

DevOps Training

Suryaraj Timsina

Recap

1. What is Continuous Integration?
2. What is Continuous Delivery?
3. What is Virtualization?
4. VM Setup

Agenda

1. Linux

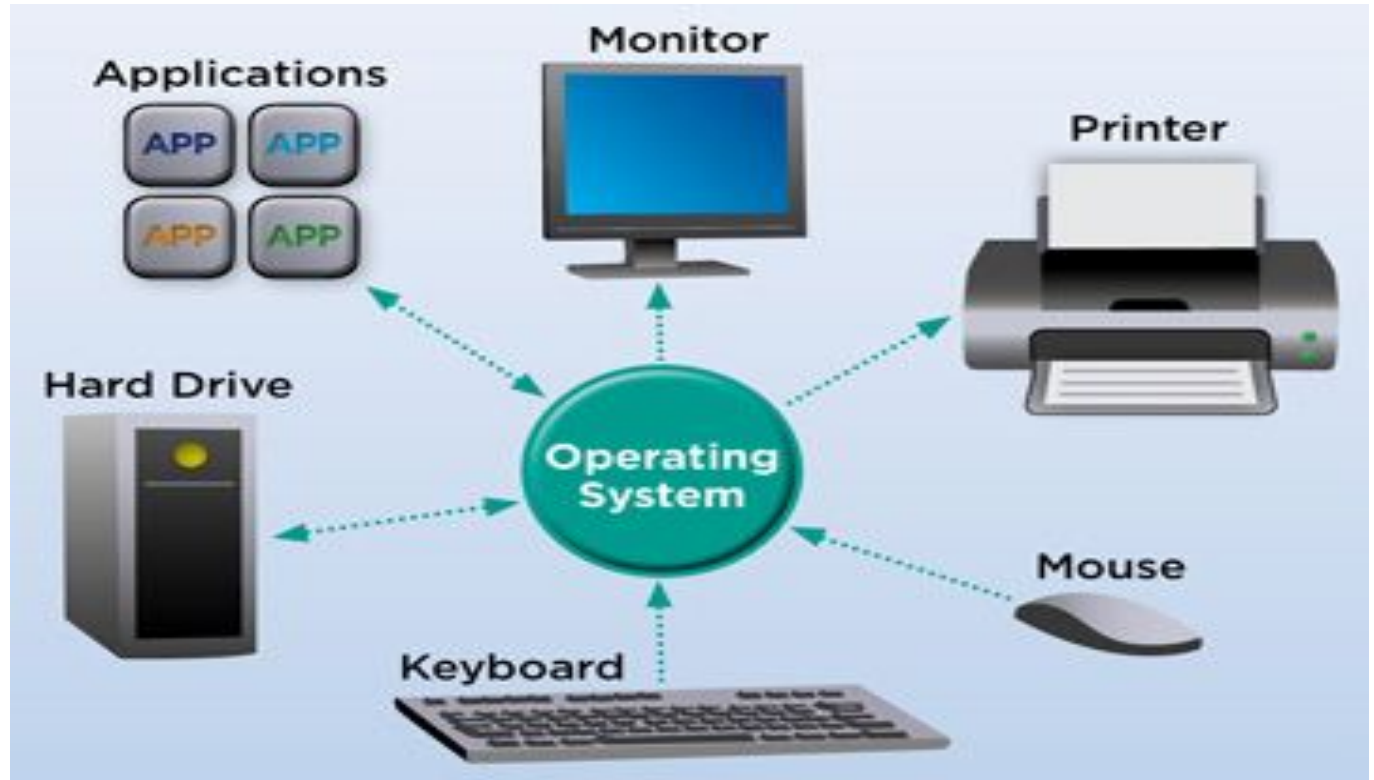
Linux

Operating System

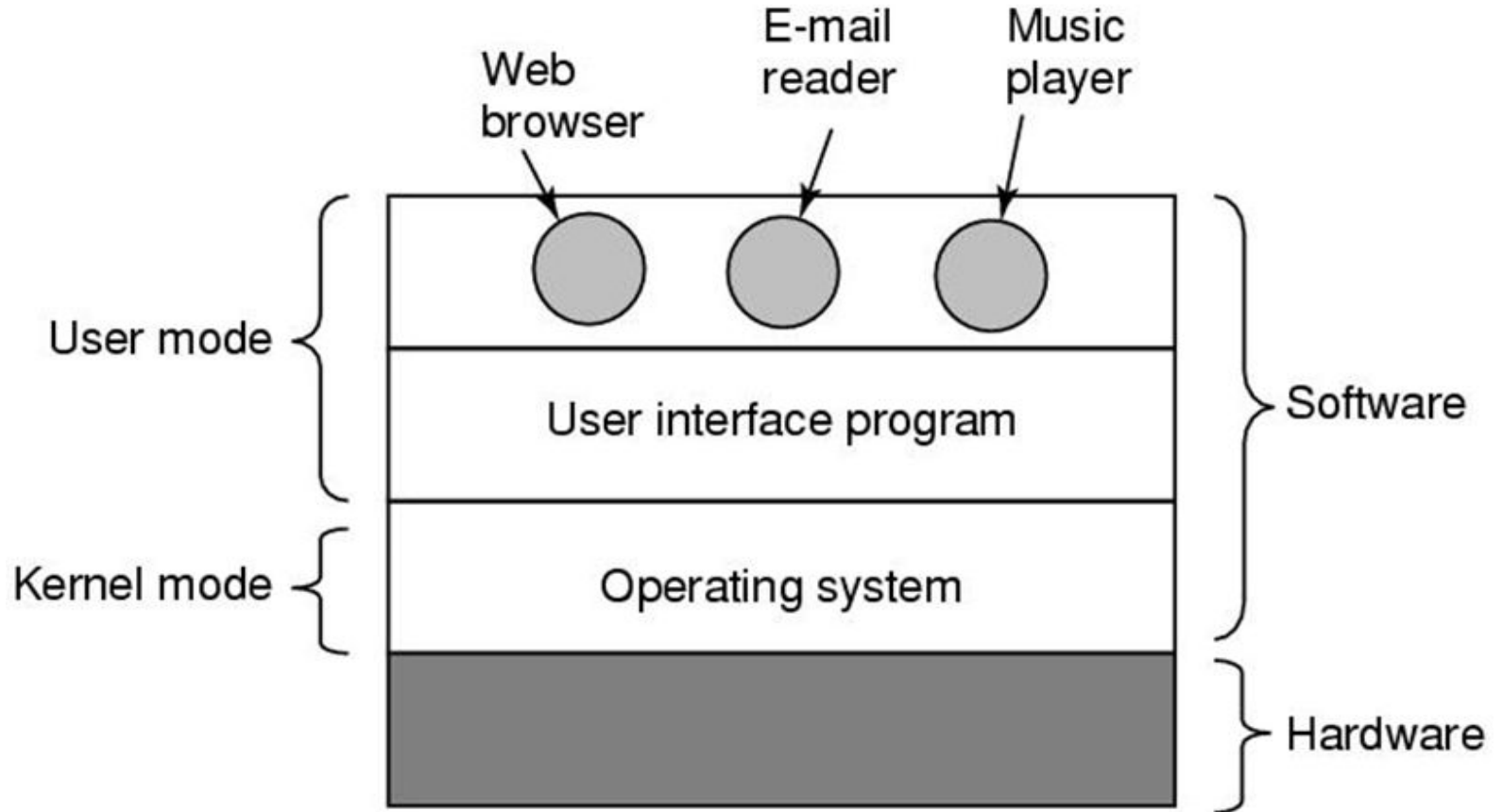
- A layer of software required to manage varied components of a computer.
- Acts as interface between user and the computer hardware.
- Processors
- Main memory
- Disks
- Input/output devices

Linux

Operating System



Linux, Where does OS lies?



Linux History:

Linux origin

- 1984: The GNU project and the free software foundation, creates the open source version of UNIX utilities.
- Creates the General Public License(GPL), software license enforcing open source principles.

1991: Linus Torvalds

- Created open source UNIX-like kernel, released under CPL.
- Ports some GNU utilities, solicits, assistance online.

Today:

- Linux Kernel + GNU utilities = complete, open source, UNIX-like operating system.
- Packaged for targeted audiences as distributions.

Linux/ Unix principles

- Everything is a file including hardware.
- Configuration files are in text form.
- Avoid use of GUI.
- Small single purpose program.
- Small programs can be combined to perform complex task.

Open Source Softwares

- Any software that satisfies following criteria are open source software.
- Source code can be download freely.
- Source code can be studied and modified freely.
- Source code can be redistributed without any need of approval.
- E.g Linux, Apache, Mysql, PHP, Perl, Python etc.

Linux Terminology

- Kernel
- Distribution
- Boot loader
- Service
- File system
- X Windows system
- Desktop environment
- Command line

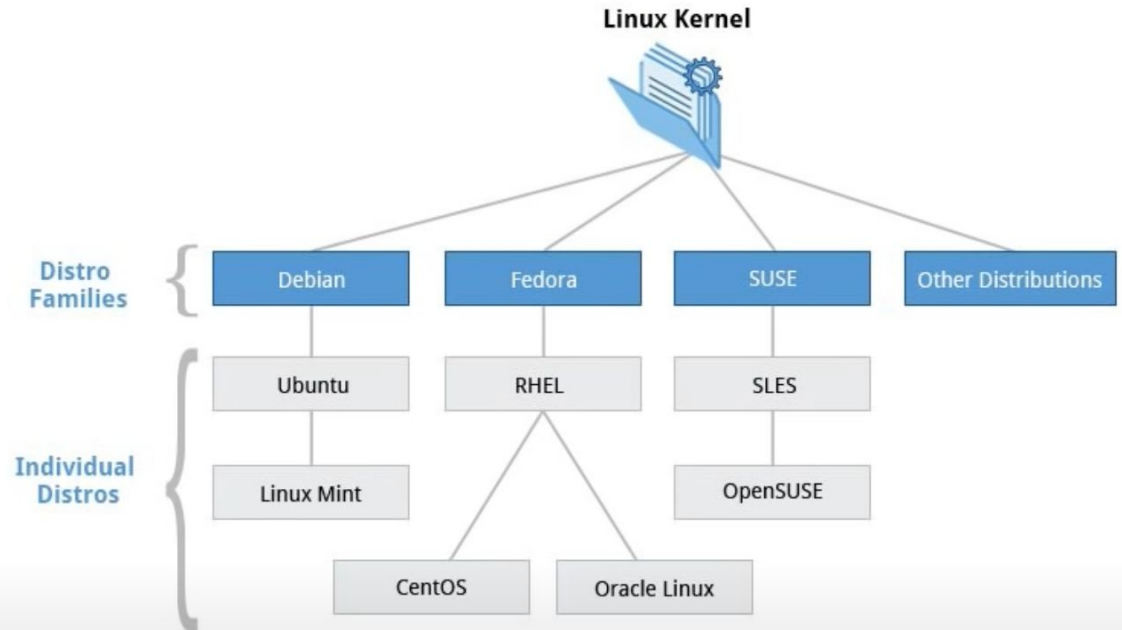
Linux Kernel

- Considered brain of the OS.
- Glue between hardware and application.
- Controls hardware and makes hardware interact with the application.
- E.g Linux Kernel

Linux Distributions

- Collection of programs combined with the linux kernels to make up linux based OS.

E.g Red hat, Fedora, Ubuntu.



Linux Bootloader

- Program boots the OS.
- E.g GRUB and ISOLINUX.

Linux Service

- Program that runs in the background process.
- E.g httpd, nfsd, ftpd.

Linux File System

- Method for storing and organizing files.
- E.g ext3, ext4, Fat, XFS, NTFS.

Linux X Windows System

- Provides the standard toolkit and protocol to build the graphical user interfaces on nearly all linux distos.

Linux Desktop Environment

- GUI interface on the top of OS.
- E.g: Gnome, KDE, Xfce.

Linux Command Line

- Interface for typing commands on top of OS.

Linux Shell

- Command line interpreter that interprets the command line input and instructs the OS to perform any necessary task and commands.
- E.g bash, tcsh, zsh.

Linux Distros

- Red Hat
- CentOS
- Ubuntu
- Debian
- Kali
- Suse
- Backtrack etc.

CentOS

- Community Enterprise OS.
- Derived from Redhat Enterprise Linux sources.

Ubuntu

- Derivative of debian linux.
- Popular for desktop installation.
- Ubuntu African word which means ‘Humanity to others’, help to others.
- Server and desktop
- Easy to deploy in the cloud: i.e. Amazon EC2, RackSpace Cloud, Custom Cloud, Vmware
- 1-cd <=700 MB which includes GUI, if needed.

/ - Root

- Top-level root directory.
- Every single file and directory starts from the root directory.
- Only root user has write privilege under this directory.

Note: /root is root user's home directory, which is not same as /.

/bin - User Binaries.

- Contains binary executables.
- Common linux commands you need to use in single-user modes are located under this directory.
- Commands used by all the users of the system are located here.
- For example: ps, ls, ping, grep, cp.

/sbin - System Binaries

- Just like /bin, /sbin also contains binary executables.
- But, the linux commands located under this directory are used typically by system administrator, for system maintenance purpose.
- For example: iptables, reboot, fdisk, ifconfig, swapon.

/etc - Configuration Files

- Contains configuration files required by all programs.
- This also contains startup and shutdown shell scripts used to start/stop individual programs.
- For example: `/etc/resolv.conf`, `/etc/logrotate.conf`

/dev - Device Files

- Contains device files.
- These include terminal devices, usb, or any device attached to the system.
- For example: /dev/tty1, /dev/usbmon0.

/proc - Process Information

- Contains information about system process.
- This is a pseudo file system contains information about running process. For example: /proc/{pid} directory contains information about the process with that particular pid.
- This is a virtual filesystem with text information about system resources. For example: /proc/uptime.

/var - Variable Files

- var stands for variable files.
- Content of the files that are expected to grow can be found under this directory.
- This includes — system log files (/var/log); packages and database files (/var/lib); emails (/var/mail); print queues (/var/spool); lock files (/var/lock); temp files needed across reboots (/var/tmp);

/tmp - Temporary Files

- Directory that contains temporary files created by system and users.
- Files under this directory are deleted when system is rebooted.

/usr - User Programs

- Contains binaries, libraries, documentation, and source-code for second level programs.
- /usr/bin contains binary files for user programs. If you can't find a user binary under /bin, look under /usr/bin. For example: at, awk, cc, less, scp
- /usr/sbin contains binary files for system administrators. If you can't find a system binary under /sbin, look under /usr/sbin. For example: atd, cron, sshd, useradd, userdel
- /usr/lib contains libraries for /usr/bin and /usr/sbin 31
- /usr/local contains users programs that you install from source. For example, when you install apache from source, it goes under /usr/local/apache2

/home - Home Directories

- Home directories for all users to store their personal files.
- For example: /home/srtimsina, /home/student

/boot - Boot Loader Files

- Contains boot loader related files.
- Kernel initrd, vmlinuz, grub files are located under /boot
- For example: initrd.img-2.6.32-24-generic,
vmlinuz-2.6.32-24-generic

/lib - System Libraries

- Contains library files that supports the binaries located under /bin and /sbin
- Library filenames are either ld* or lib*.so.*
- For example: ld-2.11.1.so, libncurses.so.5.7

/opt - Optional Add-on Applications

- opt stands for optional.
- Contains add-on applications from individual vendors.
- add-on applications should be installed under either /opt/ or /opt/ sub-directory.

/mnt - Mount Directory

- Temporary mount directory where sysadmins can mount filesystems.

/media - Removable Media Devices

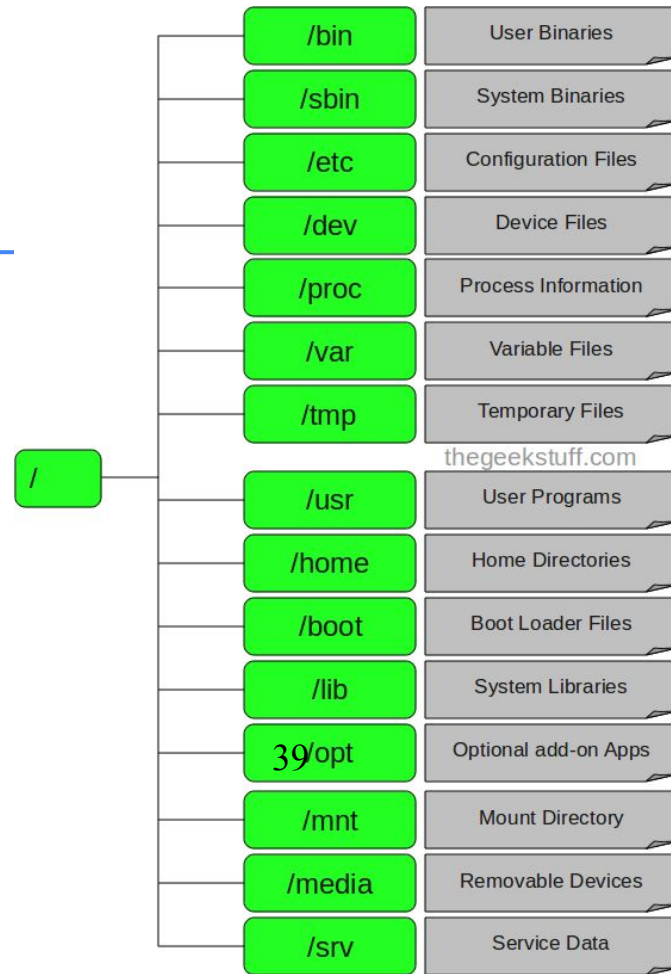
- Temporary mount directory for removable devices.
- For examples, /media/cdrom for CD-ROM; /media/floppy for floppy drives; /media/cdrecorder for CD writer.

/srv - Service Data

- `srv` stands for service.
- Contains server specific services related data.
- For example, `/srv/cvs` contains CVS related data.

File System Structure

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Login Into Linux

- Need to send username and password.
- Login types
- Graphical //gives desktop interface to supply username and password.
- Simple text //gives shell prompt to supply username and password.

Login Into Linux

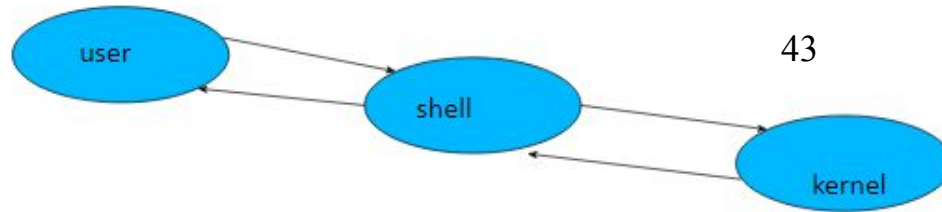
- Shell prompt usually ends in a dollar sign (\$)
- [srtimsina@example.com ~]\$
- [root@example.com ~]#

Logging Out

- Exit command
- Ctrl+D
- After a logout, new login screen should appear.

Shells

- A shell provides an interface between the user and the operating system kernel
- Either a command interpreter or a graphical user interface
- Traditional Unix shells are command-line interfaces (CLIs)
- Usually started automatically when you log in or open a terminal



Remote Login

- Via ssh.
- SSH server must be running in the machine.
- SSH client is needed in the client machine.
- `$sudo apt-get install openssh-server` //installs ssh server
- SSH clients
- For windows machine, Xshell, Putty.
- For linux machines
- `$sudo apt-get install openssh-client` //installs ssh client

Checking The Service Status

- Command Syntax [service] [service_name] [command] or
- [systemctl] [command] [service_name]
- #service sshd status
- #systemctl status sshd
- Commands can be, start, restart, reload, status, stop

Text Editors

- vim
- nano
- gedit
- VIM