

Linux Fundamentals Notes

Monday, November 20, 2023

5:04 PM

Linux Structure

Unix = Ken Thompson : Dennis Ritchie

GNU = Richard Stallman

Linux = Linus Torvalds

+ usually more secure and fast updates

+ stable and fast performance

OS manages all hardware

connects between software/hardware

Parrot OS - debian-based focused on sec,
privacy, development

Philosophy - 5 core principles

"Everything is a file" - all config
services are stored

"Everything" -
files for various services are stored
in text files

"Small, single-purpose, programs" - many
tools to work w/ that can combo
w/ each other

"ability to chain programs together
to perform complex tasks" - carry
out complex tasks like processing
or filtering specific data results

"avoid captive user interfaces" - designed
to work through shell which gives
more control

"configuration data stored in a text
file" - ex: /etc/passwd

Components

Bootloader - code that guides the booting process to start OS

ex: GRUB bootloader

OS kernel - main component of OS, manages resources for system's I/O devices at hardware level

Daemons - background services; ensure that key functions like scheduling, printing and multimedia are working

load after boot as login

OS shell - command language interpreter, CLI, interface between OS and user

bash, Tesh/Csh, ksh, zsh, Fish

graphical server - graphical sub-system (server)

graphics server - graphical sub-system (server) called "x" or "x-server" to allow graphical programs to run locally or remotely on x-windowing system

Window manager - GUI; Gnome, KDE, MATE, Unity, and Cinnamon

Utilities - programs that perform particular functions

Linux Architecture

hardware - peripheral devices like ram, hard drive, CPU

kernel - core of linux OS that virtualizes and controls hardware resources like CPU, allocated mem, ... gives each process its own dedicated ...

gives each process its own
virtual resources and prevents
conflicts

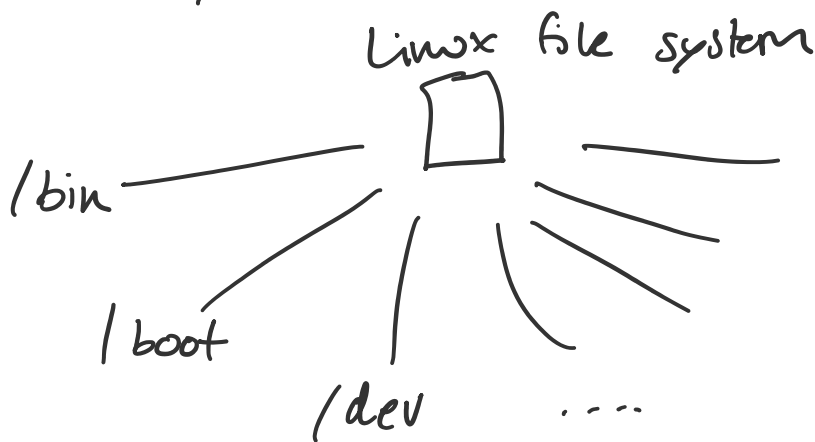
Shell - user can enter cli commands
to execute kernel functions

System utility - makes OS functionality
available to user

File System Hierarchy

tree-like

Filesystem hierarchy Standard **FHS**



/ - root filesystem, contains all
files req to boot OS before other
... , then

Files req to boot OS before other filesystems are mounted and their req files

after boot, all other filesystems are mounted as sub dirs of root

/bin - essential binaries

/boot - static bootloader, kernel exec, and files req to boot Linux OS

/dev - device files for access to every hardware device attached to system

/etc - local system config files and config files for apps

/home - each user as dir here for storage

/lib - shared lib files req for system boot

/media - external removable media devices mounted here

/mnt - temp mount point for regular filesystems

/opt - optional files such as 3rd party tools can be stored

/root - home dir of root user

/sbin - exec for sys admin binary system files

/tmp - OS and apps use to store temp files

generally cleared on boot

/usr - contains exec, libraries, man

files, etc.

/var - variable data like log files,
email inboxer, web app related
files, cron files, etc.

man files = manual files

crontab = cli job scheduler

Linux Distributions

Ubuntu, Fedora, CentOS, Debian,
red hat

Usually used for servers because
secure, stable, reliable, and
regular updates

Cybersecurity

Cybersecurity

Parrot OS, Ubuntu, Debian, Raspberry Pi,
centOS, BackBox, BlackArch, Pentoo

Kali Linux = sec tools; pen testing

Ubuntu = desktop

Debian = servers / embedded

red hat & centOS = enterprise-level
computing

Debian

uses **advanced package tool apt**

for patches & updates

flexible + custom

Introduction to Shell

text-based I/O interface between

user and kernel

Terminal Emulators

Software that emulates terminal

terminal = interface to shell interpreter

Shell

~~bourne-again shell~~ **BASH**

Prompt Description

Basic prompt

- user
- hostname
- current working dir

<username>@<hostname><working dir>\$

home dir for user = ~

\$ = user

= root

if we upload shell on target, might
not see other info and just get
\$ or #

can custom to have other info like
IP, time, exit status

good for pen tests when we
print out command histories

customize w/ chars in `.bashrc` config
file

`PS1='ld...'`