Linux Files and Directory

Linux File Types

Special Files

Filesystem Hierarchy

Archiving Files

Compression of files

Read compressed files

Modifying file permissions

Change Ownership

File Types

- Regular File
  - image file, video file, text file
  - Scripts, configuration file
- Directory
  - /etc/logs
  - /bin/bash
- Special Files
  - Character Files
  - Block Files
  - Links
  - Sockets
  - Named Pipes

Special Files

- Character Files
  - These files represent devices under the /dev file system.
- Block Files
  - These files represent block devices also located under /dev/ file system.
  - Examples include the harddisks and RAM
- Links
  - Links in linux is a way to associate two or more file names to the same set of file data.
    - The Hard Link
    - The Soft Link
- Sockets
  - A sockets is a special file that enables the communication between two processes.
- Named Pipes
  - The Named Pipes is a special type of file that allows connecting one process as an input to another

File Types in Linux

```
[~]$ ls -ld /home/michael/
drwxr-xr-x 3 root root 4096 Mar 18 17:20 /home/michael/
```

File Type	Identifier
DIRECTORY	d
REGULAR FILE	-
CHARACTER DEVICE	c
LINK	l
SOCKET FILE	s
PIPE	p
BLOCK DEVICE	b

Filesystem Hierarchy

- /home : It is the location that contains the home directories for all users, except the root user (root user home directory is located at /root)
- /opt : If you want to install any third party programs put them in the /opt filesystem.
- /mnt : It is the default mount point for any partition and it is empty by default. It is used to mount filesystems temporarly in the system
- /tmp : It is used to store temporary data
- /media : All external media is mounted on /media

Filesystem Hierarchy

- /bin : The basic programs such as binaries cp, mv, mkdir are located in the /bin directory
- /etc : It stores most of the configuration files in Linux.
- /lib : The directory /lib and /lib64 is the place to look for shared libraries to be imported into your program
- /usr : In older systems, /usr directory is used for User Home Directories, however in the modern linux operating systems it is the location where all user land applications in their data reside
- /var : It contains variable data like mails, log files

Archiving Files

- **tar** is used to group multiple files and directories into a single file
- Use tar command followed by -c to create an archive and the -f is used to specify the name of the tar file to be created.
  - tar -cf test.tar file1 file2 file3
  - tar -tf test.tar
    - see the contents of the tarball.
  - tar -xf test.tar
    - extract the contents from the tarball.
  - tar -zcf test.tar .
    - compress the tarball to reduce its size.

Compression of files

- Compression is the technique used to reduce the size consumed by a file.
- bzip2 (.bz2 extension),
- gzip (.gz extension)
- xz (.xz extension)
- bzip2 test.img - to zip
- bunzip2 test.img.bz2 - to unzip
- gzip test1.img – to zip
- gunzip test1.img.gz to unzip
- xz test2.img – to zip
- unxz test2.img.xz - unzip

Read compressed files

- Tools such as zcat , bzcat and xzcat allow the compressed files to be read without an uncompress
  - bzcat hostfile.txt.bz2
  - zcat hostfile.txt.gz
  - xzcat hostfile.txt.xz

File/Directory Permissions

Bit	Permission	Value
r	Read	4
w	Write	2
x	Execute	1
-	No Permission	0

bit	bin	octal
rwx	111	4+2+1 = 7
rw-	110	4+2 = 6
r-x	101	4+1 = 5
r--	100	4
-wx	011	2+1 = 3
-w-	010	2
--x	001	1
---	000	0

File identifier	Owner (u)	Group (g)	Other (o)
-	rwx	-wx	r--

Modifying file permissions

- chmod u+rwx test-file
- chmod ugo+r-x test-file
- chmod u+rwx,g+r-x,o-rwx test-file
- chmod 777 test-file
- chmod 124 test-file

Change Ownership

- Changes owner to hari and group to developer
  - **chown** hari:developer test-file
- Changes just the owner of the file to hari. Group unchanged.
  - **chown** hari andoid.apk
- Change the group for the test-file to the group called dev.
  - **chgrp** dev test-file