Passerelles numériques

A Gateway for Life

OS & Maintenance

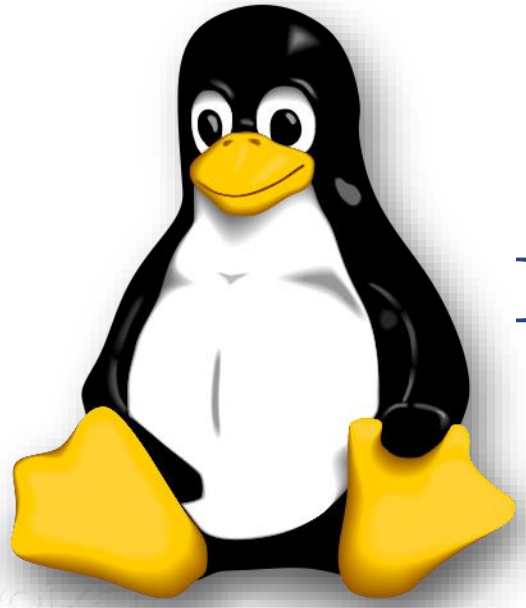
Chapter 7 – **Linux Installation**

Objective

After finished this lesson students will be able to know:

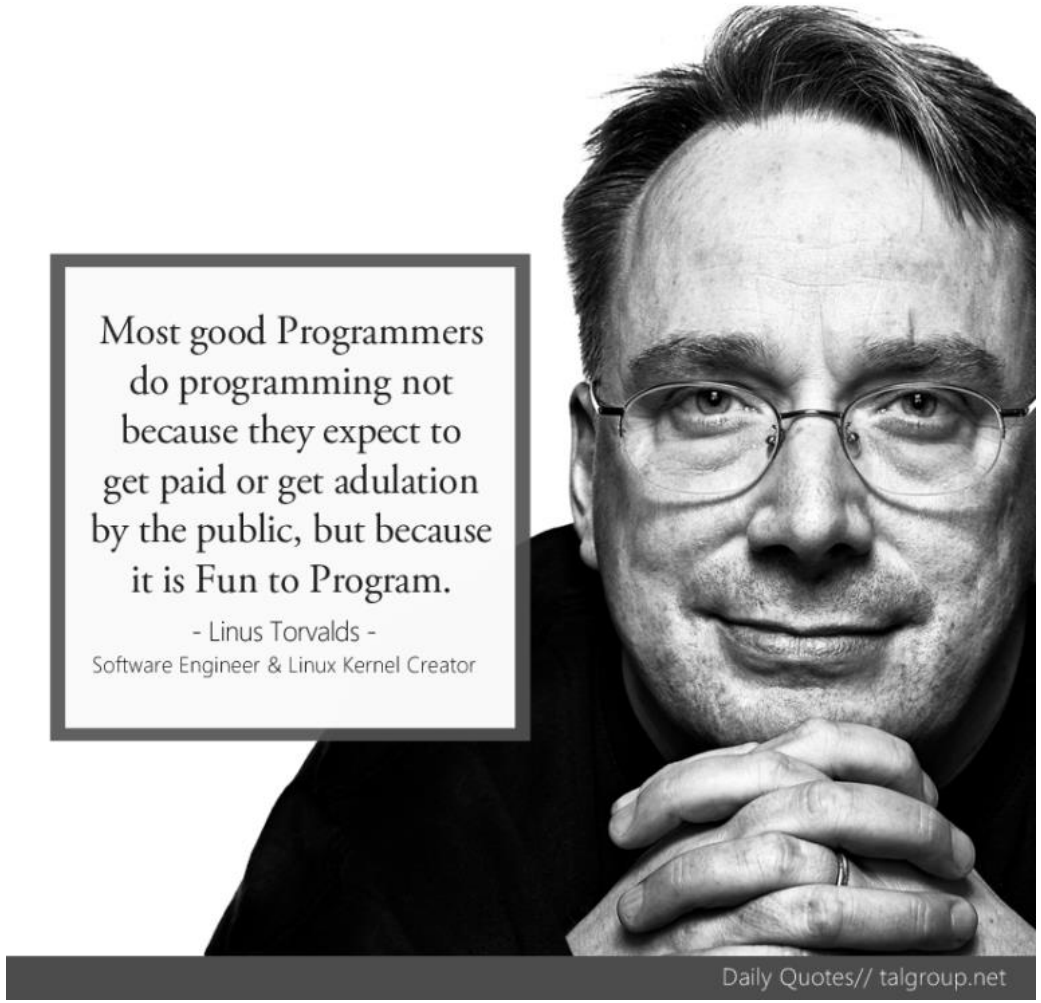
- Introduction to Linux Operating System
- Linux Installation
- Installation Application on Linux
- Linux Basic Command Line
- Linux Practice

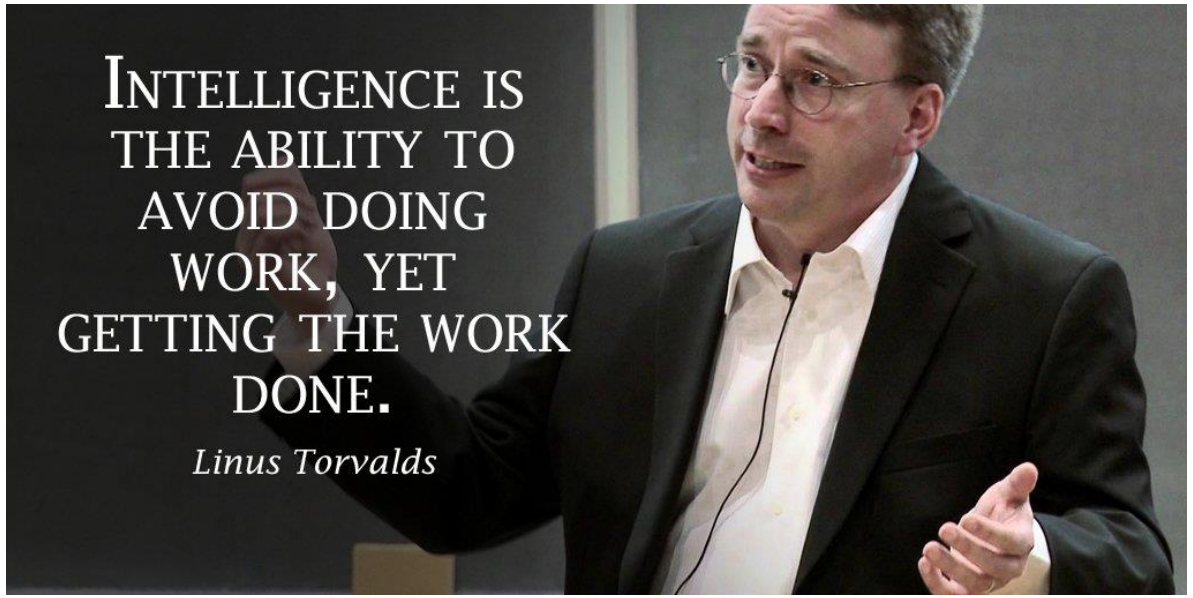
- The top 500 supercomputer in the world all use Linux
- 23 out of most popular 25 websites in 2020 are power by Linux
- Linux is the favorite OS of 83.1% of developers according to the study
- Around 1.69% of all desktop home computer are using Linux
- Well over 4,000 video games now have support for Linux

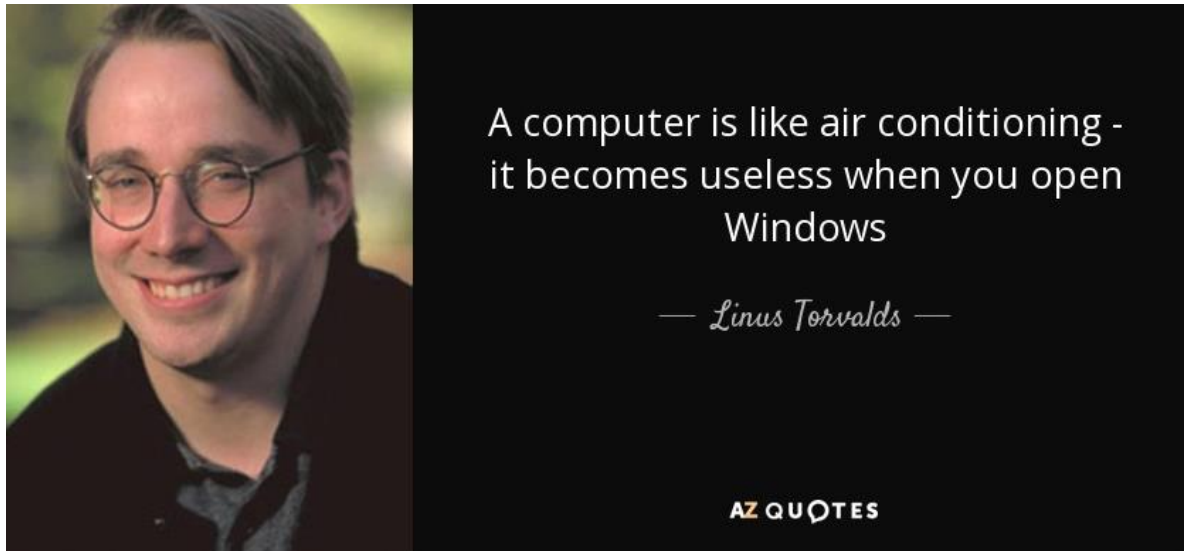


Linux Today!

Linus Torvalds (28-12-1969), A creator of **Linux kernel**.

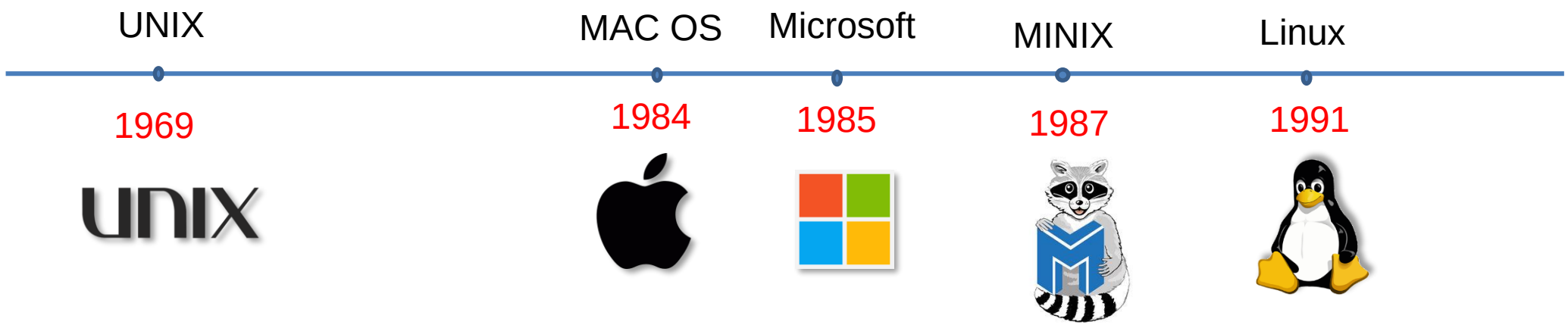






Linux Overview

- Linux is an open source operating system (OS). It was originally conceived of and created as a hobby by **Linus Torvalds** in 1991. Linus, while at university, sought to create an alternative, free, open source version of the MINIX operating system, which was itself based on the principles and design of Unix.



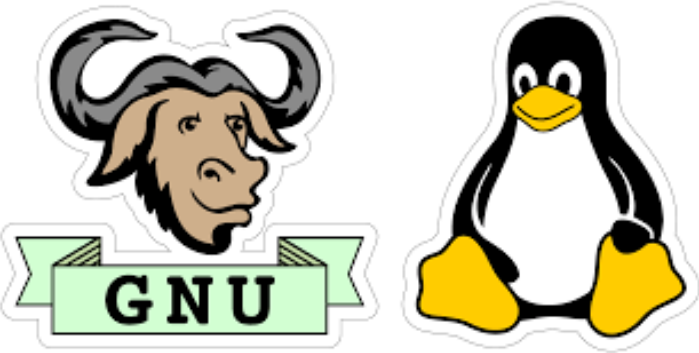
Linux Overview

What is Open Source Software?

⇒ Open source software is software with source code that anyone can modify, enhance, distribute and share because its design is publicly accessible.

Why do people prefer using open source software?

- Control
- Learning
- Security
- Stability
- Community

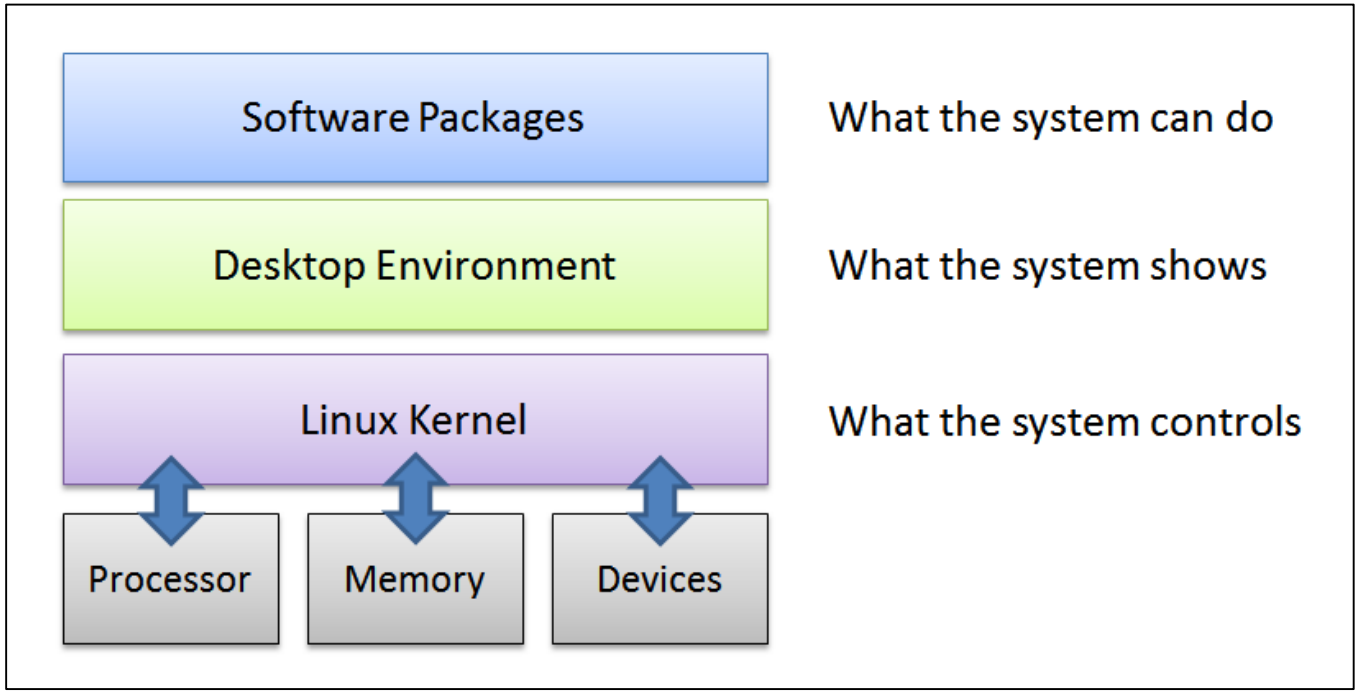


What is GNU General Public License (GPL)?

⇒ GPL License is a series of widely used free software license that guarantee end users the freedom to run, study, and modify the software.

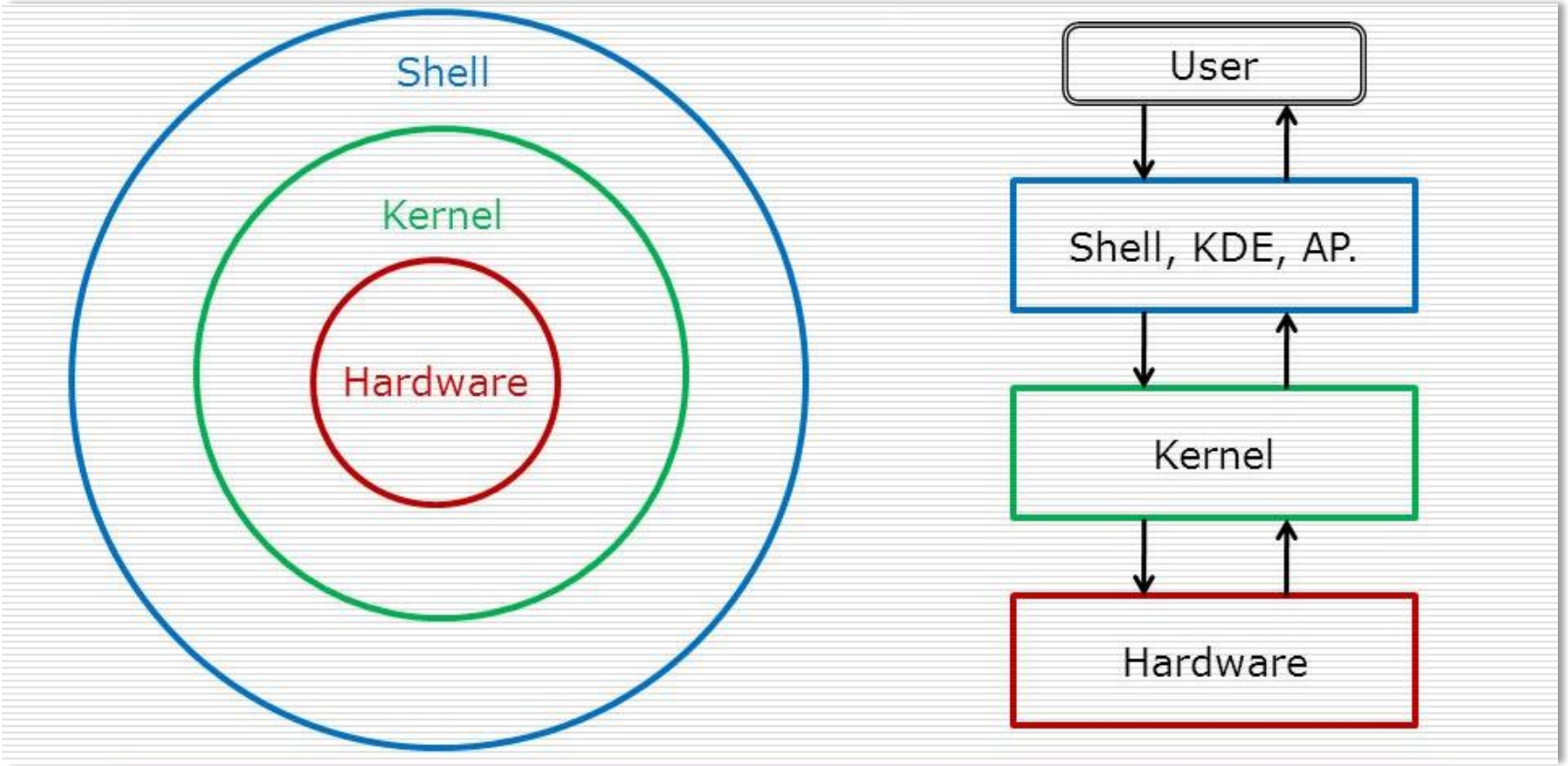
Linux Distribution

A Linux distribution is an operating system composed of the Linux kernel, GNU tools (free software) and a package manager. It may also include display server and desktop environment to be used as regular desktop operating system.



Understanding Linux Shell, Kernel

Kernel – is a core component of operating system that have control over everything on system. It's communicate between user applications and hardware.

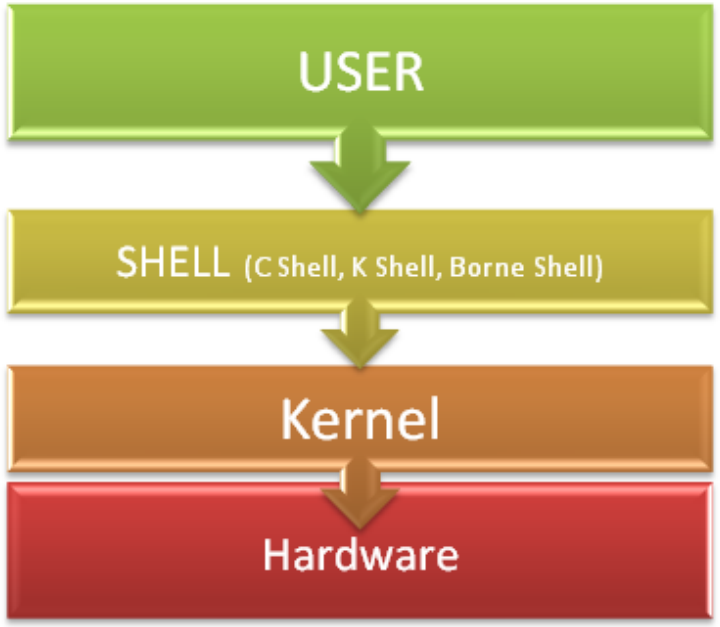


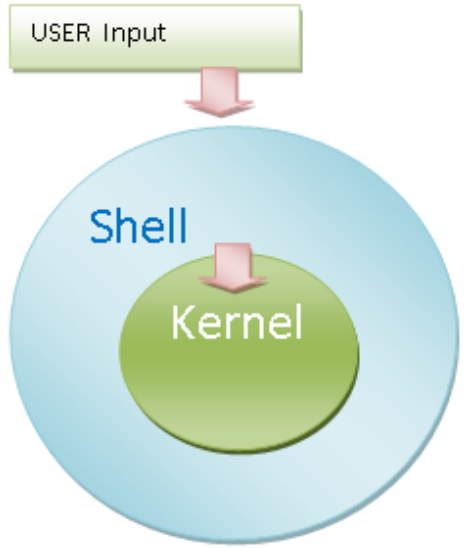
Understanding Linux Shell, Kernel

Shell – is a program that acts as the interface between user and Linux kernel, allowing you to enter commands (input) for operating system to execute.

There are many shell programs exist:

- SH : Borne Shell
- BASH : Bourne Again Shell
- CSH : C Shell
- TCSH : TC Shell
- KSH : Korn Shell
- ZSH : Zsh Shell

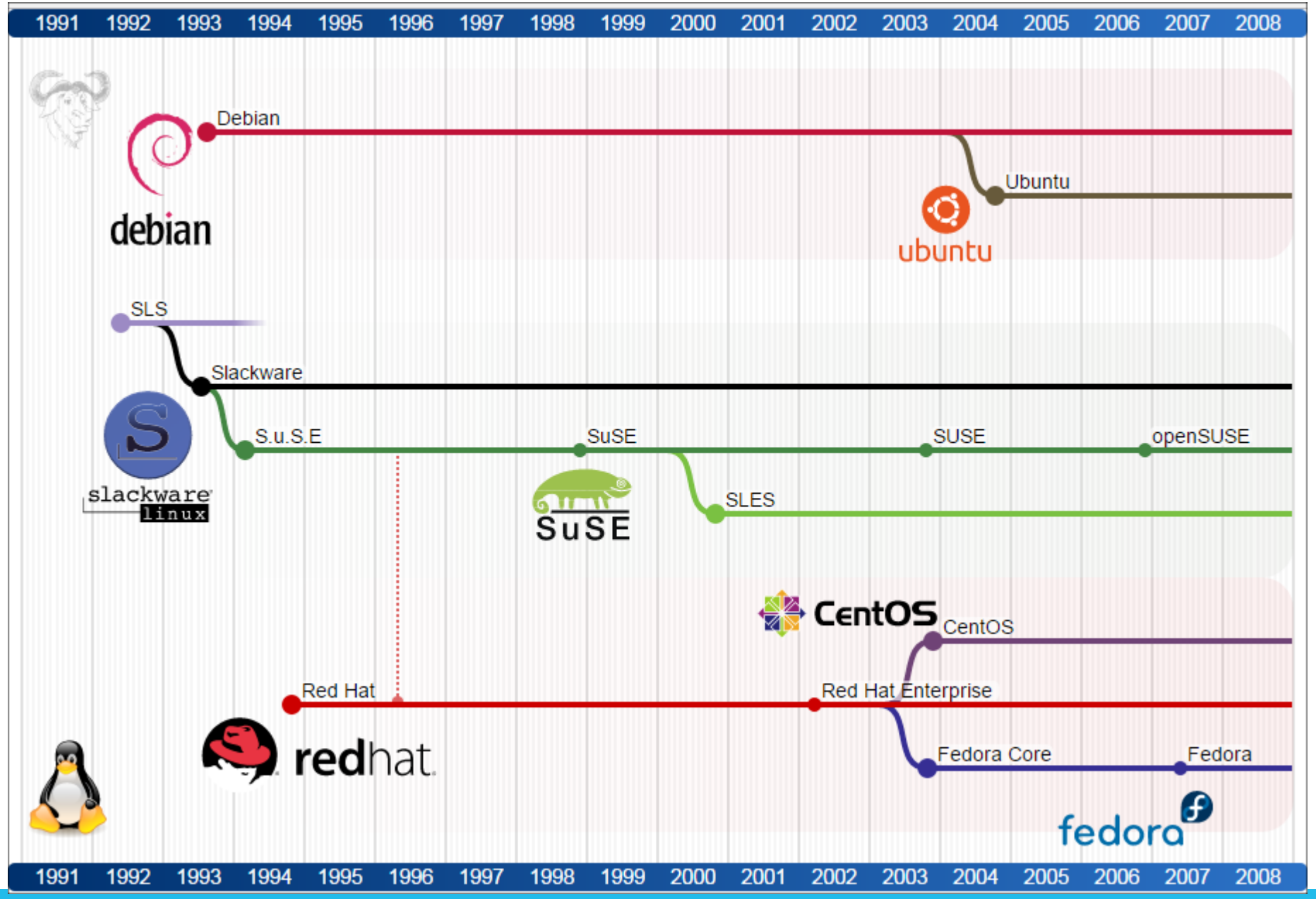




Linux Distribution

Almost **six hundred** Linux distributions exist now a day

Linux Distributions Timeline



CentOS Linux Distribution

The **CentOS** Linux distribution is a stable, predictable, manageable and reproducible platform derived from the sources of *Red Hat Enterprise Linux (RHEL).*

- Developer : CentOS Project
- OS family : Linux
- Source model : Open source
- Initial release : 14 May 2004
- Latest release : 03 Dec 2020 (8.3.2011)
- Marketing target : Server, Desktop, Workstation, Supercomputer
- Package manager : YUM
- Platform : x86_64, POWER8
- User interface : Bash Shell, GNOME Shell
- License : GNU GPL
- Official Website : *www.centos.org*

How does Linux Differ from Other OS?

- Open Source
- Free to Use
- Customization
- Compatible with older computers
- Perfect for programmers
- Software update
- Better community support
- Reliability

Linux Installation

- Linux File System
- Linux Partitioning
- Download Linux ISO image file
- Linux Installation
- Linux Navigation paths

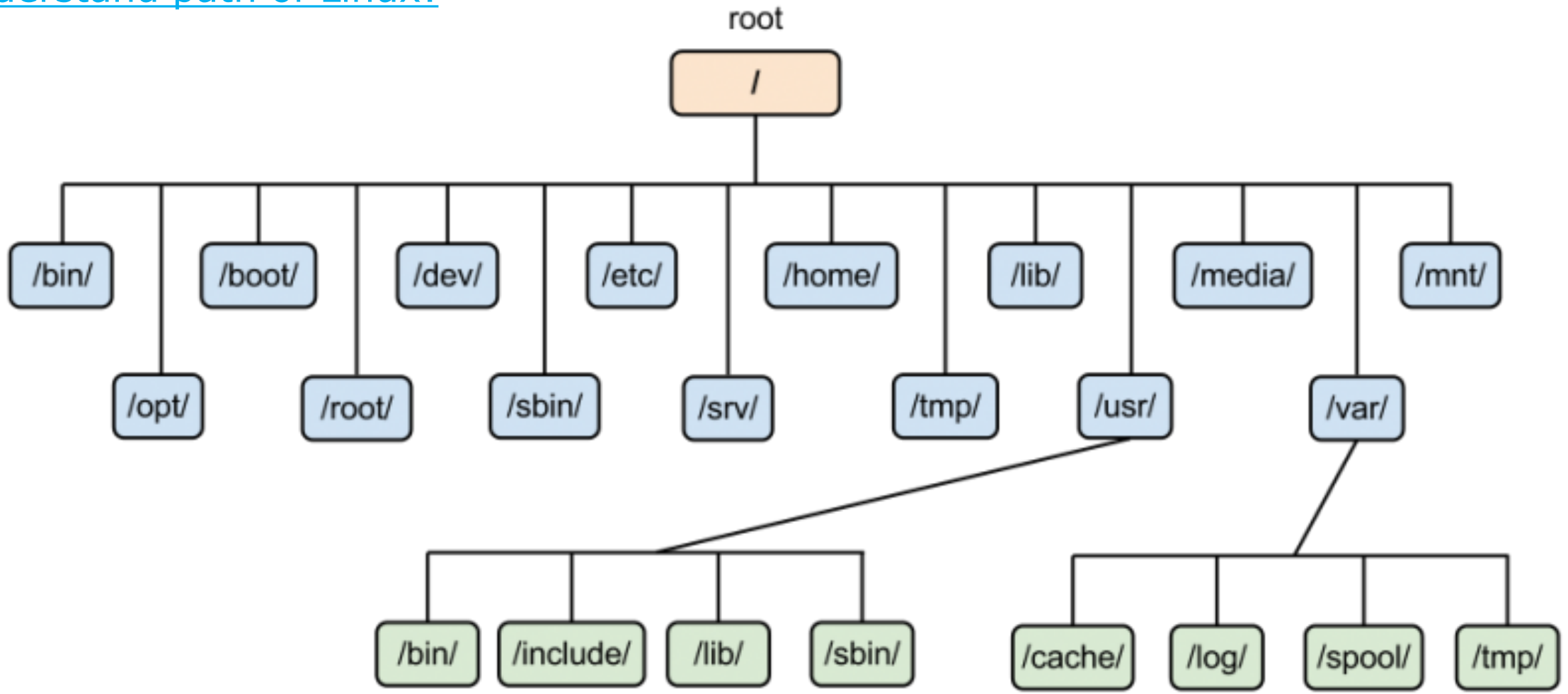
Linux Partitioning

Before Linux partitioning we need to know the types of **File system on Linux**:

- ✓ **Ext2**: support standard Unix file types, and it can support long character maximum file size of 2 TiB. (regular files, directories, symbolic links, etc.)
- ✓ **Ext3**: is based on the ext2 file system and has one main advantage journaling.
- ✓ **Swap**: are used to support virtual memory.
- ✓ **Vfat**: is Linux file system that is compatible with windows 95/NT log filenames on the FAT file system.
- ✓ **Ext4**: can support volume with sizes up to 1EiB and files with sizes up to 16TiB

Linux File System Hierarchy

Understand path of Linux:



Linux File System Hierarchy

- **/** : the root directory where every single file and directory starts from. Only user Root has the right to write under this directory.
- **/boot** : contains the operating system kernel, along with files used during the bootstrap process.
- **/etc** : contains main configuration files required by all programs
- **/bin** : contains basic commands for normal user.
- **/sbin** : contains command which required by System administrator.
- **/home** : user's home directories for all of normal user in system.
- **/root** : home directory of user root.
- **/lib** : stores shared libraries in system

Linux File System Hierarchy

- **/var** : store various system file such as log, spool, and mail
- **/srv** : store data for service Ex. FTP
- **/opt** : contains optional application software packages
- **/dev** : contains device files
- **/mnt** : temporary mount point
- **/tmp** : contains temporary files created by system and users
- **/proc** : contains information about system process
- **/usr** : store user ressource (command, document, application…)
- **/media** : mount point for removable media such as CD-ROMs

Linux Partition Scheme Recommend

- Swap partition – Support virtual memory: data is written to a swap partition when there is not enough RAM space to store the data your system is processing.

Amount of RAM in the system	Recommended Swap space
=< 2GB	2 times the amount of RAM
>2GB – 8GB	Equal to the amount of RAM
>8GB – 64GB	At least 4GB
> 64GB	At least 4GB

- /boot partition – Mounted on /boot/ directory, contains the operating system.
- /boot/efi partition – Only on system with UEFI firmware
- / partition – A root partition is the top of directory structurer, all files (expect those stored in /boot) are on the / partition.
- Home partition – Mounted on /home directory, to store user data (user profile) separately from system data.

Linux Partition Scheme Recommend

- Disk partitioning: is the act of dividing hard disk drive into multiple logical drive.
- Hard drive naming:
  - IDE Disk Partitions
    - /dev/hda1 , /dev/hda2
    - /dev/hdb1 , /dev/hdb2
  - SATA Disk Partition
    - /dev/sda1, /dev/sda2
    - /dev/sdb1, /dev/sdb2

Download Linux OS

- To install Centos 7, you need to download the ISO images from link bellow: http://mirror.cambo.host/centos/7.9.2009/isos/x86_64/

- After you download ISO image already, you can Burn to CD/DVD, and USB bootable before setup OS.

System Requirement for Installation

Operating system and version	Processor	RAM	Disk Space	Architecture
CentOS 7, CloudLinux 7, or RHEL 7	1.1 GHz	• **Minimum**: 1 GB • **Recommended**: 2 GB	• **Minimum**: 20 GB • **Recommended**: 40 GB	64-bit
CloudLinux 6	1.1 GHz	• **Minimum**: 768 MB • **Recommended**: 1 GB	• **Minimum**: 20 GB • **Recommended**: 40 GB	64-bit
CentOS 8 and CloudLinux 8 **Experimental**	1.1 GHz	• **Minimum**: 1 GB • **Recommended**: 2 GB	• **Minimum**: 20 GB • **Recommended**: 40 GB	64-bit

Installation from Boot media

Steps to installing Centos 8:

- Step 1: download ISO image
- Step 2: make a bootable drive
- Step 3: begin installation
- Step 4: select language and keyboard
- Step 5: change installation destination
- Step 6: select the partition scheme
- Step 7: create a swap space

CentOS® 8

Installation from Boot media

- Step 8: create a mount point
- Step 9: Accept changes
- Step 10: set Date and time
- Step 11: begin installation
- Step 12: set up root password
- Step 13: create a user password
- Step 14: complete installation

Linux Navigation Path

- “.” is link to the current directory
- “..” is link to the next higher directory
- “/” root partition
- “~” home directory of user root
- “~user” home directory of user

Install Application and Update

- Command Structure
- CentOS Package Manager (YUM)
- Linux Repository
- Install/Uninstall Application using YUM

yum
yellowdog updater modified

Command Line Structure

- **What is a Command?**

  Command *is an instruction given by a user telling a computer to do something.*

- **Syntax**: command -[options] [arguments]
  - Command : Tell computer what to do
  - Option : Modify command's behaviour.
  - Argument : Object for command to do with, can be files or other data.

- There are two type of options:
  - Single character option usually preceded by –
  - Can be passed as –a-b-c or –acb, Ex: #ls -l -a or ls -la

  - Full-word option usually preceded by --
  - Ex: #ifconfig --help

Command Line Structure

- Commands, options, and arguments are all case sensitive
- Each items separated by a space
- Some commands can be used without require any options or arguments. (ls , pwd…)
- Sometimes there are more than one option and argument within a command line
- Multiple commands can be separated by ;
- 256 characters can be entered on a single command line

CentOS Package Manager

- What is package manager?
- What is package?
- How does package manager work?
- Using YUM command:
  - Update package on system
  - Install package using YUM
  - Uninstall package using YUM

CentOS Package Manager

❖ What is package manager?

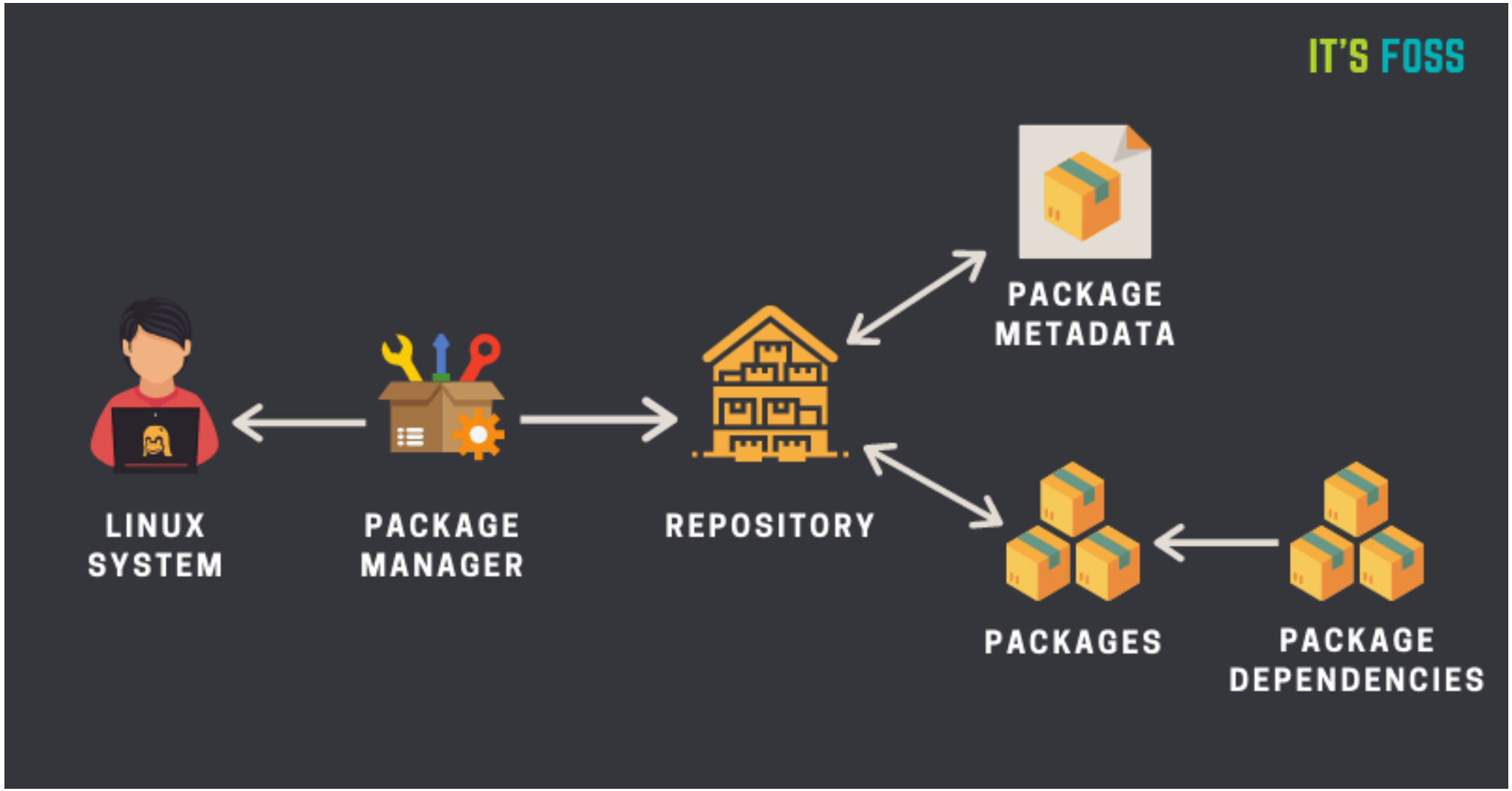
Package *manager* is a tool that allows users to install, remove, upgrade, configure and manage software packages on an operating system.

The package manager can be a *graphical application* like a software center or a *command line tool* like apt-get or yum.

❖ What is package?

Package is usually referred to an application but it could be a GUI application, command line tool or a software library (required by other software programs).

How does the package manager work?



https://itsfoss.com/package-manager/

CentOS Package Manager

- **What is repository?**

  Almost all Linux distributions have software repositories which is basically collection of software packages.

- Some type of Linux package managers:
  - **APT** (Advanced Package Tool)
  - **Aptitude**
  - **YUM** (Yellow Dog Updater Modified)
  - **DNF** (Dandified YUM)
  - **RPM** (Red Hat’s Package Manager)
  - **Pacman**
  - **Zypper**

Using YUM Command

- **Below are the example of yum command:**
  - yum install [package name]
  - yum remove [package name]
  - yum update
  - yum update [package name]
  - yum list available
  - yum list installed
  - yum search [package name]
  - yum info [package name]
  - yum clean all

Linux Basic Command Usage

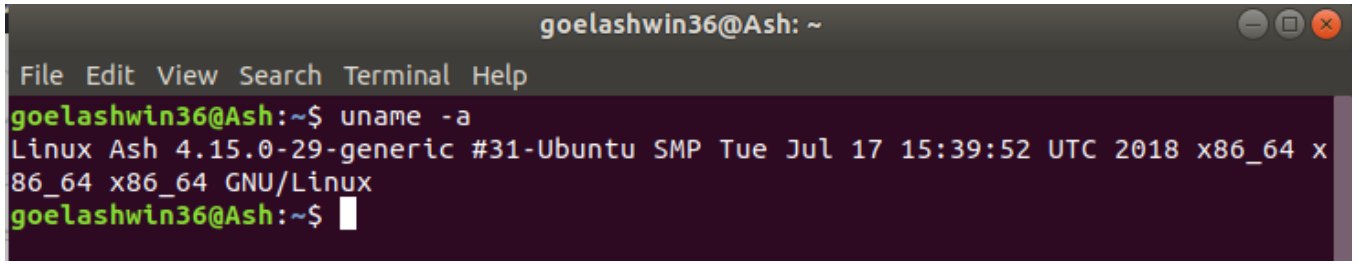
- Check OS information
- Linux Help command
- Create view edit text file
- View running process on system
- Killing running process

Linux basic command usage

View OS information:

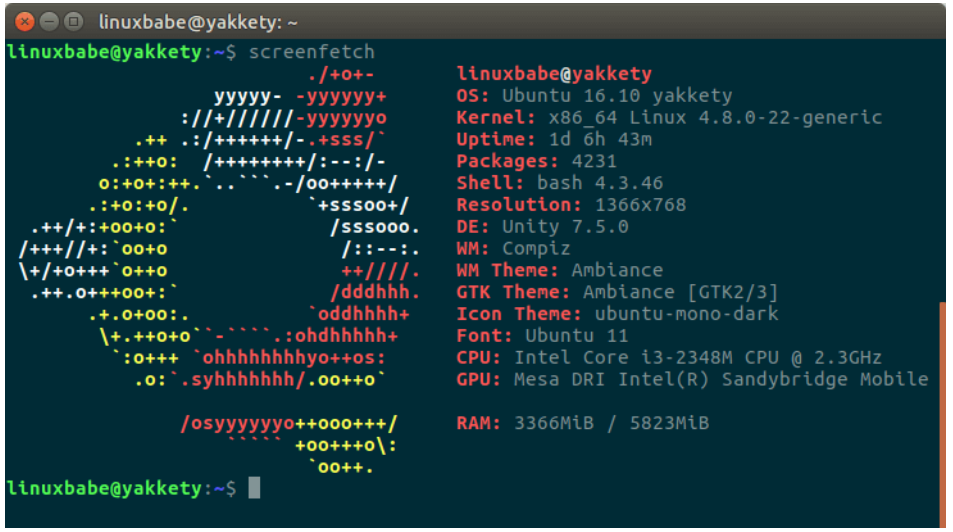
- Uname: displays the information about the system.

  $uname -a



- Screenfetch: this command also get your Linux system information.

  $screenfetch



Linux basic command usage

You cannot memorize everything!

There are many level of help in Linux

- Whatis : Display briefly information about how to use commands
- Man : Provide documentation for commands
- Info : Similar to man, but more in-depth
- Help and option -- help : Display usage summary of commands and list of options
- /usr/share/doc

All this command help can tell you the meaning of command that we used on Linux.

Linux basic command usage

Working with file and directories

- pwd : display the current working path of user
- cd : change directory path
- ls : lists contents in directory – *ls [option] [file or dir]*
- cp : copy files and directory – *cp [option] [file_name] [destination]*
- mv : move or rename files and directory
- *mv [option] [file_name] [destination]*
- *mv [option] [old_name] [new_name]*
- touch : create an empty file
- rm : remove file – *rm [option] [file_name]*
  rm –rf [directory_name] used to remove directory
- rmdir : remove an empty directory
- mkdir : create directory

Linux basic command usage

Text Editor and Text viewer

- vim : the standard Linux text editor
- less : view contents of file with one full screen at a time
- more : view contents of file with one full screen, but cannot search text.
- cat : view contents of file
- head : display the first 10 lines of a file
- tail : display the last 10 line of a file
- cut : print out the selected part of line from file to display on screen
- grep : search or output lines matching with a given keyword from file

Linux basic command usage

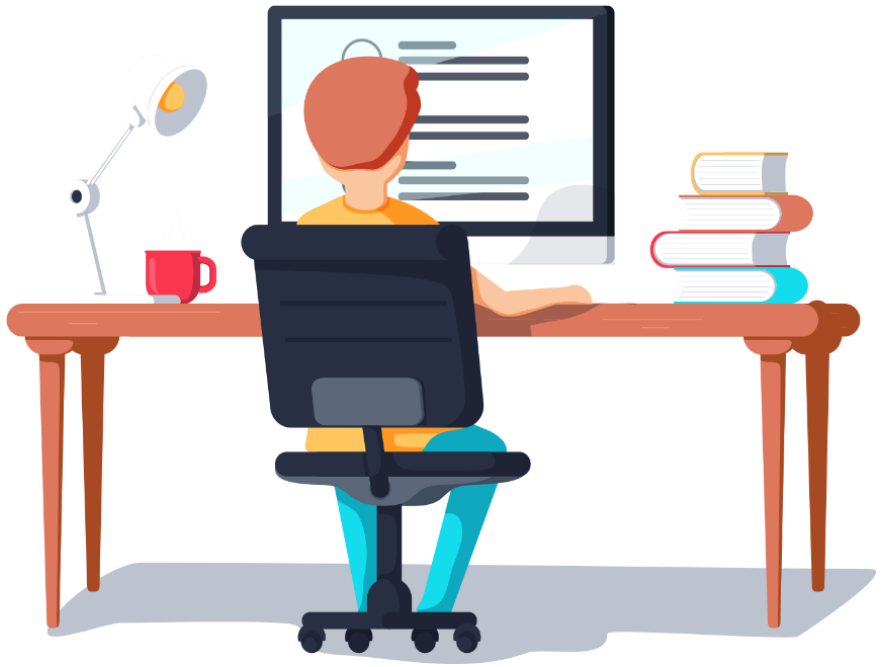
System performance checking

- free : display a detailed report the system's memory usage
- top : used to show running processes on system
- htop : show running processes on system, with better interface
- df : (disk-free) show available and used disk space on system

  df –h shows in human-readable format
- fdisk –l : show disk size along with disk partitioning information

- Install CentSO 8 with GUI on your VirtualBox
  - Total HDD 70GB, RAM 1GB
    - /boot: 5GB
    - /home: 30GB
    - Swap: 2GB
    - / : all of the rest
- Practice on basic command line
  - Create directory
  - Create files
  - View, modify, remove files
  - View / killing running process
  - Install / uninstall application

Practice !



ANY QUESTION ?