

Linux Commands

Date:

- mkder - making directory
- rmdir - deleting empty directory
- rm - delete a file
- rm -rf - Force delete anything
- touch - create empty file
- mv - move file from one place to another
- cp - copy file from one place to another
- Pwd - Present working directory
- file - shows a type of file
- stat - shows info of file & permissions
- cat - view content of file
- ls - list contents
- ls -l - long listing contents
- ls -a - listing contents with hidden files
- ls -la - long listing contents with hidden files
- ls -A - listing including hidden files without .file
- SU - switch user
- Vi filename - open vi editor.
- find - to find a file with word
- grep - to find/search word contain in the file
- cd - navigate to folder
- cd .. - move one step backward
- cd / - move to /
- cd ~ - move to first directory
- SU - - - switch to root

(-) Options are called as switches

Date:

echo - to add content in the file (single line)

grep -i " " file - search word in file without case sensitive

grep -n " " file - search word and view with line number

grep -v " " file - shows lines except searched words without line

getfacl filename/folder - shows permissions

setfacl -m user/group/other:username/ :Permission
groupname/
Other

⇒ set Ap. Permissions

Setfacl -x user/group/other:username/ file
groupname/
Other

⇒ remove Ap.permissions.

tree -F ⇒ shows in tree format

For vi :

:wq! ⇒ save & exit

:q! ⇒ without save and exit

:Set Number ⇒ Shows line number

:Set no number ⇒ hide line number

TCS
TATA
CONSULTANCY
SERVICES

/var - system logs

/run - system daemons that start very early

/mnt - mount external file system /media - For cd-rom like-
File info Date:

/etc ⇒ configuration file /proc - running process

/etc/passwd ⇒ shows users. with X password

/etc/shadow ⇒ shows users with encrypted password

/etc/group ⇒ shows groups

/etc/gshadow ⇒ shows groups with encrypted password

/root ⇒ kernel. /boot ⇒ boot loader file

/bin ⇒ actual executable file / user commands file

/dev ⇒ device driver file

/sbin ⇒ binary file essential for booting,
filesystem cmd., recovering, restoring, repairing system

/opt ⇒ keeps 3rd Party software

Files based on Permission:

drwxrwxrwx - directory file

-rwxrwxrwx - regular file

lrwxrwxrwx - symbolic link file

crwxrwxrwx - character device file

brwxrwxrwx - block device file

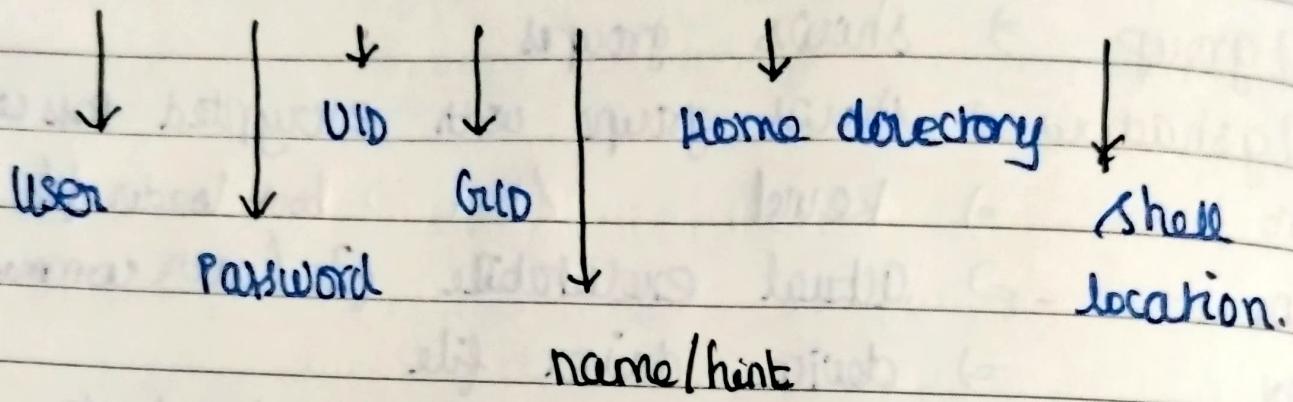
srwxrwxrwx - socket file

prwxrwxrwx - pipe file

last ⇒ This cmd used to display the users
who are logged in.

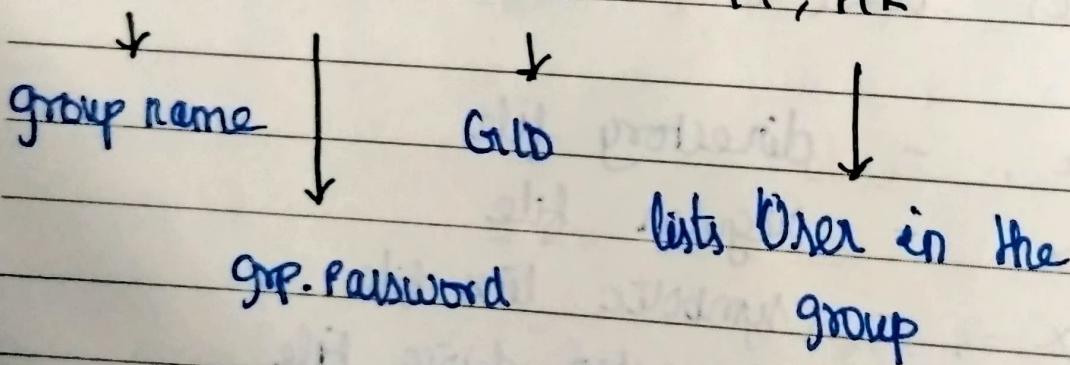
/etc/passwd - File Structure

root : x : 0 : 0 : root : /bin/bash



/etc/group - Structure

root : x : 1000 : IT, HR



	File	Permission
r	- read (4)	
w	- write (2)	
x	- executable (1)	

System info commands

Date:

`df -H` \Rightarrow Shows memory avail, free, used in human readable form

`uname` \Rightarrow OS version

`uname -r` \Rightarrow kernel version.

`hostnamectl` \Rightarrow shows OS, kernel, Architecture, chassis, type of power.

`free -h` \Rightarrow Shows swap, Cache, RAM

`dmidecode -t bios -q` \Rightarrow BIOS information

`dmidecode -t system -q` \Rightarrow System information

`dmidecode -s processor-version` \Rightarrow Processor information.

`Pvs / Pvdisplay` \Rightarrow Shows Physical volumes

`lvs / lvdisplay` \Rightarrow Shows logical volumes

`Vgs / vgdisplay` \Rightarrow Shows volume groups

`ps` \Rightarrow Process launched

`lscpu` \Rightarrow Shows CPU info

netstat

shows network info

tracepath website

shows path of network
and device

User management

useradd -u ID -g grpname -G S-GID user name - creating user with group
 # - root \$ - normal user

usermod -c "comment" username => to add hint to user

useradd username => Create new user

passwd username => & Create Password to user

usermod -u ID username => Create user ID / change

usermod -l newname oldname => change Username

userdel username => delete Username.

usermod -g grpname username => Add Primary group to user.

usermod -a -G grpname username => Add Secondary group to user

groupadd groupName => Create group

groupmod -g ID grpname => Create group & ID

groupmod -n newname oldname => change new name

gpasswd -g grpname => Create Password for groupName

gpasswd -d username grpname => remove user from group

user id user / groups user => To check groups associated with user.

To make user shell non-interactive =

ultra mode -s /sbin/nologin username

remove password from user - passwd --delete ^{Path} ~~password~~

whoami - it shows current user

who am i - it shows user who logged in first.

to Putty

gpasswd -n users groupname - To add multiple users
to one group.

chmod numeric/symbolic filename - To set Permissions

SUDO

Super User DO

sudo -V \Rightarrow Sudo version.

sudo -l \Rightarrow list commands able to use by host
Particular commands permission

① check first you are in root access.

② step 1: mkdir -p /etc/sudoers.d/ (if this
directory not exists)

③ Step 2: visudo -f /etc/sudoers.d/filename
Press i, and edit

Type,

(1 cmd) username hostname = Path command

(or)

2 or more cmd username hostname = Path command1, Path command2

Type :wq! And Save and exit.

④ Su username and check with command entered in previous editor file.

eg: mkdir -p /etc/sudusers.d/

visudo -f /etc/sudusers.d/ Permission

execute cmd with Password

Inside test: sri lenovo = /usr/bin/yum, /etc/shadow

(Particular cmd) /bin/cat, /bin/grep

(Full cmd) lenovo lenovo = ALL

execute cmd with

(Particular)

Sri lenovo = NOPASSWD: /usr/bin/yum, /etc/shadow, /bin/cat, /bin/sort

ALL cmd

lenovo lenovo -(ALL) NOPASSWD: ALL

Disk management

Date:

check the available harddisks ? \rightarrow fdisk -l

To enter to partition 3 \Rightarrow Parted harddisk name
 $(/dev/sdb)$

following commands only used Parted:

① Parted /dev/sdb print

(This shows hd info in human readable)

② parted /dev/sdb unit s print

(This shows in s size)

③ Check the disk is recognized.

④ If unrecognized, make it labelled.

Cmd : parted /dev/sdb mklabel gpt

Note: MBR (old) - allows 15 Partition, upto 2TB 1 part

GPT (new) - allows 128 Partition, upto 8ZB 1 part

⑤ Now, ready to make Partition.

cmd : mkpart type File System start end

e.g.: mkpart primary/extended ext3/ext2 1m 1000m

⑥ Use cmd 'part' to check the disk is partitioned.

⑦ Then 'quit' and go to root.

⑧ Now create one mountpoint directory using mkdir.

eg: mkdir /work

⑨ Then label your Partition with directory
eg: e2label /dev/sdb1 /work

⑩ Go to 'visudo /etc/sudo' and
add the following line:

LABREQ = /work /work ext2 defaults 1 2

Created file
directory system
mountpoint

Then will type: wq! in Back and exit!

11) Use cmd 'systemctl daemon-reload'

12) mount mountpoint eg: mount /work

13) check with df -h.

we can use another sentence instead of (10)

eg:

/dev/sdb1 ext2 XFS (=defaults)

14) To unmount disk \Rightarrow umount /disk1

2 nodes

1) Find inode number of file/directory

2) cat /etc/fstab -l

2) Find available, used inode number

df -i /home

3) cmd to increase inode number

for XFS xfs_growfs +m 30 /mountpoint

(do this after mounting)

For ext

mkfs.ext4 -i size/inode /dev/sdc1

(do this before mounting)

umount (if already mounted, unmount and do this)

Hint: Deleted files can be recovered by `testdisk`.

Date

TO check / ~~cover~~ file systems: `du -mdu -mdu -m`

For `xfs` (or `btrfs`) => `xfs_repair /dev/sd1` (or `btrfs repair /dev/sd1`)

For ext ⇒ fsck /dev/sdc3

Shared Command:

It is used to evaluate the file with unreadable format.

cmd : Shared -v /Path\filename

To make the used readable file to unreadable and delete in the 23 file. 23x 23

cmd: Shred -vzu -n5 /Path/Filename

$V =$ gives detailed output

$z =$ replace : with zero

`u` = delete the file after completed run
`f` = it's also used no forces the write
permissions if it's not have.

n = number of pages.

Drawbacks of disk management

* No more partitions

it No redundancy

A: No increasing size

~~NO COMMERCIAL~~

* Reduce Z10 performance

To overcome these drawbacks in server, there is third party software called RAID. (Harddisk related software)

Redundancy is like a inverter because its doesn't
lower down time.

Backup is like a generator, it has downtime to turn on. Backup also takes time to backup.

RATP Levels:

RAID 0 Striping

RAID 1 Mirroring

RAID 0+1 (ro)

View contents RAID box + 0 of how to copy to
1st internal RAID 105, with between
methods
(For description, turn 2 pages) X

Physical Volume, Volume Groups, Logical Volume

1) These volumes are only possible with physical disk.

2) We can create a new partition.

If we use old unused partitions of the PV creation, data in it will be wiped out.

Step 1: Create partitions in the one physical hard disk. Using fdisk command (A&R method).

Eg: Parted /dev/sdb

sdb1 : mkpart Primary ext2 100m 150m

sdb2 : mkpart Primary ext4 100m 150m

sdb3 : mkpart Primary ext2 150m 200m

Then quit

(or) raid 0

If you want to create volumes using already mounted disk, make unmount disk using "umount /dev/sdb4".

Step 2: Check the partitions are created using "lsblk".

Output contains:

/dev/sdb

```

  └── /dev/sdb1
    ├── /dev/sdb2
    └── /dev/sdb3
  
```

Step 3: Make all partitions to Physical volume using pvcreate command.

For new Partition,

Pvcreate /dev/sdb1

Pvcreate /dev/sdb2

Pvcreate /dev/sdb3

For old Partition, use the same command but it ask us to type 'y' to wipe out old data.

Crypto this is Physical volume creation

We can remove the partition from physical volume by using Pvremove.

Pvremove Path

Eg: Pvremove /dev/sdb4

Date: _____

Step 4: Creating volume groups can only be possible by creating physical volumes. Can be used only physical volumes. Group of physical volumes called volume group.

Vgcreate	volume grp name	physical volumes Path 1	Physical volumes Path 2
----------	-----------------	-------------------------	-------------------------

eg: Vgcreate Vg1 /dev/sdb1 /dev/sdb2

We can also add physical volumes to volume groups by Vgextend.

Vgcreate	volume grp name	Physical volume.
----------	-----------------	------------------

eg: Vgextend Vg1 /dev/sdb4

Date: _____

Step 5: Scan disks for volume groups to build cache file.

cmd: Vgscan

To remove Physical volume from volume group.

cmd: Vgreduce volume group name

eg: Vgreduce Vg1 /dev/sdb4

You can deactivate volume group using Vgchange.

Vgchange -a n volume group name

eg: Vgchange -a n Vg1

You can remove volume group using Vgremove. (It only works on VG contains no logical vol)

Vgremove vgname

eg: Vgremove vg1

After this volume group creation

Date: _____

Step 6: Creating logical volume using volume groups.

lvcreate -L size Volume
from group
vg name group

eg: lvcreate -L 2G vg1

You can rename logical volume using lvrename.

lvrename oldname newname

eg: lvrename /dev/vg1/lv1 /dev/vg1/lv1new

You can remove a logical volume using lvremove.

lvremove /Path/volume

eg: lvremove /dev/vg1/logicaldisk

Shrink size:

eg: lvreduce -L -2G /dev/vg1/lv01

Date: _____

For displaying physical & logical volumes and volume groups.

physical : pvs

logical : lvs

volume groups: vgs

Step 7:

To add filesystem to logical volumes

mke2fs -j /Path/vg1/lvname

eg: mke2fs -j /dev/vg1/lv01

(it default adds ext3 filesystem)

Step 8:

Then update logical volume details in etc/fstab

Path	mountpoint	fs	defaults
			1 2

eg:

/dev/vg1/lv01	/logical	ext3	defaults	1 2
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Step 9:

Then, mount the logical volume using mountpoint

mount /mountpoint

e.g.: mount /logical

Partition Using fdisk

Step 1: fdisk -l

Step 2: fdisk /dev/sdb

Step 3: p - print the info

Step 4: n - new partition

P - primary

E - extended

Partition number +

First sector

Last sector

Step 5: w - write, save & exit
or - no save & exit

Making Filesystem:

mkfs.ext4 /dev/sdb1

1 mkfs -t ext4 /dev/sdb1
mkfs /dev/sdb1

Theory

Date: _____

Disk Management

low level formatting - Vendors provide partition of harddisk with size of 512 bytes in form of sectors, tracks, cylinders.

high level formatting - when we want new Partition or applying file system in hard disk is called high level formatting (gb, mb, kb)

Partitions are made of blocks (8 bytes)

Filesystem:

Windows: NTFS, FAT32

Linux: XFS, ext2, ext3, ext4

Mountpoint: To mount the partition, we create one directory. This directory is called mountpoint

OS related names called instant names

User related names called logical names

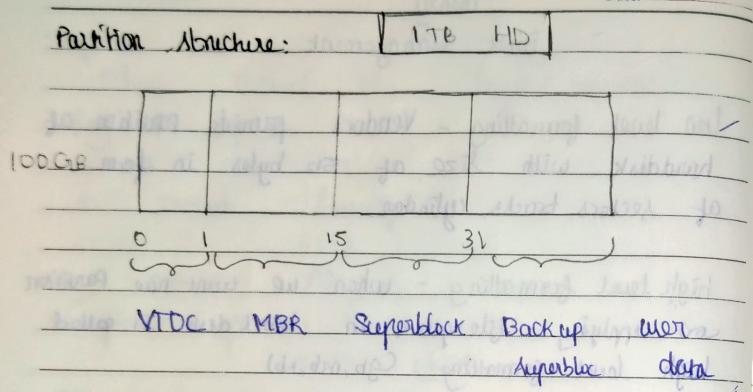
Bios related names called physical names.

Road map:

disk → Partition → Filesystem → directory

✓
mounting
(or)
mapping

Partition Structure:



(C-1) VTOC - Volume Table of Contents.
(It contains disk partitions info)

(I-15) MBR - Master Boot Record
it has actual OS. It is called kernel
This MBR is only present in 1st Partition.

(15-3) Superblock - heart of the partition. It contains
Superblock Status, inode, datablocks used
and available.

- Superblock Status:
- * Very good
 - * good
 - * bad
 - * very bad.

Date: _____

Superblock Status is only based on the data
from disks are opened or closed.

Very good - If no file is opened in the windows
contained disk, then disk update superblock
with very good status.

When no issues arises at the time of booting
is called clean booting.

good - If any files are opened from the disk
at the time of normal restart/shutdown,
disk update superblock with good status.

bad - When files are opened from the disk,
then user forced the system restart/shutdown
using power button, disk update bad status.

Very bad - when the file are opened, then OS may
corrupted the disk update with very bad status
to superblock. It only rectified by user.

good, bad - This condition rectified automatically by OS

very bad - This condition only rectified by user.

Inode

Generally, file name, directory name, user name, group name are used for recognition by user.

But OS can't recognize names. It
recognizes binary ID.

For users, X groups, there is a UID & GID.

For files and directories, Inodes are used.

Inodes are used to carry the address of the file like [10, 43]. Addresses are also called as pointers.

RAM always chooses new datablocks to write

To get space from used block, software called defragmentation used. Mostly don't recommend. Because already many software are running in background. If it used, it reduces harddisk performance.

Registers - Size is 8 bytes

It is used to full datablock with 8 bytes.

Drive error - Drive error caused due to corruption of superblock.

Scenario 1:

When the client using harddisk and filled partially with half of the registers while writing. When server administrator want to restart the server. At this time half filled registers are lost. What will be done to prevent?

Solution:

Sync sync sync reboot
(It will first sync all data & reboot)

Scenario 2:

When disk have consumed 100% space. The client unable to perform any task in disk. In this situation client asked administrator to free the disk or delete files? What will administrator do at this situation.

Solution:

By default, administrator allocated with 10% of disk space to make admin activity. By using this space, admin access the disk and free up space.

This space is called minimum free space.

Scenario 3:

when one inode size is about 1GB. total disk size is 10GB. There is a possibility of 1000 inodes. If 100 files are created, 100 inodes get allocated. But 100 files has total size of around 70GB. Has to use the remaining 30GB space without inodes.

Solution:

Without nodes, a single file can't be created. In above scenario, we have to reduce the size of each inode from 1GB to minimum to increase inode count.

Date: _____

Date: _____

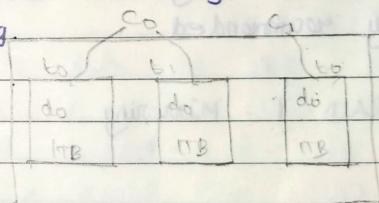
RAID is a software only works on Hard disk.

RAID 0

- * Concatenation
- * Striping

Concatenation is a grouping of Hard disks.

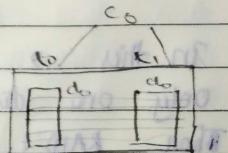
It groups 2 or more HDs. But it writes in one disk at a time. After filling the one disk, then only it moves to another disk. It has no redundancy, No I/O performance, no load balancing.



Grouping 3 HD to 1HD
(3 1TB) (1 3TB)

RAID 0 Striping:

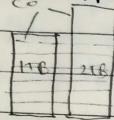
It writes across disk by typing character in 1 disk and another character in another disk. It's increasing I/O performance & load balancing. Minimum 2 disks are mandatory. Disks should be same size.



Scenario:

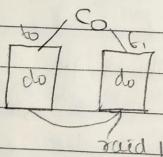
If Raid 0 striping different size harddisk, what will happen?

Solution:



Raid 0 striping is writing across disks. If it uses 1TB and 2TB harddisk, then striping is done with upto 1TB. The remaining 1TB went waste. That's why same size of harddisk is highly recommended.

RAID 1 - Mirroring

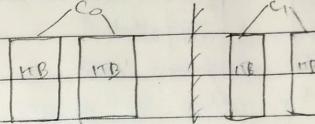


In this, 2 hard disk is mandatory. Only one disk is used to write by the user. Then RAID 1 automatically backup all from 1 disk to another disk. If you delete data from disk 1, it will delete same in disk 2. If disk 1 crashed, user uses disk 2 for write.

Date: _____

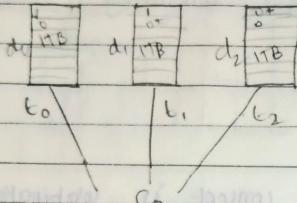
RAID 0+1

concatenation + mirroring



RAID 0+1 \Rightarrow This concept is combination of concatenation then mirroring. Usually concatenation was 1 disk to write, then mirroring (backing up all data from 1 disk to another same size disk).

RAID 5 Distributed parity



Grouping 3 (1TB) harddisks. to 1 (2TB) harddisk.

Out 3 disk, 2 disk used for data. 1 disk for Parity (Check).

It uses XOR gate for data allocation. When 1 disk goes crashed, remaining 2 disks can able to retrieve the data. If we use 7 disks with RAID 5, 6 is for data and 1 for parity.

It shows 100% redundancy. If one disk goes crashed, immediately change the disk, otherwise another disk goes crashed, data can't be retrieved.

XOR gate:

$$\begin{array}{cc} 1 & 1 \\ \oplus & \\ 0 & 0 \end{array} \rightarrow 0$$

$$\begin{array}{cc} 1 & 0 \\ \oplus & \\ 0 & 1 \end{array} \rightarrow 1$$

$$\begin{array}{cc} 0 & 1 \\ \oplus & \\ 1 & 0 \end{array} \rightarrow 1$$

Date: _____

OS Installation, Package and Patches

Package Phases:

* Pre installation

* Installation

* Post installation.

Pre installation:

It checks all the prerequisites of the installation, checks apps are already installed.

Installation:

After meeting all prerequisites, installation will be proceed.

Post installation:

After starting using the software, some updates come. These are done in Post installation phase.

What is Patches?

Problems in application is called bugs.

For these bugs, patches were developed.

Patches are of two types namely kernel patch and application patch.

Date:

If a Patching is done in kernel, we have to restart the OS. It requires no / downtime.

If a Patching is done in application, we have to restart Application. It doesn't requires downtime.

Every Patch file contains Patch info file that is called Readme file.

After sufficient approval, Patching should be done.

Before applying the kernel Patch,

- * Check the kernel info
- * Reboot the server to check OS.
- * Ask for downtime atleast 2 hrs before

Clean rebooting is called sanitary booting.

Local yum server is installed as Satellite server.

Check subscription: `cat /etc/yum.repos.d/tomcat.repo`

Subscription-manager status --repoid=1

X

Subscription-manager list --enabled

Package management

Date:

1) To check the installed software on Redhat?

rpm -qa yum

2) To install specific Package using rpm cmd?

rpm -ivh package-name

3) To remove the software Package in Redhat?

rpm -ev package-name

4) To upgrade the existing Redhat Package?

rpm -Uvh package-name

5) To display list of files in Package?

rpm -ql package-name

6) To check details of Package?

rpm -qi package-name

Hard link & softlink

Date:

In Linux, this is link. In windows, it is shortcut.
disadvantage of copy:

- * It requires space equal to source.

* It takes time to copy the entire data from source to destination.

* It can copy and paste file with different mode.

Link:

It doesn't require any space.

It takes less than one second to establish link.

It uses the same inode at source only in hard link but not in soft link.

Softlink file is denoted by (l)xxxx-xxxx
Hardlink file is like a regular file (→)

If link broken in softlink, red color shown in filename.

- to create file with desired size:

truncate -s size /path/filename

Hardlink:

It doesn't require source file after establishing link pointing ip- myff

It cannot create across different mountpoint

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In source destination.

softlink:

- * It requires extra modes other than source modes.

* If source is deleted, link broken. Can't use destination file.

In -s source destination.

Date:

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VSFTP - Very Secure File Transfer Protocol

Date: _____

To check installed packages last :-

rpm -q/a --last 1 grep "dg wed 2021"

for lockin date

yum -qa --last 1 grep "dg wed 2021"

To check Is there any vulnerable:

- 2) cd /var and ls
- copy the media.repo file to /etc/yum.
- Then vi ~~media.repo~~ repos.d
- Add text " enabled = 1
baseurl = file:///var/baseos "
- 4) copy the media.repo to AppStream.repo to same folder.

Configuring repository:
1) check /etc/yum and mount it.
mount /dev/sx0 /var.

Date: _____

- 5) vi appstream.repo
- Add text (change logic to AppStream)
enabled = 1
- baseurl = file:///var/AppStream/
- 6) yum repolist enable
- 1) yum repolist

Permissions

Date:

Read write execute

A 1 2 3 4

Max permission : 7

To change file permission: chmod 777 filename
(only one file/directory)

Permission: -rwsrwxrwx
To give all user have access to particular file / folder.

To change permission of folder with its Subdirectories: chmod -R 777 folder_name

default permission provided files
eg: /usr/bin/ls chmod.

To change owner of file => chown username file

chmod 2755 filename / directory

To change group owner of file => chgrp groupname file

To give all user in the particular group to access particular file/directory

Permission: -rwxrwxrwx

To set default permission before creating file / directory => umask 000

0 → rwx 4 → -wX
1 → rw- 5 → -w-
2 → r-x 6 → --x
3 → r-- 7 → ---

To make the normal user not to delete file in the folders.

set uid, gid & sticky bits:-

1) setuid: cmd: chmod u+s folder_name
chmod 4755 folder_name

sticky bit: chmod +t filename/directory

chmod 1755 filename/directory