Training Course

Linux Fundamentals

Course Overview

- This course helps you to understand how Linux works from basics. Once you learn complete this course you can able to
  - ✓ Fulfill your regular tasks on the Linux server
  - ✓ Easily start learning most of the trending technologies like AWS, Azure, GCP, DevOps, Python, BigData, DataScience, etc...
- Who this course is for
  - ✓ Any IT professional who wants to learn Linux basics quickly
  - ✓ People who don't know why to start their DevOps journey.

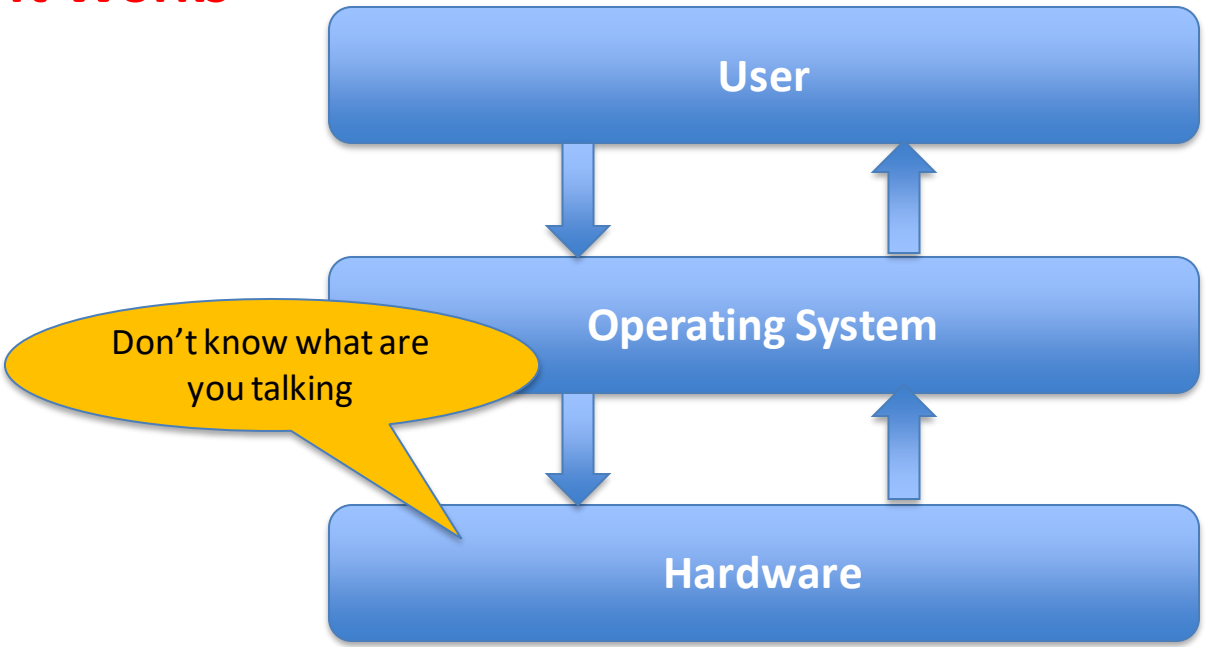
Course Schedule

Day	Presentations	Lab
Day 1	Introduction Files and Directories	X
Day 2	Management (User, System, Software) Networking and Services, Process management & other	X
Day 3	Assignment activities, **divide into group to discuss** and Test	X

What is Operating System?

OS is an interface between user and the computer hardware

How It Works

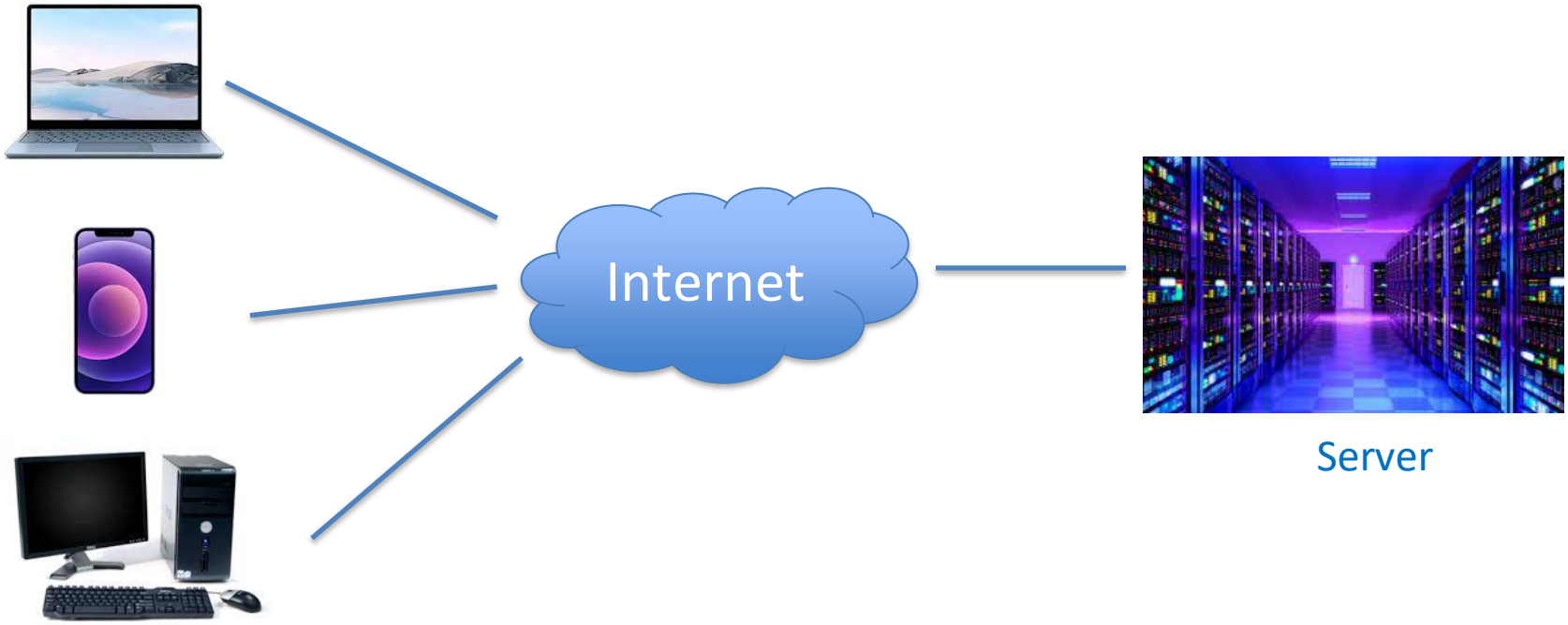

User
Operating System
Hardware
Don’t know what are you talking

Operating Systems

- Window
- OS X (MAC OS)
- IBM-AIX
- HP-UX
- Solaris
- Linux

  + RedHat, Ubuntu, fedora, Suse, Debian, cent, etc…

Linux Fundamentals



How to get a Linux System

- Install Linux OS directly in Laptop or Desktop
- Install Vmware and create a VM
- Install Virtual Box and Create VM
- Provision a Linux VM on Cloud (AWS/Azure/GCP etc..)

Why Linux

- Free
- Stability
- Secure
- Community Support

Why Linux – Hardware requirements

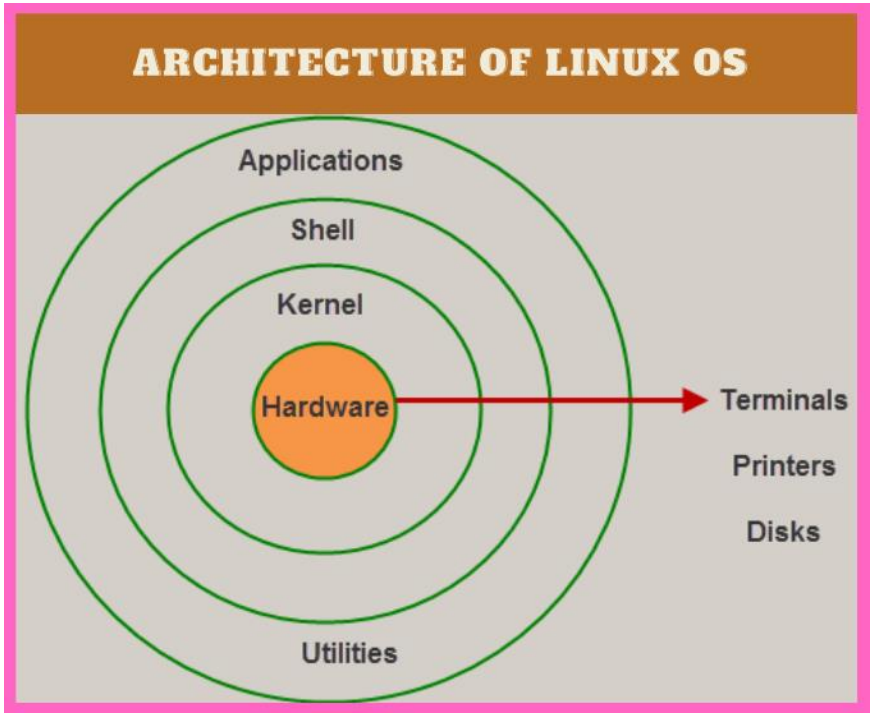
Task	Memory (MB)	Hard Disk (MB)
Smallest task: text UI, shell commad: vim, emacs, …	**8**	**200**
Graphic UI, small management : icewm, fluxbox, windowmaker	**32**	**400**
KDE graphic enviroments	**128**	**1000**
Application use more memorry	**256**	**1500**

How to get Linux?

- ✓ CD/DVD
- ✓ Community
- ✓ Internet: Linux.org (official)

Linux Fundamentals

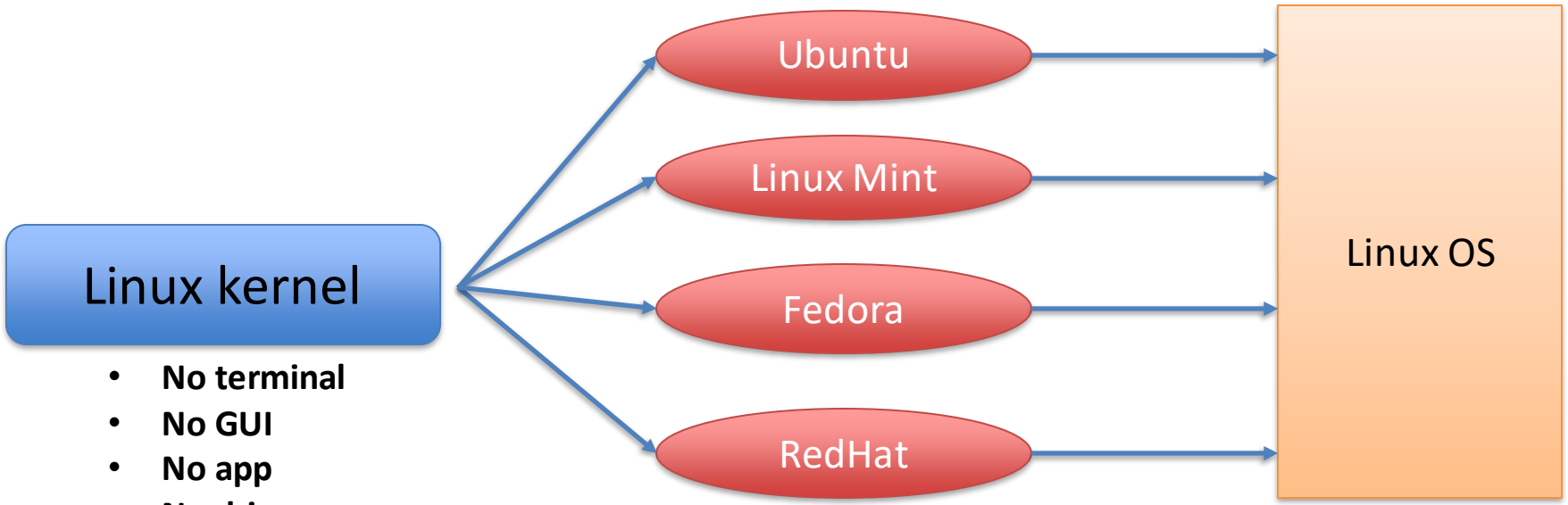
Linux Architecture



Question

What is different between Linux and Ubuntu?

Linux is kernel, core of OS



- No terminal
- No GUI
- No app
- No driver

Linux Distribution

Create Linux Environment (DEMO

- Install Virtualbox/Vmware
- Download Linux OS (.iso)
- Create Linux Machine

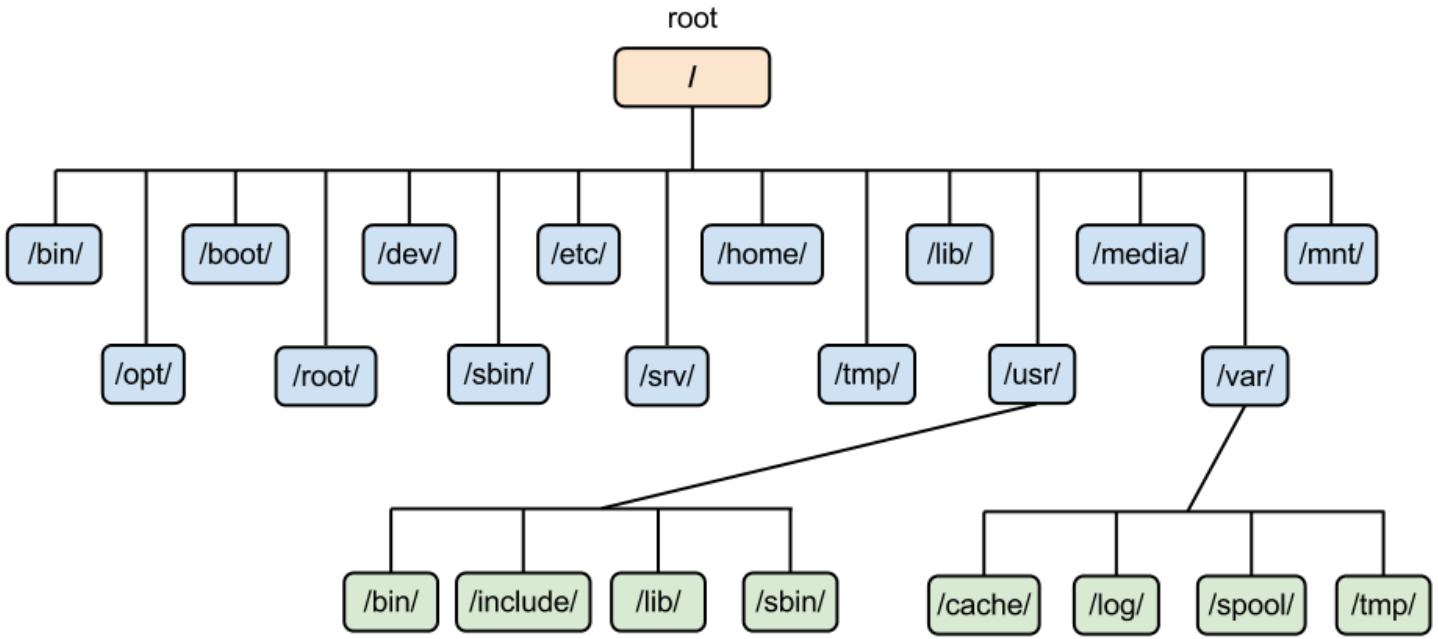
Linux User

Linux User Commands

Command	Description
cat /etc/passwd	List user
sudo Adduser “username”	Create a user with name “username”
sudo passwd username	Set password for user “username”
sudo userdel username	Delete a user account
groups	List all group
sugrodo addgroup “groupname”	Add a group
sudo usermod –a –G “namegroup” “username”	Add user to a group
sudo chage –E YYYY-MM-DD “username”	Setting the expiry date of a Account

Linux Filesystem Hierarchy

Linux Filesystem Hierarchy



Linux Filesystem Hierarchy

Directory Name	Description
/	This is top level directory It is parent directory for all other directories It is called as ROOT directory It is represented by forward slash (/) C:\ of windows
/root	It is home directory for root user (super user) It is provides working environment for root user C:\Documents and Settings\Administrator
/home	It is home directory for other users It provide working environment for other users (other than root) C:\Documents and Settings\username

Linux Filesystem Hierarchy

Directory Name	Description
/usr	By default softwares are installed in /usr directory (UNIX Sharable Resources) c:\program files
/bin	It contains commands used by all users (Binary files)
/sbin	It contains commands used by only Super User (root) (Super user's binary files)
/var	It is containing variables data like mails, log file

Linux Basic Commands

Command	Description
date	Show the current date and time
cal	Show this month's calendar
uptime	Show the current uptime
whoami	Who you are logged in as
finger	Display information about user (Will not work)
users	Shows user information
man "command"	Show manual of command
username	Shows your user name
Who / w	Display who is online

View files

Command	Description
ls	Directory listing
cat “filename”	View file content
less	View a file page by page
more	Output the contents of file
head	Output the first 10 lines of file
tail	Output the last 10 lines of file
page	Display file page by page

Create & Delete file/directory

Command	Description
touch	Create a 0 bites file
cat > filename	Create file and allow to write
nano	Create a file if filename doesn't exist
vi	Create a file if filename doesn't exist (wq! – save)
rm	Remove a file
mkdir	Create a directory
rmdir	Remove a empty directory
rm –rf	Remove a directory

Managing files or directories

Command	Description
cp	Copy a file
mv	Move a file
find	Find a file
grep	**Search for a pattern in a file**
Cdcd	Switch between directories
diff	Find content difference in 2 files
sed	Search and replace particular pattern
chmod	**Change file permissions**
chown	Change Ownership of a file
file	Show what kind of file it is

System Management

Command	Description
history	List all commands executed by a user
free	Free memory of a server
/proc/meminfo	Displays memory information
/proc/cpuinfo	Displays CPU information
uname –a	Show kernel information
du	Show directory space usage (log mangement)
whereis	Show possible locations of app
which	Show which app will be run by default

Networking

Command	Description
hostname	List host name of the server
ping <ip>	Availability of destination server over the network
wget	Download packages/software into Linux system
ifconfig	Lists IP address(es) of the server
telnet	Connect to remote host/check port availability status
curl	Access the application as from browser

Port Numbers

Port Number	Service
21	FTP
22	SSH
23	TELNET
25	SMTP
53	DNS
80	HTTP
443	HTTPS

Software Management

yum is the primary tool for getting, installing, deleting, querying and managing RetHat Enterprise Linux RPM software packages from official RedHat software repositories, as well as other third-party repositories

Commands:

- ***yum install <package name>***
- *yum remove <package name>*
- *yum update <package name>*
- *yum info <package name>*
- *yum list available*
- *yum list installed*

EXTEND: apt

Services

service – This controls the starting and stopping of services
chkconfig – This controls which services are set to start on boot

- apt list
- ps –ef / ps –ef | grep “servicename”

#service <name of the service> status --- To check the status of the service
#service <name of the service> start --- To start the service
#service <name of the service> stop --- To stop the service
#service <name of the service> reload --- To reload the service
#service <name of the service> restart --- To restart the service

Services

The above commands are useful for starting or stopping services during the current session. To tell system to start services automatically at boot, you must enable them

#systemctl enable "servicename"
#systemctl disable "servicename"

Nginx run (session) > out session > nginx stop
Nginx run (session) > enable > out session > nginx start

Process Management

- When you start a program or running an application in Linux, it actually run as a process
- A Linux process (a daemon), running in foreground or in the background, uses memory and CPU resources

Command	Description
ps –ef	List the process which are running in the system
kill / kill -9	Kill a process or service
fg	Run the program in the f
bg	Run the service in the back group
top	List top 20 process which are consuming more CPU

Networking

IP Address: An IP address can be thought of as being similar to a phone number. Just as every person who communicates with a telephone is using a phone with a unique phone number, every computer that is on the Internet has a unique IP address. Not only on internet but within an organization every computer is assigned an IP address so that they can communicate with each other.

Command: **ifconfig –a (get network info)**
ip addr

Networking

Command	Description
netstat	Display all connected network
nslookup	Query domain address

Runlevels (discuss)

Looks at the /etc/inittab file to decide the Linux run level.
Following are the available run levels

- **0 – halt**
- **1 – Single user mode**
- **2 – Multiuser, without NFS**
- **3 – Full multiuser mode**
- **4 – Unused**
- **5 – X11**
- **6 – reboot**

Archiving files or directories

Command	Description
gzip	Create a compressed file
gunzip	Unzip a file
tar	**Extract tar file**

Crontab

In any operating system, it is possible to create jobs that you want to reoccur. This process known as **job scheduling**, is usually done based on user-defind jobs. For RedHat or any other Linux, this process is handled by the cron service or a daemon called **crond**, which can be used to schedule tasks

Commands:

crontab –l (list)

crontab –e (edit)

Field	Description	Allowed Value
MIN	Minute field	0 to 59
HOUR	Hour field	0 to 23
DOM	Day of the month	1-31
MON	Month field	1-12
DOW	Day of the week	0-6
CMD		Any command

Crontab Examples

minute | hour | day(month) | month | day(week) | CMD

Execute a job at 8:30 on everyday morning

30 8 * * * Command

Execute a job at 2:00 PM on every Saturday

00 14 * * 6 Command

Execute a job at 12:00 AM on 1st July

00 00 01 07 * Command

Execute a job at 3:30 PM on Every month 25th

30 15 25 * * Command

Thank you