**UNIX :** After [AT&T](https://en.wikipedia.org/wiki/AT%26T) had dropped out of the [Multics](https://en.wikipedia.org/wiki/Multics) project, the [Unix](https://en.wikipedia.org/wiki/Unix) operating system was conceived and implemented by [Ken Thompson](https://en.wikipedia.org/wiki/Ken_Thompson) and [Dennis Ritchie](https://en.wikipedia.org/wiki/Dennis_Ritchie) (both of [AT&T Bell Laboratories](https://en.wikipedia.org/wiki/AT%26T_Bell_Laboratories)) in 1969 and first released in 1970.

**LINUX** : In 1991, while studying [computer science](https://en.wikipedia.org/wiki/Computer_science) at [University of Helsinki](https://en.wikipedia.org/wiki/University_of_Helsinki), Linus Torvalds began a project that later became the [Linux kernel](https://en.wikipedia.org/wiki/Linux_kernel).

**10+ Linux distributions today.**

* Ubuntu. ...
* **RedHat**
* Fedora. ...
* Linux Mint. ...
* openSUSE. ...
* PCLinuxOS. ...
* Debian. ...
* Mandriva. ...
* Sabayon/Gentoo.

**Why Linux**

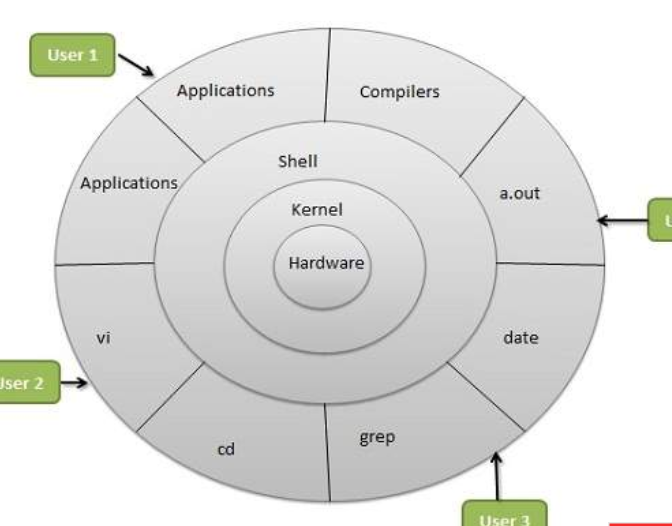
* **Open Source Nature**
* **Secure:** It is just the way Linux works that makes it a secure operating system. Overall, the process of package management, the concept of repositories, and a couple more features make it possible for Linux to be more secure than Windows.

**Note** : When you have Windows installed, you need to download/purchase an [Antivirus program](http://en.wikipedia.org/wiki/Antivirus_software) to

* **Customization**: One major *advantage of using Linux instead of Windows* is customization. If you like tweaking your system’s looks, Linux is just perfect for you.
* **Reliability**: Windows, as we know it, becomes sluggish day after day. You will want to re-install Windows after a while when you encounter crashes or slowdowns on your system.
* **Portable** − Portability means software can works on different types of hardware in same way. Linux kernel and application programs supports their installation on any kind of hardware platform
* **Multi-User** − Linux is a multiuser system means multiple users can access system resources like memory/ ram/ application programs at same time.
* **Multiprogramming** − Linux is a multiprogramming system means multiple applications can run at same time.

**Linux Structure**

* **Hardware layer** − Hardware consists of all peripheral devices (RAM/ HDD/ CPU etc).
* **Kernel** − It is the core component of Operating System, interacts directly with hardware, provides low level services to upper layer components.
* **Shell** − An interface to kernel, hiding complexity of kernel's functions from users. The shell takes commands from the user and executes kernel's functions.
* **Utilities** − Utility programs that provide the user most of the functionalities of an operating systems.



# Linux Directory Structure (File System Structure) Explained with Examples



### 1. / – Root

* Every single file and directory starts from the root directory.
* Only root user has write privilege under this directory.
* Please note that /root is root user’s home directory, which is not same as /.

### 2. /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.

### 3. /sbin – System Binaries

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

### 4. /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

### 5. /dev – Device Files

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

### 6. /proc – Process Information

* Contains information about system process.
* This is a pseudo filesystem 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

### 7. /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);

### 8. /tmp – Temporary Files

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

### 9. /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
* /usr/local contains users programs that you install from source. For example, when you install apache from source, it goes under /usr/local/apache2

### 10. /home – Home Directories

* Home directories for all users to store their personal files.
* For example: /home/john, /home/nikita

### 11. /boot – Boot Loader Files

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

### 12. /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

### 13. /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.

### 14. /mnt – Mount Directory

* Temporary mount directory where sysadmins can mount filesystems.

### 15. /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

### 16. /srv – Service Data

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

**PUTTY Client**

PuTTY is a free implementation of SSH and Telnet for Windows and Unix platforms, along with an xterm terminal emulator. It is written and maintained primarily by [Simon Tatham](https://www.chiark.greenend.org.uk/~sgtatham/).

**PuTTY** is a very versatile tool for remote access to another Linux computer. It's probably used more often by people who want secure remote shell access to a UNIX or Linux system than for any other **purpose**

**=============================Linux basic Cammand===================================**

* + 1. **Pwd** : present working directory
    2. **Ifconfig / ip addr show** : used to get the ip address of the system
    3. **Whoami** : used to get current user of the system
    4. **Ping :** used to check network connection to the server
    5. **df** : used to check free disk space in our computer

eg : df –h

* + 1. **ls** : The ls command - the list command - functions in the [Linux terminal](http://www.informit.com/store/linux-kernel-development-9780672329463) to show all of the major directories

EG :

Ls -> list the Directories & file

Ls –l -> list all the Directories & file along with time, size . permission, user

Ls –al > list out all the regular and hidden Files

## Cd : The cd command - change directory

EG CMD> **cd /folderName/subfolderName**

EG CMD/FolderName> cd .. [go back to previous directory]

## Mv : The mv command - move - allows a user to move a file to another folder or directory.

**EG “**

CMD>mv filename newFileName

CMD>mv /arora/applications/majorapps /arora/applications/minorapps

## rm : remove the file or directory

eG : rm filename

* + 1. **man** : The man command - the manual command - is used to show the help file about the cammand

EG :

**man cd**

**man mr**

**man grep**

* + 1. **mkdir : used to create new directory / folder**

mkdir folederName

mkdir /tmp/music

## . rmdir : The rmdir - remove directory - command allows the user to remove the folder

EG : rmdir foldername

* + 1. **touch**

The touch command used to create a new Empty file & control will not get inside the file

**Eg :** touch testfile.txt

* + 1. **Cat**

Create a new File and redirect the out put in console

Eg : Cat filename

* + 1. **Vi**  : Text Editor command

eG : Vi filename.txt [create a new file and control get inside the file]

press : i [used to insert data inside the file]

press escape **:wq** [used to save the file & quit]

## ===========Permission commands======================

Chmod

chmod is the command and system call which is used to change the access permissions of file

EG : > ls –l [used to get the permission of the file]

-drwx rwx rwx

R write

W= write

X = execute

EG :

Chmod 764 filename

Chmod 777 fiename

Chmode 700 filename

**grep**

The grep filter searches a file for a particular pattern of characters, and displays all lines that contain that pattern. The pattern that is searched in the file is referred to as the regular expression (grep stands for globally search for regular expression and print out). **Syntax:**

**grep [options] pattern [files]**

**Options Description**

**-c** : This prints only a count of the lines that match a pattern

**-h :** Display the matched lines, but do not display the filenames.

**-i :** Ignores, case for matching

**-l :** Displays list of a filenames only.

**-n :** Display the matched lines and their line numbers.

**-v :** This prints out all the lines that do not matches the pattern

**-e exp :** Specifies expression with this option. Can use multiple times.

**-f file :** Takes patterns from file, one per line.

**-E :** Treats pattern as an extended regular expression (ERE)

**-w :** Match whole word

**-o :** Print only the matched parts of a matching line,

with each such part on a separate output line.

EG :

**grep -i "UNix" geekfile.txt**

**grep -c "unix" geekfile.txt**

**grep -l "unix" f1.txt f2.txt f3.xt f4.txt**

**grep -n "unix" geekfile.txt**

**find**

find a File in a directory

|  |  |
| --- | --- |
| find . -name testfile.txt | Find a file called testfile.txt in current and sub-directories. |
| find /home -name \*.jpg | Find all .jpg files in the /home and sub-directories. |
| find . -type f -empty | Find an empty file within the current directory. |
| find /home -user exampleuser -mtime 7 -iname ".db" | Find all .db files (ignoring text case) modified in the last 7 days by a user named exampleuser. |

## ======================Add User================

Sudo adduser username

**kill** : Kill is the one most important commands. We can use it to terminate a process

**eg :** kill -15 PID

## ======================NetWork commands===================

**Netstat**

In computing, netstat (network statistics) is a command-line network utility tool that displays network connections for the Transmission Control Protocol (both incoming and outgoing),Netstat –a 🡺 display all current running service

Kill

In computing, kill is a command that is used in several popular operating systems to send signals to running processes. [Wikipedia](https://en.wikipedia.org/wiki/Kill_(command))

Ps -a -> will give the Process ID

[Example](https://www.google.com/search?client=firefox-b-d&sa=X&q=kill+command+example&stick=H4sIAAAAAAAAAOPgE-LUz9U3MC6qMk3SkstOttLPLojPKdcvzcusiE_Oz81NzEuxSq1IzC3ISV3EKpKdmZOjABVWgAoDAHfjSI9EAAAA&ved=2ahUKEwj5goC4lrHiAhVQbysKHcEYBAsQ6BMoADAXegQICxAb): kill -9 1234

=======================**JAVA Installation commands**===================

Wget

World Wide get web

GNU Wget is a [free software](https://www.gnu.org/philosophy/free-sw) package for retrieving files using HTTP, HTTPS, FTP and FTPS the most widely-used Internet protocols

* 1. sudo yum install wget [command to install wget]
  2. using wget commands download jdk from oracle website

wget --no-check-certificate -c --header "Cookie: oraclelicense=accept-securebackup-cookie" http://download.oracle.com/otn-pub/java/jdk/11+28/55eed80b163941c8885ad9298e6d786a/jdk-11\_linux-x64\_bin.tar.gz

* 1. UnZip [used to unzip the folder if file type .tar]

Unzip tar –zxvf jdk-8y….tar.gz

* 1. Install jdk on linux machine

sudo rpm -i jdk-8u131-linux-x64.rpm

* 1. **To define the path**

$ export JAVA\_HOME=/usr/java/jdk1.8.0\_131

* 1. **Adding the path to PATH system variable**

$ export PATH=$PATH:$JAVA\_HOME/bin

* 1. **Verifing the path is set properly or not**

$ echo $PATH

(or)

$ echo $JAVA\_HOME

* 1. To check java installation

Java -version

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