File System in Linux

A file system is a logical collection of files on a partition or disk.

Types of Linux File systems

- Ext Very old and no longer used due to limitations.
- Ext2 first Linux file system that allows two terabytes of data allowed
- Ext3 Ext2 + upgrades and backward compatibility. Issue with this -> The only problem with it that the servers don’t use this kind of file system because this file system doesn’t support file recovery or disk snapshots.
- Ext4 faster and allow large files with significant speed.
- swap The swap partition is an independent section of the hard disk used solely for swapping; no other files can reside there.

Linux File Hierarchy Structure

- / This is the root directory which should contain only the directories needed at the top level of the file structure
- /bin This is where the executable files are located. These files are available to all users
- /dev These are device drivers
- /etc Supervisor directory commands, configuration files, disk configuration files, valid user lists, groups, ethernet, hosts, where to send critical messages
- /lib Contains shared library files and sometimes other kernel-related files
- /boot Contains files for booting the system
- /homeContains the home directory for users and other accounts

Linux File Hierarchy Structure – Continued…

- /mnt Used to mount other temporary file systems, such as cdrom and floppy for the CD-ROM drive and floppy diskette drive, respectively
- /proc Contains all processes marked as a file by process number or other information that is dynamic to the system
- /tmp Holds temporary files used between system boots
- /usr Used for miscellaneous purposes and can be used by many users. Includes administrative commands, shared files, library files, and others
- /var Typically contains variable-length files such as log and print files and any other type of file that may contain a variable amount of data
- /sbin Contains binary (executable) files, usually for system administration. For example, fdisk and ifconfig utlities

Understanding the file permissions

--- --- ---

rwx rwx rwx

user group other

- The first set of three characters (rwx) is for the owner permissions.
- The second set of three characters (rwx) is for the Group permissions.
- The third set of three characters (rwx) is for the All Users permissions.

Numeric mapping

r >> 4

w >> 2

x >> 1

Understanding the file permissions – Continued..

The 'r' means you can "read" the file's contents.

The 'w' means you can "write", or modify, the file's contents.

The 'x' means you can "execute" the file.

owner – The Owner permissions apply only the owner of the file or directory

group – The Group permissions apply only to the group that has been assigned to the file or directory

others – The other users permissions apply to all the other users on the system

Alphabet mapping

u for user

g for group

o for others

ACLs - Access control list in Linux

Access control list (ACL) provides an additional, more flexible permission mechanism for file systems

To set ACLs -> setfacl -m "u:user:permissions" /path/to/file

To check ACLs -> getfacl <filepath>

Note: setfacl and getfacl are used for setting up ACL and showing ACL respectively.