



debian



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JlIT Open Dev Circle - 128

LINUX 101 - WORKSHOP

TALK IS CHEAP SHOW ME THE CODE :)
LINUS TORVALDS

What is Linux?

Linux is a kernel which is UNIX-like.

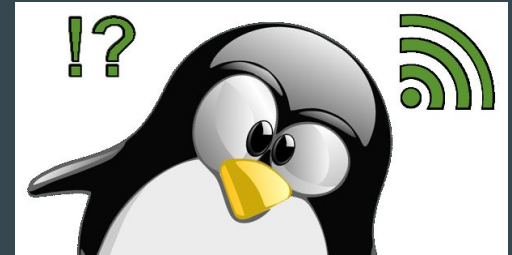
The source code for Linux is freely available to everyone.

Linux was created by Linus Torvalds in 1991.

It powers most of the web servers and supercomputers around the world.

Why LINUX ?

- A Linux distribution has software worth thousands of dollars, for virtually no cost.
- Linux operating system is reliable, stable, and very powerful.
- Linux comes with a complete development environment, including compilers, toolkits, and scripting languages.
- Linux comes with networking facilities, allowing you to share hardware.
- Linux utilizes your memory, CPU, and other hardware to the fullest.
- A wide variety of commercial software is also available.
- Linux is very easily upgradeable.
- Supports multiple processors as standard.



Linux Kernel

The kernel is the central nervous system of Linux, include OS code which runs the whole computer. It provides resources to all other programs that you run under Linux, and manages all other programs as they run.

The kernel includes the code that performs certain specialized tasks, including TCP/IP networking.

The kernel design is modular, so that the actual OS code is very small to be able to load when it needs, and then free the memory afterwards, thus the kernel remains small and fast and highly extensible.

UNIX

Linux + GNU Utilities = Free Unix

Linux is an O/S core written by Linus Torvalds and others a set of small programs written by Richard Stallman and others. They are the GNU utilities.

<http://www.gnu.org/>

GNU-GPL (Richard Stallman)

The **GNU General Public License (GNU GPL or GPL)** is a widely used free software license, which guarantees end users the freedom to run, study, share and modify the software. The license was originally written by Richard Stallman of the Free Software Foundation (FSF) for the GNU Project, and grants the recipients of a computer program the rights of the Free Software Definition. The GPL is a copyleft license, which means that derivative work can only be distributed under the same license terms.

LINUX DISTRIBUTIONS



[https://upload.wikimedia.org/wikipedia/commons/1/1b/Linux_Distribution Timeline.svg](https://upload.wikimedia.org/wikipedia/commons/1/1b/Linux_Distribution_Timeline.svg)

CLI V/S GUI

1. Control
2. Ability
3. Speed
4. System Resources
5. Need as a developer
6. Security

WE WILL BE SHOWING TERMINAL USAGE

TRY THESE COMMANDS WITH US

EXPLORE MORE AT HOME

LINUX TERMINAL - BASH

Include a slide for bash scripting too.

LINUX TERMINAL - BASH

A shell is a computer program that interprets the commands you type and sends them to the operating system. Secondly, it provide a programming environment consisting of environment variables.

Most BU systems, including the BU Linux Cluster, support at least two shells: TCSH and BASH. The default shell for your account is TCSH. The most popular and powerful Linux shell today is BASH.

To determine your shell type:

```
echo $SHELL (shell prints contents of env
```

LINUX TERMINAL - BASH

echo "\$SHELL" (shell still processes env. variable)

echo '\$SHELL' (shell treats env. variable as simple literal)

The complete environment can be printed with set, setenv (TCSH) and set (BASH).

To determine the path to the shell program, type:

which bash

which tcsh

Change the shell with "chsh /bin/bash" (provide path to new shell as a "parameter," meaning to be explained soon)

SOME COMMON COMMANDS

Pwd, cd, ls, echo,

cat, clear, touch, whoami,

cd, mkdir, cp, mv, rm,

grep, ping, head, tail

Cal, date, hostname

Ctrl-d

SOME COMMON COMMANDS

Network: ssh, scp, ping, telnet, nslookup, wget

Shells: BASH, TCSH, alias, watch, clear, history, chsh, echo, set, setenv, xargs

System Information: w, whoami, man, info, which, free, echo, date, cal, df, free, man, info

Command Information: man, info

Symbols: |, >, >>, <, &, >&, 2>&1, ;, ~, ., .., \$!, !:<n>, !<n>

Filters: grep, egrep, more, less, head, tail

SOME COMMON COMMANDS

Hotkeys: <ctrl><c>, <ctrl><d>

File System: ls, mkdir, cd, pwd, mv, ln, touch, cat, file, find, diff, cmp, /net/<hostname>/<path>, mount, du, df, chmod, find

Line Editors: awk, sed

File Editors: vim, gvim, emacs -nw, emacs

Process Management: ps, top, kill, killall, fg, bg

SOME COMMON COMMANDS

Network: ssh, scp, ping, telnet, nslookup, wget

Shells: BASH, TCSH, alias, watch, clear, history, chsh, echo, set, setenv, xargs

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Filters: grep, egrep, more, less, head, tail

MAN COMMAND AND --HELP

SUPER USER

Sudo su

PACKAGE MANAGER - APT

Install

Update

Uninstall

FILE STRUCTURE

The *Nix (Unix or Linux) file system is a hierarchical directory structure

The structure resembles an upside down tree

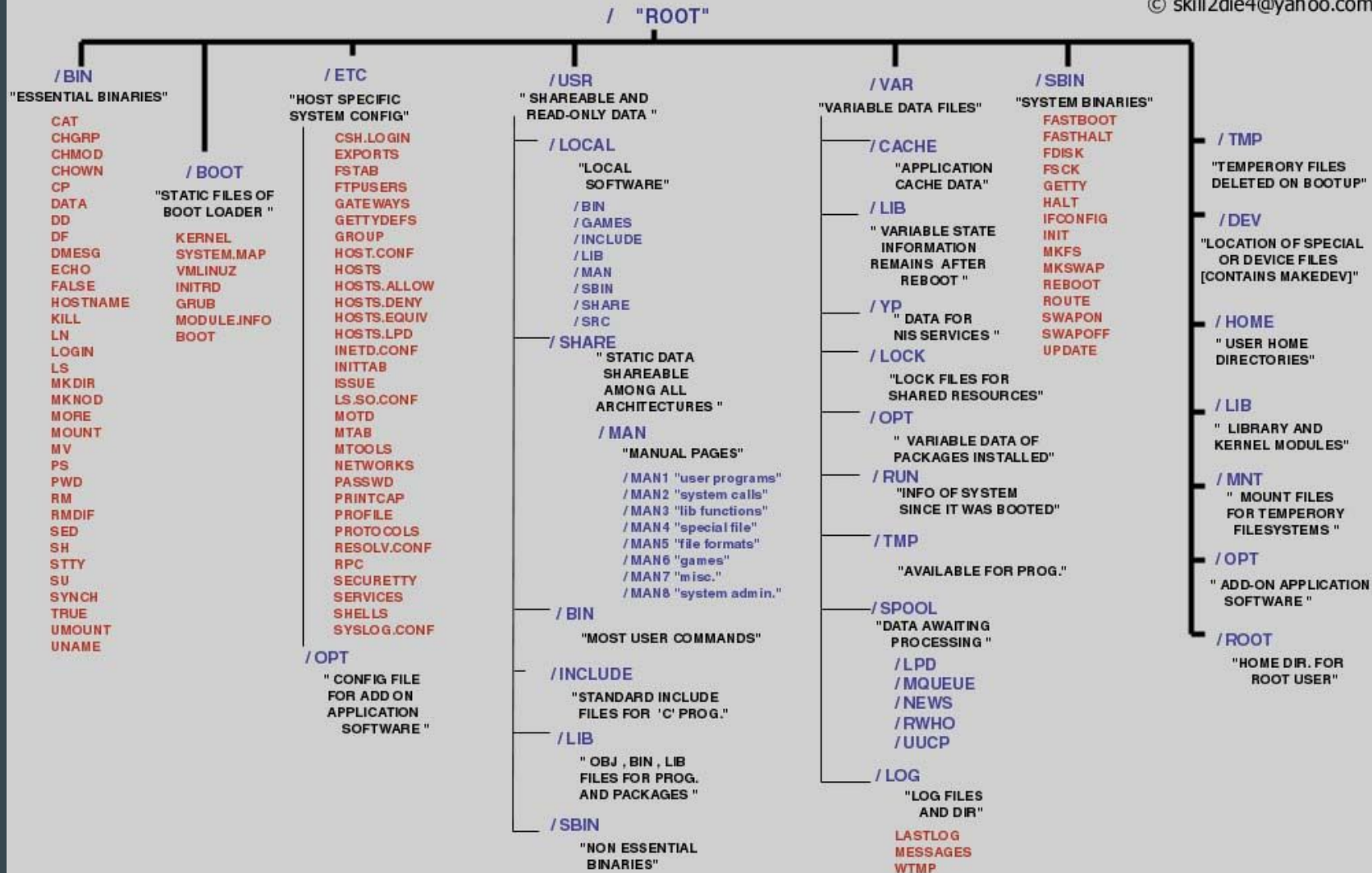
Directories are collections of files and other directories. The structure is recursive with many levels.

Every directory has a parent except for the root directory.

Many directories have children directories.

Unlike Windows, with multiple drives and multiple file systems, a *Nix system only has ONE file system.

The Linux Standard Base (LSB) specifies the structure of a Linux file system.



LINUX DIRECTORY

/bin System binaries, including the command shell

/boot Boot-up routines

/dev Device files for all your peripherals

/etc System configuration files

/home User directories

/lib Shared libraries and modules

/lost+found Lost-cluster files, recovered from a disk-check

/mnt Mounted file-systems

/opt Optional software

/proc Kernel-processes pseudo file-system

/root Administrator's home directory

/sbin System administration binaries

/usr User-oriented software

/var Various other files: mail, spooling and logging

FILE PERMISSIONS AND OWNERSHIP

All files and directories have a individual and a group ownership.

All files and directories have read (r), write (w), and execute (x) permissions assigned as octets to the individual owner (u), the group (g) owner and all others (o) that are logged into the system.

You can change permissions if you are the individual owner or a member of the group.

Only root can change ownership

chmod

chown

MULTIPLE COMMANDS

Connect Commands Together with the Pipe Symbol “|” and Using Filters.

GREP, TOP COMMANDS

PROCESSES

Ps

Top

Kill

Uname

Du

Df

IDE - INTEGRATED DEVELOPMENT ENVIRONMENTS

VERSION CONTROL SYSTEMS - GIT

RUNNING C, C++, PYTHON PROGRAMS

USERS WITH TERMINAL

Adding users

Removing users

COMPRESSION - DECOMPRESSION

Gzip

Gunzip

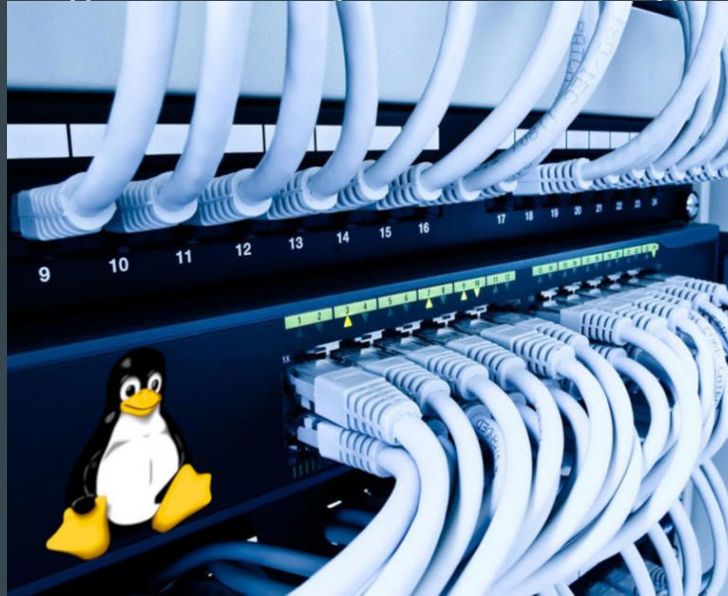
Zcat

Zless

Tar

NETWORKING

Two or more computer connected through network media called computer network. There are number of network devices or media are involved to form computer network. Computer loaded with Linux Operating System can also be a part of network whether it is small or large network by its multitasking and multiuser natures.



SSH, SCP, FTP, NETSTAT, IFCONFIG,

Telnet: Log into a remote host machine.

Rlogin: Almost the same as telnet, but uses a different protocol.

Ping: See if a remote host is up.

Ftp: Transfer files using the File Transfer Protocol..

Who: See who else is logged in.

Talk: Talk to someone else who is current logged in.

Ifconfig:

Rsync

SSH, SCP, FTP, NETSTAT, IFCONFIG,

SSH : SSH which stands for Secure Shell, It is used to connect to a remote computer securely. Compare to Telnet, SSH is secure wherein the client /server connection is authenticated using a digital certificate and passwords are encrypted. Hence it's widely used by system administrators to control remote Linux servers.

SCP: scp allows files to be copied to, from, or between different hosts. It uses ssh for data transfer and provides the same authentication and same level of security as ssh.

Ifconfig / ip: Command to enable , disable and list network interfaces.

PRACTICE

USE TERMINAL DAILY TO REMEMBER COMMANDS

SOME LINKS

http://oliverelliott.org/article/computing/tut_unix/#Introduction

<http://www.freeos.com/guides/lsst/>