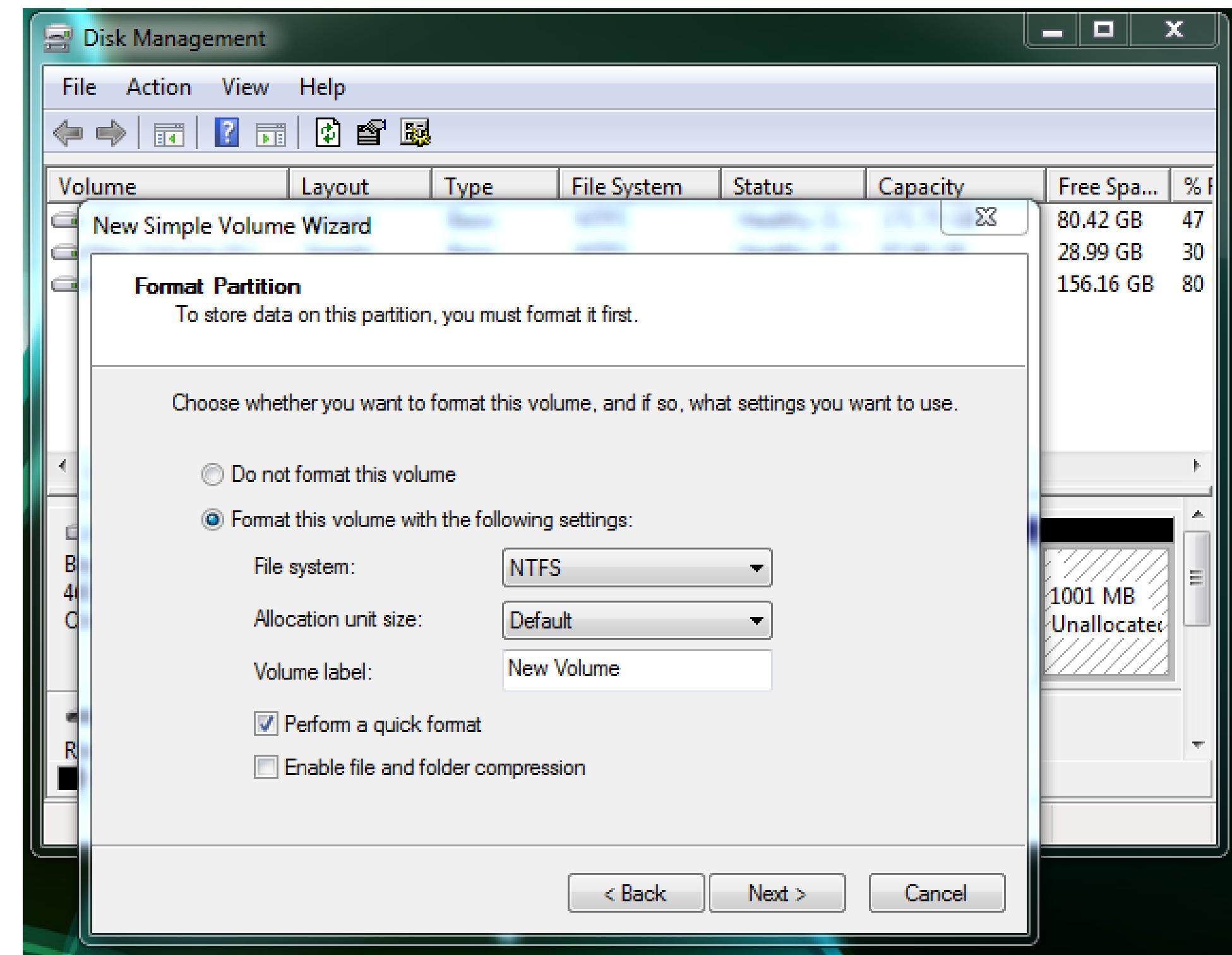


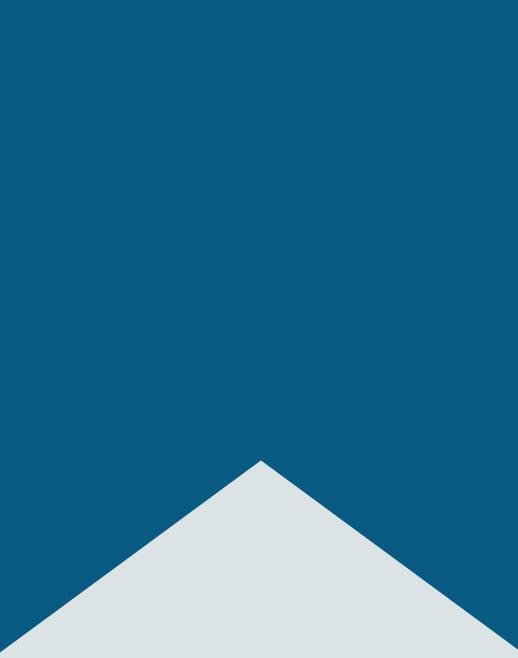
Steps To Create A Partition

STEP 5:

Click on the "Format this volume" and follow the settings:

1. For File System, select **NTFS**
2. For Allocation unit size, select **Default**
3. For Volume Label, type the **Name** you wish to give your new drive.
4. Click on the **Perform a quick format**
5. Then click on the **Next button**





Multi – Boot

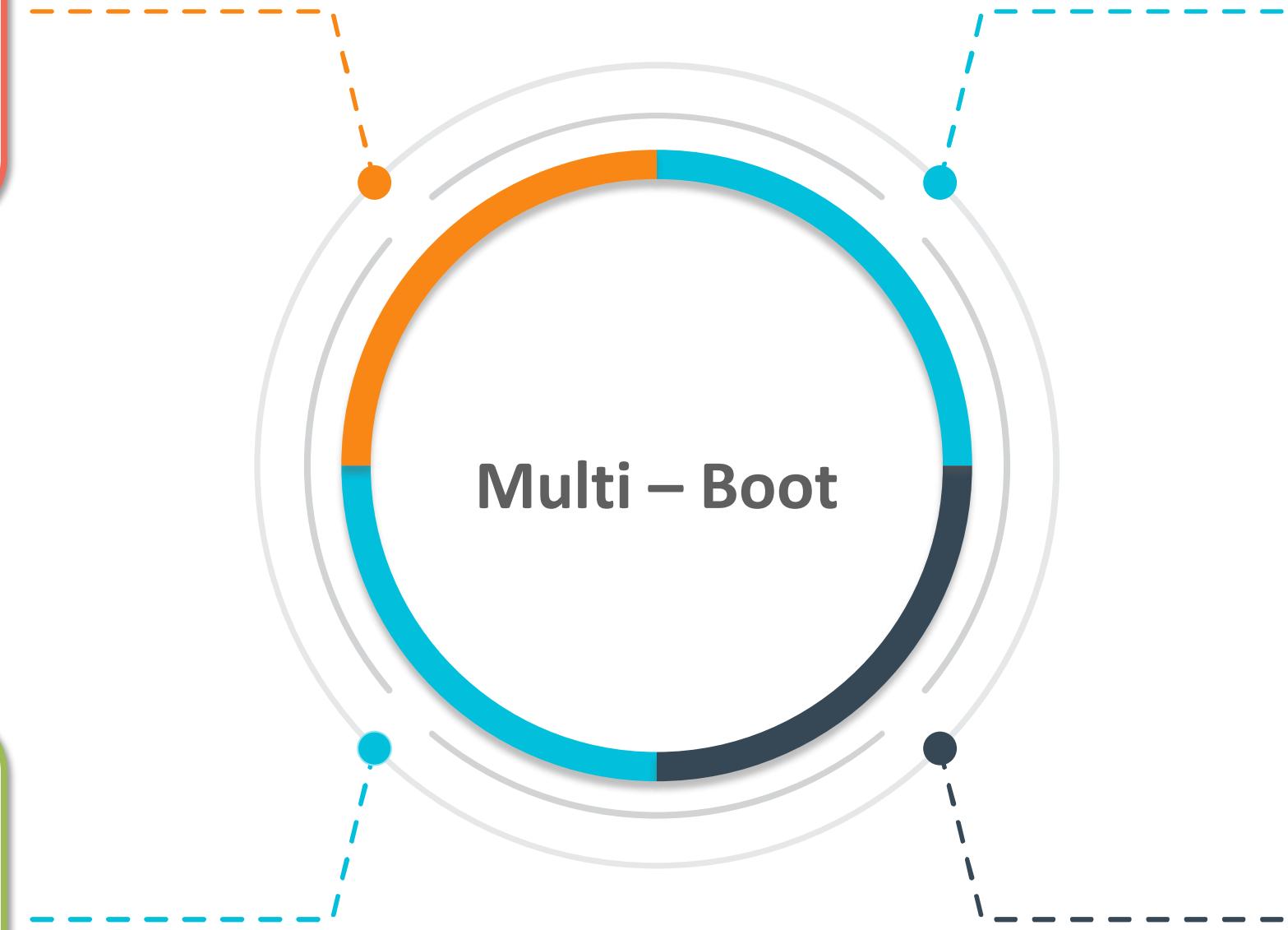
Multi – Boot System

You can have multiple OS on a single hard-disk by creating partitions and you may choose any of the one to boot

The boot loader can be different for different OS. Grub is the bootloader installed during the installation of Linux

Grub has higher priority than Windows and allows you to choose the operating system during the boot time if multiple OS are present

Having multiple OS allows you to switch between them based on usage, but will require a reboot



Boot Priority

01

Boot priority is set as the boot-device to start booting from the start-up

02

Boot device can be hard-disk, CD, Removable Device, Network boot, etc.

03

By default it is set as Hard-disk to be given the highest priority

04

To install a new OS one needs to change the priority to enable CD/USB/Floppy to get the highest priority

05

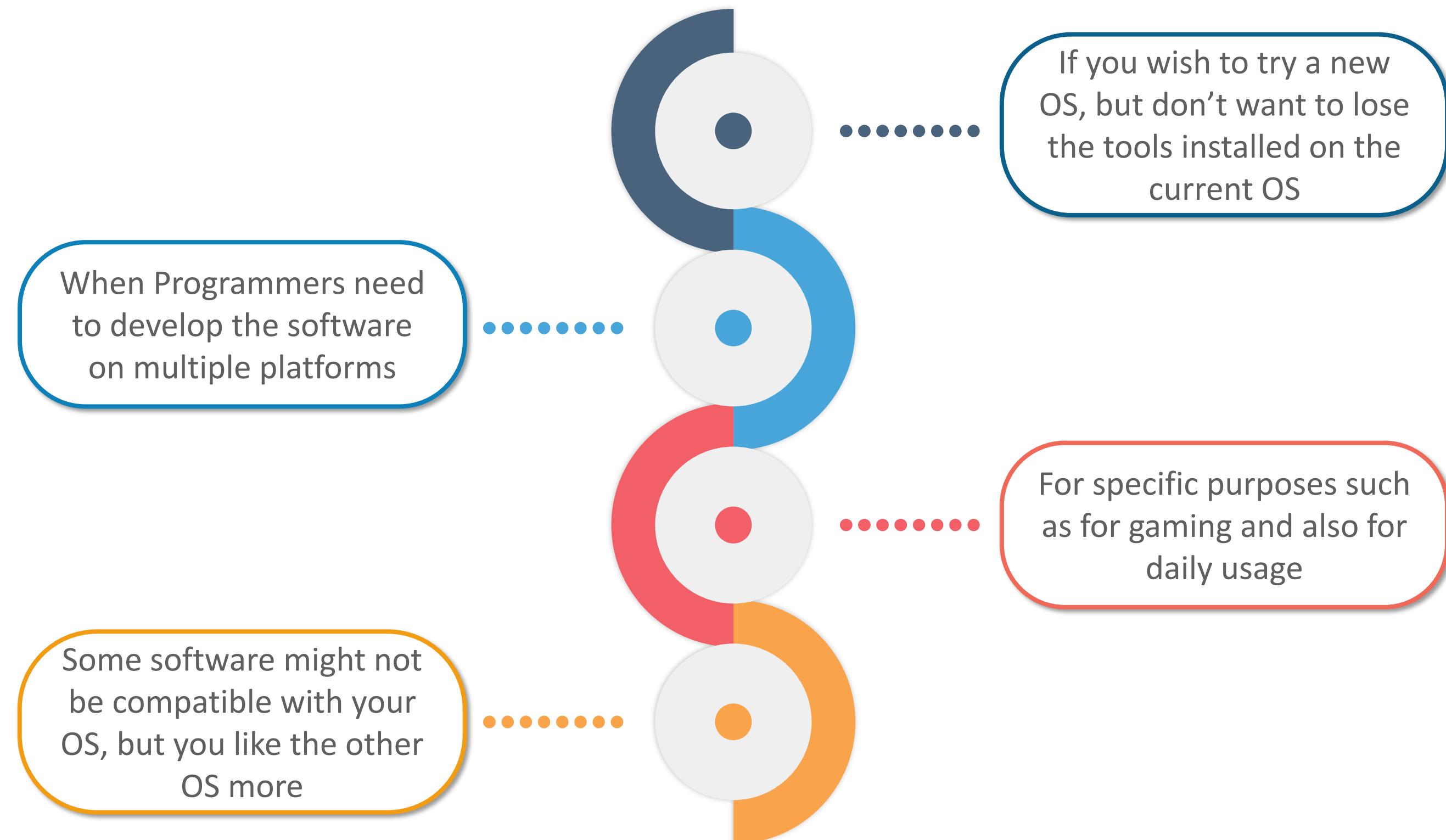
One needs to enter the BIOS mode (typically pressing F10/F12 during startup) to change priority

Dual Booting Ubuntu And Windows

If you have installed more than one OS on your system, dual booting can be possible where the demo having options for booting either Ubuntu or Windows 7



Why Choose Multi-boot?



Setting Default Operating System

- An operating System is chosen by default if no trigger is received from user after some wait time
- Steps to assign a default Operating System in Windows:

01

Click on “Start” Menu and go to “Control Panel”

02

Go to “System and Security”. Click on “System”

03

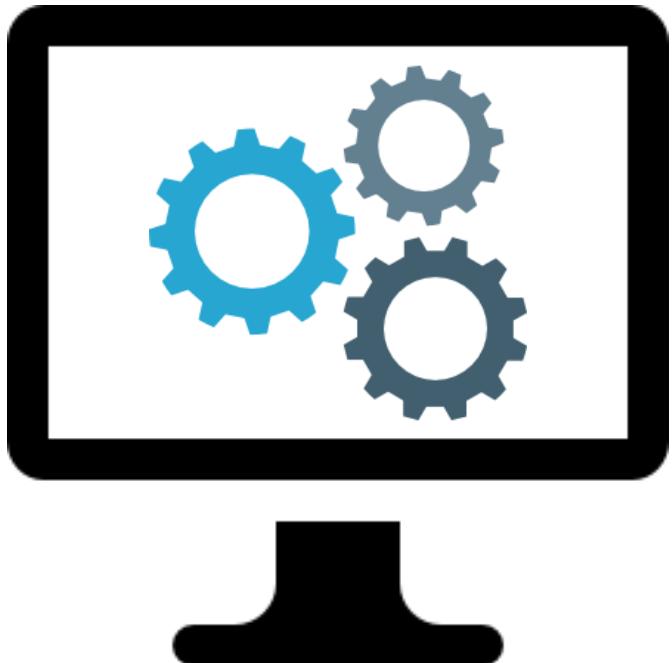
Now click on “Advanced System Settings” submenu on the right side

04

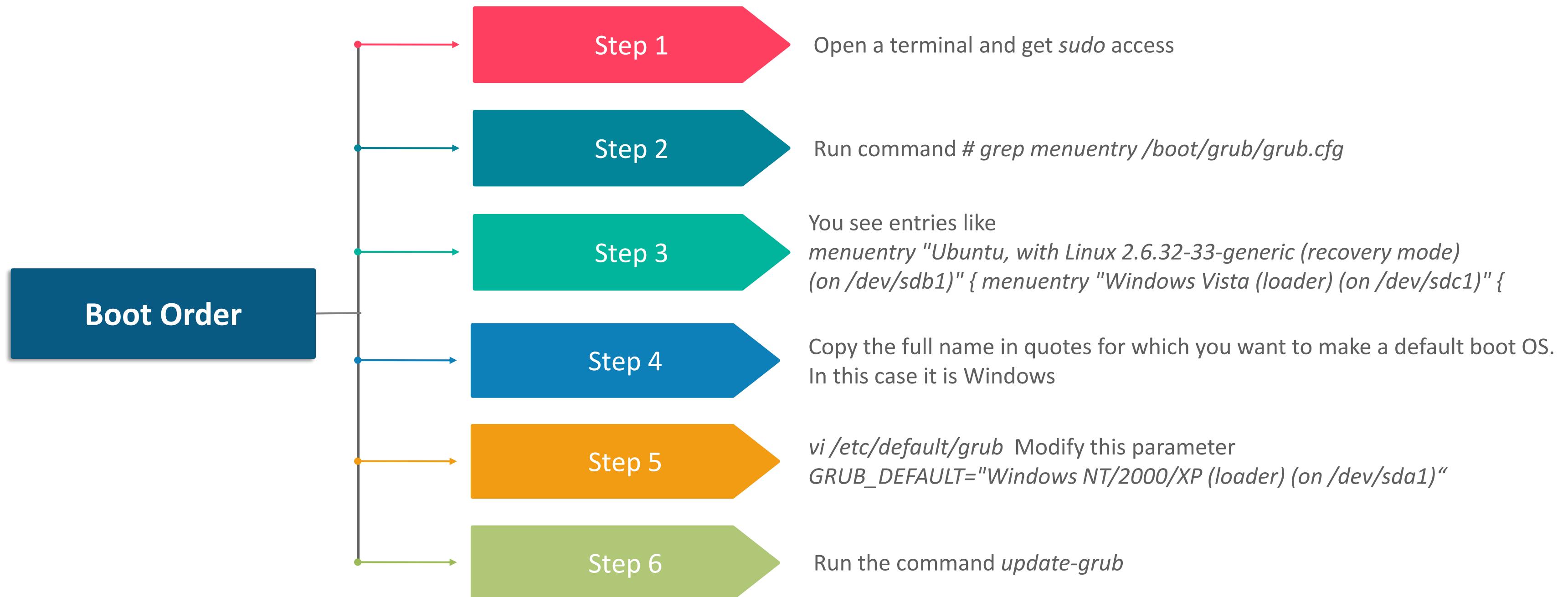
Go to “Advance” Tab. Click on “Settings” under “Startup and Recovery”

05

Choose the desired Operating System



Changing The Boot Order



Kickstart Files

Using kickstart, a system administrator can create a single file containing the answers to all the questions that would normally be asked during a typical installation

- All kickstart scripts and the log files of their execution are stored in the */tmp* directory
- Kickstart installation can be performed using a local DVD, a local hard drive or via NFS, FTP, HTTP, or HTTPS



To use kickstart, you must:

STEP 1: Create a kickstart file

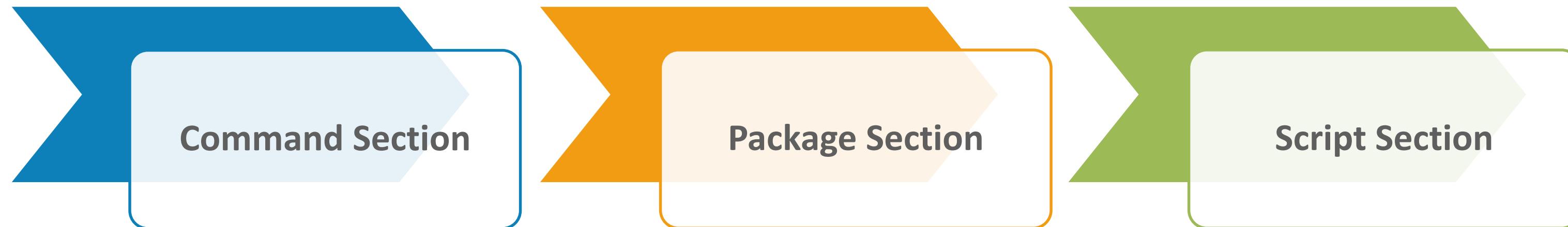
STEP 2: Create a boot media with the kickstart file or make the kickstart file available on the network

STEP 3: Make the installation tree available

STEP 4: Start the kickstart installation

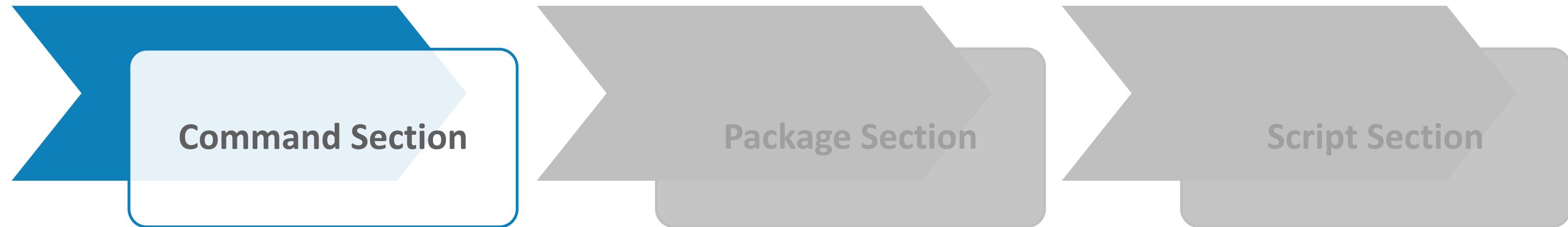
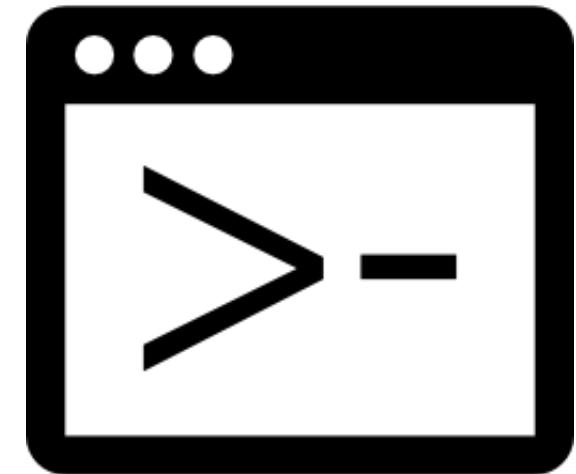
Anatomy Of A Kickstart File

- Kickstart files can be kept on a single server system and read by individual computers during the installation
- In RHEL it is written to the file `/root/anaconda-ks.cfg`
- There are three sections and it must be in order



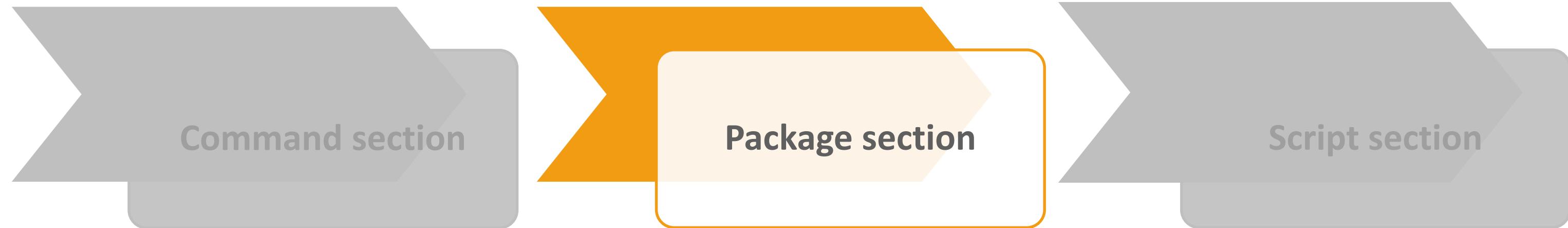
Command Section

- Command Section configures the system
- In the Command Section, omitted directives are prompted to the user



Package Section

- Percentage Package selects packages and groups for installation
- Here dependencies are always resolved



Script Section

- It is optional section(s) to customize the system
- Percentage pre scripts are run before installation
- Percentage post scripts are run after installation



Command section

Package section

Script section

Post Install Configuration

1

Update the Linux to get latest bugs fixed by updated package of running software
`# sudo apt-get update && time sudo apt-get dist-upgrade`

2

Create a user account to login and elevate the permissions

3

Disable the ssh root login and search for “#PermitRootLogin no” in `/etc/ssh/sshd_config` and remove the “#”

4

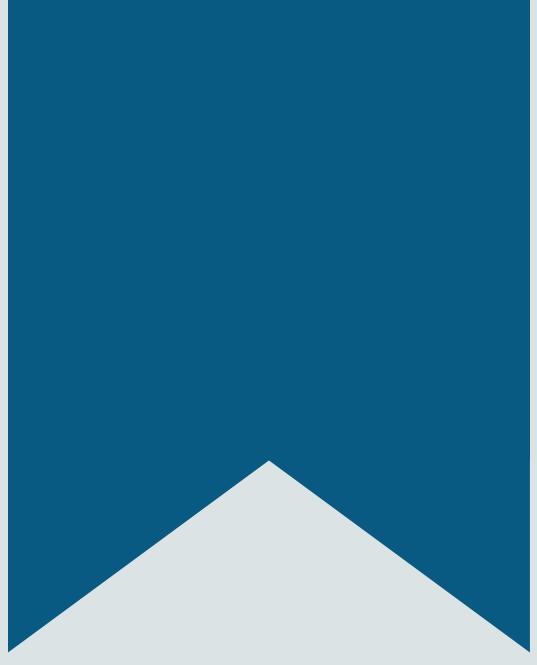
Enable the firewall for extra protection

5

Synchronize the date and time of the machine

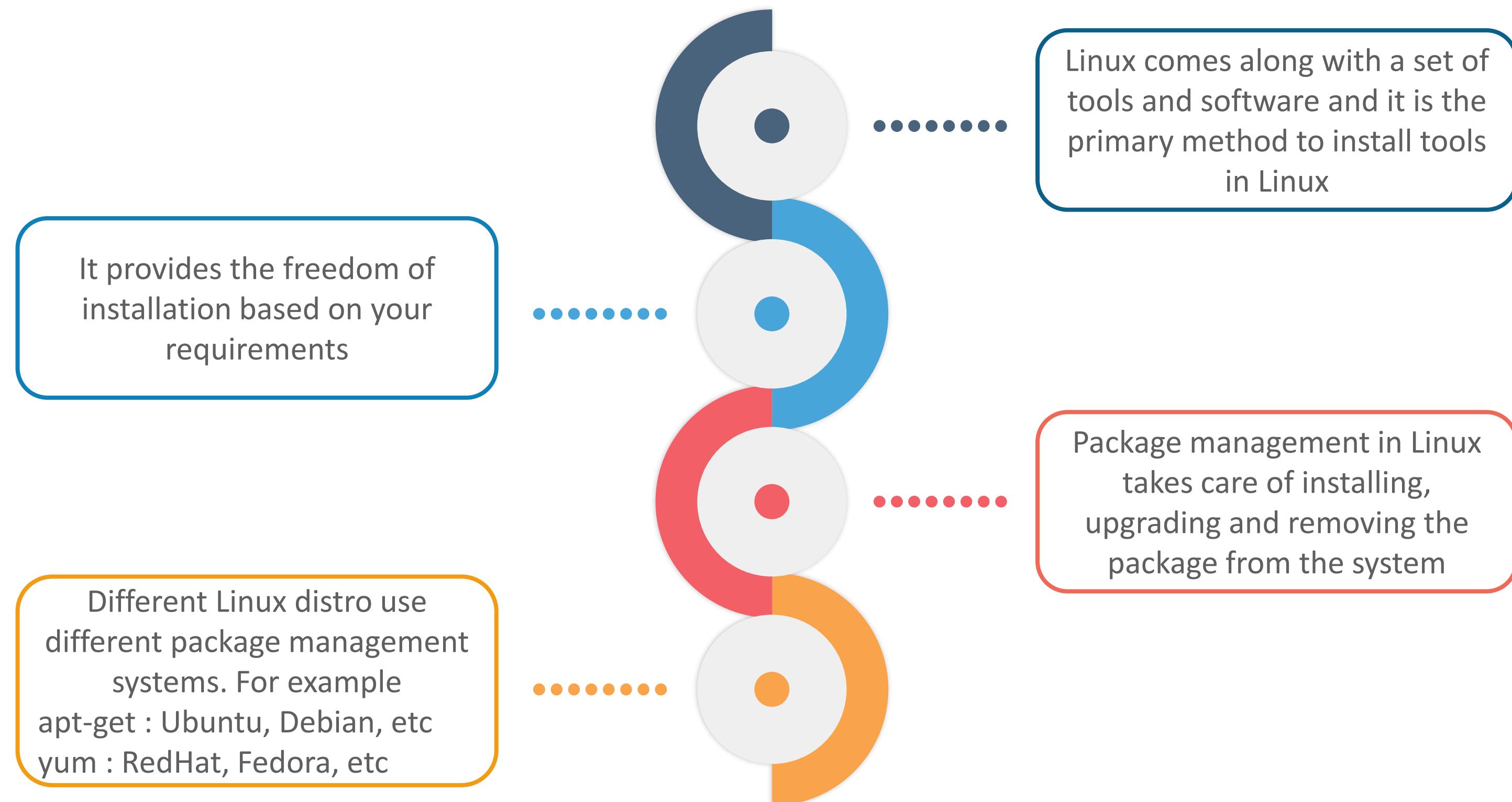
6

Based on your Linux distro, you may need additional configurations

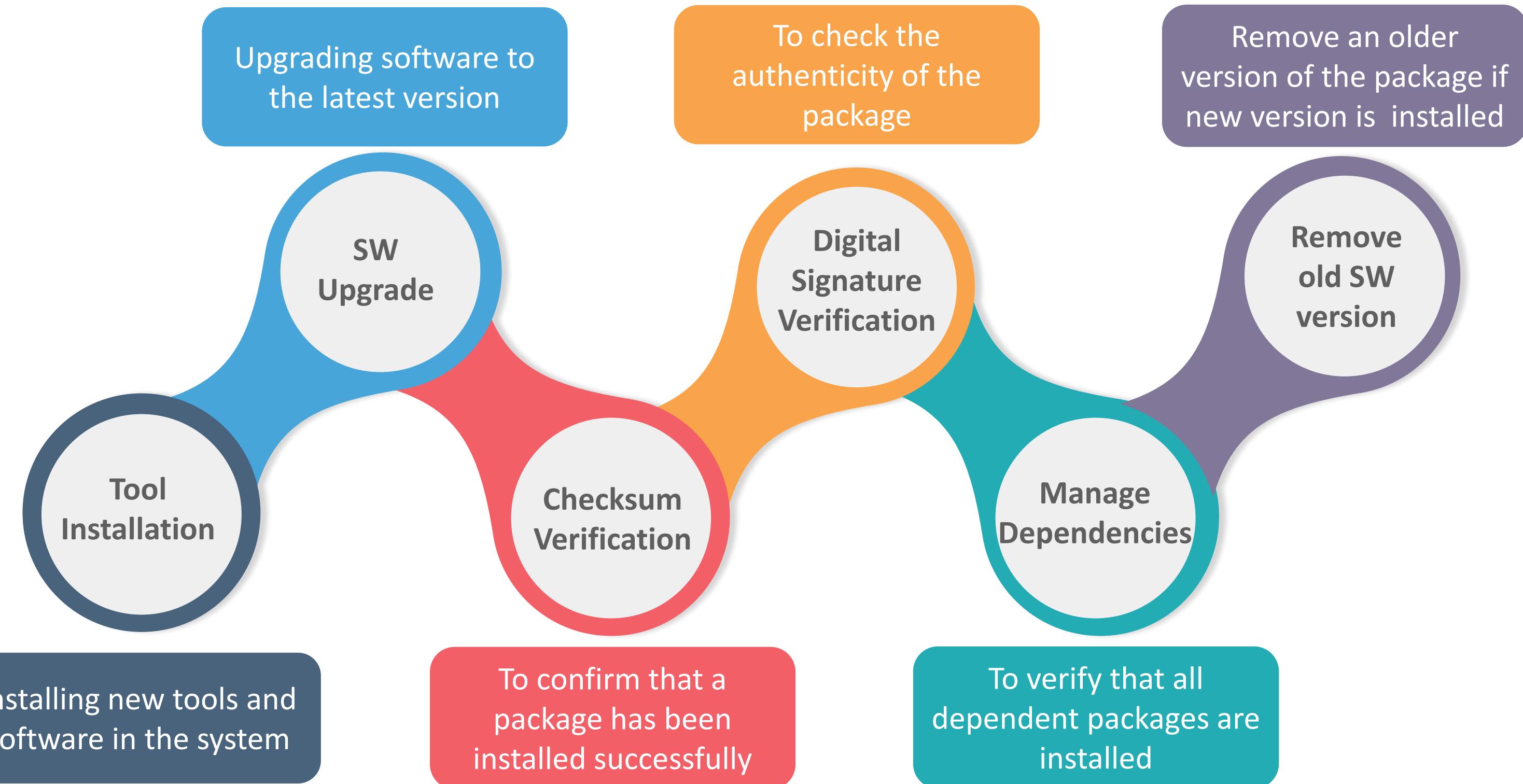


Package Management

Software Package Management



Tasks Of Package Management System



apt-get

apt-get is a package handling utility used in command line interface

Syntax

apt-get <command> <package>

//To install a new tool
apt-get install python

//To re-synchronize the tool
apt-get update
//To upgrade the currently installed tools
apt-get upgrade
//To remove a tool from the system
apt-get remove <package>
// Can be used to search for packages
apt-cache search <package>

yum

yum is a command line as well as graphical user interface based package handling tool

Syntax

yum <command> <package>

//To install a new tool
yum install python

//To update the tool to the latest stable version
yum update <package>
//To remove the tool
yum remove <package>
//To search for a particular package
yum search <package>
//To list all packages currently installed
yum list

Quiz

1. The file system used in Ubuntu is _____?
 - a. NTFS
 - b. XFS
 - c. Ext4
 - d. FAT

Answers

1. The file system used in Ubuntu is _____?

- a. NTFS
- b. XFS
- c. Ext4
- d. FAT

Answer C. The file system used in Linux is Ext4. Ubuntu is a Linux distro.

Quiz

2. A file has 5 lines of text. Which command/s can be used to print the lines on screen ?
- a. mkdir
 - b. cat
 - c. tail
 - d. pwd

Answers

2. A file has 5 lines of text. Which command/s can be used to print the lines on screen ?
- a. mkdir
 - b. cat**
 - c. tail**
 - d. pwd

Answer B,C Both cat and tail can be used

Example -

cat file.txt

tail -5 file.txt

Quiz

1. What is the command to check history of all “cd” commands?
 - a. Find cd
 - b. S/cd/history
 - c. history | grep cd
 - d. alias cd='history'

Answers

1. What is the command to check history of all “cd” commands?
 - a. Find cd
 - b. S/cd/history
 - c. **history | grep cd**
 - d. alias cd='history'

Answer C. History command is used to get a history of commands used and we can grep for a particular command with pipes.

Summary

In this module, you should have learnt:

- User Interface in Linux
- Basic Linux Commands and Tools
- File System in the OS
- Hard Disk Partitioning and Multi-Boot in a system
- Packaging Management in Linux



Questions



Thank You



For more information please visit our website
www.edureka.co