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# LINUX SERVER ADMINISTRATION :COMMAND LINE – UBUNTU

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# **LINUX SERVER ADMINISTRATION**



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# INTRODUCTION

Ubuntu is one of the fastest-growing Linux distributions available. Ubuntu combines all the desirable features - usability, security, and support—into one distribution.

This Presentation primarily deals with installation and management of Ubuntu Server Operating System in a networked environment.

# What is Linux ?

Linux is a free Unix-type operating system kernel originally developed by Linus Torvalds and other programmers in 1991 while Linus was a student at the University of Helsinki. It was released as an open-source product.

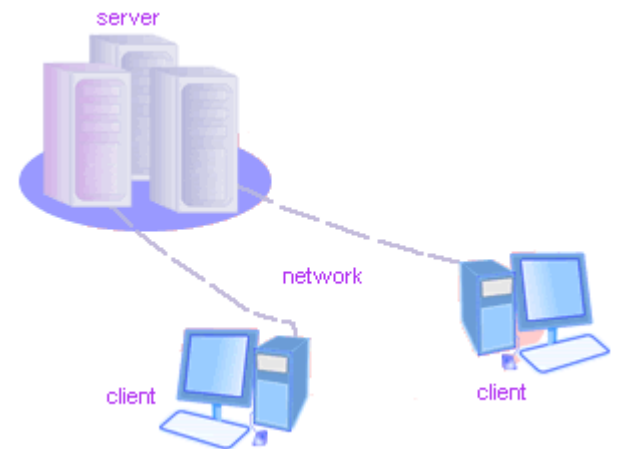
Later Linux emerged as distributions after integrating various desktops, OS components, desktop publishing softwares and many others.

# Why Linux ?

- Non Proprietary
- Easy Maintenance
- Automated Patching
- Support Multiple Hardware
- Support Option
- Minimal Investment
- Reliable
- Community-Centric

# Server

Under the structure of the client-server architecture, a business's computer network will have a server computer, which functions as the "brain" of the organization, and a group of client computers, which are commonly called workstations. The server part of the client-server architecture will be a large-capacity computer



# Server Related Components

- Server Operating system
- Server Hardware
- Server Software
- Network Medium
- Clients



# Server Operating System

“Operating System acts as an interface between the user of a computer and computer hardware.”

Ubuntu's Server Operating System is a linux operating system without gui (by default). Ubuntu is developed and distributed by **Canonical Ltd** as a free and open source Operating System.

# Server Hardware

Ubuntu SOS can be installed in a very low end hardware for personal use to a very high end hardware for enterprise environments. Minimal Requirements are,

- 500 MHz CPU
- 256 MB RAM
- 4 GB Hard Drive.
- Optical Drive.

But for an enterprise environment with different server roles, SAN, RAID, Cloud etc., the configuration needed is,

- 2 quad core CPU
- 8 GB of RAM
- Five 500 GB Hard Disks
- Two Gigabit Internet Cards
- Optical Drive.

# Server Software

Depending upon the requirements, various server software along with Server Operating System is installed to meet the client needs. Some of them are,

- |                   |               |
|-------------------|---------------|
| • Web Server      | • FTP Server  |
| • Database Server | • File Server |
| • Email Server    | • DHCP Server |
| • LDAP Server     | • DNS Server  |

# Web Server Software

The term 'web server' can mean two things - a **computer/machine** that hosts web sites (hardware) and a **software** that runs on such a machine and processes requests from browsers (also called client software).

A web server is software capable of servicing HTTP (Hypertext Transfer Protocol) requests. The web server software used with linux is “**Apache HTTP Server**”. It holds around 60% of web server market around the world.

# Database Server Software

Database Server is an application which stores information and provide it to other applications or computers in a time critical and reliable manner. DB servers so called as back end servers. Some of the DB servers used in Linux environment are PostgreSQL, MySQL, Oracle etc.

# Email Server Software

A mail server (also known as a mail transfer agent or MTA, a mail transport agent, a mail router or an Internet mailer) is an application that receives incoming e-mail from local users (people within the same domain) and remote senders and forwards outgoing e-mail for delivery. Major mail server software are,

- Postfix
- Sendmail
- qmail

# LDAP Server Software

The Lightweight Directory Access Protocol (LDAP) is an application protocol for reading and editing directories over an IP network. LDAP Server Stores the information related to computers, users, shares etc. in it and facilitate to query these information for System Administrators.

For example login information can be taken from LDAP Server.



# FTP Server Software

An FTP server is a application running the File Transfer Protocol (FTP), which is the protocol for exchanging files over the Internet.

Some of the FTP Server software in linux are,

- Proftpd
- Filezilla

# File Server Software

A file server differs from a personal computer (PC) in that the server is dedicated to storing files in a centralized location while permitting restricted access to networked computers.

File Servers in Linux are,

- NFS File Server
- Samba Server

# DHCP Server Software

A DHCP server is the server that is responsible for assigning unique IP address to the computers on a network. No two computers can have the same IP address on a network at the same time or there will be conflicts. DHCP servers will take a request from a computer that has just been added (or is renewing) to the network and assign it a unique IP address (i.e. 192.168.55.23) that is available. “dhcpcd” is the software used in linux as a dhcp server.

# DNS Server Software

The Domain Name System (DNS) is a standard technology for managing the names of Web sites and other Internet domains. DNS server is responsible for turning domain names to IP addresses and locating them on one of the millions of hosting servers. The DNS server used in linux is **“bind”**

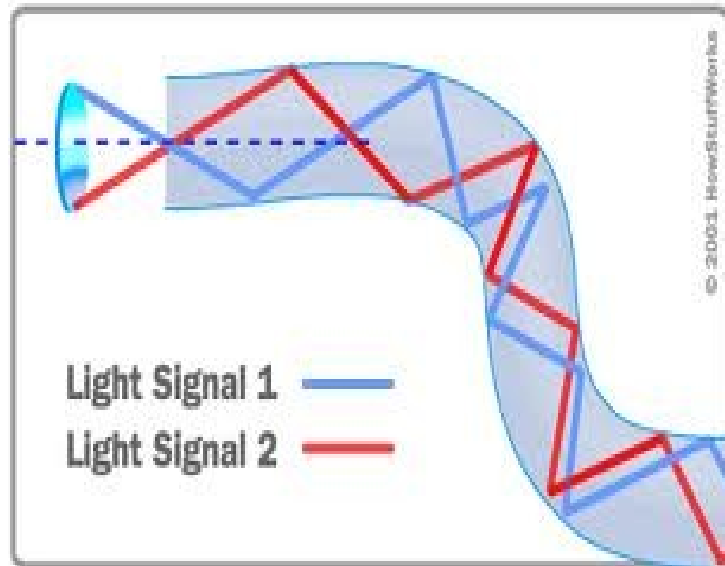
# Network Medium

The Server and Client machines are communicated inside a network using a medium. It can be wired or wireless.

Wired Network mediums : Ethernet, Optic Fibre etc.

Wireless Network medium : Microwave, GPRS, 3G etc.

# Wired Network Medium

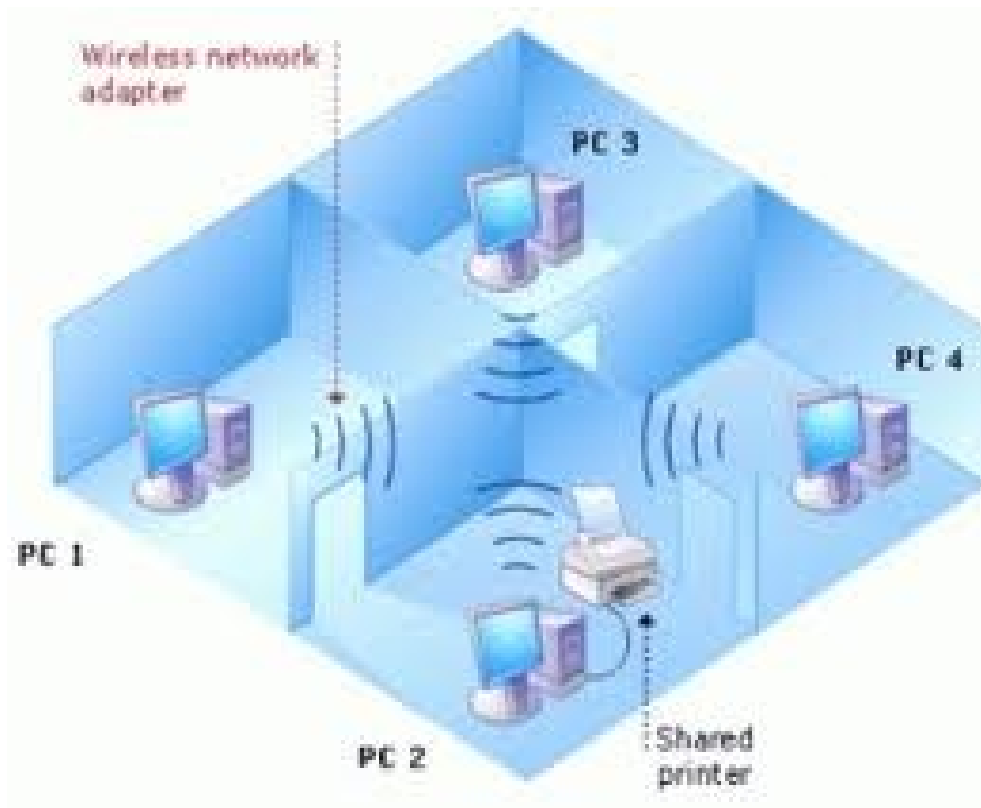


Optic Fibre

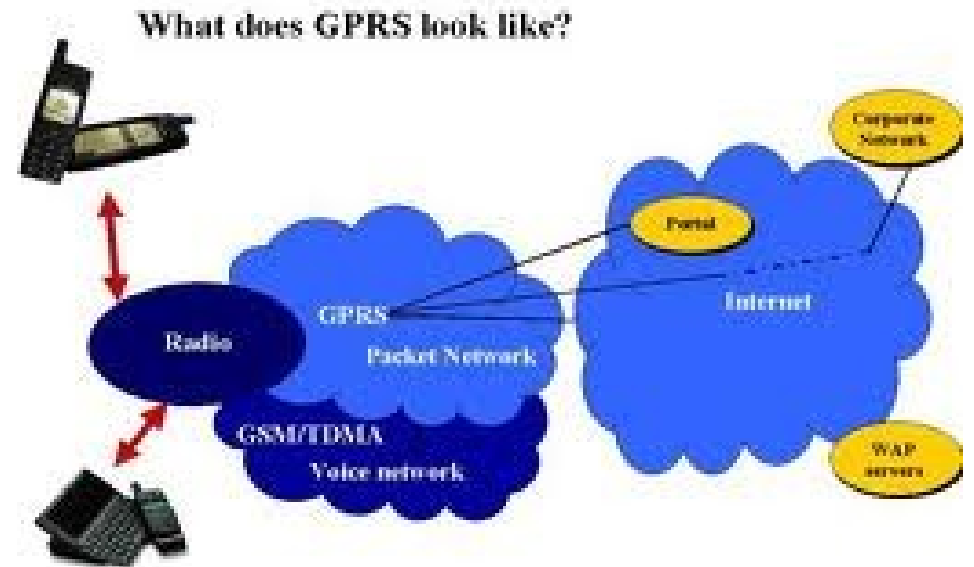


Ethernet

# Wireless Network Medium



Wifi Network



GPRS Network

# Network Clients

Network Client Computers nodes through which information is entered or extracted from the server using a web browser or a specific application. High end client PCs are also called as Work Stations,



# Installation of Ubuntu SOS

*Steps involved in installation are,*

- Boot from install CD, select language and click install ubuntu server
- Select location, country and keyboard layout
- Enter machine name and clock settings
- Partition the Hard disk
- Enter root account and password
- Select the server software required and install.

# Installation of Ubuntu SOS



**Screen Shots of Installation**

# Server Management

- Network Management Tools
- Operating System and Software Managing Tools

# Network Management Tools

- **Basic Tools**

- Ping
- Ifconfig
- Traceroute
- ufw

- **Advanced Tools**

- NTop
- Wireshark *and many more*

# Ping

Ping is a computer network administration utility used to test the reachability of a host on an Internet Protocol (IP) network and to measure the round-trip time for messages sent from the originating host to a destination computer.

- Syntax

- *Ping <hostname>*
- *Ping <ipaddress>*

# ifconfig

**ifconfig (short for interface configuration)** is a system administration utility to configure, control, and query TCP/IP network interface parameters from a command line interface (CLI)

- **Syntax**

- *Ifconfig -a : displays information of all interfaces.*
- *Ifconfig eth0 down : disables interface eth0.*
- *Ifconfig eth0 192.168.0.1 : change the ip address.*

# Traceroute

The **traceroute** utility displays the route used by IP packets on their way to a specified network (or Internet) host. Traceroute displays the IP number and host name (if possible) of the machines along the route taken by the packets. Traceroute is used as a network debugging tool

```
kishore@matrix:~$ traceroute asianet.co.in
traceroute to asianet.co.in (202.88.238.232), 30 hops max, 60 byte packets
 1  10.3.6.1 (10.3.6.1)  239.798 ms  519.765 ms  543.731 ms
 2  10.3.6.2 (10.3.6.2)  603.717 ms  699.719 ms  887.687 ms
 3  10.3.6.253 (10.3.6.253)  903.676 ms  903.663 ms  903.653 ms
 4  10.3.6.253 (10.3.6.253)  927.642 ms  927.633 ms  943.619 ms
 5  10.3.6.243 (10.3.6.243)  927.613 ms  927.604 ms  943.588 ms
 6  10.3.7.204 (10.3.7.204)  943.583 ms  286.507 ms  863.836 ms
```

- **Syntax**

- *traceroute* <domainname>
- *traceroute* <ipaddress>

# Ufw (Uncomplicated firewall)

The default firewall configuration tool for Ubuntu is **ufw**. Developed to ease iptables firewall configuration, ufw provides a user friendly way to create an IPv4 or IPv6 host-based firewall. Desktop Ubuntu has a desktop version of ufw. ie. gufw

## Syntax

- *sudo ufw deny <port>/<optional: protocol> : block a specific port with specific protocol*
- *sudo ufw allow <service name> : Allow specific services like ftp, http, ssh etc.*



# OS & Software Management Tools

- **Software installation**
  - apt-get
  - dpkg
  - Tasksel
  - htop
- **Remote admin**
  - ssh
  - webmin

# apt-get

The apt-get command is a powerful command-line tool used to work with Ubuntu's Advanced Packaging Tool (APT) performing such functions as installation of new software packages, upgrade of existing software packages, updating of the package list index, and even upgrading the entire Ubuntu system.

## Syntax

*sudo apt-get install <software\_name> : install the specific software into ubuntu system.*

*Sudo apt-get remove <software\_name>*

# dpkg

**Dpkg** is the Ubuntu package manager dpkg is a medium-level tool to install, build, remove and manage Ubuntu packages.

## Syntax

- `sudo dpkg -i <deb file name> : install a deb file`
- `Sudo dpkg -r <filename.deb> : Remove a del file`
- `Sudo dpkg -- get-selections : show list of installed s/w.`

# tasksel

**Tasksel** is a tool that installs multiple related packages as a coordinated "task" onto your system.

## Syntax

- *sudo tasksel install lamp-server : this is install and lamp server(Linux Apache mySQL and PHP)*

# SSH

SSH ("Secure Shell") is a protocol for securely accessing one computer from another. Despite the name, SSH allows you to run command line and graphical programs, transfer files, and even create secure virtual private networks over the Internet.

## Syntax

- `ssh <machine_name>`
- `ssh <ipaddress>`

# htop

- This is htop, an interactive process viewer for Linux. It is a text-mode application (for console or X terminals)

```
kishore@matrix: ~
File Edit View Search Terminal Help

1 [||| 2.6%] Tasks: 240 total, 1 running
2 [ 0.0%] Load average: 0.44 0.36 0.21
Mem[||||| 359/2896MB] Uptime: 00:13:23
Swp[ 0/1021MB]

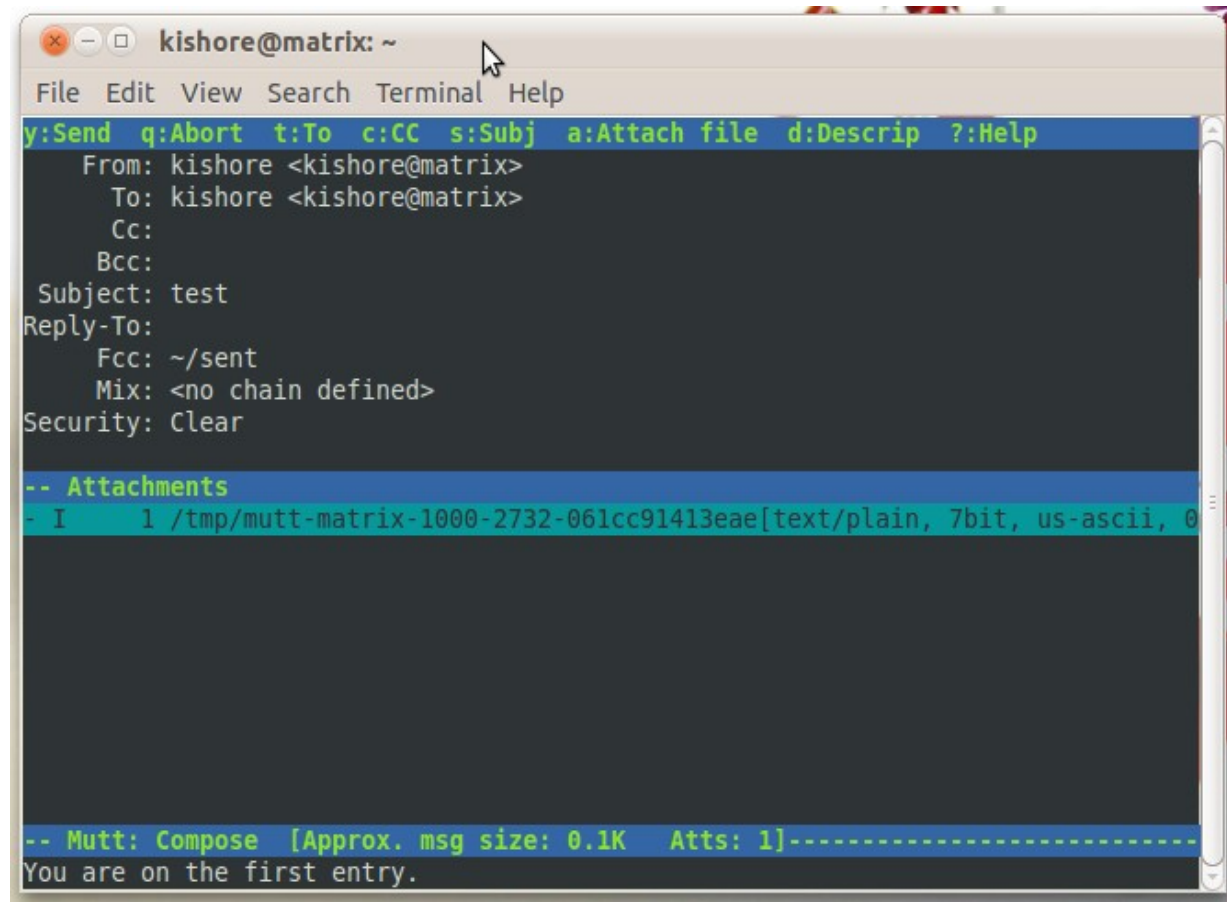
PID USER PRI NI VIRT RES SHR S CPU% MEM% TIME+ Command
1559 kishore 20 0 224M 95564 66244 S 2.0 3.2 0:27.76 /usr/lib/openoffic
1879 kishore 20 0 2664 1292 988 R 1.0 0.0 0:00.26 htop
1074 root 20 0 86036 49636 10832 S 0.0 1.7 0:26.01 /usr/bin/X :0 -nr
1225 kishore 20 0 71404 45124 15560 S 0.0 1.5 0:08.79 compiz
1 root 20 0 2892 1660 1208 S 0.0 0.1 0:00.89 /sbin/init
347 root 20 0 2528 872 608 S 0.0 0.0 0:00.04 upstart-udev-bridg
350 root 16 -4 2760 1088 340 S 0.0 0.0 0:00.04 udevd --daemon
460 root 18 -2 2756 1036 348 S 0.0 0.0 0:00.00 udevd --daemon
462 root 18 -2 2756 932 252 S 0.0 0.0 0:00.00 udevd --daemon
744 syslog 20 0 35004 1532 988 S 0.0 0.1 0:00.00 rsyslogd -c4
747 syslog 20 0 35004 1532 988 S 0.0 0.1 0:00.00 rsyslogd -c4
748 syslog 20 0 35004 1532 988 S 0.0 0.1 0:00.00 rsyslogd -c4
1737 syslog 20 0 35004 1532 988 S 0.0 0.1 0:00.00 rsyslogd -c4
755 messageb 20 0 3508 1760 884 S 0.0 0.1 0:00.19 dbus-daemon --syst
783 root 20 0 19480 4292 3564 S 0.0 0.1 0:00.04 NetworkManager
1744 root 20 0 19480 4292 3564 S 0.0 0.1 0:00.00 NetworkManager
F1Help F2Setup F3Search F4Invert F5Tree F6SortBy F7Nice -F8Nice +F9Kill F10Quit
```

# Text editors

- The **VI editor** is a screen-based editor used by many Unix users. The VI editor has powerful features to aid programmers, but many beginning users avoid using VI because the different features overwhelm them.
- **GNU nano** another text editor used with ubuntu. It is designed to be a free replacement for the Pico text editor, part of the Pine email suite

# Mutt Email Client

- The Mutt is a text-based email client which can be used in server environments.



The screenshot shows a terminal window titled "kishore@matrix: ~". The Mutt email client interface is displayed with a menu bar at the top: "File Edit View Search Terminal Help". Below the menu bar, a status bar shows navigation shortcuts: "y:Send q:Abort t:To c:CC s:Subj a:Attach file d:Descrip ?:Help". The main body of the terminal shows the headers of an email being composed:

```
From: kishore <kishore@matrix>
To: kishore <kishore@matrix>
Cc:
Bcc:
Subject: test
Reply-To:
Fcc: ~/sent
Mix: <no chain defined>
Security: Clear
```

Below the headers, there is a section for attachments:

```
-- Attachments
- I 1 /tmp/mutt-matrix-1000-2732-061cc91413eae[text/plain, 7bit, us-ascii, 0
```

At the bottom of the terminal, a status bar indicates the current state: "-- Mutt: Compose [Approx. msg size: 0.1K Atts: 1]-----". Below this, it says "You are on the first entry."



# File Permissions

- The **chmod** command to change the access mode of a file
- Syntax

```
chmod who=permissions <filename>
```

Who → u, g, o, a.

Permissions → r, w, x.

Eg: *chmod g=rw test.sh*

# Shell Scripting

- Shell Script is series of commands written in plain text file

Normally shells are interactive. It means shell accept command from you (via keyboard) and execute them. But if you use command one by one (sequence of 'n' number of commands) , the you can store this sequence of command to text file and tell the shell to execute this text file instead of entering the commands.

# Cron

- Cron is a daemon used for scheduling tasks to be executed at a certain time. Each user has a crontab file, allowing them to specify actions and times that they should be executed. There is also a system crontab, allowing tasks such as log rotation and locate database updating to be done regularly.
- To use cron, simply add entries to your crontab file. To do this, open a terminal window and enter `crontab -e`. To display the contents of current cron file enter `crontab -l`.
- Syntax : minute (0-59), hour (0-23, 0 = midnight), day (1-31), month (1-12), weekday (0-6, 0 = Sunday), command

# References

- <https://help.ubuntu.com/>
- <http://www.ubuntugeek.com/>
- <http://brainstorm.ubuntu.com/>
- <http://ubuntulinuxhowto.blogspot.com/>
- <http://ubuntu-tutorials.com/>
- <http://www.ubuntututorials.net/>
- <http://www.psychocats.net/ubuntu/index>
- <http://screencasts.ubuntu.com/>

Questions ? ? ?