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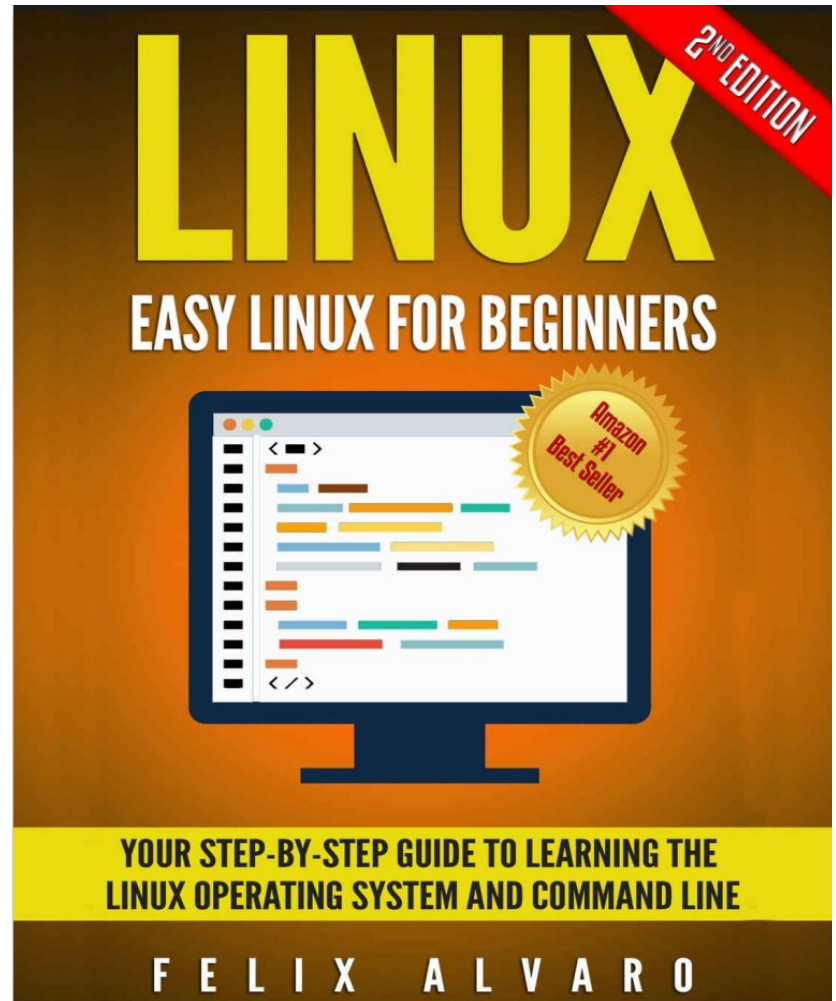


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Book we will be following



OPERATING SYSTEM



WHAT IS AN OPERATING SYSTEM?

- A computer, complete with all its parts – the CPU, mouse, monitor, and keyboard – will not work without a central program that will piece it all together
- In order to use a PC, you need a software inside which will take care of making the hardware work for you
- A special kind of software which is between the hardware of the PC, and the programs that you want to use and work with
- This piece of software is the Operating System, or more easily referred to as just an OS
- In short, an operating system is the software that brings together a computer's hardware and the different programs that you want to install on it
- Without it, when you booted up your PC, you would not get anything on the monitor, and neither mouse nor keyboard will work.

WHAT OPERATING SYSTEM DOES?

- **Initiate user interfaces**
 - An OS offers users ways to access the system either via a command line or a graphical user interface (GUI) Establish file systems
 - The OS handles the management of files (access, directories, and structure), including the access to the file system
- **Manage access and user authentication**
 - An OS allows for creating user accounts with different permissions for access to files and processes

WHAT OPERATING SYSTEM DOES?

- **Provide a platform for administrative use**
 - A computer's OS provides a platform for the administrator to
 - Add users,
 - Allocate disk space,
 - Install software,
 - Perform activities to manage the computer
- **Start-up services**
 - The OS manages several processes running in the background known as daemon processes

THE NAMES YOU HEARD THE MOST



macOS®

UNIX®



Linux

LINUX



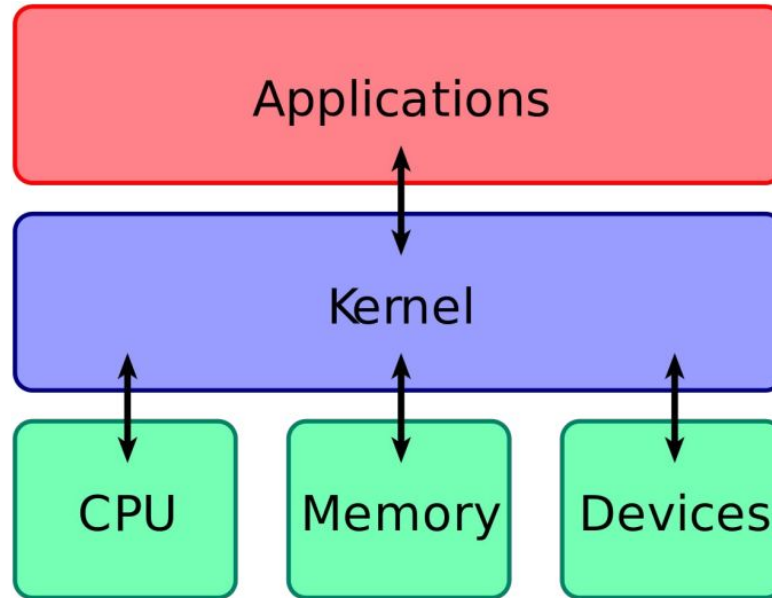
WHAT IS LINUX?

- Linux is an operating system, like the examples mentioned in the previous slide, and is often described as Unix-like
- The difference between Linux and other operating systems lies in the fact that Linux is an open-source operating system
- This means that Linux is continuously developed collaboratively
- Unlike Windows and MacOS which are both tied to the respective companies (Windows and Apple)
- Not one single company owns Linux' development and support
- Different companies sharing research, development, and the associated costs to upgrade linux operating system

WHAT IS LINUX?

- This open source cooperation among companies and developers has led to making Linux one of the best ecosystems for use from small digital wristwatches to servers and supercomputers
- Based on statistics, there are at least 100 companies and more than 1000 developers who work together for every kernel release
- Linux is composed of a kernel, the core control software, plus plenty of libraries and utilities that provide different features
- The kernel is the lowest level of the operating system
- The kernel is the main part of the operating system and is responsible for translating the command into something that can be understood by the computer

SIMPLIST OS ARCHITECTURE

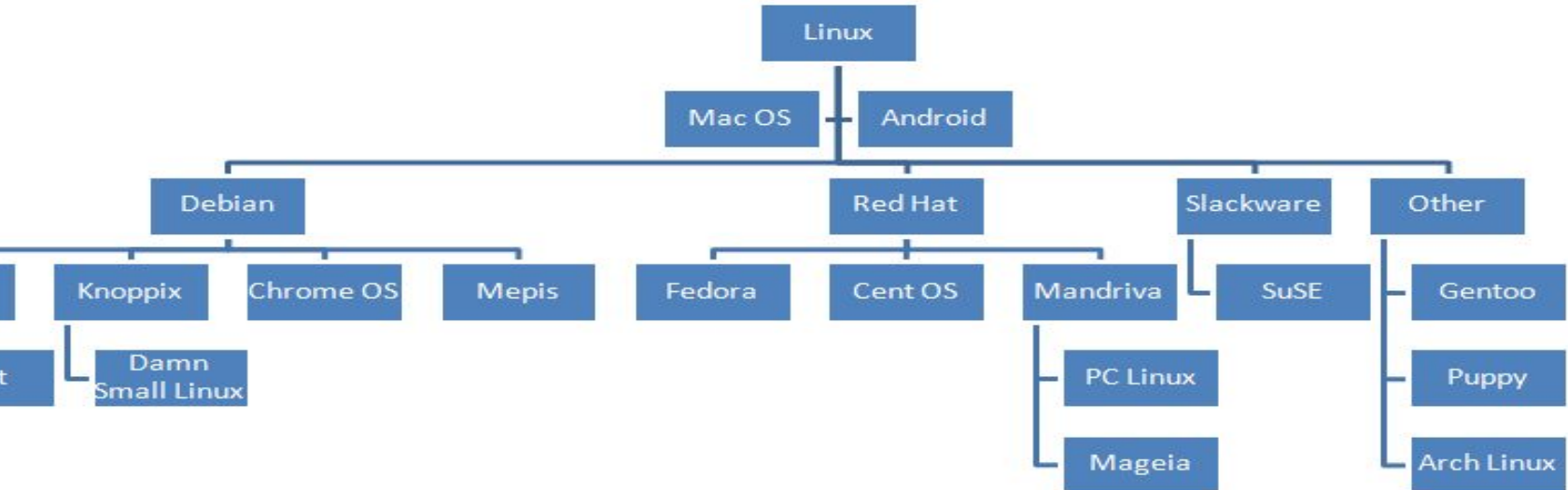


WHAT IS LINUX?

- The main functions of the kernel are:
 - Memory management
 - Network management
 - Device driver
 - File management
 - Process management
- Linux is available through many distributions. These are what we can call Linux flavours
- Distributions are groups of specific kernels and programs. The most popular ones include Arch, SUSE, Ubuntu, and Red Hat
- Even Android a mobile operating system developed by Google is based on a modified version of the Linux kernel along with other open source software

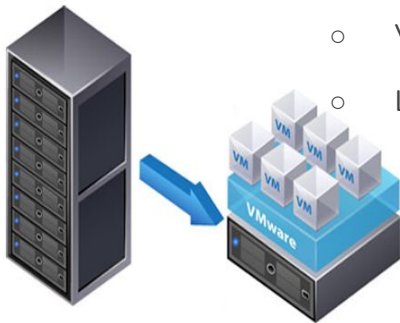


LINUX Hierarchy



ADDITIONAL CHARACTERISTICS

- In addition to the tasks performed by an operating system, Linux has the following characteristics
- **Supports clustering**
 - Multiple Linux systems can be configured to appear as one system from the outside
 - Service can be configured among clusters and still offer a seamless user experience
- **Runs virtualization**
 - Virtualization allows one computer to appear as several computers to users
 - Linux can be configured as a virtualization host
 - Where you could run other OS such as Windows, Mac OS, or other Linux systems
 - All the virtualized systems appear as separate systems to the outside world.

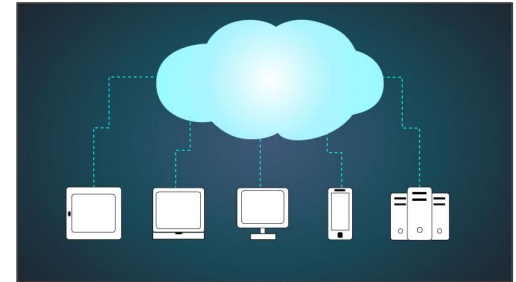


Server Virtualization

ADDITIONAL CHARACTERISTICS

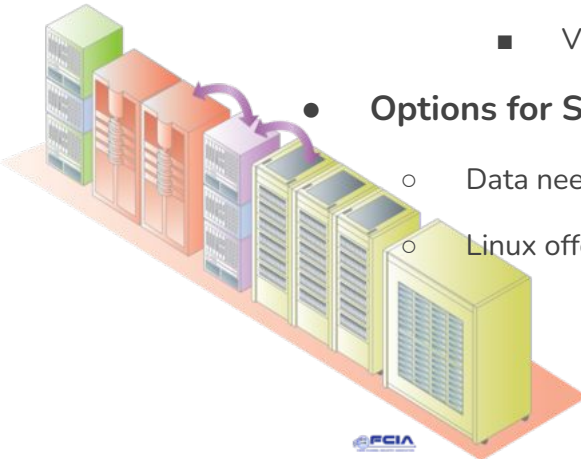
- **Cloud Computing**

- Linux can handle complex, large-scale virtualization needs including
 - Virtual networking: a technology that facilitates data communication between two or more virtual machines (VM),
 - Networked storage,
 - Virtual guests (supports guest operating system using VM)



- **Options for Storage**

- Data need not always be stored in your computer's hard disk
- Linux offers different local and networked storage options



STORY BEHIND THE NAME LINUX



LINUX + X



Linus Benedict
Torvalds



Ari Lemmke






- Linus Benedict Torvalds, a student from Finland, created Linux in 1991 using C and assembly language
- Linux was developed as a free, open source, open license operating system, which enables developers around the world to study and modify the OS
- Initially, Torvalds named the operating system he invented as Freax, a combination of the words “free”, “freak”, and “x”
- He uploaded his files to an FTP server where his colleague, Ari Lemmke, was the FTP server administrator
- Lemmke thought Freax was not a good sounding name so he renamed the folder to Linux (LINUX + X) without telling Torvalds
- Later on, Torvalds approved the name change

HISTORY

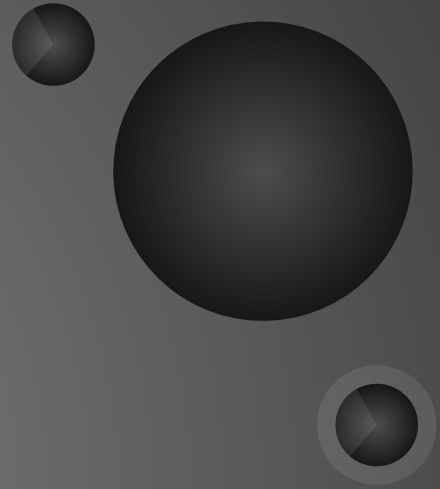
- In 1992, Linux was licensed under GNU - General Public License (GPL) and the first Linux distributions (also called distro) were created
- Several distributions have been created over time:
 - Slackware - the oldest existing distro,
 - Debian - the largest community distribution,
 - Red Hat and SUSE - commercial distributions



LINUX Distros Compared

	distro	started	pkgs	format	architectures
	Fedora (Redhat)	2003 (1995)	8,000	rpm	x86 x86-64 ppc ppc64
	openSUSE (Novell)	1994	22,000	rpm	x86 x86-64 ppc
	Mandriva	1998	~20,000	rpm	x86 x86-64
	Debian	1993	~25,000	deb	x86 x86-64 ia-64 ppc ppc64 sparc64 arm hppa mips s390 s390x alpha
	Ubuntu (Canonical)	2004	~25,000	deb	x86 x86-64 (ppc)

Through collaborative works, Linux is now one of the most powerful operating systems. Data shows that **98.8%** of the world's fastest systems use the Linux kernel



LINUX VS OTHERS



LINUX VS OTHER OS

- Cost
 - Other than Linux commercial distributions all other linux flavours are free
- Viruses
 - Linux hardly gets any viruses
 - With many developers working on Linux, there are more eyes focused on seeing security flaws
- System Stability
 - Linux is used in servers and supercomputers which cannot afford server restarts
 - Large-scale systems can go on for years without restarting the server
- Installation
 - Linux flavours comes with text editor, spreadsheet, presentation program, photo editor, web browser, movie player, PDF reader, and the like
 - In other OS like windows etc we have to install all the other software that you need one-by-one
- Support
 - Linux has a large community online where new users can get information, read FAQs, and ask questions if there are programs or features that you think are not working right

LINUX ARCHITECTURE



LINUX ARCHITECTURE

- Linux architecture can be divided into two spaces
 - The User Space,
 - the Kernel Space
- **User Space**
 - This is where the applications are used.
 - The GNU C library, in the User space, is the interface that connects to the kernel and transitions between User and Kernel space
 - This uses all the available memory
- **Kernel Space**
 - All Kernel services are processed here. The Kernel space is further divided into 3

LINUX ARCHITECTURE

- **System Call Interface**

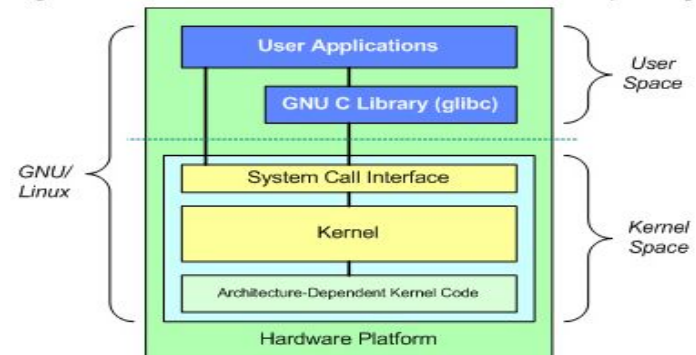
- A User process can access Kernel space through a System Call
- When a System Call is performed, arguments are passed from User to Kernel space. This is the layer that implements basic functions

- **Kernel Code**

- This is the architecture-independent code, and can be seen in all architectures that Linux supports.

- **Architecture-Dependent Kernel Code**

- This is the layer for platform-specific codes



LINUX DISTRIBUTIONS



LINUX DISTRIBUTIONS

- Each Linux distribution consists of a Linux kernel plus utilities and configuration files
- Most Linux distributions can be downloaded from their websites
- Several of the popular Linux distributions, or flavours, differ from each other based on the following criteria
 - **Availability**
 - Linux is a free software, but companies offering a support contract and proprietary components offer it for a fee
 - **Package Format**
 - Linux distributions come in packages
 - Packages are files grouped into one single file. RPM is the most commonly used

LINUX DISTRIBUTIONS

- Release Cycle

Distribution	Availability	Package Format	Release Cycle
Arch	Free	Pacman	Rolling
CentOS	Free	RPM	Approx. 2-yr
Debian	Free	Debian	2-yr
Fedora	Free	RPM	Approx. 6-mo
Gentoo	Free	Ebuild	Rolling
Mint	Free	Debian	6-month
openSUSE	Free	RPM	8-month
Red Hat Enterprise	Commercial	RPM	Approx. 2-yr.
Scientific	Free	RPM	Approx. 6-mo
Slackware	Free	Tarballs	Irregular
SUSE Enterprise	Commercial	RPM	2-3 years
Ubuntu	Free	Debian	6-month

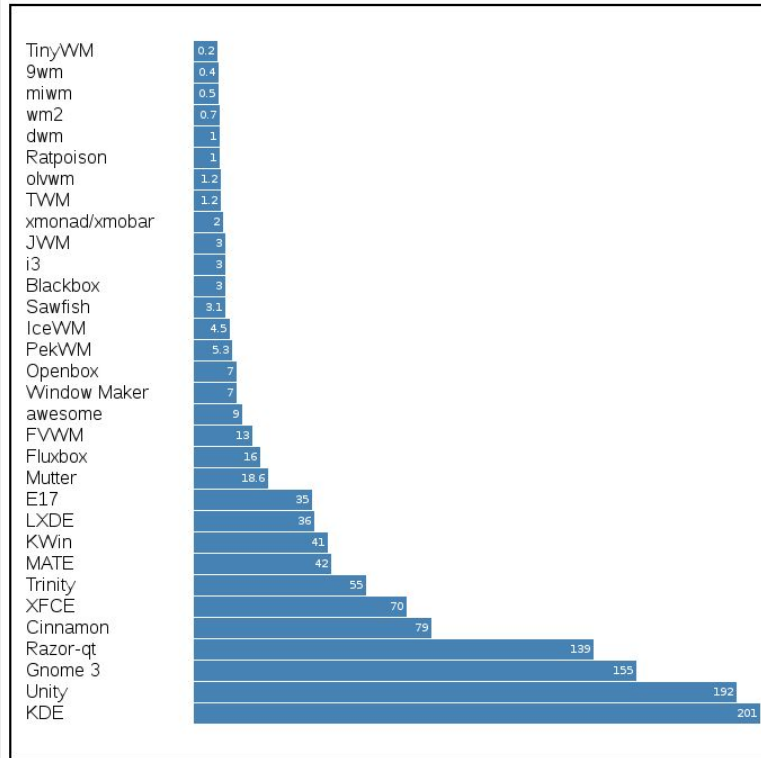
WHICH LINUX TO CHOOSE



WHICH LINUX TO CHOOSE

- Few thing can be considered before choosing any Linux flavour
- **Desktop environment**
 - Do your research and find out if the particular distribution that you're eyeing has a basic look and feel that you like, please check how customizable it is
- **Hardware Compatibility**
 - Check hardware compatibility, some drivers might not be available yet by the time you install your distro
 - We can check from online resources first to know which ones can be supported out-of-the-box.
- **Community Support**
 - Find the one with a large online community.
 - The bigger the community is, the easier it will be to find documentation and get support

Desktop Environments



INSTALL UBUNTU





Google Chrome



Document Vie...



Visual Studio ...



VLC media pla...



Files



OBS Studio



LibreOffice Calc



Settings



Software Upd...



Ubuntu Softw...



Calculator



Image Viewer

UBUNTU

WINDOWS ALIKE EXPERIENCE

Frequent

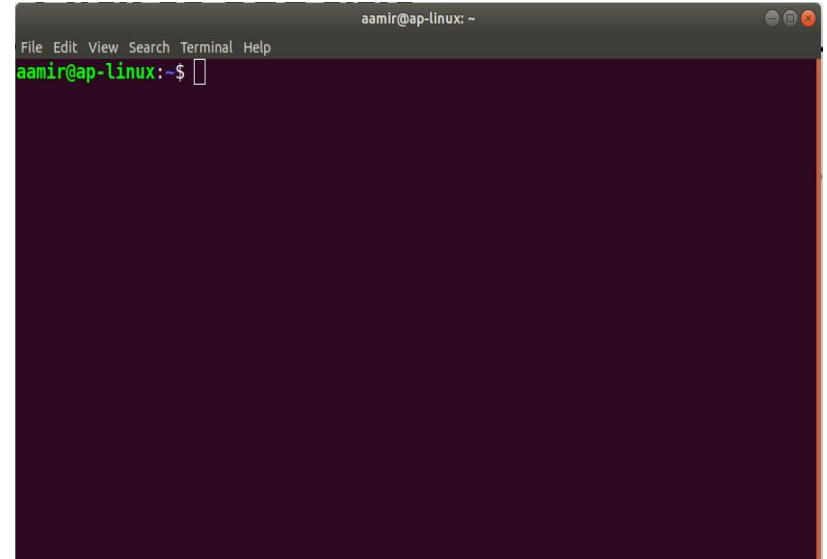
All

LET'S EXPERIENCE LINUX



LINUX SHELL

- Linux distribution uses the root username for administrator access
- The desktop that comes up is either KDE or GNOME
- The GUI for KDE or GNOME provides the best way to explore Linux through icons, windows, and pointers
- Alternate to it is Terminal / Console window
- If you notice image above in which you will find **aamir@ap-linux:~\$**
- This is called shell



LINUX SHELL AND COMMANDS

- The shell is where you can run executable files and shell scripts.
- The shell is also what we call the command line. Commands are written using the general syntax below:

command **option1** **option2** . . . **optionN**

- For example you can try following command

```
aamir@ap-linux:~$ uptime  
14:25:03 up 3 days, 13:15, 1 user, load average: 1.95, 1.81, 1.07
```

- **uptime** is the command that shows the duration that the computer has been up. In this case, the computer has been up for the last 3 days

LINUX SHELL AND COMMANDS

- For example you can try following command

```
aamir@ap-linux:~$ uname -srv
```

```
Linux 4.15.0-46-generic #49-Ubuntu SMP Wed Feb 6 09:33:07 UTC 2019
```

- **uname** is the command to show the operating system name.
 - -s (print the operating system name),
 - -r (print the operating system release),
 - -v (print the operating system version) are options that you can use for the uname command

```
aamir@ap-linux:~$ uname --help
```

```
Usage: uname [OPTION]...
```

```
Print certain system information. With no OPTION, same as -s.
```

```
-a, --all          print all information, in the following order,  
                  except omit -p and -i if unknown:
```

LINUX SHELL AND COMMANDS

- To know about the options that you can use for a particular command, you can use the `man` command

```
aamir@ap-linux:~$ man hostname
```

```
UNAME(1)
```

```
User Commands
```

```
UNAME(1)
```

```
NAME
```

```
    uname - print system information
```

```
SYNOPSIS
```

```
    uname [OPTION]...
```

```
DESCRIPTION
```

```
Print certain system information.  With no OPTION, same as -s.
```

```
-a, --all
```

```
    print all information, in the following order, except omit -p  
    and -i if unknown:
```

```
-s, --kernel-name
```

```
    print the kernel name
```

```
-n, --nodename
```

ROOT USER

- In computing, the superuser is a special user account used for system administration
- The root user can do many things an ordinary user cannot for example install new software, removing any existing application, making change in any system settings etc.
- Depending on the operating system (OS), the actual name of this account might be root, administrator, admin or supervisor
- To switch to root while in the shell, enter the command **su** - and then input your root password
- Changing to root password while in the shell environment will allow you to run tasks that only administrators and superusers can do

```
aamir@ap-linux:~$ su
Password:
root@ap-linux:/home/aamir# exit
exit
aamir@ap-linux:~$
```

LINUX DESKTOPS



LINUX DESKTOPS

- There are two commonly used GUIs that come with Linux distributions:
 - GNOME
 - Acronym for GNU Network Object Model Environment. (Pronounced guh-nome)
 - GNOME is a Windows-like desktop system that works on UNIX and UNIX-like systems and is not dependent on any one window manager
 - KDE
 - Acronym for K Desktop Environment
 - KDE GUI is equipped with everything users typically need, including a file manager, window manager, help tool and system configuration tool
- You can have both installed in your computer and switch between the two whenever you want to
- Both GUIs also run on Unix, and while there are other GUIs that can be installed on Linux, these two remain as the most popular in use

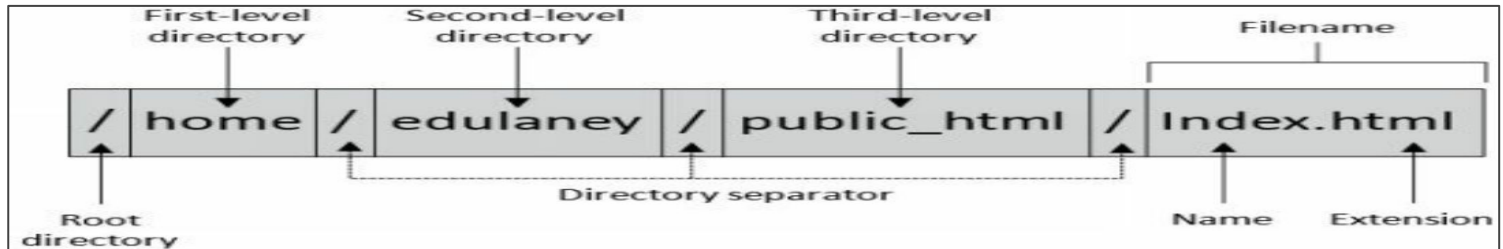
CRITERIA	GNOME	KDE
Availability	Free	Free
Minimum System Requirements	700 MHz CPU, 768 MB RAM	1 Ghz CPU, 615 MB RAM
Customization Experience	The interface is simple to use and great for first-time Linux users, advanced users may find its customization settings as limiting	<p>Allow for versatile configuration that creates great looking desktop, but the user has to learn to navigate the options.</p> <p>Customization makes it more resource-intensive</p>
Default appearance	Default setting: Toolbar at the top and a dock that pops out featuring application icons	Default setting: toolbar at the bottom and a main menu
Resource Usage and User Experience	Less resource-intensive than KDE	Good for users who came from Windows OS

LINUX FILESYSTEM



LINUX FILESYSTEM

- Linux organizes files using a hierarchical system
- Files are stored in directories and these directories can also contain other directories
- When you compare the Linux filesystem to Windows, you will find that there are no drive letters in Linux
- All files are stored in a single root directory noted as “/” regardless of where the data is physically stored (hard drive, external drive, or CR-ROM).
- To find a file in Linux, you also need the information about the directory hierarchy known as the pathname



LINUX FILESYSTEM

Top-Level Directory	Files that the directory contains
/	Single root directory – file system base
/bin	Executable files such as Linux commands cat,cp,ls
/dev	Files for the different hardware/devices
/home	User directories
/lib	Library files which includes driver modules
/media	Mounting removable media filesystems (You can find C,D and other partitions in it)
/var	Log files

LINUX FILESYSTEM AND COMMANDS

- To navigate in the directories on Linux, you can either use the
 - GUI to find a certain file by going through the folders,
 - Using the universal text-based search function,
 - By using the command line.
- You can use the following useful commands in your terminal to navigate and work in the file system:

Commands	What it does
ls	List down all the contents of a director
cd /bin/	Changes directory and goes to bin dir
cd ~	the tilde (~) sign signifies the user's home dir – change dir to home director

LINUX FILESYSTEM AND COMMANDS

Commands	What it does
<code>cd ..</code>	Means to change directory one level up
<code>mkdir</code>	A command used to create directories
<code>pwd</code>	Short for present working directory. This command will display the directory where you are currently in
<code>cat <filename></code>	Command to print all the contents of provided filename on the screen
<code>cp /home/ /tmp/</code>	Copy contents of /home/ to /tmp
<code>mv /directoryName/file1.txt /newDirectoryName/</code>	Move the file file1.txt to the /newDirectoryName/ directory. You can also use this command to move the entire directory to another Directory
<code>rm file1.txt</code>	Delete the file file1.txt. Take extra precaution in using the rm command, especially when you are logged in as root
<code>find / -name "linux*"</code>	The find command is a powerful tool that you can use when searching using the command line. The command here will search for any file or directory with a name that starts with linux

POST-INSTALLATION ACTIVITIES



CPU



CPU

- The operating system keeps programs and hardware working together smoothly
- The capabilities of Linux are affected by the limitations of your system's hardware (for example, disk space and memory) so it is important to know more details about your computer's hardware
- Let's start with the central processing unit (CPU)
- The CPU performs all the computing and its speed (in MHz) signifies how fast your computer can handle transactions
- Your CPU specs will also tell you about the CPU family (most common are x86 and x86-64) and the number of "cores" that it has
- To increase performance, manufacturers add additional "cores," or central processing units

CPU

- For example a dual-core CPU has two central processing units, quad core has 4 central processing units so it appears to the operating system as two/four CPUs
- A CPU with two cores, for example, could run two different processes at the same time.
- This speeds up your system, because your computer can do multiple things at once

Commands	What it does
<code>uname -a</code>	This command displays information about the machine, the processor architecture, and the operating system details.
<code>lscpu</code>	This command returns more information about the system such as the number of CPUs and the CPU speed
<code>cat /proc/cpuinfo</code>	This is a file that contains more information than the one displayed using the <code>lscpu</code> command

HARD DISK

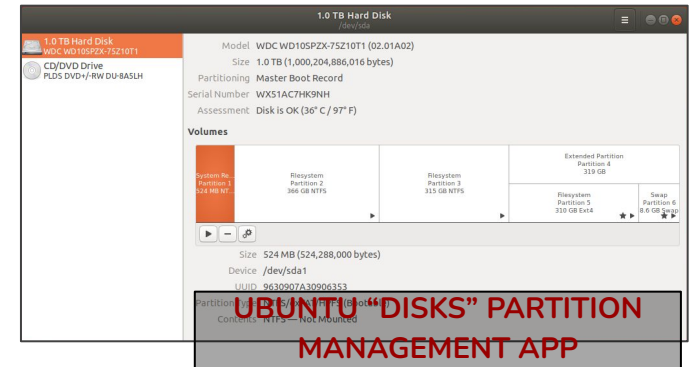


HARD DISK

- If you plan on adding a new disk in the future, learning how to partition will come in handy
- A disk partition or partition is a section of the hard drive that is separated from other segments
- Partitions enable users to divide a physical disk into logical sections, For example C Drive, D Drive etc in windows operating system
- Linux supports the following partitioning tools

Fdisk Tools

- This is composed of the text-based tools:
 - fdisk
 - cfdisk
 - sfdisk
- These tools are great for use in partitioning. However, it could be a bit overwhelming for beginners who are not yet familiar with partitioning



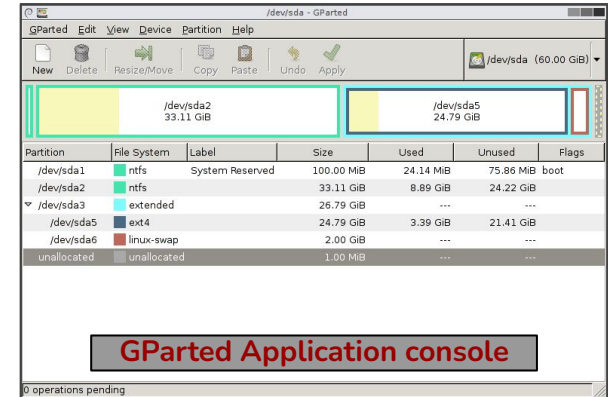
HARD DISK

- **libparted Tools**

- The libparted library presents both GUI and text-based partitioning tools
- GParted is a one of the free partition editor which can be downloaded and installed for graphically managing your disk partitions
- The interface makes it easier to use for beginners

- **GPT fdisk Tools**

- These are tools created for GPT (Globally Unique Identifier Partition Table) disks using the fdisk tools
- The GUID Partition Table (GPT) is a standard for the layout of partition tables of a physical computer storage device, such as a hard disk drive or solid-state drive, using globally unique identifiers (GUIDs)



HARD DISK

- Here are some commands that you can use to check the existing disk space on your computer

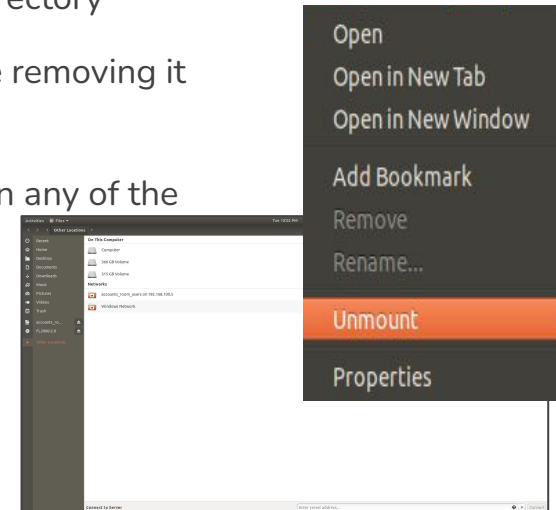
Commands	What it does
<code>df -h</code>	This command displays the disk space usage in all of the mounted devices. The -h option presents the results in a human readable output, using G for gigabytes or M for megabytes sizes
<code>du ~/Downloads</code>	This command displays all the files inside the specified directory and their corresponding file sizes. You can also specify a filename
<code>du ~/Downloads -sh</code>	The <code>-s</code> option provides the total file size of the specified directory and -h makes it human readable form

REMOVABLE STORAGE



REMOVABLE STORAGE

- Using storage such as USB flash drives and external hard disks in Linux works similarly when using Windows or Mac OS
- Plug the device in and Linux will detect the device
- Aside from accessing the drive via the desktop GUI, you can also navigate to the **/media** directory and find the mounted subdirectory
- After you use the removable media, unmount the disk before removing it to avoid any disk issues
- You can generally right-click on the Device Name and click on any of the options such as Unmount, Eject Volume, or Safely Remove

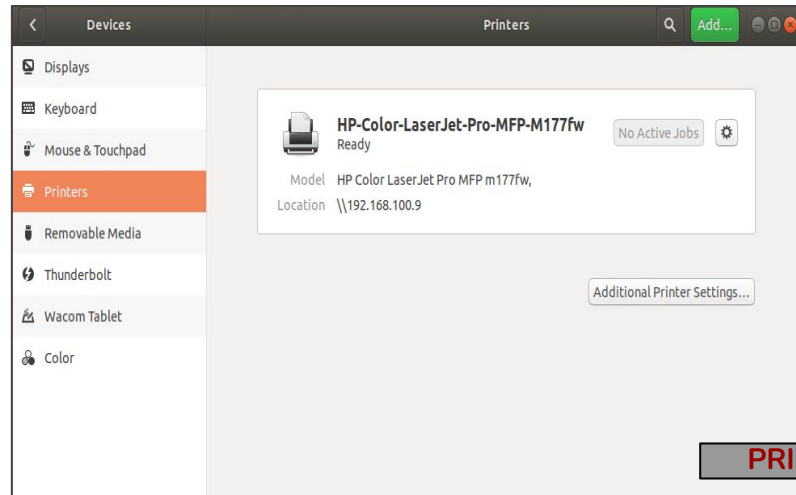


EXTERNAL USB DEVICES



EXTERNAL USB DEVICES

- You can connect other devices such as I/O devices (keyboard, mouse), cameras, mobile phones, scanners and printers to your Linux computer and expect that these work in a plug-and-play manner
- For printers, you will also need to set up the printer configuration after Linux detects the device



PRINTER SETUP SCREEN

INSTALLING ADDITIONAL SOFTWARE

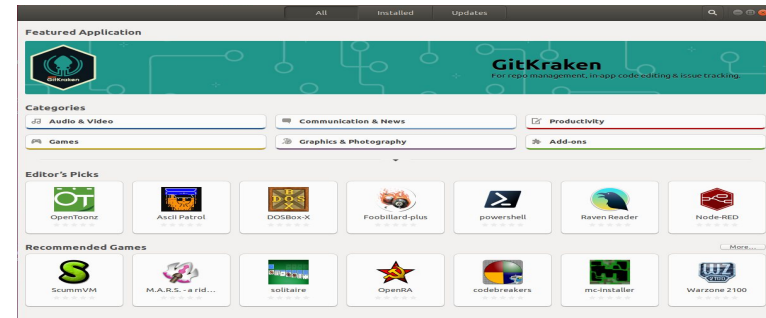


INSTALLING ADDITIONAL SOFTWARE

- Linux-compatible softwares come in
 - **.rpm** for RPM packages (Fedore, SUSE)
 - RPM Package Manager (also known simply as RPM), originally called the Red-hat Package Manager, is a program for installing, uninstalling, and managing software packages in Linux
 - The .rpm files are used primarily by distributions that derive from Redhat based distros (Fedora, CentOS, RHEL) as well as by the openSuSE distro
 - **.deb** for Debian packages (Debian, Ubuntu, Xandros)
 - A file with the DEB extension is a Debian Software Package file
 - The .deb files are meant for distributions of Linux that derive from Debian (Ubuntu, Linux Mint, Xandros etc.)
 - They're used mainly in Unix-based operating systems, including Ubuntu and iO

INSTALLING ADDITIONAL SOFTWARE

- Both of the file with either .deb and .rpm are more akin to a .zip file
- Even if the type of packages varies, both RPM and Debian packages can be installed in any type of Linux distribution
- Popularly used distributions provide a GUI for installing additional applications
- In Ubuntu you can use “Ubuntu Software” to find any app you want to install
- Ubuntu Software is similar to Play Store and App Store we have in android and iOS



INSTALLING ADDITIONAL SOFTWARE

- You also can install new software from Shell
- Debian-based distros use APT or the Advanced Packaging Tool

apt-get install <package name>

For Example: **apt-get** install **gparted**

- This command above will download the specific package name that you want to install
- In case you do not know the package name, you can search for a keyword

```
aamir@ap-linux:~$ apt-cache search screenshot | grep GNOME
gnome-screenshot - screenshot application for GNOME
libappstream-glib8 - GNOME library to access AppStream services
totem - Simple media player for the GNOME desktop based on GStreamer
gnome-flashback - helper application for the GNOME Flashback session
xdg-desktop-portal-gtk - GTK+/GNOME portal backend for xdg-desktop-portal
```

apt-cache search <package name>

For Example:

apt-cache search **screenshot**

apt-cache search **screenshot** | grep GNOME

LINUX COMMAND LINE



SHELL FEATURES



SHELL FEATURES

- Previously we've been learned few command that we also tried on Shell / Command line
- We will further learn different commands that you can use in Linux, and also study the different shell features
- You have now seen the capabilities of using the Bash shell
- Performing tasks on the command line take less time than doing it in the GUI
- To further enjoy the convenience of using the CLI (command line interface), here are some shell features that you should use:
- **Command Completion:** You can use TAB key to complete any unfinished command
 - **apt-ca TAB** - It will automatically make it **apt-cache**
 - **DOUBLE-TAB** will list all the available options on the screen

SHELL FEATURES

- **Command History:** Linux remembers commands you have recently typed in so you no longer need to retype

Keys to Use	Purpose
Arrow Up/Down	Display the previous commands from the more recent going to the oldest entered
Arrow Right/Left	Moves the cursor one character to the right/left
CTRL key + A	Transfers cursor to the beginning of the line
CTRL key + E	Transfers cursor to the end of the line
Delete key	The character under the cursor is deleted
Backspace	The character to the left of the cursor is removed
CTRL key + R	Search for a particular command from the command history. After you use CTRL key + R, type the first few letters of the command that you want to use

ESSENTIAL LINUX COMMANDS



HELP COMMANDS

Keys to Use	Purpose	Example
info	Shows online information about a command	<code>\$ info uname</code>
man	Shows details (manual) of a command	<code>\$ man uname</code>
whatis	Shows a short description of a specific keyword	<code>\$ whatis uname</code>
type	Shows the location of a command file	<code>\$ type uname</code>
al	Assign a command alias – especially useful for long commands	<code>\$ alias t=type</code> <code>\$ t uname</code> <code>\$ alias</code>
unalias	Remove command alias	<code>\$ unalias t</code>

MANAGING FILES AND DIRECTORIES

Keys to Use	Purpose	Example
cd	Change directory	<code>\$ cd Desktop/</code>
pwd	Displays the current directory	<code>\$ pwd</code>
ln	Create links to files and directories	<code>\$ ln -s [file] [soft-link-to-file]</code> <code>\$ ln -s abc.txt newAbc.txt</code>
touch	To trigger a file stamp update for a file	<code>\$ touch abc.txt</code>
find	Search for a file based on the name	<code>\$ find [dir-path] -name [filename]</code> <code>\$ find . -name ap.jpeg</code>
whereis	Search for executable files	<code>\$ whereis uname</code>
which	Search for files in the directories part of the PATH variable	<code>\$ which uname</code>

PROCESSING FILES

Keys to Use	Purpose	Example
dd	Copy lines of data https://www.geeksforgeeks.org/dd-command-linux/ https://www.howtoforge.com/linux-dd-command/	<pre>\$ dd conv=ucase Type Hello world ctrl+d \$ echo "hello world > abc.txt" \$ dd if=abc.txt of=newabc.txt conv=ucase \$ cat newabc.txt</pre>
diff	Display the results of comparing two files	<pre>\$ echo "hello world > abc.txt" \$ echo "hello world > abc1.txt" \$ diff abc.txt abc1.txt -s \$ echo "hello world123 > newabc.txt" \$ diff abc.txt newabc.txt -s</pre>
more	Show a text file one page at a time – display can only go forward	<pre>\$ ls -R > abc.txt \$ more abc.txt \$ ls -R more</pre>

PROCESSING FILES

Keys to Use	Purpose	Example
less	Show a text file one page at a time – display can only go forward and backwards	<pre>\$ less abc.txt \$ ls -R less</pre>
wc	Display the count of the number of characters, words, and lines in a file https://www.tecmint.com/wc-command-examples/	<pre>\$ wc abc.txt</pre>
cat	Show a text file in one output	<pre>\$ cat abc.txt</pre>
cut	Get sections of text in a file	<pre>\$ cut -b 1 abc.txt \$ cut -b 1-3 abc.txt \$ cut -b 1,3 abc.txt</pre>
grep	Display results of finding expressions in a file	<pre>\$ cat abc.txt grep Desktop \$ cat abc.txt grep -i desktop \$ grep -i "desktop" abc.txt</pre>

PROCESSING FILES

Keys to Use	Purpose	Example
sed	Perform editing commands, then copy to a standard output https://www.geeksforgeeks.org/sed-command-in-linux-unix-with-examples/	First occurrence in every line will be changed \$ sed 's/Desktop/Dashboard/' abc.txt 2nd occurrence in every line will be changed \$ sed 's/Desktop/Dashboard/2' abc.txt All occurrences will be changed \$ sed 's/Desktop/Dashboard/g' abc.txt
split	Specify a size to break a file into https://www.linuxtechi.com/split-command-examples-for-linux-unix/	\$ split abc.txt \$ ls \$ rm x* -l100 is 100 lines per file \$ split -l100 abc.txt \$ ls
sort	Arrange the lines in a file https://www.geeksforgeeks.org/sort-command-linuxunix-examples/	\$ sort abc.txt

PROCESSING FILES

Keys to Use	Purpose	Example
uniq	Keep unique lines in a file and delete duplicates https://www.howtoforge.com/linux-uniq-command/	<pre>\$ echo "Karachi Karachi Lahore Islamabad Islamabad Lahore" > abc.txt \$ cat abc.txt \$ uniq abc.txt \$ uniq abc.txt -c \$ uniq abc.txt -d</pre>

COMPRESSING A FILE

Keys to Use	Purpose	Example
compress	Use to compress a file	<code>\$ compress -v abc.txt</code>
uncompress	If a file was compressed with a compress command, use this to decompress	<code>\$ uncompress abc.txt.Z</code>
gunzip	Use GNU Zip to decompress files	<code>\$ gunzip -c abc.zip > newabc.txt</code>
gzip	Compress files with GNU Zip	<code>\$ gzip -c abc.txt > abc.zip</code>
tar	Archive files with one or more directories	Archive the file <code>\$ tar -cf archive.tar file1 file2</code> Extract the files <code>\$ tar -xf archive.tar</code>

DATE AND TIME

Keys to Use	Purpose	Example
cal	Show the calendar for the specified month or year	<pre>\$ cal \$ cal -3 \$ cal -m 5 \$ cal -y 2020</pre>
date	Show/Set the current date and time	<pre>\$ date Sets the system date and time to given date \$ date -s "11/20/2003 12:48:00"</pre>

MANAGING PROCESSES

Keys to Use	Purpose	Example
bg	Run a program or a process in the background https://www.geeksforgeeks.org/bg-command-in-linux-with-examples/	\$ compress -v abc.txt
free	Check for the free memory	\$ free
kill	Stop a process	\$ kill <PSID>
nice	Run a program with a low priority, niceness values range from -20 to 19, with the former being most favorable, while latter being least https://linux.101hacks.com/monitoring-performance/hack-100-nice-command-examples/	\$ nice -10 ls -R \$ nice --10 ls -R
ps	Show current running processes	\$ ps
top	Show list of CPU and memory utilization of processes	\$ top

MANAGING PROCESSES

Keys to Use	Purpose	Example
reboot	Restart the computer	\$ reboot
shutdown	Turn off computer	\$ shutdown

<https://www.binarytides.com/linux-command-shutdown-reboot-restart-system/>