Permissions it consist of there attributes:-

read - r :- 4

write - w :- 2

xecute - x :- 1

others - 0

blank - file

d - directory

l - softlink

*****

root directory permission = 755

7 - owner

5 - group owner

5 - others

******

root file permission = 644

6 - owner

4 - group owner

4 - others

```
*********
$ normal user directory permision =775
$ normal user file permission =644



****  1 - symbolic link (file)
    2 - symbolic link (directory) (default)

# mkdir /data
# ls -ld /data (permission check for directory)
# cd /data
# ls -a  (symbolic link show )
. ..
.  current directory (pwd)
.. one label back directory

# mkdir /data/a{1..5}
# touch /data/b{1..5}
# ll /data
#
# touch /tcs/a{1..5}
# ll /tcs
# ls -ld /tcs
#

# mkdir -p /data/a1/a2/a3/a4  (create parrent directory)
# ls -ld /data
# ll
# ls -R /data
# ls -lR /data
```

****** ls command

```
# l.
# ls -a
# ls -i
# ls -lrt
# ls -lrth
# ls -lSrh
# ls -lSh
```

****

```
# mkdir /php
# touch /php/a{1..5}
# ls -ld /php
# chmod 777 /php (directory rwx permission)
# ls -ld /php     (check permission)
# chmod 770 /php   (directory read ,write other permission )
# ls -ld /php
# ll /php
# chmod  777 /php
# ls -ld /php
# ll /php
# chmod -R 777 /php
#  ls -ld /php
# chmod -R 770 /php
# ls -ld /php
```

```
#
```

******

```
# useradd rahul
# chown rahul /php  ( ownership permission  create for directory)
# ls -ld /php
# ll /php
# chown -R rahul /php
# ll /php
```

```
# groupadd tcs   (create groupadd)
# useradd -G tcs u1 (add user to groupadd)
# useradd -G tcs u2  (add user to group)
# ls -ld /php
# chgrp tcs /php  ( group ownership for directory)
# ls -ld /php
# chgrp -R tcs /php
# ll /php
```

```
# useradd rajjev
# usermod -G tcs rajeev
# chown -R rahul:tcs   /php
# ls -ld /php
```

****

ACL (access control list)

**** user based acl

```
# cp /etc/fstab  /tmp  (copy file to tmp)
# ll /tmp/fstab
# getfacl /tmp/fstab
#

# useradd harry
# useradd natasha
# useradd sarah

# setfacl -m u:harry:--- /tmp/fstab

# setfacl -m u:natasha:r-- /tmp/fstab

# setfacl -m u:sarah:rwx  /tmp/fstab


# ll /tmp/fstab
# getfacl /tmp/fstab

# getfacl /tmp/fstab | grep mask
#  getfacl /tmp/fstab | grep rwx
#
```

**** group based acl

```
# groupadd ibm1
# groupadd ibm2


# useradd -G ibm1 i1

# useradd -G ibm1  i2


# useradd -G ibm2 i5

# useradd  -G ibm2 i6

# setfacl -m g:ibm1:--- /tmp/fstab

# setfacl -m g:ibm2:r-- /tmp/fstab

#getfacl /tmp/fstab
```

********** other based acl

```
# setfacl -m o:--- /tmp/fstab

# getfacl /tmp/fstab

# ll /tmp/fstab
```

****

******** how to remove acl any user

```
# setfacl -x u:harry /tmp/fstab

# getfacl /tmp/fstab
```

how to remove acl any group

```
# setfacl -x g:ibm1 /tmp/fstab

# getfacl  /tmp/fstab
```

*********** how to all remove user nd group other acl

```
# setfacl --remove-all /tmp/fstab

# ll /tmp/fstab

# getfacl /tmp/fstab

# chmod 644 /tmp/fstab
```

Q1.

1. copy the file /etc/passwd into /tmp directory

2. set the permission 770

3. add a user > rahul

4. give owenership on /tmp/passwd file for rahul

5. useradd 1. user1 ---

   user2 r--

   user3 rwx

6. group wipro1 rwx

   w1 (user)

   w2

   w3

7. remove the acl from only user3

****** chattr : change attribute

chatter mainlly used to apply very high level permision on any file or directory.

it is lso applicable super user (root)

attribute operator

a	+	(allow)
i	i	(remove)

a => allow only read,copy & append but not edit , delete, modify,rename & link move

i => read & copy but not append also

1st example:-

```
# echo "this is my test file " > linux
# cat linux

# lsattr linux  (chek chattr)
# chattr +a linux
# cat linux
# lsattr linux
# cp linux /tmp
# echo "hello" > linux
# echo "hello" >> linux
# cat linux
# rm -rf linux
# mv linux krishna
# chattr -a linux
```

2nd example:-

```
# lsattr /etc/passwd
# chattr +i /etc/passwd (set chattr to /etc/passwd)
# lsattr /etc/passwd    (check chattr to /etc/passwd)
# useraadd raj  (not useradd)
# useradd raj2
# userdel -rf raj (no user delete)
# chattr -i /etc/passwd (remove chatter /etc/passwd)
# chattr +i /etc/shadow  (set chattr shadow file )
# passwd   (not change passwd root user)
# chattr -i /etc/shadow  (remove chattr shadow file)
```

3rd step :-

```
# chattr -R +i /home
# ls /home
# su - alok
$ touch abc
$ exit
# chattr -R -i /home
```

4th step:-

******** how to apply chattr with any normal user account

command

execution rights

1. suid => super user id (u+s)
2. sudo

```
# which chattr
# ll /usr/bin/chattr
# chmod u+s /usr/bin/chattr
# ll /usr/bin/chattr
# useradd deepak
# su - deepak
$ echo "hello deepak " > abc
$ ls
$ chattr +i abc
$ lsattr abc
$ cat abc
$ rm -rf abc
$ exit
# rm -rf /home/deepak/abc
# lsattr /home/deepak/abc
# chattr -i /home/deepak/abc
# lsattr /home/deepak/abc
# rm -rf /home/deepak/abc
```

************* UMASK

umask basically defind the default permission of any users accounts data.

default umask of super user => 022

default umask of normal user => 002

root user umask

```
1.# directory => 777
           -022
           755

# file => 666
      - 022
        644
```

normal user umask

```
$ directory => 777
            - 002
             775
$ file      => 666
             -002
              644
```

how to change umask value temprory

```
# umask  (check umask)
# umask 222 (set umask)
# umask
# touch vipin
# mkdir /shyam
# ll vipin (chek umask file)
# ls -ld /shyam (check umask directory)
```

how to set permanent umask

```
# vim .bashrc
```

```
umask 222
```

```
wq!
```

```
# exit
# umask
```

remove permanent umask

```
# vim .bashrc
```

delete line umask 222

```
wq!
```

```
# exit
# umask
```

********* special permission

	numaric code	symbolic code
1. suid => set user id	-> 4	-> u+s
2. sgid => set group id	-> 2	-> g+s
3. sticky bit => sticky bit	-> 1	-> o+t

	commands	file	directory
suid	yes	no	no
sgid	no	no	yes
stikybit	no	no	yes

suid u+s or 4

# fdisk -l	$ fdisk -l	$ fdisk -l
yes	no	no

1st example:- SUID

```
# which fdisk
# fdisk -l
#  which fdisk
# ll /usr/sbin/fdisk
# chmod 4755  /usr/sbin/fdisk   (set suid)
      OR
# chmod u+s /usr/sbin/fdisk

# ll /usr/sbin/fdisk



# useradd deepak

# su - deepak
$ fdisk -l
$ exit

# chmod u-s /usr/sbin/fdisk  (remove suid)
        OR
# chmod 0755 /usr/sbin/fdisk
```

2nd example:-

```
# which useradd
# ll /usr/sbin/useradd
# chmod 4755 /usr/sbin/useradd
# ll /usr/sbin/useradd
```

3rd example:-

```
# which su
# which passwd
# ll /usr/bin/passwd (all ready set suid)
# ll /usr/bin/su
# ll /usr/bin (chek suid)
# ll /usr/sbin
```

************ SGID => 2 OR g+s

1st example:-

```
# mkdir /java
# groupadd wipro
# ls -ld /java
# chgrp wipro /java
# ls -ld  /java
# chmod 2777 /java (set sgid)
# ls -ld /java
# useradd u1
# useradd u2
# su - u1
$ cd /java
$ touch java1
$ ll
$ exit
```

```
# su - u2
```

```
$ cd /java
$ touch java2
$ ll
$ exit

# touch /java/java3
# ll /java

# chmod g-s /java  (remove sgid)
# ls -ld /java
```

********** STICKYBIT => 1 OR o+t

```
# mkdir /fedora
# chmod 1777 /fedora  (set sticky bit)
# ls -ld /fedora (check sticky bit)
# useradd sachin
# useradd soniya

# su - sachin
$ cd /fedora
$ echo "hello" > fedora1
$ ll
$ exit

# su - soniya
$ cd /fedora
$ ll
$ cat fedora1

$ rm -rf fedora1

$ cd

$ exit
```

```
# chmod 0755 /fedora (remove sticky bit)

# ls -ld /fedora
```

**** how to apply sgid and sticky bit

```
# chgrp wipro /fedora

# chmod 3777 /fedora

# ls -ld /fedora

# chmod 7777 /fedora (set suid ,sgid nd sticky bit) (not any meaning)

# ls -ld /fedora

# chmod u-s /fedora

# ls -ld /fedora
```

rwT

T (indetect to back not X)

```
# chmod o-x /fedora

# ls -ld /fedora

# chmod o+x /fedora

# ls -ld /fedora

# chmod g-x /fedora

# ls -ld /fedora

# chmod g+x /fedora

# ls -ld /fedora
```

****

how to recover any users profile files:-

```
# useradd raju
# su - raju
$ ls
$ ls -a
$ rm -rf  .*
$ ls -a
$ exit

# su - raju
$ exit

# cd /etc/skel
# ls -a
# cp -af .[!.]*  /home/raju
# su - raju
$ ls -a
$ exit
```

****

how to add any users without any useradd command with create to directory for useradd :-

```
# cd /home
# ll
# mkdir network

# ll

# chmod 700 /home/network

# ll

# vim /etc/passwd


network:x:1020:1020::/home/network:/bin/bash


wq!


# vim /etc/group


network:x:1020:


wq!


# chown network /home/network

# chgrp network /home/network

# ll


# cp -af /etc/skel/.[!.]*  /home/network

# cd

# id network

# passwd network

12345

12345

# su - network

$ pwd

$ exit
```

**************** SUDO (super user do)

1st example :- how to provide full rights

```
# useradd sachin
# passwd sachin
12345
12345
```

```
#  vim /etc/ sudoers
```

98 line after entry

```
sachin ALL=(ALL)        ALL
```

```
wq!
```

```
# su - sachin
$ sudo fdisk -l
sudo password : 12345
```

```
$ sudo useradd raj
$ sudo userdel raj
$ sudo systemctl restart crond
$ sudo -l    (rights of list )
```

```
$ exit
```

******** how to provide some limted rights sudo

```
# which useradd
# which usermod
```

```
# vim /etc/sudoers
```

98 line after entry

```
sachin ALL=(ALL)        /usr/sbin/useradd, /usr/sbin/usermod
```

wq!

```
# su -sachin
```

```
$ sudo -l
$ exit
```

********* how to allow all command except of given list

```
# which fdisk
# which userdel
# useradd alok
# passwd alok
123
```

```
# vim /etc/sudoers
```

98 line after entry

```
sachin ALL=(ALL)        /usr/sbin/useradd, /usr/sbin/usermod
alok   ALL=(ALL)        ALL, !/usr/sbin/userdel, !/usr/sbin/fdisk
```

wq!

```
# su - alok
$ sudo useradd rajeev
$ sudo fdisk -l
$ sudo -l
$ exit
```

****** how to create sudo group

```
# groupad tcs
# useradd -G tcs t1
# useradd -G tcs t2

# passwd t1
123
# passwd t2
123

# vim /etc/sudoers

%tcs ALL=(ALL)      ALL

wq!

# su - t1
$ sudo fdisk -l
passwd : 123

$ exit
```

******** contolling services

OR

Daemon

OR

units -> in rhel7

daemon => "init " or "systemd" program

OR till rhel-6 rhel-7

unit

init => pid 1

or

systemd

# pstree

server name	daemon
ssh	sshd
crontab	crond
ntp	chronyd
samba	smb
mailserver	postfix

rhel-6	rhel-7
parrent process	parrent process
"int"	"systemd"
pid = 1	pid= 1

commands		
temporey	permanent	commands
"service"	"chkconfig"	t -- p
		"systemctl"

# service sshd start/stop/restart/reload/status	# systemctl start sshd
# chkconfig sshd on/off	# systemctl enable sshd

```
# systemctl actions unitname .type
             service   path     socket
```

```
# cat /etc/redhat-release
# cat /etc/system-release
# cat /etc/os-release
```

```
# pstree
# pidof systemd
# pstree | grep crond
# pstree | grep sshd
# pidof sshd
#

# systemctl status sshd
# systemctl is-active sshd        (temprory active)
# systemctl is-enabled sshd       (permanent enble)
# systemctl stop sshd          (temprory stop)
# systemctl disable sshd    (permanent disable)
# systemctl status sshd
# systemctl start sshd    (temprory)
# systemctl enable sshd    (permanent)

#
# systemctl list-units     (temprory status of all service)
# systemctl list-units-files     (permanent status of all service)
# systemctl list-units | grep crond
# systemctl list-units sshd
# systemctl list-units | grep -E 'sshd|crond'
# systemctl
# systemctl | grep crond
#

# systemctl list-units-files | grep crond
# systemctl list-units-files | grep sshd
# systemctl list-units  --type=service
# systemctl list-units  --type=path
# systemctl list-units  --type=socket
# systemctl   list-units --failed
```

```
# systemctl status iptables
# systemctl status firewalld
# systemctl mask iptables
# systemctl start iptables
# systemctl status iptables
# systemctl umask iptables
# systemctl start iptables
# systemctl enable  iptables
# systemctl stop firewalld
# systemctl disable firewalld
# systemctel mask firewalld
# systemctl list-units | grep firewalld
```

```
# systemctl list-units-files | grep masked   (check masked of service)
#

#
```

********** RUN Lebel

run level	targets
init	systemd

there are 7 type of run level :-

```
# init  0  => { poweroff }
# int   1  => ( single user mode or trubleshooting mode)
# init  2  => ( multi user mode but without network)
# init  3  => ( full multi user mode or text mode )
# init  4  => ( unused)
# init  5  => ( gui mode x-11 window)
# init  6  => ( reboot)
```

```
# runlevel  (check runlevel mode )
# who -r
```

types of runlevel changeing method :-

```
            tempory                              permanent

by using        at the time of                   # vim /etc/inittab
"init" commnd       machine boot up                     id:3:initdefault

                                              :wq!
                                              # init 6
```

```
# runlevel
# who -r
# init 3
# runlevel
# init 5

# runlevel
# cat /etc/inittab
```

*****rhel 6

2 mode

1. rescue mode (to recover any grub & kernel related issues)

2. emergency mode (to recover any file system related issues)

rhel7

******* targets

there are only 4 types of targets

1. graphical.target => init 5 (full multi user mode with gui+cli)

2. multi-user.target => init 3 (full multi user mode with cli only)

3. rescue.target => rescue mode

4 emergency.target => emergency mode

```
# init 6
 or
# systemcl reboot
```

```
# init 0
   or
# systemctl poweroff
```

```
# init 1 => rd.break
```

```
# systemctl get-default
# systemctl isolate multi-user.target ( tempory cli text mode )
# systemctl isolate graphical.target  ( tempory gui mode)
# systemctl set-default multi-user.target ( permanent cli text mode )

# cat /etc/systemd/system/default.target  (targets file )

# systemctl reboot

# systemctl set-default graphical.target    ( permanent gui mode )


# systemctl get-default  (check runlevel )
```

******* how to deactivate ctrl+alt+delete

```
# vim /usr/lib/systemd/system/ctrl-alt-del.target


#requires=systemd-reboot.service

wq!

#
```

********** how to break root password rhel7

1. reboot

press e to edit

2. linux 16 end line type rd.break

3. than ctrl+x

```
# mount -o remount rw /sysroot
# chroot /sysroot
# passwd
redhat
redhat
```

```
# getenforce
# touch /.autorelabel
# exit
# exit
```

******** how to apply user name and password on single user mode :-

```
# grub2-mkpasswd-pbkdf2
passwed: redhat123
```

than copy

```
# vim /etc/grub.d/40_custom
```

```
set superusers="deepak"
password_pbkdf2 deepak (paste password)
```

```
wq!
```

```
# grub2-mkconfig -o /boot/grub2/grub.cfg
```

```
# reboot
```

********* remove password single user mode

```
# vim /etc/grub.d/40_custom
```

delete edit line

```
:wq!
```

```
# grub2-mkconfig -o /boot/grub2/grub.cfg
```

******** how to install google chrome for redhat 7

**** how to create repodata manually

```
# rpm -qa createrepo

# cd /redhat/Packages
# rpm -ivh createrepo-

# createrepo -v /redhat
# ls /redhat
# yum clean all
# yum repolist
```

****

how to used gpg key concept:-

```
# locate RPM
```

copy rpm gpg key

```
# cat /etc/pki/rpm-gpg/RPM-GPG-KEY-redhat-release

# vim /etc/yum.repos.d/yum.repo

[yum]
baseurl=file:///redhat
enabled=1
gpgcheck=1
gpgkey=file:///redhat1/RPM-GPG-KEY-redhat-release

wq!

# yum clean all
# yum repolist
# yum install samba
#
```

************* how to configure yum client any give url:-

```
# cd /etc/yum.repos.d/yum.repo

[yum]
baseurl=http://content.example.com/rhel7.0/x86_64/dvd
enabled=1
gpgcheck=0

wq!
```

OR

```
# yum-config-manager --add-repo=http://classroom.example.com
```

OR

```
# yum-config-manager  --add-repo=file:///redhat

#
# yum clean all
# repolist
```

******** NTP configure cli

```
# vim /etc/chrony.conf

server desktop0.example.com  iburst

wq!

# systemctl restart chronyd.service
# systemctl enable chronyd.service

# timedatectl

# nptdate -u 172.25.254.254  (**********)
```

network file :-

```
# vim /etc/hosts
# vim /etc/hostname (permanent hostname set)
# cat /etc/sysconfig/network-scrits/ifcfg-static (network configuraion file)

# nmcli connection show


# nmcli connection add connection-name static ifname eno type ethernet autoconnet yes
 ip4 '192.168.0.1/24'


# nmcli connction show
```

without dns to ping machine name

```
# vim /etc/hosts


192.168.0.1  station1.example.com  staion1      server1
192.168.0.2  station2.example.com  station2     server2



wq!



# ping station1.example.com


# ping station1
# ping server1




# hostname -a  (alias show)
# hostname -i
# hostname -d
# hostname -f
# hostname -s
```

****

(server machine ip addrs configration)

```
# nmcli connecton add con-name ststic ifname eth0 type ethernet autoconnect yes ip4
'172.25.0.11/24' gw4 172.25.254.254
```

```
# nmcli connection show
# ifconfig
# ip route (gateway check)
```

how to add machine with any dns server

```
# nmcli connection modify static ipv4.dns 172.25.254.254
# nmcli connection down static
# nmcli connetion up static
# ifconfig eth0
# ifconfig lo
# ifdown eth0
# ifup eth0
```

OR

ONLY LAB CONFIGURE DNS SERVER

```
# cat /etc/resolv.conf
```

```
# vim /etc/resolv.conf   (dns server configuration file check )
```

```
search classroom.example.com
```

```
nameserver  172.25.254.254

:wq!

# nmcli connection down static
# nmcli connection  up
# nmcli device status
# nmcli device disconnet eth0
# nmcli device status
# nmcli device connect eh0
# nmcli device status
# ip addr
# ip a
# ip link
# ip add show eth0
# ethtool eth0 (link detected yes)
# traceroute 172.25.254.254
# route -n
# route
```

****

how to change ip file method :-

```
# vim /etc/sysconfig/network-scripts/ifcfg-static

IPADDR0=172.25.0.15

wq!

# ifdown eth0
# ifup etho
# ifconfig eth0


# nmcli connetion show static (all parameter show)
#
# nmcli connection modify static ipv4.addresses '172.25.0.20/24 172.25.254.254'
# ifdown eth0
# ifup eth0
# ifconfig eth0


# nmcli connetion show --active
```

how to take ip by dhcp server :-

```
# nmcli connetion delete static
# nmcli connection show



# nmcli connetion add con-name dynamic ifname eth0 type ethernet autoconnet yes
# nmcli connetion show
# ifconfig eth0


# cat /etc/sysconfig/network-scripts/ifcfg-dynamic
#


# nmcli connection show dynamic



# netstat  -tunlp  (all running port show)
# netstat -tunlp | grep sshd
# netstat -tunlp | grep 22
# netstat -tnlp (only tcp port show)
# netstat -unlp (only udp port show)
# netstat -unlp | grep -v udp6
# netstat -nr
```

```
# vim /etc/services (all service port nuber entry)
```

```
# cat  /etc/services  | grep rsync
# cat /etc/services  | grep telnet
```

****

** scp nd rsync both command used to copy any files from one machine nd onther machine
**

SCP

```
scp -r source    dentination
        OR
rsync -avH  sourse dentination
```

```
# scp -r root@172.25.0.10:/home  /tmp
# ls /tmp
```

```
# scp -r root@172.25.0.10:/etc/psswd /tmp
```

```
# rm -rf /etc/grub.cfg
# scp -r root@172.25.0.10:/etc/grub2.cfg /tmp
# scp -r root@172.25.0.10:/etc/grub2.cfg /etc
# ls /tmp
```

RSYNC

```
# mkdir /php
# mkdir /java
# touch /php/a{1..5}
# rsync -avH /php  /java
# echo "hello" > /php/a1
# rsync -avH  /php  /java

# rsync  -avH root@172.25.0.10:/home  /srv

# rsync  -avH /etc root@172.25.0.10:/tmp
```

****

RAID

(Redundant arry of independent disk)

* Raid technology always used to provide high data writing scripting
  with data securing.

*** Types of Raid

* Software Raid
* Hardware Raid

****** Types of Raid-level

1. Raid :- 0 (stripping without parity)

2. Raid :- 1 (mirror volume)

3. Raid :- 5 (stripping with parity)

Raid - 0 :- Requirement

* 2 hardisk

* same size

* same configuration

* no fault tolerance

* data writting is very fast

* usable size 100%

Raid - 1 :- mirror volume

* minmum 2 hardisk

* same size

* same configuration

* works on mirror concept

* data writting is slow as compare to raid 0

* usable size 50%

Raid - 5

* minumum 3 hardisk

* same size

* same configuration

* fault tolerance

* data writting speed is also fast

* single hardisk failure concept

* works on single parity concept

Parity ?

works on X - or operation

0 0 = 0

0 1 = 1

1 0 = 1

1 1 = 0

disk 1 = 1010110

disk2 = 1000101

parity ? = 1000101

80GB 80GB 80GB

240 - 80= 160 = 66% usable size

```
# fdisk -l
# rpm -qa mdadm

# fdisk /dev/vdb

:n
:p
:1
:enter
:+2GB

:n
:p
:2
:enter
:+2G

:n
:p
:3
:enter
:+2G

:p

:t
:1
:fd

:t
```

```
:2
:fd

:t
:3
:fd

:p  (print)
:w (save)


# partprobe /dev/vdb
# mdadm -C /dev/md0 -a yes -l 5 -n 3 /dev/vdb{1,2,3}

# mkfs.xfs /dev/md0
# mkdir /raid
# mount /dev/md0 /raid

# vim /etc/fstab

/dev/md0  /raid  xfs defaults 0 0

:wq!

# mount -a
# df -TH

# mdadm --detail /dev/md0  (check raid configuration level nd device   active)
```

OR

```
# mdadm -D /dev/md0
# cat /proc/mdstat
```

***** permanet save raid this file :-

```
# mdadm --detail --scan >> /etc/madam.conf

# cat /etc/mdadm.conf
```

Write Data :-

```
# df -TH
# cp -rf /etc    /raid

# df -TH
```

** how to perfrom hot swapable process.

```
# mdadm /dev/md0 -f /dev/vdb3
# cat /proc/mdstat

# mdadm --detail /dev/md0

# mdadm /dev/md0 -r /dev/vdb3
# cat /proc/mdstat
# mdadm /dev/md0
```

**** readd /dev/vdb3

```
# mdadm /dev/md0 -a /dev/vdb3
# mdadm --detail  /dev/md0
# ls /raid
```

**** how to remove raid

```
# umount /raid
# mdadm --stop /dev/md0
# mdadm --assemble /dev/md0  (enable raid)

# mdadm --stop /dev/md0

# vim /etc/fstab

/dev/md0  /raid  xfs  defaults 0 0  (delete line)

:wq!

# mount -a

# df -TH

# vim /etc/madam.conf

(delete entry)

:wq!

# fdisk /dev/fdb
```

:d

:1

:d

:2

:d

:3

:w

# partprobe /dev/vdb

** Partition

MBR Limit (master boot record)

primary partion

it is use to data
nd OS file

at a ime only one
primary partition
can be active

extented partition (it is use to only
personal data)

logical partiton
it is sub part of extended

MBR 4 partion {including , primary & extended } primary :- min 1

max :- 4

Extended :- min 0

max 1

hex code :-

primary , logical :- 83

extended :- 5

swap :- 82

lvm :- 8e

raid :- fd

```
# fdisk -l (to check disk status)
```

```
# fdisk /dev/sda
```

```
:n
:e
:enter
:enter
:p (print)
:n
:enter
:+2G
:p (print)
```

```
:w (save nd quiet)
```

```
# partprobe /dev/sda
#
```

```
# mkfs.xfs /dev/sda5 (partion format)
#
# mkdir /data
```

```
# mount /dev/sd5 /data  (temprory mount data)
```

```
# df -h (data mount point check)
# ls /data
```

```
# vim /etc/fstab  (permanent data mount)
```

```
/dev/sda5  /data  xfs defaults 0 0
```

```
:wq!
```

```
#
```

defaults 0 0

0 :- dump value

0 :- fsck order

```
# mount -a
# df -TH
# du -sh /data  ( file sizze check)
```

how to test partition :-

```
# cp -rf /etc /data
# du -sh /data
# df -TH
```

****

```
# umount /data
# ls /data

# mount /dev/sd5  /data
# ls /data
```

****

swap partion :-

```
# free -h (swap check)
```

```
# fdisk /dev/vdb
:n
:p
:1
:enter
:+1G
:p (print)
```

```
:
:t (code change)
:l (code list)
:82
:p (print)

:w (save)


# partprobe  /dev/vdb
# mkswap /dev/vdb1  (to create the swap partion)
# swapon  /dev/vdb1
# swap -s (all swap partion activate check )


# free -h

# vim /etc/fstab

/dev/vdb1  swap   swap  defaults  0 0

:wq!


# mount -a

  OR
# cat /proc/swaps
# cat /proc/meminfo | grep -i swap
```

how to deactivate swap partion :-

```
# swapoff /dev/vdb1
# swapon -s

# swapoff -a  (all swap off)
# swapon -a  (all swap on)

# vim /etc/fstab

/dev/vdb1   swap swap defaults 0 0   (delete entry )

:wq!

# mount -a

# fdisk /dev/vdb

:d (delete)

:w

# partprobe /dev/vdb
```

****

Booting Process :-

1. Hardware boot
2. Bootloader

3. kernel

4. init or systemd

5. Login screen

1. Hardware Boot :-

* power on machine

* smpls will supply the :- power the all connecting devices.

* It provides Ac to Dc current.

* BIOS initilization.

* It performs the post operration. to check all hardware connectvity.
  if all devices one ok then it given

* CMOS intilization. :-

It will find the OS Boot.

2.Bootloader:- It is us to load OS booting files.

** types of bootloader

1. Lilo (linux loader)   file:- (/etc/lilo.conf

2. grub   file:- (/etc/grub.conf)

3. grub2 file:- (/etc/grub2.cfg)

(non visible stage)

* stage -1 :- MBR (Master boot record)

* stage -2 :- grub or grub2

MBR :- 512 bytes

446	64	2
primary boot	partion table	validtion code

grub2 :- load :- vmlinuz =3.10 (kernel)

load :- initrd.img (initional ram disk) (file)

1. MBR (crupt)
2. GRUB (crupt)
3. KERNEL (crupt)
4. initrd.img (crupt)
5. Kernel painic error (crupt)

go to (rescue mode) :- dvd used

3. Kernel :- It read the /etc/fstab file to mount all devices.

* first it will mount root "/" file system .

* After then it will mount all sub partiotion & network based shared file system.

ctrl+d :- error

root paasword

4. init OR systemd :-

* It will start parent process "init" OR "systemd"

* It reads /etc/inittab OR

/etc/systemd/system/default.target

to initilize the login enviroment.

* It will check all sservices status and will take the actions.

* It will run all command written in /etc/rc.loacl

5. Login screen :-

login:- root /etc/passwd

passwd :- redhat /etc/group

/etc/shadow

password policy

profile files intilization

*********** LVM **********

* logical volume management

data storage techniques :-

1. fixed size concept

2. not fixed size concept

what is physical volume:-

****

```
# fdisk -l

# fdisk /dev/vdb

:n
:p
:1
: enter
:+1G
:p (print)
:n
:p
:enter
:+2G
:p (print)
:t
:1
```

```
:8e
:t
:2
:8e
:p (print)

:w (save)


# partprobe /dev/vdb

# pvcreate /dev/vdb1 /dev/vdb2

# pvdisplay

# pvs (to check all physical volume with status)

# vgcreate myvg1  /dev/vdb{1,2}

# vgdisplay
# vgs

# lvcreate -L +1G -n mylv1  /dev/myvg1

# lvcreate -L +500M -n mylv2  /dev/myvg1

# mkfs.xfs /dev/myvg1/mylv1

# mkfs.ext4  /dev/myvg1/mylv2

# mkdir /lvm1
# mkdir  /lvm2

# mount /dev/myvg1/mylv1  /lvm1   (tempray mount)
# mount /dev/myvg1/mylv2  /lvm2
```

```
# vim /etc/fstab     (permament mount)

/dev/myvg1/mylv1      /lvm1       xfs   defaults     0 0
/dev/myvg1/mylv2      /lvm2       ext4   defaults    0 0

wq!
```

```
# mount -a

# df -h

# df -TH

# lvdisplay  /dev/myvg1/mylv1
```

```
# du -sh /etc
# df -TH

# cp -rf /etc  /lvm1
# cp -rf /etc  /lvm2

# df -TH
```

how to extend LVM size :-

```
# vgs  (to check used nd free space)
# df -TH

# lvextend -L +300M /dev/myvg1/mylv1

# xfs_growfs  /dev/myvg1/mylv1

# df -TH
```

If file ext2 , ext3 , ext4 file system :-

```
# lvextend -L +200M /dev/myvg1/mylv2

# resize2fs /dev/myvg1/mylv2

# df - TH
```

how to lvresize :-

```
# df -TH

# lvresize -L 800M -r /dev/myvg1/mylv2

# df -TH
# lvresize -L 1500M  -r /dev/myvg1/mylv1
```

```
# df -TH
```

how to reduce any lvm size :-

note:- xfs (not reduce only extend)

```
# lvresize -L 500M -r /dev/myvg1/mylv2
do you want to unmount y/n :- y
# df -TH
# vgs
```

how to extend volume group size :-

```
# fdisk /dev/vdb
:n
:p
:3
:enter
```

```
:+1G
:t
:3
:8e
:w
```

```
# partprobe  /dev/vdb
```

```
# pvcreate /dev/vdb3
# pvs
```

```
# vgextend myvg1 /dev/vdb3
# vgs
```

****

forcefully scan:-

```
# pvscan
# vgscan
# lvscan
```

bydefault block

1 PE = 4 MB

p :- phisical

e :- extent (chunk)

1 PE = minmum = 1 MB

maximum = 128 MB

128 , 64 , 32 , 16 , 8 , 4 , 2 , 1

```
# ls /etc/lvm/archive  (refrence point)
```

Permissions it cansist of there attributes:-

read - r :- 4

write - w :- 2

xecute - x :- 1

others - 0

blank - file

d - directory

l - softlink

*****

root directory permission = 755

7 - owner

5 - group owner

5 - others

******

root file permission = 644

6 - owner

4 - group owner

4 - others

****

$ normal user directory permision =775

$ normal user file permission =644

**** 1 - symbolic link (file)

2 - symbolic link (directory) (default)

```
# mkdir /data
# ls -ld /data (permission check for directory)
# cd /data
# ls -a  (symbolic link show )
. ..
.  current directory (pwd)
.. one label back directory
```

```
# mkdir /data/a{1..5}
# touch /data/b{1..5}
# ll /data
#
# touch /tcs/a{1..5}
# ll /tcs
# ls -ld /tcs
#

# mkdir -p /data/a1/a2/a3/a4  (create parrent directory)
# ls -ld /data
# ll
# ls -R /data
# ls -lR /data

****** ls command
# l.
# ls -a
# ls -i
# ls -lrt
# ls -lrth
# ls -lSrh
# ls -lSh

**********************

# mkdir /php
# touch /php/a{1..5}
# ls -ld /php
# chmod 777 /php (directory rwx permission)
# ls -ld /php     (check permission)
# chmod 770 /php   (directory read ,write other permission )
# ls -ld /php
# ll /php
# chmod  777 /php
# ls -ld /php
# ll /php
# chmod -R 777 /php

#  ls -ld /php

# chmod -R 770 /php

# ls -ld /php

#
```

******

```
# useradd rahul

# chown rahul /php  ( ownership permission  create for directory)

# ls -ld /php

# ll /php

# chown -R rahul /php

# ll /php


# groupadd tcs   (create groupadd)

# useradd -G tcs u1 (add user to groupadd)

# useradd -G tcs u2  (add user to group)

# ls -ld /php

# chgrp tcs /php  ( group ownership for directory)

# ls -ld /php

# chgrp -R tcs /php

# ll /php


# useradd rajjev

# usermod -G tcs rajeev

# chown -R rahul:tcs   /php

# ls -ld /php
```

****

ACL (access control list)

****   user based acl

```
# cp /etc/fstab  /tmp  (copy file to tmp)
# ll /tmp/fstab
# getfacl /tmp/fstab
#

# useradd harry
# useradd natasha
# useradd sarah

# setfacl -m u:harry:--- /tmp/fstab

# setfacl -m u:natasha:r-- /tmp/fstab

# setfacl -m u:sarah:rwx  /tmp/fstab


# ll /tmp/fstab
# getfacl /tmp/fstab

# getfacl /tmp/fstab | grep mask
#  getfacl /tmp/fstab | grep rwx
#
```

**** group based acl

```
# groupadd ibm1
# groupadd ibm2

# useradd -G ibm1 i1
# useradd -G ibm1  i2

# useradd -G ibm2 i5
# useradd  -G ibm2 i6
# setfacl -m g:ibm1:--- /tmp/fstab
# setfacl -m g:ibm2:r-- /tmp/fstab
#getfacl /tmp/fstab
```

********** other based acl

```
# setfacl -m o:--- /tmp/fstab
# getfacl /tmp/fstab
# ll /tmp/fstab
```

****

******** how to remove acl any user

```
# setfacl -x u:harry /tmp/fstab
# getfacl /tmp/fstab
```

how to remove acl any group

```
# setfacl -x g:ibm1 /tmp/fstab
# getfacl  /tmp/fstab
```

*********** how to all remove user nd group other acl

```
# setfacl --remove-all /tmp/fstab
# ll /tmp/fstab
# getfacl /tmp/fstab
# chmod 644 /tmp/fstab
```

Q1.

1. copy the file /etc/passwd into /tmp directory
2. set the permission 770
3. add a user > rahul
4. give owenership on /tmp/passwd file for rahul
5. useradd 1. user1 ---

   user2 r--

   user3 rwx

6. group wipro1 rwx

   w1 (user)

   w2

   w3

7. remove the acl from only user3

****** chattr : change attribute

chatter mainlly used to apply very high level permision on any file or directory.

it is lso applicable super user (root)

attribute	operator
a	+ (allow)
i	i (remove)

a => allow only read,copy & append but not edit , delete, modify,rename & link move

i => read & copy but not append also

1st example:-

```
# echo "this is my test file " > linux
# cat linux

# lsattr linux  (chek chattr)
# chattr +a linux
# cat linux
# lsattr linux
# cp linux /tmp
# echo "hello" > linux
# echo "hello" >> linux
# cat linux
# rm -rf linux
# mv linux krishna
# chattr -a linux
```

2nd example:-

```
# lsattr /etc/passwd
# chattr +i /etc/passwd (set chattr to /etc/passwd)
# lsattr /etc/passwd    (check chattr to /etc/passwd)
# useraadd raj  (not useradd)
# useradd raj2
# userdel -rf raj (no user delete)
# chattr -i /etc/passwd (remove chatter /etc/passwd)
# chattr +i /etc/shadow  (set chattr shadow file )
# passwd   (not change passwd root user)
# chattr -i /etc/shadow  (remove chattr shadow file)
```

3rd step :-

```
# chattr -R +i /home
# ls /home
# su - alok
$ touch abc
$ exit
# chattr -R -i /home
```

4th step:-

******** how to apply chattr with any normal user account

command

execution rights

1. suid => super user id (u+s)
2. sudo

```
# which chattr
# ll /usr/bin/chattr
# chmod u+s /usr/bin/chattr
# ll /usr/bin/chattr
```

```
# useradd deepak
# su - deepak
$ echo "hello deepak " > abc
$ ls
$ chattr +i abc
$ lsattr abc
$ cat abc
$ rm -rf abc
$ exit
# rm -rf /home/deepak/abc
# lsattr /home/deepak/abc
# chattr -i /home/deepak/abc
# lsattr /home/deepak/abc
# rm -rf /home/deepak/abc
```

************* UMASK

umask basically defind the default permission of any users accounts data.

default umask of super user => 022

default umask of normal user => 002

root user umask

```
1.# directory => 777
          -022
          755
```

```
# file => 666
       - 022
         644
```

normal user umask

```
$ directory => 777
           - 002
            775
$ file      => 666
            -002
             644
```

how to change umask value temprory

```
# umask  (check umask)
# umask 222 (set umask)
# umask
# touch vipin
# mkdir /shyam
# ll vipin (chek umask file)
# ls -ld /shyam (check umask directory)
```

how to set permanent umask

```
# vim .bashrc
```

```
umask 222
```

```
wq!

# exit
# umask
```

remove permanent umask

```
# vim .bashrc
```

delete line umask 222

```
wq!

# exit
# umask
```

********* special permission

	numaric code	symbolic code
1. suid => set user id	-> 4	-> u+s
2. sgid => set group id	-> 2	-> g+s
3. sticky bit => sticky bit	-> 1	-> o+t

	commands	file	directory
suid	yes	no	no
sgid	no	no	yes
stikybit	no	no	yes

suid u+s or 4

# fdisk -l	$ fdisk -l	$ fdisk -l
yes	no	no

1st example:- SUID

```
# which fdisk
# fdisk -l
#  which fdisk
# ll /usr/sbin/fdisk
# chmod 4755  /usr/sbin/fdisk   (set suid)
      OR
# chmod u+s /usr/sbin/fdisk

# ll /usr/sbin/fdisk



# useradd deepak

# su - deepak
$ fdisk -l
$ exit

# chmod u-s /usr/sbin/fdisk  (remove suid)
        OR
# chmod 0755 /usr/sbin/fdisk
```

2nd example:-

```
# which useradd
# ll /usr/sbin/useradd
# chmod 4755 /usr/sbin/useradd
# ll /usr/sbin/useradd
```

3rd example:-

```
# which su
# which passwd
# ll /usr/bin/passwd (all ready set suid)
# ll /usr/bin/su
# ll /usr/bin (chek suid)
# ll /usr/sbin
```

************ SGID => 2 OR g+s

1st example:-

```
# mkdir /java
# groupadd wipro
# ls -ld /java
# chgrp wipro /java
# ls -ld  /java
# chmod 2777 /java (set sgid)
# ls -ld /java
# useradd u1
# useradd u2
# su - u1
$ cd /java
$ touch java1
$ ll
$ exit

# su - u2
$ cd /java
$ touch java2
$ ll
$ exit

# touch /java/java3
# ll /java

# chmod g-s /java  (remove sgid)
# ls -ld /java
```

********** STICKYBIT => 1 OR o+t

```
# mkdir /fedora
# chmod 1777 /fedora  (set sticky bit)
# ls -ld /fedora (check sticky bit)
# useradd sachin
# useradd soniya

# su - sachin
$ cd /fedora
$ echo "hello" > fedora1
$ ll
$ exit
```

```
# su - soniya
$ cd /fedora
$ ll
$ cat fedora1
$ rm -rf fedora1
$ cd
$ exit
```

```
# chmod 0755 /fedora (remove sticky bit)
# ls -ld /fedora
```

**** how to apply sgid and sticky bit

```
# chgrp wipro /fedora
# chmod 3777 /fedora
# ls -ld /fedora
# chmod 7777 /fedora (set suid ,sgid nd sticky bit) (not any meaning)
# ls -ld /fedora
# chmod u-s /fedora
# ls -ld /fedora
```

rwT

T (indetect to back not X)

```
# chmod o-x /fedora
# ls -ld /fedora
# chmod o+x /fedora
# ls -ld /fedora
# chmod g-x /fedora
# ls -ld /fedora
# chmod g+x /fedora
# ls -ld /fedora
```

****

how to recover any users profile files:-

```
# useradd raju
# su - raju
$ ls
$ ls -a
$ rm -rf  .*
$ ls -a
$ exit

# su - raju
$ exit

# cd /etc/skel
# ls -a
# cp -af .[!.]*  /home/raju
# su - raju
$ ls -a
$ exit
```

****

how to add any users without any useradd command with create to directory for useradd :-

```
# cd /home
# ll


# mkdir network
# ll
# chmod 700 /home/network
# ll
# vim /etc/passwd

network:x:1020:1020::/home/network:/bin/bash

wq!

# vim /etc/group

network:x:1020:

wq!

# chown network /home/network
# chgrp network /home/network
# ll

# cp -af /etc/skel/.[!.]*  /home/network
# cd
# id network
# passwd network
12345
12345
# su - network
```

```
$ pwd
$ exit
```

**************** SUDO (super user do)

1st example :- how to provide full rights

```
# useradd sachin
# passwd sachin
12345
12345
```

```
#  vim /etc/ sudoers
```

98 line after entry

```
sachin ALL=(ALL)        ALL
```

```
wq!
```

```
# su - sachin
$ sudo fdisk -l
sudo password : 12345
```

```
$ sudo useradd raj
$ sudo userdel raj
$ sudo systemctl restart crond
$ sudo -l    (rights of list )
```

```
$ exit
```

******** how to provide some limted rights sudo

```
# which useradd
# which usermod
```

```
# vim /etc/sudoers
```

98 line after entry

```
sachin ALL=(ALL)        /usr/sbin/useradd, /usr/sbin/usermod
```

```
wq!
```

```
# su -sachin
```

```
$ sudo -l
$ exit
```

********* how to allow all command except of given list

```
# which fdisk
# which userdel
# useradd alok
# passwd alok
123
```

```
# vim /etc/sudoers
```

98 line after entry

```
sachin ALL=(ALL)        /usr/sbin/useradd, /usr/sbin/usermod

alok   ALL=(ALL)        ALL, !/usr/sbin/userdel, !/usr/sbin/fdisk


wq!


# su - alok

$ sudo useradd rajeev

$ sudo fdisk -l

$ sudo -l

$ exit
```

****** how to create sudo group

```
# groupad tcs

# useradd -G tcs t1

# useradd -G tcs t2


# passwd t1

123

# passwd t2

123


# vim /etc/sudoers


%tcs ALL=(ALL)      ALL


wq!


# su - t1

$ sudo fdisk -l
```

passwd : 123

$ exit

******** contolling services

OR

Daemon

OR

units -> in rhel7

daemon => "init " or "systemd" program

OR till rhel-6 rhel-7

unit

init => pid 1

or

systemd

# pstree

server name	daemon
ssh	sshd
crontab	crond
ntp	chronyd
samba	smb
mailserver	postfix

rhel-6	rhel-7
parrent process	parrent process
"int"	"systemd"
pid = 1	pid= 1

commands	
temporey permanent	commands
"service" "chkconfig"	t -- p
	"systemctl"

# service sshd start/stop/restart/reload/status	# systemctl start sshd
# chkconfig sshd on/off	# systemctl enable sshd

```
# systemctl actions unitname .type
                service    path       socket
```

```
# cat /etc/redhat-release
# cat /etc/system-release
# cat /etc/os-release



# pstree

# pidof systemd

# pstree | grep crond

# pstree | grep sshd

# pidof sshd

#


# systemctl status sshd

# systemctl is-active sshd        (temprory active)

# systemctl is-enabled sshd       (permanent enble)

# systemctl stop sshd          (temprory stop)

# systemctl disable sshd    (permanent disable)

# systemctl status sshd

# systemctl start sshd    (temprory)

# systemctl enable sshd    (permanent)


#

# systemctl list-units     (temprory status of all service)

# systemctl list-units-files     (permanent status of all service)

# systemctl list-units | grep crond

# systemctl list-units sshd

# systemctl list-units | grep -E 'sshd|crond'

# systemctl

# systemctl | grep crond

#


# systemctl list-units-files | grep crond

# systemctl list-units-files | grep sshd
# systemctl list-units  --type=service
# systemctl list-units  --type=path
# systemctl list-units  --type=socket

# systemctl   list-units --failed

# systemctl status iptables
# systemctl status firewalld
# systemctl mask iptables
# systemctl start iptables
# systemctl status iptables
# systemctl umask iptables
# systemctl start iptables
# systemctl enable  iptables
# systemctl stop firewalld
# systemctl disable firewalld
# systemctel mask firewalld
# systemctl list-units | grep firewalld

# systemctl list-units-files | grep masked   (check masked of service)
#

#
```

********** RUN Lebel

run level	targets
init	systemd

there are 7 type of run level :-

```
# init  0  => { poweroff }
# int   1  => ( single user mode or trubleshooting mode)
# init  2  => ( multi user mode but without network)
# init  3  => ( full multi user mode or text mode )
# init  4  => ( unused)
# init  5  => ( gui mode x-11 window)
# init  6  => ( reboot)
```

```
# runlevel  (check runlevel mode )
# who -r
```

types of runlevel changeing method :-

tempory   permanent

by using   at the time of   # vim /etc/inittab
"init" commnd   machine boot up   id:3:initdefault

```
:wq!
# init 6
```

```
# runlevel
# who -r
# init 3
# runlevel
# init 5
```

```
# runlevel
# cat /etc/inittab
```

*****rhel 6

2 mode

1. rescue mode (to recover any grub & kernel related issues)

2. emergency mode (to recover any file system related issues)

rhel7

******* targets

there are only 4 types of targets

1. graphical.target => init 5 (full multi user mode with gui+cli)

2. multi-user.target => init 3 (full multi user mode with cli only)

3. rescue.target => rescue mode

4 emergency.target => emergency mode

```
# init 6
 or
# systemcl reboot
```

```
# init 0
   or
# systemctl poweroff
```

```
# init 1 => rd.break
# systemctl get-default
# systemctl isolate multi-user.target ( tempory cli text mode )
# systemctl isolate graphical.target  ( tempory gui mode)
# systemctl set-default multi-user.target ( permanent cli text mode )

# cat /etc/systemd/system/default.target  (targets file )

# systemctl reboot

# systemctl set-default graphical.target    ( permanent gui mode )

# systemctl get-default  (check runlevel )
```

******* how to deactivate ctrl+alt+delete

```
# vim /usr/lib/systemd/system/ctrl-alt-del.target

#requires=systemd-reboot.service

wq!

#
```

********** how to break root password rhel7

1. reboot

press e to edit

2. linux 16 end line type rd.break

3. than ctrl+x

```
# mount -o remount rw /sysroot
# chroot /sysroot
# passwd
redhat
redhat
```

```
# getenforce
# touch /.autorelabel
# exit
# exit
```

******** how to apply user name and password on single user mode :-

```
# grub2-mkpasswd-pbkdf2
passwed: redhat123
```

than copy

```
# vim /etc/grub.d/40_custom
```

```
set superusers="deepak"
password_pbkdf2 deepak (paste password)
```

```
wq!
```

```
# grub2-mkconfig -o /boot/grub2/grub.cfg
```

```
# reboot
```

********* remove password single user mode

```
# vim /etc/grub.d/40_custom
```

delete edit line

```
:wq!
```

```
# grub2-mkconfig -o /boot/grub2/grub.cfg
```

******** how to install google chrome for redhat 7

**** how to create repodata manually

```
# rpm -qa createrepo
```

```
# cd /redhat/Packages
# rpm -ivh createrepo-
```

```
# createrepo -v /redhat
# ls /redhat
# yum clean all
# yum repolist
```

****

how to used gpg key concept:-

```
# locate RPM
```

copy rpm gpg key

```
# cat /etc/pki/rpm-gpg/RPM-GPG-KEY-redhat-release

# vim /etc/yum.repos.d/yum.repo

[yum]
baseurl=file:///redhat
enabled=1
gpgcheck=1
gpgkey=file:///redhat1/RPM-GPG-KEY-redhat-release

wq!

# yum clean all
# yum repolist
# yum install samba
#
```

************* how to configure yum client any give url:-

```
# cd /etc/yum.repos.d/yum.repo

[yum]
baseurl=http://content.example.com/rhel7.0/x86_64/dvd
enabled=1
gpgcheck=0
```

```
wq!
```

OR

```
# yum-config-manager --add-repo=http://classroom.example.com
```

OR

```
# yum-config-manager  --add-repo=file:///redhat

#
# yum clean all
# repolist
```

******** NTP configure cli

```
# vim /etc/chrony.conf

server desktop0.example.com  iburst

wq!

# systemctl restart chronyd.service
# systemctl enable chronyd.service

# timedatectl

# nptdate -u 172.25.254.254  (**********)
```

network file :-

```
# vim /etc/hosts
# vim /etc/hostname (permanent hostname set)
```

```
# cat /etc/sysconfig/network-scrits/ifcfg-static (network configuraion file)
# nmcli connection show

# nmcli connection add connection-name static ifname eno type ethernet autoconnet yes
 ip4 '192.168.0.1/24'

# nmcli connction show
```

without dns to ping machine name

```
# vim /etc/hosts

192.168.0.1  station1.example.com  staion1      server1
192.168.0.2  station2.example.com  station2     server2

wq!
```

```
# ping station1.example.com

# ping station1
# ping server1
```

```
# hostname -a  (alias show)
# hostname -i

# hostname -d

# hostname -f

# hostname -s
```

****

(server machine ip addrs configration)

```
# nmcli connecton add con-name ststic ifname eth0 type ethernet autoconnect yes ip4 '172.25.0.11/24' gw4 172.25.254.254
```

```
# nmcli connection show

# ifconfig

# ip route (gateway check)
```

how to add machine with any dns server

```
# nmcli connection modify static ipv4.dns 172.25.254.254

# nmcli connection down static

# nmcli connetion up static

# ifconfig eth0

# ifconfig lo

# ifdown eth0

# ifup eth0
```

OR

ONLY LAB CONFIGURE DNS SERVER

```
# cat /etc/resolv.conf
# vim /etc/resolv.conf   (dns server configuration file check )

search classroom.example.com
nameserver  172.25.254.254

:wq!

# nmcli connection down static
# nmcli connection  up
# nmcli device status
# nmcli device disconnet eth0
# nmcli device status
# nmcli device connect eh0
# nmcli device status
# ip addr
# ip a
# ip link
# ip add show eth0
# ethtool eth0 (link detected yes)
# traceroute 172.25.254.254
# route -n
# route
```

****

how to change ip file method :-

```
# vim /etc/sysconfig/network-scripts/ifcfg-static

IPADDR0=172.25.0.15
```

```
wq!

# ifdown eth0
# ifup etho
# ifconfig eth0

# nmcli connetion show static (all parameter show)
#
# nmcli connection modify static ipv4.addresses '172.25.0.20/24 172.25.254.254'
# ifdown eth0
# ifup eth0
# ifconfig eth0

# nmcli connetion show --active
```

how to take ip by dhcp server :-

```
# nmcli connetion delete static
# nmcli connection show



# nmcli connetion add con-name dynamic ifname eth0 type ethernet autoconnet yes
# nmcli connetion show
# ifconfig eth0

# cat /etc/sysconfig/network-scripts/ifcfg-dynamic
#

# nmcli connection show dynamic
# netstat  -tunlp  (all running port show)
# netstat -tunlp | grep sshd
# netstat -tunlp | grep 22

# netstat -tnlp (only tcp port show)
# netstat -unlp (only udp port show)
# netstat -unlp | grep -v udp6
# netstat -nr

# vim /etc/services (all service port nuber entry)

# cat  /etc/services  | grep rsync
# cat /etc/services  | grep telnet
```

****

** scp nd rsync both command used to copy any files from one machine nd onther machine **

SCP

```
scp -r source    dentination
       OR
rsync -avH  sourse dentination
```

```
# scp -r root@172.25.0.10:/home  /tmp
# ls /tmp

# scp -r root@172.25.0.10:/etc/psswd /tmp
# rm -rf /etc/grub.cfg
# scp -r root@172.25.0.10:/etc/grub2.cfg /tmp


# scp -r root@172.25.0.10:/etc/grub2.cfg /etc
# ls /tmp
```

RSYNC

```
# mkdir /php
# mkdir /java
# touch /php/a{1..5}
# rsync -avH /php  /java
# echo "hello" > /php/a1
# rsync -avH  /php  /java

# rsync  -avH root@172.25.0.10:/home  /srv

# rsync  -avH /etc root@172.25.0.10:/tmp
```

****

RAID

(Redundant arry of independent disk)

* Raid technology always used to provide high data writing scripting with data securing.

*** Types of Raid

* Software Raid

* Hardware Raid

****** Types of Raid-level

1. Raid :- 0 (stripping without parity)
2. Raid :- 1 (mirror volume)
3. Raid :- 5 (stripping with parity)

Raid - 0 :- Requirement

* 2 hardisk
* same size
* same configuration
* no fault tolerance
* data writting is very fast
* usable size 100%

Raid - 1 :- mirror volume

* minmum 2 hardisk
* same size
* same configuration
* works on mirror concept
* data writting is slow as compare to raid 0
* usable size 50%

Raid - 5

* minumum 3 hardisk

* same size

* same configuration

* fault tolerance

* data writting speed is also fast

* single hardisk failure concept

* works on single parity concept

Parity ?

works on X - or operation

0 0 = 0

0 1 = 1

1 0 = 1

1 1 = 0

disk 1 = 1010110

disk2 = 1000101

parity ? = 1000101

80GB 80GB 80GB

240 - 80= 160 = 66% usable size

```
# fdisk -l
# rpm -qa mdadm

# fdisk /dev/vdb

:n
:p
:1
:enter
:+2GB

:n
:p
:2
:enter
:+2G

:n
:p
:3
:enter
:+2G

:p

:t
```

```
:1
:fd

:t
:2
:fd

:t
:3
:fd

:p  (print)
:w (save)


# partprobe /dev/vdb
# mdadm -C /dev/md0 -a yes -l 5 -n 3 /dev/vdb{1,2,3}

# mkfs.xfs /dev/md0
# mkdir /raid
# mount /dev/md0 /raid

# vim /etc/fstab

/dev/md0  /raid  xfs defaults 0 0

:wq!

# mount -a
# df -TH
# mdadm --detail /dev/md0  (check raid configuration level nd device   active)
```

OR

```
# mdadm -D /dev/md0
# cat /proc/mdstat
```

***** permanet save raid this file :-

```
# mdadm --detail --scan >> /etc/madam.conf
```

```
# cat /etc/mdadm.conf
```

Write Data :-

```
# df -TH
# cp -rf /etc    /raid
```

```
# df -TH
```

** how to perfrom hot swapable process.

```
# mdadm /dev/md0 -f /dev/vdb3
# cat /proc/mdstat
```

```
# mdadm --detail /dev/md0
```

```
# mdadm /dev/md0 -r /dev/vdb3
# cat /proc/mdstat
# mdadm /dev/md0
```

**** readd /dev/vdb3

```
# mdadm /dev/md0 -a /dev/vdb3
# mdadm --detail  /dev/md0
# ls /raid
```

**** how to remove raid

```
# umount /raid
# mdadm --stop /dev/md0
# mdadm --assemble /dev/md0  (enable raid)

# mdadm --stop /dev/md0

# vim /etc/fstab

/dev/md0  /raid  xfs  defaults 0 0  (delete line)

:wq!

# mount -a

# df -TH

# vim /etc/madam.conf

(delete entry)
```

```
:wq!

# fdisk /dev/fdb

:d
:1
:d
:2
:d
:3

:w

# partprobe /dev/vdb
```

** Partition

MBR Limit (master boot record)

primary partion extented partition (it is use to only
personal data)
it is use to data logical partiton
nd OS file it is sub part of extended

at a ime only one
primary partition
can be active

MBR 4 partion {including , primary & extended }

primary :- min 1

max :- 4

Extended :- min 0

max 1

hex code :-

primary , logical :- 83

extended :- 5

swap :- 82

lvm :- 8e

raid :- fd

```
# fdisk -l (to check disk status)
```

```
# fdisk /dev/sda
```

```
:n
:e
:enter
:enter
:p (print)
```

```
:n

:enter

:+2G

:p (print)

:w (save nd quiet)



# partprobe /dev/sda

#


# mkfs.xfs /dev/sda5 (partion format)

#

# mkdir /data


# mount /dev/sd5 /data  (temprory mount data)


# df -h (data mount point check)

# ls /data


# vim /etc/fstab  (permanent data mount)


/dev/sda5  /data  xfs defaults 0 0


:wq!


#


defaults 0 0
```

0 :- dump value

0 :- fsck order

```
# mount -a
# df -TH
# du -sh /data  ( file sizze check)
```

how to test partition :-

```
# cp -rf /etc /data
# du -sh /data
# df -TH
```

****

```
# umount /data
# ls /data
```

```
# mount /dev/sd5  /data
# ls /data
```

****

swap partion :-

```
# free -h (swap check)
```

```
# fdisk /dev/vdb
:n
:p
```

```
:1
:enter
:+1G
:p (print)
:
:t (code change)
:l (code list)
:82
:p (print)

:w (save)
```

```
# partprobe  /dev/vdb
# mkswap /dev/vdb1  (to create the swap partion)
# swapon  /dev/vdb1
# swap -s (all swap partion activate check )
```

```
# free -h
```

```
# vim /etc/fstab
```

```
/dev/vdb1  swap   swap  defaults  0 0
```

```
:wq!
```

```
# mount -a
```

OR

```
# cat /proc/swaps
# cat /proc/meminfo | grep -i swap
```

how to deactivate swap partion :-

```
# swapoff /dev/vdb1
# swapon -s

# swapoff -a  (all swap off)
# swapon -a  (all swap on)

# vim /etc/fstab

/dev/vdb1   swap swap defaults 0 0   (delete entry )

:wq!

# mount -a

# fdisk /dev/vdb

:d (delete)

:w

# partprobe /dev/vdb
```

****

Booting Process :-

1. Hardware boot
2. Bootloader
3. kernel
4. init or systemd
5. Login screen

1. Hardware Boot :-

* power on machine

* smpls will supply the :- power the all connecting devices.

* It provides Ac to Dc current.

* BIOS initilization.

* It performs the post operration. to check all hardware connectvity.
if all devices one ok then it given

* CMOS intilization. :-

It will find the OS Boot.

2.Bootloader:- It is us to load OS booting files.

** types of bootloader

1. Lilo (linux loader)   file:- (/etc/lilo.conf
2. grub   file:- (/etc/grub.conf)
3. grub2 file:- (/etc/grub2.cfg)

(non visible stage)

* stage -1 :- MBR (Master boot record)

* stage -2 :- grub or grub2

MBR :- 512 bytes

446	64	2
primary boot	partion table	validtion code

grub2 :- load :- vmlinuz =3.10 (kernel)
load :- initrd.img (initional ram disk) (file)

1. MBR (crupt)
2. GRUB (crupt)
3. KERNEL (crupt)
4. initrd.img (crupt)
5. Kernel painic error (crupt)

go to (rescue mode) :- dvd used

3. Kernel :- It read the /etc/fstab file to mount all devices.

* first it will mount root "/" file system .

* After then it will mount all sub partiotion & network based
  shared file system.

ctrl+d :- error

root paasword

4. init OR systemd :-

* It will start parent process "init" OR "systemd"

* It reads /etc/inittab OR
  /etc/systemd/system/default.target
to initilize the login enviroment.

* It will check all sservices status and will take the actions.

* It will run all command written in /etc/rc.loacl

5. Login screen :-

login:- root /etc/passwd

passwd :- redhat /etc/group

/etc/shadow

password policy

profile files intilization

*********** LVM **********

* logical volume management

data storage techniques :-

1. fixed size concept
2. not fixed size concept

what is physical volume:-

****

```
# fdisk -l

# fdisk /dev/vdb

:n
:p
:1
: enter
:+1G
:p (print)
:n
:p
:enter
```

```
:+2G
:p (print)
:t
:1
:8e
:t
:2
:8e
:p (print)

:w (save)


# partprobe /dev/vdb

# pvcreate /dev/vdb1 /dev/vdb2

# pvdisplay

# pvs (to check all physical volume with status)

# vgcreate myvg1  /dev/vdb{1,2}

# vgdisplay
# vgs

# lvcreate -L +1G -n mylv1  /dev/myvg1

# lvcreate -L +500M -n mylv2  /dev/myvg1

# mkfs.xfs /dev/myvg1/mylv1
# mkfs.ext4  /dev/myvg1/mylv2

# mkdir /lvm1
# mkdir  /lvm2

# mount /dev/myvg1/mylv1  /lvm1   (tempray mount)
# mount /dev/myvg1/mylv2  /lvm2


# vim /etc/fstab     (permament mount)

/dev/myvg1/mylv1      /lvm1       xfs   defaults     0 0
/dev/myvg1/mylv2      /lvm2       ext4   defaults    0 0


wq!

# mount -a

# df -h

# df -TH

# lvdisplay  /dev/myvg1/mylv1


# du -sh /etc
# df -TH
# cp -rf /etc  /lvm1
# cp -rf /etc  /lvm2

# df -TH
```

how to extend LVM size :-

```
# vgs  (to check used nd free space)
# df -TH

# lvextend -L +300M /dev/myvg1/mylv1

# xfs_growfs  /dev/myvg1/mylv1

# df -TH
```

If file ext2 , ext3 , ext4 file system :-

```
# lvextend -L +200M /dev/myvg1/mylv2

# resize2fs /dev/myvg1/mylv2

# df - TH
```

how to lvresize :-

```
# df -TH
# lvresize -L 800M -r /dev/myvg1/mylv2

# df -TH

# lvresize -L 1500M  -r /dev/myvg1/mylv1

# df -TH
```

how to reduce any lvm size :-

note:- xfs (not reduce only extend)

```
# lvresize -L 500M -r /dev/myvg1/mylv2

do you want to unmount y/n :- y

# df -TH

# vgs
```

how to extend volume group size :-

```
# fdisk /dev/vdb
```

```
:n

:p

:3

:enter

:+1G

:t

:3

:8e

:w
```

```
# partprobe  /dev/vdb
```

```
# pvcreate /dev/vdb3

# pvs
```

```
# vgextend myvg1 /dev/vdb3

# vgs
```

****

forcefully scan:-

```
# pvscan

# vgscan

# lvscan
```

bydefault block

1 PE = 4 MB

p :- phisical

e :- extent (chunk)

1 PE = minmum = 1 MB
maximum = 128 MB

128 , 64 , 32 , 16 , 8 , 4 , 2 , 1

```
# ls /etc/lvm/archive  (refrence point)
```