

RHCSA

LINUX COMMANDS

Day 1

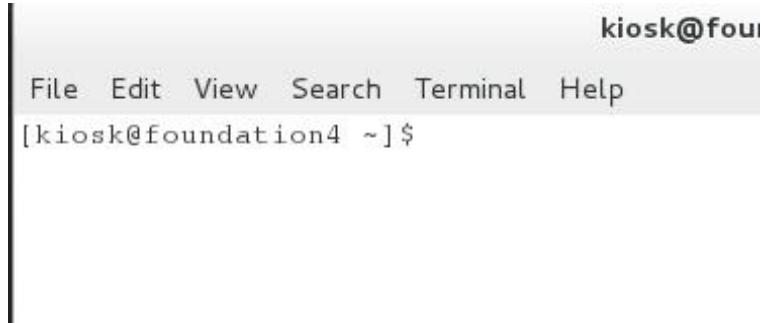
.) EXIT or CTRL + D { For Exit }

.) For Terminal

Applications → utilities → Terminal (RHEL 7)

Applications → System Tools → Terminal (RHEL 6)

Alt + F2 → gnome-terminal (RHEL 8)



[kiosk@foundation 4 ~] \$

Kiosk → Logged User Name

Foundation → Host Name

~ → Home Directory / Home / <User Name>

\$ → Normal User or Regular User

.) hostname { to know hostname }

```
kiosk@foundation4 ~]$ hostname
foundation4.ilt.example.com
[kiosk@foundation4 ~]$
```

foundation4.ilt.example.com → Fully Qualified Domain Name

Foundation4 → Host Name

Ilt.example.com → Domain Name

.) hostname -f { also to know hostname }

```
kiosk
File Edit View Search Terminal Help
[kiosk@foundation4 ~]$ hostname -f
foundation4.ilt.example.com
[kiosk@foundation4 ~]$
```

.) pwd { to know present working directory }

[pwd → Present Working Directory]

```
kiosk
File Edit View Search Terminal Help
[kiosk@foundation4 ~]$ pwd
/home/kiosk
[kiosk@foundation4 ~]$
```

.) whoami { to know logged user name }

```
kiosk
File Edit View Search Terminal Help
[kiosk@foundation4 ~]$ whoami
kiosk
[kiosk@foundation4 ~]$ 
```

.) a) rht-vmctl reset server { to reset server }

Rht → red hat training , Vm → virtual Machine , Ctl → control

```
kiosk@foundation4:~
File Edit View Search Terminal Help
[kiosk@foundation4 ~]$ rht-vmctl reset server
Are you sure you want to reset server? (y/n) y
Resetting server.
Powering off server..
Creating virtual machine disk overlay for rh299-server-vda
Creating virtual machine disk overlay for rh299-server-vdb
Starting server.
[kiosk@foundation4 ~]$ 
```

[here it will ask permission Yes/No]

b) rht-vmctl reset server -q { for reset server directly }

```
kiosk@foundation4:~
File Edit View Search Terminal Help
[kiosk@foundation4 ~]$ rht-vmctl reset server -q
Resetting server.
Powering off server..
Creating virtual machine disk overlay for rh299-server-vda
Creating virtual machine disk overlay for rh299-server-vdb
Starting server.
[kiosk@foundation4 ~]$ 
```

[here the command doesn't ask permission , directly it will reset]

.) ssh student@server4 { to connect with remote system }

[ssh → secure shell]

[student → user name , server4 → host name/IP]

Password : student

```
student@servi
File Edit View Search Terminal Help
[kiosk@foundation4 ~]$ ssh student@server4
student@server4's password:
[student@server4 ~]$ hostname
server4.example.com
[student@server4 ~]$ 
```

[here hostname changed to server4.example.com]

.) history { to see what the commands that we used before }

```
s
File Edit View Search Terminal Help
[student@server4 ~]$ history
1 hostname
2 history
3 whoami
4 pwd
5 history
[student@server4 ~]$ 
```

[In history if there is any * , then it is a modified command]

.) su - { root user login }

Root password : redhat

```
File Edit View Search Terminal Help
[student@localhost ~]$ su -
Password:
Last login: Mon Sep 16 23:55:59 IST 2019 on pts/0
[root@localhost ~]#
```

[\$ → regular user , # → root user]

.) ls { for list }

→ nothing we will get

→ minimize it

→ now open view server , login in that

→ then close it

→ now press ls

```
Applications Places Terminal
student@server4:~
```

```
File Edit View Search Terminal Help
[student@server4 ~]$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
[student@server4 ~]$
```

.) ls -l or ll { long list }

```
student@server4:~  
File Edit View Search Terminal Help  
[student@server4 ~]$ ls -l  
total 0  
drwxr-xr-x. 2 student student 6 Sep 6 17:01 Desktop  
drwxr-xr-x. 2 student student 6 Sep 6 17:01 Documents  
drwxr-xr-x. 2 student student 6 Sep 6 17:01 Downloads  
drwxr-xr-x. 2 student student 6 Sep 6 17:01 Music  
drwxr-xr-x. 2 student student 19 Sep 6 17:03 Pictures  
drwxr-xr-x. 2 student student 6 Sep 6 17:01 Public  
drwxr-xr-x. 2 student student 6 Sep 6 17:01 Templates  
drwxr-xr-x. 2 student student 6 Sep 6 17:01 Videos  
[student@server4 ~]$ █
```

{ D → directory (in blue) , l → link / shortcut , - → blank (File)}

.) ls -l Desktop

```
kiosk@foundation4:~  
File Edit View Search Terminal Help  
[kiosk@foundation4 ~]$ ls -l Desktop  
total 0  
[kiosk@foundation4 ~]$ █
```

.) ls -l / { list of directories on root file system }

[/ → root file system]

```
kiosk@foundation4:~  
File Edit View Search Terminal Help  
[kiosk@foundation4 ~]$ ls -l /  
total 36  
lrwxrwxrwx. 1 root root 7 Aug 16 15:59 bin -> usr/bin  
dr-xr-xr-x. 4 root root 4096 Aug 16 16:08 boot  
drwxrwxrwx. 7 root root 4096 Aug 17 11:40 CEH  
drwxr-xr-x. 19 root root 3320 Sep 6 17:04 dev  
drwxr-xr-x. 139 root root 8192 Sep 6 11:32 etc  
drwxr-xr-x. 4 root root 32 Aug 29 20:34 home  
lrwxrwxrwx. 1 root root 7 Aug 16 15:59 lib -> usr/lib  
lrwxrwxrwx. 1 root root 9 Aug 16 15:59 lib64 -> usr/lib64  
drwxr-xr-x. 2 root root 6 Mar 13 2014 media  
drwxr-xr-x. 2 root root 6 Mar 13 2014 mnt  
drwxr-xr-x. 3 root root 15 Aug 16 16:05 opt  
dr-xr-xr-x. 210 root root 0 Sep 6 11:31 proc  
dr-xr-x---. 6 root root 4096 Aug 29 21:41 root  
drwxr-xr-x. 39 root root 1340 Sep 6 17:04 run  
lrwxrwxrwx. 1 root root 8 Aug 16 15:59 sbin -> usr/sbin  
drwxr-xr-x. 2 root root 6 Mar 13 2014 srv  
dr-xr-xr-x. 13 root root 0 Sep 6 11:31 sys  
drwxrwxrwt. 24 root root 4096 Sep 6 16:56 tmp  
drwxr-xr-x. 13 root root 4096 Aug 16 15:59 usr  
drwxr-xr-x. 22 root root 4096 Sep 6 11:31 var  
[kiosk@foundation4 ~]$ 
```

[Note : ctrl + shift for new tab in terminal]

Day 2

.) ifconfig (or) ip addr (or) ip a { to know ip address}

```
student@server4:~  
File Edit View Search Terminal Help  
[student@server4 ~]$ ip a  
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN  
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00  
    inet 127.0.0.1/8 scope host lo  
        valid_lft forever preferred_lft forever  
    inet6 ::1/128 scope host  
        valid_lft forever preferred_lft forever  
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000  
    link/ether 52:54:00:00:04:0b brd ff:ff:ff:ff:ff:ff  
    inet 172.25.4.11/24 brd 172.25.4.255 scope global dynamic eth0  
        valid_lft 21492sec preferred_lft 21492sec  
    inet6 fe80::5054:ff:fe00:40b/64 scope link  
        valid_lft forever preferred_lft forever  
  
[ Hex Values → 0-9 , A-F ]
```

.) ssh student@172.25.4.11 { connecting to remote system with ip }

Password : student

```
student@server4:~  
File Edit View Search Terminal Help  
[kiosk@foundation4 ~]$ ssh student@172.25.4.11  
student@172.25.4.11's password:  
Last login: Fri Sep  6 17:01:06 2019  
[student@server4 ~]$ 
```

Networking Concepts

IP address → 0-255 . 0-255 . 0-255 . 0-255 → 32 bit

Octet = 8 bits $4 \times 8 = 32$

$$2^8 = 256 \quad \{ 0-255 \}$$

Decimal to Binary →

2	27	-1
2	13	-1
2	6	-0
2	3	-0
	1	-1

11011

Binary to Decimal → 1 0 1 0 1

$$2^4 \ 2^3 \ 2^2 \ 2^1 \ 2^0$$

16 8 4 2 1

$$16+0+4+0+1 = 21$$

1 2 3 4 5 6 7 8

0 0 0 0 0 0 0 0 = 0 (Min)

1 1 1 1 1 1 1 1 = 255 (Max)

$$2^7 \ 2^6 \ 2^5 \ 2^4 \ 2^3 \ 2^2 \ 2^1 \ 2^0$$

128 64 32 16 8 4 2 1 → 192 224 240 248 252 254 255

0 → Invalid

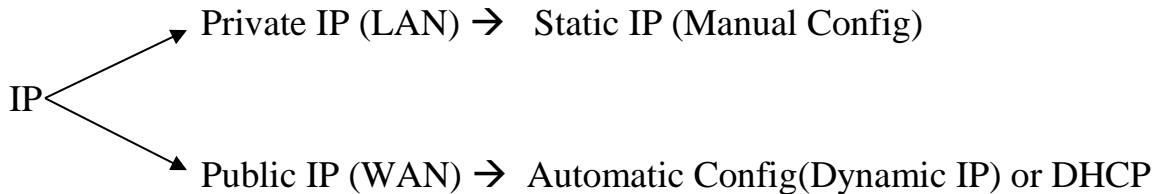
0.0.0.0 → valid → any one 127 → reserved for loop back

IP divided in to 5 classes based on 1st octet value

Range	Valid Range	Subnet Mask / Net Mask
A → 0 - 127	→ 1 - 126	255.0.0.0 or 8
B → 128 – 191		255.255.0.0 or 16
C → 192 – 223		255.255.255.0 or 24
<hr/>		
D → 224 -239	Multi Casting	255.255.255.255 or 32
E → 240 – 255	R&D	255.255.255.255 or 32

A,B,C valid for TCP/IP

Subnet Mask value is greater than or equal to their Range Value.



DHCP → Dynamic Host Configuration Protocol

.) cat /etc/sysconfig/network-scripts/ifcfg-eth0{ to read scripts and DHCP info }

```
student@server4:~  
File Edit View Search Terminal Help  
[student@server4 ~]$ cat /etc/sysconfig/network-scripts/ifcfg-eth0  
DEVICE=eth0  
BOOTPROTO=dhcp  
ONBOOT=yes  
TYPE=Ethernet  
USERCTL=yes  
PEERDNS=yes  
IPV6INIT=no  
PERSISTENT_DHCLIENT=1  
[student@server4 ~]$ 
```

BOOT PROTO = dhcp means Dynamic IP

None means Static IP

ON BOOT = YES means that it will be available at the boot time.

.) rht-vmctl start server { to start server }

```
kiosk@foundation4:~  
File Edit View Search Terminal Help  
[kiosk@foundation4 ~]$ rht-vmctl start server  
Error: server not started (is already running)  
[kiosk@foundation4 ~]$ 
```

[here server is already running]

Day 3

A → 0 - 127 → 1 - 126
B → 128 – 191
C → 192 – 223

PUBLIC IP'S

10.0.0.0 – 10.255.255.255
172.16.0.0 – 172.31.255.255
192.168.0.0 – 192.168.255.255

PRIVATE IP'S (for LAN)

*) These all are assigned by IANA – ICANN

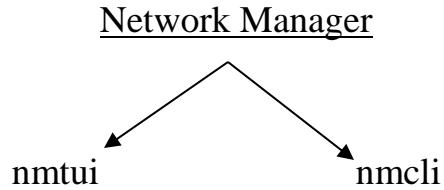
IANA → Internet Assigned Numbers Authority

ICANN → Internet Consortium for Assigned Names & Numbers

127.X.X.X → 127.0.0.1 - Loop Back IP

169.254.0.0 → 169.254.255.255 - APIPA (Automatic Private IP Address)

(This will be assigned by o/s if no DHCP available)



nmcli will control the network manager

.) nmcli dev { to get Device Information }

```

File Edit View Search Terminal Help
[student@server4 ~]$ nmcli dev
DEVICE  TYPE      STATE      CONNECTION
eth0    ethernet  connected  System eth0
lo     loopback  unmanaged  --
[student@server4 ~]$ 
  
```

.) nmcli con { for Connection Information }

```

student@server4:~ File Edit View Search Terminal Help
[student@server4 ~]$ nmcli con
NAME          UUID                                  TYPE      DEVICE
System eth0  5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03  802-3-ethernet  eth0
[student@server4 ~]$ 
  
```

UUID → Universal Unique Identifier

.) a) ip route { to get router ip }

```
kiosk@foundation4:~  
File Edit View Search Terminal Help  
[kiosk@foundation4 ~]$ ip route  
default via 172.25.254.254 dev br0 proto static metric 1024  
172.16.28.0/24 dev vmnet8 proto kernel scope link src 172.16.28.1  
172.25.4.0/24 dev br0 proto kernel scope link src 172.25.4.250  
172.25.254.0/24 dev br0 proto kernel scope link src 172.25.254.4  
192.168.53.0/24 dev vmnet1 proto kernel scope link src 192.168.53.1  
192.168.122.0/24 dev virbr0 proto kernel scope link src 192.168.122.1  
[kiosk@foundation4 ~]$
```

b) route -n { also use this for get router ip }

```
kiosk@foundation4:~  
File Edit View Search Terminal Help  
[kiosk@foundation4 ~]$ route -n  
Kernel IP routing table  


| Destination   | Gateway        | Genmask       | Flags | Metric | Ref | Use | Iface  |
|---------------|----------------|---------------|-------|--------|-----|-----|--------|
| 0.0.0.0       | 172.25.254.254 | 0.0.0.0       | UG    | 1024   | 0   | 0   | br0    |
| 172.16.28.0   | 0.0.0.0        | 255.255.255.0 | U     | 0      | 0   | 0   | vmnet8 |
| 172.25.4.0    | 0.0.0.0        | 255.255.255.0 | U     | 0      | 0   | 0   | br0    |
| 172.25.254.0  | 0.0.0.0        | 255.255.255.0 | U     | 0      | 0   | 0   | br0    |
| 192.168.53.0  | 0.0.0.0        | 255.255.255.0 | U     | 0      | 0   | 0   | vmnet1 |
| 192.168.122.0 | 0.0.0.0        | 255.255.255.0 | U     | 0      | 0   | 0   | virbr0 |

  
[kiosk@foundation4 ~]$
```

.) cat /etc/resolv.conf { for DNS / Name Server }

```
kiosk@found
File Edit View Search Terminal Help
[kiosk@foundation4 ~]$ cat /etc/resolv.conf
# Generated by NetworkManager
search ilt.example.com example.com
nameserver 172.25.254.250
[kiosk@foundation4 ~]$
```

DNS → 172.25.254.254

Domain Name Server / Name Server

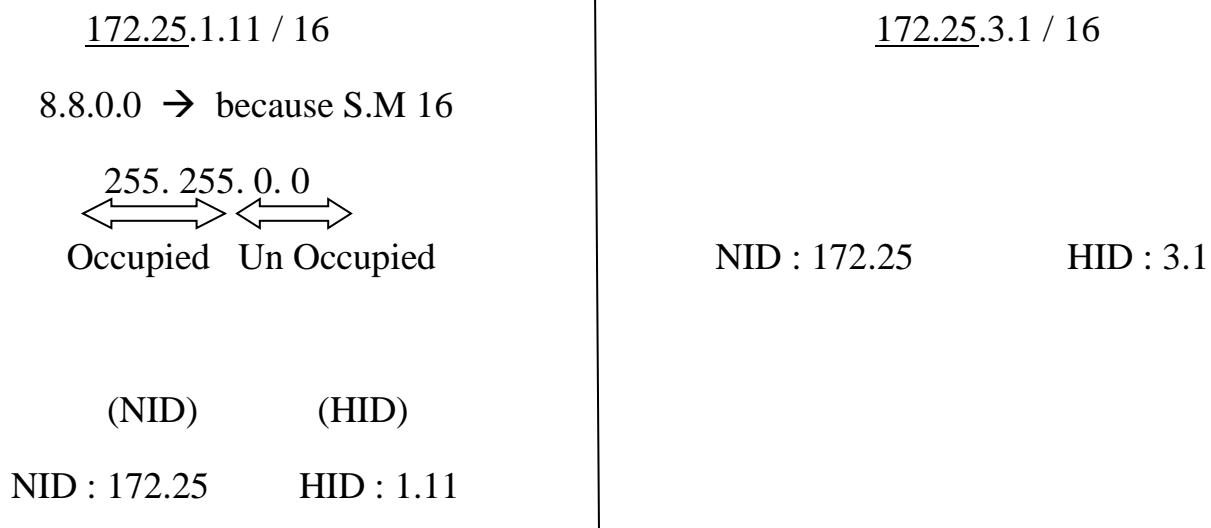
DNS will resolves name to IP

.) nmcli dev show etho { to get IP , Gate way , DNS & More }

```
student@server4:~
File Edit View Search Terminal Help
[student@server4 ~]$ nmcli dev show eth0
GENERAL.DEVICE:                eth0
GENERAL.TYPE:                  ethernet
GENERAL.HWADDR:                52:54:00:00:04:0B
GENERAL.MTU:                   1500
GENERAL.STATE:                 100 (connected)
GENERAL.CONNECTION:             System eth0
GENERAL.CON-PATH:               /org/freedesktop/NetworkManager/ActiveConnecti
on/0
WIRED-PROPERTIES.CARRIER:       on
IP4.ADDRESS[1]:                ip = 172.25.4.11/24, gw = 172.25.4.254
IP4.ROUTE[1]:                  dst = 172.25.202.254/32, nh = 172.25.4.254, mt
= 0
IP4.DNS[1]:                     172.25.254.254
IP4.DOMAIN[1]:                  example.com
IP6.ADDRESS[1]:                ip = fe80::5054:ff:fe00:40b/64, gw = ::

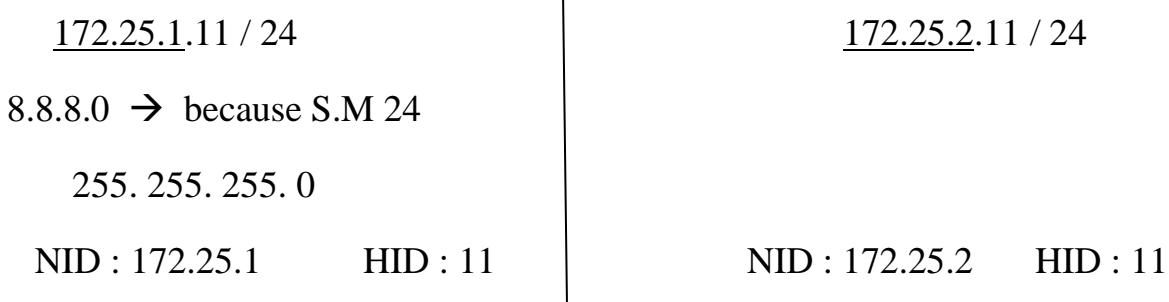
[student@server4 ~]$
```

Example : 1



Here NID is Same so no mediator (router) required.

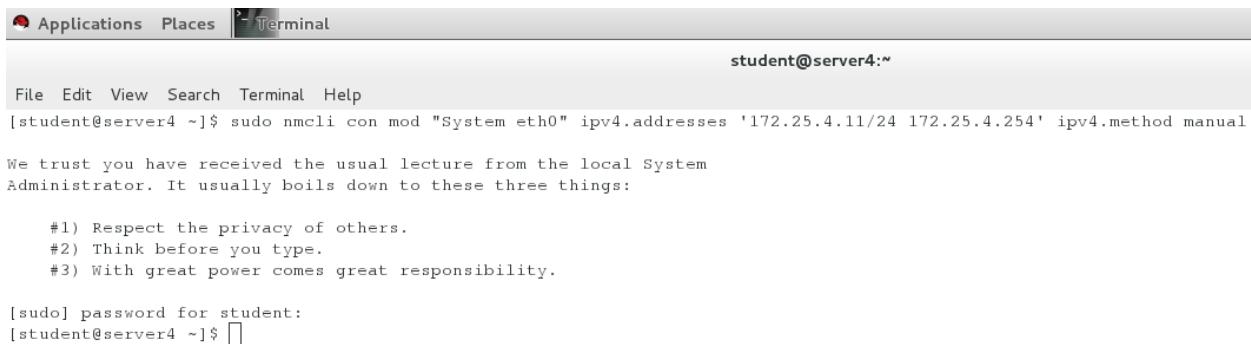
Example : 2



Here NID is Not Same so mediator (router) is required.

[Shortcut → use of Tab key : If we press the Tab key after typing two three letters in a word while typing commands , automatically it will fulfill the word. If we double tap the Tab key , it will show options with same letters]

.) sudo nmcli con mod "System eth0" ipv4.address
'172.25.4.11/24 172.25.4.254' ipv4.method manual { manual assign }



```
student@server4:~$ sudo nmcli con mod "System eth0" ipv4.addresses '172.25.4.11/24 172.25.4.254' ipv4.method manual
We trust you have received the usual lecture from the local System
Administrator. It usually boils down to these three things:
#1) Respect the privacy of others.
#2) Think before you type.
#3) With great power comes great responsibility.

[sudo] password for student:
[student@server4 ~]$ 
```

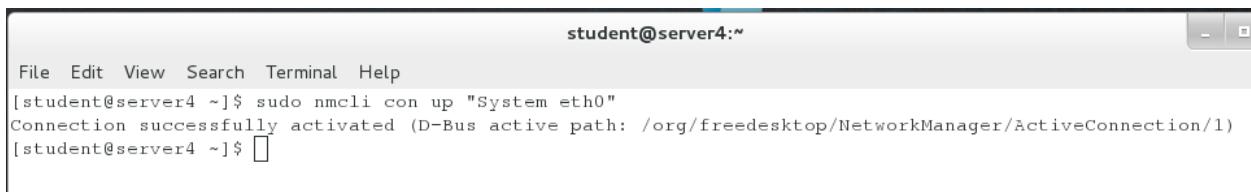
Here 172.25.4.11 is IP and 172.25.4.254 is Gate Way

If u give the correct code it will ask password and the password is student.

*) SUDO means Super User DO. If we get Authentication issue we can use sudo,
When \$ is appearing we can use sudo

if there is # , no need to type Sudo. We can use sudo only in front of command only.

.) sudo nmcli con up "System eth0" { to up or activate the connection}



```
student@server4:~$ sudo nmcli con up "System eth0"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/1)
[student@server4 ~]$ 
```

- .) ping 172.25.1.11
- .) continuously it will ping

```
student@serv

File Edit View Search Terminal Help
[student@server4 ~]$ ping 172.25.1.11
PING 172.25.1.11 (172.25.1.11) 56(84) bytes of data.
From 172.25.4.11 icmp_seq=1 Destination Host Unreachable
From 172.25.4.11 icmp_seq=2 Destination Host Unreachable
From 172.25.4.11 icmp_seq=3 Destination Host Unreachable
From 172.25.4.11 icmp_seq=4 Destination Host Unreachable
From 172.25.4.11 icmp_seq=5 Destination Host Unreachable
From 172.25.4.11 icmp_seq=6 Destination Host Unreachable
From 172.25.4.11 icmp_seq=7 Destination Host Unreachable
From 172.25.4.11 icmp_seq=8 Destination Host Unreachable
[ ]
```

- .) ctrl+c { to stop }

```
student@server4:~

File Edit View Search Terminal Help
[student@server4 ~]$ ping 172.25.1.11
PING 172.25.1.11 (172.25.1.11) 56(84) bytes of data.
From 172.25.4.11 icmp_seq=1 Destination Host Unreachable
From 172.25.4.11 icmp_seq=2 Destination Host Unreachable
From 172.25.4.11 icmp_seq=3 Destination Host Unreachable
From 172.25.4.11 icmp_seq=4 Destination Host Unreachable
From 172.25.4.11 icmp_seq=5 Destination Host Unreachable
From 172.25.4.11 icmp_seq=6 Destination Host Unreachable
From 172.25.4.11 icmp_seq=7 Destination Host Unreachable
From 172.25.4.11 icmp_seq=8 Destination Host Unreachable
From 172.25.4.11 icmp_seq=9 Destination Host Unreachable
From 172.25.4.11 icmp_seq=10 Destination Host Unreachable
From 172.25.4.11 icmp_seq=11 Destination Host Unreachable
From 172.25.4.11 icmp_seq=12 Destination Host Unreachable
From 172.25.4.11 icmp_seq=13 Destination Host Unreachable
From 172.25.4.11 icmp_seq=14 Destination Host Unreachable
From 172.25.4.11 icmp_seq=15 Destination Host Unreachable
From 172.25.4.11 icmp_seq=16 Destination Host Unreachable
^C
--- 172.25.1.11 ping statistics ---
16 packets transmitted, 0 received, +16 errors, 100% packet loss, time 15002ms
pipe 4
[student@server4 ~]$ [ ]
```

- .) ctrl + l { to Clear Screen }
- .) ping 172.25.1.11 -c3 { 3 times ping }

```
student@server4:~  
File Edit View Search Terminal Help  
[student@server4 ~]$ ping 172.25.1.11 -c3  
PING 172.25.1.11 (172.25.1.11) 56(84) bytes of data.  
From 172.25.4.254: icmp_seq=2 Redirect Host (New nexthop: 172.25.1.11)  
From 172.25.4.254 icmp_seq=2 Redirect HostFrom 172.25.4.254 icmp_seq=1 Destination Host Unreachable  
From 172.25.4.254 icmp_seq=2 Destination Host Unreachable  
--- 172.25.1.11 ping statistics ---  
3 packets transmitted, 0 received, +3 errors, 100% packet loss, time 1999ms  
pipe 3  
[student@server4 ~]$ 
```

.) sudo nmcli con mod “System etho” ipv4.method auto { automatic assign }

.) sudo nmcli con mod “ System etho” ipv4.dns 172.25.254.254
{ DNS Automatic }

[Note : select a word or a line to copy and press shift + insert to paste]

[Note : select a word or a line to copy and press mouse middle button to paste]

Day 4

LINUX

.) It is a Kernel.

{ the Kernel is a computer program that is the core of an operating system }

.) Linux Kernel was developed by LINUS TORVALD in 1991.

.) Linux was developed from scratch level.

.) It is a open source.

.) Free to modify or use

.) It is a core (heart) element for os

.) Name of the OS – GNU Linux

{ GNU means “not unix” }

Linux Distributions :

1) RHEL → Red Hat Enterprise Linux

3,4,5,6,7,8

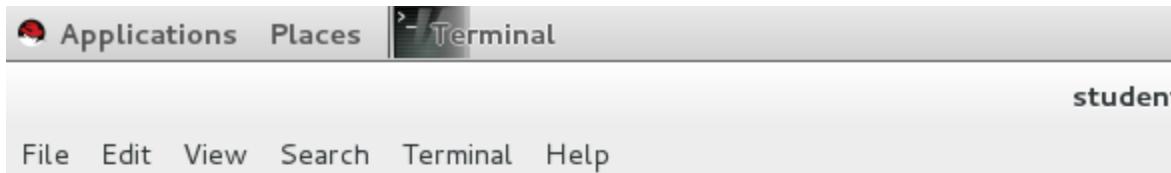
.) Centos – 6,7,8

.) Fedora

2) Ubuntu Server edition

3) SUSE – open source (free)

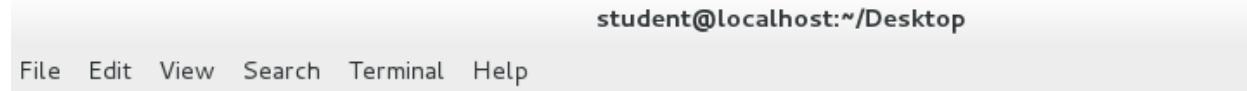
.) cat /etc/os-release { OS information }



```
student@localhost:~$ cat /etc/os-release
NAME="Red Hat Enterprise Linux Server"
VERSION="7.0 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="7.0"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.0 (Maipo)"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:redhat:enterprise_linux:7.0:GA:server"
HOME_URL="https://www.redhat.com/"
BUG_REPORT_URL="https://bugzilla.redhat.com/"

REDHAT_BUGZILLA_PRODUCT="Red Hat Enterprise Linux 7"
REDHAT_BUGZILLA_PRODUCT_VERSION=7.0
REDHAT_SUPPORT_PRODUCT="Red Hat Enterprise Linux"
REDHAT_SUPPORT_PRODUCT_VERSION=7.0
[student@localhost Desktop]$
```

.) uname -a { to read kernel info }



```
student@localhost:~/Desktop
File Edit View Search Terminal Help
[student@localhost Desktop]$ uname -a
Linux localhost.localdomain 3.10.0-123.el7.x86_64 #1 SMP Mon May 5 11:16:57 EDT
2014 x86_64 x86_64 x86_64 GNU/Linux
[student@localhost Desktop]$
```

.) cat /etc/redhat-release { for RHEL Version }

```
student@localhost:~/Desktop
File Edit View Search Terminal Help
[student@localhost Desktop]$ cat /etc/redhat-release
Red Hat Enterprise Linux Server release 7.0 (Maipo)
[student@localhost Desktop]$ █
```

.) tty { typing terminal }

```
student@localhost:~/Deskt
File Edit View Search Terminal Help
[student@localhost Desktop]$ tty
/dev/pts/0
[student@localhost Desktop]$ █
```

*) Ctrl + Alt + F1 → GUI terminal called as Console (or) Physical Console

Ctrl + Alt + F2 → Command line called as Virtual Console

*) Ctrl + Alt + F2 tty2

Ctrl + Alt + F3 tty3

Ctrl + Alt + F4 tty4

Ctrl + Alt + F5 tty5

Ctrl + Alt + F6 tt6

In this virtual consoles are 5 from tty2 to tt6

*) In RHEL 5 - F7 is GUI

F1 – F6 → Virtual Console

Day 5

.) ssh root@serverX

.)password : redhat

```
File Edit View Search Terminal Help
[kiosk@foundation4 ~]$ ssh root@server4
root@server4's password:
[root@server4 ~]# 
```

.) hostnamectl set-hostname serverX.example.com {to set hostname persistently}

(give this command and try to ping ,we will not get response because the host name was not connected)

```
root@server4:~
File Edit View Search Terminal Help
[root@server4 ~]# hostnamectl set-hostname serverX.example.com
[root@server4 ~]#
[root@server4 ~]# ping serverX.example.com
ping: unknown host serverX.example.com
[root@server4 ~]# 
```

.) echo "172.25.X.11 serverX.example.com server" >>/etc/hosts

Give this code and type Ping serverX.example.com {to up the host name}

```
root@server4:~  
File Edit View Search Terminal Help  
[root@server4 ~]# hostnamectl set-hostname serverX.example.com  
[root@server4 ~]#  
[root@server4 ~]# ping serverX.example.com  
ping: unknown host serverX.example.com  
[root@server4 ~]#  
[root@server4 ~]# echo "172.25.4.11 serverX.example.com server">>/etc/hosts  
[root@server4 ~]#  
[root@server4 ~]# ping serverX.example.com  
PING serverX.example.com (172.25.4.11) 56(84) bytes of data.  
64 bytes from serverX.example.com (172.25.4.11): icmp_seq=1 ttl=64 time=0.044 ms  
64 bytes from serverX.example.com (172.25.4.11): icmp_seq=2 ttl=64 time=0.045 ms  
64 bytes from serverX.example.com (172.25.4.11): icmp_seq=3 ttl=64 time=0.044 ms  
64 bytes from serverX.example.com (172.25.4.11): icmp_seq=4 ttl=64 time=0.043 ms  
64 bytes from serverX.example.com (172.25.4.11): icmp_seq=5 ttl=64 time=0.045 ms  
^C  
--- serverX.example.com ping statistics ---  
5 packets transmitted, 5 received, 0% packet loss, time 3999ms  
rtt min/avg/max/mdev = 0.043/0.044/0.045/0.004 ms  
[root@server4 ~]#
```

*) give full domain name , or short name (server) it will work.

```
root@server4:~  
File Edit View Search Terminal Help  
[root@server4 ~]# ping server  
PING serverX.example.com (172.25.4.11) 56(84) bytes of data.  
64 bytes from serverX.example.com (172.25.4.11): icmp_seq=1 ttl=64 time=0.043 ms  
64 bytes from serverX.example.com (172.25.4.11): icmp_seq=2 ttl=64 time=0.043 ms  
64 bytes from serverX.example.com (172.25.4.11): icmp_seq=3 ttl=64 time=0.043 ms  
64 bytes from serverX.example.com (172.25.4.11): icmp_seq=4 ttl=64 time=0.042 ms  
64 bytes from serverX.example.com (172.25.4.11): icmp_seq=5 ttl=64 time=0.044 ms  
64 bytes from serverX.example.com (172.25.4.11): icmp_seq=6 ttl=64 time=0.044 ms  
^C  
--- serverX.example.com ping statistics ---  
6 packets transmitted, 6 received, 0% packet loss, time 4999ms  
rtt min/avg/max/mdev = 0.042/0.043/0.044/0.003 ms  
[root@server4 ~]#
```

HOW TO CREATE A DIRECTORY

.) mkdir victor { to create or make directory }

[instead of victor we can give any name]

.) cd victor { change directory }

[here we can use only top argument]

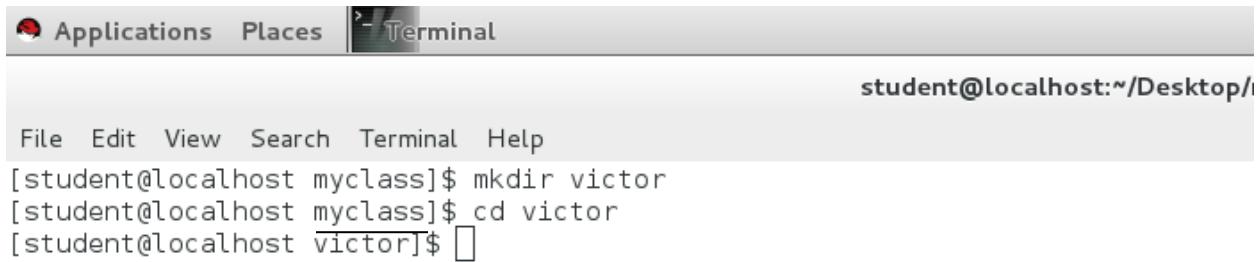
[Shortcuts :

cd + ENTER → it will come out from the present directory to home directory

cd .. → one step backward (directory)

cd ~/<dir> → go to specific directory from home directory

cd <dir> → change directory from particular directory

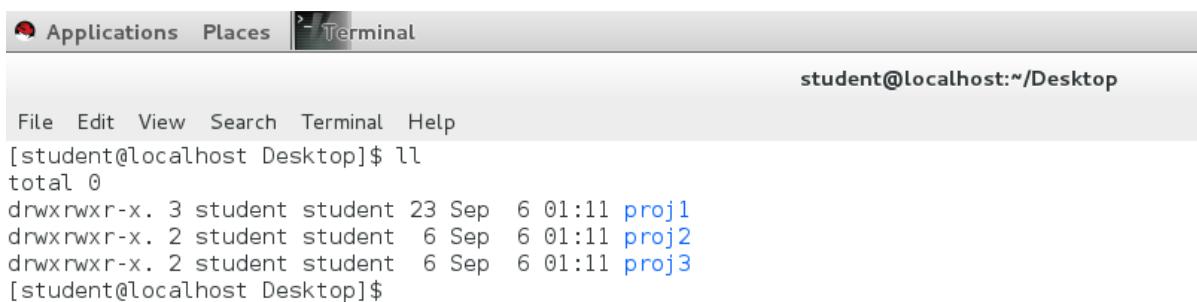


A screenshot of a Linux desktop environment. At the top, there is a menu bar with icons for Applications, Places, and Terminal. The terminal window is open, showing a command-line interface. The prompt is student@localhost:~/Desktop/. The user has run the command 'mkdir victor' followed by 'cd victor'. The current directory is now 'victor', as indicated by the underlined text in the terminal.

```
student@localhost:~/Desktop/
File Edit View Search Terminal Help
[student@localhost myclass]$ mkdir victor
[student@localhost myclass]$ cd victor
[student@localhost victor]$ 
```

.) mkdir proj1 proj2 proj3 { to create 3 directories at a time }

To see these directories we need to use ll command.



A screenshot of a Linux desktop environment showing a terminal window. The terminal prompt is student@localhost:~/Desktop/. The user has run the command 'll', which lists the contents of the current directory. Three new directories, 'proj1', 'proj2', and 'proj3', are listed with their details: permissions (drwxrwxr-x), number of files (3), owner (student), group (student), date (23 Sep 6 01:11), and names (proj1, proj2, proj3).

```
student@localhost:~/Desktop/
File Edit View Search Terminal Help
[student@localhost Desktop]$ ll
total 0
drwxrwxr-x. 3 student student 23 Sep 6 01:11 proj1
drwxrwxr-x. 2 student student 6 Sep 6 01:11 proj2
drwxrwxr-x. 2 student student 6 Sep 6 01:11 proj3
[student@localhost Desktop]$ 
```

.) mkdir -p proj1/production/reports

{to create sub directories in one directory}

```
student@localhost:~  
File Edit View Search Terminal Help  
[student@localhost ~]$ mkdir -p proj1/production/reports  
[student@localhost ~]$  
[student@localhost ~]$ ls -lR proj1  
proj1:  
total 0  
drwxrwxr-x. 3 student student 20 Sep 11 02:11 production  
  
proj1/production:  
total 0  
drwxrwxr-x. 2 student student 6 Sep 11 02:11 reports  
  
proj1/production/reports:  
total 0  
[student@localhost ~]$ █
```

.) ls -l proj1 {to see what happen with the above code }

```
Applications Places Terminal student@localhost:~  
File Edit View Search Terminal Help  
[student@localhost Desktop]$ mkdir proj1 proj2 proj3  
[student@localhost Desktop]$ mkdir -p proj1/production/reports  
[student@localhost Desktop]$ ls -l proj1  
total 0  
drwxrwxr-x. 3 student student 20 Sep 6 01:11 production  
[student@localhost Desktop]$ █
```

.) ls -lR proj1 [R=recurssive means sub] { to see Recurssive }

A screenshot of a terminal window. The title bar says "Terminal". The user is logged in as "student@localhost". The command "ls -lR proj1" is run, showing the contents of the "proj1" directory and its subdirectory "production". The "reports" file in "production" is highlighted in blue.

```
File Edit View Search Terminal Help
[student@localhost Desktop]$ ls -lR proj1
proj1:
total 0
drwxrwxr-x. 3 student student 20 Sep  6 01:11 production

proj1/production:
total 0
drwxrwxr-x. 2 student student 6 Sep  6 01:11 reports

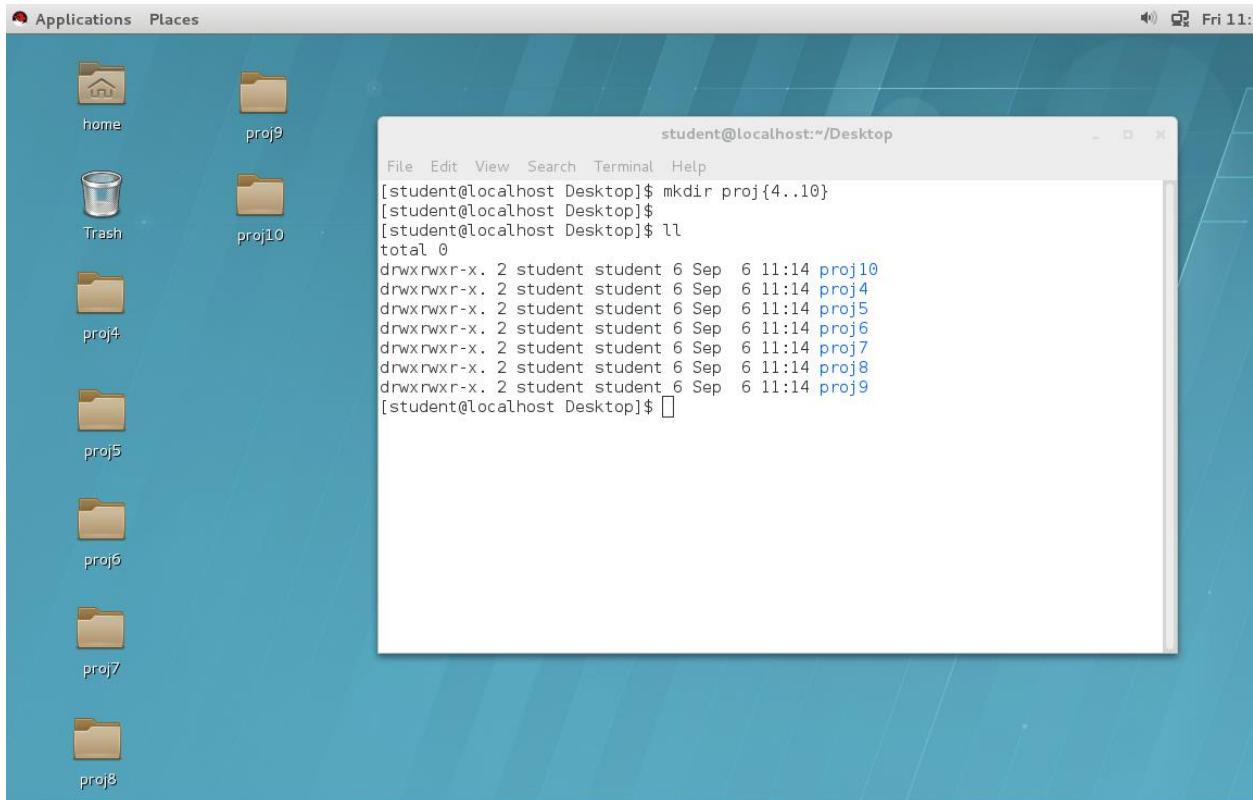
proj1/production/reports:
total 0
[student@localhost Desktop]$
```

.) ls -ld proj1 [d=directory] { list directory }

A screenshot of a terminal window. The title bar shows the current directory as "~/.student@localhost:~/" and the user as "student@localhost". The command "ls -ld proj1" is run, showing the directory "proj1" with permissions drwxrwxr-x and a timestamp of 23 Sep 6 01:11.

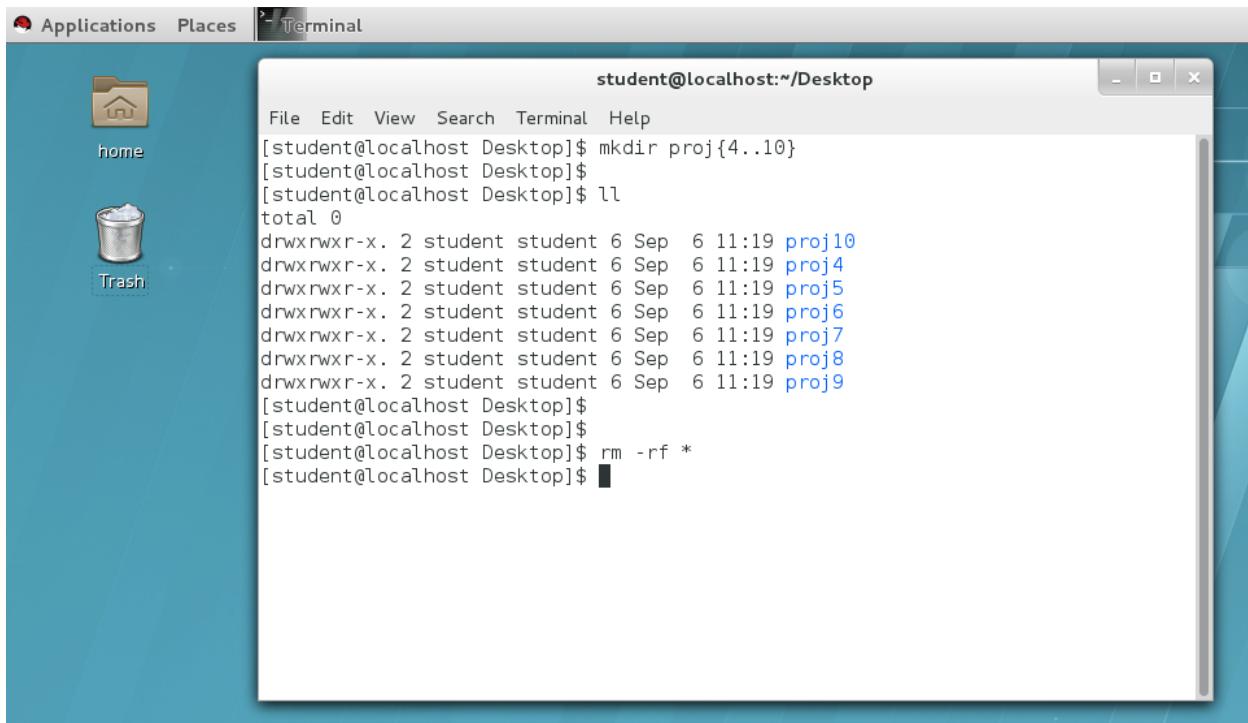
```
File Edit View Search Terminal Help
[student@localhost Desktop]$ ls -ld proj1
drwxrwxr-x. 3 student student 23 Sep  6 01:11 proj1
[student@localhost Desktop]$
```

.) mkdir proj{4..10} [.. represent range , instead of {4..10} we can use any number or alphabet]



.) rm -rf * { to delete all created files }

[rf – recursive forcefully , * - all]



```
student@localhost:/Desktop
File Edit View Search Terminal Help
[student@localhost Desktop]$ mkdir proj{4..10}
[student@localhost Desktop]$
[student@localhost Desktop]$ ll
total 0
drwxrwxr-x. 2 student student 6 Sep  6 11:19 proj10
drwxrwxr-x. 2 student student 6 Sep  6 11:19 proj4
drwxrwxr-x. 2 student student 6 Sep  6 11:19 proj5
drwxrwxr-x. 2 student student 6 Sep  6 11:19 proj6
drwxrwxr-x. 2 student student 6 Sep  6 11:19 proj7
drwxrwxr-x. 2 student student 6 Sep  6 11:19 proj8
drwxrwxr-x. 2 student student 6 Sep  6 11:19 proj9
[student@localhost Desktop]$
[student@localhost Desktop]$
[student@localhost Desktop]$ rm -rf *
[student@localhost Desktop]$
```

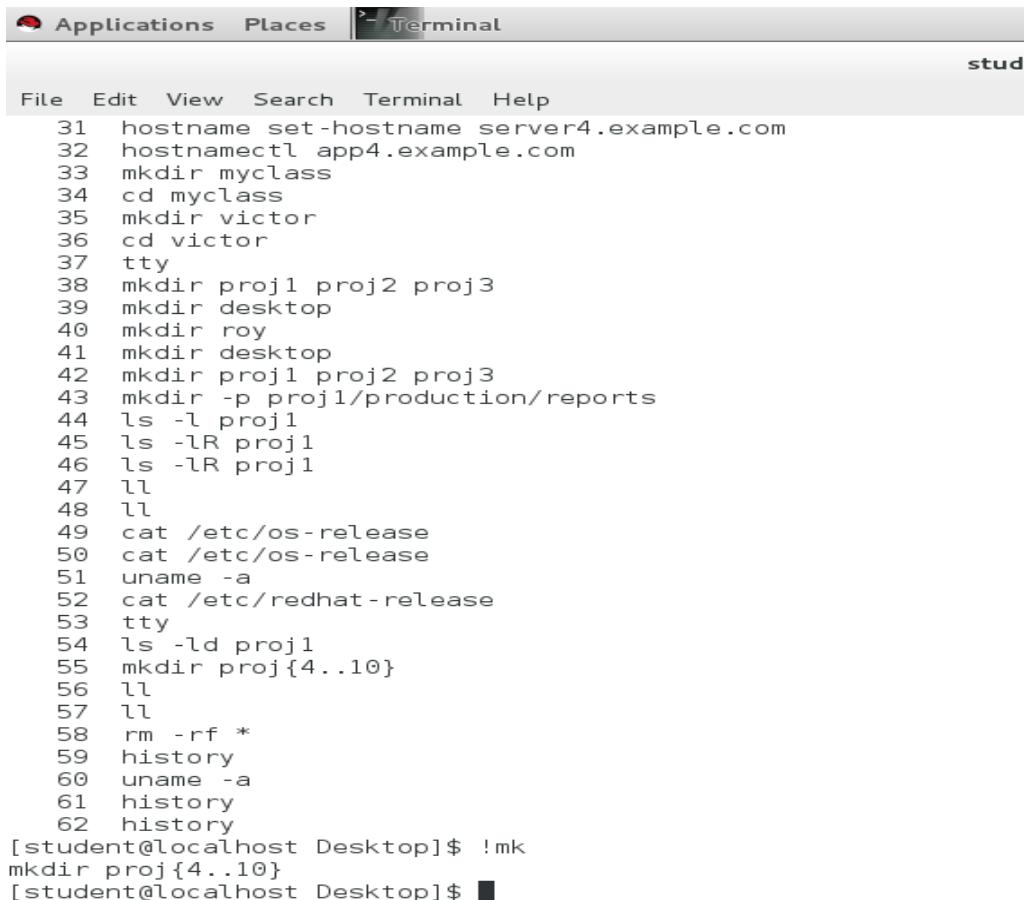
.) !<line no> { to repeat command from history }

[Before that you need to open history]



```
student@localhost:/Desktop
File Edit View Search Terminal Help
29 ifconfig
30 16) ssh student@172.25.4.11
31 hostname set-hostname server4.example.com
32 hostnamectl app4.example.com
33 mkdir myclass
34 cd myclass
35 mkdir victor
36 cd victor
37 tty
38 mkdir proj1 proj2 proj3
39 mkdir desktop
40 mkdir roy
41 mkdir desktop
42 mkdir proj1 proj2 proj3
43 mkdir -p proj1/production/reports
44 ls -l proj1
45 ls -lR proj1
46 ls -lR proj1
47 ll
48 ll
49 cat /etc/os-release
50 cat /etc/os-release
51 uname -a
52 cat /etc/redhat-release
53 tty
54 ls -ld proj1
55 mkdir proj{4..10}
56 ll
57 ll
58 rm -rf *
59 history
[student@localhost Desktop]$ !51
uname -a
Linux localhost.localdomain 3.10.0-123.el7.x86_64 #1 SMP Mon May  5 11:16:57 EDT 2014 x86_64 x86_64 x86_64 GNU/Linux
[student@localhost Desktop]$
```

.) !<letter/word> { to repeat command from history with name or word }

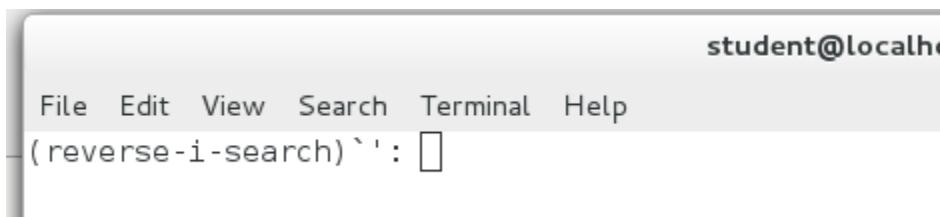


A screenshot of a terminal window titled "Terminal". The window shows a list of commands entered by the user, numbered 31 through 62. The commands include various system calls like hostname, hostnamectl, mkdir, cd, and ls, along with cat and uname commands. At the bottom of the list, the user types "!mk" and presses enter. The terminal then repeats the command "mkdir proj{4..10}" from the history.

```
File Edit View Search Terminal Help
31 hostname set-hostname server4.example.com
32 hostnamectl app4.example.com
33 mkdir myclass
34 cd myclass
35 mkdir victor
36 cd victor
37 tty
38 mkdir proj1 proj2 proj3
39 mkdir desktop
40 mkdir roy
41 mkdir desktop
42 mkdir proj1 proj2 proj3
43 mkdir -p proj1/production/reports
44 ls -l proj1
45 ls -lR proj1
46 ls -lR proj1
47 ll
48 ll
49 cat /etc/os-release
50 cat /etc/os-release
51 uname -a
52 cat /etc/redhat-release
53 tty
54 ls -ld proj1
55 mkdir proj{4..10}
56 ll
57 ll
58 rm -rf *
59 history
60 uname -a
61 history
62 history
[student@localhost Desktop]$ !mk
mkdir proj{4..10}
[student@localhost Desktop]$ █
```

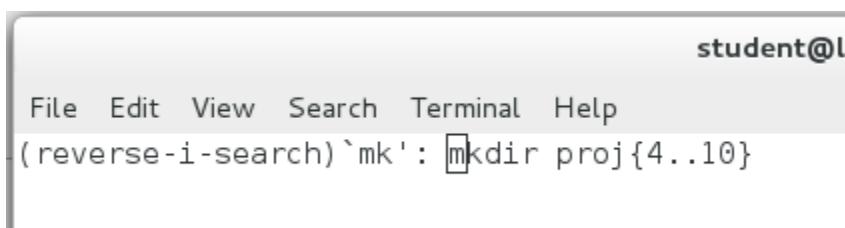
.) ctrl + r { reverse search }

Ex : !mk



A screenshot of a terminal window showing a reverse search. The user has typed "(reverse-i-search) ``" followed by a cursor. The terminal is waiting for the user to type a search term.

```
student@localhost: ~
File Edit View Search Terminal Help
(reverse-i-search) ``: █
```

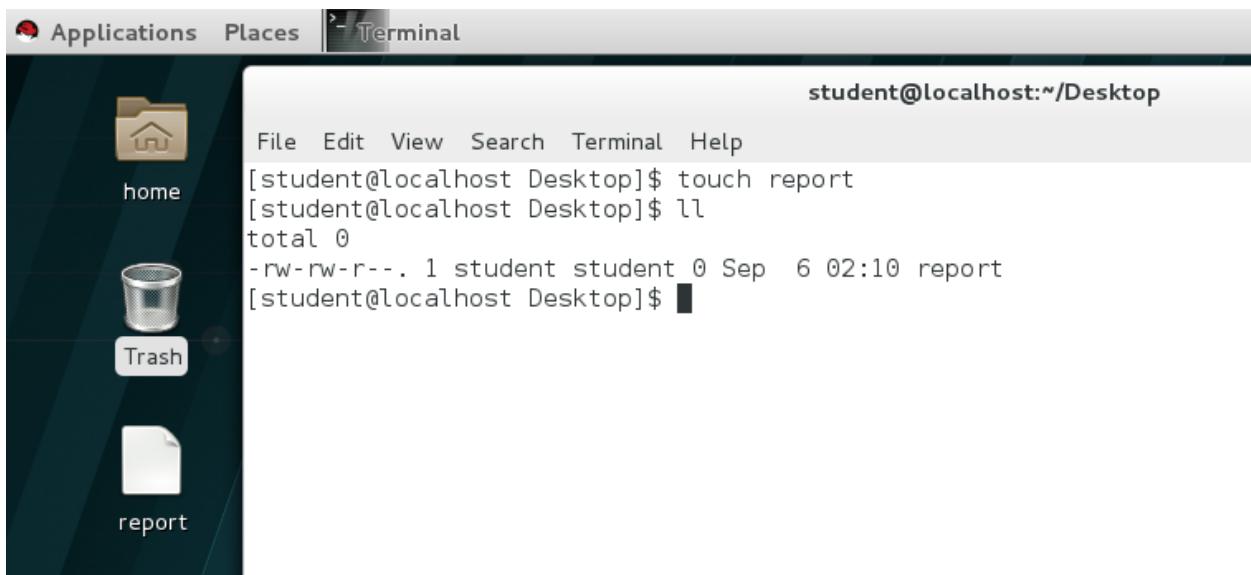


A screenshot of a terminal window showing the result of a reverse search. The user has typed "mk" into the search field, and the terminal has found the command "mkdir proj{4..10}" from the history.

```
student@localhost: ~
File Edit View Search Terminal Help
(reverse-i-search)`mk': mkdir proj{4..10}
```

HOW TO CREATE A FILE

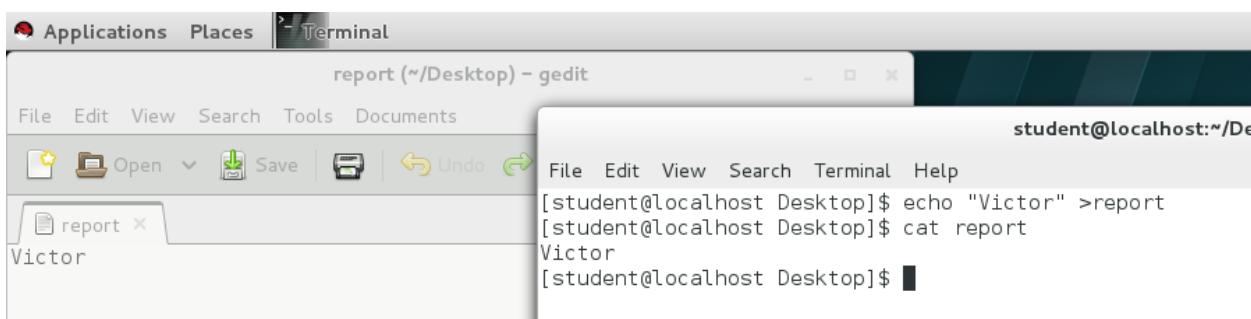
.) touch report [instead of report u can write any name] {to create a blank file}



.) echo "Victor" > report { to write something in that file }

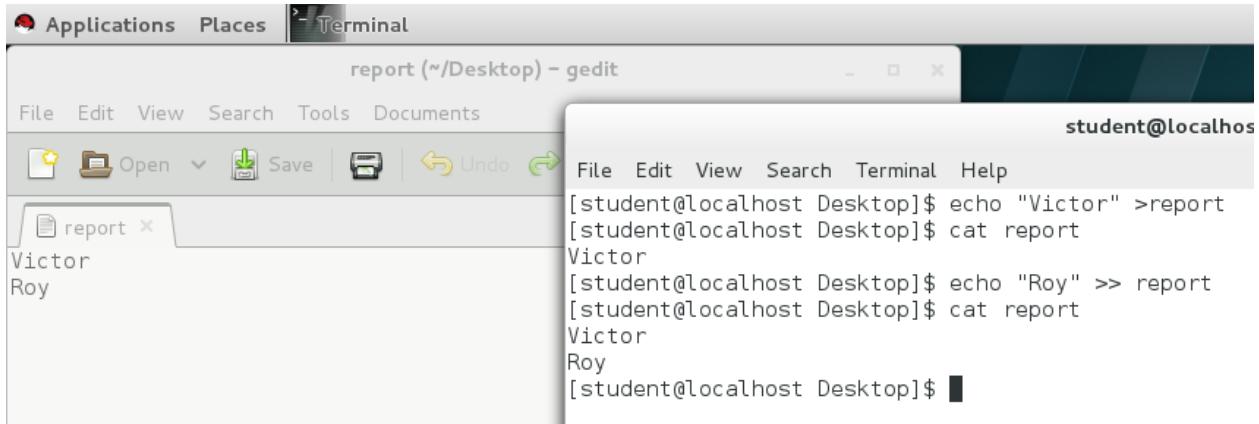
> → create/export/overwrite

.) cat report { to see what happened with above command }



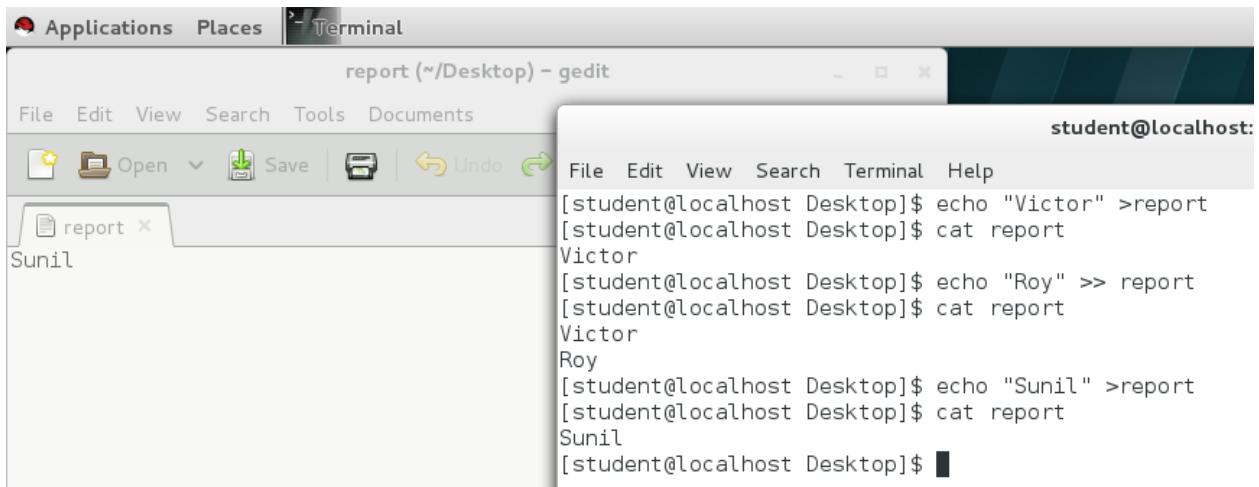
.) echo "Roy" >>report { to add more in that file }

>> → append means add



```
student@localhost: ~$ echo "Roy" >> report
student@localhost: ~$ cat report
Victor
Roy
student@localhost: ~$
```

.) echo "Sunil" >report { to overwrite , > for create/export/overwrite }



```
student@localhost: ~$ echo "Sunil" >report
student@localhost: ~$ cat report
Sunil
student@localhost: ~$
```

a.) cat > report

creating new file → write something (I wrote Linux)

then press ctrl+D

b.) cat >> report then press enter

add something as second line (I wrote Unix)

then press ctrl+D

c.) cat report

The screenshot shows a Linux desktop interface. On the left is a window titled 'report (~/Desktop) -' containing a text editor with the content:

```
Linux
Unix
```

To the right is a terminal window titled 'student@localhost:~/De' with the following session history:

```
[student@localhost Desktop]$ echo "Victor" >report
[student@localhost Desktop]$ cat report
Victor
[student@localhost Desktop]$ echo "Roy" >> report
[student@localhost Desktop]$ cat report
Victor
Roy
[student@localhost Desktop]$ echo "Sunil" >report
[student@localhost Desktop]$ cat report
Sunil
[student@localhost Desktop]$ cat >report
Linux
[student@localhost Desktop]$ cat >>report
Unix
[student@localhost Desktop]$ cat report
Linux
Unix
[student@localhost Desktop]$
```

.) cp <source> <destination> { copy file }

.) cp /etc/passwd /var/tmp

```
student@server4: ~]$ cp /etc/passwd /var/tmp
[student@server4 ~]$ 
```

.) wc /var/tmp/passwd

```
File Edit View Search Terminal Help
[student@server4 ~]$ cp /etc/passwd /var/tmp
[student@server4 ~]$ wc /var/tmp
wc: /var/tmp: Is a directory
      0      0      0 /var/tmp
[student@server4 ~]$ wc /var/tmp/passwd
   39    70  2005 /var/tmp/passwd
[student@server4 ~]$ 
```

[Shortcut : Esc + . → press Esc + . after the command for previous argument]

[here wc is command and /var/tmp/passwd is the argument]

.) file /var/tmp/passwd

```
File Edit View Search Terminal Help
[student@server4 ~]$ file /var/tmp/passwd
/var/tmp/passwd: ASCII text
[student@server4 ~]$ 
```

.) file /bin/ls

```
student@server4:~  
File Edit View Search Terminal Help  
[student@server4 ~]$ file /bin/ls  
/bin/ls: ELF 64-bit LSB executable, x86-64, version 1 (SYSV), dynamically linked (uses shared libs), for GNU/  
Linux 2.6.32, BuildID[sha1]=0x7dc964034aa8ec7327b3992e3239a0f50789a3dd, stripped  
[student@server4 ~]$ 
```

.) head /var/tmp/passwd { display first 10 lines }

```
File Edit View Search Terminal Help  
[student@server4 ~]$ head /var/tmp/passwd  
root:x:0:0:root:/root:/bin/bash  
bin:x:1:1:bin:/bin:/sbin/nologin  
daemon:x:2:2:daemon:/sbin:/sbin/nologin  
adm:x:3:4:adm:/var/adm:/sbin/nologin  
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin  
sync:x:5:0:sync:/sbin:/bin/sync  
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown  
halt:x:7:0:halt:/sbin:/sbin/halt  
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin  
operator:x:11:0:operator:/root:/sbin/nologin  
[student@server4 ~]$ 
```

.) tail /var/tmp/passwd { display last 10 lines }

```
student@server4:~  
File Edit View Search Terminal Help  
[student@server4 ~]$ tail /var/tmp/passwd  
unbound:x:995:993:Unbound DNS resolver:/etc/unbound:/sbin/nologin  
qemu:x:107:107:qemu user:/sbin/nologin  
saslauthd:x:994:76:"Saslauthd user":/run/saslauthd:/sbin/nologin  
ntp:x:38:38::/etc/ntp:/sbin/nologin  
rtkit:x:172:172:RealtimeKit:/proc:/sbin/nologin  
radvd:x:75:75:radvd user:/sbin/nologin  
pulse:x:171:171:PulseAudio System Daemon:/var/run/pulse:/sbin/nologin  
gdm:x:42:42::/var/lib/gdm:/sbin/nologin  
gnome-initial-setup:x:993:991::/run/gnome-initial-setup:/sbin/nologin  
tcpdump:x:72:72::/sbin/nologin  
[student@server4 ~]$ █
```

.) tail -1 var/tmp/passwd { display last 1 line }

```
File Edit View Search Terminal Help  
[student@server4 ~]$ tail -1 /var/tmp/passwd  
tcpdump:x:72:72::/sbin/nologin  
[student@server4 ~]$ █
```

.) history > today [here today is a file] { show file name in history }

.) less today { less history to show file name in history }

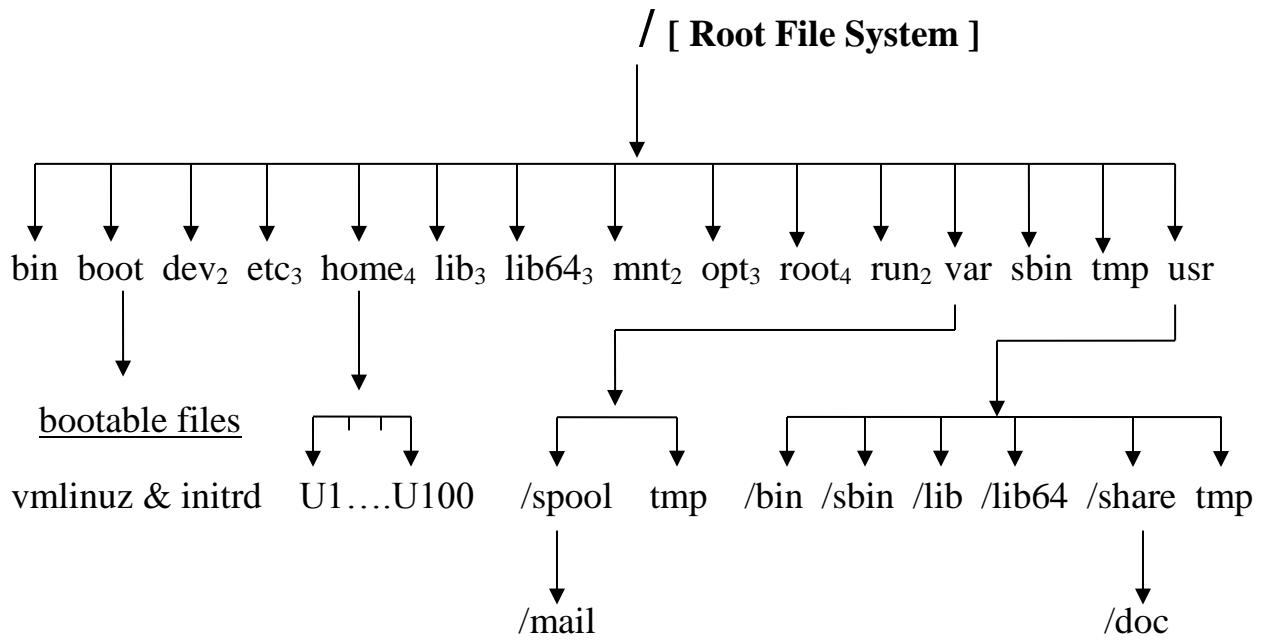
.) mv <source> <destination> { to move file }

Day 6

FHS

- .) FHS → File system Hierarchy Standard
- .) It defines directory & file structure in Linux
- .) Linux foundation → in 1994
- .) started with FHS 1.0 , now FHS 3.0 (2015)
- .) It is a Inverted tree model structure (reverse tree)

- .) bin → binary used by regular user and system admin
- .) sbin → system binary used by system admin
- .) Vmlinuz → vmlinux compressed with Gunzip (gzip)
- .) Initrd.img → (RAM Disk) compressed Image



- .) /dev – devices
- .) /mnt – manual mounts → access point to access devices
- .) /run – dynamic mount or dynamic program
- .) etc – config file
- .) lib - /usr/lib
- .) lib64 - /usr/lib64
- .) /usr/share/doc – manuals or help
- .) /opt – optional packages
- .) /home – user's home directory
- .) /root – root user directory
- .) /var/spool/mail → mailDir
- .) /tmp – system temp (Globally rwx – read write permission) LifeSpan → 10 days
- .) /var/tmp – Application temp (Globally rwx) LifeSpan → 30 days
- .) /usr/tmp - /var/tmp

Day 7

PARTITIONS

We must do 6 partitions while doing OS installation.

- 1) /
- 2) SWAP Size → 2 X RAM Size (if RAM Size < 2 GB)
RAM Size (if RAM Size > 4 GB)
RAM Size (if RAM Size 8 GB)
8 GB >16 GB
- 3) /boot
- 4) /home – 2 GB
- 5) /var – 2 GB
- 6) /usr – 2 GB

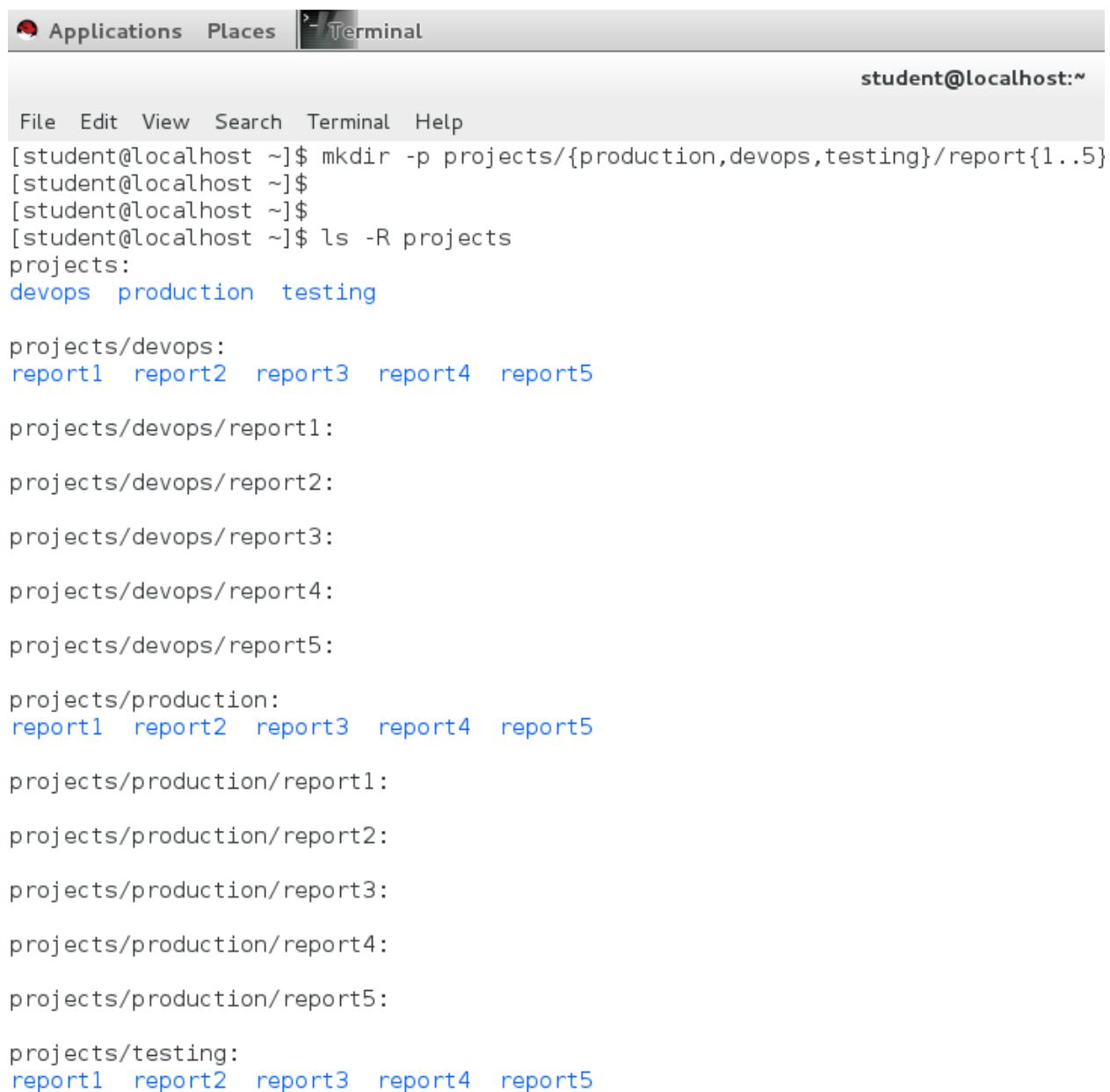
If File location is /home/student/Desktop/mydata

Pwd - /home/student/Desktop

<u>Absolute Path</u>	<u>Relative Path</u>
/home/student/Desktop/mydata	mydata
/home/student	Desktop/mydata

```
.) mkdir -p projects/{production,devops,testing}/report{1..5}
```

```
Ls -R projects [ To see what happened with the above command ]
```



The screenshot shows a desktop environment with a terminal window open. The terminal window has a title bar with 'Applications' and 'Places' on the left and 'Terminal' on the right. The command line shows the user's session:

```
student@localhost:~
```

The terminal output shows the directory structure created by the command:

```
File Edit View Search Terminal Help
[student@localhost ~]$ mkdir -p projects/{production,devops,testing}/report{1..5}
[student@localhost ~]$
[student@localhost ~]$
[student@localhost ~]$ ls -R projects
projects:
    devops  production  testing

projects/devops:
    report1  report2  report3  report4  report5

projects/devops/report1:
projects/devops/report2:
projects/devops/report3:
projects/devops/report4:
projects/devops/report5:

projects/production:
    report1  report2  report3  report4  report5

projects/production/report1:
projects/production/report2:
projects/production/report3:
projects/production/report4:
projects/production/report5:

projects/testing:
    report1  report2  report3  report4  report5
```

[Note : If we keep . (dot) before file/dir It'll be hide (hidden file/hidden dir)]

.) ls -a { list – It'll show hidden files }

ls -al { also show the hidden files in long list }

```
File Edit View Search Terminal Help
[student@localhost Desktop]$ cd Projects
[student@localhost Projects]$ mkdir .Folder
[student@localhost Projects]$ touch .Files
[student@localhost Projects]$
[student@localhost Projects]$ ll
total 0
drwxrwxr-x. 7 student student 81 Sep 16 01:29 Devops
drwxrwxr-x. 7 student student 81 Sep 16 01:29 Production
drwxrwxr-x. 7 student student 81 Sep 16 01:29 Testing
[student@localhost Projects]$
[student@localhost Projects]$
[student@localhost Projects]$ ls -a
. .. Devops .Files .Folder Production Testing
[student@localhost Projects]$
[student@localhost Projects]$
[student@localhost Projects]$ ls -al
total 0
drwxrwxr-x. 6 student student 77 Sep 16 01:31 .
drwxr-xr-x. 3 student student 21 Sep 16 01:29 ..
drwxrwxr-x. 7 student student 81 Sep 16 01:29 Devops
-rw-rw-r--. 1 student student 0 Sep 16 01:31 .Files
drwxrwxr-x. 2 student student 6 Sep 16 01:31 .Folder
drwxrwxr-x. 7 student student 81 Sep 16 01:29 Production
drwxrwxr-x. 7 student student 81 Sep 16 01:29 Testing
[student@localhost Projects]$ █
```

In the above screenshot .Folder is a hidden directory and .Files is a hidden file.

If we use command ll it doesn't show the hidden files.

Day 8

System Administration



User Administration

In User Administration → Regular or Normal users
→ Admin Users

→ Admin/root prompt
\$ → Regular user prompt

.) Total we have 9 sections, but we can use 8 sections another one is for admin

Shortcuts :

HELP → <command> --help (or) man <command>

Shift + Ctrl + + → Maximize Font Size

Ctrl + - → Minimize Font Size

Ctrl + 0 → Normal Font Size (Default)

Q → quit

HELP → <command> --help

```
File Edit View Search Terminal Help
[student@localhost ~]$ ls -al --help
Usage: ls [OPTION]... [FILE]...
List information about the FILEs (the current directory by default).
Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.

Mandatory arguments to long options are mandatory for short options too.
-a, --all          do not ignore entries starting with .
-A, --almost-all   do not list implied . and ..
--author           with -l, print the author of each file
-b, --escape        print C-style escapes for nongraphic characters
--block-size=SIZE   scale sizes by SIZE before printing them; e.g.,
                   '--block-size=M' prints sizes in units of
                   1,048,576 bytes; see SIZE format below
-B, --ignore-backups
-c                do not list implied entries ending with ~
                   with -lt: sort by, and show, ctime (time of last
                   modification of file status information);
                   with -l: show ctime and sort by name;
                   otherwise: sort by ctime, newest first
-C                list entries by columns
--color[=WHEN]      colorize the output; WHEN can be 'never', 'auto'
                   or 'always' (the default); more info below
-d, --directory     list directories themselves, not their contents
-D, --dired         generate output designed for Emacs' dired mode
-f                do not sort, enable -aU, disable -ls --color
-F, --classify      append indicator (one of */=>@{}) to entries
                   likewise, except do not append '*'
                   across -x, commas -m, horizontal -x, long -l,
                   single-column -1, verbose -l, vertical -C
--full-time        like -l --time-style=full-iso
-g                like -l, but do not list owner
--group-directories-first
                   group directories before files;
                   can be augmented with a --sort option, but any
                   use of --sort=none (-U) disables grouping
                   in a long listing, don't print group names
-G, --no-group      in a long listing, don't print group names
```

HELP → man <command>

```
File Edit View Search Terminal Help
LS(1)                                         User Commands                                         LS(1)

NAME
  ls - list directory contents

SYNOPSIS
  ls [OPTION]... [FILE]...

DESCRIPTION
  List information about the FILEs (the current directory by default). Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.

  Mandatory arguments to long options are mandatory for short options too.

  -a, --all
    do not ignore entries starting with .

  -A, --almost-all
    do not list implied . and ..

  --author
    with -l, print the author of each file

  -b, --escape
    print C-style escapes for nongraphic characters

  --block-size=SIZE
    scale sizes by SIZE before printing them; e.g., '--block-size=M' prints sizes in units of 1,048,576 bytes; see SIZE format below

  -B, --ignore-backups
    do not list implied entries ending with ~

  -c    with -lt: sort by, and show, ctime (time of last modification of file status information); with -l: show ctime and sort by
  Manual page ls(1) line 1 (press h for help or q to quit)
```

CREATING USERS AND GROUPS

Users

Create → useradd <un>

Delete → userdel -r <un> [r – to delete home dir & mail box of the user]

Modify → usermod -L <un> [L – lock]

usermod -U <un> [U – unlock]

Groups

Create → groupadd <gn>

Delete → groupdel <gn>

Modify → groupmod -n <newname> <oldname>

Group

Production

.) rob

.) smith

.) saara

Devops

.) bob

.) modi

.) arif

Testing

.) dare

.) bodhi

.) john

Ex : .) groupadd Production

.) useradd rob [user will be the member of his own group]

To check : id <un> [ex : id rob]

```
File Edit View Search Terminal Help
[ root@localhost ~]# useradd rob
[ root@localhost ~]#
[ root@localhost ~]# id rob
uid=1002(rob) gid=1002(rob) groups=1002(rob)
[ root@localhost ~]# █
```

Useradd → will create a user

a) Create user's home dir

ls -l /home

b) Create users's mail box

ls -l /var/spool/mail

c) Will add user info into /etc/passwd

tail /etc/passwd

d) Will add password info into /etc/shadow

tail /etc/shadow

e) Will add group info into /etc/group

tail /etc/group

Day 9

TYPES OF GROUPS

- 1) Primary Group (g)
- 2) Secondary Group / Supplementary Group (G)

Adding User into groups

If User Exists

Usermod -aG <gn> <un>

[a means append , G means secondary]

If User Doesn't Exist

useradd -G <gn> <un>

.) id <un> { To check in primary group }

.) tail /etc/group (or) id <un> { to check in secondary group }

.) useradd -G <gn> <un>

.) id <un> [To check above command]

[before adding user into group we need to create a group]

[here rob is not a exist group member , he is new member to group]

```
File Edit View Search Terminal Help
[root@localhost ~]# groupadd Production
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# useradd -G Production rob
[root@localhost ~]#
[root@localhost ~]# id rob
uid=1001(rob) gid=1002(rob) groups=1002(rob),1001(Production)
[root@localhost ~]# █
```

```
.) usermod -aG <gn> <un>
```

```
.) id rob
```

[here rob is already a group member (exist user) in Production group]

```
File Edit View Search Terminal Help
[root@localhost ~]# groupadd Devops
[root@localhost ~]#
[root@localhost ~]# usermod -aG Devops rob
[root@localhost ~]#
[root@localhost ~]# id rob
uid=1001(rob) gid=1002(rob) groups=1002(rob),1001(Production),1003(Devops)
[root@localhost ~]#
[root@localhost ~]#
```

```
.) tail /etc/group
```

```
File Edit View Search Terminal Help
[root@localhost ~]# tail /etc/group
stapdev:x:158:
slocate:x:21:
postdrop:x:90:
postfix:x:89:
sshd:x:74:
tcpdump:x:72:
student:x:1000:student
Production:x:1001:rob
rob:x:1002:
Devops:x:1003:rob
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# tail -3 /etc/group
Production:x:1001:rob
rob:x:1002:
Devops:x:1003:rob
[root@localhost ~]# █
```

[now rob is member in two groups]

.) useradd -g <gn> <un>

[g means primary]

.) id bodhi

```
File Edit View Search Terminal Help
[root@localhost ~]# useradd -g Production bodhi
[root@localhost ~]#
[root@localhost ~]# id bodhi
uid=1002(bodhi) gid=1001(Production) groups=1001(Production)
[root@localhost ~]#
```

[here Production group is already created]

To add / delete user from specific group

.) gpasswd -d <un> <gn> { to delete user from specific group }

[d means delete]

```
File Edit View Search Terminal Help
[root@localhost ~]# gpasswd -d rob Devops
Removing user rob from group Devops
[root@localhost ~]#
[root@localhost ~]# id rob
uid=1001(rob) gid=1002(rob) groups=1002(rob),1001(Production)
[root@localhost ~]#
```

.) gpasswd -a <un> <gn> { to add user into specific group }

[a means add]

```
File Edit View Search Terminal Help
root@localhost ~]# gpasswd -a rob Devops
adding user rob to group Devops
root@localhost ~]#
root@localhost ~]# id rob
uid=1001(rob) gid=1002(rob) groups=1002(rob),1001(Production),1003(Devops)
root@localhost ~]# █
```

.) usermod -G <gn> <un>

.) id rob

```
File Edit View Search Terminal Help
root@localhost ~]# groupadd Testing
root@localhost ~]#
root@localhost ~]# usermod -G Testing rob
root@localhost ~]#
root@localhost ~]# id rob
uid=1001(rob) gid=1002(rob) groups=1002(rob),1004(Testing)
root@localhost ~]# █
```

[here new group created (Testing) and modified user (rob)]

To set / reset password to user

.) passwd <un> { to set password }

[It is invisible & ask 2 times to enter new password]

```
root@localhost:~  
File Edit View Search Terminal Help  
[root@localhost ~]# passwd rob  
Changing password for user rob.  
New password:  
Retype new password:  
passwd: all authentication tokens updated successfully.  
[root@localhost ~]# █
```

.) passwd --stdin <un> { also to set password }

[It is visible & ask only 1 time to enter new password]

```
root@localhost:~  
File Edit View Search Terminal Help  
[root@localhost ~]# passwd --stdin rob  
Changing password for user rob.  
password12345  
passwd: all authentication tokens updated successfully.  
[root@localhost ~]# █
```

.) echo password123 | passwd --stdin <un>

[here password123 is the password , paasswd --stdin is the command]

```
root@localhost:~  
File Edit View Search Terminal Help  
[root@localhost ~]# echo pass123 | passwd --stdin rob  
Changing password for user rob.  
passwd: all authentication tokens updated successfully.  
[root@localhost ~]# █
```

Creating groups & users at a time

Group		
<u>TeamA</u>	<u>TeamB</u>	<u>TeamC</u>
.) rob	.) bob	.) bob
.) smith	.) modi	.) jc
.) saara	.) john	.) jack

.) for g in {TeamA,TeamB,TeamC };do groupadd \$g;done

(Or)

for g in { TeamA TeamB TeamC };do groupadd \$g;done

{ to create groups at a time }

[here g is a variable , variable means any letter or word , instead of g we can use any letter or word]

.) tail /etc/group

```
File Edit View Search Terminal Help
[ root@localhost ~]# for g in {TeamA,TeamB,TeamC};do groupadd $g;done
[ root@localhost ~]#
[ root@localhost ~]# tail /etc/group
stapdev:x:158:
slocate:x:21:
postdrop:x:90:
postfix:x:89:
sshd:x:74:
tcpdump:x:72:
student:x:1000:student
TeamA:x:1001:
TeamB:x:1002:
TeamC:x:1003:
[ root@localhost ~]#
[ root@localhost ~]#
[ root@localhost ~]# tail -3 /etc/group
TeamA:x:1001:
TeamB:x:1002:
TeamC:x:1003:
[ root@localhost ~]# ■
```

[if we want to use sudo here , we can type sudo before ‘groupadd’ only, not in front of ‘for’. Because we can use sudo in front of command only.]

```
.) for u in {rob,smith,saara};do useradd -G TeamA $u;done  
{ to add users into a group at a time }  
. ) tail -3 /etc/passwd
```

```
File Edit View Search Terminal Help  
[root@localhost ~]# for u in {rob,smith,saara};do useradd -G TeamA $u;done  
[root@localhost ~]#  
[root@localhost ~]# tail -3 /etc/passwd  
rob:x:1001:1004::/home/rob:/bin/bash  
smith:x:1002:1005::/home/smith:/bin/bash  
saara:x:1003:1006::/home/saara:/bin/bash  
[root@localhost ~]# █
```

[same as above creating groups TeamB and TeamC]

```
File Edit View Search Terminal Help  
[root@localhost ~]# for u in {bodhi,modi,john};do useradd -G TeamB $u;done  
[root@localhost ~]# tail -3 /etc/group  
bodhi:x:1007:  
modi:x:1008:  
john:x:1009:  
[root@localhost ~]#  
[root@localhost ~]#  
[root@localhost ~]# for u in {bob,jc,jack};do useradd -G TeamC $u;done  
[root@localhost ~]# tail -3 /etc/group  
bob:x:1010:  
jc:x:1011:  
jack:x:1012:  
[root@localhost ~]# █
```

```
.) for u in {rob,smith,saara,bodhi,modi,john,bob,jc,jack};do echo flectrag |  
passwd --stdin $u;done  
  
{to create password to all the users at a time}  
  
[flectrag is the password for all users]
```

.) tail /etc/shadow

```
File Edit View Search Terminal Help  
[root@localhost ~]# for u in {rob,smith,saara,bodhi,modi,john,bob,jc,jack};do echo flectrag | passwd --stdin $u;done  
Changing password for user rob.  
passwd: all authentication tokens updated successfully.  
Changing password for user smith.  
passwd: all authentication tokens updated successfully.  
Changing password for user saara.  
passwd: all authentication tokens updated successfully.  
Changing password for user bodhi.  
passwd: all authentication tokens updated successfully.  
Changing password for user modi.  
passwd: all authentication tokens updated successfully.  
Changing password for user john.  
passwd: all authentication tokens updated successfully.  
Changing password for user bob.  
passwd: all authentication tokens updated successfully.  
Changing password for user jc.  
passwd: all authentication tokens updated successfully.  
Changing password for user jack.  
passwd: all authentication tokens updated successfully.  
[root@localhost ~]#  
[root@localhost ~]#  
[root@localhost ~]#  
[root@localhost ~]# tail /etc/shadow  
student:$6$9nV4V5w2$1ui8wKvXYySd6Y0VZHeuGZVb6hvoa5YR8lQHDJFP4j1yhtAS1Jzuqu7P00KYwc fKIBZeXNbHtkxlxb4gg./n.:18154:0:99999:7:::  
rob:$6$DMR6IFm4$UZmsAjDRZLerGLJhNUI7DIhiITzMhxln.ImhSoM.iwDij6B6lclQzTov69i0z6BURtL2/TR/K63VnK0xxDkPV.:18154:0:99999:7:::  
smith:$6$x2wyF7Lm$diNTE1Z8PNBd/crcwYpwLq/luHdYqznib34ZtXbKcZu/3.X3fw0bjzj7dbe0qv/nur0.450931kHiOCW9E0:18154:0:99999:7:::  
saara:$6$APwmJC/2$pbAtFos7RbYsDJVTNL1QtRRrarGDc1T1iGYLs/agyRE1L9cbVXY0/dZ7T6ZzKyFn7.365rFPDPHjsSR99Aa1:18154:0:99999:7:::  
bodhi:$6$FGDiCGN2$S4oqpEwJ14uej5cmqMgroatKxJ7o3Ks3swt0ZbVsSuRwbAZhZBregSUIZ6nY.z5T800pPDgET.bJmROMwjOga1:18154:0:99999:7:::  
modi:$6$17fenG8w$ddI3X7ntx.7JI3bE03F9Lf1QAzokK4o2DbrKery2v2kuJw9bVyDs3U.N3AmuPGdYpVKxhCzkHFxFVRNnXXZN.:18154:0:99999:7:::  
john:$6$U1H1HX0F$8mbH06JjsMEe2EjU7cjtbdn78Wl147CnHgo/4HVbkgVDVKBMPHjGL6P1CTcgYQmHnuqB6S3YL5UDba7V.sU.:18154:0:99999:7:::  
bob:$6$KyEfW0rD$18v6gN1Vsjf6f8huZH81LdcG0g7rppJaF50cfuDFN93wSyoTxGyjCF7ea6NIgm0uCJVyatB/MSMf8j2sJrxg1:18154:0:99999:7:::  
jc:$6$6GP..UuDh$JToWITF65UBR3oqZg2RKRL03WiYakeX20K1pgFEJqqtcEy1ej0uM08l5rqXLCSMedXYKKPCAPL6VJjtta0RLln1:18154:0:99999:7:::  
jack:$6$mB0vMJFg$Ro6LZmf13EcF704mTT43CISCb64.n0EI.SZD9FJnThMKsQB9nQhjUd03adieVH0c5QzLeJ00GjtglQssgBw/c1:18154:0:99999:7:::  
[root@localhost ~]# ■
```

COMMANDS INFORMATION

.) tail /etc/passwd [in this total 7 fields are there]

```
File Edit View Search Terminal Help
[root@localhost ~]# tail /etc/passwd
student:x:1000:1000:student:/home/student:/bin/bash
rob:x:1001:1004:::home/rob:/bin/bash
smith:x:1002:1005:::home smith:/bin/bash
saara:x:1003:1006:::home/saara:/bin/bash
bodhi:x:1004:1007:::home/bodhi:/bin/bash
modi:x:1005:1008:::home/modi:/bin/bash
john:x:1006:1009:::home/john:/bin/bash
bob:x:1007:1010:::home/bob:/bin/bash
jc:x:1008:1011:::home/jc:/bin/bash
jack:x:1009:1012:::home/jack:/bin/bash
[root@localhost ~]#
```

1 2 3 4 5 6 7

<un> : X : UID : GID : GECOS : Homedir : Shell
↓ ↓ ↓ ↓ ↓
Password Comment /home/<un> /bin/bash
Link Description

RHEL 6		RHEL 7	
Root →	UID	GID	
	0	0	
Users →	500 +	500 +	
		Max – 60,000	
Sys Accounts → 201 – 999		1 – 200	
(Manageable)		(Unmanageable)	

.) less /etc/login.defs { login def details }

```
File Edit View Search Terminal Help
#
# Please note that the parameters in this configuration file control the
# behavior of the tools from the shadow-utils component. None of these
# tools uses the PAM mechanism, and the utilities that use PAM (such as the
# passwd command) should therefore be configured elsewhere. Refer to
# /etc/pam.d/system-auth for more information.
#
# *REQUIRED*
#   Directory where mailboxes reside, _or_ name of file, relative to the
#   home directory. If you _do_ define both, MAIL_DIR takes precedence.
#   QMAIL_DIR is for Qmail
#
#QMAIL_DIR      Maildir
MAIL_DIR        /var/spool/mail
#MAIL_FILE      .mail

# Password aging controls:
#
#       PASS_MAX_DAYS    Maximum number of days a password may be used.
#       PASS_MIN_DAYS    Minimum number of days allowed between password changes.
#       PASS_MIN_LEN     Minimum acceptable password length.
#       PASS_WARN_AGE    Number of days warning given before a password expires.
#
PASS_MAX_DAYS  99999
PASS_MIN_DAYS  0
PASS_MIN_LEN   5
PASS_WARN_AGE  7

#
# Min/max values for automatic uid selection in useradd
#
UID_MIN         1000
UID_MAX         60000
.■
```

.) tail /etc/group [in this total 4 fields are there]

```
File Edit View Search Terminal Help
[ root@localhost ~]# tail /etc/group
TeamC:x:1003:bob,jc,jack
```

1 2 3 4

Group Name : X : GID : Members

.) tail /etc/shadow [in this total 9 fields are there]

[here I added one new user (victor)]

```
File Edit View Search Terminal Help
[root@localhost ~]# useradd victor
[root@localhost ~]# tail /etc/shadow
rob:$6$DRM6IFm4$UZmsAjDRZLerGLJhNUI7DIhiITzMhx1n.ImhSoM.iwDiJ6B6lc1QzTov69i0z6BURtL2/TR/K63VnK0xxDkPV.:18154:0:99999:7:::
smith:$6$xFwyF7Lm$#/d1NTE1Z8PNbD/crcwYpWLq/luHdYqznib34ZtXbKcZu/3.X3fw0bjzj7dbaE0qv/nur0..45093lkHiQCCW9E0:18154:0:99999:7:::
saara:$6$APwmJC/2$pbAtFos7RbYsDJVTNLiQtRRrarGDc1T1iGYLs/agyRE1L9cbVXY0/dZ7T6ZzKyFr7..365rFPDPHijRsR999Aai1:18154:0:99999:7:::
bodhi:$6$FGDiCGN2$54oqpEwJ4uej5cmqMgrovCKxJ7o3ks3swt0Zbv9uRwbZhZbreg6UIZ6nY..z5T800pPDgET..bJmROMwj0ga1:18154:0:99999:7:::
modi:$6$i7fenG6w$ddI3X7ntx..7J13bE03F9LflQAzoksk4o2DbrKery2v2kuUw9bVyDs3U..N3amuPgdypVKXhC2kHFxVFRNnXXZN..:18154:0:99999:7:::
john:$6$U1H1HX0F$n0mbHQ6JjsMEe2EjU7cJtbdn78wI47CnHgo/4HVTbkGVDFVKBMPhjGL6PICTcgYQmHnuqB6S3YL5UDba7V.sU.:18154:0:99999:7:::
bob:$6$KyEfW0rD$iv8v6gN1vS1fcG6F8huZH81LdcG0q7rppJaF5DcfuDFN93wSyotxGyjCF7ea6NIqm0uCJVyatB/M5Mf8j2sJrxgl:18154:0:99999:7:::
jc:$6$GP..UuDhs$JTowITF65UBR3oqZg2RKRL03WiYakeX20K1pgFEJqqtcEylejoUM08l5rqXLCMedXYYKKPCAPL6VJjta0RLln1:18154:0:99999:7:::
jack:$6$mb0vMJFg$Ro6lZmf13ECf704mTT43CISCb64.n0EI.SZD9FJnThMKsQB9nQhjUd03adieVH0c5QzLeJ00Gjtg1QssgBw/c1:18154:0:99999:7:::
victor:!!:18154:0:99999:7:::
[root@localhost ~]#
```

1 2 3 4 5 6 7 8 9

<un> : Encrypted Password : 18154 : Min Age : Max Age : Warning Age : : :
↓ ! ↓ ↓ ↓ ↓
Last P/W Changed 0 99999 7

2) ! → User Account

! → Password Blank

3) No of days since 01.01.1970

5) Password Expiry

6) warning Days before Password Expiry

7) Inactive age

8) Account Expiry → for contract & reliving employees

9) blank

\$1\$Hash → RHEL 6 [Message Digest]

↓
MD5Hash

\$6\$SALT\$Hash → RHEL 7 [Secure Hashing Algorithm]

↓
SHA512 will be choose by O/S

.) usermod -L <un> { to lock user }

```
File Edit View Search Terminal Help
[root@localhost ~]# usermod -L victor
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# tail -1 /etc/shadow
victor:!$1$18154$0:99999:7:::
```

.) usermod -U <un> { to unlock user }

```
[root@localhost ~]# usermod -U victor
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# tail -1 /etc/shadow
victor:$!$18154$0:99999:7:::
[root@localhost ~]# █
```

Day 10

PASSWORD AGEING

.) chage -l <un> { to know password info }

[chage means change]

```
File Edit View Search Terminal Help
[root@localhost ~]# chage -l victor
Last password change : Sep 15, 2019
Password expires       : never
Password inactive      : never
Account expires         : never
Minimum number of days between password change : 0
Maximum number of days between password change : 99999
Number of days of warning before password expires : 7
[root@localhost ~]#
```

.) cat /etc/shadow | grep <un> { to know user password details }

[grep is a filter (for particular user)]

```
File Edit View Search Terminal Help
[root@localhost ~]# cat /etc/shadow | grep victor
victor:!:18154:0:99999:7:::
[root@localhost ~]#
```

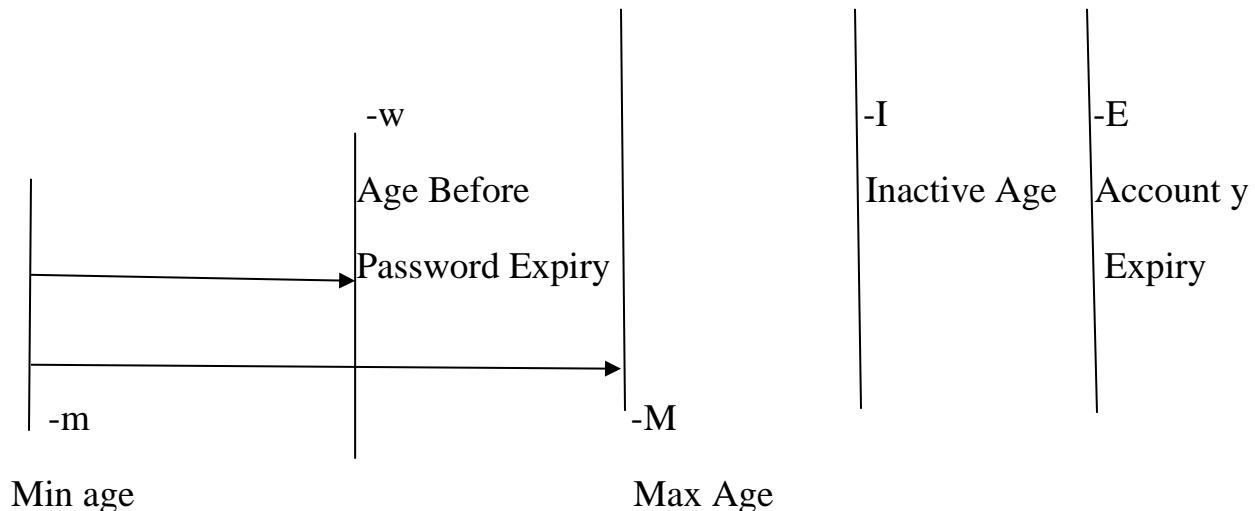
.) grep <un> /etc/shadow { also for , to know user password details }

```
File Edit View Search Terminal Help
[root@localhost ~]# grep victor /etc/shadow
victor:!:18154:0:99999:7:::
[root@localhost ~]#
```

.) passwd --stdin <un> { changing password for user}

```
File Edit View Search Terminal Help
[root@localhost ~]# passwd --stdin victor
Changing password for user victor.
password2223
passwd: all authentication tokens updated successfully.
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# chage -l victor
Last password change : Sep 15, 2019
Password expires : never
Password inactive : never
Account expires : never
Minimum number of days between password change : 0
Maximum number of days between password change : 99999
Number of days of warning before password expires : 7
[root@localhost ~]#
```

Explanation with Diagram



.) -d 0 { to change password immediately }

[d menas days & 0 means zero] [* this is the last command]

.) chage -M 30 -W 3 <un> { change max age & warning days }

[30 = max days & 3 = Warning]

.) chage -l <un>

```
File Edit View Search Terminal Help
[root@localhost ~]# chage -M 30 -W 3 victor
[root@localhost ~]#
[root@localhost ~]# chage -l victor
Last password change : Sep 15, 2019
Password expires      : Oct 15, 2019
Password inactive     : never
Account expires        : never
Minimum number of days between password change : 0
Maximum number of days between password change  : 30
Number of days of warning before password expires: 3
[root@localhost ~]# █
```

.) chage -I 5 <un> { change inactive age }

.) chage -l <un>

```
File Edit View Search Terminal Help
[root@localhost ~]# chage -I 5 victor
[root@localhost ~]#
[root@localhost ~]# chage -l victor
Last password change : Sep 15, 2019
Password expires      : Oct 15, 2019
Password inactive     : Oct 20, 2019
Account expires        : never
Minimum number of days between password change : 0
Maximum number of days between password change  : 30
Number of days of warning before password expires: 3
[root@localhost ~]# █
```

.) date -d +90days { for date }

```
File Edit View Search Terminal Help
[root@localhost ~]# date -d +90days
Sun Dec 15 05:07:44 IST 2019
[root@localhost ~]# █
```

.) chage -E yyyy-mm-dd <un> { change account expiry date }

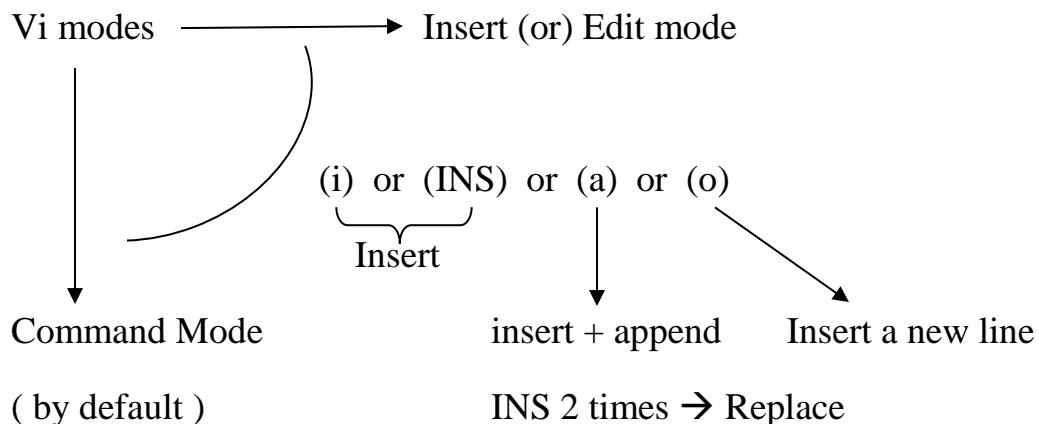
```
File Edit View Search Terminal Help
[root@localhost ~]# chage -E 2019-12-12 victor
[root@localhost ~]#
[root@localhost ~]# chage -l victor
Last password change : Sep 15, 2019
Password expires      : Oct 15, 2019
Password inactive     : Oct 20, 2019
Account expires        : Dec 12, 2019
Minimum number of days between password change : 0
Maximum number of days between password change : 30
Number of days of warning before password expires : 3
[root@localhost ~]# █
```

EDITORS

1) vi / vim → CLI based editor

2) gedit → GUI (similar to notepad)
3) leafpad

} Graphical



ESC → exit edit mode

.) :wq! → save & Exit

.) :q! → exit without saving

.) cp /etc/passwd /var/tmp

.) vim /var/tmp/passwd { whole process open in command mode }

Note : After 3 lines press enter , it'll move to next line by creating space .Then write something and press “wq!

```
File Edit View Search Terminal Help
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
hello world
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:99:99:Nobody:/sbin/nologin
dbus:x:81:81:System message bus:/sbin/nologin
polkitd:x:999:998:User for polkitd:/sbin/nologin
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin
avahi-autoipd:x:170:170:Avahi IPv4LL Stack:/var/lib/avahi-autoipd:/sbin/nologin
rpc:x:32:32:Rpcbind Daemon:/var/lib/rpcbind:/sbin/nologin
rpcuser:x:29:29:RPC Service User:/var/lib/nfs:/sbin/nologin
nfsnobody:x:65534:65534:Anonymous NFS User:/var/lib/nfs:/sbin/nologin
ovirtagent:x:175:175:RHEV-M Guest Agent:/usr/share/ovirt-guest-agent:/sbin/nologin
postfix:x:89:89::/var/spool/postfix:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin
chrony:x:998:996::/var/lib/chrony:/sbin/nologin
student:x:1000:1000:Student User:/home/student:/bin/bash
usbmuxd:x:113:113:usbmuxd user:/sbin/nologin
colord:x:997:995:User for colord:/var/lib/colord:/sbin/nologin
abrt:x:173:173::/etc/abrt:/sbin/nologin
libstoragegmt:x:996:994:daemon account for libstoragegmt:/var/run/lsm:/sbin/nologin
unbound:x:995:993:Unbound DNS resolver:/etc/unbound:/sbin/nologin
qemu:x:107:107:qemu user:/sbin/nologin
saslauth:x:994:76:"Saslauthd user":/run/saslauthd:/sbin/nologin
ntp:x:38:38::/etc/ntp:/sbin/nologin
:wq!
```

Next type .) head /var/tmp/passwd

```
File Edit View Search Terminal Help
[root@server4 ~]# head /var/tmp/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
hello world
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
[root@server4 ~]# 
```

DAY 11

Vimtutor

Movements : Arrow Keys

Movement with Keyboard Letters : H J K L

← ↓ ↑ →

U → Undo

Ctrl + r → Redo

dd → to delete a line

<no>dd → ex : 4dd → Delete 4 lines

dw → to delete a particular word

5dw → 5 words deleting

Shift + : se nu → to get serial number

Shift + : 12 → to go to 12th line

Shift + g → last line

gg → to go to first line

\$	Sudo
<ul style="list-style-type: none"> .) run any regular commands .) to run admin commands <ul style="list-style-type: none"> a) su - to become super user by knowing root user prompt . b) su [shows as # but shell will be same] <p><u>To switch user</u></p> <ul style="list-style-type: none"> .) su - <un> Password : user password Or .) su <un> → this is wrong 	<ul style="list-style-type: none"> .) To share admin privileges without sharing root user password. a) add user to wheel group sudo command it'll ask current logged user .) sudo useradd test <hr/> <ul style="list-style-type: none"> .) Sudo usermod -aG wheel rob .) id rob .) su - rob .) sudo useradd test2

[Note : wheel is the default admin group in RHEL 7]

[we can create users in root level only but here with sudo we can create users]

Below example for \$

```
File Edit View Search Terminal Help
[root@server4 ~]# useradd rob
[root@server4 ~]# passwd rob
Changing password for user rob.
New password:
BAD PASSWORD: The password fails the dictionary check - it is based on a dictionary word
Retype new password:
passwd: all authentication tokens updated successfully.
[root@server4 ~]# pwd
/root
[root@server4 ~]# logout
[student@server4 ~]$ su - rob
Password:
[rob@server4 ~]$ pwd
/home/rob
[rob@server4 ~]$ logout
[student@server4 ~]$ su rob
Password:
[rob@server4 student]$ touch myfile
touch: cannot touch 'myfile': Permission denied
[rob@server4 student]$ pwd
/home/student
[rob@server4 student]$ 
```

[here we can clearly see the difference between “su -” and “su” with pwd]

Below example for Sudo

```
root@server4:~
File Edit View Search Terminal Help
[roy@server4 ~]$ sudo useradd victor

We trust you have received the usual lecture from the local System
Administrator. It usually boils down to these three things:

#1) Respect the privacy of others.
#2) Think before you type.
#3) With great power comes great responsibility.

[sudo] password for roy:
roy is not in the sudoers file. This incident will be reported.
[roy@server4 ~]$ logout
You have mail in /var/spool/mail/root
[root@server4 ~]$ 
```

[Here already we created rob , now we modifying by changing group]

```
File Edit View Search Terminal Help
[student@server4 ~]$ sudo usermod -aG wheel rob
[student@server4 ~]$ id rob
uid=1001(rob) gid=1001(rob) groups=1001(rob),10(wheel)
[student@server4 ~]$ su - rob
Password:
Last login: Mon Sep 16 19:34:36 IST 2019 on pts/0
[rob@server4 ~]$ sudo useradd test2
```

We trust you have received the usual lecture from the local System Administrator. It usually boils down to these three things:

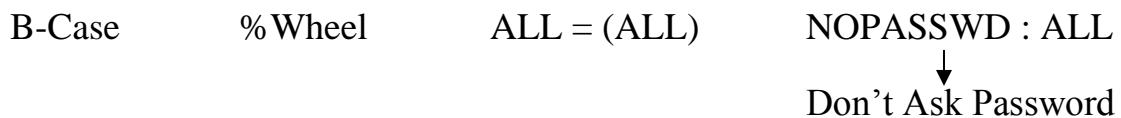
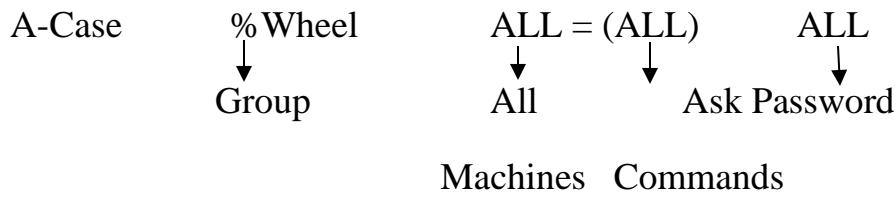
- #1) Respect the privacy of others.
- #2) Think before you type.
- #3) With great power comes great responsibility.

```
[sudo] password for rob:
[rob@server4 ~]$ 
```

.) sudo less /etc/sudoers { to check sudoers written program in editor }

```
## Allows people in group wheel to run all commands
%wheel    ALL=(ALL)          ALL

## Same thing without a password
# %wheel          ALL=(ALL)          NOPASSWD: ALL
```



/etc/sudoers → read only by default

To Edit

```
$ sudo visudo (or) # visudo { to edit in the vimtutor}
```

EX : Smith ALL=(ALL) NOPASSWD : ALL

[Means that giving all the permissions to Smith , he is like admin now]

DAY 12

TO CREATE A USER WITH SPECIFIC UID

.) useradd -u 5000 <un>

```
File Edit View Search Terminal Help
[student@server4 ~]$ sudo useradd -u 5000 bodhi
[student@server4 ~]$ id bodhi
uid=5000(bodhi) gid=5000(bodhi) groups=5000(bodhi)
[student@server4 ~]$ 
```

To create user without shell

Or Non Interactive Shell

Or No shell



Service Users

.) sudo useradd -s /sbin/nologin <un>

Tail /etc/passwd

```
File Edit View Search Terminal Help
[student@server4 ~]$ sudo useradd -s /sbin/nologin boss
[student@server4 ~]$ tail /etc/passwd
saslauthd:x:994:76:"Saslauthd user":/run/saslauthd:/sbin/nologin
ntp:x:38:38::/etc/ntp:/sbin/nologin
rtkit:x:172:172:RealtimeKit:/proc:/sbin/nologin
radvd:x:75:75:radvd user:/:/sbin/nologin
pulse:x:171:171:PulseAudio System Daemon:/var/run/pulse:/sbin/nologin
gdm:x:42:42::/var/lib/gdm:/sbin/nologin
gnome-initial-setup:x:993:991::/run/gnome-initial-setup:/sbin/nologin
tcpdump:x:72:72::/sbin/nologin
bodhi:x:5000:5000::/home/bodhi:/bin/bash
boss:x:5001:5001::/home/boss:/sbin/nologin
[student@server4 ~]$ █
```

[Note : To connect as a root with sudo { sudo -i (or) sudo su - }]
↓
(Old one)

PERMISSIONS

We have 3 permissions

Read → r

Write → w

Execute → x

r w x

0 0 0 - 0 (Min)

1 1 1 - 7 (Max)

$2^2 2^1 2^0$

4 2 1 = 7

.) ls -l / (list command)

```
kiosk@foundation4:~  
File Edit View Search Terminal Help  
[kiosk@foundation4 ~]$ ls -l /  
total 36  
lrwxrwxrwx. 1 root root 7 Aug 16 15:59 bin -> usr/bin  
dr-xr-xr-x. 4 root root 4096 Aug 16 16:08 boot  
drwxrwxrwx. 7 root root 4096 Aug 17 11:40 CEH  
drwxr-xr-x. 19 root root 3320 Sep 6 17:04 dev  
drwxr-xr-x. 139 root root 8192 Sep 6 11:32 etc  
drwxr-xr-x. 4 root root 32 Aug 29 20:34 home  
lrwxrwxrwx. 1 root root 7 Aug 16 15:59 lib -> usr/lib  
lrwxrwxrwx. 1 root root 9 Aug 16 15:59 lib64 -> usr/lib64  
drwxr-xr-x. 2 root root 6 Mar 13 2014 media  
drwxr-xr-x. 2 root root 6 Mar 13 2014 mnt  
drwxr-xr-x. 3 root root 15 Aug 16 16:05 opt  
dr-xr-xr-x. 210 root root 0 Sep 6 11:31 proc  
dr-xr-x--. 6 root root 4096 Aug 29 21:41 root  
drwxr-xr-x. 39 root root 1340 Sep 6 17:04 run  
lrwxrwxrwx. 1 root root 8 Aug 16 15:59 sbin -> usr/sbin  
drwxr-xr-x. 2 root root 6 Mar 13 2014 srv  
dr-xr-xr-x. 13 root root 0 Sep 6 11:31 sys  
drwxrwxrwt. 24 root root 4096 Sep 6 16:56 tmp  
drwxr-xr-x. 13 root root 4096 Aug 16 15:59 usr  
drwxr-xr-x. 22 root root 4096 Sep 6 11:31 var  
[kiosk@foundation4 ~]$ 
```

1st line → 1 rwx rwx rwx

1 → link (Type)

rwx → owner (or) user

rwx → group owner (or) group user

rwx → other

.) mkdir dat

.) touch report

.) ll

```
File Edit View Search Terminal Help
[student@server4 ~]$ mkdir dat
[student@server4 ~]$ touch report
[student@server4 ~]$ ll
total 0
drwxrwxr-x. 2 student student 6 Sep 17 19:25 dat
-rw-rw-r--. 1 student student 0 Sep 17 19:25 report
[student@server4 ~]$ 
```

drwxrwxr-x

-rw-rw-r-

↓
File

Permissions by default set by umask (user mask)

.) umask { to know umask }

```
File Edit View Search Terminal Help
[student@server4 ~]$ umask
0002
[student@server4 ~]$ 
```

.) sudo umask { to know sudo umask }

```
[student@server4 ~]$
[student@server4 ~]$ sudo umask
0022
[student@server4 ~]$ 
```

By default umask and sudo umask values are fixed

.) sudo less /etc/bashrc { to see umask and sudo mask values }

```
File Edit View Search Terminal Help
        PATH=$PATH:$1
    else
        PATH=$1:$PATH
    fi
esac
}

# By default, we want umask to get set. This sets it for non-login shell.
# Current threshold for system reserved uid/gids is 200
# You could check uidgid reservation validity in
# /usr/share/doc/setup-*/uidgid file
if [ $UID -gt 199 ] && [ "`id -gn`" = "'id -un'" ]; then
    umask 002
else
    umask 022
fi

SHELL=/bin/bash
# Only display echos from profile.d scripts if we are no login shell
# and interactive - otherwise just process them to set envvars
for i in /etc/profile.d/*.sh; do
    if [ -r "$i" ]; then
        if [ "$PS1" ]; then
            . "$i"
        else
            . "$i" >/dev/null
        fi
    fi
done

unset i
unset -f pathmunge
fi
# vim:ts=4:sw=4
(END)
```

.) sudo mkdir admindata

.) sudo touch adminreport

.) ll

```
File Edit View Search Terminal Help
[student@server4 ~]$ sudo mkdir admindata
[sudo] password for student:
[student@server4 ~]$ sudo touch adminreport
[student@server4 ~]$
[student@server4 ~]$ ll
total 0
drwxr-xr-x. 2 root      root      6 Sep 17 19:32 admindata
-rw-r--r--. 1 root      root      0 Sep 17 19:32 adminreport
drwxrwxr-x. 2 student   student   6 Sep 17 19:25 dat
-rw-rw-r--. 1 student   student   0 Sep 17 19:25 report
[student@server4 ~]$ 
```

.) ls -l /home

```
File Edit View Search Terminal Help
[student@server4 ~]$ ls -l /home
total 4
drwx----- 4 bodhi    bodhi     88 Sep 17 19:09 bodhi
drwx----- 4 boss     boss     88 Sep 17 19:11 boss
drwx----- 7 student   student  4096 Sep 17 19:32 student
[student@server4 ~]$ 
```

.) less /etc/logindefs

```
#
CREATE_HOME      yes

# The permission mask is initialized to this value. If not specified,
# the permission mask will be initialized to 022.
UMASK          077

# This enables userdel to remove user groups if no members exist.
#
USERGROUPS_ENAB yes

# Use SHA512 to encrypt password.
ENCRYPT_METHOD SHA512

```

.) vim /etc/profile { to change umask permanantly }

```
File Edit View Search Terminal Help
else
    pathmunge /usr/local/sbin after
    pathmunge /usr/sbin after
fi

HOSTNAME=`/usr/binhostname 2>/dev/null`
HISTSIZE=1000
if [ "$HISTCONTROL" = "ignorespace" ] ; then
    export HISTCONTROL=ignoreboth
else
    export HISTCONTROL=ignoredups
fi

export PATH USER LOGNAME MAIL HOSTNAME HISTSIZE HISTCONTROL

# By default, we want umask to get set. This sets it for login shell
# Current threshold for system reserved uid/gids is 200
# You could check uid/gid reservation validity in
# /usr/share/doc/setup-*/uidgid file
if [ $UID -gt 199 ] && [ "`id -gn`" = "`id -un`" ] ; then
    umask 002
else
    umask 022
fi

for i in /etc/profile.d/*.sh ; do
    if [ -r "$i" ] ; then
        if [ "${-#*i}" != "$-" ] ; then
            . "$i"
        else
            . "$i" >/dev/null
        fi
    fi
done
```

[we can change the umask values and exit from the user and login again, Now check again the umask value. Now it'll show the changed umask value.]

DAY 13

		<u>Directory</u>	<u>File</u>
4	r	Can list <code>ls -l <dir></code>	Can open/read <code>cat <file></code> <code>less <file></code> <code>head <file></code>
2	w	Can modify/add/delete <code>cp/rm/mv</code>	Can edit (vi <file>)
1	x	Can open <code>cd <dir></code>	Can run (shell script/program)
4+2+1=7	Full Permission	777 UGO (run as a program) U – User G – Group O – Other	666 UGO (can't execute) If File have permissions like 777 then it is not a file, it might be a program.

These Permissions are called DISCRETIONARY PERMISSIONS

	<u>Directory</u>		<u>File</u>	
Full Permissions	777		666	
	Root	Regular	Root	Regular
	User	User	User	User
By default umask	022	002	022	002
	777 - 022	777 - 002	666 - 022	666 - 002
Effective Permissions	755	775	644	664

The permission values are 755 for Root User

755 for Regular User } Directory

644 for Root User

644 for Regular User } File

[Note : by default umask means removing / subtract the umask value , we can change the umask values by using bashrc]

EX:

```
.) mkdir data1  
.) sudo mkdir data2  
.) touch secret1  
.) sudo touch secret2  
. ) ll
```

```
File Edit View Search Terminal Help  
[student@server4 ~]$ mkdir data1  
[student@server4 ~]$ sudo mkdir data2  
  
We trust you have received the usual lecture from the local System Administrator. It usually boils down to these three things:  
  
#1) Respect the privacy of others.  
#2) Think before you type.  
#3) With great power comes great responsibility.  
  
[sudo] password for student:  
[student@server4 ~]$ touch secret1  
[student@server4 ~]$ sudo touch secret2  
[student@server4 ~]$  
[student@server4 ~]$  
[student@server4 ~]$ ll  
total 0  
drwxrwxr-x. 2 student student 6 Sep 18 19:12 data1  
drwxr-xr-x. 2 root root 6 Sep 18 19:12 data2  
-rw-rw-r--. 1 student student 0 Sep 18 19:12 secret1  
-rw-r--r--. 1 root root 0 Sep 18 19:12 secret2  
[student@server4 ~]$ □
```

d rwx r-x 7 7 5

d rwx r-x 7 5 5

- rw- rw- r-- 6 6 4

- rw- r---- 6 4 4

HOW TO SET UMASK TEMPORARILY

.) umask 007 { to change umask value temporarily }

```
File Edit View Search Terminal Help
[student@server4 ~]$ umask
0002
[student@server4 ~]$ umask 007
[student@server4 ~]$
[student@server4 ~]$
[student@server4 ~]$ umask
0007
[student@server4 ~]$ 
```

[the temporary umask is available until the shell closes]

Dir 777	File 666
(-) 007	(-) 006
<hr/> 770	<hr/> 660

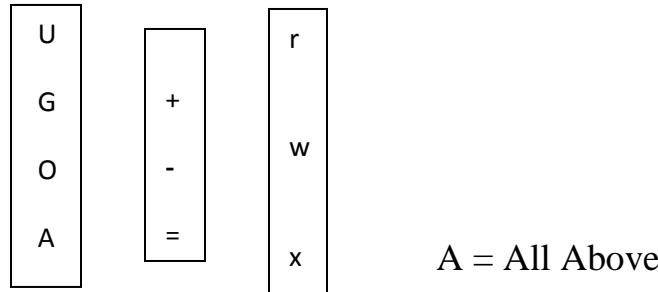
.) mkdir data3

.) touch secret3

```
File Edit View Search Terminal Help
[student@server4 ~]$ mkdir data3
[student@server4 ~]$ touch secret3
[student@server4 ~]$
[student@server4 ~]$ ll
total 0
drwxrwxr-x. 2 student student 6 Sep 18 19:12 data1
drwxr-xr-x. 2 root      root    6 Sep 18 19:12 data2
drwxrwx---. 2 student student 6 Sep 18 19:27 data3
-rw-rw-r--. 1 student student 0 Sep 18 19:12 secret1
-rw-r--r--. 1 root      root    0 Sep 18 19:12 secret2
-rw-rw----. 1 student student 0 Sep 18 19:27 secret3
[student@server4 ~]$ 
```

TO CHANGE PERMISSIONS

.) chmod WHO WHAT WHICH <dir/file>



.) chmod UGO <dir/file>

0 0 0
| | |
7 7 7

.) chmod u+rwx,g-w,o-rwx data1 { to change permissions }

```
File Edit View Search Terminal Help
[student@server4 ~]$ ll
total 0
drwxrwxr-x. 2 student student 6 Sep 18 19:12 data1
drwxr-xr-x. 2 root      root    6 Sep 18 19:12 data2
drwxrwx---. 2 student student 6 Sep 18 19:27 data3
-rw-rw-r--. 1 student student 0 Sep 18 19:12 secret1
-rw-r--r--. 1 root      root    0 Sep 18 19:12 secret2
-rw-rw----. 1 student student 0 Sep 18 19:27 secret3
[student@server4 ~]$
[student@server4 ~]$
[student@server4 ~]$ chmod u+rwx,g-w,o-rwx data1
[student@server4 ~]$
[student@server4 ~]$ ll
total 0
drwxr-x---. 2 student student 6 Sep 18 19:12 data1
drwxr-xr-x. 2 root      root    6 Sep 18 19:12 data2
drwxrwx---. 2 student student 6 Sep 18 19:27 data3
-rw-rw-r--. 1 student student 0 Sep 18 19:12 secret1
-rw-r--r--. 1 root      root    0 Sep 18 19:12 secret2
-rw-rw----. 1 student student 0 Sep 18 19:27 secret3
[student@server4 ~]$ █
```

U - 7 , G - 5 , o - 0

.) chmod 700 data

```
File Edit View Search Terminal Help
[student@localhost ~]$ mkdir data
[student@localhost ~]$
[student@localhost ~]$ ll
total 0
drwxrwxr-x. 2 student student 6 Sep 20 05:21 data
drwxr-xr-x. 2 student student 6 Sep 16 05:17 Desktop
drwxrwxr-x. 2 student student 6 Sep 11 02:07 Documents
drwxrwxr-x. 2 student student 6 Sep 11 02:08 Downloads
drwxrwxr-x. 2 student student 6 Sep 11 02:08 Music
drwxrwxr-x. 2 student student 6 Sep 19 02:10 Pictures
drwxrwxr-x. 2 student student 6 Sep 11 02:08 Videos
[student@localhost ~]$
[student@localhost ~]$
[student@localhost ~]$ chmod 700 data
[student@localhost ~]$
[student@localhost ~]$ ll
total 0
drwx----- 2 student student 6 Sep 20 05:21 data
drwxr-xr-x. 2 student student 6 Sep 16 05:17 Desktop
drwxrwxr-x. 2 student student 6 Sep 11 02:07 Documents
drwxrwxr-x. 2 student student 6 Sep 11 02:08 Downloads
drwxrwxr-x. 2 student student 6 Sep 11 02:08 Music
drwxrwxr-x. 2 student student 6 Sep 19 02:10 Pictures
drwxrwxr-x. 2 student student 6 Sep 11 02:08 Videos
[student@localhost ~]$
```

AT A TIME CHANGE PERMISSIONS FOR BOTH

.) chmod -R ug+rwx,o-rwx <dir> { to change permissions for user and group }

 ↓
 capitals

[why capitals means to ignore files]

[R means recursive (sub)]

[With his command sub directories are not impacted]

```
File Edit View Search Terminal Help
[student@server4 ~]$ chmod -R ug+rwx,o-rwx data1
[student@server4 ~]$ ll
total 0
drwxrwx---. 2 student student 6 Sep 18 19:12 data1
drwxr-xr-x. 2 root      root    6 Sep 18 19:12 data2
drwxrwx---. 2 student student 6 Sep 18 19:27 data3
-rw-rw-r--. 1 student student 0 Sep 18 19:12 secret1
-rw-r--r--. 1 root      root    0 Sep 18 19:12 secret2
-rw-rw----. 1 student student 0 Sep 18 19:27 secret3
[student@server4 ~]$ █
```

.) chmod -R 770 <dir>

[This is not recommended because sub directories also can get execute permissions]

TO CHANGE OWNER

.) chown <un> <dir/file> { to change owner }

.) chown sunil DATA

```
File Edit View Search Terminal Help
[ root@localhost ~]# mkdir DATA
[ root@localhost ~]#
[ root@localhost ~]# ll
total 8
-rw----- 1 root root 1209 Sep  3 12:10 anaconda-ks.cfg
drwxr-xr-x. 2 root root     6 Sep 20 05:49 DATA
-rw-r--r--. 1 root root 1260 Sep  3 19:12 initial-setup-ks.cfg
[ root@localhost ~]#
[ root@localhost ~]#
[ root@localhost ~]# useradd sunil
[ root@localhost ~]#
[ root@localhost ~]# id sunil
uid=1003(sunil) gid=1003(sunil) groups=1003(sunil)
[ root@localhost ~]#
[ root@localhost ~]#
[ root@localhost ~]# chown sunil DATA
[ root@localhost ~]#
[ root@localhost ~]# ll
total 8
-rw----- 1 root root 1209 Sep  3 12:10 anaconda-ks.cfg
drwxr-xr-x. 2 sunil root     6 Sep 20 05:49 DATA
-rw-r--r--. 1 root root 1260 Sep  3 19:12 initial-setup-ks.cfg
[ root@localhost ~]# █
```

TO CHANGE GROUP NAME

.) chgrp <gn> <dir/file>

.) chgrp wheel DATA

```
[root@localhost ~]# chown sunil DATA
[root@localhost ~]#
[root@localhost ~]# ll
total 8
-rw----- 1 root  root 1209 Sep  3 12:10 anaconda-ks.cfg
drwxr-xr-x. 2 sunil  root     6 Sep 20 05:49 DATA
-rw-r--r--. 1 root  root 1260 Sep  3 19:12 initial-setup-ks.cfg
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# chgrp wheel DATA
[root@localhost ~]#
[root@localhost ~]# ll
total 8
-rw----- 1 root  root 1209 Sep  3 12:10 anaconda-ks.cfg
drwxr-xr-x. 2 sunil  wheel     6 Sep 20 05:49 DATA
-rw-r--r--. 1 root  root 1260 Sep  3 19:12 initial-setup-ks.cfg
[root@localhost ~]# █
```

TO CHANGE BOTH

.) chown <un>:<gn> <dir/file> {to change both username & group name at a time}

.) chown BAT:CRICKET DATA

```
[root@localhost ~]#  
[root@localhost ~]# ll  
total 8  
-rw----- 1 root root 1209 Sep  3 12:10 anaconda-ks.cfg  
drwxr-xr-x 2 sunil wheel   6 Sep 20 05:49 DATA  
-rw-r--r-- 1 root root 1260 Sep  3 19:12 initial-setup-ks.cfg  
[root@localhost ~]#  
[root@localhost ~]#  
[root@localhost ~]# chown BAT:CRICKET DATA  
[root@localhost ~]#  
[root@localhost ~]#  
[root@localhost ~]# ll  
total 8  
-rw----- 1 root root 1209 Sep  3 12:10 anaconda-ks.cfg  
drwxr-xr-x 2 BAT CRICKET    6 Sep 20 05:49 DATA  
-rw-r--r-- 1 root root 1260 Sep  3 19:12 initial-setup-ks.cfg  
[root@localhost ~]# █
```

IF USER NAME & GROUP NAME ARE SAME (CHANGING BOTH)

.) chown <un>. <dir/file> { if user name & group name are same }

[. means both are same]

.) chown root. DATA

```
[root@localhost ~]# ll
total 8
-rw----- 1 root root 1209 Sep  3 12:10 anaconda-ks.cfg
drwxr-xr-x 2 BAT CRICKET 6 Sep 20 05:49 DATA
-rw-r--r-- 1 root root 1260 Sep  3 19:12 initial-setup-ks.cfg
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# chown root. DATA
[root@localhost ~]#
[root@localhost ~]# ll
total 8
-rw----- 1 root root 1209 Sep  3 12:10 anaconda-ks.cfg
drwxr-xr-x 2 root root 6 Sep 20 05:49 DATA
-rw-r--r-- 1 root root 1260 Sep  3 19:12 initial-setup-ks.cfg
[root@localhost ~]#
```

DAY 14

SPECIAL PERMISSIONS

			<u>Directories</u>	<u>Files</u>
4	u + s	Set UID	X	X
2	g + s	Set GID (to set default group ownership)	✓	X
1	o + t	Set Sticky Bit (to protect files from group members)	✓	X

These permissions are for protecting the Directories.

```
.) chmod g+s <dir> / chmod 2770 <dir>
.) chmod o+t <dir> / chmod 1770 <dir>
```

Or

```
.) chmod g+s,o+t <dir> / chmod 3770 <dir>
```

For understanding purpose I done whole part.

```
File Edit View Search Terminal Help
[student@server4 ~]$ for u in {victor,roy};do sudo useradd -G Team $u;done
[student@server4 ~]$
[student@server4 ~]$ for u in {victor,roy};do echo 12345 | sudo passwd --stdin $u;done
Changing password for user victor.
passwd: all authentication tokens updated successfully.
Changing password for user roy.
passwd: all authentication tokens updated successfully.
[student@server4 ~]$
```

```
File Edit View Search Terminal Help
[student@server4 ~]$ sudo ls -l /proj1
total 0
-rw-rw-r--. 1 victor Team 0 Sep 25 18:02 report1
-rw-r--r--. 1 victor Team 0 Sep 25 17:46 report2
-rw-r--r--. 1 victor Team 0 Sep 25 17:46 report3
-rw-r--r--. 1 victor Team 0 Sep 25 17:46 report4
-rw-r--r--. 1 victor Team 0 Sep 25 17:46 report5
[student@server4 ~]$
[student@server4 ~]$ su - roy
Password:
Last login: Wed Sep 25 17:56:12 IST 2019 on pts/0
[roy@server4 ~]$
[roy@server4 ~]$ cd /proj1
[roy@server4 proj1]$
[roy@server4 proj1]$ rm -rf report1
[roy@server4 proj1]$
[roy@server4 proj1]$ ls -l /proj1
total 0
-rw-r--r--. 1 victor Team 0 Sep 25 17:46 report2
-rw-r--r--. 1 victor Team 0 Sep 25 17:46 report3
-rw-r--r--. 1 victor Team 0 Sep 25 17:46 report4
-rw-r--r--. 1 victor Team 0 Sep 25 17:46 report5
[roy@server4 proj1]$
[roy@server4 proj1]$ logout
[student@server4 ~]$
```

```

[student@server4 ~]$
[student@server4 ~]$ sudo chmod -R g+s,ot+ /proj1
[student@server4 ~]$
[student@server4 ~]$ ls -l /proj1
ls: cannot open directory /proj1: Permission denied
[student@server4 ~]$ sudo ls -l /proj1
total 0
-rw-r-Sr-T. 1 victor Team 0 Sep 25 17:46 report2
-rw-r-Sr-T. 1 victor Team 0 Sep 25 17:46 report3
-rw-r-Sr-T. 1 victor Team 0 Sep 25 17:46 report4
-rw-r-Sr-T. 1 victor Team 0 Sep 25 17:46 report5
[student@server4 ~]$
[student@server4 ~]$
[student@server4 ~]$
[student@server4 ~]$ su - roy
Password:
Last login: Wed Sep 25 18:07:22 IST 2019 on pts/0
[roy@server4 ~]$
[roy@server4 ~]$
[roy@server4 ~]$ cd /proj1
[roy@server4 proj1]$
[roy@server4 proj1]$
[roy@server4 proj1]$ rm -rf report2
rm: cannot remove 'report2': Operation not permitted
[roy@server4 proj1]$
[roy@server4 proj1]$
[roy@server4 proj1]$ touch report1
[roy@server4 proj1]$ ls -l
total 0
-rw-rw-r--. 1 roy      Team 0 Sep 25 18:11 report1
-rw-r-Sr-T. 1 victor Team 0 Sep 25 17:46 report2
-rw-r-Sr-T. 1 victor Team 0 Sep 25 17:46 report3
-rw-r-Sr-T. 1 victor Team 0 Sep 25 17:46 report4
-rw-r-Sr-T. 1 victor Team 0 Sep 25 17:46 report5
[roy@server4 proj1]$ □

```

Execute Permissions shown in small letters , Non Execute Permissions shown in Capital letters.

$$X + s \rightarrow s$$

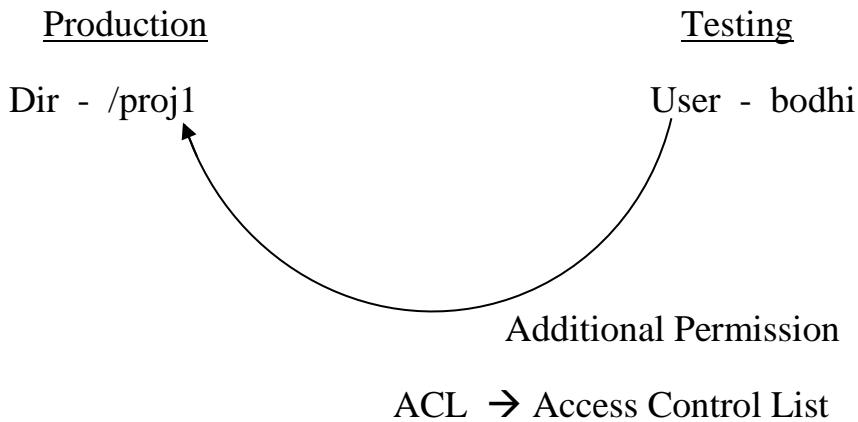
$$- + s \rightarrow S$$

$$X + t \rightarrow t$$

$$- + t \rightarrow T$$

DAY 15

ADDITIONAL PERMISSIONS



.) getfacl <dir> { to get the permission details }

```
File Edit View Search Terminal Help
[student@server4 ~]$ ls -l DATA
total 0
-rw-rw-r--. 1 victor Team 0 Sep 25 18:19 file1
-rw-rw-r--. 1 victor Team 0 Sep 25 18:19 file2
-rw-rw-r--. 1 victor Team 0 Sep 25 18:19 file3
-rw-rw-r--. 1 victor Team 0 Sep 25 18:19 file4
-rw-rw-r--. 1 victor Team 0 Sep 25 18:19 file5
[student@server4 ~]$
[student@server4 ~]$
[student@server4 ~]$ getfacl DATA
# file: DATA
# owner: victor
# group: Team
user::rwx
group::rwx
other::r-x
[student@server4 ~]$ □
```

.) setfacl -m u:<un>:rwx <dir> { to set the user permissions }
↓
Modify :rx
:
_

```
File Edit View Search Terminal Help
[student@server4 ~]$ getfacl DATA
# file: DATA
# owner: victor
# group: Team
user::rwx
group::rwx
other::r-x

[student@server4 ~]$ sudo setfacl -m u:victor:rx DATA
[student@server4 ~]$
[student@server4 ~]$ getfacl DATA
# file: DATA
# owner: victor
# group: Team
user::rwx
user:victor:r-x
group::rwx
mask::rwx
other::r-x

[student@server4 ~]$ █
```

.) setfacl -m g:<gn>:rwx <dir> { to set group permissions }

:rx

:_

```
File Edit View Search Terminal Help
[student@server4 ~]$ getfacl DATA
# file: DATA
# owner: victor
# group: Team
user::rwx
user:victor:r-x
group::rwx
mask::rwx
other::r-x

[student@server4 ~]$ sudo setfacl -m g:Team:- DATA
[student@server4 ~]$
[student@server4 ~]$ getfacl DATA
# file: DATA
# owner: victor
# group: Team
user::rwx
user:victor:r-x
group::rwx
group:Team:---
mask::rwx
other::r-x

[student@server4 ~]$ █
```

```
.) setfacl -m o: :rwx      <dir>      { to set others Permissions }

        : :rx

        : :_
```

```
File Edit View Search Terminal Help
[student@server4 ~]$ getfacl DATA
# file: DATA
# owner: victor
# group: Team
user::rwx
user:victor:r-x
group::rwx
group:Team:---
mask::rwx
other::r-x

[student@server4 ~]$ sudo setfacl -m o::rwx DATA
[student@server4 ~]$
[student@server4 ~]$ getfacl DATA
# file: DATA
# owner: victor
# group: Team
user::rwx
user:victor:r-x
group::rwx
group:Team:---
mask::rwx
other::rwx

[student@server4 ~]$ █
```

.) setfacl -Rm g:<gn>:rwX <dir> { recursive }

```
File Edit View Search Terminal Help
[student@server4 ~]$ getfacl DATA
# file: DATA
# owner: victor
# group: Team
user::rwx
user:victor:r-x
group::rwx
group:Team:---
mask::rwx
other::rwx

[student@server4 ~]$ ls -l DATA
total 0
-rw-rw-r--. 1 victor Team 0 Sep 25 18:19 file1
-rw-rw-r--. 1 victor Team 0 Sep 25 18:19 file2
-rw-rw-r--. 1 victor Team 0 Sep 25 18:19 file3
-rw-rw-r--. 1 victor Team 0 Sep 25 18:19 file4
-rw-rw-r--. 1 victor Team 0 Sep 25 18:19 file5
[student@server4 ~]$
[student@server4 ~]$
[student@server4 ~]$ sudo setfacl -Rm g:Team:rwx DATA
[student@server4 ~]$
[student@server4 ~]$ ls -l DATA
total 20
-rw-rw-r--+ 1 victor Team 0 Sep 25 18:19 file1
-rw-rw-r--+ 1 victor Team 0 Sep 25 18:19 file2
-rw-rw-r--+ 1 victor Team 0 Sep 25 18:19 file3
-rw-rw-r--+ 1 victor Team 0 Sep 25 18:19 file4
-rw-rw-r--+ 1 victor Team 0 Sep 25 18:19 file5
[student@server4 ~]$ 
```

[if there is any + symbol that is ACL]

.) setfacl -dm u:<un>:rwx <dir> { default }

```
File Edit View Search Terminal Help
[student@server4 ~]$ sudo setfacl -dm u:victor:rwx DATA
[student@server4 ~]$
[student@server4 ~]$ getfacl DATA
# file: DATA
# owner: victor
# group: Team
user::rwx
user:victor:r-x
group::rwx
group:Team:rwx
mask::rwx
other::rwx
default:user::rwx
default:user:victor:rwx
default:group::rwx
default:mask::rwx
default:other::rwx

[student@server4 ~]$ □
```

.) df -h { to know file size }

```
File Edit View Search Terminal Help
[student@localhost ~]$ df -h
Filesystem           Size  Used Avail Use% Mounted on
/dev/mapper/rhel-root  48G  2.9G   45G  7% /
devtmpfs              905M    0  905M  0% /dev
tmpfs                 914M  100K  914M  1% /dev/shm
tmpfs                 914M  8.9M  905M  1% /run
tmpfs                 914M    0  914M  0% /sys/fs/cgroup
/dev/sda1              497M  119M  379M  24% /boot
[student@localhost ~]$ □
```

HOW TO FIND FILES & DIRECTORIES

Non Admin → locate

Step 1 : updated

Step 2 : locate <file/dir>

) locate <file/dir>

```
File Edit View Search Terminal Help
[student@server4 ~]$ locate DATA
/etc/usb_modeswitch.d/05c6:1000:uMa=AnyDATA
/usr/share/doc/postfix-2.10.1/README_FILES/DATABASE_README
/usr/share/i18n/charmaps/BS_VIEWDATA.gz
[student@server4 ~]$ █
```

Admin → find & grep

Find

.) find / -name <file/dir>

/ → where we want to search

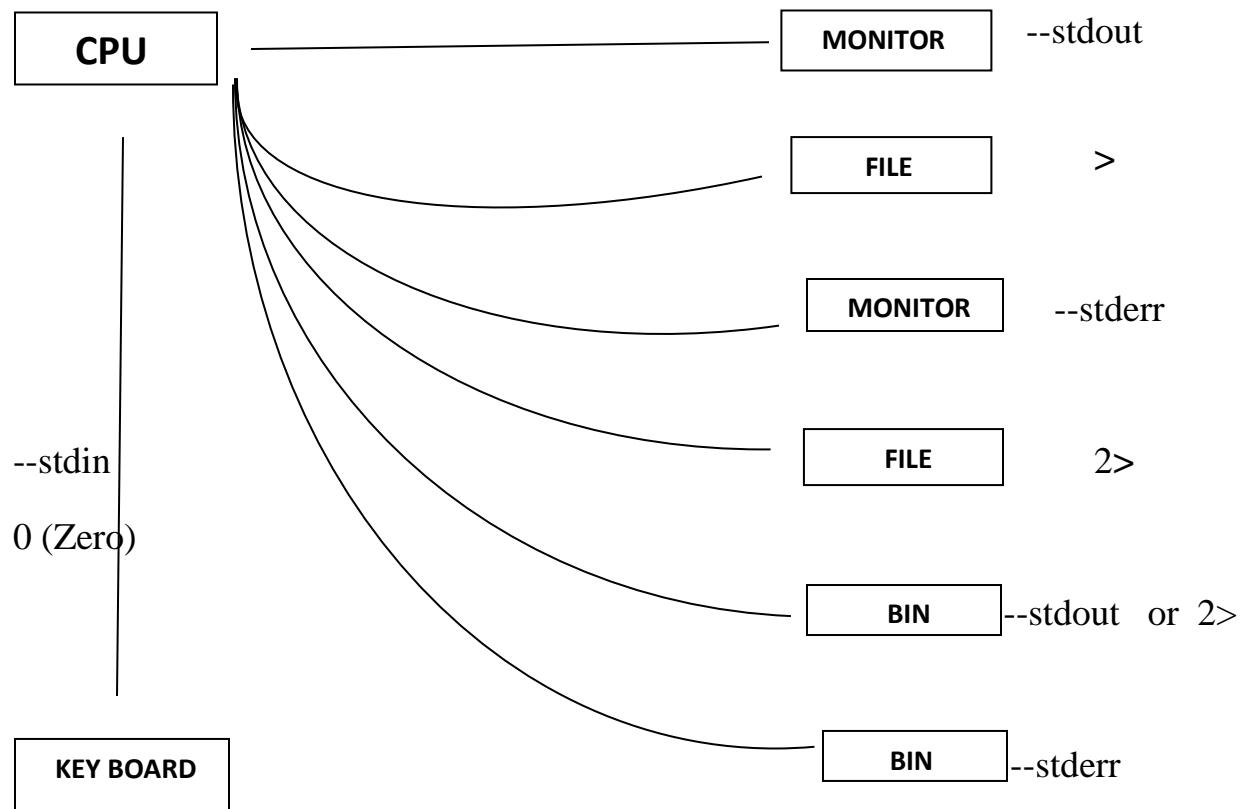
-name → type / user/group

files owned by user - <un> / files owned by group - <gn>

<file/dir> → what we want to search

.) find / -name <file/dir>

```
File Edit View Search Terminal Help
[student@localhost ~]$
[student@localhost ~]$ find /home -user student
/home/student
/home/student/.mozilla
/home/student/.mozilla/extensions
/home/student/.mozilla/plugins
/home/student/.bash_logout
/home/student/.bash_profile
/home/student/.bashrc
/home/student/.config
/home/student/.config/imsettings
/home/student/.config/user-dirs.dirs
/home/student/.config/user-dirs.locale
/home/student/.config/abrt
/home/student/.config/gnome-session
/home/student/.config/gnome-session/saved-session
/home/student/.config/pulse
/home/student/.config/pulse/cookie
/home/student/.config/pulse/23d93faa986846138b20a6f821f2fee9-device-volumes.tdb
/home/student/.config/pulse/23d93faa986846138b20a6f821f2fee9-stream-volumes.tdb
/home/student/.config/pulse/23d93faa986846138b20a6f821f2fee9-card-database.tdb
/home/student/.config/pulse/23d93faa986846138b20a6f821f2fee9-default-sink
/home/student/.config/pulse/23d93faa986846138b20a6f821f2fee9-default-source
/home/student/.config/gconf
/home/student/.config/goa-1.0
/home/student/.config/dconf
/home/student/.config/dconf/user
/home/student/.config/ibus
/home/student/.config/ibus/bus
/home/student/.config/ibus/bus/23d93faa986846138b20a6f821f2fee9-unix-0
/home/student/.config/evolution
/home/student/.config/evolution/sources
/home/student/.config/nautilus
/home/student/.config/nautilus/desktop-metadata
/home/student/.config/nautilus/acceles
```



[Note : configuration files start with *.conf]

DAY 16

FIND AND COPY

When we use find & copy commands at a time we need to type -exec between the both commands and the total command ends with \;

```
File Edit View Search Terminal Help
[root@server0 ~]# #find /etc -name *.conf -exec cp -a {} /conf.found/ \;
[root@server0 ~]# mkdir /proj1
[root@server0 ~]# chown student:wheel /proj1
[root@server0 ~]# touch /tmp/test
[root@server0 ~]# chown student /tmp/test
[root@server0 ~]# mkdir /student.found
[root@server0 ~]# find / -user student -exec cp -rpf {} /student.found/ \;
cp: error reading '/proc/3869/task/3869/mem': Input/output error
cp: failed to extend '/student.found/3869/task/3869/mem': Input/output error
cp: error reading '/proc/3869/task/3869/clear_refs': Invalid argument
cp: failed to extend '/student.found/3869/task/3869/clear_refs': Invalid argument
```

-a means all

-rpf means recursive presurve force

[-a and -rpf we can use these two for copy as same , without any changes]

{ } – if we don't know the exact source we need to use these brackets

below screenshot is another example for find and copy

```
File Edit View Search Terminal Help
[root@server4 ~]# find / -user student >>result 2>>errors
[root@server4 ~]#
[root@server4 ~]#
[root@server4 ~]# ll
total 25488
-rw-----. 1 root root      8619 May  7  2014 anaconda-ks.cfg
-rw-r--r--. 1 root root     1413 Sep 26 18:10 errors
-rw-r--r--. 1 root root 9958500 Sep 26 18:10 result
[root@server4 ~]# 
```

Grep

grep → Global Regular Expression

.) grep <keyword> <path of the file>

```
File Edit View Search Terminal Help
[student@server4 ~]$ grep victor /etc/passwd
victor:x:1001:1002::/home/victor:/bin/bash
[student@server4 ~]$
[student@server4 ~]$ grep roy /etc/passwd
roy:x:1002:1003::/home/roy:/bin/bash
[student@server4 ~]$ █
```

.) grep -i <keyword> <path of the file>

{ i - ignore case (means capitals or small letters) }

```
File Edit View Search Terminal Help
[student@server4 ~]$ grep -i Team /etc/group
Team:x:1001:victor,roy
[student@server4 ~]$ █
```

.) grep -ir <keyword> <path of the dir> { search in dir }

```
File Edit View Search Terminal Help
[student@server4 ~]$ grep -ir DATA /home
/home/student/.bash_history:mkdir DATA
/home/student/.bash_history:cd DATA
grep: /home/victor: Permission denied
grep: /home/roy: Permission denied
[student@server4 ~]$ █
```

.) grep -inr <keyword> <path of the dir> { show line no's }

[nr – line no , i is not recommended all the times]

```
File Edit View Search Terminal Help
[student@server4 ~]$
[student@server4 ~]$ grep -inr victor /etc
grep: /etc/crypttab: Permission denied
grep: /etc/pki/CA/private: Permission denied
grep: /etc/pki/rsyslog: Permission denied
grep: /etc/audit: Permission denied
Binary file /etc/udev/hwdb.bin matches
/etc/group:64:Team:x:1001:victor,roy
/etc/group:65:victor:x:1002:
grep: /etc/gshadow: Permission denied
grep: /etc/shadow-: Permission denied
grep: /etc/ppp/peers/wvdial: Permission denied
grep: /etc/ppp/chap-secrets: Permission denied
grep: /etc/ppp/eaptls-client: Permission denied
grep: /etc/ppp/eaptls-server: Permission denied
grep: /etc/ppp/pap-secrets: Permission denied
grep: /etc/iscsi/iscsid.conf: Permission denied
/etc/passwd:40:victor:x:1001:1002:::home/victor:/bin/bash
grep: /etc/securetty: Permission denied
grep: /etc/anacrontab: Permission denied
grep: /etc/shadow: Permission denied
grep: /etc/cron.deny: Permission denied
grep: /etc/sysconfig/ip6tables-config: Permission denied
grep: /etc/sysconfig/iptables-config: Permission denied
grep: /etc/sysconfig/crond: Permission denied
grep: /etc/sysconfig/sshd: Permission denied
grep: /etc/sysconfig/ip6tables: Permission denied
grep: /etc/sysconfig/iptables: Permission denied
grep: /etc/sysconfig/ebtables-config: Permission denied
grep: /etc/polkit-1/rules.d: Permission denied
grep: /etc/polkit-1/localauthority: Permission denied
/etc/passwd-:40:victor:x:1001:1002:::home/victor:/bin/bash
grep: /etc/ssh/moduli: Permission denied
grep: /etc/ssh/ssh_host_rsa_key: Permission denied
grep: /etc/ssh/ssh_host_ecdsa_key: Permission denied
```

In original order / In the same order

.) grep -i <keyword> <file path> >/filename

(Or)

grep -i <keyword> <file path> >filename

```
File Edit View Search Terminal Help
[root@server4 ~]# grep -i student /etc/group > result
[root@server4 ~]#
[root@server4 ~]# cat result
wheel:x:10:student
student:x:1000:
[root@server4 ~]# 
```

In order

.) grep -i <keyword> <filepath> | sort > filename

```
File Edit View Search Terminal Help
[root@server4 ~]# grep -i student /etc/group | sort > orderresult
[root@server4 ~]#
[root@server4 ~]# cat orderresult
student:x:1000:
wheel:x:10:student
[root@server4 ~]# 
```

In reverse order

.) grep -i <keyword> <filepath> | sort -r > filepath

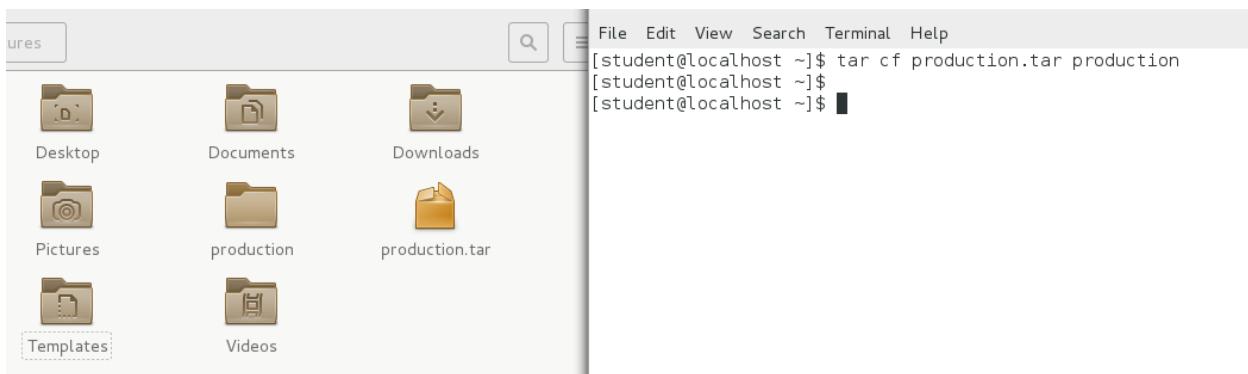
```
File Edit View Search Terminal Help
[root@server4 ~]# grep -i student /etc/group | sort -r > reverseresult
[root@server4 ~]#
[root@server4 ~]# cat reverseresult
wheel:x:10:student
student:x:1000:
[root@server4 ~]# 
```

ARCHIVING or BACKUP

tar → Tape Drive Archive

.) tar cf output.tar src(es) { to create archive }

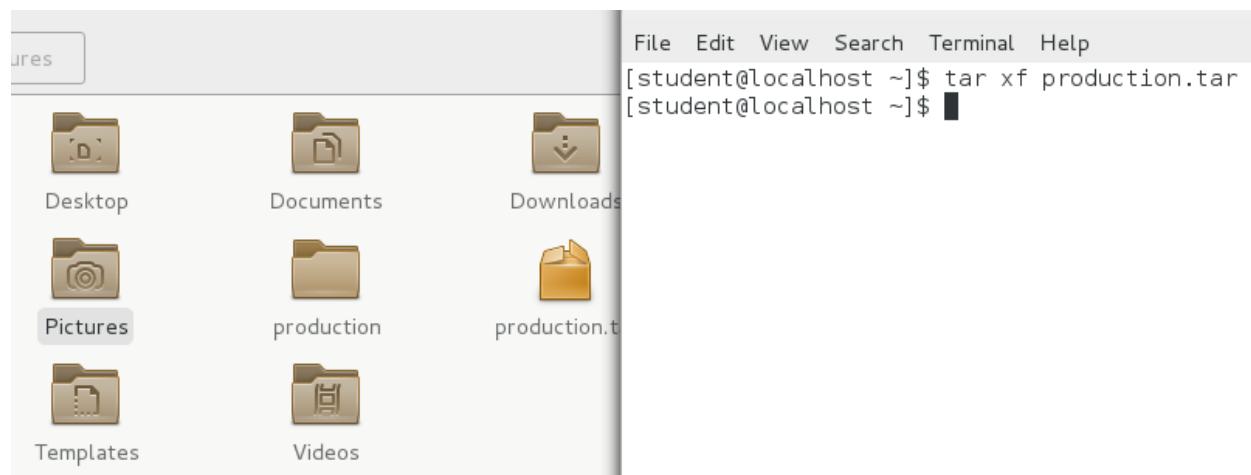
[c – create , f – file ,output.tar – destination]



.) tar tf output.tar { to see list inside the archive }
[t – list]

```
File Edit View Search Terminal Help  
[student@localhost ~]$ tar tf production.tar  
production/  
production/project1/  
production/project1/report1  
production/project1/report2  
production/project1/report3  
production/project1/report4  
production/project1/report5  
production/project2/  
production/project2/report1  
production/project2/report2  
production/project2/report3  
production/project3/  
production/project3/report1  
production/project3/report2  
production/project3/report3  
production/project3/report4  
[student@localhost ~]$ █
```

.) tar xf output.tar { extracting }



Compress Method

Normal – Gunzip (Gzip)

Medium – Bunzip (bzip)

High – xzip (xz)

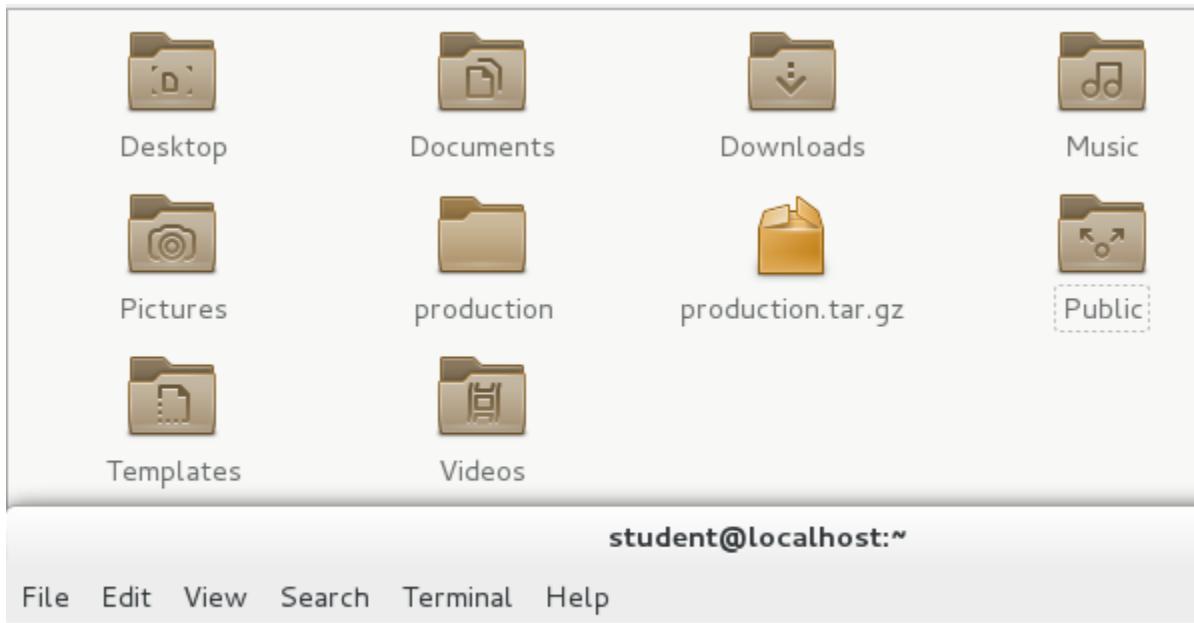
[do not compress the videos in high compress mode because the quality]

Normal

.) tar czf output.tar.gz src(es)

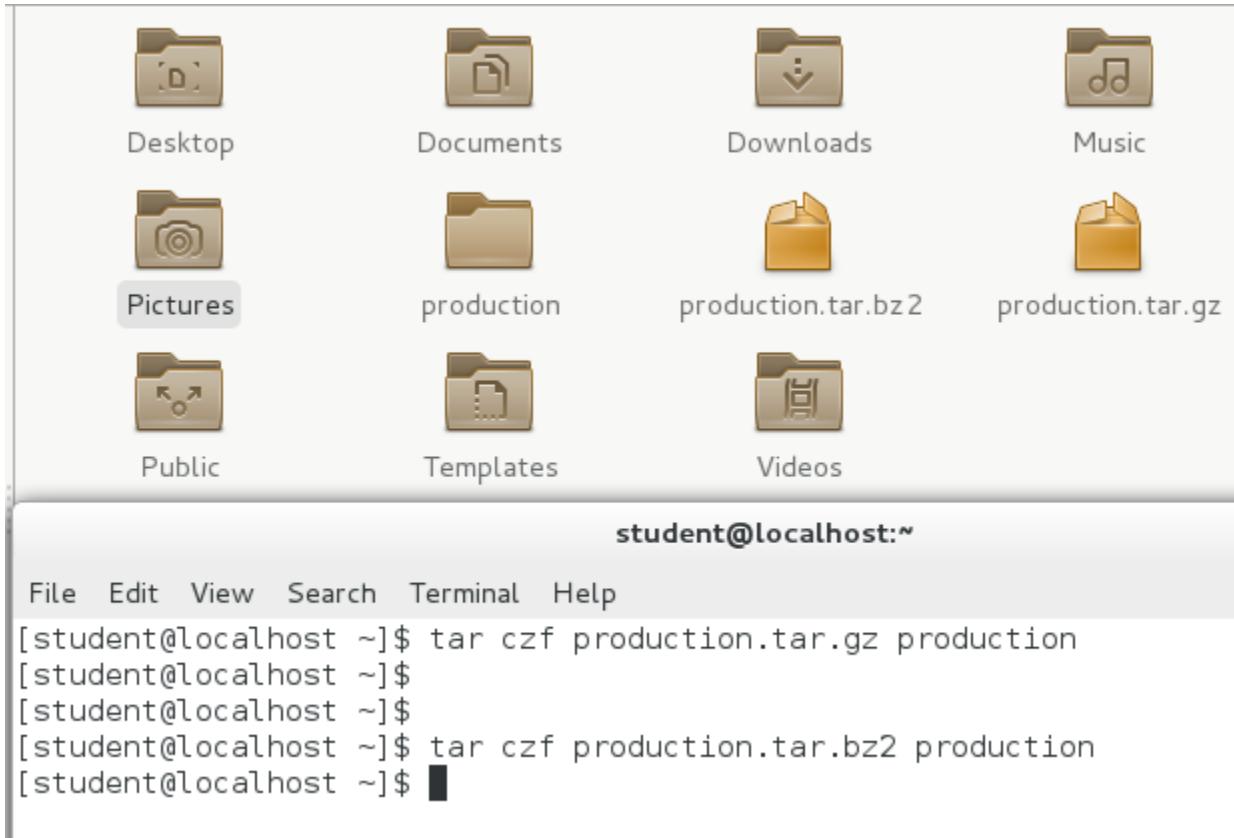
(or)

tar czf output.tgz src(es)



Medium

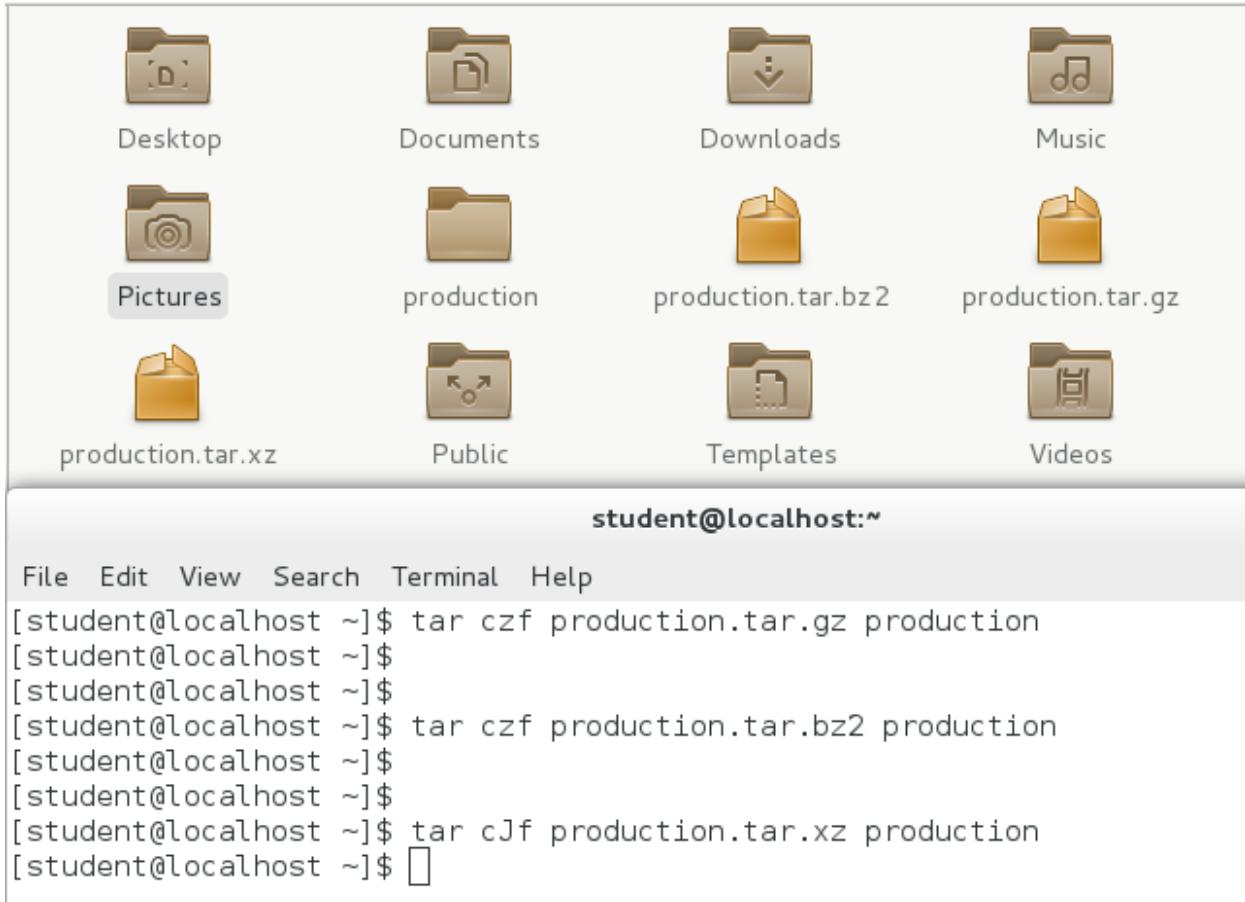
.) tar cjf output.tar.bz2 src(es)



High

.) tar cJf output.tar.xz src(es)

[here J capital]



[Help → man tar we can get all the details]

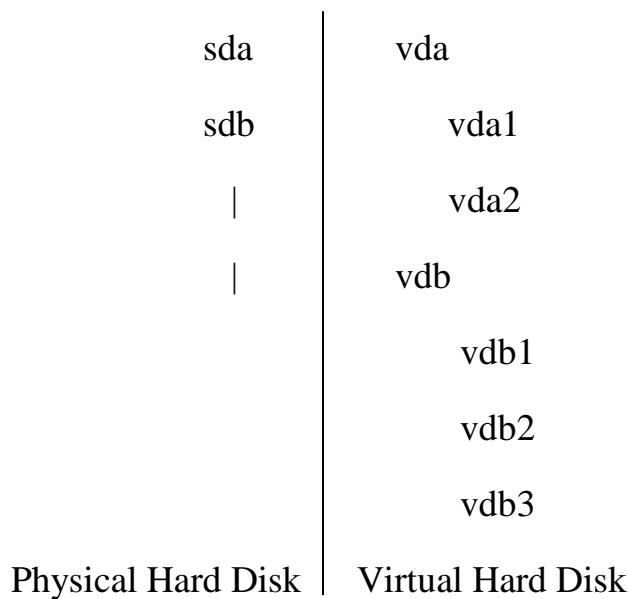
.) tar xf output.tar -c <destination> { extract to destination }

DAY 17

PARTITION MANAGEMENT

.) lsblk { to list the partitions info }

```
File Edit View Search Terminal Help
[student@server4 ~]$ lsblk
NAME   MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
vda    253:0    0 10G  0 disk
└─vda1 253:1    0 10G  0 part /
vdb    253:16   0 10G  0 disk
[student@server4 ~]$ █
```



.) cat /proc/partitions { here also we can see the partitions info }

[lsblk will show more info]

```
File Edit View Search Terminal Help
[student@server4 ~]$ cat /proc/partitions
major minor #blocks name

253      0    10485760 vda
253      1    10484142 vda1
253     16    10485760 vdb
[student@server4 ~]$ █
```

.) # fdisk -l { shows partitions info in root }

```
File Edit View Search Terminal Help
[root@server4 ~]# fdisk -l

Disk /dev/vda: 10.7 GB, 10737418240 bytes, 20971520 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x00013f3e

      Device Boot      Start        End      Blocks   Id  System
/dev/vda1  *        2048    20970332    10484142+   83  Linux

Disk /dev/vdb: 10.7 GB, 10737418240 bytes, 20971520 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
[root@server4 ~]# █
```

.) lsblk -f { show file system type and UUID }

```
File Edit View Search Terminal Help
[student@server4 ~]$ lsblk -f
NAME   FSTYPE LABEL UUID                                     MOUNTPOINT
vda
└vda1  xfs   /   9bf6b9f7-92ad-441b-848e-0257cbb883d1 /
vdb
[student@server4 ~]$ █
```

TO CREATE /DELETE/MANAGE PARTITIONS

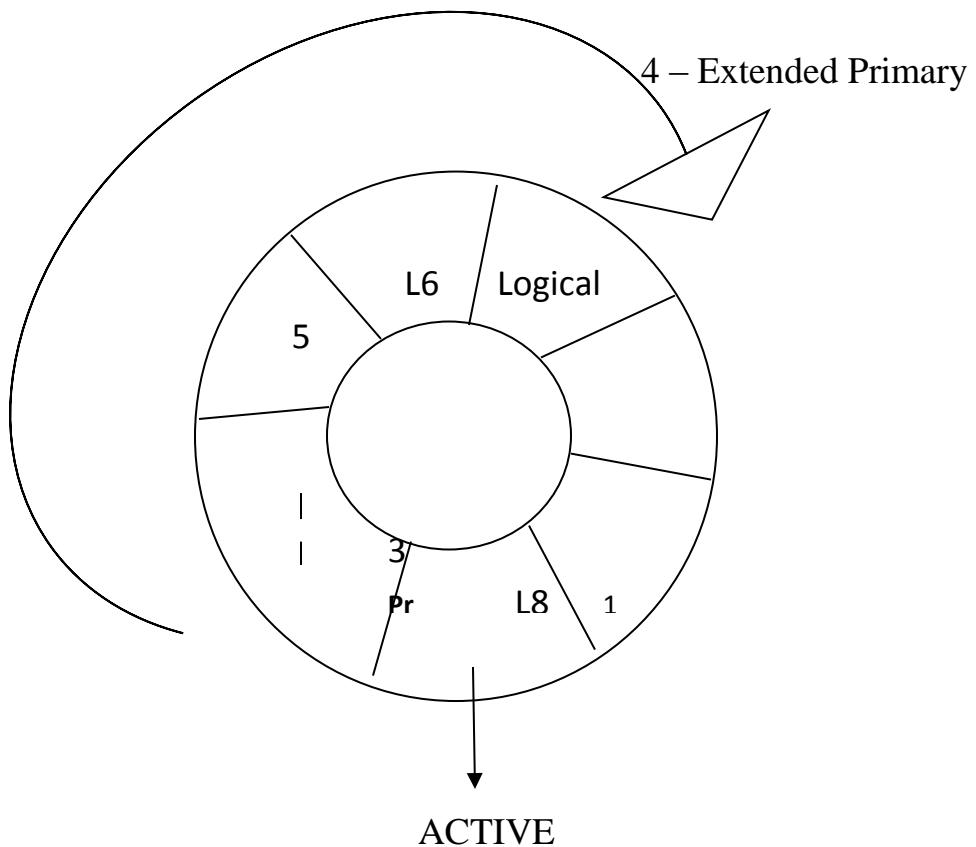
fdisk parted

or or

gdisk gparted

fd – fixed disk → depends on master boot record

gd – global disk → depends on global partition table



1st partition is active

4 Primary

↳ 3 Primary

1 Extended Primary (This is imaginary)

11 Logical Partitions

Total we can make 15 Partitions .

MBR

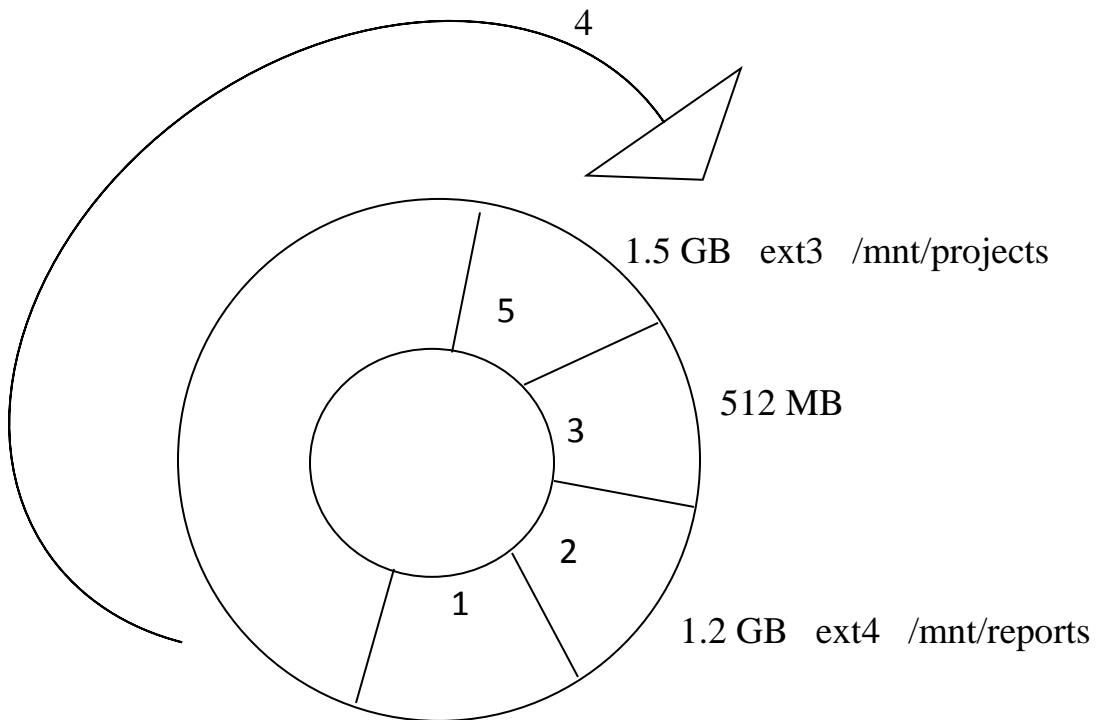
Boot Loader	Partition Info	MBR validity Check	512 bytes
-------------	----------------	--------------------	-----------

439 – 446 bytes 64 bytes 2-7 bytes

each partition needs

$$16 \text{ bytes} \quad 16 \times 4 = 64$$

Ex :



size : 1 GB

Format : xfs

Mount Point : /mnt/data

Size :

.) fdisk <device path>

m → help

n → new partition

d → delete partition

w → save & exit

q → exit without saving

t → to change type

l → to know types

these are the most used commands for partitions

.) fdisk <device path>

```
root@server4:~# fdisk /dev/vdb
File Edit View Search Terminal Help
[root@server4 ~]# fdisk /dev/vdb
Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table
Building a new DOS disklabel with disk identifier 0x47035d32.

Command (m for help): n
Partition type:
  p  primary (0 primary, 0 extended, 4 free)
  e  extended
Select (default p): p
Partition number (1-4, default 1):
First sector (2048-20971519, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-20971519, default 20971519): +1G
Partition 1 of type Linux and of size 1 GiB is set

Command (m for help): n
Partition type:
  p  primary (1 primary, 0 extended, 3 free)
  e  extended
Select (default p): p
Partition number (2-4, default 2):
First sector (2099200-20971519, default 2099200):
Using default value 2099200
Last sector, +sectors or +size{K,M,G} (2099200-20971519, default 20971519): +1200M
Partition 2 of type Linux and of size 1.2 GiB is set

Command (m for help): 
```

command : n

select (default p) : p

Partition number : press enter { automatically it'll choose the partition)

First sector : press enter

Last sector : +1G (press enter)

1st partition with size 1GB is set

same as well 2nd partition with size 1.2 GB is set

```
File Edit View Search Terminal Help
Partition 2 of type Linux and of size 1.2 GiB is set

Command (m for help): n
Partition type:
  p  primary (2 primary, 0 extended, 2 free)
  e  extended
Select (default p): p
Partition number (3,4, default 3):
First sector (4556800-20971519, default 4556800):
Using default value 4556800
Last sector, +sectors or +size{K,M,G} (4556800-20971519, default 20971519): +512M
Partition 3 of type Linux and of size 512 MiB is set

Command (m for help):
Command (m for help): n
Partition type:
  p  primary (3 primary, 0 extended, 1 free)
  e  extended
Select (default e):
Using default response e
Selected partition 4
First sector (5605376-20971519, default 5605376):
Using default value 5605376
Last sector, +sectors or +size{K,M,G} (5605376-20971519, default 20971519):
Using default value 20971519
Partition 4 of type Extended and of size 7.3 GiB is set
```

3rd Partition with size 512 MB is set

but for the fourth partition

command : n

select (default e) : press enter

Partition number : press enter { automatically it'll choose the partition)

First sector : press enter

Last sector : press enter (don't give any value here)

because 4th partition extended primary .

```
Command (m for help): n
All primary partitions are in use
Adding logical partition 5
First sector (5607424-20971519, default 5607424):
Using default value 5607424
Last sector, +sectors or +size{K,M,G} (5607424-20971519, default 20971519): +1500G
Value out of range.
Last sector, +sectors or +size{K,M,G} (5607424-20971519, default 20971519): +1500M
Partition 5 of type Linux and of size 1.5 GiB is set
```

```
Command (m for help): p
```

```
Disk /dev/vdb: 10.7 GB, 10737418240 bytes, 20971520 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x47035d32
```

Device	Boot	Start	End	Blocks	Id	System
/dev/vdb1		2048	2099199	1048576	83	Linux
/dev/vdb2		2099200	4556799	1228800	83	Linux
/dev/vdb3		4556800	5605375	524288	83	Linux
/dev/vdb4		5605376	20971519	7683072	5	Extended
/dev/vdb5		5607424	8679423	1536000	83	Linux

```
Command (m for help): w
The partition table has been altered!
```

```
Calling ioctl() to re-read partition table.
```

```
Syncing disks.
```

```
[root@server4 ~]# partprobe /dev/vdb
[root@server4 ~]# █
```

5th partition is 1.5 GB , at Last sector don't give +1.5G , give +1500M

5th partition with size 1.5GB is set

press p (we can see the partitions)

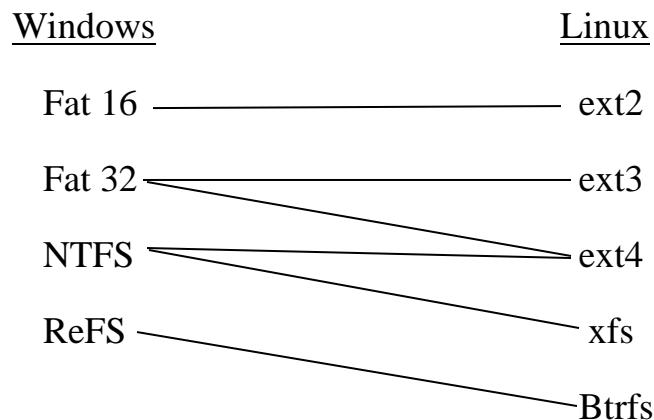
press w (save and exit)

.) partprobe <devicepath> { to update kernel }

[it will update kernel about partition changes without rebooting]

WRITING FILESYSTEM

Format :



.) mkfs.<fstype> <partition path> {to make format for the partition }

(or)

mkfs -t <fstype> <partition path> [1st one is easy]

```
[root@server4 ~]#
[root@server4 ~]# mkfs.xfs /dev/vdb1
meta-data=/dev/vdb1              isize=256    agcount=4, agsize=65536 blks
                                sectsz=512   attr=2, projid32bit=1
                                =          crc=0
data     =               bsize=4096   blocks=262144, imaxpct=25
                                =          sunit=0   swidth=0 blks
naming  =version 2             bsize=4096   ascii-ci=0 ftype=0
log      =internal log         bsize=4096   blocks=2560, version=2
                                =          sectsz=512  sunit=0 blks, lazy-count=1
realtime =none                 extsz=4096   blocks=0, rtextents=0
```

1st partition format is changed to xfs format

.) lsblk -f

```
File Edit View Search Terminal Help
[root@server4 ~]# lsblk -f
NAME   FSTYPE LABEL UUID                                     MOUNTPOINT
vda
└─vdb1  xfs    39da04af-ebf2-469d-a650-466b33587397
vdb2
vdb3
vdb4
vdb5
[root@server4 ~]#
```

```
File Edit View Search Terminal Help
[root@server4 ~]# mkfs.ext4 /dev/vdb2
mke2fs 1.42.9 (28-Dec-2013)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
76800 inodes, 307200 blocks
15360 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=314572800
10 block groups
32768 blocks per group, 32768 fragments per group
7680 inodes per group
Superblock backups stored on blocks:
      32768, 98304, 163840, 229376, 294912

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done
```

2nd partition format is change to ext4 format

```
[root@server4 ~]# mkfs.ext3 /dev/vdb5
mke2fs 1.42.9 (28-Dec-2013)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
96000 inodes, 384000 blocks
19200 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=394264576
12 block groups
32768 blocks per group, 32768 fragments per group
8000 inodes per group
Superblock backups stored on blocks:
      32768, 98304, 163840, 229376, 294912

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done

[root@server4 ~]# lsblk -f
NAME   FSTYPE LABEL UUID                                     MOUNTPOINT
vda
└─vda1 xfs      9bf6b9f7-92ad-441b-848e-0257cbb883d1 /
vdb
└─vdb1 xfs      39da04af-ebf2-469d-a650-466b33587397
└─vdb2 ext4     61318a61-8c16-44e4-beda-d9359644ec7b
└─vdb3
└─vdb4
└─vdb5 ext3     417820a7-9492-4258-b4db-c4acf7f21b9d
[root@server4 ~]# 
```

5th partition format is changed to ext3 format

TO ACCESS FILE SYSTEM

Mount Point :

- 1) Permanent Mount
 - 2) Temporary Mount

Permanent Mount :

.) vim /etc/fstab

before that we must create directory under /mnt

```
[root@server4 ~]# mkdir /mnt/data  
[root@server4 ~]# vim /etc/fstab  
[root@server4 ~]# █
```

in the vim need to do edit

src	dst	fs type	defaults	0	0
/dev/vdb1	/mnt/data	xfs	defaults	0	0

to save and exit vim → wq!

.) mount -a { mount all from fstab }

.) lsblk -f

```
File Edit View Search Terminal Help
[root@server4 ~]# mkdir /mnt/data
[root@server4 ~]# vim /etc/fstab
[root@server4 ~]#
[root@server4 ~]#
[root@server4 ~]# mount -a
[root@server4 ~]#
[root@server4 ~]# lsblk -f
NAME   FSTYPE LABEL UUID                                     MOUNTPOINT
vda
└─vda1  xfs   9bf6b9f7-92ad-441b-848e-0257cbb883d1 /
vdb
└─vdb1  xfs   39da04af-ebf2-469d-a650-466b33587397 /mnt/data
vdb2   ext4   61318a61-8c16-44e4-beda-d9359644ec7b
vdb3
vdb4
└─vdb5  ext3   417820a7-9492-4258-b4db-c4acf7f21b9d
[root@server4 ~]# 
```

next for partition 2 :

.)mkdir /mnt/reports

.) vim /etc/fstab

```
File Edit View Search Terminal Help
```

```
#  
# /etc/fstab  
# Created by anaconda on Wed May 7 01:22:57 2014  
#  
# Accessible filesystems, by reference, are maintained under '/dev/disk'  
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info  
#  
UUID=9bf6b9f7-92ad-441b-848e-0257cbb883d1 / xfs defaults 1 1  
/dev/vdb1 /mnt/data xfs defaults 0 0  
/dev/vdb2 /mnt/reports ext4 defaults 0 0
```

```
File Edit View Search Terminal Help
```

```
[root@server4 ~]# mkdir /mnt/reports  
[root@server4 ~]#  
[root@server4 ~]# vim /etc/fstab  
[root@server4 ~]#  
[root@server4 ~]# mount -a  
[root@server4 ~]#  
[root@server4 ~]# lsblk -f  
NAME FSTYPE LABEL UUID MOUNTPOINT  
vda  
└─vda1 xfs 9bf6b9f7-92ad-441b-848e-0257cbb883d1 /  
vdb  
└─vdb1 xfs 39da04af-ebf2-469d-a650-466b33587397 /mnt/data  
└─vdb2 ext4 61318a61-8c16-44e4-beda-d9359644ec7b /mnt/reports  
└─vdb3  
└─vdb4  
└─vdb5 ext3 417820a7-9492-4258-b4db-c4acf7f21b9d  
[root@server4 ~]#
```

for 2nd partition mount point is fixed

next for partition 5

.) mkdir /mnt/projects

.) vim /etc/fstab

```

File Edit View Search Terminal Help

#
# /etc/fstab
# Created by anaconda on Wed May  7 01:22:57 2014
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
UUID=9bf6b9f7-92ad-441b-848e-0257cbb883d1 /           xfs      defaults    1 1
/dev/vdb1 /mnt/data xfs defaults 0 0
/dev/vdb2 /mnt/reports ext4 defaults 0 0
/dev/vdb5 /mnt/projects ext3 defaults 0 0

```

then wq!

```

File Edit View Search Terminal Help

[root@server4 ~]# mkdir /mnt/projects
[root@server4 ~]#
[root@server4 ~]# vim /etc/fstab
[root@server4 ~]#
[root@server4 ~]# mount -a
[root@server4 ~]#
[root@server4 ~]# lsblk -f
NAME   FSTYPE LABEL UUID                                     MOUNTPOINT
vda
└─vda1 xfs     9bf6b9f7-92ad-441b-848e-0257cbb883d1 /
vdb
└─vdb1 xfs     39da04af-ebf2-469d-a650-466b33587397 /mnt/data
└─vdb2 ext4    61318a61-8c16-44e4-beda-d9359644ec7b /mnt/reports
└─vdb3
└─vdb4
└─vdb5 ext3    417820a7-9492-4258-b4db-c4acf7f21b9d /mnt/projects
[root@server4 ~]# 

```

for 5th partition mount point is fixed

[Note : we can mount only one partition with one mount point]

.) df -hT { can see size , type & mount point }

```
File Edit View Search Terminal Help
[root@server4 ~]# df -hT
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/vda1        xfs       10G   8.2G  1.9G  82% /
devtmpfs        devtmpfs  482M    0  482M   0% /dev
tmpfs           tmpfs     498M   92K  497M   1% /dev/shm
tmpfs           tmpfs     498M   14M  484M   3% /run
tmpfs           tmpfs     498M    0  498M   0% /sys/fs/cgroup
/dev/vdb1        xfs      1014M  33M  982M   4% /mnt/data
/dev/vdb2        ext4      1.2G   3.6M  1.1G   1% /mnt/reports
/dev/vdb5        ext3      1.5G   2.3M  1.4G   1% /mnt/projects
[root@server4 ~]# 
```

Temporary Mount :

I am doing temporary mount to the partition 3.

before that need to change the format for partition 3

.) mkfs.<fstype> <partition path>

```
File Edit View Search Terminal Help
[root@server4 ~]# mkfs.ext2 /dev/vdb3
mke2fs 1.42.9 (28-Dec-2013)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
32768 inodes, 131072 blocks
6553 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=134217728
4 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
      32768, 98304

Allocating group tables: done
Writing inode tables: done
Writing superblocks and filesystem accounting information: done
```

and now create directory under /mnt

.) mkdir /mnt/docs

.) mount <src> <dst> { to create temporary mount }

```
File Edit View Search Terminal Help
[root@server4 ~]# mkdir /mnt/docs
[root@server4 ~]#
[root@server4 ~]# mount /dev/vdb3 /mnt/docs
[root@server4 ~]#
[root@server4 ~]# lsblk -f
NAME   FSTYPE LABEL UUID                                     MOUNTPOINT
vda
└─vda1 xfs      9bf6b9f7-92ad-441b-848e-0257cbb883d1 /
vdb
└─vdb1 xfs      39da04af-ebf2-469d-a650-466b33587397 /mnt/data
└─vdb2 ext4     61318a61-8c16-44e4-beda-d9359644ec7b /mnt/reports
└─vdb3 ext2     0b35b6aa-5a83-4057-b8cb-36698f02e137 /mnt/docs
└─vdb4
└─vdb5 ext3     417820a7-9492-4258-b4db-c4acf7f21b9d /mnt/projects
[root@server4 ~]#
```

temporary mount for the partition 3 is created

.) umount <src> { to delete mount }

```
[root@server4 ~]#
[root@server4 ~]# umount /dev/vdb3
[root@server4 ~]#
[root@server4 ~]# lsblk -f
NAME   FSTYPE LABEL UUID                                     MOUNTPOINT
vda
└─vda1 xfs      9bf6b9f7-92ad-441b-848e-0257cbb883d1 /
vdb
└─vdb1 xfs      39da04af-ebf2-469d-a650-466b33587397 /mnt/data
└─vdb2 ext4     61318a61-8c16-44e4-beda-d9359644ec7b /mnt/reports
└─vdb3 ext2     0b35b6aa-5a83-4057-b8cb-36698f02e137
└─vdb4
└─vdb5 ext3     417820a7-9492-4258-b4db-c4acf7f21b9d /mnt/projects
[root@server4 ~]# 
```

DAY 18

SWAP

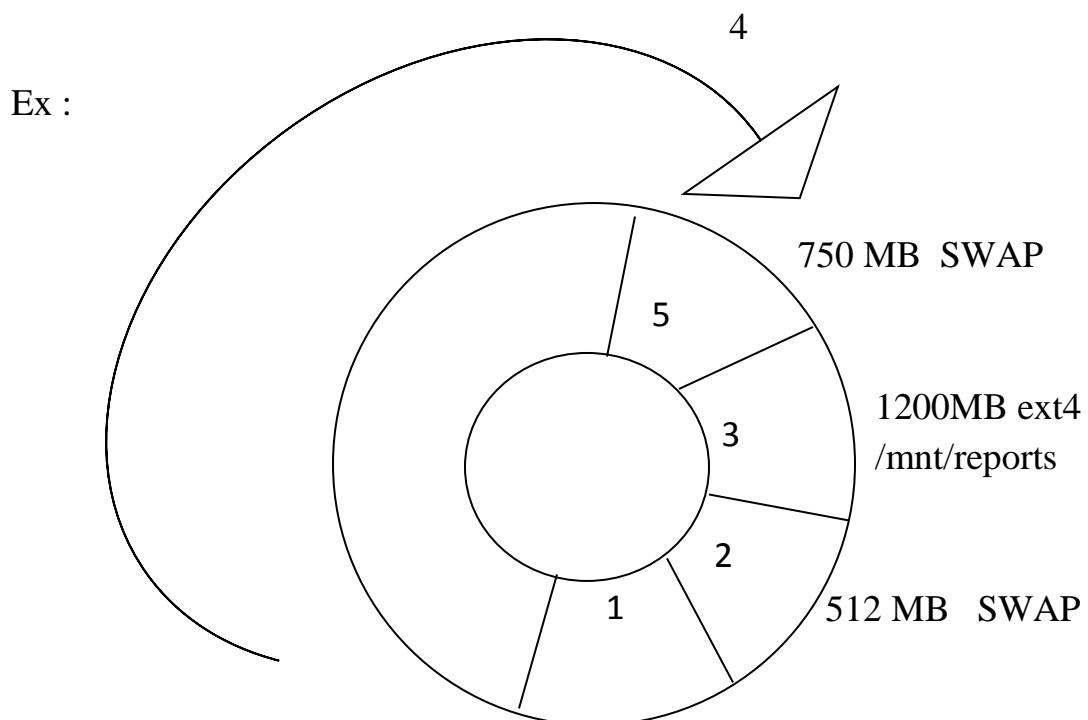
In Windows SWAP space will take from other drives

In Linux

RAM Size	SWAP Size
< 2 GB	2 X Ram Size
4 GB	4GB
< 8 GB	8 GB
> 16 GB	8 GB

In Windows - virtual memory

It is a page file system , which will allow RAM to SWAP ideal processes & resources as per application requirement to swap space



size : 1 GB , Format : xfs , Mount Point : /mnt/data

First doing the Partitions

```
File Edit View Search Terminal Help
[root@server4 ~]# lsblk
NAME   MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
vda    253:0    0 10G  0 disk
└─lvda1 253:1    0 10G  0 part /
vdb    253:16   0 10G  0 disk
[root@server4 ~]#
[root@server4 ~]# fdisk /dev/vdb
Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table
Building a new DOS disklabel with disk identifier 0x08893d88.

Command (m for help): n
Partition type:
  p   primary (0 primary, 0 extended, 4 free)
  e   extended
Select (default p):
Using default response p
Partition number (1-4, default 1):
First sector (2048-20971519, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-20971519, default 20971519): +1G
Partition 1 of type Linux and of size 1 GiB is set
```

1st partition is done

```
File Edit View Search Terminal Help
Using default response p
Partition number (2-4, default 2):
First sector (2099200-20971519, default 2099200):
Using default value 2099200
Last sector, +sectors or +size{K,M,G} (2099200-20971519, default 20971519): +512M
Partition 2 of type Linux and of size 512 MiB is set

Command (m for help): n
Partition type:
  p   primary (2 primary, 0 extended, 2 free)
  e   extended
Select (default p):
Using default response p
Partition number (3,4, default 3):
First sector (3147776-20971519, default 3147776):
Using default value 3147776
Last sector, +sectors or +size{K,M,G} (3147776-20971519, default 20971519): +1200M
Partition 3 of type Linux and of size 1.2 GiB is set
```

2,3 partitions are done

```

Command (m for help): n
Partition type:
  p  primary (3 primary, 0 extended, 1 free)
  e  extended
Select (default e):
Using default response e
Selected partition 4
First sector (5605376-20971519, default 5605376):
Using default value 5605376
Last sector, +sectors or +size{K,M,G} (5605376-20971519, default 20971519):
Using default value 20971519
Partition 4 of type Extended and of size 7.3 GiB is set

Command (m for help): n
All primary partitions are in use
Adding logical partition 5
First sector (5607424-20971519, default 5607424):
Using default value 5607424
Last sector, +sectors or +size{K,M,G} (5607424-20971519, default 20971519): +750M
Partition 5 of type Linux and of size 750 MiB is set

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
[root@server4 ~]# partprobe /dev/vdb
[root@server4 ~]#

```

4.5 Partitions are done. Total Partitions are done

.) lsblk

```

[root@server4 ~]# lsblk
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
vda    253:0    0   10G  0 disk
└─vda1 253:1    0   10G  0 part /
vdb    253:16   0   10G  0 disk
└─vdb1 253:17   0   1G   0 part
└─vdb2 253:18   0   512M 0 part
└─vdb3 253:19   0   1.2G 0 part
└─vdb4 253:20   0   1K   0 part
└─vdb5 253:21   0   750M 0 part
[root@server4 ~]#

```

Now giving formats to vdb1 and vdb3

```
File Edit View Search Terminal Help
[root@server4 ~]# mkfs.xfs /dev/vdb1
meta-data=/dev/vdb1              isize=256    agcount=4, agsize=65536 blks
                                =          sectsz=512  attr=2, projid32bit=1
                                =          crc=0
data     =           bsize=4096   blocks=262144, imaxpct=25
          =           sunit=0    swidth=0 blks
naming   =version 2             bsize=4096   ascii-ci=0 ftype=0
log      =internal log         bsize=4096   blocks=2560, version=2
          =           sectsz=512  sunit=0 blks, lazy-count=1
realtime =none                 extsz=4096   blocks=0, rtextents=0
[root@server4 ~]#
[root@server4 ~]# lsblk -f
NAME   FSTYPE LABEL UUID                                     MOUNTPOINT
vda
└─vdal xfs          9bf6b9f7-92ad-441b-848e-0257ccb883d1 /
vdb
└─vdb1 xfs          bbbb835c-77ff-4769-a540-05b33e2a6ce4
vdb2
vdb3
vdb4
vdb5
[root@server4 ~]# 
```

for vdb1 .xfs format is given

```
File Edit View Search Terminal Help
[root@server4 ~]# mkfs.ext4 /dev/vdb3
mke2fs 1.42.9 (28-Dec-2013)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
76800 inodes, 307200 blocks
15360 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=314572800
10 block groups
32768 blocks per group, 32768 fragments per group
7680 inodes per group
Superblock backups stored on blocks:
            32768, 98304, 163840, 229376, 294912

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done

[root@server4 ~]# lsblk -f
NAME   FSTYPE LABEL UUID                                     MOUNTPOINT
vda
└─vdal xfs          9bf6b9f7-92ad-441b-848e-0257ccb883d1 /
vdb
└─vdb1 xfs          bbbb835c-77ff-4769-a540-05b33e2a6ce4
vdb2
vdb3  ext4          61825930-480e-4423-8f02-71b9c1c69bda
vdb4
vdb5
[root@server4 ~]# 
```

for vdb4 .ext4 format is given

Now giving mount points , before that make directories under /mnt

```
File Edit View Search Terminal Help
[root@server4 ~]# mkdir /mnt/data
[root@server4 ~]#
[root@server4 ~]# mkdir /mnt/reports
[root@server4 ~]#
[root@server4 ~]# vim /etc/fstab
```

now edit in vim

```
File Edit View Search Terminal Help

#
# /etc/fstab
# Created by anaconda on Wed May 7 01:22:57 2014
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
UUID=9bf6b9f7-92ad-441b-848e-0257cbb883d1 /           xfs      defaults    1 1
/dev/vdb1 /mnt/data xfs      defaults 0 0
/dev/vdb3 /mnt/reports ext4    defaults 0 0

~
```

after edit press shift + : now type wq! to save and exit vim

.) mount -a

.) df -hT

```
File Edit View Search Terminal Help
[root@server4 ~]# vim /etc/fstab
[root@server4 ~]#
[root@server4 ~]# mount -a
[root@server4 ~]#
[root@server4 ~]# df -hT
Filesystem  Type      Size  Used Avail Use% Mounted on
/dev/vdal    xfs       10G   3.0G  7.1G  30% /
devtmpfs    devtmpfs  482M    0   482M  0% /dev
tmpfs        tmpfs     498M   80K  497M  1% /dev/shm
tmpfs        tmpfs     498M   14M  485M  3% /run
tmpfs        tmpfs     498M    0   498M  0% /sys/fs/cgroup
/dev/vdb1    xfs      1014M  33M  982M  4% /mnt/data
/dev/vdb3    ext4      1.2G   3.6M  1.1G  1% /mnt/reports
[root@server4 ~]#
```

```
.) fdisk /dev/vdb
t : 82      {t - to change type , 82 – linux swap} [ L – to see all hex values ]
|
|
w
partprobe
lsblk
```

```
File Edit View Search Terminal Help
[root@server4 ~]# fdisk /dev/vdb
Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Command (m for help): t
Partition number (1-5, default 5): 2
Hex code (type L to list all codes): 82
Changed type of partition 'Linux' to 'Linux swap / Solaris'

Command (m for help): t
Partition number (1-5, default 5): 5
Hex code (type L to list all codes): 82
Changed type of partition 'Linux' to 'Linux swap / Solaris'

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.

WARNING: Re-reading the partition table failed with error 16: Device or resource busy.
The kernel still uses the old table. The new table will be used at
the next reboot or after you run partprobe(8) or kpartx(8)
Syncing disks.
[root@server4 ~]#
[root@server4 ~]# partprobe /dev/vdb
```

L – to see all hex values

```
File Edit View Search Terminal Help
Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Command (m for help): L

 0  Empty          24  NEC DOS          81  Minix / old Lin bf  Solaris
 1  FAT12          27  Hidden NTFS Win  82  Linux swap / So c1  DRDOS/sec (FAT-
 2  XENIX root     39  Plan 9          83  Linux             c4  DRDOS/sec (FAT-
 3  XENIX usr      3c  PartitionMagic   84  OS/2 hidden C:  c6  DRDOS/sec (FAT-
 4  FAT16 <32M    40  Venix 80286     85  Linux extended   c7  Syrinx
 5  Extended       41  PPC PReP Boot   86  NTFS volume set da  Non-FS data
 6  FAT16          42  SFS              87  NTFS volume set db  CP/M / CTOS /
 7  HPFS/NTFS/exFAT 4d  QNX4.x        88  Linux plaintext de  Dell Utility
 8  AIX            4e  QNX4.x 2nd part  8e  Linux LVM         df  BootIt
 9  AIX bootable   4f  QNX4.x 3rd part 93  Amoeba          e1  DOS access
 a  OS/2 Boot Manag 50  OnTrack DM     94  Amoeba BBT      e3  DOS R/O
 b  W95 FAT32      51  OnTrack DM6 Aux  9f  BSD/OS          e4  SpeedStor
 c  W95 FAT32 (LBA) 52  CP/M           a0  IBM Thinkpad hi eb  BeOS fs
 e  W95 FAT16 (LBA) 53  OnTrack DM6 Aux  a5  FreeBSD         ee  GPT
 f  W95 Ext'd (LBA) 54  OnTrackDM6    a6  OpenBSD         ef  EFI (FAT-12/16/
10  OPUS           55  EZ-Drive        a7  NeXTSTEP       f0  Linux/PA-RISC b
11  Hidden FAT12    56  Golden Bow     a8  Darwin UFS     f1  SpeedStor
12  Compaq diagnost 5c  Priam Edisk   a9  NetBSD          f4  SpeedStor
14  Hidden FAT16 <3 61  SpeedStor     ab  Darwin boot    f2  DOS secondary
16  Hidden FAT16    63  GNU HURD or Sys af  HFS / HFS+    fb  VMware VMFS
17  Hidden HPFS/NTF 64  Novell Netware b7  BSDI fs        fc  VMware VMKCORE
18  AST SmartSleep  65  Novell Netware b8  BSDI swap      fd  Linux raid auto
1b  Hidden W95 FAT3  70  DiskSecure Mult bb  Boot Wizard hid fe  LANstep
1c  Hidden W95 FAT3  75  PC/IX          be  Solaris boot   ff  BBT
1e  Hidden W95 FAT1  80  Old Minix

Command (m for help): 
```

.) mkswap <partpath> { to write swap file system }

```
[root@server4 ~]#  
[root@server4 ~]# mkswap /dev/vdb2  
Setting up swapspace version 1, size = 524284 KiB  
no label, UUID=c66a42b4-b717-4743-987d-1b9d7f1b9423  
[root@server4 ~]#  
[root@server4 ~]# mkswap /dev/vdb5  
Setting up swapspace version 1, size = 767996 KiB  
no label, UUID=1d7c31db-d649-4030-9110-f6e65362ec86  
[root@server4 ~]#  
[root@server4 ~]# vim /etc/fstab
```

Permanent Swap

.) vim /etc/fstab

<partpath>	swap	swap	defaults	0	0
	↓	↓			
	Mount Point	FS			

This is default, we don't need to make directory

.) swapon -a { to on } [swapoff -a → to off]

```
# /etc/fstab  
# Created by anaconda on Wed May 7 01:22:57 2014  
#  
# Accessible filesystems, by reference, are maintained under '/dev/disk'  
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info  
#  
UUID=9bf6b9f7-92ad-441b-848e-0257cbb883d1 / xfs defaults 1 1  
/dev/vdb1 /mnt/data xfs defaults 0 0  
/dev/vdb3 /mnt/reports ext4 defaults 0 0  
/dev/vdb2 swap swap defaults 0 0  
/dev/vdb5 swap swap defaults 0 0
```

after edit in vim save and exit vim

.) lsblk -f

```
File Edit View Search Terminal Help
[root@server4 ~]# lsblk -f
NAME   FSTYPE LABEL UUID                                     MOUNTPOINT
vda
└─vda1 xfs      9bf6b9f7-92ad-441b-848e-0257cbb883d1 /
vdb
└─vdb1 xfs      bbbb835c-77ff-4769-a540-05b33e2a6ce4 /mnt/data
└─vdb2 swap     c66a42b4-b717-4743-987d-1b9d7f1b9423
└─vdb3 ext4     61825930-480e-4423-8f02-71b9c1c69bda /mnt/reports
└─vdb4
└─vdb5 swap     a883ef74-b788-4e74-b0f3-8f9cfcc25676c
[root@server4 ~]# 
```

For vdb2 and vdb5 swap file system is created

To Check

.) free -m (or) swapon -s

Temporary Swap

For temporary swap I created one more partition [partition 6]

```
File Edit View Search Terminal Help
[root@server4 ~]# fdisk /dev/vdb
Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Command (m for help): n
All primary partitions are in use
Adding logical partition 6
First sector (7145472-20971519, default 7145472):
Using default value 7145472
Last sector, +sectors or +size{K,M,G} (7145472-20971519, default 20971519): +1234M
Partition 6 of type Linux and of size 1.2 GiB is set

Command (m for help): t
Partition number (1-6, default 6):
Hex code (type L to list all codes): 82
Changed type of partition 'Linux' to 'Linux swap / Solaris'

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.

WARNING: Re-reading the partition table failed with error 16: Device or resource busy.
The kernel still uses the old table. The new table will be used at
the next reboot or after you run partprobe(8) or kpartx(8)
Syncing disks.
[root@server4 ~]# partprobe /dev/vdb
```

.)lsblk -f

.)mkswap <partpath>

.)swapon <partpath> { to enable }

```
File Edit View Search Terminal Help
[root@server4 ~]# lsblk -f
NAME   FSTYPE LABEL UUID                                     MOUNTPOINT
vda
└─vda1 xfs    9bf6b9f7-92ad-441b-848e-0257ccb883d1 /
vdb
└─vdb1 xfs    bbbb835c-77ff-4769-a540-05b33e2a6ce4 /mnt/data
vdb2 swap    c66a42b4-b717-4743-987d-1b9d7f1b9423
vdb3 ext4    61825930-480e-4423-8f02-71b9c1c69bda /mnt/reports
vdb4
vdb5 swap    a883ef74-b788-4e74-b0f3-8f9cfcc25676c
└─vdb6

[root@server4 ~]# mkswap /dev/vdb6
Setting up swap space version 1, size = 1263612 KiB
no label, UUID=094dd3a9-bc8b-4dea-a2d1-47637ff43653
[root@server4 ~]#
[root@server4 ~]# swapon /dev/vdb6
[root@server4 ~]#
[root@server4 ~]# lsblk -f
NAME   FSTYPE LABEL UUID                                     MOUNTPOINT
vda
└─vda1 xfs    9bf6b9f7-92ad-441b-848e-0257ccb883d1 /
vdb
└─vdb1 xfs    bbbb835c-77ff-4769-a540-05b33e2a6ce4 /mnt/data
vdb2 swap    c66a42b4-b717-4743-987d-1b9d7f1b9423
vdb3 ext4    61825930-480e-4423-8f02-71b9c1c69bda /mnt/reports
vdb4
vdb5 swap    a883ef74-b788-4e74-b0f3-8f9cfcc25676c
└─vdb6 swap    094dd3a9-bc8b-4dea-a2d1-47637ff43653 [SWAP]
[root@server4 ~]# 
```

.) swapoff <partpath> { to disable }

```
File Edit View Search Terminal Help
[root@server4 ~]# lsblk -f
NAME   FSTYPE LABEL UUID                                     MOUNTPOINT
vda
└─vda1 xfs      9bf6b9f7-92ad-441b-848e-0257cbb883d1 /
vdb
└─vdb1 xfs      bbbb835c-77ff-4769-a540-05b33e2a6ce4 /mnt/data
vdb2 swap      c66a42b4-b717-4743-987d-1b9d7f1b9423
vdb3 ext4      61825930-480e-4423-8f02-71b9c1c69bda /mnt/reports
vdb4
vdb5 swap      a883ef74-b788-4e74-b0f3-8f9cfcc25676c
vdb6 swap      094dd3a9-bc8b-4dea-a2d1-47637ff43653 [SWAP]

[root@server4 ~]#
[root@server4 ~]#
[root@server4 ~]# swapoff /dev/vdb6
[root@server4 ~]#
[root@server4 ~]#
[root@server4 ~]# lsblk -f
NAME   FSTYPE LABEL UUID                                     MOUNTPOINT
vda
└─vda1 xfs      9bf6b9f7-92ad-441b-848e-0257cbb883d1 /
vdb
└─vdb1 xfs      bbbb835c-77ff-4769-a540-05b33e2a6ce4 /mnt/data
vdb2 swap      c66a42b4-b717-4743-987d-1b9d7f1b9423
vdb3 ext4      61825930-480e-4423-8f02-71b9c1c69bda /mnt/reports
vdb4
vdb5 swap      a883ef74-b788-4e74-b0f3-8f9cfcc25676c
vdb6 swap      094dd3a9-bc8b-4dea-a2d1-47637ff43653

[root@server4 ~]# 
```

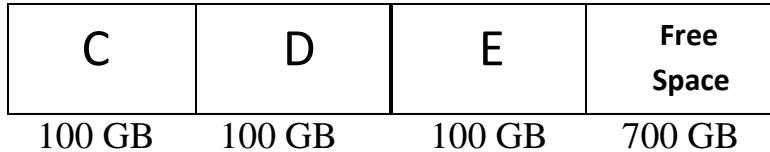
Note

.) rm -f /etc/.fstab.swap { to delete } [if we enter any mistake we can do this]

/path/ <filename>.swap

DAY 19

LVM - Logical Volume Manager



If we want some space in C , first we'll move E next move D. Now we'll get some additional space to C. In this some data may loss.

Increase or shrink - LVM

.) It is a device mapper utility to expand or shrink volumes in the partitions &disks



.) a) create a partition [I created 3 partitions]

b) change type → 8e (linux LVM)

```
Command (m for help): t
Partition number (1-3, default 3): 1
Hex code (type L to list all codes): 8e
Changed type of partition 'Linux' to 'Linux LVM'
```

```
Command (m for help): t
Partition number (1-3, default 3): 2
Hex code (type L to list all codes): 8e
Changed type of partition 'Linux' to 'Linux LVM'
```

```
Command (m for help): t
Partition number (1-3, default 3): 3
Hex code (type L to list all codes): 8e
Changed type of partition 'Linux' to 'Linux LVM'
```

```
Command (m for help): w
The partition table has been altered!
```

```
Calling ioctl() to re-read partition table.
Syncing disks.
[root@server7 ~]# partprobe /dev/vdb
[root@server7 ~]#
```

```
File Edit View Search Terminal Help
[root@server7 ~]# lsblk
NAME   MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
vda    253:0    0 10G  0 disk
└─vda1 253:1    0 10G  0 part /
vdb    253:16   0 10G  0 disk
├─vdb1 253:17   0   1G  0 part
└─vdb2 253:18   0   3G  0 part
└─vdb3 253:19   0   2G  0 part
[root@server7 ~]#
[root@server7 ~]#
```

.) create a PV (physical volume)

pvcreate <device path / partpath >

ex : pvcreate /dev/vdb1 /dev/vdb2

pvs , pvdisplay [to check]

```
[root@server7 ~]# pvcreate /dev/vdb1 /dev/vdb2
  Physical volume "/dev/vdb1" successfully created
  Physical volume "/dev/vdb2" successfully created
[root@server7 ~]#
[root@server7 ~]# pvs
  PV          VG   Fmt Attr PSize PFree
  /dev/vdb1      lvm2 a--  1.00g 1.00g
  /dev/vdb2      lvm2 a--  3.00g 3.00g
[root@server7 ~]#
[root@server7 ~]# pvdisplay
"/dev/vdb1" is a new physical volume of "1.00 GiB"
--- NEW Physical volume ---
PV Name           /dev/vdb1
VG Name
PV Size          1.00 GiB
Allocatable      NO
PE Size          0
Total PE         0
Free PE          0
Allocated PE     0
PV UUID          rluotj-xLnU-8u31-i5nV-NfJ9-3VLJ-baq6Ek

"/dev/vdb2" is a new physical volume of "3.00 GiB"
--- NEW Physical volume ---
PV Name           /dev/vdb2
VG Name
PV Size          3.00 GiB
Allocatable      NO
PE Size          0
Total PE         0
Free PE          0
Allocated PE     0
PV UUID          VRkyTF-GpFb-QKBj-KFjp-0SVL-6bcK-sIsJX0
```

.) create a VG (volume group)

```
vgcreate <vgname> pv(s) / device path / part path
```

ex : vgcreate prod_vg /dev/vda1 /dev/vda2

vgs , vgdisplay [to check]

```
File Edit View Search Terminal Help
[root@server7 ~]# vgcreate prod_vg /dev/vdb1 /dev/vdb2
  Volume group "prod_vg" successfully created
[root@server7 ~]#
[root@server7 ~]# vgs
  VG      #PV #LV #SN Attr   VSize  VFree
  prod_vg    2    0    0 wz--n- 3.99g  3.99g
[root@server7 ~]#
[root@server7 ~]# vgdisplay
--- Volume group ---
VG Name            prod_vg
System ID
Format           lvm2
Metadata Areas     2
Metadata Sequence No  1
VG Access        read/write
VG Status         resizable
MAX LV             0
Cur LV             0
Open LV             0
Max PV             0
Cur PV             2
Act PV             2
VG Size          3.99 GiB
PE Size          4.00 MiB
Total PE         1022
Alloc PE / Size   0 / 0
Free  PE / Size   1022 / 3.99 GiB
VG UUID          x6kiYh-QlrW-MWWg-sTdB-IRBX-Qyk7-j6jEQ3

[root@server7 ~]# 
```

.) create a LV (logical volume)

```
lvcreate -n <lvname> -L size (M/G/T) <vgname>
```

ex : lvcreate -n vol1 -L 1G prod_vg

lvs , lvdisplay [to check]

```
File Edit View Search Terminal Help
[root@server7 ~]# lvcreate -n vol1 -L 1G prod_vg
Logical volume "vol1" created
[root@server7 ~]#
[root@server7 ~]# lvs
  LV   VG      Attr       LSize Pool Origin Data%  Move Log Cpy%Sync Convert
  vol1 prod_vg -wi-a---- 1.00g
[root@server7 ~]#
[root@server7 ~]#
[root@server7 ~]# lvdisplay
--- Logical volume ---
LV Path              /dev/prod_vg/vol1
LV Name             vol1
VG Name             prod_vg
LV UUID             9eDAO7-P54r-4Klo-FWdc-XYtE-3XrT-ckZ623
LV Write Access     read/write
LV Creation host, time server7.example.com, 2019-10-05 11:56:57 +0530
LV Status           available
# open              0
LV Size             1.00 GiB
Current LE          256
Segments            1
Allocation          inherit
Read ahead sectors auto
- currently set to 8192
Block device        252:0

[root@server7 ~]# 
```

.) write fs

```
mkfs.<fs> <lvpath>
          ↓
          /dev/vgname/lvname
```

```
File Edit View Search Terminal Help
[root@server7 ~]# mkfs.ext4 /dev/prod_vg/voll
mke2fs 1.42.9 (28-Dec-2013)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
65536 inodes, 262144 blocks
13107 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=268435456
8 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
      32768, 98304, 163840, 229376

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done

[root@server7 ~]# vim /etc/fstab
```

.) vim /etc/fstab

```
File Edit View Search Terminal Help

#
# /etc/fstab
# Created by anaconda on Wed May  7 01:22:57 2014
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
UUID=9bf6b9f7-92ad-441b-848e-0257cbb883d1 /          xfs      defaults        1 1
UUID=9eDA07-P54r-4Klo-FWdc-XYtE-3XrT-ckZ623 /  ext4      defaults        0 0
--
```

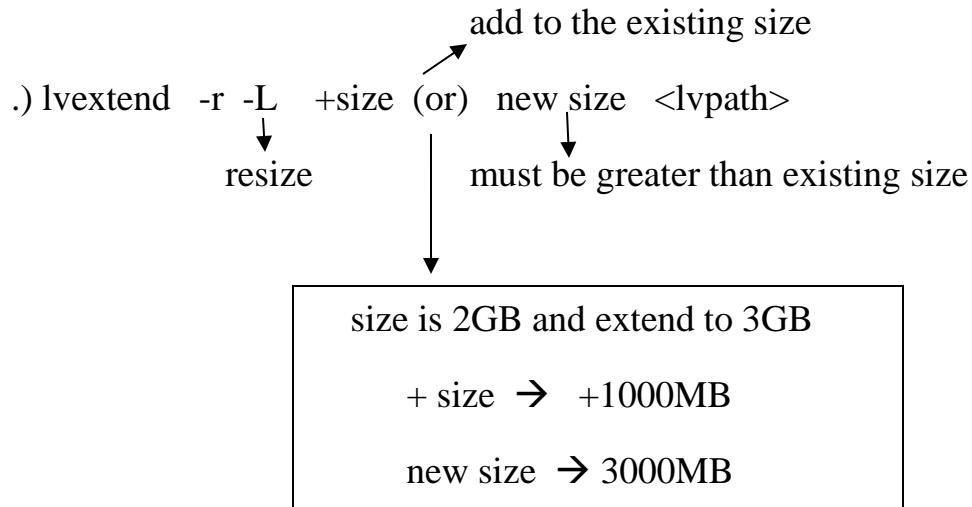
.) mount -a

.) lsblk -f

.) lsblk

```
File Edit View Search Terminal Help
[root@server7 ~]# vim /etc/fstab
[root@server7 ~]#
[root@server7 ~]# mount -a
[root@server7 ~]#
[root@server7 ~]# lsblk -f
NAME          FSTYPE      LABEL UUID                                     MOUNTPOINT
vda
└vda1          xfs        9bf6b9f7-92ad-441b-848e-0257ccb883d1   /
vdb
└vdb1          LVM2_member rluotj-xLnU-8u31-i5nV-NfJ9-3VLJ-bag6Ek
└vdb2          LVM2_member VRkyTF-GpFb-QKBj-KFjp-0SVL-6bcK-sIsJX0
  └prod_vg-voll ext4    67919416-d334-4c1c-bb9c-69693f7244f5
└vdb3
[root@server7 ~]#
[root@server7 ~]#
[root@server7 ~]# lsblk
NAME          MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
vda          253:0    0  10G  0 disk
└vda1         253:1    0  10G  0 part /
vdb          253:16   0  10G  0 disk
└vdb1         253:17   0   1G  0 part
└vdb2         253:18   0   3G  0 part
  └prod_vg-voll 252:0   0   1G  0 lvm
└vdb3         253:19   0   2G  0 part
[root@server7 ~]# 
```

Extend



+size example

```
File Edit View Search Terminal Help
[root@server7 ~]# lsblk
NAME      MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
vda       253:0   0   10G  0 disk
└─vdal    253:1   0   10G  0 part /
vdb       253:16  0   10G  0 disk
└─vdbl1  253:17  0   1G   0 part
└─vdbl2  253:18  0   3G   0 part
└─prod_vg-voll 252:0  0   1G   0 lvm
└─vdb3   253:19  0   2G   0 part
[root@server7 ~]#
[root@server7 ~]# lvextend -r -L +300M /dev/prod_vg/voll
fscck from util-linux 2.23.2
/dev/mapper/prod_vg-voll: clean, 11/65536 files, 12955/262144 blocks
  Extending logical volume voll to 1.29 GiB
  Logical volume voll successfully resized
resize2fs 1.42.9 (28-Dec-2013)
Resizing the filesystem on /dev/mapper/prod_vg-voll to 338944 (4k) blocks.
The filesystem on /dev/mapper/prod_vg-voll is now 338944 blocks long.

[root@server7 ~]#
[root@server7 ~]# lsblk
NAME      MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
vda       253:0   0   10G  0 disk
└─vdal    253:1   0   10G  0 part /
vdb       253:16  0   10G  0 disk
└─vdbl1  253:17  0   1G   0 part
└─vdbl2  253:18  0   3G   0 part
└─prod_vg-voll 252:0  0  1.3G  0 lvm
└─vdb3   253:19  0   2G   0 part
[root@server7 ~]#
```

new size example

```
File Edit View Search Terminal Help
[root@server7 ~]# lsblk
NAME      MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
vda        253:0   0   10G  0 disk
└─vda1     253:1   0   10G  0 part /
vdb        253:16  0   10G  0 disk
└─vdb1     253:17  0    1G  0 part
└─vdb2     253:18  0    3G  0 part
  └─prod_vg-voll 252:0  0  1.3G  0 lvm
vdb3       253:19  0    2G  0 part

[root@server7 ~]#
[root@server7 ~]#
[root@server7 ~]# lvextend -r -L 1600M /dev/prod_vg/voll
fsck from util-linux 2.23.2
/dev/mapper/prod_vg-voll: clean, 11/90112 files, 14626/338944 blocks
  Extending logical volume voll to 1.56 GiB
  Logical volume voll successfully resized
resize2fs 1.42.9 (28-Dec-2013)
Resizing the filesystem on /dev/mapper/prod_vg-voll to 409600 (4k) blocks.
The filesystem on /dev/mapper/prod_vg-voll is now 409600 blocks long.

[root@server7 ~]#
[root@server7 ~]# lsblk
NAME      MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
vda        253:0   0   10G  0 disk
└─vda1     253:1   0   10G  0 part /
vdb        253:16  0   10G  0 disk
└─vdb1     253:17  0    1G  0 part
└─vdb2     253:18  0    3G  0 part
  └─prod_vg-voll 252:0  0  1.6G  0 lvm
vdb3       253:19  0    2G  0 part

[root@server7 ~]# 
```

Shrink

subtract from existing size
.) lvreduce -r -L -size (or) new size <lvpath>
 ↓
 must be less than existing size

-size example

```
root@server7 ~]# lsblk
File Edit View Search Terminal Help
[root@server7 ~]# lsblk
NAME      MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
vda       253:0   0 10G  0 disk
└─vda1    253:1   0 10G  0 part /
vdb       253:16  0 10G  0 disk
└─vdb1    253:17  0 1G   0 part
└─vdb2    253:18  0 3G   0 part
  └─prod_vg-voll 252:0   0 1.6G 0 lvm
vdb3     253:19  0 2G   0 part
[root@server7 ~]#
[root@server7 ~]#
[root@server7 ~]# lvreduce -r -L -200M /dev/prod_vg/voll
fsck from util-linux 2.23.2
/dev/mapper/prod_vg-voll: clean, 11/106496 files, 15654/409600 blocks
resize2fs 1.42.9 (28-Dec-2013)
Resizing the filesystem on /dev/mapper/prod_vg-voll to 358400 (4k) blocks.
The filesystem on /dev/mapper/prod_vg-voll is now 358400 blocks long.

Reducing logical volume voll to 1.37 GiB
Logical volume voll successfully resized
[root@server7 ~]#
[root@server7 ~]#
[root@server7 ~]# lsblk
NAME      MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
vda       253:0   0 10G  0 disk
└─vda1    253:1   0 10G  0 part /
vdb       253:16  0 10G  0 disk
└─vdb1    253:17  0 1G   0 part
└─vdb2    253:18  0 3G   0 part
  └─prod_vg-voll 252:0   0 1.4G 0 lvm
vdb3     253:19  0 2G   0 part
[root@server7 ~]# 
```

new size example

```
File Edit View Search Terminal Help
[root@server7 ~]# lsblk
NAME      MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
vda       253:0   0  10G  0 disk
└─vda1    253:1   0  10G  0 part /
vdb       253:16  0  10G  0 disk
└─vdb1    253:17  0   1G  0 part
└─vdb2    253:18  0   3G  0 part
  └─prod_vg-voll 252:0  0  1.4G 0 lvm
vdb3     253:19  0   2G  0 part

[root@server7 ~]#
[root@server7 ~]#
[root@server7 ~]# lvreduce -r -L 1000M /dev/prod_vg/voll
fsck from util-linux 2.23.2
/dev/mapper/prod_vg-voll: clean, 11/90112 files, 14626/358400 blocks
resize2fs 1.42.9 (28-Dec-2013)
Resizing the filesystem on /dev/mapper/prod_vg-voll to 256000 (4k) blocks.
The filesystem on /dev/mapper/prod_vg-voll is now 256000 blocks long.

Reducing logical volume voll to 1000.00 MiB
Logical volume voll successfully resized
[root@server7 ~]#
[root@server7 ~]#
[root@server7 ~]# lsblk
NAME      MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
vda       253:0   0  10G  0 disk
└─vda1    253:1   0  10G  0 part /
vdb       253:16  0  10G  0 disk
└─vdb1    253:17  0   1G  0 part
└─vdb2    253:18  0   3G  0 part
  └─prod_vg-voll 252:0  0 1000M 0 lvm
vdb3     253:19  0   2G  0 part

[root@server7 ~]# █
```

[Note : xfs doesn't support shrinking volumes , but it supports extend]

Extents

Extent size by default 4 MB

1 GiB → $1024 - 4 \text{ MB} = 1020 \text{ MB}$

partition size	Extent size	Available size
-------------------	----------------	----------------

by default 4MB but we can take 8MB , 16 MB , 32 MB based on data share

lvcreate

.) lvcreate -n <lvname> -l <no of extents > <vgname>

```
File Edit View Search Terminal Help
[root@server7 ~]# lvs
  LV   VG      Attr       LSize   Pool Origin Data%  Move Log Cpy%Sync Convert
  vol1 prod_vg -wi-a---- 1000.00m
[root@server7 ~]#
[root@server7 ~]#
[root@server7 ~]# pvs
  PV      VG      Fmt  Attr PSize    PFree
  /dev/vdb1  prod_vg lvm2 a-- 1020.00m 1020.00m
  /dev/vdb2  prod_vg lvm2 a--     3.00g    2.02g
[root@server7 ~]#
[root@server7 ~]#
[root@server7 ~]# lvcreate -n vol2 -l 50 prod_vg
  Logical volume "vol2" created
[root@server7 ~]#
[root@server7 ~]# lsblk
NAME      MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
vda        253:0   0   10G  0 disk
└─lvda1    253:1   0   10G  0 part /
vdb        253:16  0   10G  0 disk
└─lvdbl1  253:17  0    1G  0 part
  └─prod_vg-vol2 252:1   0  200M 0 lvm
vdb2      253:18  0    3G  0 part
  └─prod_vg-vol1 252:0   0 1000M 0 lvm
vdb3      253:19  0    2G  0 part
[root@server7 ~]# 
```

lvremove

.) lvremove -f <lvpah>

```
File Edit View Search Terminal Help
[root@server7 ~]# vgcreate data_vg /dev/vdb3
Physical volume "/dev/vdb3" successfully created
Volume group "data_vg" successfully created
[root@server7 ~]#
[root@server7 ~]# lvcreate -n vol2 -L 500M data_vg
Logical volume "vol2" created
[root@server7 ~]#
[root@server7 ~]# lsblk
NAME      MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
vda        253:0   0   10G  0 disk
└─vda1     253:1   0   10G  0 part /
vdb        253:16  0   10G  0 disk
└─vdb1     253:17  0   1G   0 part
└─vdb2     253:18  0   3G   0 part
  └─prod_vg-vol1 252:0   0 1000M 0 lvm
vdb3       253:19  0   2G   0 part
  └─data_vg-vol2 252:1   0 500M 0 lvm
[root@server7 ~]#
[root@server7 ~]#
[root@server7 ~]# lvremove -f data_vg/vol2
Logical volume "vol2" successfully removed
[root@server7 ~]#
[root@server7 ~]#
[root@server7 ~]# lsblk
NAME      MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
vda        253:0   0   10G  0 disk
└─vda1     253:1   0   10G  0 part /
vdb        253:16  0   10G  0 disk
└─vdb1     253:17  0   1G   0 part
└─vdb2     253:18  0   3G   0 part
  └─prod_vg-vol1 252:0   0 1000M 0 lvm
vdb3       253:19  0   2G   0 part
[root@server7 ~]# █
```

.) lvextends -r -l + no of extents (or) new no of extents <lvpath>

[lvdisplay to see lvpath]

```
File Edit View Search Terminal Help
[root@server7 ~]# lvs
  LV   VG     Attr      LSize   Pool Origin Data%  Move Log Cpy%Sync Convert
  vol3 data_vg -wi-a----  200.00m
  vol4 data_vg -wi-a----  600.00m
  voll prod_vg -wi-a---- 1000.00m
[root@server7 ~]#
[root@server7 ~]#
[root@server7 ~]# lvextend -r -l +30  /dev/prod_vg/voll
fsck from util-linux 2.23.2
/dev/mapper/prod_vg-voll: clean, 11/65536 files, 12955/256000 blocks
Extending logical volume voll to 1.09 GiB
Logical volume voll successfully resized
resize2fs 1.42.9 (28-Dec-2013)
Resizing the filesystem on /dev/mapper/prod_vg-voll to 286720 (4k) blocks.
The filesystem on /dev/mapper/prod_vg-voll is now 286720 blocks long.

[root@server7 ~]#
[root@server7 ~]# lvs
  LV   VG     Attr      LSize   Pool Origin Data%  Move Log Cpy%Sync Convert
  vol3 data_vg -wi-a----  200.00m
  vol4 data_vg -wi-a----  600.00m
  voll prod_vg -wi-a----  1.09g
[root@server7 ~]# 
```

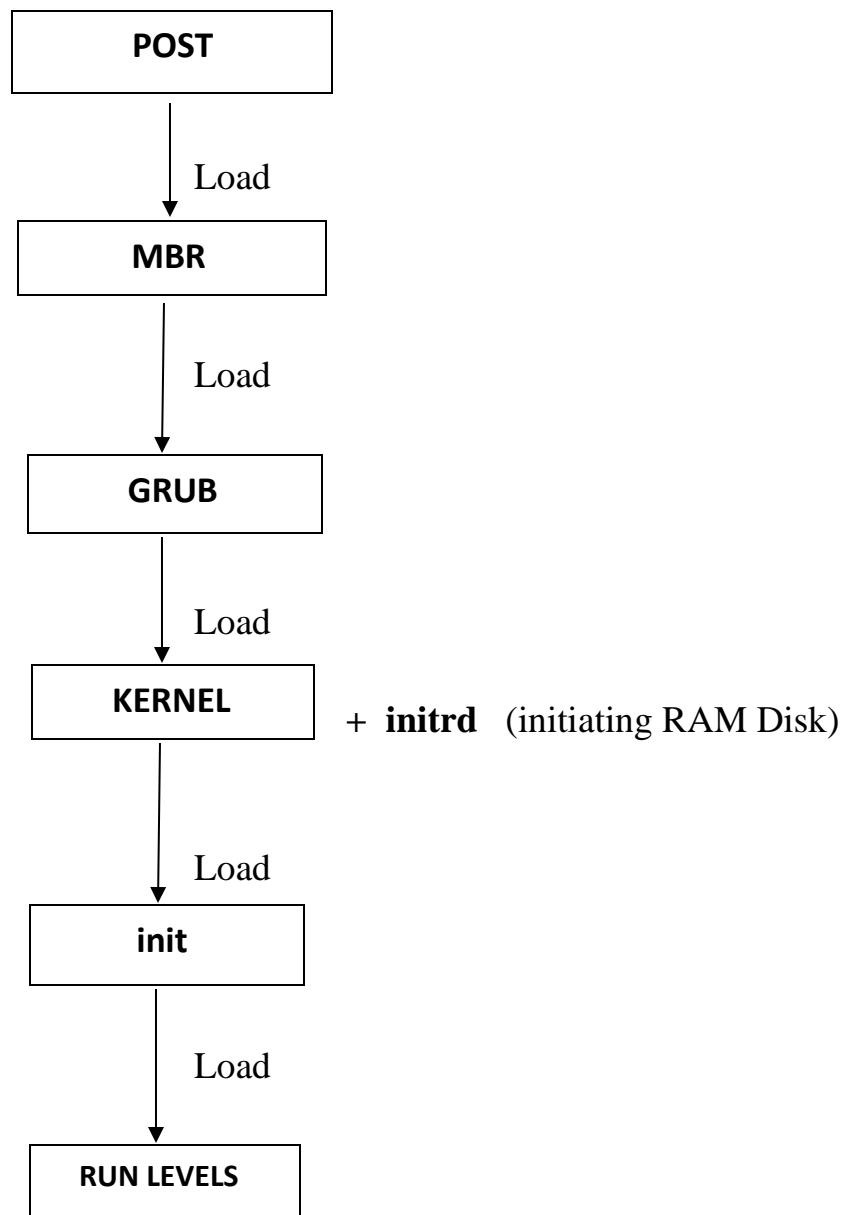
.) lvreduce -r -l - no of extents (or) new no of extents <lvpath>

```
File Edit View Search Terminal Help
[root@server7 ~]# lvs
  LV   VG      Attr      LSize   Pool Origin Data%  Move Log Cpy%Sync Convert
  vol3 data_vg -wi-a---- 200.00m
  vol4 data_vg -wi-a---- 600.00m
  voll prod_vg -wi-a---- 1.41g
[root@server7 ~]#
[root@server7 ~]#
[root@server7 ~]# lvreduce -r -l -30  /dev/prod_vg/voll
fsck from util-linux 2.23.2
/dev/mapper/prod_vg-voll: clean, 11/98304 files, 15140/368640 blocks
resize2fs 1.42.9 (28-Dec-2013)
Resizing the filesystem on /dev/mapper/prod_vg-voll to 337920 (4k) blocks.
The filesystem on /dev/mapper/prod_vg-voll is now 337920 blocks long.

Reducing logical volume voll to 1.29 GiB
Logical volume voll successfully resized
[root@server7 ~]#
[root@server7 ~]#
[root@server7 ~]# lvs
  LV   VG      Attr      LSize   Pool Origin Data%  Move Log Cpy%Sync Convert
  vol3 data_vg -wi-a---- 200.00m
  vol4 data_vg -wi-a---- 600.00m
  voll prod_vg -wi-a---- 1.29g
[root@server7 ~]# 
```

DAY 20

BOOT PROCESS IN LINUX



POST: Power On Self Test

↓
BIOS (Basic Input Output System)

- .) BIOS detect the necessary hardware I/O , RAM ,CPU etc
- .) I/O will load MBR
- .) MBR available in first sector of the hard disk
- .) 1 sector = 512 bytes

MBR:

Boot Loader	Partition Info	MBR validity Check	512 bytes
-------------	----------------	--------------------	-----------

439 – 446 bytes 64 bytes 2-7 bytes

each partition needs

16 bytes $16 \times 4 = 64$

GRUB: Grand unified Boot Loader

- .) boot.ini in windows
- .) menu.lst in linux
- .) menu.lst will display splash screen

KERNEL + initrd :

- .) while Kernel is loading , initrd is going to mount temporary Root file System (/) to detect necessary drivers & start necessary services and then kernel mount permanent Root File System , Once Root File System mounted permanently it destroys temporary Root File System.

init :

- init 0 → Power off / Shutdown
- init 1 → Single user mode
- init 2 → Multi user without Network
- init 3 → Multi user with Network
- init 4 → No Use
- init 5 → X11/GUI/Graphical
- init 6 → Reboot

.) cat /etc/inittab

```
File Edit View Search Terminal Help
[student@localhost ~]$ cat /etc/inittab
# inittab is no longer used when using systemd.
#
# ADDING CONFIGURATION HERE WILL HAVE NO EFFECT ON YOUR SYSTEM.
#
# Ctrl-Alt-Delete is handled by /etc/systemd/system/ctrl-alt-del.target
#
# systemd uses 'targets' instead of runlevels. By default, there are two main targets:
#
# multi-user.target: analogous to runlevel 3
# graphical.target: analogous to runlevel 5
#
# To set a default target, run:
#
# ln -sf /lib/systemd/system/<target name>.target /etc/systemd/system/default.target
#
[student@localhost ~]$ █
```

.) runlevel { to know runlevel }

```
File Edit View Search Terminal Help
[student@localhost ~]$ runlevel
3 5
[student@localhost ~]$ █
```

.) who -r

```
File Edit View Search Terminal Help
[student@localhost ~]$ who -r
          run-level 5  2019-10-17 00:28      last=3
[student@localhost ~]$ █
```

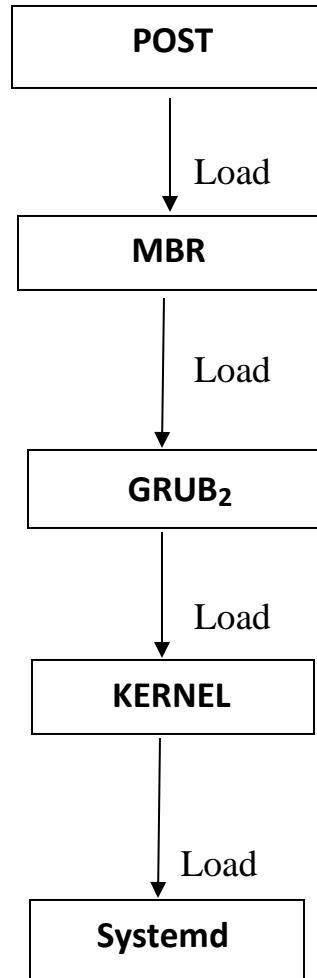
.) init 3 { to go to the multiuser } [after login type runlevel and who -r]

```
Red Hat Enterprise Linux Server 7.0 (Maipo)
Kernel 3.10.0-123.el7.x86_64 on an x86_64

localhost login: root
Password:
Last login: Sat Oct 19 00:45:42 on pts/0
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# runlevel
5 3
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# who -r
          run-level 3  2019-10-19 00:45      last=5
[root@localhost ~]#
[root@localhost ~]# init 5
```

.) init 5 { to come back to graphical }

BOOT PROCESS IN RHEL 7



Systemd :

- .) system would be controlled by systemctl.

.) systemctl -t help

```
File Edit View Search Terminal Help
[student@localhost ~]$ systemctl -t help
Available unit types:
service
socket
target
device
mount
automount
snapshot
timer
swap
path
slice
scope
[student@localhost ~]$ █
```

.) systemctl get-default

```
File Edit View Search Terminal Help
[student@localhost ~]$ systemctl get-default
graphical.target
[student@localhost ~]$ █
```

.) ls -l /usr/lib/system/system/

```
File Edit View Search Terminal Help
[student@localhost ~]$ ls -l /usr/lib/systemd/system/
total 1144
-rw-r--r--. 1 root root 275 Mar  3 2014 abrt-ccpp.service
-rw-r--r--. 1 root root 380 Mar  3 2014 abrtd.service
-rw-r--r--. 1 root root 361 Mar  3 2014 abrt-oops.service
-rw-r--r--. 1 root root 266 Mar  3 2014 abrt-pstoreoops.service
-rw-r--r--. 1 root root 248 Mar  3 2014 abrt-vmcore.service
-rw-r--r--. 1 root root 311 Mar  3 2014 abrt-xorg.service
-rw-r--r--. 1 root root 421 Jan 29 2014 accounts-daemon.service
-rw-r--r--. 1 root root 501 Jan 29 2014 alsa-restore.service
-rw-r--r--. 1 root root 558 Jan 29 2014 alsa-state.service
-rw-r--r--. 1 root root 412 Jan 29 2014 alsa-store.service
-rw-r--r--. 1 root root 646 Apr 29 2014 anaconda-direct.service
-rw-r--r--. 1 root root 660 Apr 29 2014 anaconda-noshell.service
-rw-r--r--. 1 root root 387 Apr 29 2014 anaconda.service
-rw-r--r--. 1 root root 684 Apr 29 2014 anaconda-shell@.service
-rw-r--r--. 1 root root 322 Apr 29 2014 anaconda-sshd.service
-rw-r--r--. 1 root root 312 Apr 29 2014 anaconda.target
drwxr-xr-x. 2 root root 4096 Sep  3 19:12 anaconda.target.wants
-rw-r--r--. 1 root root 498 Apr 29 2014 anaconda-tmux@.service
-rw-r--r--. 1 root root 275 Feb 14 2014 arp-ethers.service
-rw-r--r--. 1 root root 205 Jan 29 2014 atd.service
-rw-r----- 1 root root 602 Mar 19 2014 auditd.service
lrwxrwxrwx. 1 root root    14 Sep  3 12:03 autovt@.service -> getty@.service
-rw-r--r--. 1 root root 1044 Jan 29 2014 avahi-daemon.service
-rw-r--r--. 1 root root  874 Jan 29 2014 avahi-daemon.socket
-rw-r--r--. 1 root root 546 Apr  2 2014 basic.target
drwxr-xr-x. 2 root root 4096 Sep  3 12:03 basic.target.wants
-r--r--r--. 1 root root 341 Mar 26 2014 blk-availability.service
-rw-r--r--. 1 root root 176 Jan 29 2014 bluetooth.service
-rw-r--r--. 1 root root 379 Apr  2 2014 bluetooth.target
-rw-r--r--. 1 root root 160 Apr  2 2014 brandbot.path
-rw-r--r--. 1 root root 101 Apr  2 2014 brandbot.service
-rw-r--r--. 1 root root 144 Jan 29 2014 brltty.service
-rw-r--r--. 1 root root 491 Jan 26 2014 canberra-system-bootup.service
```

.) ls -l /usr/lib/system/system/ | grep target { to search particular word }

```
File Edit View Search Terminal Help
[student@localhost ~]$ ls -l /usr/lib/systemd/system/ | grep target
-rw-r--r--. 1 root root 312 Apr 29 2014 anaconda.target
drwxr-xr-x. 2 root root 4096 Sep 3 19:12 anaconda.target.wants
-rw-r--r--. 1 root root 546 Apr 2 2014 basic.target
drwxr-xr-x. 2 root root 4096 Sep 3 12:03 basic.target.wants
-rw-r--r--. 1 root root 379 Apr 2 2014 bluetooth.target
-rw-r--r--. 1 root root 366 Apr 2 2014 cryptsetup.target
lrwxrwxrwx. 1 root root 13 Sep 3 12:03 ctrl-alt-del.target -> reboot.target
drwxr-xr-x. 2 root root 24 Sep 3 12:03 dbus.target.wants
lrwxrwxrwx. 1 root root 16 Sep 3 12:03 default.target -> graphical.target
drwxr-xr-x. 2 root root 6 Apr 2 2014 default.target.wants
-rw-r--r--. 1 root root 431 Apr 2 2014 emergency.target
-rw-r--r--. 1 root root 440 Apr 2 2014 final.target
-rw-r--r--. 1 root root 460 Apr 2 2014 getty.target
-rw-r--r--. 1 root root 522 Apr 2 2014 graphical.target
drwxr-xr-x. 2 root root 6 Apr 2 2014 graphical.target.wants
-rw-r--r--. 1 root root 487 Apr 2 2014 halt.target
drwxr-xr-x. 2 root root 34 Sep 3 12:03 halt.target.wants
-rw-r--r--. 1 root root 447 Apr 2 2014 hibernate.target
-rw-r--r--. 1 root root 468 Apr 2 2014 hybrid-sleep.target
-rw-r--r--. 1 root root 536 Apr 2 2014 initrd-fs.target
-rw-r--r--. 1 root root 509 Apr 2 2014 initrd-root-fs.target
-rw-r--r--. 1 root root 691 Apr 2 2014 initrd-switch-root.target
drwxr-xr-x. 2 root root 70 Sep 3 12:03 initrd-switch-root.target.wants
-rw-r--r--. 1 root root 654 Apr 2 2014 initrd.target
drwxr-xr-x. 2 root root 4096 Sep 3 12:03 initrd.target.wants
-rw-r--r--. 1 root root 501 Apr 2 2014 kexec.target
drwxr-xr-x. 2 root root 35 Sep 3 12:03 kexec.target.wants
-rw-r--r--. 1 root root 395 Apr 2 2014 local-fs-pre.target
-rw-r--r--. 1 root root 489 Apr 2 2014 local-fs.target
drwxr-xr-x. 2 root root 4096 Sep 3 12:03 local-fs.target.wants
-rw-r--r--. 1 root root 524 Apr 2 2014 multi-user.target
drwxr-xr-x. 2 root root 4096 Sep 3 12:03 multi-user.target.wants
-rw-r--r--. 1 root root 443 Apr 2 2014 network-online.target
drwxr-xr-x. 2 root root 47 Sep 3 12:03 network-online.target.wants
```

< RHEL 6

RHEL 7

init 0 →	Power off / Shutdown	Power off.target
init 1 →		rescue.target
init 2 →		
init 3 →	Multi user with Network	
init 4 →		Multi user.target
init 5 →	X11/GUI/Graphical	Graphical.target
init 6 →	Reboot	reboot.target

init 6 - reboot (don't test this command , if it is necessary then use it)

.) systemctl set-default poweroff.target { changing }

.) systemctl get-default

```
File Edit View Search Terminal Help
[root@server4 ~]# systemctl set-default poweroff.target
rm '/etc/systemd/system/default.target'
ln -s '/usr/lib/systemd/system/poweroff.target' '/etc/systemd/system/default.target'
[root@server4 ~]#
[root@server4 ~]# systemctl get-default
poweroff.target
[root@server4 ~]# 
```

from the next version onwards these commands changing

init 3 - runlevel 3 → -systemctl isolate multi-user.target

init 5 - runlevel 5 → -systemctl isolate graphical.target

DAY 21

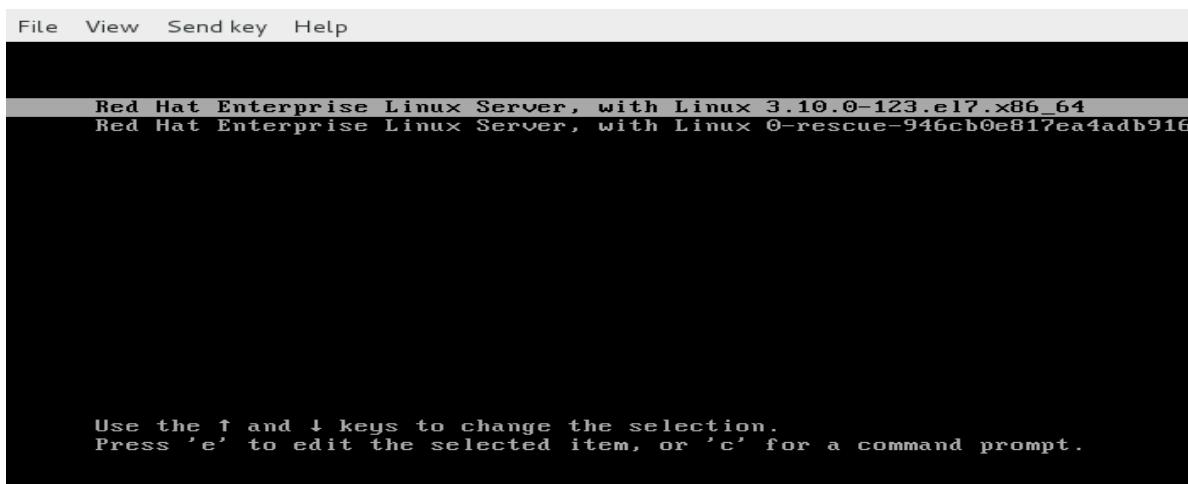
REBOOT TO NORMAL

.) systemctl set-default poweroff.target

.) init 6

. while rebooting click on send key option in that click on ctrl + Alt + del

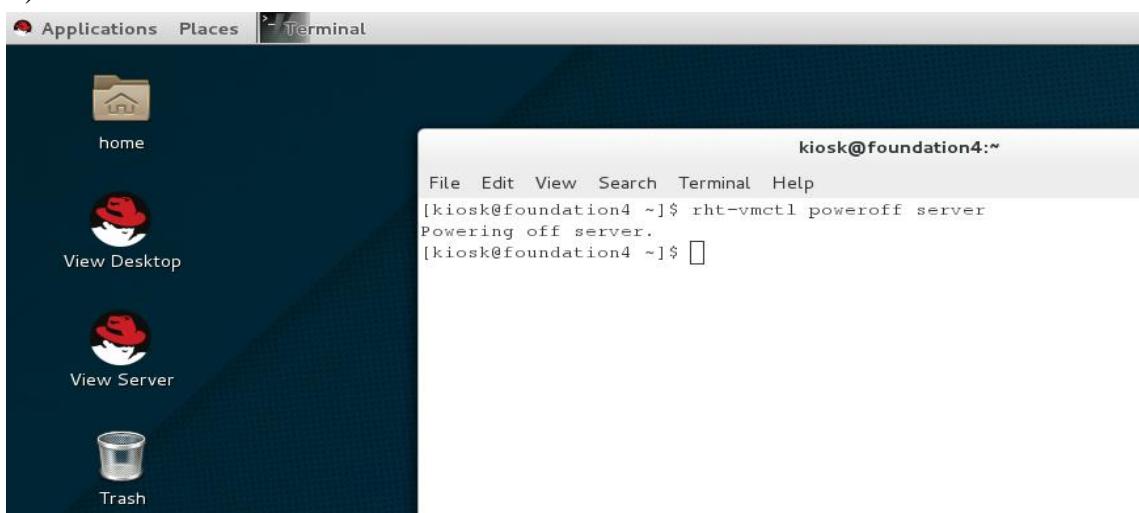
. next continuously press spacebar key to pause the splash screen



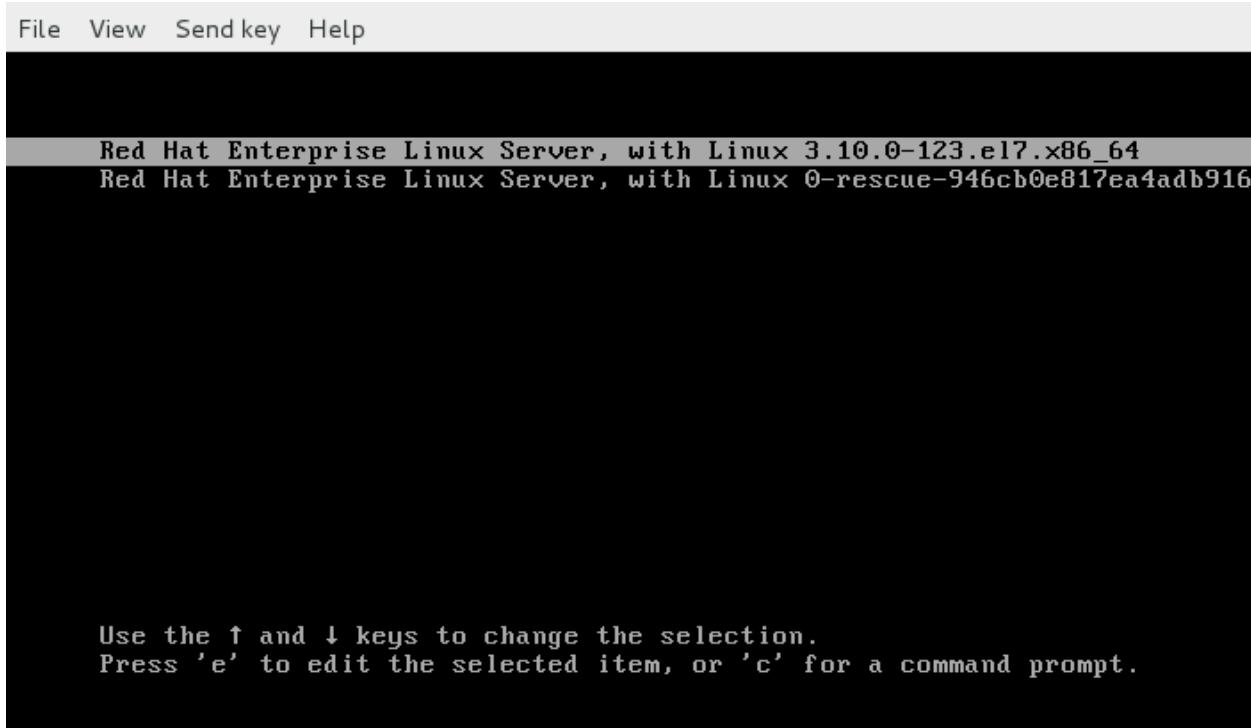
If the above screen is not coming with the above process then follow below

1) rht-vmctl poweroff server [type this command from physical machine]

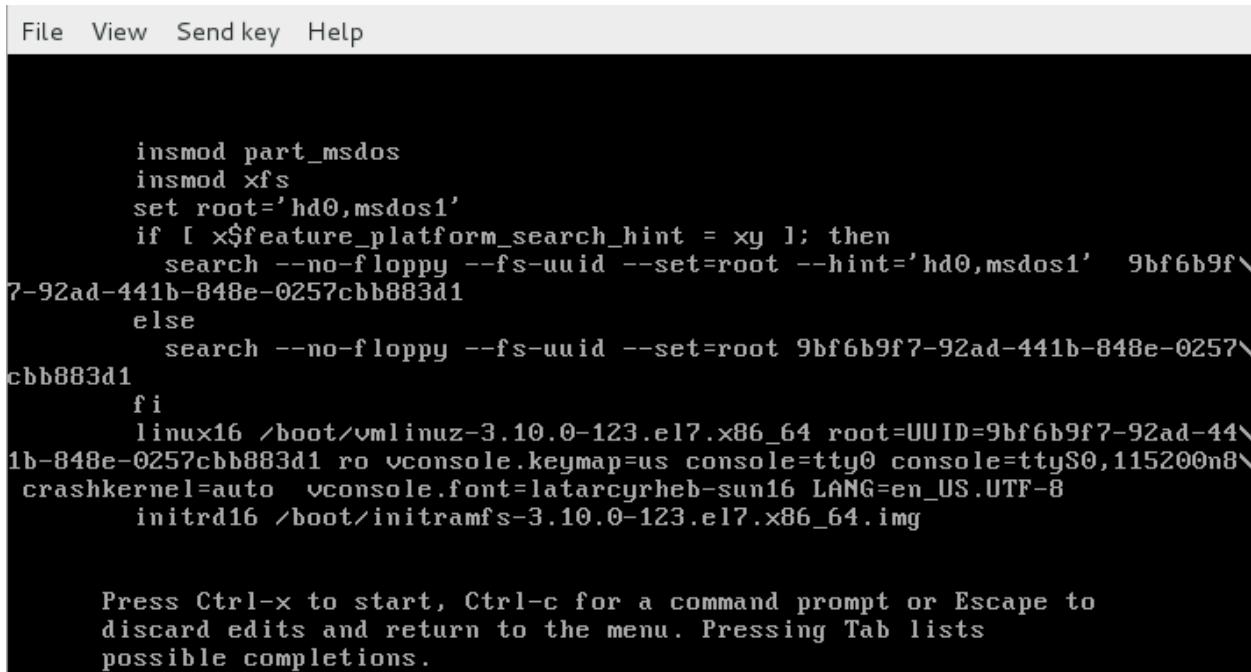
2) click on view server



3) a) press “e” to edit



b) use ↓ arrow to linux 16 and then press end key



here we can see ro vonsole.keymap ; in this ro means read only.

c) press space bar and type “system.unit=emergency.target”

```
File View Send key Help

insmod part_msdos
insmod xfs
set root='hd0,msdos1'
if [ x$feature_platform_search_hint = xy ]; then
    search --no-floppy --fs-uuid --set=root --hint='hd0,msdos1' 9bf6b9f7-92ad-441b-848e-0257cbb883d1
else
    search --no-floppy --fs-uuid --set=root 9bf6b9f7-92ad-441b-848e-0257cbb883d1
fi
linux16 /boot/vmlinuz-3.10.0-123.el7.x86_64 root=UUID=9bf6b9f7-92ad-441b-848e-0257cbb883d1 ro vconsole.keymap=us console=tty0 console=ttyS0,115200n8 crashkernel=auto vconsole.font=latarcyrheb-sun16 LANG=en_US.UTF-8 systemd.unitt=emergency.target
initrd16 /boot/initramfs-3.10.0-123.el7.x86_64.img

Press Ctrl-x to start, Ctrl-c for a command prompt or Escape to
discard edits and return to the menu. Pressing Tab lists
possible completions.
```

d) ctrl + x to continue

```
File View Send key Help

[ 5.768803] ACPI: bus type ATA registered
[ 5.799320] ACPI: PCI Interrupt Link [LNKA] enabled at IRQ 10
[ 5.901998] scsi0 : ata_piix
[ 5.916780] scsi1 : ata_piix
[ 5.930135] ata1: PATA max MWDMA2 cmd 0x1f0 ctl 0x3f6 bmdma 0xc100 irq 14
[ 5.953436] ata2: PATA max MWDMA2 cmd 0x170 ctl 0x376 bmdma 0xc108 irq 15
[ 6.020022] ACPI: PCI Interrupt Link [LNKB] enabled at IRQ 11
[ 6.104595] vda: vda1
[ 6.152254] vdb: unknown partition table
[ 6.292865] SGI XFS with ACLs, security attributes, large block/inode numbers
, no debug enabled
[ 6.305248] XFS (vda1): Mounting Filesystem
[ 6.328081] XFS (vda1): Ending clean mount
[ 6.618894] systemd-journald[125]: Received SIGTERM
[ 6.702413] type=1404 audit(1571234653.020:2): enforcing=1 old_enforcing=0 au
id=4294967295 ses=4294967295
[ 6.907420] type=1403 audit(1571234653.225:3): policy loaded auid=4294967295
ses=4294967295
[ 6.917798] systemd[1]: Successfully loaded SELinux policy in 217.020ms.
[ 6.978929] systemd[1]: Relabelled /dev and /run in 18.368ms.
[ 7.291480] systemd-journald[340]: Vacuuming done, freed 0 bytes
[ 7.302452] systemd-journald[340]: Received request to flush runtime journal
from PID 1
Give root password for maintenance
(or type Control-D to continue):
```

e) give the root password

```
File View Send key Help
[ 5.930135] ata1: PATA max MWDMA2 cmd 0x1f0 ctl 0x3f6 bmdma 0xc100 irq 14
[ 5.953436] ata2: PATA max MWDMA2 cmd 0x170 ctl 0x376 bmdma 0xc108 irq 15
[ 6.020022] ACPI: PCI Interrupt Link [LNKB] enabled at IRQ 11
[ 6.104595] vda: vda1
[ 6.152254] vdb: unknown partition table
[ 6.292865] SGI XFS with ACLs, security attributes, large block/inode numbers
, no debug enabled
[ 6.305248] XFS (vda1): Mounting Filesystem
[ 6.328081] XFS (vda1): Ending clean mount
[ 6.618894] systemd-journald[125]: Received SIGTERM
[ 6.702413] type=1404 audit(1571234653.020:2): enforcing=1 old_enforcing=0 au
id=4294967295 ses=4294967295
[ 6.907420] type=1403 audit(1571234653.225:3): policy loaded auid=4294967295
ses=4294967295
[ 6.917798] systemd[1]: Successfully loaded SELinux policy in 217.020ms.
[ 6.978929] systemd[1]: Relabelled /dev and /run in 18.368ms.
[ 7.291480] systemd-journald[340]: Vacuuming done, freed 0 bytes
[ 7.302452] systemd-journald[340]: Received request to flush runtime journal
from PID 1
Give root password for maintenance
(or type Control-D to continue):
mktemp: failed to create file via template ▨/tmp/.colorlsXXX▪: Read-only file sy
stem
bash: $TMP: ambiguous redirect
[root@localhost ~]#
```

4)systemctl get-default

```
File View Send key Help
[ 6.020022] ACPI: PCI Interrupt Link [LNKB] enabled at IRQ 11
[ 6.104595] vda: vda1
[ 6.152254] vdb: unknown partition table
[ 6.292865] SGI XFS with ACLs, security attributes, large block/inode numbers
, no debug enabled
[ 6.305248] XFS (vda1): Mounting Filesystem
[ 6.328081] XFS (vda1): Ending clean mount
[ 6.618894] systemd-journald[125]: Received SIGTERM
[ 6.702413] type=1404 audit(1571234653.020:2): enforcing=1 old_enforcing=0 au
id=4294967295 ses=4294967295
[ 6.907420] type=1403 audit(1571234653.225:3): policy loaded auid=4294967295
ses=4294967295
[ 6.917798] systemd[1]: Successfully loaded SELinux policy in 217.020ms.
[ 6.978929] systemd[1]: Relabelled /dev and /run in 18.368ms.
[ 7.291480] systemd-journald[340]: Vacuuming done, freed 0 bytes
[ 7.302452] systemd-journald[340]: Received request to flush runtime journal
from PID 1
Give root password for maintenance
(or type Control-D to continue):
mktemp: failed to create file via template ▨/tmp/.colorlsXXX▪: Read-only file sy
stem
bash: $TMP: ambiguous redirect
[root@localhost ~]# systemctl get-default
poweroff.target
[root@localhost ~]#
```

5) systemctl set-default multi-user.target

```
File View Send key Help
[   6.152254] vdb: unknown partition table
[   6.292865] SGI XFS with ACLs, security attributes, large block/inode numbers
, no debug enabled
[   6.305248] XFS (vda1): Mounting Filesystem
[   6.328081] XFS (vda1): Ending clean mount
[   6.618894] systemd-journald[125]: Received SIGTERM
[   6.702413] type=1404 audit(1571234653.020:2): enforcing=1 old_enforcing=0 au
id=4294967295 ses=4294967295
[   6.907420] type=1403 audit(1571234653.225:3): policy loaded auid=4294967295
ses=4294967295
[   6.917798] systemd[1]: Successfully loaded SELinux policy in 217.020ms.
[   6.978929] systemd[1]: Relabelled /dev and /run in 18.368ms.
[   7.291480] systemd-journald[340]: Vacuuming done, freed 0 bytes
[   7.302452] systemd-journald[340]: Received request to flush runtime journal
from PID 1
Give root password for maintenance
(or type Control-D to continue):
mktemp: failed to create file via template [/tmp/.colorlsXXX]: Read-only file sy
stem
bash: $TMP: ambiguous redirect
[root@localhost ~]# systemctl get-default
poweroff.target
[root@localhost ~]# systemctl set-default multi-user.target
Failed to issue method call: File exists
[root@localhost ~]#
```

not done , because we have only read permission.

6) mount -o remount,rw /

[o means output and rw means read ,write permission]

```
File View Send key Help
, no debug enabled
[   6.305248] XFS (vda1): Mounting Filesystem
[   6.328081] XFS (vda1): Ending clean mount
[   6.618894] systemd-journald[125]: Received SIGTERM
[   6.702413] type=1404 audit(1571234653.020:2): enforcing=1 old_enforcing=0 au
id=4294967295 ses=4294967295
[   6.907420] type=1403 audit(1571234653.225:3): policy loaded auid=4294967295
ses=4294967295
[   6.917798] systemd[1]: Successfully loaded SELinux policy in 217.020ms.
[   6.978929] systemd[1]: Relabelled /dev and /run in 18.368ms.
[   7.291480] systemd-journald[340]: Vacuuming done, freed 0 bytes
[   7.302452] systemd-journald[340]: Received request to flush runtime journal
from PID 1
Give root password for maintenance
(or type Control-D to continue):
mktemp: failed to create file via template [/tmp/.colorlsXXX]: Read-only file sy
stem
bash: $TMP: ambiguous redirect
[root@localhost ~]# systemctl get-default
poweroff.target
[root@localhost ~]# systemctl set-default multi-user.target
Failed to issue method call: File exists
[root@localhost ~]# mount -o remount,rw /
[root@localhost ~]#
```

7) systemctl set-default multi-user.target [again]

```
Send key Help
id=4294967295 ses=4294967295
[ 6.907420] type=1403 audit(1571234653.225:3): policy loaded auid=4294967295
ses=4294967295
[ 6.917798] systemd[1]: Successfully loaded SELinux policy in 217.020ms.
[ 6.978929] systemd[1]: Relabelled /dev and /run in 18.368ms.
[ 7.291480] systemd-journald[340]: Vacuuming done, freed 0 bytes
[ 7.302452] systemd-journald[340]: Received request to flush runtime journal
from PID 1
Give root password for maintenance
(or type Control-D to continue):
mktemp: failed to create file via template ▨/tmp/.colorlsXXXX▪: Read-only file system
bash: $TMP: ambiguous redirect
[root@localhost ~]# systemctl get-default
poweroff.target
[root@localhost ~]# systemctl set-default multi-user.target
Failed to issue method call: File exists
[root@localhost ~]#
[root@localhost ~]# mount -o remount,rw /
[root@localhost ~]#
[root@localhost ~]# systemctl set-default multi-user.target
rm '/etc/systemd/system/default.target'
ln -s '/usr/lib/systemd/system/multi-user.target' '/etc/systemd/system/default.target'
[root@localhost ~]#
```

8)systemctl get-default

```
Send key Help
ses=4294967295
[ 6.917798] systemd[1]: Successfully loaded SELinux policy in 217.020ms.
[ 6.978929] systemd[1]: Relabelled /dev and /run in 18.368ms.
[ 7.291480] systemd-journald[340]: Vacuuming done, freed 0 bytes
[ 7.302452] systemd-journald[340]: Received request to flush runtime journal
from PID 1
Give root password for maintenance
(or type Control-D to continue):
mktemp: failed to create file via template ▨/tmp/.colorlsXXXX▪: Read-only file system
bash: $TMP: ambiguous redirect
[root@localhost ~]# systemctl get-default
poweroff.target
[root@localhost ~]# systemctl set-default multi-user.target
Failed to issue method call: File exists
[root@localhost ~]#
[root@localhost ~]# mount -o remount,rw /
[root@localhost ~]#
[root@localhost ~]# systemctl set-default multi-user.target
rm '/etc/systemd/system/default.target'
ln -s '/usr/lib/systemd/system/multi-user.target' '/etc/systemd/system/default.target'
[root@localhost ~]# systemctl get-default
multi-user.target
[root@localhost ~]# _
```

9) reboot

```
Send key Help
ses=4294967295
[   6.917798] systemd[1]: Successfully loaded SELinux policy in 217.020ms.
[   6.978929] systemd[1]: Relabelled /dev and /run in 18.368ms.
[   7.291480] systemd-journald[340]: Vacuuming done, freed 0 bytes
[   7.302452] systemd-journald[340]: Received request to flush runtime journal
from PID 1
Give root password for maintenance
(or type Control-D to continue):
mktemp: failed to create file via template [/tmp/.color1sXXXX]: Read-only file system
bash: $TMP: ambiguous redirect
[root@localhost ~]# systemctl get-default
poweroff.target
[root@localhost ~]# systemctl set-default multi-user.target
Failed to issue method call: File exists
[root@localhost ~]#
[root@localhost ~]# mount -o remount,rw /
[root@localhost ~]#
[root@localhost ~]# systemctl set-default multi-user.target
rm '/etc/systemd/system/default.target'
ln -s '/usr/lib/systemd/system/multi-user.target' '/etc/systemd/system/default.target'
[root@localhost ~]# systemctl get-default
multi-user.target
[root@localhost ~]# reboot
```

```
Send key Help
[ OK ] Started Show Plymouth Reboot Screen.
```

[Note : if the mouse pointer or cursor is strucked then press **ctrl + Alt** to release]

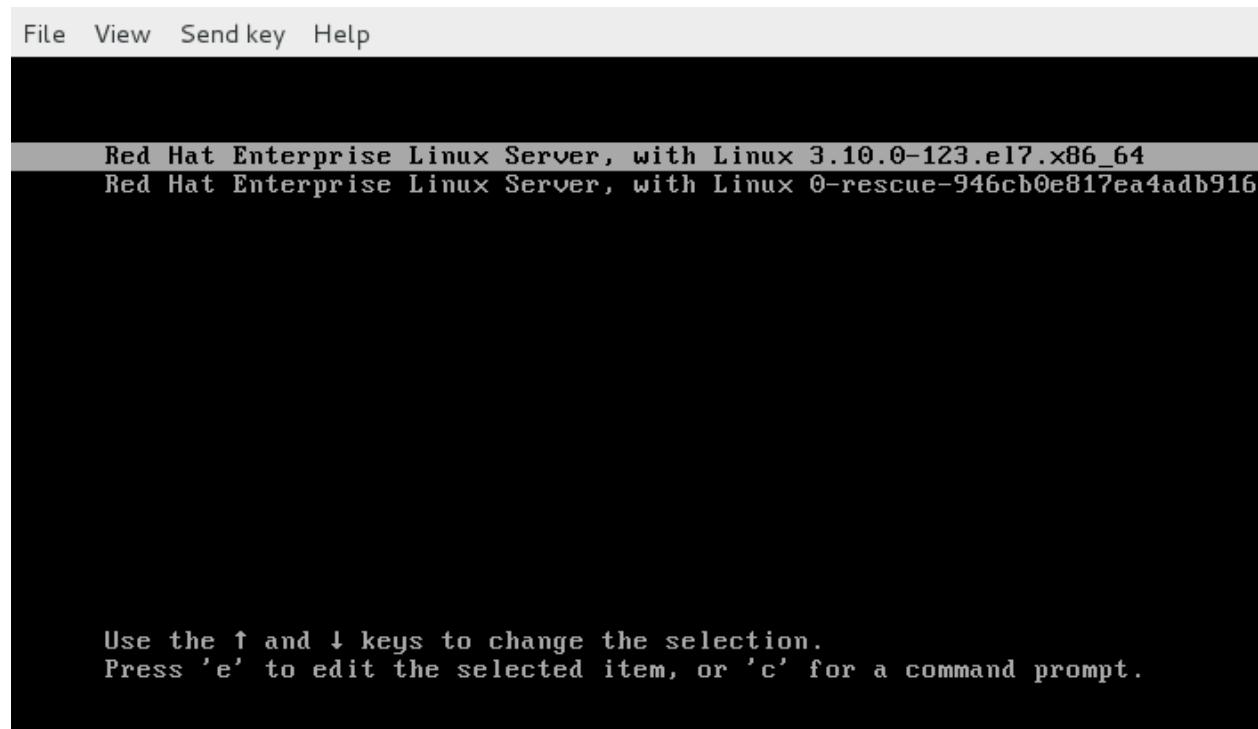
HOW TO CHANGE ROOT PASSWORD

.) lab rootpw setup

```
ew Send key Help
[root@server4 ~]# lab rootpw setup
Changing root password...
Adjusting boot menu timeout...
Rebooting your system in 5 seconds...
SUCCESS
```

given the above command and trying to login with root password ; but it is showing login incorrect.

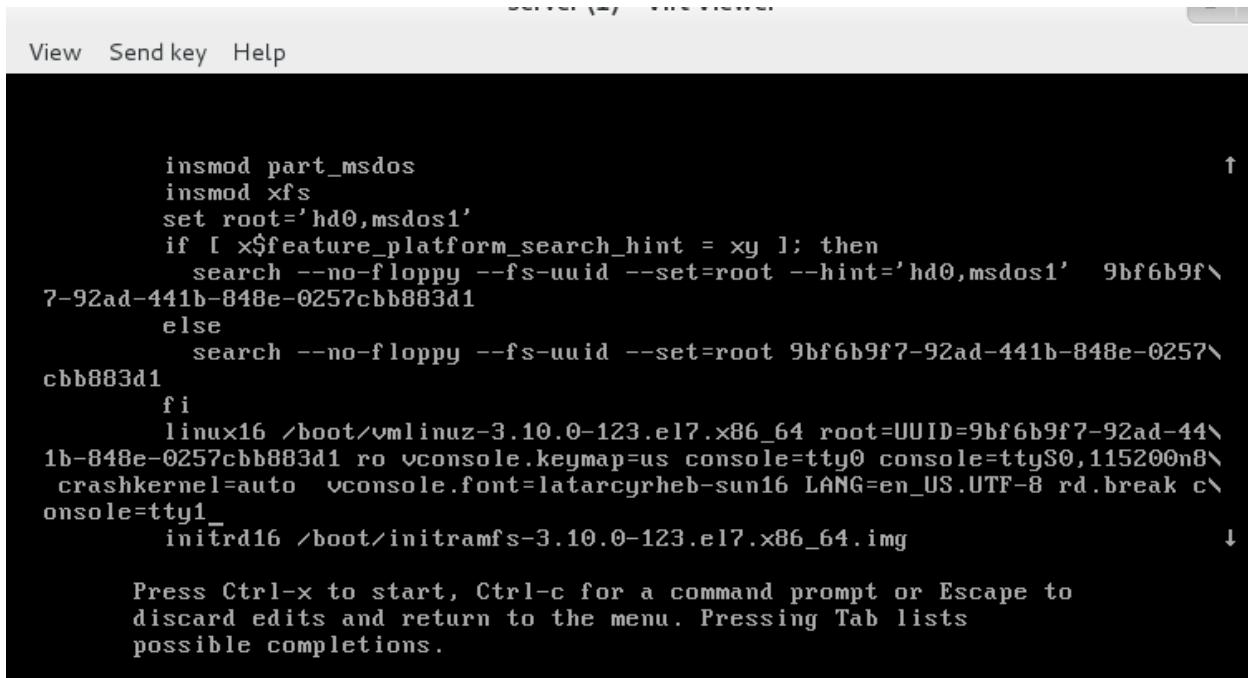
- 1) cilick on send key menu bar and click ctrl +Alt + del
- 2) press space bar contineously



3) a) press “e”

b) ↓ to linux 16 , press end button and press space bar and type

rd.break console=tty1 [rd means Ram Disk]

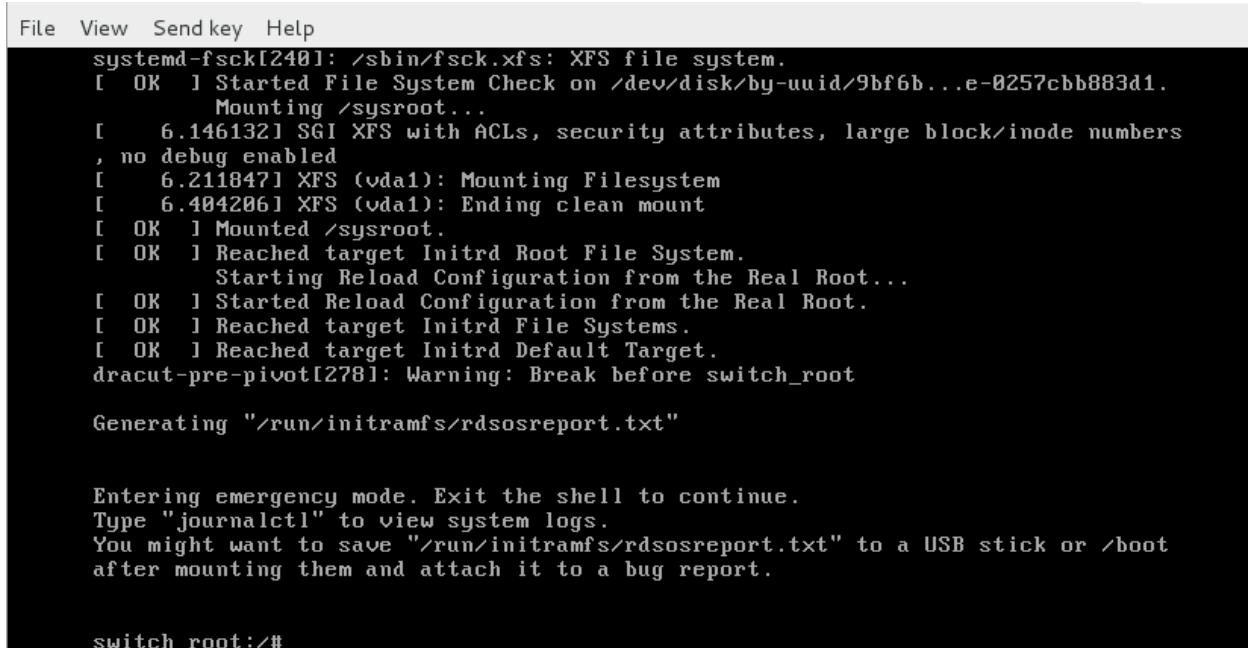


The screenshot shows a terminal window with a menu for booting a Linux system. The menu includes options for kernel versions 3.10.0-123.e17.x86_64 and 3.10.0-123.e17.x86_64.img. The selected option is the second one. The configuration for this kernel includes the command 'rd.break console=tty1'. Below the menu, there is a message about using Ctrl-x to start, Ctrl-c for a command prompt, or Escape to discard edits.

```
insmod part_msdos
insmod xfs
set root='hd0,msdos1'
if [ x$feature_platform_search_hint = xy ]; then
    search --no-floppy --fs-uuid --set=root --hint='hd0,msdos1' 9bf6b9f7-92ad-441b-848e-0257cbb883d1
else
    search --no-floppy --fs-uuid --set=root 9bf6b9f7-92ad-441b-848e-0257cbb883d1
fi
linux16 /boot/vmlinuz-3.10.0-123.e17.x86_64 root=UUID=9bf6b9f7-92ad-441b-848e-0257cbb883d1 ro vconsole.keymap=us console=tty0 console=ttyS0,115200n8 crashkernel=auto vconsole.font=latarcyrheb-sun16 LANG=en_US.UTF-8 rd.break console=tty1_
initrd16 /boot/initramfs-3.10.0-123.e17.x86_64.img

Press Ctrl-x to start, Ctrl-c for a command prompt or Escape to
discard edits and return to the menu. Pressing Tab lists
possible completions.
```

c) ctrl + x to continue



The screenshot shows a terminal window displaying the output of the 'dracut-pre-pivot' command. It includes messages from 'systemd-fsck[240]', 'dracut-pre-pivot[278]', and 'Generating "/run/initramfs/rdsosreport.txt"'. At the bottom, there is an instruction to enter emergency mode if needed.

```
File View Send key Help
systemd-fsck[240]: /sbin/fsck.xfs: XFS file system.
[ OK ] Started File System Check on /dev/disk/by-uuid/9bf6b...e-0257cbb883d1.
          Mounting /sysroot...
[ 6.146132] SGI XFS with ACLs, security attributes, large block/inode numbers
, no debug enabled
[ 6.211847] XFS (vda1): Mounting Filesystem
[ 6.404206] XFS (vda1): Ending clean mount
[ OK ] Mounted /sysroot.
[ OK ] Reached target Initrd Root File System.
          Starting Reload Configuration from the Real Root...
[ OK ] Started Reload Configuration from the Real Root.
[ OK ] Reached target Initrd File Systems.
[ OK ] Reached target Initrd Default Target.
dracut-pre-pivot[278]: Warning: Break before switch_root

Generating "/run/initramfs/rdsosreport.txt"

Entering emergency mode. Exit the shell to continue.
Type "journalctl" to view system logs.
You might want to save "/run/initramfs/rdsosreport.txt" to a USB stick or /boot
after mounting them and attach it to a bug report.

switch_root:/# _
```

4) mount -o remount,rw /sysroot/

```
File View Send key Help
systemd-fsck[240]: /sbin/fsck.xfs: XFS file system.
[ OK ] Started File System Check on /dev/disk/by-uuid/9bf6b...e-0257cbb883d1.
          Mounting /sysroot...
[ 6.146132] SGI XFS with ACLs, security attributes, large block/inode numbers
, no debug enabled
[ 6.211847] XFS (vda1): Mounting Filesystem
[ 6.404206] XFS (vda1): Ending clean mount
[ OK ] Mounted /sysroot.
[ OK ] Reached target Initrd Root File System.
          Starting Reload Configuration from the Real Root...
[ OK ] Started Reload Configuration from the Real Root.
[ OK ] Reached target Initrd File Systems.
[ OK ] Reached target Initrd Default Target.
dracut-pre-pivot[278]: Warning: Break before switch_root

Generating "/run/initramfs/rdsosreport.txt"

Entering emergency mode. Exit the shell to continue.
Type "journalctl" to view system logs.
You might want to save "/run/initramfs/rdsosreport.txt" to a USB stick or /boot
after mounting them and attach it to a bug report.

switch_root:/# mount -o remount,rw /sysroot/
```

.) try to change password with passwd command

passwd root

```
View Send key Help
[ 6.146132] SGI XFS with ACLs, security attributes, large block/inode numbers
, no debug enabled
[ 6.211847] XFS (vda1): Mounting Filesystem
[ 6.404206] XFS (vda1): Ending clean mount
[ OK ] Mounted /sysroot.
[ OK ] Reached target Initrd Root File System.
          Starting Reload Configuration from the Real Root...
[ OK ] Started Reload Configuration from the Real Root.
[ OK ] Reached target Initrd File Systems.
[ OK ] Reached target Initrd Default Target.
dracut-pre-pivot[278]: Warning: Break before switch_root

Generating "/run/initramfs/rdsosreport.txt"

Entering emergency mode. Exit the shell to continue.
Type "journalctl" to view system logs.
You might want to save "/run/initramfs/rdsosreport.txt" to a USB stick or /boot
after mounting them and attach it to a bug report.

switch_root:/# mount -o remount,rw /sysroot/
switch_root:/# passwd root
sh: passwd: command not found
switch_root:/# _
```

But here the command not working

5) chroot /sysroot/

```
View Send key Help
[  OK  ] 6.211847] XFS (vda1): Mounting Filesystem
[  OK  ] 6.404206] XFS (vda1): Ending clean mount
[ OK ] Mounted /sysroot.
[ OK ] Reached target Initrd Root File System.
      Starting Reload Configuration from the Real Root...
[ OK ] Started Reload Configuration from the Real Root.
[ OK ] Reached target Initrd File Systems.
[ OK ] Reached target Initrd Default Target.
dracut-pre-pivot[278]: Warning: Break before switch_root

Generating "/run/initramfs/rdsosreport.txt"

Entering emergency mode. Exit the shell to continue.
Type "journalctl" to view system logs.
You might want to save "/run/initramfs/rdsosreport.txt" to a USB stick or /boot
after mounting them and attach it to a bug report.

switch_root:/# mount -o remount,rw /sysroot/
switch_root:/# passwd root
sh: passwd: command not found
switch_root:/#
switch_root:/#
switch_root:/# chroot /sysroot/
```

6) passwd root

```
View Send key Help
[ OK ] Reached target Initrd Default Target.
dracut-pre-pivot[278]: Warning: Break before switch_root

Generating "/run/initramfs/rdsosreport.txt"

Entering emergency mode. Exit the shell to continue.
Type "journalctl" to view system logs.
You might want to save "/run/initramfs/rdsosreport.txt" to a USB stick or /boot
after mounting them and attach it to a bug report.

switch_root:/# mount -o remount,rw /sysroot/
switch_root:/# passwd root
sh: passwd: command not found
switch_root:/#
switch_root:/#
switch_root:/# chroot /sysroot/
sh-4.2# passwd root
Changing password for user root.
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: all authentication tokens updated successfully.
sh-4.2# _
```

Give the new password 2 times

7) touch /.autorelabel { to update the password }

```
View Send key Help
dracut-pre-pivot[278]: Warning: Break before switch_root
Generating "/run/initramfs/rdsosreport.txt"

Entering emergency mode. Exit the shell to continue.
Type "journalctl" to view system logs.
You might want to save "/run/initramfs/rdsosreport.txt" to a USB stick or /boot
after mounting them and attach it to a bug report.

switch_root:/# mount -o remount,rw /sysroot/
switch_root:/# passwd root
sh: passwd: command not found
switch_root:/#
switch_root:/#
switch_root:/# chroot /sysroot/
sh-4.2# passwd root
Changing password for user root.
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: all authentication tokens updated successfully.
sh-4.2#
sh-4.2# touch /.autorelabel_
```

8) exit

9) exit

type exit 2 times

```
View Send key Help

Entering emergency mode. Exit the shell to continue.
Type "journalctl" to view system logs.
You might want to save "/run/initramfs/rdsosreport.txt" to a USB stick or /boot
after mounting them and attach it to a bug report.

switch_root:/# mount -o remount,rw /sysroot/
switch_root:/# passwd root
sh: passwd: command not found
switch_root:/#
switch_root:/#
switch_root:/# chroot /sysroot/
sh-4.2# passwd root
Changing password for user root.
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: all authentication tokens updated successfully.
sh-4.2#
sh-4.2# touch /.autorelabel
sh-4.2# exit
exit
switch_root:/# exit_
```

If it is showing % then it is working

```
v Send key Help
Starting Activation of DM RAID sets...
[ 464.706788] piix4_smbus 0000:00:01.3: SMBus Host Controller at 0xb100, revision 0
[ 464.809930] [drm] Initialized drm 1.1.0 20060810
[ 464.878087] input: PC Speaker as /devices/platform/pcspkr/input/input3
[ OK ] Found device /dev/ttys0.
[ 464.974758] device-mapper: uevent: version 1.0.3
[ 465.062723] [drm] Device Version 0.0
[ 465.070461] [drm] Compression level 0 log level 0
[ 465.081250] [drm] Currently using mode #0, list at 0x488
[ 465.086481] [drm] 12286 io pages at offset 0x1000000
[ 465.090274] [drm] 16777216 byte draw area at offset 0x0
[ 465.140619] [drm] RAM header offset: 0x3ffe000
[ 465.148493] [drm] ram modes offset 0x488 for 128 modes
[ 465.169636] [TTM] Zone kernel: Available graphics memory: 508996 kB
[ 465.262969] [TTM] Initializing pool allocator
[ 465.312457] [TTM] Initializing DMA pool allocator
[ 465.399248] [drm] qxl: 16M of VRAM memory size
[ 465.402824] [drm] qxl: 63M of 10 pages memory ready (VRAM domain)
[ 465.440962] device-mapper: ioctl: 4.27.0-ioctl (2013-10-30) initialised: dm-d
evel@redhat.com
[ 465.499644] [drm] main mem slot 1 [f4000000,3ffe000]
[ 465.560787] [drm] fb mappable at 0xF4000000, size 3145728
[ 465.625229] [drm] fb: depth 24, pitch 4096, width 1024, height 768
[ 465.677952] fbcon: qxldrmfb (fb0) is primary device
[ 465.718249] Console: switching to colour frame buffer device 128x48
[ 465.850982] qxl 0000:00:02.0: fb0: qxldrmfb frame buffer device
[ 465.850984] qxl 0000:00:02.0: registered panic notifier
[ 465.860341] [drm] Initialized qxl 0.1.0 20120117 for 0000:00:02.0 on minor 0
[ 465.904060] systemd-journald[416]: Received request to flush runtime journal from PID 1
[ 465.942350] type=1305 audit(151236789.384:4): audit_pid=470 old=0 auid=4294967295 subj=system_u:system_r:audi
td_t:s0 res=1
[ OK ] Started Show Plymouth Boot Screen.
[ OK ] Started Monitoring of LVM2 mirrors, snapshots etc. u...gress polling.
[ OK ] Started udev Wait for Complete Device Initialization.
      Starting Activation of DM RAID sets...
[ OK ] Found device /dev/ttys0.

*** Warning -- SELinux targeted policy relabel is required.
*** Relabeling could take a very long time, depending on file
*** system size and speed of hard drives.
[ OK ] Started Update UTMP about System Reboot/Shutdown.
26.7%_
```

10) Id : root

Password : redhat

```
v Send key Help
Red Hat Enterprise Linux Server 7.0 (Maipo)
Kernel 3.10.0-123.el7.x86_64 on an x86_64

server4 login: root
Password:
Last failed login: Wed Oct 16 19:50:36 IST 2019 on ttys1
There was 1 failed login attempt since the last successful login.
Last login: Wed Oct 16 19:44:20 on ttys1
[root@server4 ~]#
```

BOOT BREAK PROCESS

.) lab bootbreakfs setup

```
Red Hat Enterprise Linux Server 7.0 (Maipo)
Kernel 3.10.0-123.el7.x86_64 on an x86_64

server4 login: root
Password:
Last failed login: Wed Oct 16 19:50:36 IST 2019 on tty1
There was 1 failed login attempt since the last successful login.
Last login: Wed Oct 16 19:44:20 on tty1
[root@server4 ~]#
[root@server4 ~]#
[root@server4 ~]# lab bootbreakfs setup
```

after giving this command it'll go to maintenance mode

```
w Send key Help

Red Hat Enterprise Linux Server 7.0 (Maipo)
Kernel 3.10.0-123.el7.x86_64 on an x86_64

server4 login: root
Password:
Last failed login: Wed Oct 16 19:50:36 IST 2019 on tty1
There was 1 failed login attempt since the last successful login.
Last login: Wed Oct 16 19:44:20 on tty1
[root@server4 ~]#
[root@server4 ~]#
[root@server4 ~]# lab bootbreakfs setup
Breaking the boot process...
Adjusting boot menu timeout...
Rebooting your system in 5 seconds...
SUCCESS
-
```

```
?w Send key Help
[ OK ] I Started Monitoring of LVM2 mirrors, snapshots etc. u...gress polling.
[ 6.057432] [drm] Initialized drm 1.1.0 20060810
[ 6.957293] device-mapper: uevent: version 1.0.3
[ 6.984395] input: PC Speaker as /devices/platform/pcspkr/input/input3
[ OK ] I Found device /dev/ttys0.
[ 7.063258] device-mapper: ioctl: 4.27.0-ioctl (2013-10-30) initialised: dm-d
evel@redhat.com
[ OK ] I Started Activation of DM RAID sets.
[ OK ] I Reached target Encrypted Volumes.
[ 7.376429] [drm] Device Version 0.0
[ 7.385946] [drm] Compression level 0 log level 0
[ 7.446300] [drm] Currently using mode #0, list at 0x488
[ 7.495113] [drm] 12286 io pages at offset 0x1000000
[ 7.504864] [drm] 16777216 byte draw area at offset 0x0
[ 7.509032] [drm] RAM header offset: 0x3ffe000
[ 7.537949] [drm] rom modes offset 0x488 for 128 modes
[ 7.574069] [TTM] Zone kernel: Available graphics memory: 508996 kB
[ 7.641784] [TTM] Initializing pool allocator
[ 7.694209] [TTM] Initializing DMA pool allocator
[ 7.759426] [drm] qxl: 16M of URAM memory size
[ 7.763255] [drm] qxl: 63M of 10 pages memory ready (VRAM domain)
[ 7.851727] [drm] main mem slot 1 [f4000000,3ffe000)
[ 7.909485] [drm] fb mappable at 0xF4000000, size 3145728
[ 7.965253] [drm] fb: depth 24, pitch 4096, width 1024, height 768
[ 7.970508] fbcon: qxldrmfb (fb0) is primary device
[ 7.989414] Console: switching to colour frame buffer device 128x48
[ 8.138298] qxl 0000:00:02.0: fb0: qxldrmfb frame buffer device
[ 8.142676] qxl 0000:00:02.0: registered panic notifier
[ 8.146964] [drm] Initialized qxl 0.1.0 20120117 for 0000:00:02.0 on minor 0
[*] A start job is running for dev-1_Dont_Exist.device_
```

It is in the maintenance mode ; after that wait for some time

```
?w Send key Help
[ OK ] I Started Monitoring of LVM2 mirrors, snapshots etc. u...gress polling.
[ 6.057432] [drm] Initialized drm 1.1.0 20060810
[ 6.957293] device-mapper: uevent: version 1.0.3
[ 6.984395] input: PC Speaker as /devices/platform/pcspkr/input/input3
[ OK ] I Found device /dev/ttys0.
[ 7.063258] device-mapper: ioctl: 4.27.0-ioctl (2013-10-30) initialised: dm-d
evel@redhat.com
[ OK ] I Started Activation of DM RAID sets.
[ OK ] I Reached target Encrypted Volumes.
[ 7.376429] [drm] Device Version 0.0
[ 7.385946] [drm] Compression level 0 log level 0
[ 7.446300] [drm] Currently using mode #0, list at 0x488
[ 7.495113] [drm] 12286 io pages at offset 0x1000000
[ 7.504864] [drm] 16777216 byte draw area at offset 0x0
[ 7.509032] [drm] RAM header offset: 0x3ffe000
[ 7.537949] [drm] rom modes offset 0x488 for 128 modes
[ 7.574069] [TTM] Zone kernel: Available graphics memory: 508996 kB
[ 7.641784] [TTM] Initializing pool allocator
[ 7.694209] [TTM] Initializing DMA pool allocator
[ 7.759426] [drm] qxl: 16M of URAM memory size
[ 7.763255] [drm] qxl: 63M of 10 pages memory ready (VRAM domain)
[ 7.851727] [drm] main mem slot 1 [f4000000,3ffe000)
[ 7.909485] [drm] fb mappable at 0xF4000000, size 3145728
[ 7.965253] [drm] fb: depth 24, pitch 4096, width 1024, height 768
[ 7.970508] fbcon: qxldrmfb (fb0) is primary device
[ 7.989414] Console: switching to colour frame buffer device 128x48
[ 8.138298] qxl 0000:00:02.0: fb0: qxldrmfb frame buffer device
[ 8.142676] qxl 0000:00:02.0: registered panic notifier
[ 8.146964] [drm] Initialized qxl 0.1.0 20120117 for 0000:00:02.0 on minor 0
[ TIME ] I Timed out waiting for device dev-1_Dont_Exist.device.
[DEPEND] Dependency failed for /RemoveMe.
[DEPEND] Dependency failed for Local File Systems.
[DEPEND] Dependency failed for Relabel all filesystems, if necessary.
[DEPEND] Dependency failed for Mark the need to relabel after reboot.
[ 96.092899] systemd-journald[376]: Received request to flush runtime journal from PID 1
[ 96.153603] type=1305 audit(1571237425.532:4): audit_pid=435 old=0 auid=4294967295 ses=4294967295 subj=system_u:system_r:audi
td_t:s0 res=1
Give root password for maintenance
(or type Control-D to continue):
[root@localhost ~]# _
```

give the root password for maintenance

.) mount -a

```
:w Send key Help
[ OK ] Started Monitoring of LVM2 mirrors, snapshots etc. u...gress polling.
[ 6.057432] [drm] Initialized drm 1.1.0 20060810
[ 6.957293] device-mapper: uevent: version 1.0.3
[ 6.984395] input: PC Speaker as /devices/platform/pcspkr/input/input3
[ OK ] Found device /dev/ttys0.
[ 7.063258] device-mapper: ioctl: 4.27.0-ioctl (2013-10-30) initialised: dm-d
evel@redhat.com
[ OK ] Started Activation of DM RAID sets.
[ OK ] Reached target Encrypted Volumes.
[ 7.376429] [drm] Device Version 0.0
[ 7.385946] [drm] Compression level 0 log level 0
[ 7.446300] [drm] Currently using mode #0, list at 0x488
[ 7.495113] [drm] 12286 io pages at offset 0x1000000
[ 7.504064] [drm] 16777216 byte draw area at offset 0x0
[ 7.509032] [drm] RAM header offset: 0x3ffe000
[ 7.537949] [drm] rom modes offset 0x488 for 128 modes
[ 7.574069] [TTM] Zone kernel: Available graphics memory: 508996 kB
[ 7.641784] [TTM] Initializing pool allocator
[ 7.694209] [TTM] Initializing DMA pool allocator
[ 7.759426] [drm] qxl: 16M of VRAM memory size
[ 7.763255] [drm] qxl: 63M of IO pages memory ready (VRAM domain)
[ 7.851727] [drm] main mem slot 1 [f4000000,3ffe000]
[ 7.909485] [drm] fb mappable at 0xF4000000, size 3145728
[ 7.965253] [drm] fb: depth 24, pitch 4096, width 1024, height 768
[ 7.970508] fbcon: qxldrmfb (fb0) is primary device
[ 7.989414] Console: switching to colour frame buffer device 128x48
[ 8.138298] qxl 0000:00:02.0: fb0: qxldrmfb frame buffer device
[ 8.142676] qxl 0000:00:02.0: registered panic notifier
[ 8.146964] [drm] Initialized qxl 0.1.0 20120117 for 0000:00:02.0 on minor 0
[ TIME ] Timed out waiting for device dev-1_Dont_Exist.device.
[DEPEND] Dependency failed for /RemoveMe.
[DEPEND] Dependency failed for Local File Systems.
[DEPEND] Dependency failed for Relabel all filesystems, if necessary.
[DEPEND] Dependency failed for Mark the need to relabel after reboot.
[ 96.092899] systemd-journald[3761]: Received request to flush runtime journal from PID 1
[ 96.153603] type=1305 audit(1571237425.532:4): audit_pid=435 old=0 auid=4294967295 subj=system_u:system_r:audi
td_t:s0 res=1
Give root password for maintenance
(or type Control-D to continue):
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# mount -a
mount: mount point /RemoveMe does not exist
[root@localhost ~]#
```

.) vim /etc/fstab [it will go to edit mode]

```
:w Send key Help
#
# /etc/fstab
# Created by anaconda on Wed May  7 01:22:57 2014
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
UUID=9bf6b9f7-92ad-441b-848e-0257cbb883d1 /           xfs      defaults        1 1
/dev/I_Dont_Exist /_RemoveMe xfs defaults 1 2
```

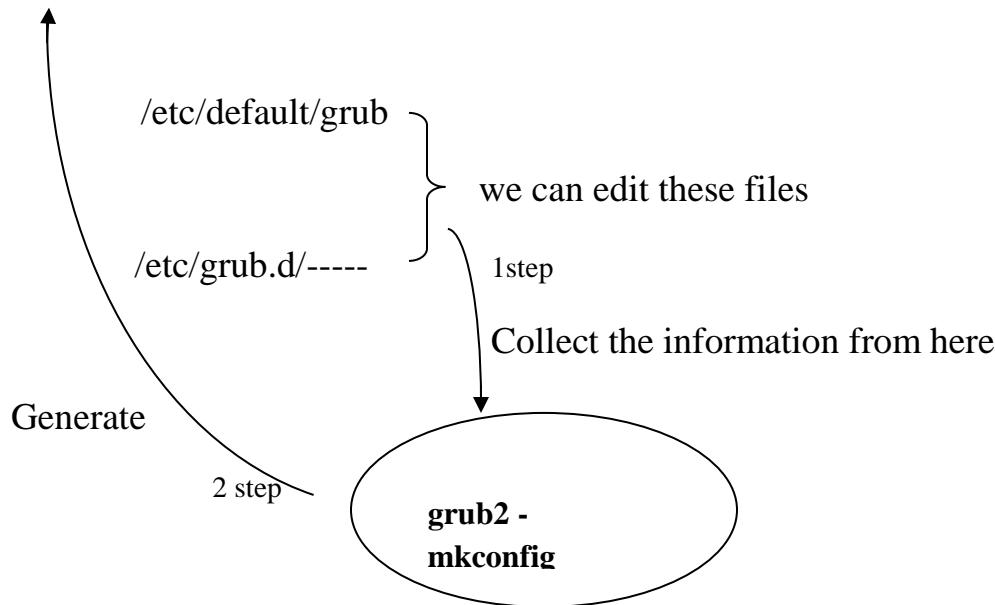
after that add # in front of /dev/I_Dont_Exist ; then type wq! save and exit

[adding # means commenting]

DAY 22

GRUB2

.) less /boot/grub2/grub.cfg → main config file [we can't edit]



.) less /boot/grub2/grub.cfg

```
File Edit View Search Terminal Help
#
# DO NOT EDIT THIS FILE
#
# It is automatically generated by grub2-mkconfig using templates
# from /etc/grub.d and settings from /etc/default/grub
#
#### BEGIN /etc/grub.d/00_header ####
set pager=1

if [ -s $prefix/grubenv ]; then
  load_env
fi
if [ "${next_entry}" ] ; then
  set default="${next_entry}"
  set next_entry=
  save_env next_entry
  set boot_once=true
else
  set default="${saved_entry}"
fi

if [ x"${feature_menuentry_id}" = xy ] ; then
  menuentry_id_option="--id"
else
  menuentry_id_option=""
fi

export menuentry_id_option

if [ "${prev_saved_entry}" ] ; then
  set saved_entry="${prev_saved_entry}"
  save_env saved_entry
  set prev_saved_entry=
-
```

.) ls -l /etc/grub.d { to see files in /etc/grub }

```
File Edit View Search Terminal Help
[root@localhost ~]# ls -l /etc/grub.d
total 64
-rwxr-xr-x. 1 root root 8698 Mar 20 2014 00_header
-rwxr-xr-x. 1 root root 9517 Mar 20 2014 10_linux
-rwxr-xr-x. 1 root root 10275 Mar 20 2014 20_linux_xen
-rwxr-xr-x. 1 root root 2559 Mar 20 2014 20_ppc_terminfo
-rwxr-xr-x. 1 root root 11110 Mar 20 2014 30_os-prober
-rwxr-xr-x. 1 root root 214 Mar 20 2014 40_custom
-rwxr-xr-x. 1 root root 216 Mar 20 2014 41_custom
-rw-r--r--. 1 root root 483 Mar 20 2014 README
[root@localhost ~]#
```

Splash Screen time is by default 10sec , but we have to change it to 1 sec

.) cat /etc/default/grub { we can see grub settings }

```
Applications Places Terminal
root@localhost:~
File Edit View Search Terminal Help
[root@localhost ~]# cat /etc/default/grub
GRUB_TIMEOUT=1
GRUB_DISTRIBUTOR="$(sed 's, release .*$,,g' /etc/system-release)"
GRUB_DEFAULT=saved
GRUB_DISABLE_SUBMENU=true
GRUB_TERMINAL_OUTPUT="console"
GRUB_CMDLINE_LINUX="rd.lvm.lv=rhel/root crashkernel=auto rd.lvm.lv=rhel/swap vconsole.font=latarcyrheb-sun16 vconsole.keymap=us rhgb quiet"
GRUB_DISABLE_RECOVERY="true"
[root@localhost ~]#
```

.) vim /etc/default/grub { to edit grub settings }

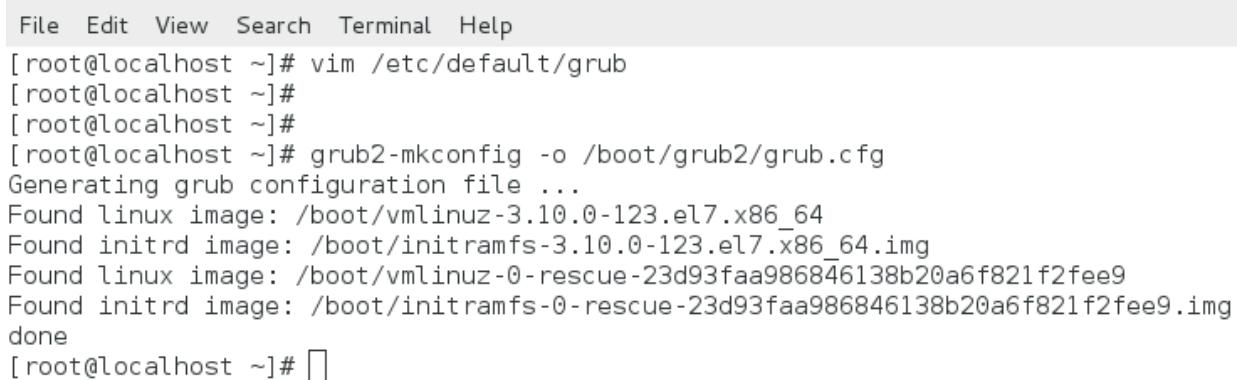


A screenshot of a terminal window titled "Terminal". The window shows the command "root@localhost:~". The content of the terminal is the /etc/default/grub file, which contains the following configuration:

```
GRUB_TIMEOUT=100
GRUB_DISTRIBUTOR="$(sed 's, release .*$,,g' /etc/system-release)"
GRUB_DEFAULT=saved
GRUB_DISABLE_SUBMENU=true
GRUB_TERMINAL_OUTPUT="console"
GRUB_CMDLINE_LINUX="rd.lvm.lv=rhel/root crashkernel=auto rd.lvm.lv=rhel/swap vconsole.font=latarcyrheb-sun16 vconsole.keymap=us rhgb quiet"
GRUB_DISABLE_RECOVERY="true"
```

Here I changed grub timeout from 1 to 100

.) grub2-mkconfig -o /boot/grub2/grub.cfg { to save the changes }

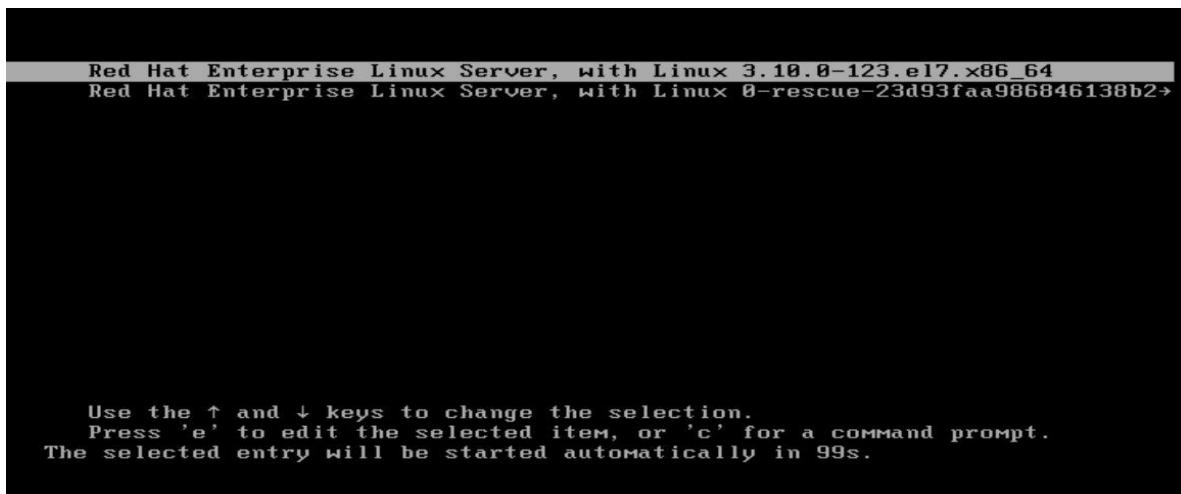


A screenshot of a terminal window showing the command "grub2-mkconfig -o /boot/grub2/grub.cfg" being run. The output shows the process of generating the grub configuration file, listing found images and initrds, and indicating the command is done.

```
File Edit View Search Terminal Help
[root@localhost ~]# vim /etc/default/grub
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# grub2-mkconfig -o /boot/grub2/grub.cfg
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-3.10.0-123.el7.x86_64
Found initrd image: /boot/initramfs-3.10.0-123.el7.x86_64.img
Found linux image: /boot/vmlinuz-0-rescue-23d93faa986846138b20a6f821f2fee9
Found initrd image: /boot/initramfs-0-rescue-23d93faa986846138b20a6f821f2fee9.img
done
[root@localhost ~]#
```

After any changes in grub or solving any grub issues we must type this command

.) reboot



Here we can see the countdown from 100 to 1

GRUB BOOT BREAK SETUP

.) lab bootbreakgrub setup

1) pause

2) type “e”

3) go to os16 line and change os16 to linux16

```
File View Send key Help

insmod gzio
insmod part_msdos
insmod xfs
set root='hd0,msdos1'
if [ $feature_platform_search_hint = xy ]; then
    search --no-floppy --fs-uuid --set=root --hint='hd0,msdos1' 9bf6b9f7-92ad-441b-848e-0257cbb883d1
else
    search --no-floppy --fs-uuid --set=root 9bf6b9f7-92ad-441b-848e-0257cbb883d1
fi
os16 /boot/vmlinuz-3.10.0-123.e17.x86_64 root=UUID=9bf6b9f7-92ad-441b-848e-0257cbb883d1 ro vconsole.keymap=us console=tty0 crashkernel=auto vconsole.font=latarcyrheb-sun16 initrd16 /boot/initramfs-3.10.0-123.e17.x86_64.img

Press Ctrl-x to start, Ctrl-c for a command prompt or Escape to
discard edits and return to the menu. Pressing Tab lists
possible completions.
```

```
File View Send key Help

insmod gzio
insmod part_msdos
insmod xfs
set root='hd0,msdos1'
if [ $feature_platform_search_hint = xy ]; then
    search --no-floppy --fs-uuid --set=root --hint='hd0,msdos1' 9bf6b9f7-92ad-441b-848e-0257cbb883d1
else
    search --no-floppy --fs-uuid --set=root 9bf6b9f7-92ad-441b-848e-0257cbb883d1
fi
linux16 /boot/vmlinuz-3.10.0-123.e17.x86_64 root=UUID=9bf6b9f7-92ad-441b-848e-0257cbb883d1 ro vconsole.keymap=us console=tty0 crashkernel=auto vconsole.font=latarcyrheb-sun16 initrd16 /boot/initramfs-3.10.0-123.e17.x86_64.img

Press Ctrl-x to start, Ctrl-c for a command prompt or Escape to
discard edits and return to the menu. Pressing Tab lists
possible completions.
```

4) ctrl + x

5) login

6) grub2-mkconfig -o /boot/grub2/grub.cfg

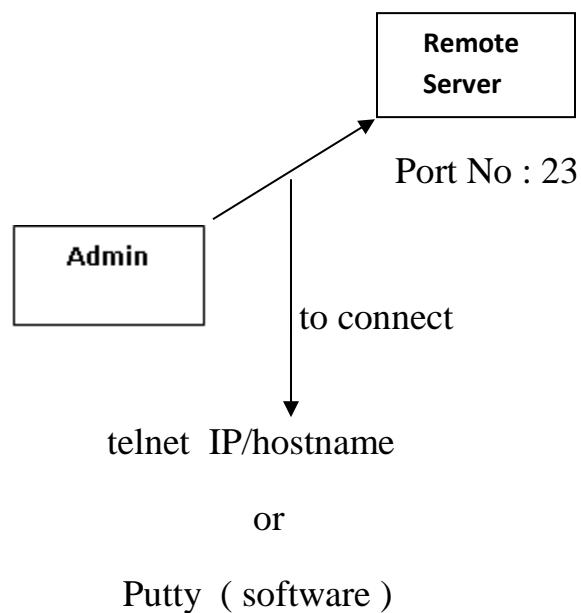
7) reboot

REMOTE ADMINISTRATION

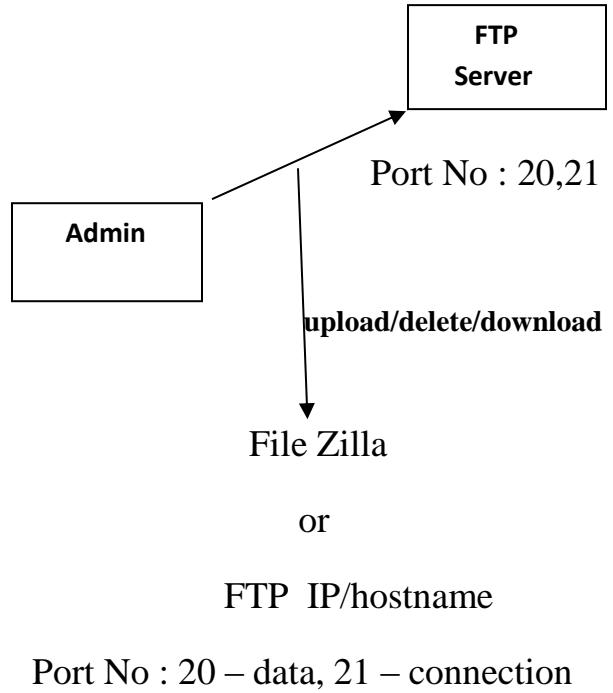
Total number of ports : 65536 [0 - 1023 well known ports]



1) Telnet

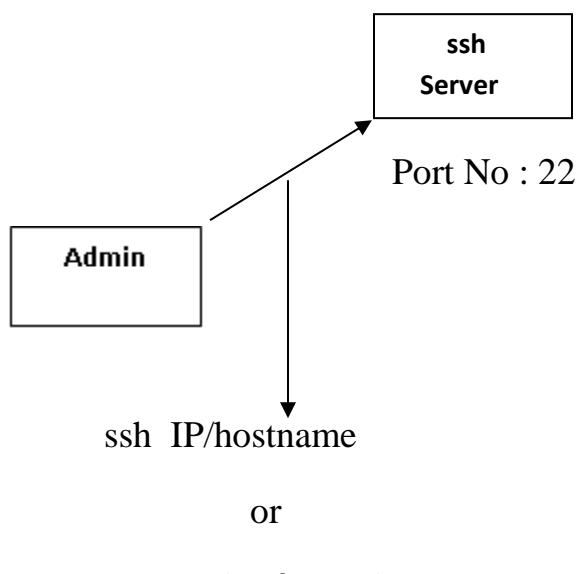


1) FTP

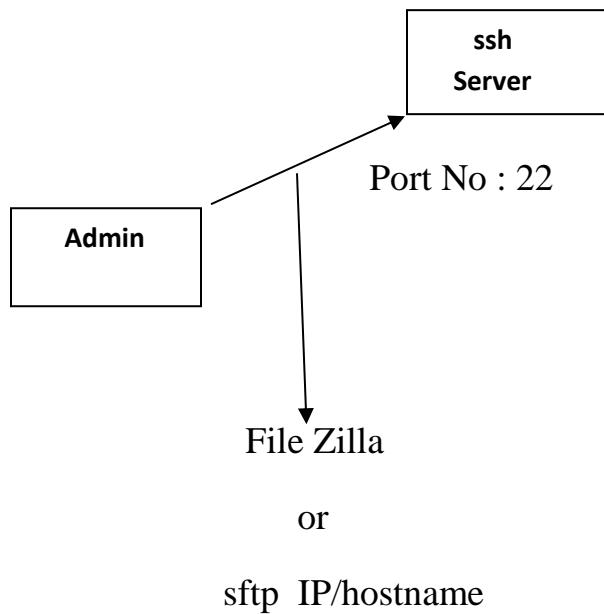


These two are having plain Text communication , not recommended for Remote Administration

2) ssh – Secure Shell



2) SFTP



Both side ssh server only

PACKAGE MANAGEMENT

.) this is for software installation ,update,repair

RPM – Redhat Package Management (.rpm)

.) wget path (url) { to Download }

```
File Edit View Search Terminal Help
[root@localhost ~]# wget https://www.google.com/chrome/?brand=CHBD&gclid=EAIAiQobChMIhcXN26Gv5QIVzRWPCh15XwTaEAYASAAEgKz5fD_BwE&gclsrc=aw.ds
[1] 5971
[2] 5972
[root@localhost ~]# --2019-10-22 12:14:12-- https://www.google.com/chrome/?brand=CHBD
Resolving www.google.com (www.google.com)... 172.217.26.164, 2404:6800:4007:802::2004
Connecting to www.google.com (www.google.com)|172.217.26.164|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 160486 (157K) [text/html]
Saving to: 'index.html?brand=CHBD'

100%[=====] 1,60,486 --.-K/s in 0.09s

2019-10-22 12:14:13 (1.66 MB/s) - 'index.html?brand=CHBD' saved [160486/160486]
```

.) rpm -ivh package.rpm { to install }

[i-install v-verbose h-hash]

Here I am doing install firefox

```
[student@localhost ~]$ sudo rpm -ivh firefox.rpm
We trust you have received the usual lecture from the local System
Administrator. It usually boils down to these three things:
#1) Respect the privacy of others.
#2) Think before you type.
#3) With great power comes great responsibility.

[sudo] password for student:
warning: firefox-24.5.0-1.el7.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID f4a80eb5: NOKEY
Preparing... ################################ [100%]
Updating / installing...
 1:firefox-24.5.0-1.el7.x86_64  ###### [100%]
[student@server0 Desktop]$
```

.) rpm -e package {to uninstall }

I didn't uninstalled it

.) rpm -q package { will show the package installed or not }
[we'll get full info]

```
File Edit View Search Terminal Help  
[student@localhost ~]$ rpm -q firefox  
firefox-24.5.0-1.el7.x86_64  
[student@localhost ~]$ █
```

.) rpm -qa package { query about package }

```
File Edit View Search Terminal Help  
[student@localhost ~]$ rpm -qa firefox  
firefox-24.5.0-1.el7.x86_64  
[student@localhost ~]$ █
```

.) rpm -qc package { for config file }

```
File Edit View Search Terminal Help  
[student@localhost ~]$ rpm -qc firefox  
[student@localhost ~]$ █
```

not showing anything means that there is no config files related to firefox

.) rpm -qd package { for documents }

```
File Edit View Search Terminal Help  
[student@localhost ~]$ rpm -qd firefox  
/usr/lib64/firefox/LICENSE  
/usr/share/man/man1/firefox.1.gz  
[student@localhost ~]$ █
```

.) rpm -ql package { for all }

```
File Edit View Search Terminal Help
[student@localhost ~]$ rpm -ql firefox
/usr/bin/firefox
/usr/lib64/firefox
/usr/lib64/firefox/LICENSE
/usr/lib64/firefox/application.ini
/usr/lib64/firefox/browser/blocklist.xml
/usr/lib64/firefox/browser/chrome
/usr/lib64/firefox/browser/chrome.manifest
/usr/lib64/firefox/browser/chrome/icons
/usr/lib64/firefox/browser/chrome/icons/default
/usr/lib64/firefox/browser/chrome/icons/default/default16.png
/usr/lib64/firefox/browser/chrome/icons/default/default32.png
/usr/lib64/firefox/browser/chrome/icons/default/default48.png
/usr/lib64/firefox/browser/components
/usr/lib64/firefox/browser/components/components.manifest
/usr/lib64/firefox/browser/components/libbrowsercomps.so
/usr/lib64/firefox/browser/defaults/preferences
/usr/lib64/firefox/browser/extensions
/usr/lib64/firefox/browser/extensions/{972ce4c6-7e08-4474-a285-3208198ce6fd}
/usr/lib64/firefox/browser/extensions/{972ce4c6-7e08-4474-a285-3208198ce6fd}/icon.png
/usr/lib64/firefox/browser/extensions/{972ce4c6-7e08-4474-a285-3208198ce6fd}/install.rdf
/usr/lib64/firefox/browser/icons
```

DAY 23

TELNET SERVER



(Laptop / Desktop)



To Connect :	Package (P) →	telnet-server
telnet (p-telnet) or putty	Service (S) →	telnet.socket
	Port →	23
	Fire Wall Service (F.S) →	telnet (or) 23/tcp

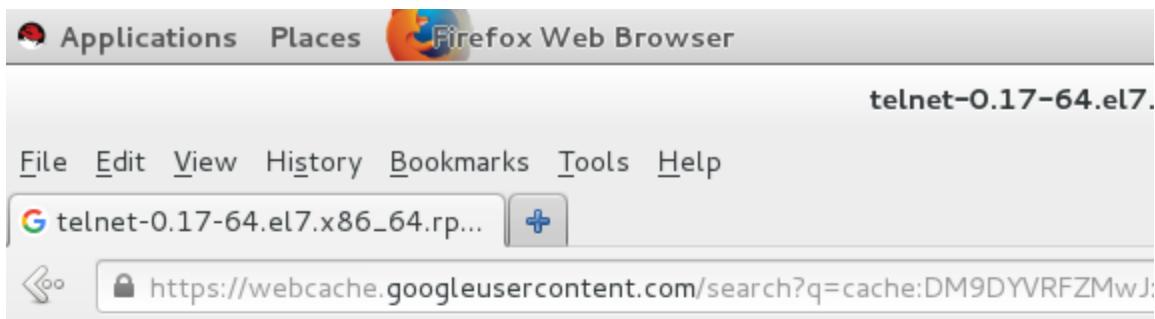
Steps :

- 1) open firefox and search telnet.rpm for rhel 7

The screenshot shows a Firefox browser window with the following details:

- Toolbar:** Applications, Places, Firefox Web Browser
- Address Bar:** telnet.rpm for rhel7 - Google Search - Mozilla Firefox
- Search Bar:** telnet.rpm for rhel7
- Google Results:**
 - All results (0.88 seconds): About 68,900 results
 - Top Result:** [telnet-0.17-64.el7.x86_64.rpm CentOS 7 Download](https://centos.pkgs.org/centos-x86_64/telnet-0.17-64.el7.x86_64.rpm....)
https://centos.pkgs.org/centos-x86_64/telnet-0.17-64.el7.x86_64.rpm.... ▾
Download telnet-0.17-64.el7.x86_64.rpm for CentOS 7 from CentOS repository. Cached

- 2) click on cached
- 3) click on binary package and copy link location



Name	Value
telnet	= 0.17-64.el7
telnet(x86-64)	= 0.17-64.el7

Download

Type	URL
Mirror	mirror.centos.org
Binary Package	telnet-0.17-64.el7.x86_64.rpm
Source Package	telnet-0.17-64.el7.src.rpm

Install Howto

Install telnet rpm package:

```
# yum install telnet
```

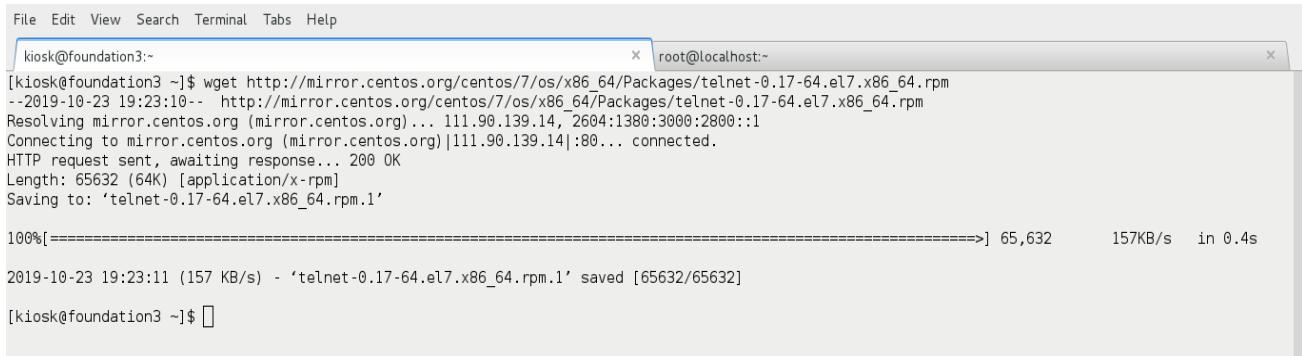
Files

- Open Link in New Tab
- Open Link in New Window
- Open Link in New Private Window
- Bookmark This Link
- Save Link As...
- Copy Link Location**
- Inspect Element (Q)

4) open terminal

In Kiosk :

5) download (wget) telnet.rpm



```
File Edit View Search Terminal Tabs Help
[kiosk@foundation3 ~]$ wget http://mirror.centos.org/centos/7/os/x86_64/Packages/telnet-0.17-64.el7.x86_64.rpm
--2019-10-23 19:23:10--  http://mirror.centos.org/centos/7/os/x86_64/Packages/telnet-0.17-64.el7.x86_64.rpm
Resolving mirror.centos.org (mirror.centos.org)... 111.90.139.14, 2604:1380:3000:2800::1
Connecting to mirror.centos.org (mirror.centos.org)|111.90.139.14|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 65632 (64K) [application/x-rpm]
Saving to: 'telnet-0.17-64.el7.x86_64.rpm.1'

100%[=====] 65,632      157KB/s   in 0.4s

2019-10-23 19:23:11 (157 KB/s) - 'telnet-0.17-64.el7.x86_64.rpm.1' saved [65632/65632]
[kiosk@foundation3 ~]$ 
```

6) open another tab and connect with root

7) copy this telnet.rpm to root

.) scp telnet-0.17-64.el7.x86_64.rpm root@server3:

scp { secure copy } copied from kiosk to root

“ : ” represents home directory



```
File Edit View Search Terminal Tabs Help
[kiosk@foundation3 ~]$ scp telnet-0.17-64.el7.x86_64.rpm root@server3:
root@server3's password:
telnet-0.17-64.el7.x86_64.rpm
100% 64KB 64.1KB/s 00:00
[kiosk@foundation3 ~]$ 
[kiosk@foundation3 ~]$ 
```

[in this there are two ways to copy]

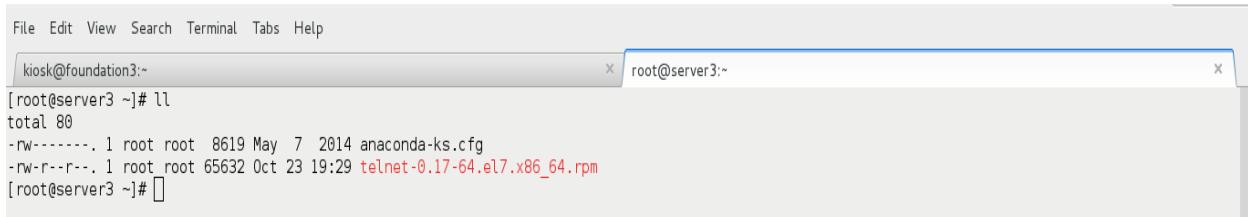
.) scp telnet-0.17-64.el7.x86_64.rpm root@server3:/var/tmp



```
File Edit View Search Terminal Tabs Help
[kiosk@foundation3 ~]$ scp telnet-0.17-64.el7.x86_64.rpm root@server3:
root@server3's password:
telnet-0.17-64.el7.x86_64.rpm
100% 64KB 64.1KB/s 00:00
[kiosk@foundation3 ~]$ 
[kiosk@foundation3 ~]$ scp telnet-0.17-64.el7.x86_64.rpm root@server3:/var/tmp
root@server3's password:
telnet-0.17-64.el7.x86_64.rpm
100% 64KB 64.1KB/s 00:00
[kiosk@foundation3 ~]$ 
```

In root :

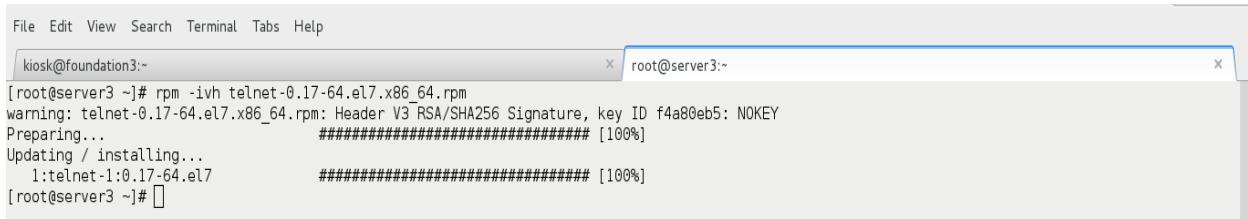
8) check telnet.rpm copied or not by using command “ll”



```
File Edit View Search Terminal Tabs Help
kiosk@foundation3:~                                     root@server3:~
[root@server3 ~]# ll
total 80
-rw----- 1 root root 8619 May  7 2014 anaconda-ks.cfg
-rw-r--r-- 1 root root 65632 Oct 23 19:29 telnet-0.17-64.el7.x86_64.rpm
[root@server3 ~]#
```

9) install telnet

.) rpm -ivh telnet-0.17-64.el7.x86_64.rpm

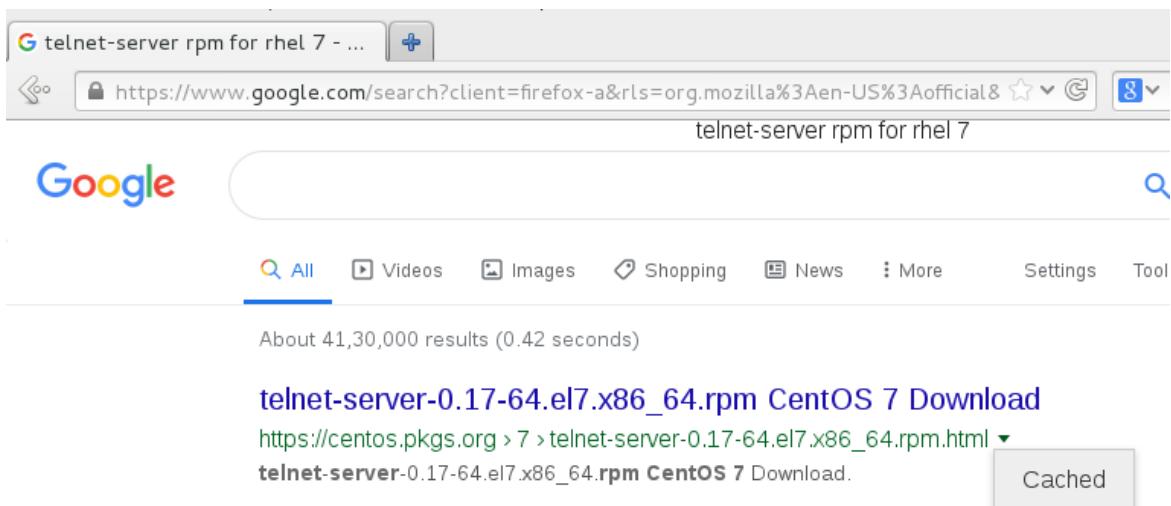


```
File Edit View Search Terminal Tabs Help
kiosk@foundation3:~                                     root@server3:~
[root@server3 ~]# rpm -ivh telnet-0.17-64.el7.x86_64.rpm
warning: telnet-0.17-64.el7.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID f4a80eb5: NOKEY
Preparing...                                           #####[100%]
Updating / installing...
 1:telnet-1:0.17-64.el7                                #####[100%]
[root@server3 ~]#
```

Now go to View Server

In View Server :

10) open firefox and search telnet-server rpm for rhel 7



A screenshot of a Google search results page. The search query "telnet-server rpm for rhel 7" is entered in the search bar. The results show a link to "telnet-server-0.17-64.el7.x86_64.rpm CentOS 7 Download" from "https://centos.pkgs.org". Below the link, there is a snippet of text: "telnet-server-0.17-64.el7.x86_64.rpm CentOS 7 Download." A "Cached" button is visible on the right side of the snippet.

11) click on cached

12) click on binary package and copy link location

telnet-server(x86-64) = 0.17-64.el7

Type	URL
Mirror	mirror.centos.org
Binary Package	telnet-server-0.17-64.el7.x86_64.rpm
Source Package	telnet-0.17-64.el7.src.rpm

Download

Install telnet-server rpm package:

```
# yum install telnet-server
```

Files

13) open terminal

14) download (wget) telnet-server.rpm

```
File Edit View Search Terminal Help
[student@server3 ~]$ wget http://mirror.centos.org/centos/7/os/x86_64/Packages/telnet-server-0.17-64.el7.x86_64.rpm
--2019-10-23 19:42:08--  http://mirror.centos.org/centos/7/os/x86_64/Packages/telnet-server-0.17-64.el7.x86_64.rpm
Resolving mirror.centos.org (mirror.centos.org)... 160.116.15.22, 2401:78c0::e00e
Connecting to mirror.centos.org (mirror.centos.org)|160.116.15.22|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 41804 (41K) [application/x-rpm]
Saving to: 'telnet-server-0.17-64.el7.x86_64.rpm'

100%[=====] 41,804      44.3KB/s  in 0.9s

2019-10-23 19:42:10 (44.3 KB/s) - 'telnet-server-0.17-64.el7.x86_64.rpm' saved [41804/41804]

[student@server3 ~]$
```

15) install telnet-server.rpm

.) sudo rpm -ivh telnet-server-0.17-64.el7.x86_64.rpm

```
File Edit View Search Terminal Help
[student@server3 ~]$ sudo rpm -ivh telnet-server-0.17-64.el7.x86_64.rpm

We trust you have received the usual lecture from the local System
Administrator. It usually boils down to these three things:

#1) Respect the privacy of others.
#2) Think before you type.
#3) With great power comes great responsibility.

[sudo] password for student:
warning: telnet-server-0.17-64.el7.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID f4a80eb5: NOKEY
Preparing... ################################################ [100%]
Updating / installing...
1:telnet-server-1:0.17-64.el7      ################################################ [100%]
[student@server3 ~]$ █
```

after installing

16) system enable telnet.socket { to enable service }

```
student@server3:~$ 

File Edit View Search Terminal Help
[student@server3 ~]$ sudo systemctl enable telnet.socket
ln -s '/usr/lib/systemd/system/telnet.socket' '/etc/systemd/system/sockets.target.wants/telnet.socket'
[student@server3 ~]$ █
```

17) systemctl start telnet.socket { to start service }

```
student@se

File Edit View Search Terminal Help
[student@server3 ~]$ sudo systemctl start telnet.socket
[student@server3 ~]$ █
```

Here service started

18) `systemctl status telnet.socket` { to check status }

```
File Edit View Search Terminal Help
[student@server3 ~]$ sudo systemctl status telnet.socket
telnet.socket - Telnet Server Activation Socket
   Loaded: loaded (/usr/lib/systemd/system/telnet.socket; enabled)
   Active: active (listening) since Wed 2019-10-23 19:44:32 IST; 25s ago
     Docs: man:telnetd(8)
   Listen: [::]:23 (Stream)
  Accepted: 0; Connected: 0

Oct 23 19:44:32 server3.example.com systemd[1]: Starting Telnet Server Activation Socket.
Oct 23 19:44:32 server3.example.com systemd[1]: Listening on Telnet Server Activation Socket.
[student@server3 ~]$ █
```

19) `systemctl is-enabled telnet.socket` { to check status }

```
File Edit View Search Terminal Help
[student@server3 ~]$ sudo systemctl is-enabled telnet.socket
enabled
[student@server3 ~]$ █
```

20) `systemctl is-active telnet.socket` { to check status }

```
File Edit View Search Terminal Help
[student@server3 ~]$ sudo systemctl is-active telnet.socket
active
[student@server3 ~]$ █
```

21) `ss -ant` { to check socket statistics }

```
File Edit View Search Terminal Help
[student@server3 ~]$ ss -ant
State      Recv-Q Send-Q          Local Address:Port          Peer Address:Port
LISTEN      0      100              127.0.0.1:25            *:*
LISTEN      0      128              *:48225                *:*
LISTEN      0      128              *:111                  *:*
LISTEN      0      128              *:22                   *:*
LISTEN      0      128              127.0.0.1:631            *:*
ESTAB       0      0                172.25.3.11:22          172.25.3.250:48616
LISTEN      0      100              ::1:25                 :::*
LISTEN      0      128              :::44974                :::*
LISTEN      0      128              :::111                 :::*
LISTEN      0      128              :::22                  :::*
LISTEN      0      128              :::23                  :::*
LISTEN      0      128              ::1:631                :::*
[student@server3 ~]$ █
```

22) ss -at { to check socket statistics }

```
File Edit View Search Terminal Help
[student@server3 ~]$ ss -at
State      Recv-Q Send-Q          Local Address:Port          Peer Address:Port
LISTEN      0      100              127.0.0.1:smtp          *:*
LISTEN      0      128              *:48225                *:*
LISTEN      0      128              *:sunrpc               *:*
LISTEN      0      128              *:ssh                  *:*
LISTEN      0      128              127.0.0.1:ipp          *:*
ESTAB      0      0                172.25.3.11:ssh          172.25.3.250:48616
LISTEN      0      100              ::1:smtp               :::*
LISTEN      0      128              :::44974                :::*
LISTEN      0      128              :::sunrpc               :::*
LISTEN      0      128              :::ssh                  :::*
LISTEN      0      128              :::telnet               :::*
LISTEN      0      128              ::1:ipp                 :::*
[student@server3 ~]$
```

23) netstat -ant {to check network statistics }

```
File Edit View Search Terminal Help
[student@server3 ~]$ netstat -ant
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp     0      0    127.0.0.1:25          0.0.0.0:*
tcp     0      0    0.0.0.0:48225         0.0.0.0:*
tcp     0      0    0.0.0.0:111          0.0.0.0:*
tcp     0      0    0.0.0.0:22           0.0.0.0:*
tcp     0      0    0.0.0.0:631          0.0.0.0:*
tcp     0      0    0.0.0.0:1:22          172.25.3.250:48616 ESTABLISHED
tcp6    0      0    ::1:25                :::*
tcp6    0      0    :::44974              :::*
tcp6    0      0    ::1:111               :::*
tcp6    0      0    ::1:22                :::*
tcp6    0      0    ::1:23                :::*
tcp6    0      0    ::1:631               :::*
[student@server3 ~]$
```

24) netstat -at { to check network statistics }

```
File Edit View Search Terminal Help
[student@server3 ~]$ netstat -at
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp     0      0    localhost:smtp          0.0.0.0:*
tcp     0      0    0.0.0.0:48225         0.0.0.0:*
tcp     0      0    0.0.0.0:sunrpc         0.0.0.0:*
tcp     0      0    0.0.0.0:ssh            0.0.0.0:*
tcp     0      0    localhost:ipp          0.0.0.0:*
tcp     0      0    server3.example.com:ssh 172.25.3.250:48616 ESTABLISHED
tcp6    0      0    localhost:smtp          [::]:*
tcp6    0      0    [::]:44974             [::]:*
tcp6    0      0    [::]:sunrpc            [::]:*
tcp6    0      0    [::]:ssh               [::]:*
tcp6    0      0    [::]:telnet            [::]:*
tcp6    0      0    localhost:ipp          [::]:*
[student@server3 ~]$
```

25) `systemctl status firewalld.service`

```
File Edit View Search Terminal Help
[student@server3 ~]$ systemctl status firewalld.service
firewalld.service - firewalld - dynamic firewall daemon
  Loaded: loaded (/usr/lib/systemd/system/firewalld.service; enabled)
  Active: active (running) since Wed 2019-10-23 19:28:27 IST; 20min ago
    Main PID: 467 (firewalld)
   CGroup: /system.slice/firewalld.service
           └─467 /usr/bin/python -Es /usr/sbin/firewalld --nofork --nopid

[student@server3 ~]$ █
```

26) `firewall-cmd --add-service=telnet` {adding telnet }

```
student@server3:~$ 
File Edit View Search Terminal Help
[student@server3 ~]$ sudo firewall-cmd --add-service=telnet
success
[student@server3 ~]$ █
```

27) `firewall-cmd --add-service=telnet --permanent` { adding permanently }

```
File Edit View Search Terminal Help
[student@server3 ~]$ sudo firewall-cmd --add-service=telnet --permanent
success
[student@server3 ~]$ █
```

.) `firewall-cmd --remove-service=telnet` { to remove }

after installation to connect :

In root :

28) telnet server3 { to use }

login : student

password : student

The screenshot shows a terminal window with two tabs. The left tab, titled 'kiosk@foundation3:~', shows the command 'telnet server3' being run by a user with root privileges. The right tab, titled 'student@server3:~', shows the connection established to 'server3'. The terminal displays the kernel version 'Kernel 3.10.0-123.el7.x86_64 on an x86_64', the user 'server3 login: student', a password prompt, and the last login information 'Last login: Wed Oct 23 19:36:48 on :0'. The prompt '[student@server3 ~]\$' is visible at the end of the session.

```
File Edit View Search Terminal Tabs Help
kiosk@foundation3:~ [root@server3 ~]# telnet server3
Trying 172.25.3.11...
Connected to server3.
Escape character is '^']'.

Kernel 3.10.0-123.el7.x86_64 on an x86_64
server3 login: student
Password:
Last login: Wed Oct 23 19:36:48 on :0
[student@server3 ~]$ telnet> 
```

in client side (in root)

1) download

2) install

3) use the package

FTP SERVER



(Laptop / Desktop)

To Connect :	Package (P)	→	vsftpd
ftp (p-ftp) or filezilla	Service (S)	→	vsftpd
	Port	→	21
	Fire Wall Service (F.S)	→	FTP

Steps :

- 1) open firefox and search ftp rpm for rhel 7

The screenshot shows a Google search results page. The search query "ftp rpm for rhel 7" is entered in the search bar. Below the search bar, there are navigation links for "All", "Shopping", "Videos", "Images", "News", "More", and "Set". The search results indicate "About 4,05,000 results (0.49 seconds)". The top result is a blue link titled "ftp-0.17-67.el7.x86_64.rpm CentOS 7 Download" with the URL "https://centos.pkgs.org/7/ftp-0.17-67.el7.x86_64.rpm.html". To the right of this link, there is a "Cached" button.

- 2) click on cached

3) click on binary package and copy link location



Provides

Name	Value
ftp	= 0.17-67.el7
ftp(x86-64)	= 0.17-67.el7

Download

Type	URL
Mirror	mirror.centos.org
Binary Package	ftp-0.17-67.el7.x86_64.rpm
Source Package	ftp-0.17-67.el7.src.rpm

Install Howto

Install ftp rpm package:

```
# yum install ftp
```

Files

A context menu is displayed over the "Binary Package" link. The menu items are: Open Link in New Tab, Open Link in New Window, Open Link in New Private Window, Bookmark This Link, Save Link As..., Copy Link Location (highlighted in blue), and Inspect Element (Q).

4) open terminal

In Kiosk :

5) download (wget) ftp.rpm

```
File Edit View Search Terminal Help
[kiosk@foundation3 ~]$ wget http://mirror.centos.org/centos/7/os/x86_64/Packages/ftp-0.17-67.el7.x86_64.rpm
--2019-10-23 20:24:11-- http://mirror.centos.org/centos/7/os/x86_64/Packages/ftp-0.17-67.el7.x86_64.rpm
Resolving mirror.centos.org (mirror.centos.org)... 160.116.15.18, 2604:1380:3000:2800::1
Connecting to mirror.centos.org (mirror.centos.org)|160.116.15.18|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 62092 (61K) [application/x-rpm]
Saving to: 'ftp-0.17-67.el7.x86_64.rpm'

100%[=====] 62,092      181KB/s   in 0.3s

2019-10-23 20:24:12 (181 KB/s) - 'ftp-0.17-67.el7.x86_64.rpm' saved [62092/62092]

[kiosk@foundation3 ~]$ 
```

6) open another tab and connect with root

7) copy this ftp.rpm to root

.) scp ftp-0.17-67.el7.x86_64.rpm root@server3:

```
[kiosk@foundation3 ~]$ scp ftp-0.17-67.el7.x86_64.rpm root@server3:
root@server3's password:
ftp-0.17-67.el7.x86_64.rpm                                              100%  61KB  60.6KB/s  00:00
[kiosk@foundation3 ~]$ 
```

In root :

8) check ftp.rpm copied or not by using command “ll”

```
File Edit View Search Terminal Tabs Help
[kiosk@foundation3:~]                                     root@server3:~
[root@server3 ~]# ll
total 144
-rw-----. 1 root root 8619 May  7  2014 anaconda-ks.cfg
-rw-r--r--. 1 root root 62092 Oct 23 20:26 ftp-0.17-67.el7.x86_64.rpm
-rw-r--r--. 1 root root 65632 Oct 23 19:29 telnet-0.17-64.el7.x86_64.rpm
[root@server3 ~]# 
```

9) install ftp

.) rpm -ivh ftp-0.17-67.el7.x86_64.rpm

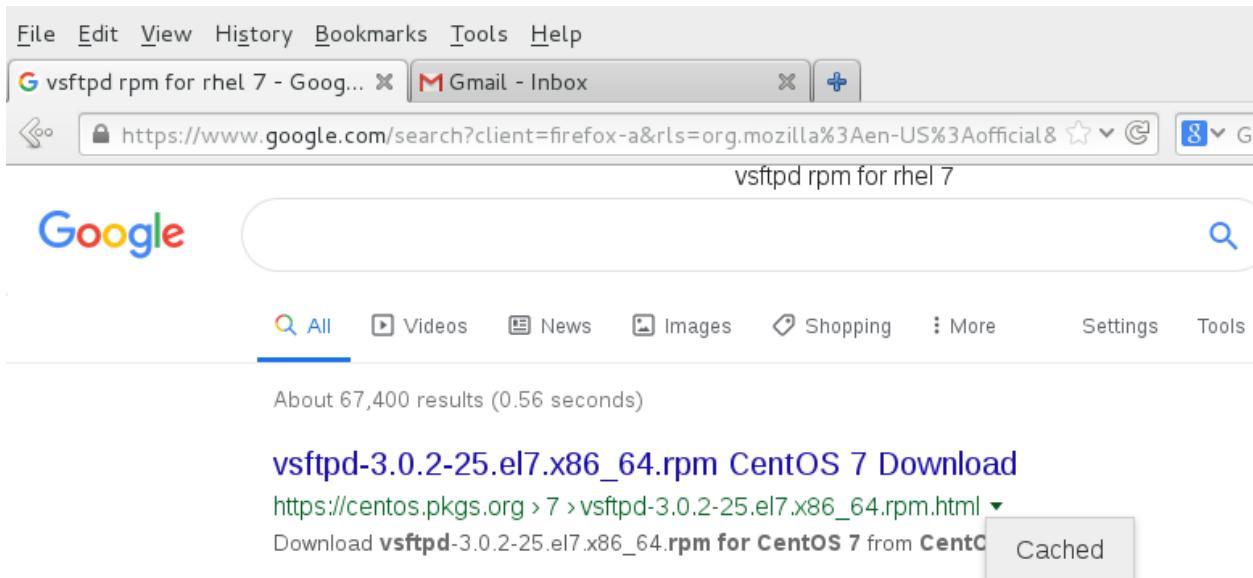


```
File Edit View Search Terminal Tabs Help
kiosk@foundation3:~                                     root@server3:~
[root@server3 ~]# rpm -ivh ftp-0.17-67.el7.x86_64.rpm
warning: ftp-0.17-67.el7.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID f4a80eb5: NOKEY
Preparing...                                               #### [100%]
Updating / installing...
 1:ftp-0.17-67.el7.x86_64                               #### [100%]
[root@server3 ~]#
```

Now go to View Server

In View Server :

10) open firefox and search vsftpd rpm for rhel 7



11) click on cached

12) click on binary package and copy link location

Type URL
Mirror mirror.centos.org
Binary Package [vsftpd-3.0.2-25.el7.x86_64.rpm](https://mirror.centos.org/centos/7/os/x86_64/Packages/vsftpd-3.0.2-25.el7.x86_64.rpm)
Source Package [vsftpd-3.0.2-25.el7.src.rpm](https://mirror.centos.org/centos/7/os/SRPMS/vsftpd-3.0.2-25.el7.src.rpm)

Open Link in New Tab
Open Link in New Window
Open Link in New Private Window
Bookmark This Link
Save Link As...
Copy Link Location
Inspect Element (Q)

13) open terminal

14) download (wget) and install

.) sudo rpm -ivh vsftpd-3.0.2-25.el7.x86_64.rpm

```
File Edit View Search Terminal Help
[student@server3 ~]$ sudo rpm -ivh vsftpd-3.0.2-25.el7.x86_64.rpm
[sudo] password for student:
warning: vsftpd-3.0.2-25.el7.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID f4a80eb5: NOKEY
Preparing... #####
Updating / installing...
1:vsftpd-3.0.2-25.el7 #####
[student@server3 ~]$
```

after installing

15) system enable vsftpd { to enable service }

```
File Edit View Search Terminal Help
[student@server3 ~]$ sudo systemctl enable vsftpd
ln -s '/usr/lib/systemd/system/vsftpd.service' '/etc/systemd/system/multi-user.target.wants/vsftpd.service'
[student@server3 ~]$ █
```

16) systemctl start vsftpd { to start service }

```
File Edit View Search Terminal Help
[student@server3 ~]$ sudo systemctl start vsftpd
[student@server3 ~]$ █
```

Here service started

17) systemctl status vsftpd { to check status }

```
File Edit View Search Terminal Help
[student@server3 ~]$ sudo systemctl status vsftpd
vsftpd.service - Vsftpd ftp daemon
   Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; enabled)
     Active: active (running) since Wed 2019-10-23 20:33:43 IST; 16s ago
       Process: 4805 ExecStart=/usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf (code=exited, status=0/SUCCESS)
      Main PID: 4806 (vsftpd)
         CGroup: /system.slice/vsftpd.service
                 └─4806 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf

Oct 23 20:33:43 server3.example.com systemd[1]: Started Vsftpd ftp daemon.
[student@server3 ~]$ █
```

18) ss -ant { to check socket statistics }

```
File Edit View Search Terminal Help
[student@server3 ~]$ ss -ant
State      Recv-Q Send-Q          Local Address:Port          Peer Address:Port
LISTEN     0      100              127.0.0.1:25            *:*
LISTEN     0      128              *:48225               *:*
LISTEN     0      128              *:111                 *:*
LISTEN     0      128              *:22                  *:*
LISTEN     0      128              127.0.0.1:631           *:*
TIME-WAIT   0      0              172.25.3.11:33855        172.217.31.194:443
TIME-WAIT   0      0              172.25.3.11:33815        172.217.31.194:443
ESTAB      0      0              172.25.3.11:22           172.25.3.250:48714
TIME-WAIT   0      0              172.25.3.11:33814        172.217.31.194:443
LISTEN     0      100              ::1:25                :::*
LISTEN     0      128              ::::44974              :::*
LISTEN     0      128              ::::111               :::*
LISTEN     0      32               ::::21                :::*
LISTEN     0      128              ::::22                :::*
LISTEN     0      128              ::::23                :::*
LISTEN     0      128              ::::1:631              :::*
[student@server3 ~]$
```

19) ss -at { to check socket statistics }

```
File Edit View Search Terminal Help
[student@server3 ~]$ ss -at
State      Recv-Q Send-Q          Local Address:Port          Peer Address:Port
LISTEN     0      100              127.0.0.1:smtp           *:*
LISTEN     0      128              *:48225               *:*
LISTEN     0      128              *:sunrpc              *:*
LISTEN     0      128              *:ssh                 *:*
LISTEN     0      128              127.0.0.1:ipp           *:*
ESTAB      0      0              172.25.3.11:ssh           172.25.3.250:48714
LISTEN     0      100              ::1:smtp               :::*
LISTEN     0      128              ::::44974              :::*
LISTEN     0      128              ::::sunrpc             :::*
LISTEN     0      32               ::::ftp                :::*
LISTEN     0      128              ::::ssh                :::*
LISTEN     0      128              ::::telnet              :::*
LISTEN     0      128              ::::1:ipp              :::*
[student@server3 ~]$
```

20) systemctl status firewalld.service

```
File Edit View Search Terminal Help
[student@server3 ~]$ sudo systemctl status firewalld.service
firewalld.service - firewalld - dynamic firewall daemon
   Loaded: loaded (/usr/lib/systemd/system/firewalld.service; enabled)
   Active: active (running) since Wed 2019-10-23 19:28:27 IST; 1h 6min ago
     Main PID: 467 (firewalld)
        CGroup: /system.slice/firewalld.service
                  └─467 /usr/bin/python -Es /usr/sbin/firewalld --nofork --nopid

Oct 23 19:28:27 localhost systemd[1]: Started firewalld - dynamic firewall daemon.
[student@server3 ~]$
```

21) firewall-cmd --add-service=ftp { adding telnet }

```
File Edit View Search Terminal Help
[student@server3 ~]$ sudo firewall-cmd --add-service=ftp
success
[student@server3 ~]$ █
```

22) firewall-cmd --add-service=ftp --permanent { adding permanently }

```
File Edit View Search Terminal Help
[student@server3 ~]$ sudo firewall-cmd --add-service=ftp --permanent
success
[student@server3 ~]$ █
```

.) firewall-cmd --remove-service=vsftpd { to remove }

after installation to connect :

In root :

23) ftp server3 & password : blank

```
File Edit View Search Terminal Help
ftp> pwd
257 "/pub"
ftp> cd
(remote-directory)
usage: cd remote-directory
ftp> cd ..
250 Directory successfully changed.
ftp> pwd
257 "/"
ftp> ls
227 Entering Passive Mode (172,25,0,11,176,174).
150 Here comes the directory listing.
drwxr-xr-x    2 0          0        4096 Oct 22 14:27 pub
226 Directory send OK.
ftp> cd pub
250 Directory successfully changed.
ftp> pwd
257 "/pub"
ftp> !pwd
/home/student/Downloads
ftp> lcd /home/student
Local directory now /home/student
ftp> !pwd
/home/student
ftp> █
```

Document → Root → /var/ftp → Folder / pub [ftp files created under pub]

in FTP “/_pub” → document root → /var/ftp/pub

! → local

get → download

put → upload

mget }
 multiple files
mput }

SSH SERVER



(Laptop / Desktop)

To Connect :	Package (P)	→	openssh
ssh (p-openssh) or putty	Service (S)	→	sshd
	Port	→	22
	Fire Wall Service (F.S)	→	ssh

Configuration : /etc/ssh/sshd-config

.) when installing /linux, bydefault ssh also installed automatically

.) ssh server { connect without user }

.) ssh student@server4 { connect with user }

```
student@serv
File Edit View Search Terminal Help
[kiosk@foundation4 ~]$ ssh student@server4
student@server4's password:
[student@server4 ~]$ hostname
server4.example.com
[student@server4 ~]$ 
```

SFTP

- .) sftp root@server0
- .) sftp allow upload
- .) port no : 22

```
[nitya@desktop0 ~]$ sftp root@server0
root@server0's password:
Connected to server0.
sftp> cd /var/ftp/pub/
sftp> pwd
Remote working directory: /var/ftp/pub
sftp> !ls
secret
sftp> put secret
Uploading secret to /var/ftp/pub/secret
secret                                         100%    0      0.0KB/s   00:00
sftp> ls
mov1.mpg    mov10.mpg   mov2.mpg    mov3.mpg    mov4.mpg    mov5.mpg    mov6.mpg
mov7.mpg    mov8.mpg   mov9.mpg    secret
sftp> _
```

DAY 24

Web Server



Package (P) → httpd

Service (S) → httpd

Port → 80

Fire Wall Service (F.S) → http

Configuration : /etc/httpd/conf/httpd.conf

Document Root : /var/www/html

Directory Index : index.html

Steps :

- 1) go to terminal
- 2) connect as root
- 3) open firefox and seach for httpd rpm for rhel 7
- 4) click on binary package and copy link location
- 5) download and try to install

```
File Edit View Search Terminal Help
[root@server0 ~]# wget http://mirror.centos.org/centos/7/os/x86_64/Packages/httpd-2.4.6-90.el7.centos.x86_64.rpm
--2019-10-24 19:33:31--  http://mirror.centos.org/centos/7/os/x86_64/Packages/httpd-2.4.6-90.el7.centos.x86_64.rpm
Resolving mirror.centos.org (mirror.centos.org)... 202.76.233.2, 2401:78c0::e00e
Connecting to mirror.centos.org (mirror.centos.org)|202.76.233.2|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 2844388 (2.7M) [application/x-rpm]
Saving to: 'httpd-2.4.6-90.el7.centos.x86_64.rpm'

100%[=====] 2,844,388  1.93MB/s   in 1.4s

2019-10-24 19:33:33 (1.93 MB/s) - 'httpd-2.4.6-90.el7.centos.x86_64.rpm' saved [2844388/2844388]

[root@server0 ~]# ll
total 2792
-rw----- 1 root root 8619 May  7 2014 anaconda-ks.cfg
-rw-r--r-- 1 root root 2844388 Aug 23 02:55 httpd-2.4.6-90.el7.centos.x86_64.rpm
[root@server0 ~]# rpm -ivh httpd-2.4.6-90.el7.centos.x86_64.rpm
warning: httpd-2.4.6-90.el7.centos.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID f4a80eb5: NOKEY
error: Failed dependencies:
        /etc/mime.types is needed by httpd-2.4.6-90.el7.centos.x86_64
        httpd-tools = 2.4.6-90.el7.centos is needed by httpd-2.4.6-90.el7.centos.x86_64
        libapr-1.so.0()(64bit) is needed by httpd-2.4.6-90.el7.centos.x86_64
        libaprutil-1.so.0()(64bit) is needed by httpd-2.4.6-90.el7.centos.x86_64
```

It'll not installed because ; RPM will fail, if dependencies not installed in advance

So that instead of RPM we use YUM.

YUM : Yellowdog Updater Modifier

It is a frontend package management interface for RPM

1) Download ISO and mount it (locally available)

Or

Find in Internet package paths (somewhere via ftp/http)

2) Create a repofile

/etc/yum.repos.d/filename.repo

3) It resolves dependencies by creating metadata indexing

↓
Data about Data

Steps :

1) mkdir -p /dvd/isos

```
File Edit View Search Terminal Help
[root@server4 ~]# mkdir -p /dvd/isos
[root@server4 ~]#
[root@server4 ~]# cd /dvd
[root@server4 dvd]#
[root@server4 dvd]# ll
total 0
drwxr-xr-x. 2 root root 6 Oct 25 17:45 isos
[root@server4 dvd]# 
```

2) wget -O /dvd/isos/rhel7.iso <http://classroom.example.com/rhce/rhel7.iso>

↓
Capital

```
File Edit View Search Terminal Help
[root@server4 ~]# wget -O /dvd/isos/rhel7.iso http://classroom.example.com/rhce/rhel7.iso
--2019-10-25 17:48:40-- http://classroom.example.com/rhce/rhel7.iso
Resolving classroom.example.com (classroom.example.com)... 172.25.254.254
Connecting to classroom.example.com (classroom.example.com)|172.25.254.254|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 3743416320 (3.5G) [application/octet-stream]
Saving to: '/dvd/isos/rhel7.iso'

22% [=====] 851,175,416 77.8MB/s eta 36s
```

3) mkdir /mnt/dvd

```
File Edit View Search Terminal Help
[root@server4 ~]# mkdir /mnt/dvd
[root@server4 ~]#
[root@server4 ~]# cd /mnt
[root@server4 mnt]#
[root@server4 mnt]# ll
total 0
drwxr-xr-x. 2 root root 6 Oct 25 17:50 dvd
[root@server4 mnt]#
```

4) vim /etc/fstab

```
File Edit View Search Terminal Help
[root@server4 ~]# vim /etc/fstab
```



```
File Edit View Search Terminal Help
#
# /etc/fstab
# Created by anaconda on Wed May 7 01:22:57 2014
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
UUID=9bf6b9f7-92ad-441b-848e-0257cbb883d1 /          xfs      defaults        1 1
/dvd/isos/rhel7.iso /mnt/dvd iso9660 defaults,ro 0 0
~
```

Save and Exit

5) mount -a

6) df -hT

```
File Edit View Search Terminal Help
[root@server4 ~]# vim /etc/fstab
[root@server4 ~]#
[root@server4 ~]# mount -a
[root@server4 ~]#
[root@server4 ~]# df -hT
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/vdal        xfs       10G  6.5G  3.6G  65% /
devtmpfs         devtmpfs  482M    0  482M  0% /dev
tmpfs            tmpfs     498M   80K  497M  1% /dev/shm
tmpfs            tmpfs     498M   14M  485M  3% /run
tmpfs            tmpfs     498M    0  498M  0% /sys/fs/cgroup
/dev/loop0        iso9660  3.5G  3.5G    0 100% /mnt/dvd
[root@server4 ~]# 
```

[dev/loop0 means iso file]

7) vim /etc/yum.repos.d/rhcsa.repo

```
File Edit View Search Terminal Help
[root@server4 ~]# vim /etc/yum.repos.d/rhcsa.repo
[root@server4 ~]# 
```

```
File Edit View Search Terminal
[rhcsa]
name = for RHEL7 Packages
baseurl = file:///mnt/dvd
enabled = 1
gpgcheck = 0

```

[File – we always use file for local]

[http for remote]

gpg – gnu public licence

8) cat /etc/yum.repos.d/rhcsa.repo

```
File Edit View Search Terminal Help
[root@server4 ~]# vim /etc/yum.repos.d/rhcsa.repo
[root@server4 ~]#
[root@server4 ~]# cat /etc/yum.repos.d/rhcsa.repo
[rhcsa]
name = for RHEL7 Packages
baseurl = file:///mnt/dvd
enabled = 1
gpgcheck = 0

[root@server4 ~]# 
```

9) yum repolist { to check repos are there }

```
File Edit View Search Terminal Help
[root@server4 ~]# yum repolist
Loaded plugins: langpacks
rhcsa
rhel_dvd
(1/4): rhcsa/group_gz
(2/4): rhcsa/primary_db
(3/4): rhel_dvd/group_gz
(4/4): rhel_dvd/primary_db
repo id          repo name                                         status
rhcsa            for RHEL7 Packages                               4,305
rhel_dvd         Remote classroom copy of dvd                   4,305
repolist: 8,610
[root@server4 ~]# 
```

10) yum make cache

```
File Edit View Search Terminal Help
[root@server4 ~]# yum makecache
Loaded plugins: langpacks
rhcsa
rhel_dvd
(1/5): rhcsa/other_db
(2/5): rhcsa/productid
(3/5): rhcsa/filelists_db
(4/5): rhel_dvd/other_db
(5/5): rhel_dvd/filelists_db
Metadata Cache Created
[root@server4 ~]# 
```

11) yum update

```
File Edit View Search Terminal Help
[root@server4 ~]# yum update
Loaded plugins: langpacks
Resolving Dependencies
--> Running transaction check
---> Package yum.noarch 0:3.4.3-117.el7 will be updated
---> Package yum.noarch 0:3.4.3-118.el7 will be an update
--> Finished Dependency Resolution

Dependencies Resolved

=====
Package           Arch      Version       Repository      Size
=====
Updating:
yum              noarch   3.4.3-118.el7    rhcsa          1.2 M

Transaction Summary
=====
Upgrade  1 Package

Total download size: 1.2 M
Is this ok [y/d/N]: y
Downloading packages:
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Updating : yum=3.4.3-118.el7.noarch                                1/2
  Cleanup  : yum=3.4.3-117.el7.noarch                                2/2
  Verifying : yum=3.4.3-118.el7.noarch                                1/2
  Verifying : yum=3.4.3-117.el7.noarch                                2/2

Updated:
  yum.noarch 0:3.4.3-118.el7

Complete!
```

12) yum install http -y [y means yes]

```
File Edit View Search Terminal Help
[root@server4 ~]# yum install httpd -y
Loaded plugins: langpacks
Resolving Dependencies
--> Running transaction check
---> Package httpd.x86_64 0:2.4.6-17.el7 will be installed
---> Processing Dependency: httpd-tools = 2.4.6-17.el7 for package: httpd-2.4.6-17.el7.x86_64
---> Processing Dependency: /etc/mime.types for package: httpd-2.4.6-17.el7.x86_64
---> Processing Dependency: libapr1.so.0()(64bit) for package: httpd-2.4.6-17.el7.x86_64
---> Processing Dependency: libaprutil1.so.0()(64bit) for package: httpd-2.4.6-17.el7.x86_64
--> Running transaction check
---> Package apr.x86_64 0:1.4.8-3.el7 will be installed
---> Package apr-util.x86_64 0:1.5.2-6.el7 will be installed
---> Package httpd-tools.x86_64 0:2.4.6-17.el7 will be installed
---> Package mailcap.noarch 0:2.1.41-2.el7 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

=====
Package           Arch      Version       Repository      Size
=====
Installing:
httpd            x86_64   2.4.6-17.el7    rhcsa          1.2 M
Installing for dependencies:
apr              x86_64   1.4.8-3.el7    rhcsa          103 k
apr-util         x86_64   1.5.2-6.el7    rhcsa          92 k
httpd-tools      x86_64   2.4.6-17.el7    rhcsa          77 k
mailcap          noarch   2.1.41-2.el7   rhcsa          31 k
```

13) systemctl enable httpd.service

```
File Edit View Search Terminal Help
[root@server4 ~]# systemctl enable httpd.service
ln -s '/usr/lib/systemd/system/httpd.service' '/etc/systemd/system/multi-user.target.wants/httpd.service'
[root@server4 ~]# 
```

14) systemctl start httpd.service

```
File Edit View Search Terminal Help
[root@server4 ~]# systemctl start httpd.service
[root@server4 ~]# 
```

15) firewall-cmd --add-service=http

```
File Edit View Search Terminal Help
[root@server4 ~]# firewall-cmd --add-service=http
success
[root@server4 ~]# 
```

16) firewall-cmd --add-service=http --permanent

```
File Edit View Search Terminal Help
[root@server4 ~]# firewall-cmd --add-service=http --permanent
success
[root@server4 ~]# 
```

17) tail /etc/yum.repos.d/rhcsa.repo

```
File Edit View Search Terminal Help
[root@server4 ~]# tail /etc/yum.repos.d/rhcsa.repo
[rhcsa]
name = for RHEL7 Packages
baseurl = file:///mnt/dvd
enabled = 1
gpgcheck = 0

[root@server4 ~]# 
```

18) yum list installed httpd { to check installed packs }

```
File Edit View Search Terminal Help
[root@server4 ~]# yum list installed httpd
Loaded plugins: langpacks
Installed Packages
httpd.x86_64                  2.4.6-17.el7                               @rhcsa
[root@server4 ~]#
```

19) yum list httpd

```
File Edit View Search Terminal Help
[root@server4 ~]# yum list httpd
Loaded plugins: langpacks
Installed Packages
httpd.x86_64                  2.4.6-17.el7                               @rhcsa
[root@server4 ~]#
```

.) yum provides ftp { we can check ftp through yum }

```
File Edit View Search Terminal Help
[root@server4 ~]# yum provides ftp
Loaded plugins: langpacks
ftp-0.17-66.el7.x86_64 : The standard UNIX FTP (File Transfer Protocol) client
Repo       : rhcsa

ftp-0.17-66.el7.x86_64 : The standard UNIX FTP (File Transfer Protocol) client
Repo       : rhel_dvd

[root@server4 ~]#
```

.) yum provides vsftpd { we can check vsftpd through yum }

```
File Edit View Search Terminal Help
[root@server4 ~]# yum provides vsftpd
Loaded plugins: langpacks
vsftpd-3.0.2-9.el7.x86_64 : Very Secure Ftp Daemon
Repo       : rhcsa

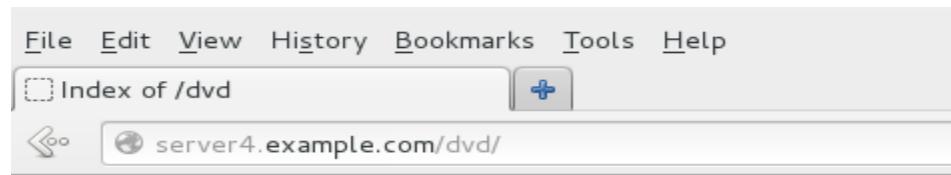
vsftpd-3.0.2-9.el7.x86_64 : Very Secure Ftp Daemon
Repo       : rhel_dvd

[root@server4 ~]#
```

20) ln -s /mnt/dvd/ /var/www/html/dvd { link }

```
File Edit View Search Terminal Help
[root@server4 ~]# ln -s /mnt/dvd/ /var/www/html/dvd
[root@server4 ~]#
[root@server4 ~]#
[root@server4 ~]# cd /var/www/html
[root@server4 html]#
[root@server4 html]#
[root@server4 html]# ll
total 0
lrwxrwxrwx. 1 root root 9 Oct 25 18:02 dvd -> /mnt/dvd/
[root@server4 html]# 
```

21) open firefox and type “ server.example.com/dvd ”

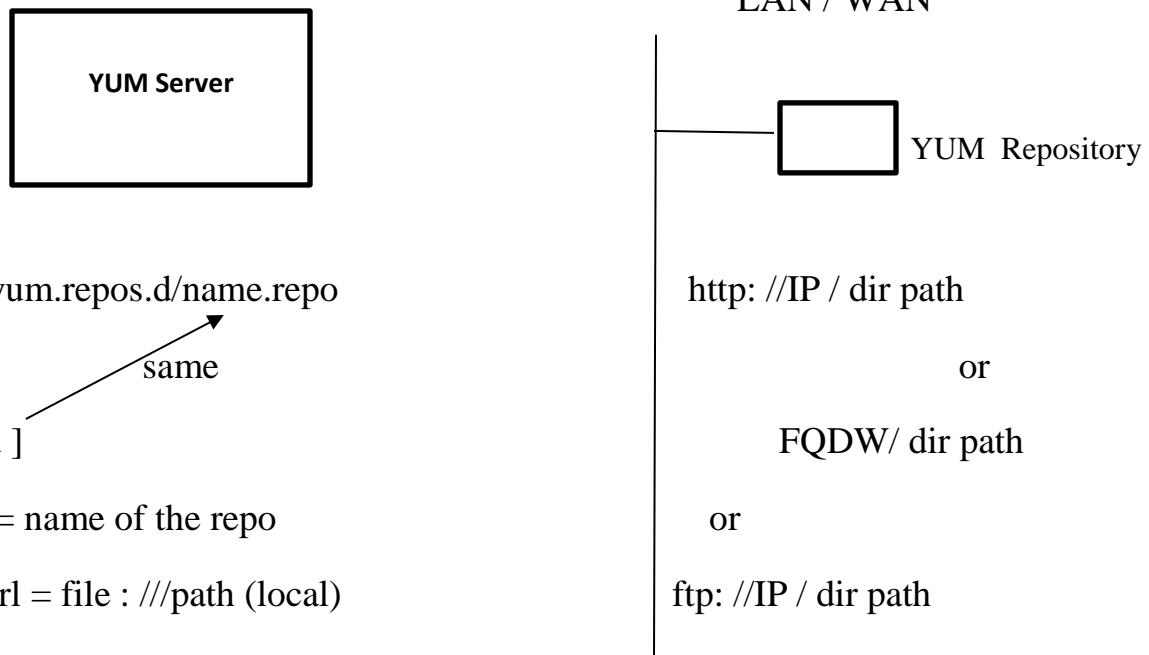


The screenshot shows a Firefox browser window. The address bar contains "server4.example.com/dvd/". The main content area displays a file listing titled "Index of /dvd". The table has columns for Name, Last modified, Size, and Description. The data includes various files and directories such as EFI/, EULA, GPL, LiveOS/, Packages/, RPM-GPG-KEY-redhat-beta, RPM-GPG-KEY-redhat-r., TRANS.TBL, addons/, images/, isolinux/, media.repo, release-notes/, and repodata/.

Name	Last modified	Size	Description
 Parent Directory		-	
 EFI/	2014-05-07 13:28	-	
 EULA	2014-04-04 17:32	8.1K	
 GPL	2012-03-06 19:36	18K	
 LiveOS/	2014-05-07 13:28	-	
 Packages/	2014-05-07 13:28	-	
 RPM-GPG-KEY-redhat-beta	2014-04-01 18:58	3.3K	
 RPM-GPG-KEY-redhat-r..>	2014-04-01 18:58	3.1K	
 TRANS.TBL	2014-05-07 13:28	1.5K	
 addons/	2014-05-07 13:28	-	
 images/	2014-05-07 13:28	-	
 isolinux/	2014-05-07 13:28	-	
 media.repo	2014-05-07 13:23	108	
 release-notes/	2014-05-07 13:28	-	
 repodata/	2014-05-07 13:28	-	

DAY 25

YUM Server



name = name of the repo

base url = file : //path (local)

http://IP /path (remote)

enabled = 1

gpg check = 0

yum remove }
 }
 don't use these two to delete ; they both delete dependencies
yum erase

use “ rpm -e ” to delete

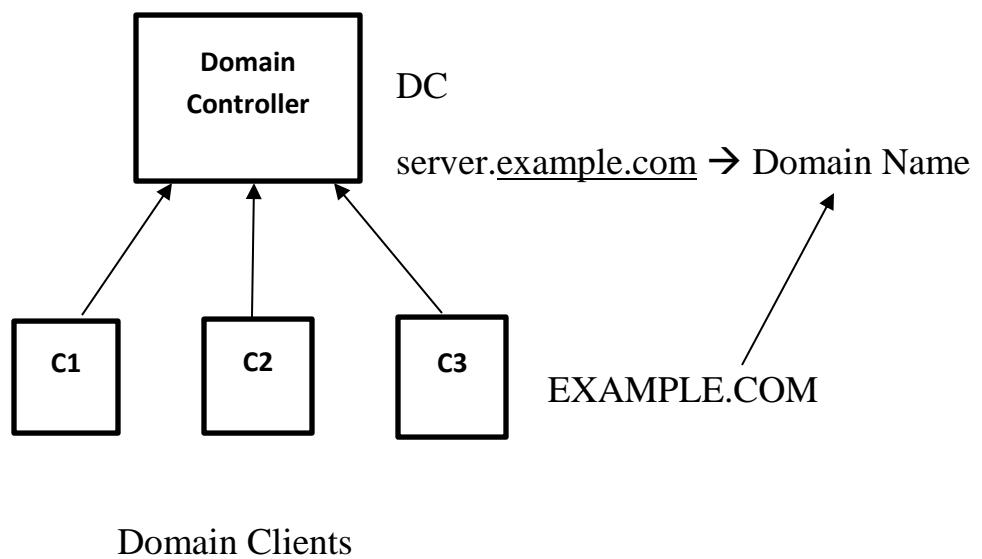
Directory Clients

Here directory is a Active Directory ; not a folder

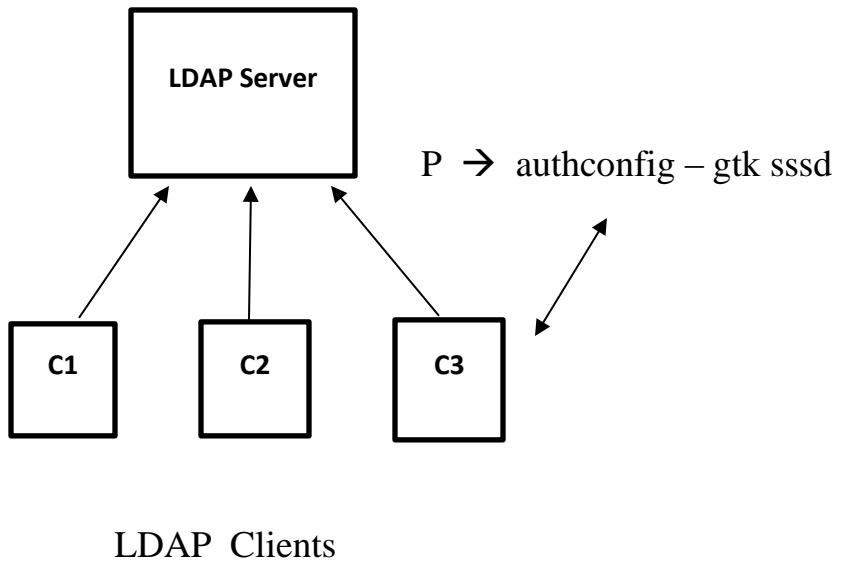
In Windows we have Active Directory

In Linux we have LDAP (Light Weight Directory Access Protocol)

IN WINDOWS



IN Linux



Work Group → local authentication (same machine)

Domain → centralized authentication (any machine)

both are connected with LAN only

Ex : classroom.example.com - domain

DN → Distinguished Name

DN → dc = example , dc = com

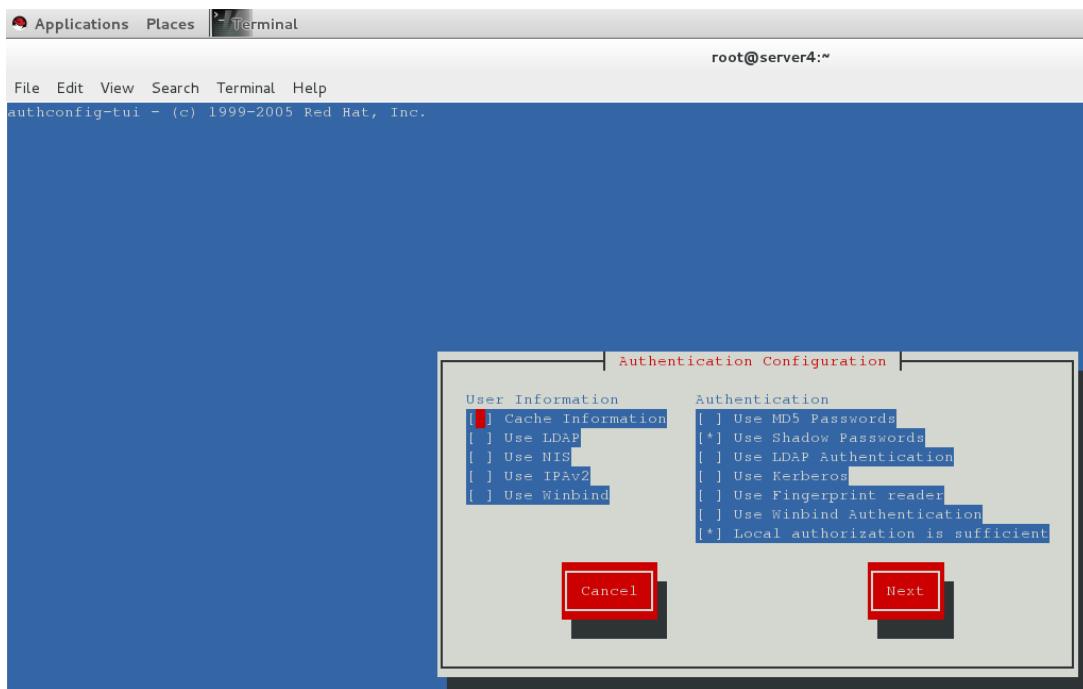
dc → Domain Component

Ex: server.domain3.example.com

DN → dc = domain3 , dc = example , dc = com

Steps :

.) authconfig – tui { to check }



this is Authentication Configuration ; press tab till the cursor came cancel button and click on it to exit.

.) getent passwd ldapuser0 { check user }

```
File Edit View Search Terminal Help
[root@server4 ~]# getent passwd ldapuser0
[root@server4 ~]# 
```

Here I'm unable to login as ldapuser0

1) ssh -X root@serverX

```
File Edit View Search Terminal Help
[kiosk@foundation4 ~]$ ssh -X root@server4
root@server4's password:
/usr/bin/xauth:  file /root/.Xauthority does not exist
[root@server4 ~]# 
```

2) yum install authconfig-gtk sssd -y { to install }

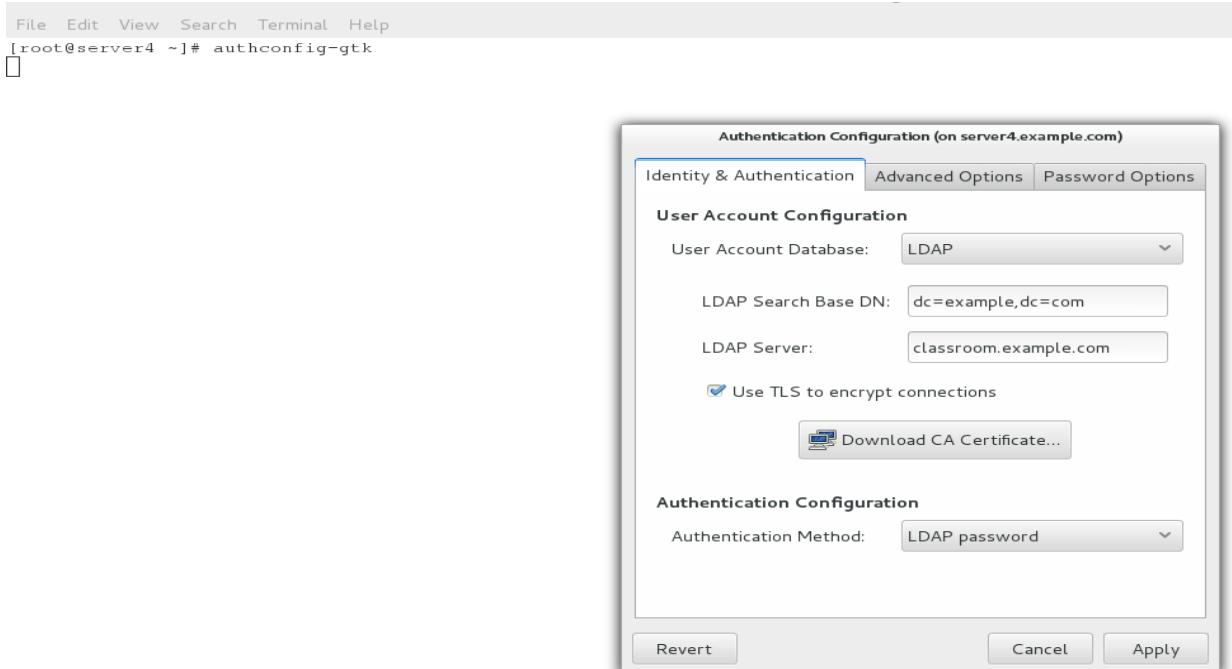
```
File Edit View Search Terminal Help
[root@server4 ~]# yum install authconfig-gtk sssd -y
Loaded plugins: langpacks
rhel_dvd
(1/2): rhel_dvd/group_gz
(2/2): rhel_dvd/primary_db
Resolving Dependencies
--> Running transaction check
---> Package authconfig-gtk.x86_64 0:6.2.8-8.el7 will be installed
---> Package sssd.x86_64 0:1.11.2-65.el7 will be installed
---> Processing Dependency: python-sssdconfig = 1.11.2-65.el7 for package: sssd-1.11.2-65.el7.x86_64
---> Processing Dependency: sssd-ad = 1.11.2-65.el7 for package: sssd-1.11.2-65.el7.x86_64
---> Processing Dependency: sssd-common = 1.11.2-65.el7 for package: sssd-1.11.2-65.el7.x86_64
---> Processing Dependency: sssd-common-pac = 1.11.2-65.el7 for package: sssd-1.11.2-65.el7.x86_64
---> Processing Dependency: sssd-ipa = 1.11.2-65.el7 for package: sssd-1.11.2-65.el7.x86_64
---> Processing Dependency: sssd-ldap = 1.11.2-65.el7 for package: sssd-1.11.2-65.el7.x86_64
---> Processing Dependency: sssd-proxy = 1.11.2-65.el7 for package: sssd-1.11.2-65.el7.x86_64
---> Running transaction check
---> Package python-sssdconfig.noarch 0:1.11.2-65.el7 will be installed
---> Package sssd-ad.x86_64 0:1.11.2-65.el7 will be installed
---> Processing Dependency: sssd-krb5-common = 1.11.2-65.el7 for package: sssd-ad-1.11.2-65.el7.x86_64
---> Processing Dependency: libdbhash.so.1()(64bit) for package: sssd-ad-1.11.2-65.el7.x86_64
---> Processing Dependency: libssss_idmap.so.0()(64bit) for package: sssd-ad-1.11.2-65.el7.x86_64
---> Processing Dependency: libssss_krb5_common.so()(64bit) for package: sssd-ad-1.11.2-65.el7.x86_64
---> Package sssd-common.x86_64 0:1.11.2-65.el7 will be installed
---> Processing Dependency: libini_config >= 1.0.0.1 for package: sssd-common-1.11.2-65.el7.x86_64
---> Processing Dependency: libcares.so.2()(64bit) for package: sssd-common-1.11.2-65.el7.x86_64
---> Processing Dependency: libcollection.so.2()(64bit) for package: sssd-common-1.11.2-65.el7.x86_64
---> Processing Dependency: libini_config.so.3()(64bit) for package: sssd-common-1.11.2-65.el7.x86_64
--->> Package sssd-common-pac.x86_64 0:1.11.2-65.el7 will be installed
---> Package sssd-ipa.x86_64 0:1.11.2-65.el7 will be installed
---> Processing Dependency: libipa_hbac(x86-64) = 1.11.2-65.el7 for package: sssd-ipa-1.11.2-65.el7.x86_64
---> Processing Dependency: libipa_hbac.so.0()(64bit) for package: sssd-ipa-1.11.2-65.el7.x86_64
---> Package sssd-krb5.x86_64 0:1.11.2-65.el7 will be installed
---> Package sssd-ldap.x86_64 0:1.11.2-65.el7 will be installed
---> Package sssd-proxy.x86_64 0:1.11.2-65.el7 will be installed
---> Running transaction check
---> Package c-ares.x86_64 0:1.10.0-3.el7 will be installed
---> Package libcollection.x86_64 0:0.6.2-22.el7 will be installed
---> Package libdbhash.x86_64 0:0.4.3-22.el7 will be installed
---> Package libini_config.x86_64 0:1.0.0.1-22.el7 will be installed
---> Processing Dependency: libbasicobjects.so.0()(64bit) for package: libini_config-1.0.0.1-22.el7.x86_64
---> Processing Dependency: libpath_utils.so.1()(64bit) for package: libini_config-1.0.0.1-22.el7.x86_64
```

3) authconfig-gtk

[window will open]

LDAP Search Base ON : dc = example , dc = com

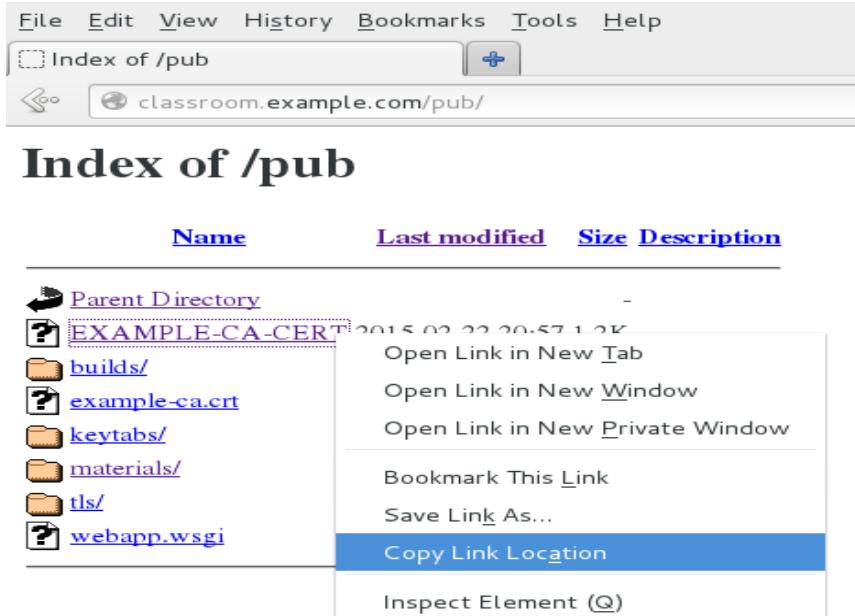
LDAP Server : classroom.example.com



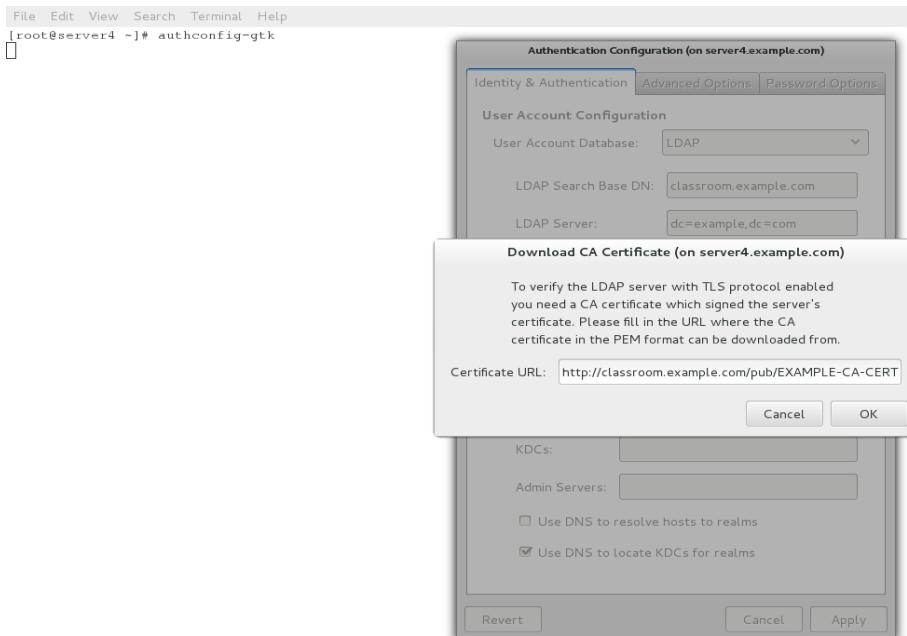
to download CA certificate

go to firefox : classroom.example.com/pub

example-CA-Cert (copy link location)



Click on Download CA Certificate and paste that link and click ok



Now click on Apply , It'll take some time

4) getent passwd ldapuser0 { check }

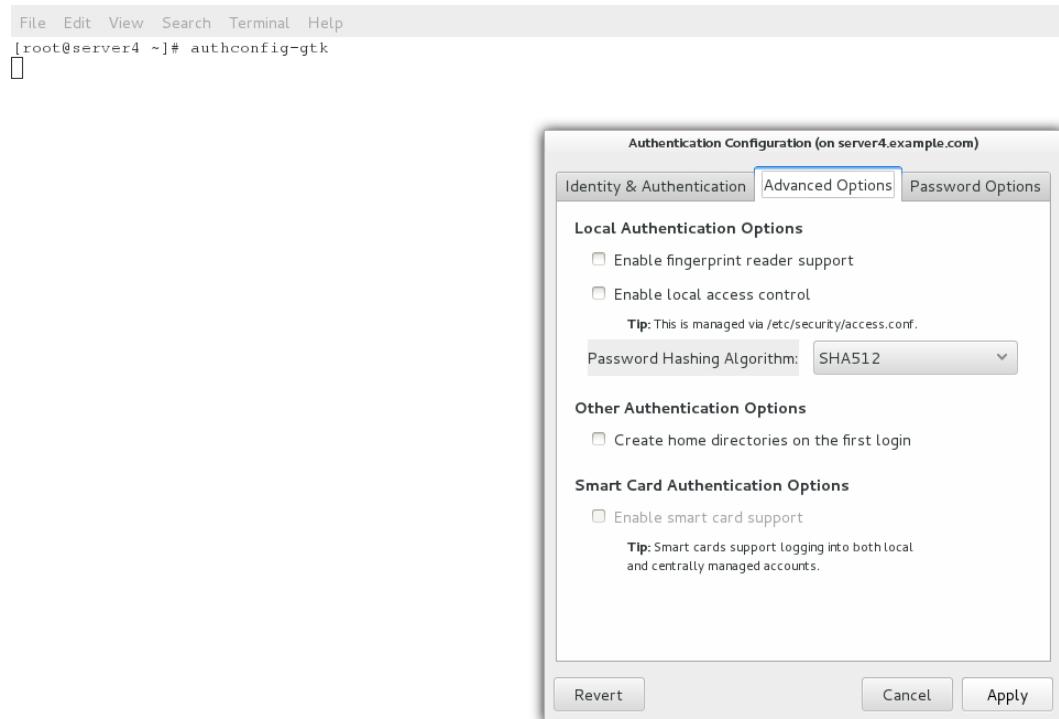
now we'll get info

```
File Edit View Search Terminal Help
[root@server4 ~]# getent passwd ldapuser30
ldapuser30:*:1730:1730:LDAP Test User 30:/home/guests/ldapuser30:/bin/bash
[root@server4 ~]# 
```

5) authconfig-gtk

[window will open]

Click on Advanced Options and check the details



no changes in that

6) ssh ldapuser0@localhost

password : password

In server we have 30 users

```
File Edit View Search Terminal Help
[root@server4 ~]# ssh ldapuser0@localhost
The authenticity of host 'localhost (::1)' can't be established.
ECDSA key fingerprint is eb:24:0e:07:96:26:b1:04:c2:37:0c:78:2d:bc:b0:08.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'localhost' (ECDSA) to the list of known hosts.
ldapuser0@localhost's password:
Could not chdir to home directory /home/guests/ldapuser0: No such file or directory
mkdir: cannot create directory '/home/guests': Permission denied
-bash-4.2$ 
```

Unable to login as ldapuser0 , Now we need to install AutoFS

Auto FS – Auto File System (client side application)

.) for auto mount

p - autofs

s – autofs

config → /etc/auto.master
 |
 | } 2 files
 |
 | /etc/auto.misc

1) vim /etc/auto.master

/dirpath /etc/auto.misc

2) vim /etc/automisc

* -rw, sync Storage Server Name(IP):/path/&



user name -rw, sync Storage Server Name(IP):/path/ user name

* means giving permission to all

user name – means to particular user

7) yum install autofs -y

```
File Edit View Search Terminal Help
[root@server4 ~]# yum install autofs -y
Loaded plugins: langpacks
Resolving Dependencies
--> Running transaction check
---> Package autofs.x86_64 1:5.0.7-40.el7 will be installed
---> Processing Dependency: libhesiod.so.0()(64bit) for package: 1:autofs-5.0.7-40.el7.x86_64
---> Running transaction check
---> Package hesiod.x86_64 0:3.2.1-3.el7 will be installed
---> Finished Dependency Resolution

Dependencies Resolved

=====
Package           Arch      Version       Repository      Size
=====
Installing:
autofs            x86_64   1:5.0.7-40.el7    rhel_dvd        550 k
Installing for dependencies:
hesiod            x86_64   3.2.1-3.el7      rhel_dvd        30 k

Transaction Summary
=====
Install 1 Package (+1 Dependent package)

Total download size: 579 k
Installed size: 3.6 M
Downloading packages:
(1/2): hesiod-3.2.1-3.el7.x86_64.rpm          | 30 kB  00:00:00
(2/2): autofs-5.0.7-40.el7.x86_64.rpm         | 550 kB  00:00:00
                                                               1.5 MB/s | 579 kB  00:00:00

Total
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : hesiod-3.2.1-3.el7.x86_64          1/2
  Installing : 1:autofs-5.0.7-40.el7.x86_64        2/2
  Verifying  : hesiod-3.2.1-3.el7.x86_64          1/2
  Verifying  : 1:autofs-5.0.7-40.el7.x86_64        2/2

Installed:
  autofs.x86_64 1:5.0.7-40.el7
```

8) systemctl enable autofs

```
File Edit View Search Terminal Help
[root@server4 ~]# systemctl enable autofs
ln -s '/usr/lib/systemd/system/autofs.service' '/etc/systemd/system/multi-user.target.wants/autofs.service'
[root@server4 ~]# 
```

9) systemctl start autofs

```
File Edit View Search Terminal Help
[root@server4 ~]# systemctl start autofs
[root@server4 ~]# 
```

10) vim /etc/auto.master

```
File Edit View Search Terminal Help

#
# Sample auto.master file
# This is an automounter map and it has the following format
# key [ -mount-options-separated-by-comma ] location
# For details of the format look at autofs(5).
#
/misc    /etc/auto.misc
/home/guests /etc/auto.misc
# NOTE: mounts done from a hosts map will be mounted with the
#        "nosuid" and "nodev" options unless the "suid" and "dev"
#        options are explicitly given.
#
/net      -hosts
#
# Include /etc/auto.master.d/*.autofs
#
+dir:/etc/auto.master.d
#
# Include central master map if it can be found using
# nsswitch sources.
#
# Note that if there are entries for /net or /misc (as
# above) in the included master map any keys that are the
# same will not be seen as the first read key seen takes
# precedence.
#
+auto.master
```

11) vim /etc/auto.misc

```
File Edit View Search Terminal Help  
#  
# This is an automounter map and it has the following format  
# key [ -mount-options-separated-by-comma ] location  
# Details may be found in the autoofs(5) manpage  
  
cd           -fstype=iso9660,ro,nosuid,nodev :/dev/cdrom  
  
# the following entries are samples to pique your imagination  
#linux        -ro,soft,intr      ftp.example.org:/pub/linux  
#boot         -fstype=ext2       :/dev/hd1  
#floppy       -fstype=auto      :/dev/fd0  
#floppy       -fstype=ext2       :/dev/fd0  
#e2floppy    -fstype=ext2       :/dev/fd0  
#jaz          -fstype=ext2       :/dev/sdcl  
#removable   -fstype=ext2       :/dev/hdd  
ldapuser0 -rw,sync classroom.example.com:/home/guests/ldapuser0  
~
```

12) systemctl restart autofs.service { after changes we have to do restart }

```
File Edit View Search Terminal Help  
[root@server4 ~]# systemctl restart autofs.service  
[root@server4 ~]#
```

13) ssh ldapuser0@localhost { to check }

```
File Edit View Search Terminal Help  
[root@server4 ~]# ssh ldapuser0@localhost  
ldapuser0@localhost's password:  
Last login: Mon Oct 28 19:01:51 2019 from localhost  
[ldapuser0@server4 ~]$
```

Now login as ldapuser0

.) grep /home /etc/auto.master { to see }

```
File Edit View Search Terminal Help
[root@server4 ~]# grep /home /etc/auto.master
/home/guests /etc/auto.misc
[root@server4 ~]#
```

.) grep /home /etc/auto.misc { to see }

```
File Edit View Search Terminal Help
[root@server4 ~]# grep /home /etc/auto.misc
ldapuser0 -rw, sync classroom.example.com:/home/guests/ldapuser0
[root@server4 ~]#
```

.) ssh ldapuser10@localhost { to check }

Now trying to login as ldapuser10

```
File Edit View Search Terminal Help
[root@server4 ~]# ssh ldapuser10@localhost
ldapuser10@localhost's password:
Could not chdir to home directory /home/guests/ldapuser10: No such file or directory
mkdir: cannot create directory '/home/guests/ldapuser10': Permission denied
-bash-4.2$
```

.) vim /etc/auto.misc

```
File Edit View Search Terminal Help
#
# This is an automounter map and it has the following format
# key [ -mount-options-separated-by-comma ] location
# Details may be found in the autoofs(5) manpage

cd -fstype=iso9660,ro,nosuid,nodev :/dev/cdrom

# the following entries are samples to pique your imagination
#linux -ro,soft,intr ftp.example.org:/pub/linux
#boot -fstype=ext2 :/dev/hd1
#floppy -fstype=auto :/dev/fd0
#floppy -fstype=ext2 :/dev/fd0
#e2floppy -fstype=ext2 :/dev/fd0
#jaz -fstype=ext2 :/dev/sdcl
#removable -fstype=ext2 :/dev/hdd
ldapuser0 -rw, sync classroom.example.com:/home/guests/ldapuser0
ldapuser10 -rw, sync classroom.example.com:/home/guests/ldapuser10
~
```

.) systemctl restart autofs.service

```
File Edit View Search Terminal Help
[root@server4 ~]# systemctl restart autofs.service
[root@server4 ~]# 
```

.) ssh ldapuser 10@localhost

```
File Edit View Search Terminal Help
[root@server4 ~]# ssh ldapuser10@localhost
ldapuser10@localhost's password:
Last login: Mon Oct 28 19:07:13 2019 from localhost
[ldapuser10@server4 ~]$ 
```

.) vim /etc/auto.misc

```
File Edit View Search Terminal Help
#
# This is an automounter map and it has the following format
# key [ -mount-options-separated-by-comma ] location
# Details may be found in the autofs(5) manpage

cd           -fstype=iso9660,ro,nosuid,nodev :/dev/cdrom

# the following entries are samples to pique your imagination
#linux        -ro,soft,intr          ftp.example.org:/pub/linux
#boot         -fstype=ext2          :/dev/hd1
#floppy       -fstype=auto         :/dev/fd0
#floppy       -fstype=ext2          :/dev/fd0
#e2floppy     -fstype=ext2          :/dev/fd0
#jaz          -fstype=ext2          :/dev/sdcl
#removable    -fstype=ext2          :/dev/hdd
ldapuser0   -rw,sync classroom.example.com:/home/guests/ldapuser0
ldapuser10   -rw,sync classroom.example.com:/home/guests/ldapuser10
* -rw, sync classroom.example.com:/home/guests/&
~

* means giving permission to all
```

.) systemctl restart autofs.service

```
File Edit View Search Terminal Help
[root@server4 ~]# systemctl restart autofs.service
[root@server4 ~]# 
```

.) ssh ldapuser2@localhost

```
File Edit View Search Terminal Help
[root@server4 ~]# ssh ldapuser22@localhost
ldapuser22@localhost's password:
[ldapuser22@server4 ~]$ 
```

.) ssh ldapuser22@localhost

```
File Edit View Search Terminal Help
[root@server4 ~]# ssh ldapuser2@localhost
ldapuser2@localhost's password:
[ldapuser2@server4 ~]$ 
```

Now we can connect upto 30 users because in server we have 30 users

DAY 26

SSH Server



(Laptop / Desktop)



Remote Sever / Cloud Server / VM / Data Centre

To Connect :

Package (P) → openssh

openssh → ssh hostname

Service (S) → sshd

putty → ssh UN@hostname

Port → 22

Fire Wall Service (F.S) → ssh

Authentication : 2 types

1) Password Authentication

2) Key Based Authentication

i) only key (password less authentication)

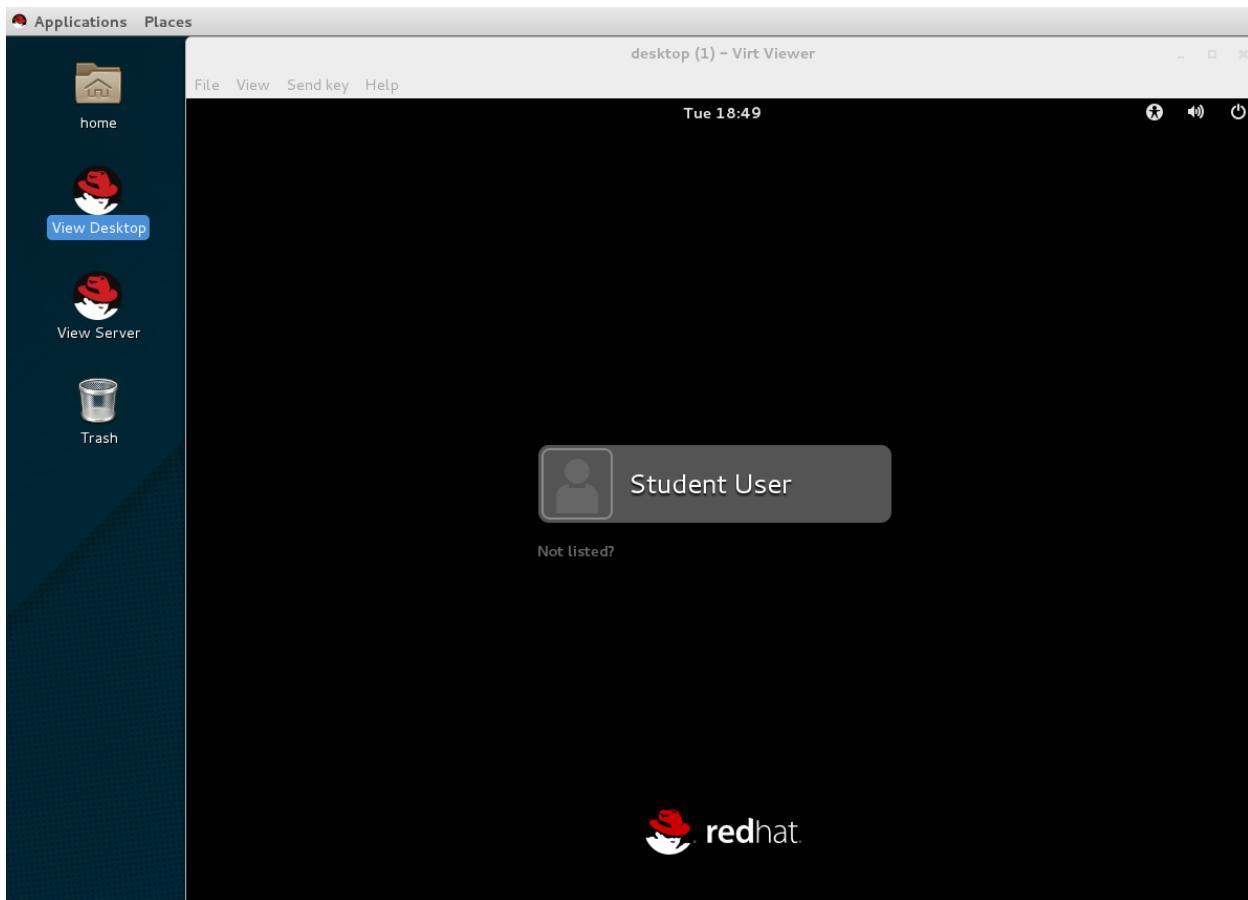
ii) Key + Passphrase (secret)

} Public Key
Private Key

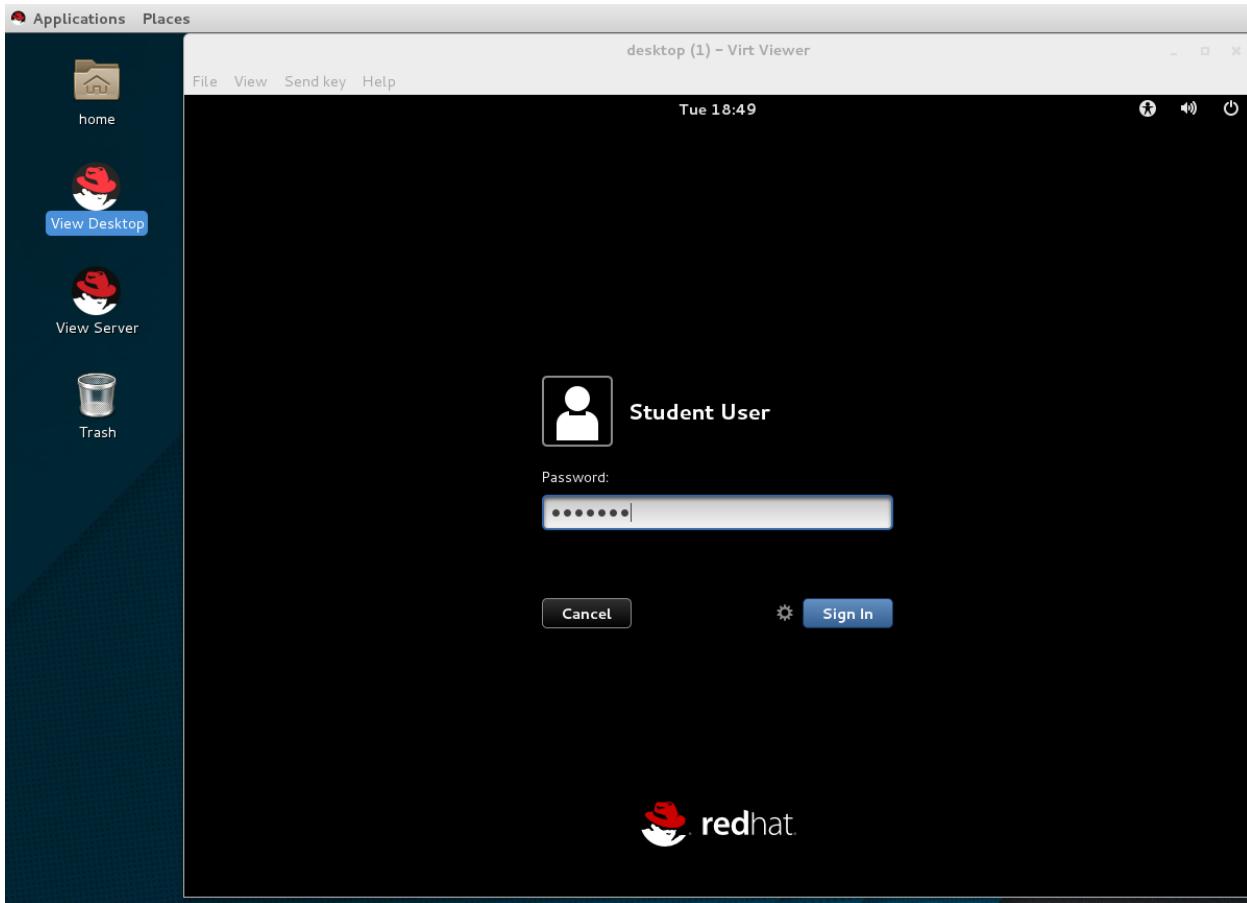
1)) Password Authentication

Steps :

- 1) click on view desktop



2) login as student



3) ssh root@serverX

```
root@server4:~  
File Edit View Search Terminal Help  
[student@desktop4 Desktop]$ ssh root@server4  
root@server4's password:  
Last login: Tue Oct 29 19:15:20 2019 from desktop4.example.com  
[root@server4 ~]#
```

4) useradd rob

5) useradd saara

6) useradd smith

```
File Edit View Search Terminal Help
[root@server4 ~]# useradd rob
[root@server4 ~]# useradd saara
[root@server4 ~]# useradd smith
[root@server4 ~]#
[root@server4 ~]# tail -3 /etc/passwd
rob:x:1006:1006::/home/rob:/bin/bash
saara:x:1007:1007::/home/saara:/bin/bash
smith:x:1008:1008::/home/smith:/bin/bash
[root@server4 ~]# █
```

7) echo redhat | passwd --stdin rob

8) echo redhat | passwd --stdin saara

9) echo redhat | passwd --stdin smith

```
File Edit View Search Terminal Help
[root@server4 ~]# echo redhat | passwd --stdin rob
Changing password for user rob.
passwd: all authentication tokens updated successfully.
[root@server4 ~]#
[root@server4 ~]# echo redhat | passwd --stdin saara
Changing password for user saara.
passwd: all authentication tokens updated successfully.
[root@server4 ~]#
[root@server4 ~]# echo redhat | passwd --stdin smith
Changing password for user smith.
passwd: all authentication tokens updated successfully.
[root@server4 ~]# █
```

10) logout from root

11) ssh rob@serverX

password : redhat

```
File Edit View Search Terminal Help
[student@desktop4 Desktop]$ ssh rob@server4
rob@server4's password:
[ rob@server4 ~]$ █
```

12) [rob@serverX ~] logout

[student@desktopX desktop]

```
File Edit View Search Terminal ↵
[ rob@server4 ~]$ logout
Connection to server4 closed.
[student@desktop4 Desktop]$ █
```

2 i) only key

1) ssh-keygen -f <key name>

enter passphrase : none

again enter passphrase : none

```
File Edit View Search Terminal Help
[student@desktop4 Desktop]$ ssh-keygen -f rob_key
Generating public/private rsa key pair.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in rob_key.
Your public key has been saved in rob_key.pub.
The key fingerprint is:
95:95:81:22:02:0b:53:54:6a:81:d6:23:8f:68:fe:32 student@desktop4.example.com
The key's randomart image is:
++-[ RSA 2048]---+
|o+*o. .oo
|= * . . . o.
|o B . . . o
|+ .
|o S
|
|
| E .
| o
+-----+
[student@desktop4 Desktop]$ █
```

2) ll

rob_key.pub → Public Key

rob_key → Private Key [Private Key must 6 0 0]

```
[student@desktop4 Desktop]$ ll
total 8
-rw----- 1 student student 1675 Oct 29 20:58 rob_key
-rw-r--r-- 1 student student 410 Oct 29 20:58 rob_key.pub
[student@desktop4 Desktop]$ █
```

3) cat rob_key

```
File Edit View Search Terminal Help
[student@desktop4 Desktop]$ cat rob_key
-----BEGIN RSA PRIVATE KEY-----
MIIEowIBAAKCAQEAnXIN/b/Xj8tGfs6NUZ3seVWAKLz2KEhGGPAuBedP79xseZZ
JFZ/uDDqPYep+oMQpJ9WhnS0o5e7G2cknkyeGHkWhlGSKyZFXInw+K/rnc/Ba6hE
h95JzEIWIo/mNI6sgUCB7APCKcrxP4/zr9+0XLRahAz4xU49qPfCfML1jB06+cRU
6xwq2r0he+xHuUTdU1yzsHLreUgssj2MuHEMFqfdsuoIDFj9eIsXrsMtq0427GzU
DZTJGMIkrAC7fQGsDkpVVsqCWhm+0yrP1hpCi/8Uas5Pd7axbWi7qsxTdg1rcV7v
TWJwsY7Ex10nvmul3XkmEBvy/GvI4pUQozhUiQIDAQABoIBABxc0BL2JIEdT5R1
51TGSpMgH0R3JFC+4VXKpa+gi/Cb1tpL7Nw9U6bWQY+UqryQuQ0Y2iozLqm0SFv
r3X+0pd78Ee/l8G4AhR6MHLLVXi2vJ0E2ttSeh6V50DS5Negv4gEs6Jsxu06T5xw
dKfAdv+f6RIS0BlqT4cJIfpRL+PMPavb0s106aIrnsJWeS7DGekDgM/DpL/JGsQ0
9C060cnNysbDMbMPLahe87EVoWQJ6pFpdBwZ4K94IraqATHJHrCpf3HsWG3/erIA
8ePjJs//+KsKpQrj0JtJnkDMp1u/mVubpV0cT0jAwC/fWJ15D/gmyoWCbS27Tyeb
yZFnQ7UCgYEazzL9nZ99mWfK0W1Eq1rruEwF3BMoH0PMMEo8oqyEL1kMmqUjXE6Y
4/MHQ3lSD0MKTx3nEPYZg8XswK6RGzsF9HHrH68kS2zzl52g7SSp1gi2Tv6qlNc
GMvVx2+SLcGhzcQRq1A600GTEGYgX1CeXr/uKvrcyolwLZeCDNEhEysCgYEAwocu
1jwe4XIZ/1rPWxglitzC3NW68fRX9DlxilfvDVi2P4HLmu3lNcmugU2t98gg5eTu
qbZ6rwnogSu+IUdVLEecAgGshat6gQYuEKaSG9E9AAyjNUwQRLoS9AFksPY3Php9
R3mHwAZZ7i4piSor4g4g0CzLXJ8f2I6l9B22bRsCgYEaq66lhJilupnM7TDr6Ewi
6wdbB5p78UP9CbpJecUwlidkF7NjlFWvy5kQ2LDK8tChNcTluD5jLVWuHm7RJmdW
TPp0x7gPyP+kCAFhjaPurGiUH4naTo1Zz1X+Yg0pg25hAp1GwrtssqUwFTN5+wBU
iU/hKDUDGE0/PRe/85zJGhcCgYBlfgRo0CtIcrCvsyB1zKLbxZaBg52q+VIeYQCU
dHaL3xoPHlgteCtbmeNLIU0/9xF7AKuorkVqJ+A/7K0hV0dP9/ikb10kzKf4w1Gr
bEzU6KFL7ufVud7PDMowtr1jOsLtywJMFnHU8j950XU48TLh5U12eEsbPU/loVt
TUdNuwKBgCEAHmG0Iz5R2VNwQoqPhF+r4JYvvKAwuVwsxhvIEJ9puFp3q/FYU53I
JvkWhn92u49woLaT9mzVXMAiCGHdHhvGxBSSYBeavgnZ3kUzSryogg39ReBGTrtcx
vMnQI6VZGPHnBkxAiLs/goKXVvR0UJhtdxEqIqvryILMaxyWG2p
-----END RSA PRIVATE KEY-----
```

4) cat rob_key.pub

```
File Edit View Search Terminal Help
[student@desktop4 Desktop]$ cat rob_key.pub
ssh-rsa AAAAB3NzaC1yc2EAAAQABAAQCdgc39v9ePy0Z+zo1Rnex5VYCQvPYoSEYYY8C4F50/v3Gx5lkkVn+4M0o9h6n6gxCkn1adI6jl
7sbZySeRzJ4YeRaGUZIrJkVcifD4r+ud2FrqESH3knMQhYij+Y0j/qyBOIHsA8IpvyE/j/0v37RctFqEDPjFTj2o98J8vvWME7r5xFTrHCras6F7
7Ee65N1TXL0wcut5SCyyPYy4cQwWp92y6ggMWP14ixeuyw2rTjbsbNQNLMkYwiSsALT9Aaw0SLVWyoJaGb7TKs/WGkKL/xRqzk93trFtaLuqzFN2
Dwtxxu9NYnCxsjTHU6e+a6XdcqYQG/L8a8jilRCj0FSJ student@desktop4.example.com
[student@desktop4 Desktop]$ █
```

5) ssh-copy-id -i rob_key.pub rob@serverX

password : redhat

[i means identity]

```
File Edit View Search Terminal Help
[student@desktop4 Desktop]$ ssh-copy-id -i rob_key.pub rob@server4
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
rob@server4's password:

Number of key(s) added: 1

Now try logging into the machine, with: "ssh 'rob@server4'"
and check to make sure that only the key(s) you wanted were added.

[student@desktop4 Desktop]$
```

6) ssh-copy-id -i rob_key.pub student@serverX

```
File Edit View Search Terminal Help
[student@desktop4 Desktop]$ ssh-copy-id -i rob_key.pub student@server4
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
student@server4's password:

Number of key(s) added: 1

Now try logging into the machine, with: "ssh 'student@server4'"
and check to make sure that only the key(s) you wanted were added.

[student@desktop4 Desktop]$
```

7) ssh -i rob_key rob@serverX

[rob_key is private key]

Here with out asking password it'll login ; key less entry

```
File Edit View Search Terminal Help
[student@desktop4 Desktop]$ ssh -i rob_key rob@server4
Last login: Tue Oct 29 20:57:43 2019 from desktop4.example.com
[rob@server4 ~]$
```

2 ii) Key + Passphrase

```
ssh-keygen -f <key name>
```

enter passphrase : password

again enter passphrase : password

[Here password is the password]

```
File Edit View Search Terminal Help
[rob@server4 ~]$ ssh-keygen -f smith_key
Generating public/private rsa key pair.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in smith_key.
Your public key has been saved in smith_key.pub.
The key fingerprint is:
72:15:bb:d5:67:60:78:4f:76:9a:bf:57:e6:76:12:de rob@server4.example.com
The key's randomart image is:
+--[ RSA 2048]----+
|          .o |
|          o.o..+|
|          o ...*+|
|          . o  oo.|
|          . S .    .|
|          o       . +|
|                  =o|
|                  o.E|
|                  oo|
+-----+
[rob@server4 ~]$ █
```

2) ssh-copy-id -i smith_key.pub smith@serverX

password : redhat

[i means identity]

```
File Edit View Search Terminal Help
[rob@server4 ~]$ ssh-copy-id -i smith_key.pub smith@server4
The authenticity of host 'server4 (172.25.4.11)' can't be established.
ECDSA key fingerprint is eb:24:0e:07:96:26:b1:04:c2:37:0c:78:2d:bc:b0:08.
Are you sure you want to continue connecting (yes/no)? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
smith@server4's password:

Number of key(s) added: 1

Now try logging into the machine, with: "ssh 'smith@server4'"
and check to make sure that only the key(s) you wanted were added.

[ rob@server4 ~]$ █
```

3) ssh -i smith_key smith@serverX

[smith_key is private key]

Here it'll ask passphrase password

```
File Edit View Search Terminal Help
[rob@server4 ~]$ ssh -i smith_key smith@server4
Enter passphrase for key 'smith_key':
[smith@server4 ~]$ █
```

DAY 27

Password Authentication Changing Permissions

steps :

.) click on View Server and Connect as root

1) crating users (rob, smith, saara)

```
File Edit View Search Terminal Help
[root@server4 Desktop]# for u in rob smith saara;do useradd $u;done
[root@server4 Desktop]#
[root@server4 Desktop]# tail -3 /etc/passwd
rob:x:1001:1001::/home/rob:/bin/bash
smith:x:1002:1002::/home/smith:/bin/bash
saara:x:1003:1003::/home/saara:/bin/bash
[root@server4 Desktop]#
[root@server4 Desktop]#
```

2) echo password (redhat)

```
File Edit View Search Terminal Help
[root@server4 Desktop]# for u in rob smith saara;do echo redhat | passwd --stdin $u;done
Changing password for user rob.
passwd: all authentication tokens updated successfully.
Changing password for user smith.
passwd: all authentication tokens updated successfully.
Changing password for user saara.
passwd: all authentication tokens updated successfully.
[root@server4 Desktop]#
```

.) click on View Desktop and connect as root

3) ssh-keygen -f rob_key [passphrase - none]

4) ll { list }

```
File Edit View Search Terminal Help
[root@desktop4 Desktop]# ssh-keygen -f rob_key
Generating public/private rsa key pair.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in rob_key.
Your public key has been saved in rob_key.pub.
The key fingerprint is:
f8:1a:c3:9e:2f:84:0a:dc:db:12:04:7c:b9:79:95:22 root@desktop4.example.com
The key's randomart image is:
+-[ RSA 2048]-----+
| . . .
| o E . o
| o + o
| + . .
| . o ... S
| .. o.....
| ..+.+.
| .o o.=
| . +o.
+-----+
[root@desktop4 Desktop]# ll
total 8
-rw----- 1 root root 1675 Oct 31 19:43 rob_key
-rw-r--r-- 1 root root 407 Oct 31 19:43 rob_key.pub
[root@desktop4 Desktop]# █
```

5) ssh-copy-id -i rob_key.pub rob@serverX [password : redhat]

```
File Edit View Search Terminal Help
[root@desktop4 Desktop]# ssh-copy-id -i rob_key.pub rob@server4
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
rob@server4's password:
Permission denied, please try again.
rob@server4's password:

Number of key(s) added: 1

Now try logging into the machine, with: "ssh 'rob@server4'"
and check to make sure that only the key(s) you wanted were added.
[root@desktop4 Desktop]# █
```

6) ssh-copy-id -i rob_key.pub student@serverX [password : student]

```
File Edit View Search Terminal Help
[root@desktop4 Desktop]# ssh-copy-id -i rob_key.pub student@server4
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
student@server4's password:
Number of key(s) added: 1

Now try logging into the machine, with: "ssh 'student@server4'"
and check to make sure that only the key(s) you wanted were added.

[root@desktop4 Desktop]#
```

In View Server

7) vim /etc/ssh/sshd_config

```
File Edit View Search Terminal Help
[root@server4 Desktop]# vim /etc/ssh/sshd_config
```

Now go to line no 48

```
# Authentication:
#LoginGraceTime 2m
#PermitRootLogin yes
#StrictModes yes
#MaxAuthTries 6
-- INSERT --                                         48,1
```

remove # change the permission yes to no

```
# Authentication:
#LoginGraceTime 2m
PermitRootLogin no
#StrictModes yes
#MaxAuthTries 6
#MaxSessions 10

#RSAAuthentication yes
#PubkeyAuthentication yes
-- INSERT --
```

Now go to line no 78

```
#IgnoreRhosts yes  
# To disable tunneled clear text passwords, change to no here!  
#PasswordAuthentication yes  
#PermitEmptyPasswords no  
PasswordAuthentication yes  
-- INSERT --
```

78,27

```
# To disable tunneled clear text passwords, change to no here!  
#PasswordAuthentication yes  
#PermitEmptyPasswords no  
PasswordAuthentication no  
  
# Change to no to disable s/key passwords  
#ChallengeResponseAuthentication yes  
-- INSERT --
```

8) systemctl reload sshd

```
File Edit View Search Terminal Help  
[root@server4 Desktop]# systemctl reload sshd  
[root@server4 Desktop]#
```

9) cat /etc/ssh/sshd_config | egrep -i "Root login | Password Authentication"

```
File Edit View Search Terminal Help  
[root@server4 Desktop]# cat /etc/ssh/sshd_config | egrep -i "RootLogin|PasswordAuthenticatio"  
PermitRootLogin no  
#PasswordAuthentication yes  
PasswordAuthentication no  
# PasswordAuthentication. Depending on your PAM configuration,  
# the setting of "PermitRootLogin without-password".  
# PAM authentication, then enable this but set PasswordAuthentication  
[root@server4 Desktop]#
```

In View Desktop

10) ssh root@serverX

11) ssh rob@serverX

```
File Edit View Search Terminal Help
[root@desktop4 Desktop]# ssh root@server4
Permission denied (publickey,gssapi-keyex,gssapi-with-mic).
[root@desktop4 Desktop]#
[root@desktop4 Desktop]# ssh rob@server4
Permission denied (publickey,gssapi-keyex,gssapi-with-mic).
[root@desktop4 Desktop]# █
```

Permission denied for users

12) ssh -i rob_key rob@serverX

```
File Edit View Search Terminal Help
[root@desktop4 Desktop]# ssh -i rob_key rob@server4
Last failed login: Thu Oct 31 19:44:25 IST 2019 from desktop4.example.com on ssh:notty
There was 1 failed login attempt since the last successful login.
[rob@server4 ~]$ █
```

But entered in rob

13) ssh-keygen -f saara [passphrase - none]

14) ll { list }

```
File Edit View Search Terminal Help
[ root@desktop4 Desktop]# ssh-keygen -f saara
Generating public/private rsa key pair.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in saara.
Your public key has been saved in saara.pub.
The key fingerprint is:
45:cc:fa:bd:1e:55:43:de:ec:82:a3:f3:c0:f7:61:5e root@desktop4.example.com
The key's randomart image is:
---[ RSA 2048]---
|       . |
|       o..|
|       ..o+|
|       ..o.|
| S. .o o .|
|     ...o .|
|     = o.o E|
|     =.= o |
|     .o o |
+-----+
[ root@desktop4 Desktop]# ll
total 16
-rw-----. 1 root root 1675 Oct 31 19:43 rob_key
-rw-r--r--. 1 root root  407 Oct 31 19:43 rob_key.pub
-rw-----. 1 root root 1675 Oct 31 19:51 saara
-rw-r--r--. 1 root root  407 Oct 31 19:51 saara.pub
[ root@desktop4 Desktop]# 
```

15) scp -i rob_key saara.pub student@serverX:/var/tmp

```
File Edit View Search Terminal Help
[ root@desktop4 Desktop]# scp -i rob_key saara.pub student@server4:/var/tmp
saara.pub                                         100%  407      0.4KB/s  00:00
[ root@desktop4 Desktop]# 
```

In View Server

16) ls -al /home/saara

```
File View Send key Help
Applications Places Terminal
root@server4

File Edit View Search Terminal Help
[root@server4 Desktop]# ls -al /home/saara
total 12
drwx----- 4 saara saara 88 Oct 31 19:40 .
drwxr-xr-x. 6 root root 54 Oct 31 19:40 ..
-rw-r--r--. 1 saara saara 18 Jan 29 2014 .bash_logout
-rw-r--r--. 1 saara saara 193 Jan 29 2014 .bash_profile
-rw-r--r--. 1 saara saara 231 Jan 29 2014 .bashrc
drwxr-xr-x. 2 saara saara 56 Jul 11 2014 .config
drwxr-xr-x. 4 saara saara 37 Jul 11 2014 .mozilla
[root@server4 Desktop]#
```

17) mkdir /home/saara/.ssh

18) touch /home/saara/.ssh/authorized_keys

19) ls -al /home/saara

```
File Edit View Search Terminal Help
[root@server4 Desktop]# mkdir /home/saara/.ssh
[root@server4 Desktop]#
[root@server4 Desktop]# touch /home/saara/.ssh/authorized_keys
[root@server4 Desktop]#
[root@server4 Desktop]# ls -al /home/saara
total 16
drwx----- 5 saara saara 4096 Oct 31 20:01 .
drwxr-xr-x. 6 root root 54 Oct 31 19:40 ..
-rw-r--r--. 1 saara saara 18 Jan 29 2014 .bash_logout
-rw-r--r--. 1 saara saara 193 Jan 29 2014 .bash_profile
-rw-r--r--. 1 saara saara 231 Jan 29 2014 .bashrc
drwxr-xr-x. 2 saara saara 56 Jul 11 2014 .config
drwxr-xr-x. 4 saara saara 37 Jul 11 2014 .mozilla
drwxr-xr-x. 2 root root 28 Oct 31 20:02 .ssh
[root@server4 Desktop]#
```

20) chown -R saara. /home/saara/.ssh

21) chmod -R u+rwx,go-rwx /home/saara/.ssh

22) ls -al /home/saara

```
File Edit View Search Terminal Help
[root@server4 Desktop]# ls -al /home/saara
total 16
drwx----- 5 saara saara 4096 Oct 31 20:01 .
drwxr-xr-x  6 root  root   54 Oct 31 19:40 ..
-rw-r--r--  1 saara saara   18 Jan 29  2014 .bash_logout
-rw-r--r--  1 saara saara  193 Jan 29  2014 .bash_profile
-rw-r--r--  1 saara saara  231 Jan 29  2014 .bashrc
drwxr-xr-x  2 saara saara   56 Jul 11  2014 .config
drwxr-xr-x  4 saara saara   37 Jul 11  2014 .mozilla
drwxr-xr-x  2 root  root   28 Oct 31 20:02 .ssh
[root@server4 Desktop]#
[root@server4 Desktop]# chown -R saara. /home/saara/.ssh/
[root@server4 Desktop]#
[root@server4 Desktop]# chmod -R u+rwx,go-rwx /home/saara/.ssh/
[root@server4 Desktop]#
[root@server4 Desktop]# ls -al /home/saara
total 16
drwx----- 5 saara saara 4096 Oct 31 20:01 .
drwxr-xr-x  6 root  root   54 Oct 31 19:40 ..
-rw-r--r--  1 saara saara   18 Jan 29  2014 .bash_logout
-rw-r--r--  1 saara saara  193 Jan 29  2014 .bash_profile
-rw-r--r--  1 saara saara  231 Jan 29  2014 .bashrc
drwxr-xr-x  2 saara saara   56 Jul 11  2014 .config
drwxr-xr-x  4 saara saara   37 Jul 11  2014 .mozilla
drwx----- 2 saara saara   28 Oct 31 20:02 .ssh
[root@server4 Desktop]# █
```

ownership and permissions also changed

23) ls -ld /home/saara/.ssh

```
File Edit View Search Terminal Help
[root@server4 Desktop]# ls -ld /home/saara/.ssh
drwx----- 2 saara saara 28 Oct 31 20:02 /home/saara/.ssh
[root@server4 Desktop]#
```

24) ls -l /home/saara/.ssh

```
File Edit View Search Terminal Help
[root@server4 Desktop]# ls -l /home/saara/.ssh
total 0
-rw-----. 1 saara saara 0 Oct 31 20:02 authorized_keys
[root@server4 Desktop]#
```

25) cat /var/tmp/saara.pub >> /home/saara/.ssh/authorized_keys

```
File Edit View Search Terminal Help
[root@server4 Desktop]# cat /var/tmp/saara.pub >> /home/saara/.ssh/authorized_keys
[root@server4 Desktop]# █
```

26) cat /home/saara/.ssh/authorized_keys

```
File Edit View Search Terminal Help
[root@server4 Desktop]# cat /home/saara/.ssh/authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAQABAAQDFKvqYrU17eKHSm1mA$llvDj8pbMJUJrYMA6H5xNjxXZC1y7ajUBAvAttbwR/dd0WmlRj68k+u
ffmcJ3kvXXELe5NEiy+EeSwb+Rs7ovZoAp/h27ub905c4FqVwEq/eM9CTCX19RSfbP+5m9XKPFva/7CP4cR0zb3TMMC17z9oJaawUa2aNmmuy07G
WEZGPjkdzMzMu3wasPfSsv5LDkyuZ42MLFSr0vdM2eLWPShucaryBvfz0L1n01jPKWAqGZtyKNwYnfJ0nbdjwtI4eDhNnglPiFLalU1S4mmcK1ShKd
FfKezwJeDp5V4d546yejtcb3jTysD8bvNTyQ3VcWN3H root@desktop4.example.com
[root@server4 Desktop]# █
```

27) rm -rf /var/tmp/saara.pub

In View Desktop

28) ssh -i saara saara@serverX

```
File Edit View Search Terminal Help
[root@desktop4 Desktop]# ssh -i saara saara@server4
[saara@server4 ~]$ 
[saara@server4 ~]$ pwd
/home/saara
[saara@server4 ~]$ █
```

Scheduling Jobs

One Time Job

P → at

S → atd

To Schedule a job

1) at now +5min

ex: at 10am Nov1

(first mention time)

at going to execute jobs in shell

a) mkdir data

b) cd data

c) tar czf file.tar.gz src(es)

d) ctrl + D

To check

2) atq

To delete

3) atrm <job no>

[It'll create at PWD]

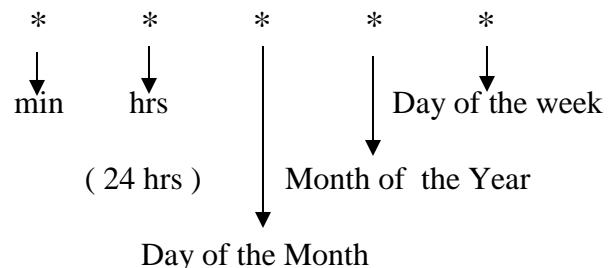
Recurring Job (Repeated Job)

Cron Job

P → cronie

S → crond

cat /etc/crontab



To Create

1) crontab -e

To see

2) crontab -l

To delete

3) crontab -e

[go to that line and delete]

[It'll Create at Home Directory]

In these two prefer Cron Job

at

steps :

1) at now +5min (first mension time ex: at 10am Nov1)

Now entered into at

.) mkdir data

.) cd data

.) tar czf file.tar.gz /usr/share/doc

.) ctrl + D

```
File Edit View Search Terminal Help
[student@server4 jobs]$ at now +5min
at> mkdir data
at> cd data
at> tar czf file.target.gz /usr/share/doc
at> <EOT>
job 3 at Wed Oct 30 19:18:00 2019
[student@server4 jobs]$ █
```

.) ll { to check given work done or not }

```
File Edit View Search Terminal Help
[student@server4 jobs]$ ll
total 0
[student@server4 jobs]$ ll
total 0
[student@server4 jobs]$ ll
total 8128
-rw-rw-r--. 3 student student 5718016 Oct 30 19:23 output.gz
[student@server4 jobs]$ █
```

at 19:18 I given work and at 19:23 work was done

2) atq { To check the jobs }

```
File Edit View Search Terminal Help
[student@server4 ~]$ at now +5min
at> mkdir data
at> cd data
at> tar czf file.target.gz /usr/share/doc
at> <EOT>
job 3 at Wed Oct 30 19:18:00 2019
[student@server4 ~]$
[student@server4 ~]$
[student@server4 ~]$ at 7pm tomorrow
at> rm -rf data
at> <EOT>
job 4 at Thu Oct 31 19:00:00 2019
[student@server4 ~]$
[student@server4 ~]$ atq
3      Wed Oct 30 19:18:00 2019 a student
4      Thu Oct 31 19:00:00 2019 a student
[student@server4 ~]$\square
```

here I given 2 jobs 1st is now and 2nd one is tomorrow at 7pm

3) atrm <job no> { To delete }

```
[student@server4 ~]$ atq
3      Wed Oct 30 19:18:00 2019 a student
4      Thu Oct 31 19:00:00 2019 a student
[student@server4 ~]$
[student@server4 ~]$
[student@server4 ~]$ atrm 4
[student@server4 ~]$
[student@server4 ~]$ atq
3      Wed Oct 30 19:18:00 2019 a student
[student@server4 ~]$\square
```

Here we have 2 jobs and deleted job no 4

NTP Network Time Protocol

- .) to Scheduling before we have to synchronize NTP
- .) The time stamp is different for our time and server time so schedule the time at correct time we need synchronize both.

RHEL 6 → NTPD

P → ntp

S → ntpd

RHEL 7 → NTP

P → chrony

S → chronyd

steps :

1) tail /var/log/messages



The screenshot shows a terminal window titled 'Terminal' with the command 'root@server4:~\$' in the title bar. The window displays the following text:

```
File Edit View Search Terminal Help
[root@server4 ~]# vim /etc/chrony.conf
[root@server4 ~]#
[root@server4 ~]# tail /var/log/messages
Oct 31 08:14:57 localhost systemd-logind: Removed session 3.
Oct 31 08:19:27 localhost systemd: Starting Cleanup of Temporary Directories...
Oct 31 08:19:27 localhost systemd: Started Cleanup of Temporary Directories.
Oct 31 08:20:01 localhost systemd: Created slice user-0.slice.
Oct 31 08:20:01 localhost systemd: Starting Session 4 of user root.
Oct 31 08:20:01 localhost systemd: Started Session 4 of user root.
Oct 31 08:24:20 localhost systemd: Created slice user-0.slice.
Oct 31 08:24:20 localhost systemd: Starting Session 5 of user root.
Oct 31 08:24:20 localhost systemd: Started Session 5 of user root.
Oct 31 08:24:20 localhost systemd-logind: New session 5 of user root.
[root@server4 ~]#
```

Here we can see the time difference between local time and server time

To synchronize time with NTP Server

2) vim /etc/chrony.conf

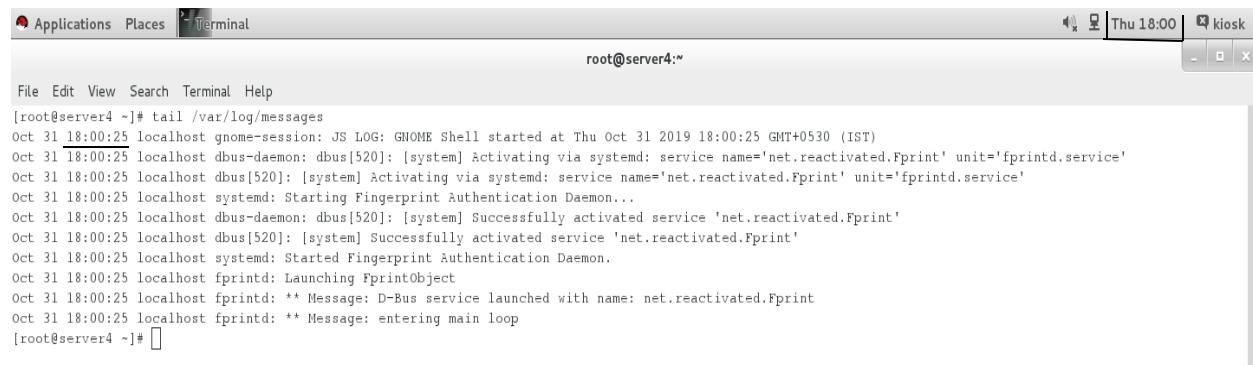
```
File Edit View Search Terminal Help
# Use public servers from the pool.ntp.org project.
# Please consider joining the pool (http://www.pool.ntp.org/join.html).
server 0.rhel.pool.ntp.org iburst
server 1.rhel.pool.ntp.org iburst
server 2.rhel.pool.ntp.org iburst
server 3.rhel.pool.ntp.org iburst
```

insert and add server classroom.example.com iburst

```
File Edit View Search Terminal Help
# Use public servers from the pool.ntp.org project.
# Please consider joining the pool (http://www.pool.ntp.org/join.html).
server 0.rhel.pool.ntp.org iburst
server 1.rhel.pool.ntp.org iburst
server 2.rhel.pool.ntp.org iburst
server 3.rhel.pool.ntp.org iburst
server classroom.example.com iburst
```

save and exit

3) tail /var/log/messages

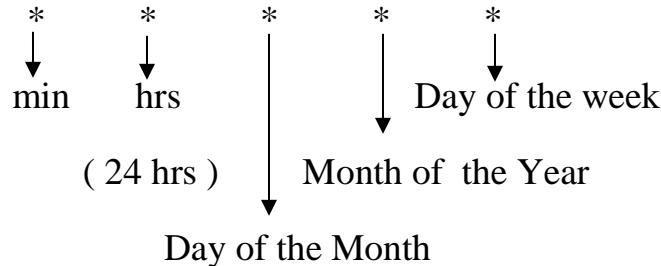


```
File Edit View Terminal Help
root@server4 ~]# tail /var/log/messages
root 31 18:00:25 localhost gnome-session: JS LOG: GNOME Shell started at Thu Oct 31 2019 18:00:25 GMT+0530 (IST)
Oct 31 18:00:25 localhost dbus-daemon: dbus[520]: [system] Activating via systemd: service name='net.reactivated.Fprint' unit='fprintd.service'
Oct 31 18:00:25 localhost dbus[520]: [system] Activating via systemd: service name='net.reactivated.Fprint' unit='fprintd.service'
Oct 31 18:00:25 localhost systemd: Starting Fingerprint Authentication Daemon...
Oct 31 18:00:25 localhost dbus-daemon: dbus[520]: [system] Successfully activated service 'net.reactivated.Fprint'
Oct 31 18:00:25 localhost dbus[520]: [system] Successfully activated service 'net.reactivated.Fprint'
Oct 31 18:00:25 localhost systemd: Started Fingerprint Authentication Daemon.
Oct 31 18:00:25 localhost fprintd: Launching FprintObject
Oct 31 18:00:25 localhost fprintd: ** Message: D-Bus service launched with name: net.reactivated.Fprint
Oct 31 18:00:25 localhost fprintd: ** Message: entering main loop
[root@server4 ~]#
```

we can see the local time and server time is same

Cronjob

.) cat /etc/crontab



```
File Edit View Search Terminal Help
[student@server4 jobs]$ cat /etc/crontab
SHELL=/bin/bash
PATH=/sbin:/bin:/usr/sbin:/usr/bin
MAILTO=root

# For details see man 4 crontabs

# Example of job definition:
# .----- minute (0 - 59)
# | .----- hour (0 - 23)
# | | .----- day of month (1 - 31)
# | | | .---- month (1 - 12) OR jan,feb,mar,apr ...
# | | | | .--- day of week (0 - 6) (Sunday=0 or 7) OR sun,mon,tue,wed,thu,fri,sat
# | | | | |
# * * * * * user-name command to be executed

[student@server4 jobs]$ █
```

we have to give jobs related to this

1) crontab -e { to give jobs }

```
File Edit View Search Terminal Help
[student@server4 jobs]$ crontab -e
crontab: installing new crontab
```

it'll go to vim mode

```
File Edit View Search Terminal Help
51 18 * * * /bin/echo "Hello World"
51 18 * * * /bin/mkdir test
51 18 * * * /bin/cd test
51 18 * * * /bin/tar czf file.tar.gz /usr/share/doc
~
```

give jobs then save and exit

2) crontab -l { to see jobs }

```
File Edit View Search Terminal Help
[student@server4 jobs]$ crontab -e
crontab: installing new crontab
[student@server4 jobs]$
[student@server4 jobs]$
[student@server4 jobs]$ crontab -l
51 18 * * * /bin/echo "Hello World"
51 18 * * * /bin/mkdir test
51 18 * * * /bin/cd test
51 18 * * * /bin/tar czf file.tar.gz /usr/share/doc
[student@server4 jobs]$ 
```

3) ll { to check given jobs done or not }

```
[student@server4 jobs]$ crontab -l
51 18 * * * /bin/echo "Hello World"
51 18 * * * /bin/mkdir test
51 18 * * * /bin/cd test
51 18 * * * /bin/tar czf file.tar.gz /usr/share/doc
[student@server4 jobs]$ ll
total 0
[student@server4 jobs]$ ll
total 0
[student@server4 jobs]$ cd
You have new mail in /var/spool/mail/student
[student@server4 ~]$ ll
total 24580
-rw-r--r--. 1 student student 25169634 Oct 31 18:51 file.tar.gz
drwxrwxr-x. 2 student student 6 Oct 31 18:33 jobs
drwxr-xr-x. 2 student student 6 Oct 31 18:51 test
[student@server4 ~]$ 
```

we can see clearly job will done at home directory only

4) crontab -e { to create and delete we use same command }

```
File Edit View Search Terminal Help  
[student@server4 jobs]$ crontab -e  
crontab: installing new crontab
```

it'll go to vim mode

```
File Edit View Search Terminal Help  
51 18 * * * /bin/mkdir test  
51 18 * * * /bin/cd test  
51 18 * * * /bin/tar czf file.tar.gz /usr/share/doc  
~
```

I deleted first job

5) crontab -l

```
File Edit View Search Terminal Help  
[student@server4 ~]$ crontab -l  
51 18 * * * /bin/echo "Hello World"  
51 18 * * * /bin/mkdir test  
51 18 * * * /bin/cd test  
51 18 * * * /bin/tar czf file.tar.gz /usr/share/doc  
[student@server4 ~]$  
[student@server4 ~]$  
[student@server4 ~]$ crontab -e  
crontab: installing new crontab  
[student@server4 ~]$  
[student@server4 ~]$ crontab -l  
51 18 * * * /bin/mkdir test  
51 18 * * * /bin/cd test  
51 18 * * * /bin/tar czf file.tar.gz /usr/share/doc  
[student@server4 ~]$ □
```

Here we can see jobs before deleting job and after deleting job

DAY 28

SE Linux - Secured Enhanced Linux

Default Security :

Permissions

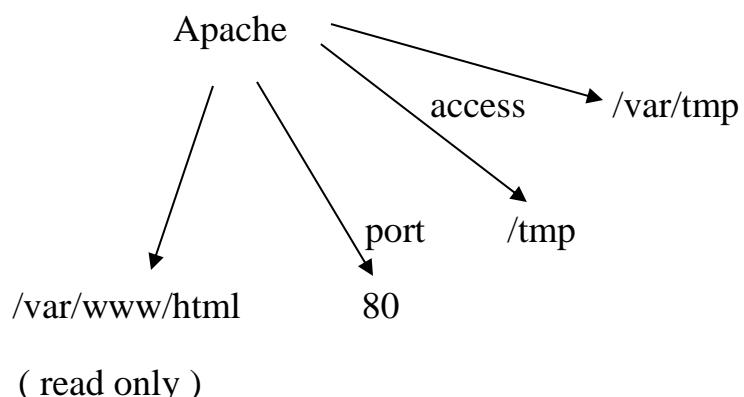
Special Permissions

ACL

These all are called DAC model security

DAC - Discretionary Access Control

Web Server running with Apache



If the Hackers try to compromise Apache , Because of Default Security they can't access Apache. They can read (it is having read only permission) ;

Default Security will secure the Apache

SE Linux will implement :

- .) MAC Model Security
- .) Mandatory Access Control

Modes :

Meaning

- enforcing → strict
- permissive → warning
- disabled → no SE Linux

steps :

- .) ssh root@serverX
- .) sestatus { to get info }

```
File Edit View Search Terminal Help
[root@server4 ~]# sestatus
SELinux status:                 enabled
SELinuxfs mount:                /sys/fs/selinux
SELinux root directory:         /etc/selinux
Loaded policy name:              targeted
Current mode:                   enforcing
Mode from config file:          enforcing
Policy MLS status:              enabled
Policy deny_unknown status:      allowed
Max kernel policy version:       28
[root@server4 ~]# 
```

.) getenforce { to get info in short form }

```
File Edit View Search Terminal Help
[root@server4 ~]# getenforce
Enforcing
[root@server4 ~]# 
```

.) setenforce

```
File Edit View Search Terminal Help
[root@server4 ~]# setenforce
usage: setenforce [ Enforcing | Permissive | 1 | 0 ]
[root@server4 ~]# 
```

.) setenforce 1 { 1 means enforce }

.) getenforce

```
File Edit View Search Terminal Help
[root@server4 ~]# setenforce 1
[root@server4 ~]#
[root@server4 ~]# getenforce
Enforcing
[root@server4 ~]# 
```

.) setenforce 0 {0 means permissive }

.) getenforce

```
File Edit View Search Terminal Help
[root@server4 ~]# setenforce 1
[root@server4 ~]#
[root@server4 ~]# getenforce
Enforcing
[root@server4 ~]#
[root@server4 ~]# setenforce 0
[root@server4 ~]#
[root@server4 ~]# getenforce
Permissive
[root@server4 ~]# 
```

.) reboot

after reboot it'll change to default

.) ssh root

.) getenforce

```
File Edit View Search Terminal Help
[root@server4 ~]# getenforce
Enforcing
[root@server4 ~]# 
```

To change Permanently :

.) vim /etc/selinux/config

```
File Edit View Search Terminal Help
[ ]# This file controls the state of SELinux on the system.
[ ]# SELINUX= can take one of these three values:
[ ]#       enforcing - SELinux security policy is enforced.
[ ]#       permissive - SELinux prints warnings instead of enforcing.
[ ]#       disabled - No SELinux policy is loaded.
SELINUX=enforcing
[ ]# SELINUXTYPE= can take one of these two values:
[ ]#       targeted - Targeted processes are protected,
[ ]#       minimum - Modification of targeted policy. Only selected processes are protected.
[ ]#       mls - Multi Level Security protection.
SELINUXTYPE=targeted
```

```
File Edit View Search Terminal Help
[ ]# This file controls the state of SELinux on the system.
[ ]# SELINUX= can take one of these three values:
[ ]#       enforcing - SELinux security policy is enforced.
[ ]#       permissive - SELinux prints warnings instead of enforcing.
[ ]#       disabled - No SELinux policy is loaded.
SELINUX=permissive[ ]
[ ]# SELINUXTYPE= can take one of these two values:
[ ]#       targeted - Targeted processes are protected,
[ ]#       minimum - Modification of targeted policy. Only selected processes are protected.
[ ]#       mls - Multi Level Security protection.
SELINUXTYPE=targeted
```

changed to enforcing to permissive

.) getenforce

```
File Edit View Search Terminal Help
[root@server4 ~]# getenforce
Enforcing
[root@server4 ~]# [ ]
```

.) reboot [to change permanently]

.) getenforce

```
File Edit View Search Terminal Help
[root@server4 ~]# getenforce
Permissive
[root@server4 ~]# █
```

In Exam we have to change to enforce

Kernel

.) Kernel is a computer program that is the core of an operating system

steps :

.) uname

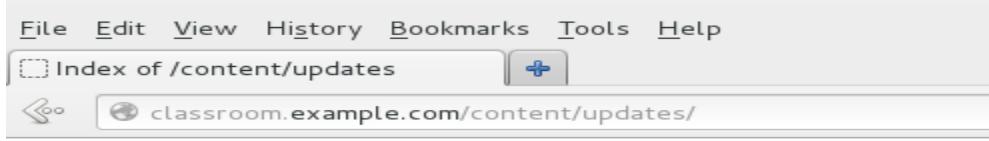
```
File Edit View Search Terminal Help
[root@server4 ~]# uname
Linux
[root@server4 ~]#
[root@server4 ~]# 
```

.) unmae -rms { to see kernel version }

```
File Edit View Search Terminal Help
[root@server4 ~]# uname -rms
Linux 3.10.0-123.el7.x86_64 x86_64
[root@server4 ~]# 
```

.) wget [download in kiosk]

[download from classroom.example.com/content/updates]



Index of /content/updates

Name Last modified Size Description

Parent Directory	-	-	
kernel-3.10.0-123.6...>	2014-12-01 15:16 29M		Open Link in New Tab Open Link in New Window Open Link in New Private Window Bookmark This Link Save Link As... Copy Link Location Inspect Element (Q)
repodata/			

A screenshot of a terminal window titled 'kiosk@foundation4:~/Desktop'. The window has tabs labeled 'root@server4:' and 'kiosk@foundation4:~/Desktop'. The terminal output shows the execution of the 'wget' command to download a kernel rpm file:

```
[kiosk@foundation4 Desktop]$ wget http://classroom.example.com/content/updates/kernel-3.10.0-123.6.3.el7.x86_64.rpm
--2019-10-31 19:19:00--  http://classroom.example.com/content/updates/kernel-3.10.0-123.6.3.el7.x86_64.rpm
Resolving classroom.example.com (classroom.example.com)... 172.25.254.254
Connecting to classroom.example.com (classroom.example.com)|172.25.254.254|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 30277448 (29M) [application/x-rpm]
Saving to: 'kernel-3.10.0-123.6.3.el7.x86_64.rpm'

100%[=====] 30,277,448 107MB/s in 0.3s

2019-10-31 19:19:00 (107 MB/s) - 'kernel-3.10.0-123.6.3.el7.x86_64.rpm' saved [30277448/30277448]

[kiosk@foundation4 Desktop]$
```

.) scp kernel.rpm root@serverX: [to root from kiosk]

[If wget in server then no need scp]

```
kiosk@foundation4:~/Desktop
File Edit View Search Terminal Tabs Help
root@server4:~ kiosk@foundation4:~/Desktop
[kiosk@foundation4 Desktop]$ wget http://classroom.example.com/content/updates/kernel-3.10.0-123.6.3.el7.x86_64.rpm
--2019-10-31 19:19:00-- http://classroom.example.com/content/updates/kernel-3.10.0-123.6.3.el7.x86_64.rpm
Resolving classroom.example.com (classroom.example.com)... 172.25.254.254
Connecting to classroom.example.com (classroom.example.com)|172.25.254.254|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 30277448 (29M) [application/x-rpm]
Saving to: 'kernel-3.10.0-123.6.3.el7.x86_64.rpm'

100%[=====] 30,277,448 107MB/s in 0.3s

2019-10-31 19:19:00 (107 MB/s) - `kernel-3.10.0-123.6.3.el7.x86_64.rpm' saved [30277448/30277448]

[kiosk@foundation4 Desktop]$ scp kernel-3.10.0-123.6.3.el7.x86_64.rpm root@server4:
root@server4's password:
kernel-3.10.0-123.6.3.el7.x86_64.rpm
[kiosk@foundation4 Desktop]$
```

Now check in root with ll

```
root@server4:~
File Edit View Search Terminal Tabs Help
root@server4:~ kiosk@foundation4:~/Desktop
[root@server4 ~]# ll
total 2950
-rw-r--r--. 1 root root 8619 May 7 2014 anaconda-ks.cfg
-rw-r--r--. 1 root root 30277448 Oct 31 19:20 kernel-3.10.0-123.6.3.el7.x86_64.rpm
[root@server4 ~]#
```

.) rpm -ivh kernel [installing root]

```
root@server4:~
File Edit View Search Terminal Tabs Help
root@server4:~ kiosk@foundation4:~/Desktop
[root@server4 ~]# rpm -ivh kernel-3.10.0-123.6.3.el7.x86_64.rpm
warning: kernel-3.10.0-123.6.3.el7.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID fd431d51: NOKEY
Preparing.. #####
Updating / installing...
 1:kernel-3.10.0-123.6.3.el7 #####
[root@server4 ~]#
```

.) uname -rms { to see kernel version }

It'll show old one only ; not updated

```
root@server4:~
File Edit View Search Terminal Tabs Help
root@server4:~ kiosk@foundation4:~/Desktop
[root@server4 ~]# uname -rms
Linux 3.10.0-123.6.3.el7.x86_64 x86_64
[root@server4 ~]#
```

.) yum list installed kernel

```
root@server4:~# yum list installed kernel
Loaded plugins: langpacks
rhel_dvd
(1/2): rhel_dvd/group_gz
(2/2): rhel_dvd/primary_db
Installed Packages
kernel.x86_64          3.10.0-123.el7                    installed
kernel.x86_64          3.10.0-123.6.3.el7                installed
[root@server4 ~]#
```

Highlighted one is present using version

Here another version is showing in yellow color , new version not installed

.) reboot [to update kernel]



[new kernel version will appear in the top]

.) yum list installed kernel

```
root@server4:~# yum list installed kernel
Loaded plugins: langpacks
Installed Packages
kernel.x86_64          3.10.0-123.el7                    installed
kernel.x86_64          3.10.0-123.6.3.el7                installed
[root@server4 ~]#
```

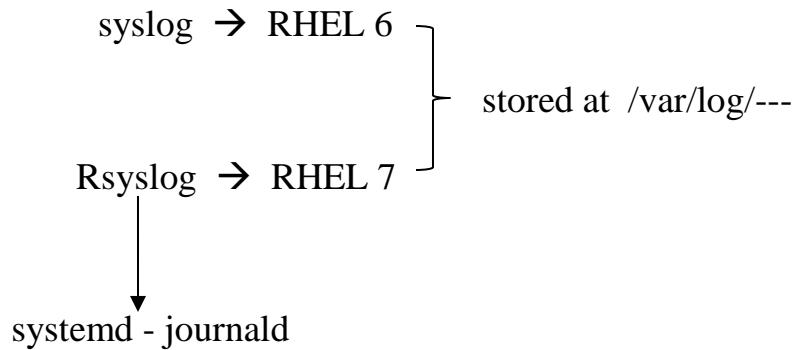
After reboot it'll updated

.) rpm -e package { to uninstall }

Logging

.) Information about System , Service & User activities

.) we can call it as



systemd-journald will collect all information from boot time and then send to rsyslog service

P → rsyslog

S → rsyslog

Config file → /etc/rsyslog.conf

.) systemctl status systemd-journald.service

```
File Edit View Search Terminal Help
[root@server4 ~]# systemctl status systemd-journald.service
systemd-journald.service - Journal Service
   Loaded: loaded (/usr/lib/systemd/system/systemd-journald.service; static)
   Active: active (running) since Thu 2019-10-31 19:02:07 IST; 9min ago
     Docs: man:systemd-journald.service(8)
           man:journald.conf(5)
 Main PID: 363 (systemd-journal)
    Status: "Processing requests..."
      CGroup: /system.slice/systemd-journald.service
              └─363 /usr/lib/systemd/systemd-journald

Oct 31 19:02:07 localhost systemd-journal[363]: Runtime journal is using 6.2M (max 49.7M, leaving 74.5M of free 484.6M, current limit 49.7M).
Oct 31 19:02:07 localhost systemd-journal[363]: Runtime journal is using 6.2M (max 49.7M, leaving 74.5M of free 484.6M, current limit 49.7M).
Oct 31 19:02:07 localhost systemd-journal[363]: Journal started
Oct 31 19:02:09 localhost systemd-journal[363]: Runtime journal is using 6.2M (max 49.7M, leaving 74.5M of free 484.2M, current limit 49.7M).
[root@server4 ~]# 
```

.) journalctl

```
File Edit View Search Terminal Help
[root@server4 ~]# journalctl
-- Logs begin at Thu 2019-10-31 19:02:03 IST, end at Thu 2019-10-31 19:10:01 IST. --
Oct 31 19:02:03 localhost systemd-journal[84]: Runtime journal is using 6.2M (max 49.7M, leaving 74.5M of free 490.8M, current limit 49.7M).
Oct 31 19:02:03 localhost systemd-journal[84]: Runtime journal is using 6.2M (max 49.7M, leaving 74.5M of free 490.8M, current limit 49.7M).
Oct 31 19:02:03 localhost kernel: Initializing cgroup subsys cpuset
Oct 31 19:02:03 localhost kernel: Initializing cgroup subsys cpu
Oct 31 19:02:03 localhost kernel: Initializing cgroup subsys cpusett
Oct 31 19:02:03 localhost kernel: Linux version 3.10.0-123.e17.x86_64 (mockbuild@x86-017.build.eng.bos.redhat.com) (gcc version 4.8.2 20140120 (Red Hat 4.8.2-0.18))
Oct 31 19:02:03 localhost kernel: Command line: BOOT_IMAGE=/boot/vmlinuz-3.10.0-123.e17.x86_64 root=UUID=9bf6b9f7-92ad-441b-b848-e0257ccb883d1 ro vconsole.keymap
Oct 31 19:02:03 localhost kernel: e820: BIOS-provided physical RAM map:
Oct 31 19:02:03 localhost kernel: BIOS-e820: [mem 0x0000000000000000-0x00000000009fbfff] usable
Oct 31 19:02:03 localhost kernel: BIOS-e820: [mem 0x00000000009fc00-0x00000000009ffff] reserved
Oct 31 19:02:03 localhost kernel: BIOS-e820: [mem 0x0000000000f000-0x0000000000ffff] reserved
Oct 31 19:02:03 localhost kernel: BIOS-e820: [mem 0x00000000100000-0x000000003ffffdff] usable
Oct 31 19:02:03 localhost kernel: BIOS-e820: [mem 0x000000003ffffe00-0x000000003fffffff] reserved
Oct 31 19:02:03 localhost kernel: BIOS-e820: [mem 0x00000000fffc000-0x00000000feffff] reserved
Oct 31 19:02:03 localhost kernel: BIOS-e820: [mem 0x00000000fffc0000-0x00000000fffffff] reserved
Oct 31 19:02:03 localhost kernel: NX (Execute Disable) protection: active
Oct 31 19:02:03 localhost kernel: SMBIOS 2.4 present.
Oct 31 19:02:03 localhost kernel: DMI: Red Hat KVM, BIOS Bochs 01/01/2011
Oct 31 19:02:03 localhost kernel: Hypervisor detected: KVM
Oct 31 19:02:03 localhost kernel: e820: update [mem 0x00000000-0x00000fff] usable ==> reserved
Oct 31 19:02:03 localhost kernel: e820: remove [mem 0x000a0000-0x000fffff] usable
Oct 31 19:02:03 localhost kernel: No AGP bridge found
Oct 31 19:02:03 localhost kernel: e820: last_pfn = 0x3fff max_arch_pfn = 0x40000000
Oct 31 19:02:03 localhost kernel: MTRR default type: write-back
Oct 31 19:02:03 localhost kernel: MTRR fixed ranges enabled:
Oct 31 19:02:03 localhost kernel: 00000-9FFFF write-back
Oct 31 19:02:03 localhost kernel: A0000-BFFFF uncachable
Oct 31 19:02:03 localhost kernel: C0000-FFFFF write-protect
Oct 31 19:02:03 localhost kernel: MTRR variable ranges enabled:
Oct 31 19:02:03 localhost kernel: 0 base 000080000000 mask FFFF80000000 uncachable
Oct 31 19:02:03 localhost kernel: 1 disabled
Oct 31 19:02:03 localhost kernel: 2 disabled
Oct 31 19:02:03 localhost kernel: 3 disabled
Oct 31 19:02:03 localhost kernel: 4 disabled
Oct 31 19:02:03 localhost kernel: 5 disabled
Oct 31 19:02:03 localhost kernel: 6 disabled
Oct 31 19:02:03 localhost kernel: 7 disabled
Oct 31 19:02:03 localhost kernel: x86 PAT enabled: cpu 0, old 0x70406, new 0x7010600070106
Oct 31 19:02:03 localhost kernel: found SMP MP-table at [mem 0x000fd40-0x000fdf4f] mapped at [fffff8800000fdf40]
Oct 31 19:02:03 localhost kernel: Base memory trampoline at [fffff880000099000] 99000 size 24576
Oct 31 19:02:03 localhost kernel: init_memory_mapping: [mem 0x00000000-0x000fffff]
```

journalctl controls system-journald

.) vim /etc/rsyslog.conf

[In this all rules are defined]

```
File Edit View Search Terminal Help
#### RULES ####

# Log all kernel messages to the console.
# Logging much else clutters up the screen.
#kern.*                                     /dev/console

# Log anything (except mail) of level info or higher.
# Don't log private authentication messages!
*.info;mail.none;authpriv.none;cron.none      /var/log/messages

# The authpriv file has restricted access.
authpriv.*                                    /var/log/secure

# Log all the mail messages in one place.
mail.*                                         -/var/log/maillog

# Log cron stuff
cron.*                                         /var/log/cron

# Everybody gets emergency messages
*.emerg                                         :omusrmsg:*

# Save news errors of level crit and higher in a special file.
uucp,news.crit                                  /var/log/spooler

# Save boot messages also to boot.log
local7.*                                        /var/log/boot.log

# ### begin forwarding rule ###
# The statement between the begin ... end define a SINGLE forwarding
# rule. They belong together, do NOT split them. If you create multiple
# forwarding rules, duplicate the whole block!
```

.) tail /var/log/messages

```
File Edit View Search Terminal Help
[root@server4 ~]# tail /var/log/messages
Oct 31 19:08:07 localhost dbus[524]: avc: received setenforce notice (enforcing=0)
Oct 31 19:08:07 localhost dbus-daemon: dbus[524]: avc: received setenforce notice (enforcing=0)
Oct 31 19:08:19 localhost dbus[1459]: avc: received setenforce notice (enforcing=1)
Oct 31 19:08:19 localhost dbus[1449]: avc: received setenforce notice (enforcing=1)
Oct 31 19:08:19 localhost dbus[524]: avc: received setenforce notice (enforcing=1)
Oct 31 19:08:19 localhost dbus-daemon: dbus[524]: avc: received setenforce notice (enforcing=1)
Oct 31 19:08:19 localhost dbus[524]: [system] Reloaded configuration
Oct 31 19:08:19 localhost dbus-daemon: dbus[524]: [system] Reloaded configuration
Oct 31 19:10:01 localhost systemd: Starting Session 2 of user root.
Oct 31 19:10:01 localhost systemd: Started Session 2 of user root.
[root@server4 ~]# 
```

.) tail /var/log/secure

```
File Edit View Search Terminal Help
[root@server4 ~]# tail /var/log/secure
Oct 31 19:02:11 localhost polkitd[572]: Loading rules from directory /etc/polkit-1/rules.d
Oct 31 19:02:11 localhost polkitd[572]: Loading rules from directory /usr/share/polkit-1/rules.d
Oct 31 19:02:11 localhost polkitd[572]: Finished loading, compiling and executing 5 rules
Oct 31 19:02:11 localhost polkitd[572]: Acquired the name org.freedesktop.PolicyKit1 on the system bus
Oct 31 19:02:17 localhost sshd[1208]: Server listening on 0.0.0.0 port 22.
Oct 31 19:02:17 localhost sshd[1208]: Server listening on :: port 22.
Oct 31 19:02:19 localhost gdm[launch-environment]: pam_unix(gdm-launch-environment:session): session opened for user gdm by (uid=0)
Oct 31 19:02:24 localhost polkitd[572]: Registered Authentication Agent for unix-session:cl (system bus name :1.35 [gnome-shell --mode=gdm], object path /org/freedesktop/PolicyKit1/AuthenticateAgent, locale en_US.UTF-8)
Oct 31 19:02:29 localhost sshd[1589]: Accepted password for root from 172.25.4.250 port 60766 ssh2
Oct 31 19:02:29 localhost sshd[1589]: pam_unix(sshd:session): session opened for user root by (uid=0)
[root@server4 ~]# 
```

.) tail /var/log/ audit/audit.log

```
File Edit View Search Terminal Help
[root@server4 ~]# tail /var/log/audit/audit.log
type=USER_AVC msg=audit(1572529201.751:495): pid=1 uid=0 auid=4294967295 subj=system_u:system_r:init_t:s0 msg='avc: received setenforce notice (enforcing=0) exe="/usr/lib/systemd/systemd" sauid=0 hostname=? addr=? terminal=?'
type=USER_AVC msg=audit(1572529201.751:496): pid=1 uid=0 auid=4294967295 subj=system_u:system_r:init_t:s0 msg='avc: received setenforce notice (enforcing=1) exe="/usr/lib/systemd/systemd" sauid=0 hostname=? addr=? terminal=?'
type=USER_AVC msg=audit(1572529201.751:497): pid=1 uid=0 auid=4294967295 subj=system_u:system_r:init_t:s0 msg='avc: received setenforce notice (enforcing=0) exe="/usr/lib/systemd/systemd" sauid=0 hostname=? addr=? terminal=?'
type=USER_AVC msg=audit(1572529201.751:498): pid=1 uid=0 auid=4294967295 subj=system_u:system_r:init_t:s0 msg='avc: received setenforce notice (enforcing=1) exe="/usr/lib/systemd/systemd" sauid=0 hostname=? addr=? terminal=?'
type=USER_AVC msg=audit(1572529201.751:499): pid=1 uid=0 auid=4294967295 subj=system_u:system_r:init_t:s0 msg='avc: received setenforce notice (enforcing=0) exe="/usr/lib/systemd/systemd" sauid=0 hostname=? addr=? terminal=?'
type=USER_AVC msg=audit(1572529201.751:500): pid=1 uid=0 auid=4294967295 subj=system_u:system_r:init_t:s0 msg='avc: received setenforce notice (enforcing=1) exe="/usr/lib/systemd/systemd" sauid=0 hostname=? addr=? terminal=?'
type=USER_START msg=audit(1572529201.766:501): pid=1726 uid=0 auid=0 ses=2 subj=system_u:system_r:crond_t:s0-s0:c0.c1023 msg='op=PAM:session_open acct="root" exe="/usr/sbin/cron" hostname=? addr=? terminal=cron res=success'
type=CRED_REFI msg=audit(1572529201.767:502): pid=1726 uid=0 auid=0 ses=2 subj=system_u:system_r:crond_t:s0-s0:c0.c1023 msg='op=PAM:setcred acct="root" exe="/usr/sbin/cron" hostname=? addr=? terminal=cron res=success'
type=CRED_DISP msg=audit(1572529201.791:503): pid=1726 uid=0 auid=0 ses=2 subj=system_u:system_r:crond_t:s0-s0:c0.c1023 msg='op=PAM:setcred acct="root" exe="/usr/sbin/cron" hostname=? addr=? terminal=cron res=success'
type=USER_END msg=audit(1572529201.794:504): pid=1726 uid=0 auid=0 ses=2 subj=system_u:system_r:crond_t:s0-s0:c0.c1023 msg='op=PAM:session_close acct="root" exe="/usr/sbin/cron" hostname=? addr=? terminal=cron res=success'
[root@server4 ~]# 
```

.) tail /var/log/cron

```
File Edit View Search Terminal Help
[root@server4 ~]# tail /var/log/cron
Oct 31 18:52:35 localhost crontab[1866]: (student) END EDIT (student)
Oct 31 18:52:41 localhost crontab[1877]: (student) LIST (student)
Oct 31 18:52:48 localhost crontab[1879]: (student) BEGIN EDIT (student)
Oct 31 18:53:08 localhost crontab[1879]: (student) REPLACE (student)
Oct 31 18:53:08 localhost crontab[1879]: (student) END EDIT (student)
Oct 31 18:53:12 localhost crontab[1882]: (student) LIST (student)
Oct 31 18:54:01 localhost crond[534]: (student) RELOAD (/var/spool/cron/student)
Oct 31 19:02:10 localhost crond[536]: (CRON) INFO (RANDOM_DELAY will be scaled with factor 44% if used.)
Oct 31 19:02:12 localhost crond[536]: (CRON) INFO (running with inotify support)
Oct 31 19:10:01 localhost CROND[1728]: (root) CMD (/usr/lib64/sa/sal 1 1)
[root@server4 ~]# 
```

.) tail /var/log/maillog

```
File Edit View Search Terminal Help
[root@server4 ~]# tail /var/log/maillog
Oct 31 18:51:02 localhost postfix/qmgr[1356]: OFFD8245C8C: from=<student@server4.example.com>, size=742, nrcpt=1 (queue active)
Oct 31 18:51:02 localhost postfix/local[1843]: OFFD8245C8C: to=<student@server4.example.com>, orig_to=<student>, relay=local, delay=0.2, delays=0.15/0.03/0/0,
02, dsn=2.0.0, status=sent (delivered to mailbox)
Oct 31 18:51:02 localhost postfix/qmgr[1356]: OFFD8245C8C: removed
Oct 31 18:51:09 localhost postfix/pickup[1355]: 41FFB245C8C: uid=1000 from=<student>
Oct 31 18:51:09 localhost postfix/cleanup[1838]: 41FFB245C8C: message-id=<20191031132109.41FFB245C8C@server4.example.com>
Oct 31 18:51:09 localhost postfix/qmgr[1356]: 41FFB245C8C: from=<student@server4.example.com>, size=795, nrcpt=1 (queue active)
Oct 31 18:51:09 localhost postfix/local[1843]: 41FFB245C8C: to=<student@server4.example.com>, orig_to=<student>, relay=local, delay=7.5, delays=7.4/0/0/0.09,
dsn=2.0.0, status=sent (delivered to mailbox)
Oct 31 18:51:09 localhost postfix/qmgr[1356]: 41FFB245C8C: removed
Oct 31 19:02:19 localhost postfix/postfix-script[1384]: starting the Postfix mail system
Oct 31 19:02:19 localhost postfix/master[1390]: daemon started -- version 2.10.1, configuration /etc/postfix
[root@server4 ~]# 
```

.) tail /var/log/yum.log

```
File Edit View Search Terminal Help
[root@server4 ~]# tail /var/log/yum.log
Jul 10 18:59:07 Installed: ntsysv-1.3.61-4.el7.x86_64
Jul 10 18:59:10 Installed: wget-1.14-10.el7.x86_64
Jul 10 18:59:11 Installed: iwl2000-firmware-18.168.6.1-34.el7.noarch
Jul 10 18:59:13 Installed: iwl5150-firmware-8.24.2.2-34.el7.noarch
Jul 10 18:59:14 Installed: 2:mtr-0.85-7.el7.x86_64
Jul 10 18:59:16 Installed: rfkill-0.4-9.el7.x86_64
Jul 10 18:59:18 Installed: 1:bash-completion-2.1-6.el7.noarch
Jul 10 18:59:20 Installed: biosdevname-0.5.0-10.el7.x86_64
Jul 10 18:59:22 Installed: mlocate-0.26-5.el7.x86_64
Jul 10 18:59:24 Installed: words-3.0-22.el7.noarch
[root@server4 ~]# 
```

.) tail /var/log/boot.log

```
File Edit View Search Terminal Help
[root@server4 ~]# tail /var/log/boot.log
[ OK ] Started RealtimeKit Scheduling Policy Service.
[ OK ] Started Login Service.
    Starting Authorization Manager...
[ OK ] Started Modem Manager.
[ OK ] Started LSB: Start the ipr dump daemon.
[ OK ] Started Authorization Manager.
[ OK ] Started Accounts Service.
[ OK ] Started Dynamic System Tuning Daemon.
[ OK ] Started firewalld - dynamic firewall daemon.
    Starting Network Manager...
[root@server4 ~]# 
```

.) tail -f /var/log/secure

[f means fallow]

open another tab and try to login as student then type wrong password

the information we can see at tail -f /var/log/secure

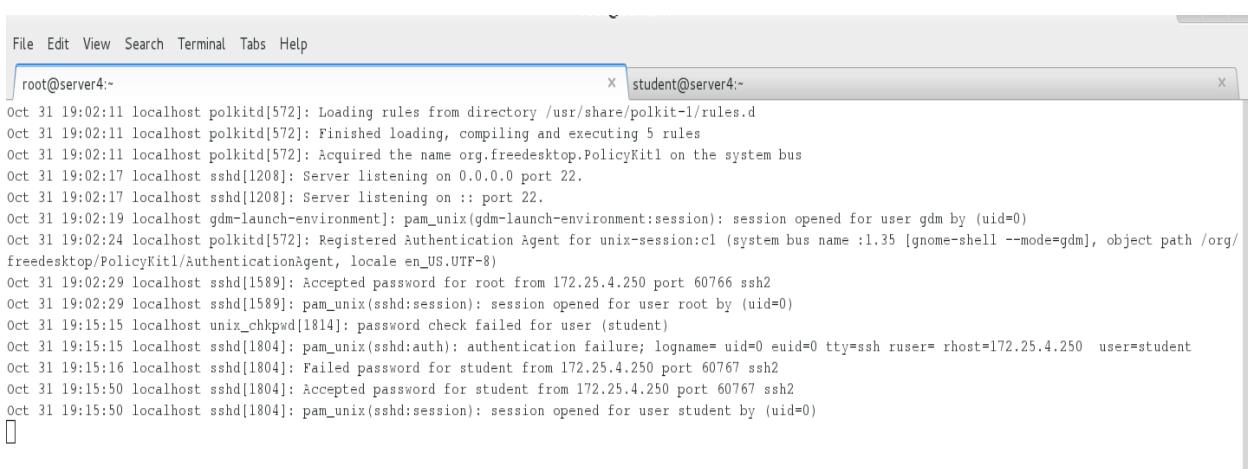
```
File Edit View Search Terminal Tabs Help
root@server4:~ kiosk@foundation4:~/Desktop
[kiosk@foundation4 Desktop]$ ssh student@server4
student@server4's password:
Permission denied, please try again.
student@server4's password: 
```

```
File Edit View Search Terminal Tabs Help
root@server4:~ kiosk@foundation4:~/Desktop
Oct 31 19:02:11 localhost polkitd[572]: Loading rules from directory /usr/share/polkit-1/rules.d
Oct 31 19:02:11 localhost polkitd[572]: Finished loading, compiling and executing 5 rules
Oct 31 19:02:11 localhost polkitd[572]: Acquired the name org.freedesktop.PolicyKit1 on the system bus
Oct 31 19:02:17 localhost sshd[1208]: Server listening on 0.0.0.0 port 22.
Oct 31 19:02:17 localhost sshd[1208]: Server listening on :: port 22.
Oct 31 19:02:19 localhost gdm-launch-environment]: pam_unix(gdm-launch-environment:session): session opened for user gdm by (uid=0)
Oct 31 19:02:24 localhost polkitd[572]: Registered Authentication Agent for unix-session:cl (system bus name :1.35 [gnome-shell --mode=gdm], object path /org/freedesktop/PolicyKit1/AuthenticationAgent, locale en_US.UTF-8)
Oct 31 19:02:19 localhost sshd[1589]: Accepted password for root from 172.25.4.250 port 60766 ssh2
Oct 31 19:02:29 localhost sshd[1589]: pam_unix(sshd:session): session opened for user root by (uid=0)
Oct 31 19:15:15 localhost unix_chkpwd[1814]: password check failed for user (student)
Oct 31 19:15:15 localhost sshd[1804]: pam_unix(sshd:auth): authentication failure; logname= uid=0 euid=0 tty=ssh ruser= rhost=172.25.4.250 user=student
Oct 31 19:15:16 localhost sshd[1804]: Failed password for student from 172.25.4.250 port 60767 ssh2
```

now give correct password ; now check in tail -f /var/log/secure



```
[root@server4:~] kiosk@foundation4 Desktop]$ ssh student@server4
student@server4's password:
Permission denied, please try again.
student@server4's password:
Last failed login: Thu Oct 31 19:15:16 IST 2019 from 172.25.4.250 on ssh:notty
There was 1 failed login attempt since the last successful login.
Last login: Thu Oct 31 18:42:49 2019 from 172.25.4.250
[student@server4 ~]$ 
```

```
[root@server4:~] Oct 31 19:02:11 localhost polkitd[572]: Loading rules from directory /usr/share/polkit-1/rules.d
Oct 31 19:02:11 localhost polkitd[572]: Finished loading, compiling and executing 5 rules
Oct 31 19:02:11 localhost polkitd[572]: Acquired the name org.freedesktop.PolicyKit1 on the system bus
Oct 31 19:02:17 localhost sshd[1208]: Server listening on 0.0.0.0 port 22.
Oct 31 19:02:17 localhost sshd[1208]: Server listening on :: port 22.
Oct 31 19:02:19 localhost gdm-launch-environment]: pam_unix(gdm-launch-environment:session): session opened for user gdm by (uid=0)
Oct 31 19:02:24 localhost polkitd[572]: Registered Authentication Agent for unix-session:cl (system bus name :1.35 [gnome-shell --mode=qdm], object path /org/freedesktop/PolicyKit1/AuthenticationAgent, locale en_US.UTF-8)
Oct 31 19:02:29 localhost sshd[1589]: Accepted password for root from 172.25.4.250 port 60766 ssh2
Oct 31 19:02:29 localhost sshd[1589]: pam_unix(sshd:session): session opened for user root by (uid=0)
Oct 31 19:15:15 localhost unix_chkpwd[1814]: password check failed for user (student)
Oct 31 19:15:15 localhost sshd[1804]: pam_unix(sshd:auth): authentication failure; logname= uid=0 euid=0 tty=ssh ruser= rhost=172.25.4.250 user=student
Oct 31 19:15:16 localhost sshd[1804]: Failed password for student from 172.25.4.250 port 60767 ssh2
Oct 31 19:15:50 localhost sshd[1804]: Accepted password for student from 172.25.4.250 port 60767 ssh2
Oct 31 19:15:50 localhost sshd[1804]: pam_unix(sshd:session): session opened for user student by (uid=0)
```

Day 29

Loger

Overview of Syslog Priorities :

<u>Code</u>	<u>Priority</u>	<u>Severity</u>
0	emerg	System is unusable
1	alert	Action must be taken immediately
2	crit	Critical Condition
3	err	Non – Critical Condition
4	warning	Warning Condition
5	notice	Normal but significant event
6	info	informational event
7	debug	Debugging – level message

steps :

root 1

.) tail -f /var/log/boot.log

```
File Edit View Search Terminal Tabs Help
root@localhost:~# tail -f /var/log/boot.log
Starting LSB: Start the ipr dump daemon...
[ OK ] Started System Logging Service.
[ OK ] Started LSB: Start the ipr dump daemon.
[ OK ] Started Avahi mDNS/DNS-SD Stack.
[ OK ] Started Bluetooth service.
[ OK ] Reached target Bluetooth.
[ OK ] Started RealtimeKit Scheduling Policy Service.
[ OK ] Started Login Service.
[ OK ] Started GNOME Display Manager.
Starting Authorization Manager...
```

don't close it and go to root 2

root 2

.) vim /etc/rsyslog.conf

```
File Edit View Search Terminal Tabs Help
root@localhost:~# vim /etc/rsyslog.conf
mail.*                                     -/var/log/maillog

# Log cron stuff
cron.*                                     /var/log/cron

# Everybody gets emergency messages
*.emerg                                     :omusrmsg:*

# Save news errors of level crit and higher in a special file.
uucp,news.crit                                /var/log/spooler

# Save boot messages also to boot.log
local7.*                                     /var/log/boot.log
```

saving boot messages in boot log

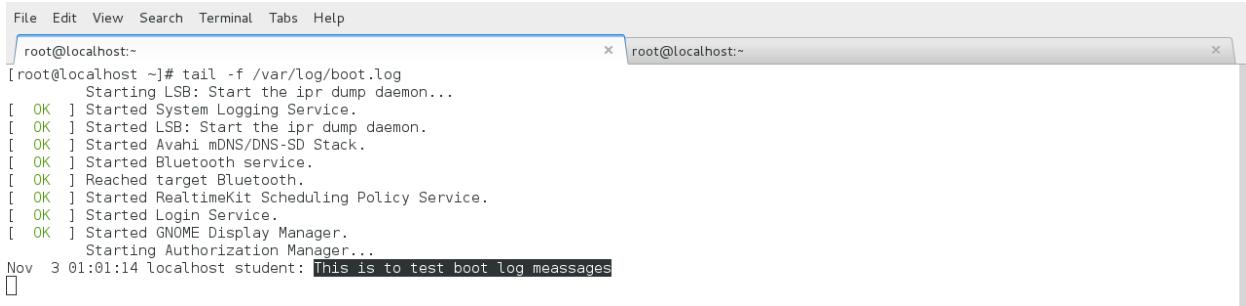
local7.* /var/log/boot.log

.) logger -p local7.info "This is to test boot messages"

```
File Edit View Search Terminal Tabs Help
root@localhost:~# vim /etc/rsyslog.conf
root@localhost:~#
[root@localhost ~]# logger -p local7.info "This is to test boot log meassages"
[root@localhost ~]#
```

root 1

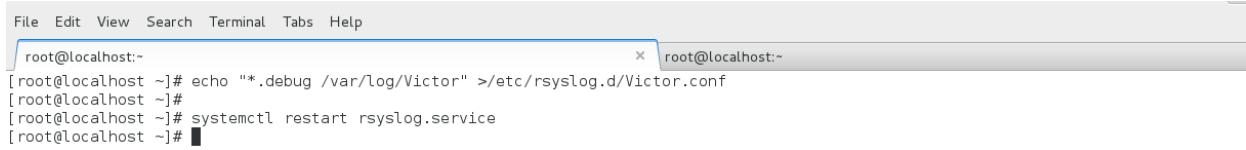
check in root 1



```
File Edit View Search Terminal Tabs Help
root@localhost:~]# tail -f /var/log/boot.log
Starting LSB: Start the ipr dump daemon...
[ OK ] Started System Logging Service.
[ OK ] Started LSB: Start the ipr dump daemon.
[ OK ] Started Avahi mDNS/DNS-SD Stack.
[ OK ] Started Bluetooth service.
[ OK ] Reached target Bluetooth.
[ OK ] Started RealtimeKit Scheduling Policy Service.
[ OK ] Started Login Service.
[ OK ] Started GNOME Display Manager.
Starting Authorization Manager...
Nov  3 01:01:14 localhost student: This is to test boot log meassages
```

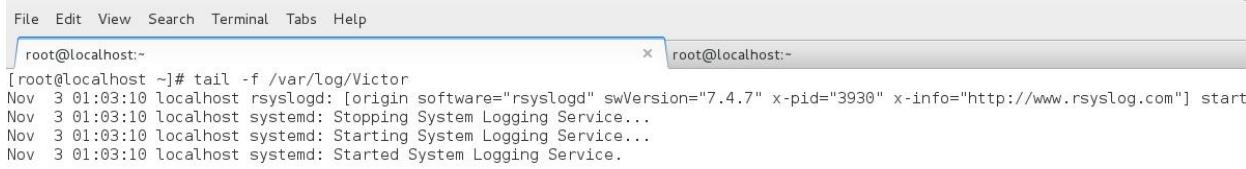
.) echo “*.debug /var/log/Victor” >./etc/rsyslog.d/Victor.conf

.) systemctl restart rsyslog.service



```
File Edit View Search Terminal Tabs Help
root@localhost:~]# echo "*.debug /var/log/Victor" >/etc/rsyslog.d/Victor.conf
[root@localhost ~]#
[root@localhost ~]# systemctl restart rsyslog.service
[root@localhost ~]#
```

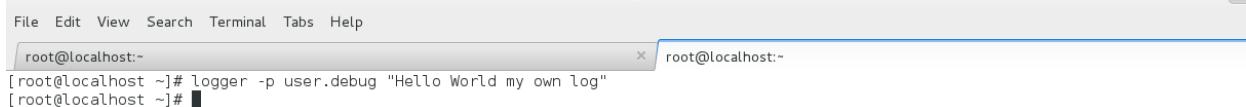
.) tail -f /var/log/Victor



```
File Edit View Search Terminal Tabs Help
root@localhost:~]# tail -f /var/log/Victor
Nov  3 01:03:10 localhost rsyslogd: [origin software="rsyslogd" swVersion="7.4.7" x-pid="3930" x-info="http://www.rsyslog.com"] start
Nov  3 01:03:10 localhost systemd: Stopping System Logging Service...
Nov  3 01:03:10 localhost systemd: Starting System Logging Service...
Nov  3 01:03:10 localhost systemd: Started System Logging Service.
```

root 2

.) logger -p user.debug “Hello World my ownlog”



```
File Edit View Search Terminal Tabs Help
root@localhost:~]# logger -p user.debug "Hello World my own log"
[root@localhost ~]#
```

root 1

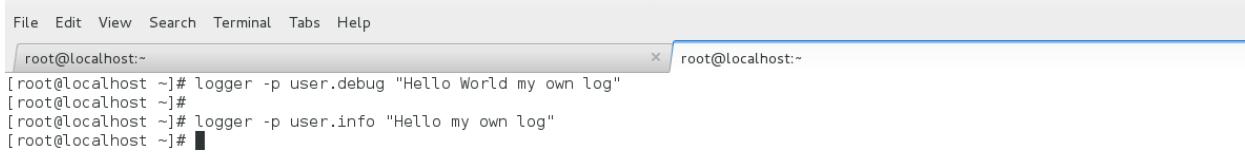
check in root 1



```
File Edit View Search Terminal Tabs Help
root@localhost:~# tail -f /var/log/Victor
[root@localhost ~]# tail -f /var/log/Victor
Nov 3 01:03:10 localhost rsyslogd: [origin software="rsyslogd" swVersion="7.4.7" x-pid="3930" x-info="http://www.rsyslog.com"] start
Nov 3 01:03:10 localhost systemd: Stopping System Logging Service...
Nov 3 01:03:10 localhost systemd: Starting System Logging Service...
Nov 3 01:03:10 localhost systemd: Started System Logging Service.
Nov 3 01:03:57 localhost student: Hello World my own log
```

root 2

.) logger -p user.info "Hello my own log"



```
File Edit View Search Terminal Tabs Help
root@localhost:~# logger -p user.debug "Hello World my own log"
[root@localhost ~]#
[root@localhost ~]# logger -p user.info "Hello my own log"
[root@localhost ~]#
```

root1

go to root 1 and check



```
File Edit View Search Terminal Tabs Help
root@localhost:~# tail -f /var/log/Victor
[root@localhost ~]# tail -f /var/log/Victor
Nov 3 01:03:10 localhost rsyslogd: [origin software="rsyslogd" swVersion="7.4.7" x-pid="3930" x-info="http://www.rsyslog.com"] start
Nov 3 01:03:10 localhost systemd: Stopping System Logging Service...
Nov 3 01:03:10 localhost systemd: Starting System Logging Service...
Nov 3 01:03:10 localhost systemd: Started System Logging Service.
Nov 3 01:03:57 localhost student: Hello World my own log
Nov 3 01:05:24 localhost student: Hello my own log
```

Processes , Jobs , Monitoring & Managing Job / Service / Processes

.) dd if=/dev/zero of=/dev/null (overwriting with zeros)

[if – input of – output]

dd is having multiple options

dd is most important utility

* don't run dd in servers

If we do 13 times format then only it is tough to recovery

In windows we don't have PS by default, we need to install 'sysinternals'

If the system is running slowly don't open Task Manager , type below command

.) kill ps

Steps :

root1

.) dd if=/dev/zero of=/dev/null

```
File Edit View Search Terminal Tabs Help
root@server4:~ [root@server4 ~]# dd if=/dev/zero of=/dev/null
^C105209685+0 records in
105209684+0 records out
53867358208 bytes (54 GB) copied, 44.5587 s, 1.2 GB/s
[root@server4 ~]# 
```

.) dd if=/dev/zero of=/dev/null&

```
File Edit View Search Terminal Tabs Help
root@server4:~ [root@server4 ~]# dd if=/dev/zero of=/dev/null
^C105209685+0 records in
105209684+0 records out
53867358208 bytes (54 GB) copied, 44.5587 s, 1.2 GB/s
[root@server4 ~]#
[root@server4 ~]# dd if=/dev/zero of=/dev/null&
[1] 1736
[root@server4 ~]#
[root@server4 ~]# jobs
[1]+  Running                  dd if=/dev/zero of=/dev/null &
[root@server4 ~]# 
```

.) jobs { current shell running jobs }

Running – old one

-Running – last but one

+Running – Current one

```
File Edit View Search Terminal Tabs Help
root@server4:~ x root@server4:~
[root@server4 ~]# dd if=/dev/zero of=/dev/null&
[2] 1802
[root@server4 ~]# dd if=/dev/zero of=/dev/null&
[3] 1803
[root@server4 ~]# jobs
[1]  Running                  dd if=/dev/zero of=/dev/null &
[2]- Running                  dd if=/dev/zero of=/dev/null &
[3]+ Running                  dd if=/dev/zero of=/dev/null &
[root@server4 ~]# 
```

root2

.) ps -e { short info }

```
File Edit View Search Terminal Tabs Help
root@server4:~ x root@server4:~
[root@server4 ~]# ps -e
 PID TTY      TIME CMD
  1 ?        00:00:02 systemd
  2 ?        00:00:00 kthreadd
  3 ?        00:00:00 ksoftirqd/0
  4 ?        00:00:00 kworker/0:0
  5 ?        00:00:00 kworker/0:0H
  6 ?        00:00:00 kworker/u2:0
  7 ?        00:00:00 migration/0
  8 ?        00:00:00 rcu_bh
  9 ?        00:00:00 rcuob/0
 10 ?       00:00:00 rcu_sched
 11 ?       00:00:00 rcuos/0
 12 ?       00:00:00 watchdog/0
 13 ?       00:00:00 khelper
 14 ?       00:00:00 kdevtmpfs
 15 ?       00:00:00 netns
 16 ?       00:00:00 writeback
 17 ?       00:00:00 kintegrityd
 18 ?       00:00:00 bioset
 19 ?       00:00:00 kblockd
 20 ?       00:00:00 khubd
 21 ?       00:00:00 md
 22 ?       00:00:00 kworker/0:1
 24 ?       00:00:00 kswapd0
 25 ?       00:00:00 ksm
 26 ?       00:00:00 khugepaged
 27 ?       00:00:00 fsnotify_mark
 28 ?       00:00:00 crypto
 37 ?       00:00:00 kthrotld
 38 ?       00:00:00 kworker/u2:1
 39 ?       00:00:00 kmpath_rdacd
 40 ?       00:00:00 kpsmoused
 41 ?       00:00:00 kworker/0:2
 60 ?       00:00:00 deferwq
 87 ?       00:00:00 kaudited
 97 ?       00:00:00 kworker/0:3
166 ?       00:00:00 rpciod
225 ?       00:00:00 kworker/u2:2
229 ?       00:00:00 ata_sff
232 ?       00:00:00 scsi_eh_0
```

.) ps -el { long info }

S – Sleeping

R – Running

```
File Edit View Search Terminal Tabs Help
root@server4:~ x root@server4:~
[root@server4 ~]# ps -el
F S  UID   PID  PPID C PRI NI ADDR SZ WCHAN TTY          TIME CMD
4 S  0     1      0  0  80    0 - 13082 ep_pol ?        00:00:02 systemd
1 S  0     2      0  0  80    0 -      0 kthrea ?        00:00:00 kthreadd
1 S  0     3      2  0  80    0 -      0 smpboo ?        00:00:00 ksoftirqd/0
1 S  0     4      2  0  80    0 -      0 worker ?        00:00:00 kworker/0:0
1 S  0     5      2  0  60   -20 -      0 worker ?        00:00:00 kworker/0:0H
1 S  0     6      2  0  80    0 -      0 worker ?        00:00:00 kworker/u2:0
1 S  0     7      2  0  -40   -- -      0 smpboo ?        00:00:00 migration/0
1 S  0     8      2  0  80    0 -      0 rcu_gp ?        00:00:00 rcu_bh
1 S  0     9      2  0  80    0 -      0 rcu_no ?        00:00:00 rcuob/0
1 S  0    10      2  0  80    0 -      0 rcu_gp ?        00:00:00 rcu_sched
1 R  0    11      2  0  80    0 -      0 - ?        00:00:00 rcuos/0
5 S  0    12      2  0  -40   -- -      0 smpboo ?        00:00:00 watchdog/0
1 S  0    13      2  0  60   -20 -      0 rescue ?        00:00:00 khelper
5 S  0    14      2  0  80    0 -      0 devtmp ?        00:00:00 kdevtmpfs
1 S  0    15      2  0  60   -20 -      0 rescue ?        00:00:00 netns
1 S  0    16      2  0  60   -20 -      0 rescue ?        00:00:00 writeback
1 S  0    17      2  0  60   -20 -      0 rescue ?        00:00:00 kintegrityd
1 S  0    18      2  0  60   -20 -      0 rescue ?        00:00:00 bioset
1 S  0    19      2  0  60   -20 -      0 rescue ?        00:00:00 kblockd
1 S  0    20      2  0  80    0 -      0 hub_th ?        00:00:00 khubd
1 S  0    21      2  0  60   -20 -      0 rescue ?        00:00:00 md
5 S  0    22      2  0  80    0 -      0 worker ?        00:00:00 kworker/0:1
1 S  0    24      2  0  80    0 -      0 kswapd ?        00:00:00 kswapd0
1 S  0    25      2  0  85    5 -      0 ksm_sc ?        00:00:00 ksm
1 S  0    26      2  0  99   19 -      0 khugep ?        00:00:00 khugepaged
1 S  0    27      2  0  80    0 -      0 fsnoti ?        00:00:00 fsnotify_mark
1 S  0    28      2  0  60   -20 -      0 rescue ?        00:00:00 crypto
1 S  0    37      2  0  60   -20 -      0 rescue ?        00:00:00 kthrotld
1 S  0    38      2  0  80    0 -      0 worker ?        00:00:00 kworker/u2:1
1 S  0    39      2  0  60   -20 -      0 rescue ?        00:00:00 kmpath_rdacd
1 S  0    40      2  0  60   -20 -      0 rescue ?        00:00:00 kpsmoused
5 R  0    41      2  0  80    0 -      0 - ?        00:00:00 kworker/0:2
1 S  0    60      2  0  60   -20 -      0 rescue ?        00:00:00 deferwq
1 S  0    87      2  0  80    0 -      0 kaudit ?        00:00:00 kauditd
1 S  0    97      2  0  80    0 -      0 worker ?        00:00:00 kworker/0:3
1 S  0   166      2  0  60   -20 -      0 rescue ?        00:00:00 rpciod
1 S  0   225      2  0  80    0 -      0 worker ?        00:00:00 kworker/u2:2
1 S  0   229      2  0  60   -20 -      0 rescue ?        00:00:00 ata_sff
1 S  0   232      2  0  80    0 -      0 scsi_e ?        00:00:00 scsi_eh_0
```

.) tty

A screenshot of a terminal window with two tabs. The left tab shows the command `[root@server4 ~]# tty` and its output `/dev/pts/1`. The right tab shows the command `[root@server4 ~]#`.

.) w { who is working in another terminal }

[w – who, which, what, when]

A screenshot of a terminal window with two tabs. The left tab shows the command `[root@server4 ~]# w` and its output, which includes user information like student pts/0, root pts/1, and root pts/2. The right tab shows the command `[root@server4 ~]#`.

root1

.) dd if=/dev/zero of=/dev/null

A screenshot of a terminal window with two tabs. The left tab shows the command `[root@server4 ~]# dd if=/dev/zero of=/dev/null` and its output, which includes record counts and bytes copied. The right tab shows the command `[root@server4 ~]#`.

root2

.) w

A screenshot of a terminal window with two tabs. The left tab shows the command `[root@server4 ~]# w` and its output, which includes user information like student pts/0, root pts/1, and root pts/2. The right tab shows the command `[root@server4 ~]#`.

.) uptime { system uptime }

load average : -----

[if load average is increasing soon system will hand]

```
File Edit View Search Terminal Tabs Help
root@server4:~ x root@server4:~
[root@server4 ~]# uptime
18:50:10 up 7 min, 4 users, load average: 2.08, 1.06, 0.50
[root@server4 ~]#
```

.) kill -l

[SIGKILL - forcefully SIGTERM – softly]

```
File Edit View Search Terminal Tabs Help
root@server4:~ x root@server4:~
[root@server4 ~]# kill -l
 1) SIGHUP      2) SIGINT      3) SIGQUIT      4) SIGILL      5) SIGTRAP
 6) SIGABRT     7) SIGBUS      8) SIGFPE       9) SIGKILL     10) SIGUSR1
11) SIGSEGV     12) SIGUSR2     13) SIGPIPE     14) SIGALRM     15) SIGTERM
16) SIGSTKFLT   17) SIGCHLD     18) SIGCONT     19) SIGSTOP     20) SIGSTP
21) SIGTTIN     22) SIGTTOU     23) SIGURG      24) SIGXCPU     25) SIGXFSZ
26) SIGVTALRM   27) SIGPROF     28) SIGWINCH    29) SIGIO       30) SIGPWR
31) SIGSYS     34) SIGRTMIN    35) SIGRTMIN+1  36) SIGRTMIN+2  37) SIGRTMIN+3
38) SIGRTMIN+4  39) SIGRTMIN+5  40) SIGRTMIN+6  41) SIGRTMIN+7  42) SIGRTMIN+8
43) SIGRTMIN+9  44) SIGRTMIN+10 45) SIGRTMIN+11 46) SIGRTMIN+12 47) SIGRTMIN+13
48) SIGRTMIN+14 49) SIGRTMIN+15 50) SIGRTMAX-14 51) SIGRTMAX-13 52) SIGRTMAX-12
53) SIGRTMAX-11 54) SIGRTMAX-10 55) SIGRTMAX-9  56) SIGRTMAX-8  57) SIGRTMAX-7
58) SIGRTMAX-6  59) SIGRTMAX-5  60) SIGRTMAX-4  61) SIGRTMAX-3  62) SIGRTMAX-2
63) SIGRTMAX-1 64) SIGRTMAX
[root@server4 ~]#
```

root1

.) jobs

```
File Edit View Search Terminal Tabs Help
root@server4:~ x root@server4:~
[root@server4 ~]# jobs
[1]-  Running                  dd if=/dev/zero of=/dev/null &
[2]-  Running                  dd if=/dev/zero of=/dev/null &
[3]+  Running                  dd if=/dev/zero of=/dev/null &
[root@server4 ~]#
```

root2

.) kill 15 <pid>

[15 – SIGTERM]

```
File Edit View Search Terminal Tabs Help
x root@server4:~
[root@server4 ~]# kill -15 1802
[root@server4 ~]# 
```

root1

.) jobs

```
File Edit View Search Terminal Tabs Help
x root@server4:~
[root@server4 ~]# jobs
[1]- Running dd if=/dev/zero of=/dev/null &
[2]- Running dd if=/dev/zero of=/dev/null &
[3]+ Running dd if=/dev/zero of=/dev/null &
[root@server4 ~]#
[2]- Terminated dd if=/dev/zero of=/dev/null
[root@server4 ~]#
[root@server4 ~]# jobs
[1]- Running dd if=/dev/zero of=/dev/null &
[3]+ Running dd if=/dev/zero of=/dev/null &
[root@server4 ~]# 
```

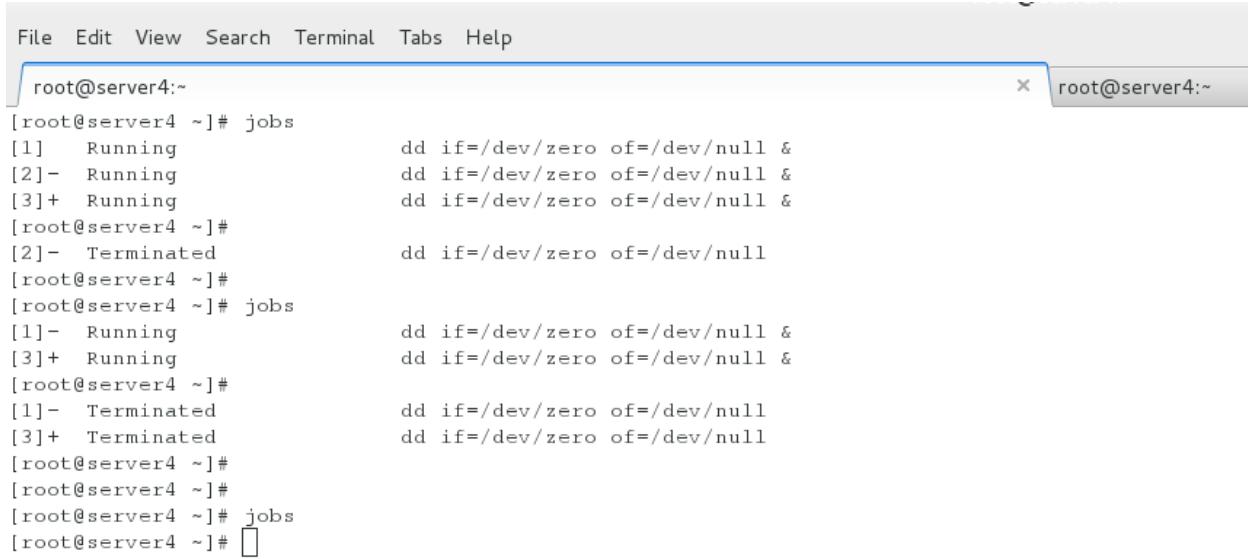
root2

.) kill all <process name>

```
File Edit View Search Terminal Tabs Help
x root@server4:~
[root@server4 ~]# killall dd
[root@server4 ~]# 
```

root1

.) jobs



The screenshot shows a terminal window with a menu bar at the top containing File, Edit, View, Search, Terminal, Tabs, and Help. The title bar indicates the session is running as root on server4. The main area of the terminal displays the output of the 'jobs' command. The output shows three job entries:

```
root@server4:~# jobs
[1]  Running                  dd if=/dev/zero of=/dev/null &
[2]- Running                  dd if=/dev/zero of=/dev/null &
[3]+ Running                  dd if=/dev/zero of=/dev/null &
[root@server4 ~]#
[2]- Terminated               dd if=/dev/zero of=/dev/null
[root@server4 ~]#
[root@server4 ~]# jobs
[1]- Running                  dd if=/dev/zero of=/dev/null &
[3]+ Running                  dd if=/dev/zero of=/dev/null &
[root@server4 ~]#
[1]- Terminated               dd if=/dev/zero of=/dev/null
[3]+ Terminated               dd if=/dev/zero of=/dev/null
[root@server4 ~]#
[root@server4 ~]# jobs
[root@server4 ~]#
```

There are no jobs right now

TOP

Top is not recommended

steps :

root1

```
File Edit View Search Terminal Tabs Help
root@server4:~#
[root@server4 ~]# dd if=/dev/zero of=/dev/null&
[1] 1856
[root@server4 ~]# 
```

root2

```
File Edit View Search Terminal Tabs Help
root@server4:~#
root@server4:~#
top - 18:53:31 up 10 min, 4 users, load average: 0.89, 1.32, 0.74
Tasks: 123 total, 3 running, 120 sleeping, 0 stopped, 0 zombie
%Cpu(s): 23.7 us, 76.3 sy, 0.0 ni, 0.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
KiB Mem: 1017992 total, 551580 used, 466412 free, 688 buffers
KiB Swap: 0 total, 0 used, 0 free. 239368 cached Mem

PID USER      PR  NI    VIRT    RES    SHR S %CPU %MEM     TIME+ COMMAND
1856 root      20   0 107920   624  528 R 99.8  0.1  0:08.17 dd
1847 root      20   0 123676  1516 1044 R  0.3  0.1  0:00.04 top
  1 root      20   0  52328  6476 3664 S  0.0  0.6  0:02.34 systemd
  2 root      20   0      0      0      0 S  0.0  0.0  0:00.00 kthreadd
  3 root      20   0      0      0      0 S  0.0  0.0  0:00.00 ksoftirqd/0
  5 root      0 -20      0      0      0 S  0.0  0.0  0:00.00 kworker/0:0H
  7 root      rt  0      0      0      0 S  0.0  0.0  0:00.00 migration/0
  8 root      20   0      0      0      0 S  0.0  0.0  0:00.00 rcu_bh
  9 root      20   0      0      0      0 S  0.0  0.0  0:00.00 rcuob/0
 10 root     20   0      0      0      0 S  0.0  0.0  0:00.21 rcu_sched
 11 root     20   0      0      0      0 R  0.0  0.0  0:00.20 rcuos/0
 12 root     rt  0      0      0      0 S  0.0  0.0  0:00.77 watchdog/0
 13 root     0 -20      0      0      0 S  0.0  0.0  0:00.00 khelper
 14 root     20   0      0      0      0 S  0.0  0.0  0:00.00 kdevtmpfs
 15 root     0 -20      0      0      0 S  0.0  0.0  0:00.00 netns
 16 root     0 -20      0      0      0 S  0.0  0.0  0:00.00 writeback
 17 root     0 -20      0      0      0 S  0.0  0.0  0:00.00 integrityd
 18 root     0 -20      0      0      0 S  0.0  0.0  0:00.00 bioset
 19 root     0 -20      0      0      0 S  0.0  0.0  0:00.00 kblockd
 20 root     20   0      0      0      0 S  0.0  0.0  0:00.00 khubd
 21 root     0 -20      0      0      0 S  0.0  0.0  0:00.00 md
 22 root     20   0      0      0      0 S  0.0  0.0  0:00.04 kworker/0:1
 24 root     20   0      0      0      0 S  0.0  0.0  0:00.00 kswapd0
 25 root     25   5      0      0      0 S  0.0  0.0  0:00.00 ksmd
 26 root     39  19      0      0      0 S  0.0  0.0  0:00.03 khugepaged
 27 root     20   0      0      0      0 S  0.0  0.0  0:00.00 fsnotify_mark
 28 root     0 -20      0      0      0 S  0.0  0.0  0:00.00 crypto
 37 root     0 -20      0      0      0 S  0.0  0.0  0:00.00 kthrotld
 38 root     20   0      0      0      0 S  0.0  0.0  0:00.01 kworker/u2:1
 39 root     0 -20      0      0      0 S  0.0  0.0  0:00.00 kmpath_rdacd
 40 root     0 -20      0      0      0 S  0.0  0.0  0:00.00 kpsmoused
 60 root     0 -20      0      0      0 S  0.0  0.0  0:00.00 deferwq
 87 root     20   0      0      0      0 S  0.0  0.0  0:00.00 kauditd
166 root     0 -20      0      0      0 S  0.0  0.0  0:00.00 rpciod
```

PS - offline monitoring tool

Top - online monitoring tool

In top shortcuts :

q – quit

c – command expand / command shrink

b – bold [current running jobs]

k – kill

r – renice

<u>Priority</u>	<u>Nice</u>
-----------------	-------------

20 - Default	0
--------------	---

Both are Inter relation ; To change priority we have to change nice value

Nice → -10 Priority → 20

$$\begin{array}{r} -10 \\ \hline 10 \end{array}$$

Nice → -05 Priority → 20

$$\begin{array}{r} -05 \\ \hline 15 \end{array}$$

Nice → 10

Priority → 20

+10

30

.) negative nice value will increase priority

.) positive nice value will decrease priority

.) negative nice value can be used by Admin only

Nice Values : (-20 to 1 & 0 to 19)

Total 40

root2

.) c { command shrink / command expand }

```
File Edit View Search Terminal Tabs Help
root@server4:~ x root@server4:~
top - 18:53:35 up 10 min, 4 users, load average: 0.90, 1.31, 0.74
Tasks: 123 total, 4 running, 119 sleeping, 0 stopped, 0 zombie
%Cpu(s): 23.5 us, 76.5 sy, 0.0 ni, 0.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
KiB Mem: 1017992 total, 551580 used, 466412 free, 688 buffers
KiB Swap: 0 total, 0 used, 0 free. 239368 cached Mem

PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
1856 root 20 0 107920 624 528 R 98.5 0.1 0:11.98 dd if=/dev/zero of=/dev/null
1 root 20 0 52328 6476 3664 S 0.0 0.6 0:02.34 /usr/lib/systemd/systemd --switched-root --system --deserialize 21
2 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [kthreadd]
3 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [ksoftirqd/0]
5 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [kworker/0:0H]
7 root rt 0 0 0 0 S 0.0 0.0 0:00.00 [migration/0]
8 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [rcu_bh]
9 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [rcuob/0]
10 root 20 0 0 0 0 S 0.0 0.0 0:00.21 [rcu_sched]
11 root 20 0 0 0 0 R 0.0 0.0 0:00.20 [rcuos/0]
12 root rt 0 0 0 0 S 0.0 0.0 0:00.77 [watchdog/0]
13 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [khelper]
14 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [kdevtmpfs]
15 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [netns]
16 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [writeback]
17 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [kintegrityd]
18 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [bioset]
19 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [kblockd]
20 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [khubd]
21 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [md]
22 root 20 0 0 0 0 S 0.0 0.0 0:00.04 [kworker/0:1]
24 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [kswapd0]
25 root 25 5 0 0 0 S 0.0 0.0 0:00.00 [ksmd]
26 root 39 19 0 0 0 S 0.0 0.0 0:00.03 [khugepaged]
27 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [fsnotify_mark]
28 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [crypto]
37 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [kthrotld]
38 root 20 0 0 0 0 S 0.0 0.0 0:00.01 [kworker/u2:1]
39 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [kmpath_rdacd]
40 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [kpamoused]
60 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [deferwq]
87 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [kaudit]
166 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [rpciod]
225 root 20 0 0 0 0 S 0.0 0.0 0:00.01 [kworker/u2:2]
```

root1

```
File Edit View Search Terminal Tabs Help
root@server4:~ [root@server4 ~]# dd if=/dev/zero of=/dev/null&
[1] 1856
[root@server4 ~]# dd if=/dev/zero of=/dev/null&
[2] 1890
[root@server4 ~]# 
```

root2

```
File Edit View Search Terminal Tabs Help
root@server4:~ [root@server4:~]
top - 18:57:31 up 14 min, 4 users, load average: 1.17, 1.19, 0.81
Tasks: 125 total, 4 running, 121 sleeping, 0 stopped, 0 zombie
%Cpu(s): 24.9 us, 75.1 sy, 0.0 ni, 0.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
KiB Mem: 1017992 total, 551852 used, 466140 free, 688 buffers
KiB Swap: 0 total, 0 used, 0 free. 239368 cached Mem

PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
1890 root 20 0 107920 624 528 R 50.2 0.1 0:04.62 dd if=/dev/zero of=/dev/null
1856 root 20 0 107920 624 528 R 49.9 0.1 4:02.54 dd if=/dev/zero of=/dev/null
1 root 20 0 52328 6476 3664 S 0.0 0.6 0:02.34 /usr/lib/systemd/systemd --switched-root --system --deserialize 21
2 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [kthreadd]
3 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [ksoftirqd/0]
5 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [kworker/0:0H]
7 root rt 0 0 0 0 S 0.0 0.0 0:00.00 [migration/0]
8 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [rcu_bh]
9 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [rcuob/0]
10 root 20 0 0 0 0 S 0.0 0.0 0:00.21 [rcusched]
11 root 20 0 0 0 R 0.0 0.0 0:00.21 [rcuos/0]
12 root rt 0 0 0 0 S 0.0 0.0 0:00.77 [watchdog/0]
13 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [khelper]
14 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [kdevtmpfs]
15 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [netns]
16 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [writeback]
17 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [integrityd]
18 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [bioset]
19 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [kblockd]
20 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [khubd]
21 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [md]
22 root 20 0 0 0 0 S 0.0 0.0 0:00.04 [kworker/0:1]
24 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [kswapd0]
25 root 25 5 0 0 0 S 0.0 0.0 0:00.00 [ksmd]
26 root 39 19 0 0 0 S 0.0 0.0 0:00.03 [khugepaged]
27 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [fsnotify_mark]
28 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [crypto]
37 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [kthrotld]
38 root 20 0 0 0 0 S 0.0 0.0 0:00.01 [kworker/u2:1]
39 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [kmpath_rdacd]
40 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [kpsmoused]
60 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [deferwq]
87 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [kaudit]
166 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [rpciod]
```

.) r { renice }

to renice first we need to give PID Here PID : 1856

```
File Edit View Search Terminal Tabs Help
root@server4:~ x root@server4:~
top - 18:57:40 up 14 min, 4 users, load average: 1.30, 1.21, 0.83
Tasks: 125 total, 4 running, 121 sleeping, 0 stopped, 0 zombie
%Cpu(s): 25.0 us, 75.0 sy, 0.0 ni, 0.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
KiB Mem: 1017992 total, 551852 used, 466140 free, 688 buffers
KiB Swap: 0 total, 0 used, 0 free. 239368 cached Mem
PID to renice [default pid = 1856] 1856
PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
1856 root 20 0 107920 624 528 R 50.2 0.1 4:07.06 dd if=/dev/zero of=/dev/null
1890 root 20 0 107920 624 528 R 49.9 0.1 0:09.12 dd if=/dev/zero of=/dev/null
1847 root 20 0 123676 1516 1044 R 0.3 0.1 0:00.24 top
1 root 20 0 52328 6476 3664 S 0.0 0.6 0:02.34 /usr/lib/systemd/systemd --switched-root --system --deserialize 21
2 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [kthreadd]
3 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [ksoftirqd/0]
```

Next give renice value ; I given 10

```
File Edit View Search Terminal Tabs Help
root@server4:~ x root@server4:~
top - 18:57:40 up 14 min, 4 users, load average: 1.30, 1.21, 0.83
Tasks: 125 total, 4 running, 121 sleeping, 0 stopped, 0 zombie
%Cpu(s): 25.0 us, 75.0 sy, 0.0 ni, 0.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
KiB Mem: 1017992 total, 551852 used, 466140 free, 688 buffers
KiB Swap: 0 total, 0 used, 0 free. 239368 cached Mem
Renice PID 1856 to value 10
PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
1856 root 20 0 107920 624 528 R 50.2 0.1 4:07.06 dd if=/dev/zero of=/dev/null
1890 root 20 0 107920 624 528 R 49.9 0.1 0:09.12 dd if=/dev/zero of=/dev/null
1847 root 20 0 123676 1516 1044 R 0.3 0.1 0:00.24 top
1 root 20 0 52328 6476 3664 S 0.0 0.6 0:02.34 /usr/lib/systemd/systemd --switched-root --system --deserialize 21
2 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [kthreadd]
3 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [ksoftirqd/0]
5 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [kworker/0:0H]
```

Here we can see nice value changed to 20 to 30 for PID 1856

```
File Edit View Search Terminal Tabs Help
root@server4:~ x root@server4:~
top - 18:58:14 up 15 min, 4 users, load average: 1.72, 1.33, 0.88
Tasks: 125 total, 5 running, 120 sleeping, 0 stopped, 0 zombie
%Cpu(s): 24.7 us, 75.3 sy, 0.0 ni, 0.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
KiB Mem: 1017992 total, 551860 used, 466132 free, 688 buffers
KiB Swap: 0 total, 0 used, 0 free. 239368 cached Mem
PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
1890 root 20 0 107920 624 528 R 49.8 0.1 0:26.07 dd if=/dev/zero of=/dev/null
1856 root 30 10 107920 624 528 R 49.7 0.1 4:23.99 dd if=/dev/zero of=/dev/null
1550 gdm 20 0 1349468 99764 33292 S 0.3 9.8 0:07.69 gnome-shell --mode=gdm
584 root 20 0 160720 17800 6468 S 0.1 1.7 0:03.02 /usr/bin/Xorg :0 -background none -verbose -auth /run/gdm/auth-for-gdm-zypcR0/database -st
1 root 20 0 52328 6480 3668 S 0.0 0.6 0:02.35 /usr/lib/systemd/systemd --switched-root --system --deserialize 21
```

.) r

Enter PID value Here PID : 1890

```
File Edit View Search Terminal Tabs Help
root@server4:~ top - 18:58:20 up 15 min, 4 users, load average: 1.75, 1.34, 0.89
Tasks: 125 total, 4 running, 121 sleeping, 0 stopped, 0 zombie
%Cpu(s): 22.1 us, 75.2 sy, 2.6 ni, 0.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
KiB Mem: 1017992 total, 551860 used, 466132 free, 688 buffers
KiB Swap: 0 total, 0 used, 0 free. 239368 cached Mem
PID to renice [default pid = 1890] 1890
PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
1890 root 20 0 107920 624 528 R 90.2 0.1 0:31.51 dd if=/dev/zero of=/dev/null
1856 root 30 10 107920 624 528 R 9.3 0.1 4:24.57 dd if=/dev/zero of=/dev/null
1 root 20 0 52328 6480 3668 S 0.0 0.6 0:02.35 /usr/lib/systemd/systemd --switched-root --system --deserialize 21
2 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [kthreadd]
3 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [ksoftirqd/0]
```

and I give renice value -5 ; Here nice value changed to 15

```
File Edit View Search Terminal Tabs Help
root@server4:~ top - 18:58:40 up 15 min, 4 users, load average: 1.95, 1.42, 0.92
Tasks: 125 total, 5 running, 120 sleeping, 0 stopped, 0 zombie
%Cpu(s): 22.2 us, 75.3 sy, 2.6 ni, 0.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
KiB Mem: 1017992 total, 551860 used, 466132 free, 688 buffers
KiB Swap: 0 total, 0 used, 0 free. 239368 cached Mem
PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
1890 root 15 -5 107920 624 528 R 90.2 0.1 0:48.86 dd if=/dev/zero of=/dev/null
1856 root 30 10 107920 624 528 R 9.7 0.1 4:26.44 dd if=/dev/zero of=/dev/null
1 root 20 0 52328 6480 3668 S 0.0 0.6 0:02.35 /usr/lib/systemd/systemd --switched-root --system --deserialize 21
2 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [kthreadd]
3 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [ksoftirqd/0]
5 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [kworker/0:0H]
```

.) b – bold [current running command]

```
File Edit View Search Terminal Tabs Help
root@server4:~ top - 18:58:48 up 15 min, 4 users, load average: 1.96, 1.43, 0.93
Tasks: 125 total, 5 running, 120 sleeping, 0 stopped, 0 zombie
%Cpu(s): 22.0 us, 77.1 sy, 1.0 ni, 0.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
KiB Mem: 1017992 total, 551860 used, 466132 free, 688 buffers
KiB Swap: 0 total, 0 used, 0 free. 239368 cached Mem
PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
1890 root 15 -5 107920 624 528 R 96.5 0.1 0:56.65 dd if=/dev/zero of=/dev/null
1856 root 30 10 107920 624 528 R 3.4 0.1 4:26.72 dd if=/dev/zero of=/dev/null
1847 root 20 0 123676 1516 1044 R 0.5 0.1 0:00.27 top
1 root 20 0 52328 6480 3668 S 0.0 0.6 0:02.35 /usr/lib/systemd/systemd --switched-root --system --deserialize 21
2 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [kthreadd]
3 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [ksoftirqd/0]
5 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [kworker/0:0H]
7 root rt 0 0 0 0 S 0.0 0.0 0:00.00 [migration/0]
8 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [rcu_bh]
9 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [rcuob/0]
10 root 20 0 0 0 0 S 0.0 0.0 0:00.21 [rcu_sched]
11 root 20 0 0 0 0 R 0.0 0.0 0:00.21 [rcuos/0]
12 root rt 0 0 0 0 S 0.0 0.0 0:00.77 [watchdog/0]
13 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [khelper]
* . ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^
```

.) k – kill [first need to give PID Number]

I given 1856

```
File Edit View Search Terminal Tabs Help
root@server4:~ x root@server4:~
top - 18:58:57 up 16 min, 4 users, load average: 1.96, 1.45, 0.94
Tasks: 124 total, 5 running, 119 sleeping, 0 stopped, 0 zombie
%Cpu(s): 23.3 us, 75.3 sy, 1.4 ni, 0.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
KiB Mem: 1017992 total, 551836 used, 466156 free, 688 buffers
KiB Swap: 0 total, 0 used, 0 free. 239368 cached Mem
PID to signal/kill [default pid = 1890] 1856
PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
1890 root 15 -5 107920 624 528 R 96.6 0.1 1:05.27 dd if=/dev/zero of=/dev/null
1856 root 30 10 107920 624 528 R 3.4 0.1 4:27.02 dd if=/dev/zero of=/dev/null
1 root 20 0 52328 6480 3668 S 0.0 0.6 0:02.35 /usr/lib/systemd/systemd --switched-root --system --deserialize 21
2 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [kthreadd]
3 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [ksoftirqd/0]
5 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [kworker/0:0H]
```

Next given 15 [15 is sigterm]

```
File Edit View Search Terminal Tabs Help
root@server4:~ x root@server4:~
top - 18:58:57 up 16 min, 4 users, load average: 1.96, 1.45, 0.94
Tasks: 124 total, 5 running, 119 sleeping, 0 stopped, 0 zombie
%Cpu(s): 23.3 us, 75.3 sy, 1.4 ni, 0.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
KiB Mem: 1017992 total, 551836 used, 466156 free, 688 buffers
KiB Swap: 0 total, 0 used, 0 free. 239368 cached Mem
Send pid 1856 signal [15=sigterm] 15
PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
1890 root 15 -5 107920 624 528 R 96.6 0.1 1:05.27 dd if=/dev/zero of=/dev/null
1856 root 30 10 107920 624 528 R 3.4 0.1 4:27.02 dd if=/dev/zero of=/dev/null
1 root 20 0 52328 6480 3668 S 0.0 0.6 0:02.35 /usr/lib/systemd/systemd --switched-root --system --deserialize 21
2 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [kthreadd]
3 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [ksoftirqd/0]
5 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [kworker/0:0H]
7 root rt 0 0 0 0 S 0.0 0.0 0:00.00 [migration/0]
```

Here we can see PID 1856 was killed

```
File Edit View Search Terminal Tabs Help
root@server4:~ x root@server4:~
top - 18:59:26 up 16 min, 4 users, load average: 1.98, 1.50, 0.97
Tasks: 124 total, 3 running, 121 sleeping, 0 stopped, 0 zombie
%Cpu(s): 22.0 us, 78.0 sy, 0.0 ni, 0.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
KiB Mem: 1017992 total, 551968 used, 466024 free, 688 buffers
KiB Swap: 0 total, 0 used, 0 free. 239368 cached Mem
PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
1890 root 15 -5 107920 624 528 R 99.9 0.1 1:33.90 dd if=/dev/zero of=/dev/null
1 root 20 0 52328 6480 3668 S 0.0 0.6 0:02.35 /usr/lib/systemd/systemd --switched-root --system --deserialize 21
2 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [kthreadd]
3 root 20 0 0 0 0 S 0.0 0.0 0:00.00 [ksoftirqd/0]
5 root 0 -20 0 0 0 S 0.0 0.0 0:00.00 [kworker/0:0H]
7 root rt 0 0 0 0 S 0.0 0.0 0:00.00 [migration/0]
```

root1

.) jobs [to check]

```
File Edit View Search Terminal Tabs Help
root@server4:~ x root@server4:~
[root@server4 ~]# jobs
[1]- Terminated dd if=/dev/zero of=/dev/null
[2]+ Running dd if=/dev/zero of=/dev/null &
[root@server4 ~]#
```

RHCE

DAY30

IPV6

In IPV4 $\underline{\quad} \cdot \underline{\quad} \cdot \underline{\quad} \cdot \underline{\quad}$ /32 bit
 ↓
 octet – 8bit

Default subnet mask 32

4 octets from 0-255

In IPV6 $\underline{\quad} \cdot \underline{\quad} \cdot \underline{\quad} \cdot \underline{\quad} \cdot \underline{\quad} \cdot \underline{\quad} \cdot \underline{\quad} \cdot \underline{\quad}$ /128 bit
 ↓
 block – 16bit

Default subnet mask 32

8 blocks

Binary – 0 or 1

Decimal – 0 to 9

Hex Decimal - : (we can found : in Hex Decimal)

0 – 9 } 4 bits
 A – F

.) ip a

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
        inet 127.0.0.1/8 scope host lo
            valid_lft forever preferred_lft forever
        inet6 ::1/128 scope host
            valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether 52:54:00:00:04:0b brd ff:ff:ff:ff:ff:ff
        inet 172.25.4.11/24 brd 172.25.4.255 scope global dynamic eth0
            valid_lft 18303sec preferred_lft 18303sec
        inet6 fe80::5054:ff:fe00:40b/64 scope link
            valid_lft forever preferred_lft forever
[student@server4 Desktop]$ █
```

IPV4 Details

inet 127.0.0.1/8 - loop back

inet 172.25.4.11/24 - eth0 (device name)

IPV6 Details

inet6 :: 1/128 - loop back

inet6 fe80 :: 5054 : ff : fe00 : 40b/64 - eth0

.) ping <ipv4> { checking the connection with ipv4 }

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ ping 172.25.4.11
PING 172.25.4.11 (172.25.4.11) 56(84) bytes of data.
64 bytes from 172.25.4.11: icmp_seq=1 ttl=64 time=0.047 ms
64 bytes from 172.25.4.11: icmp_seq=2 ttl=64 time=0.044 ms
64 bytes from 172.25.4.11: icmp_seq=3 ttl=64 time=0.044 ms
64 bytes from 172.25.4.11: icmp_seq=4 ttl=64 time=0.043 ms
64 bytes from 172.25.4.11: icmp_seq=5 ttl=64 time=0.043 ms
64 bytes from 172.25.4.11: icmp_seq=6 ttl=64 time=0.043 ms
^C
--- 172.25.4.11 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 4999ms
rtt min/avg/max/mdev = 0.043/0.044/0.047/0.001 ms
[student@server4 Desktop]$ █
```

.) ping6 <ipv6>

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ ping6 fe80::5054:ff:fe00:40b
connect: Invalid argument
[student@server4 Desktop]$ █
```

Here with the above command it will say Invalid argument

.) ping6 -I eth0 <ipv6> { checking the connection with ipv6 }

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ ping6 -I eth0 fe80::5054:ff:fe00:40b
PING fe80::5054:ff:fe00:40b(fe80::5054:ff:fe00:40b) from fe80::5054:ff:fe00:40b
eth0: 56 data bytes
64 bytes from fe80::5054:ff:fe00:40b: icmp_seq=1 ttl=64 time=0.068 ms
64 bytes from fe80::5054:ff:fe00:40b: icmp_seq=2 ttl=64 time=0.053 ms
64 bytes from fe80::5054:ff:fe00:40b: icmp_seq=3 ttl=64 time=0.053 ms
64 bytes from fe80::5054:ff:fe00:40b: icmp_seq=4 ttl=64 time=0.052 ms
^C
--- fe80::5054:ff:fe00:40b ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 2999ms
rtt min/avg/max/mdev = 0.052/0.056/0.068/0.010 ms
[student@server4 Desktop]$ █
```

Shrink and Expand

Shrink :

ex 1 :

fe80 : 0000 : 0000 : 0064 : 5400 : fe00 : 0001 : 002b

Rule 1 : omit all pre zeros

fe80 : 0 : 0 : 64 : 5400 : fe00 : 1 : 2b

Rule 2 : omit block , if more than one continuous blocks having zeros

fe80 :: 64 : 5400 : fe00 : 1 : 2b

ex 2 :

b65a : 5054 : 0000 : fe80 : 000f : 0000 : 2100 : 0267

Rule 1 : b65a : 5054 : 0 : fe80 : f : 0 : 2100 : 267

Rule 2 : b65a : 5054 : 0 : fe80 : f : 0 : 2100 : 267

Rule 1 and Rule are same because In Rule 2 We are not having continuous Zeros

ex 3 :

b65a : 5054 : 0000 : fe80 : 0000 : 0000 : 2100 : 0267

Rule 1 : b65a : 5054 : 0000 : fe80 : 0 : 0 : 2100 : 0267

Rule 2 : b65a : 5054 : 0000 : fe80 :: 2100 : 0267

ex 4 :

b65a : 0000 : 0000 : fe80 : 0000 : 0000 : 0021 : 0267

Rule 1 : b65a : 0 : 0 : fe80 : 0 : 0 : 21 : 267

Rule 2 : b65a :: fe80 :: 21: 267 → wrong

But Rule 2 is wrong because In IPV6 only one time :: accepted

Rule 3 :

Rule 2 + Rule 1 (recommended)

b65a :: fe80 : 0 : 0 : 21 : 267

Rule 1 + Rule 2 (also correct)

b65a : 0 : 0 : fe80 :: 21 : 267

ex 5 : b65a : fe80 : 2364 : 0000 : 0000 : 1234 : 0000 : 0000

Network ID | Host ID

First 4 blocks – Network ID

Last 4 block – Host ID

* IPV6 have self-discovery gateway option

with the above ex Rule 3 : b65a : fe80 : 2364 :: 1234 : 0 : 0 (invalid)

it is invalid because both rules are applied in Host ID

Expand

ex 6 :

fe80 :: 5054 : 1234 : 002b [8-4 = 4]

fe80 : 0000 : 0000 : 0000 : 0000 : 5054 : 1234 : 002b

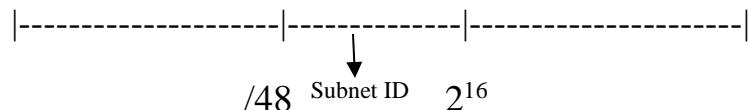
ex 7 :

loop back → :: 1 [8-1 = 7]

0000 : 0000 : 0000 : 0000 : 0000 : 0000 : 0000 : 0001

In Corporates We Use

3 blocks 1 block 4 blocks



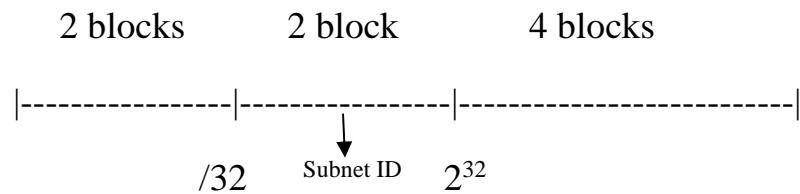
0 0 0 0

0 0 0 1 → start

f f f e → end

f f f f

For ISP



[Note : history -c to clear history]

DAY 31

nmcli

Adding IP and DNS

.) ip route or .) route -n

```
File Edit View Search Terminal Help
[root@server4 ~]# ip route
default via 172.25.4.254 dev eth0 proto static metric 1024
172.25.4.0/24 dev eth0 proto kernel scope link src 172.25.4.11
172.25.202.254 via 172.25.4.254 dev eth0 proto static metric 1
[root@server4 ~]# 
```

.) route -n

```
File Edit View Search Terminal Help
[root@server4 ~]# route -n
Kernel IP routing table
Destination     Gateway         Genmask        Flags Metric Ref    Use Iface
0.0.0.0         172.25.4.254   0.0.0.0       UG    1024    0        0 eth0
172.25.4.0      0.0.0.0        255.255.255.0 U        0    0        0 eth0
172.25.202.254 172.25.4.254   255.255.255.255 UGH   1        0        0 eth0
[root@server4 ~]# 
```

.) cat /etc/resolv.conf { DNS }

```
File Edit View Search Terminal Help
[root@server4 ~]# cat /etc/resolv.conf
# Generated by NetworkManager
domain example.com
search example.com
nameserver 172.25.254.254
[root@server4 ~]# 
```

.) nmcli dev show eth0 { show all info }

```
File Edit View Search Terminal Help
[root@server4 ~]# nmcli dev show eth0
GENERAL.DEVICE:                         eth0
GENERAL.TYPE:                            ethernet
GENERAL.HWADDR:                          52:54:00:00:04:0B
GENERAL.MTU:                             1500
GENERAL.STATE:                           100 (connected)
GENERAL.CONNECTION:                     System eth0
GENERAL.CON-PATH:                       /org/freedesktop/NetworkManager/ActiveConnection/0
WIRED-PROPERTIES.CARRIER:
IP4.ADDRESS[1]:                          ip = 172.25.4.11/24, gw = 172.25.4.254
IP4.ROUTE[1]:                           dst = 172.25.202.254/32, nh = 172.25.4.254, mt = 0
IP4.DNS[1]:                             172.25.254.254
IP4.DOMAIN[1]:                          example.com
IP6.ADDRESS[1]:                          ip = fe80::5054:ff:fe00:40b/64, gw = ::

[root@server4 ~]#
```

.) nmcli dev

```
File Edit View Search Terminal Help
[root@server4 ~]# nmcli dev
DEVICE  TYPE      STATE      CONNECTION
eth0    ethernet  connected  System eth0
lo     loopback  unmanaged  --
[root@server4 ~]#
```

.) nmcli con —add
 |
 |——— up down - X [don't use use]
 |——— delete
 |——— modify

.) nmcli con [UUID is unique]

```
File Edit View Search Terminal Help
[root@server4 ~]# nmcli con
NAME      UUID                                     TYPE      DEVICE
System eth0  5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03  802-3-ethernet  eth0
[root@server4 ~]#
```

Modifying Connection

- .) nmcli con mod "System eth0" ipv4.address 'IP GW' ipv4.method manual
- .) nmcli con mod "System eth0" ipv4.dns IP
- .) nmcli con up "System eth0"

```
File Edit View Search Terminal Help
[root@server4 ~]# nmcli con modify "System eth0" ipv4.addresses '172.25.4.11/24 172.25.4.254' ipv4.method manual
[root@server4 ~]#
[root@server4 ~]# nmcli con mod "System eth0" ipv4.dns 172.25.254.254
[root@server4 ~]#
[root@server4 ~]# nmcli con up "System eth0"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/1)
[root@server4 ~]# 
```

- .) nmcli con mod "System eth0" ipv4.address 'IP GW' ipv4.dns 8.8.8.8
 ipv4.method manual
 { Both IP and DNS at a time }
- .) nmcli con up "System eth0"

```
File Edit View Search Terminal Help
[root@server4 ~]# nmcli con modify "System eth0" ipv4.addresses '172.25.4.11/24 172.25.4.254' ipv4.dns 8.8.8.8 ipv4.method manual
[root@server4 ~]#
[root@server4 ~]# nmcli con up "System eth0"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/2)
[root@server4 ~]# 
```

- .).) cat /etc/resolv.conf

```
File Edit View Search Terminal Help
[root@server4 ~]# cat /etc/resolv.conf
# Generated by NetworkManager
nameserver 8.8.8.8
[root@server4 ~]# 
```

If we deactivate then go to server and activate through nmtui

nmtuiu {easy method }

.) nmtui

```
File Edit View Search Terminal Help  
[root@server4 ~]# nmtui
```

in nmtui choose Edit a Connection then choose ok



In Edit Connection

Addresses

<Add...>

give IP address

then If want to change DNS then change it and click on ok



.) nmcli con up "System eth0"

```
File Edit View Search Terminal Help
[root@server4 ~]# nmtui
[root@server4 ~]#
[root@server4 ~]# nmcli con up "System eth0"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/3)
[root@server4 ~]# 
```

.) ifconfig

```
File Edit View Search Terminal Help
[root@server4 ~]# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 172.25.4.11 netmask 255.255.255.0 broadcast 172.25.4.255
              inet6 fe80::5054:ff:fe00:40b prefixlen 64 scopeid 0x20<link>
                ether 52:54:00:00:04:0b txqueuelen 1000 (Ethernet)
                  RX packets 1416 bytes 155344 (151.7 KiB)
                  RX errors 0 dropped 0 overruns 0 frame 0
                  TX packets 800 bytes 123203 (120.3 KiB)
                  TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
        inet 127.0.0.1 netmask 255.0.0.0
              inet6 ::1 prefixlen 128 scopeid 0x10<host>
                loop txqueuelen 0 (Local Loopback)
                  RX packets 44 bytes 4084 (3.9 KiB)
                  RX errors 0 dropped 0 overruns 0 frame 0
                  TX packets 44 bytes 4084 (3.9 KiB)
                  TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

[root@server4 ~]# 
```

ifconfig won't show multiple IP address of our PC

ip a can show all IP address

.) ip a

```
File Edit View Search Terminal Help
[root@server4 ~]# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
        inet 127.0.0.1/8 scope host lo
            valid_lft forever preferred_lft forever
        inet6 ::1/128 scope host
            valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether 52:54:00:00:04:0b brd ff:ff:ff:ff:ff:ff
        inet 172.25.4.11/24 brd 172.25.4.255 scope global eth0
            valid_lft forever preferred_lft forever
        inet 172.25.4.100/24 brd 172.25.4.255 scope global secondary eth0
            valid_lft forever preferred_lft forever
        inet6 fe80::5054:ff:fe00:40b/64 scope link
            valid_lft forever preferred_lft forever
[root@server4 ~]# 
```

.) nmcli con mod “System eth0” +ipv4.address IP +ipv4.dns 4.4.4.4

[every time doesn't require to give method manual]

.) nmcli con up “System eth0”

```
File Edit View Search Terminal Help
[root@server4 ~]# nmcli con modify "System eth0" +ipv4.addresses 172.25.4.200/24 +ipv4.dns 4.4.4.4
[root@server4 ~]#
[root@server4 ~]# nmcli con up "System eth0"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/4)
[root@server4 ~]# 
```

.) ip a

```
File Edit View Search Terminal Help
[root@server4 ~]# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
        inet 127.0.0.1/8 scope host lo
            valid_lft forever preferred_lft forever
        inet6 ::1/128 scope host
            valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether 52:54:00:00:04:0b brd ff:ff:ff:ff:ff:ff
        inet 172.25.4.11/24 brd 172.25.4.255 scope global eth0
            valid_lft forever preferred_lft forever
        inet 172.25.4.100/24 brd 172.25.4.255 scope global secondary eth0
            valid_lft forever preferred_lft forever
        inet 172.25.4.200/24 brd 172.25.4.255 scope global secondary eth0
            valid_lft forever preferred_lft forever
        inet6 fe80::5054:ff:fe00:40b/64 scope link
            valid_lft forever preferred_lft forever
[root@server4 ~]# 
```

.) cat /etc/resolv.conf

```
File Edit View Search Terminal Help
[root@server4 ~]# cat /etc/resolv.conf
# Generated by NetworkManager
nameserver 8.8.8.8
nameserver 4.4.4.4
[root@server4 ~]# 
```

.) nmcli con mod "System eth0" -ipv4.address IP -ipv4.dns 4.4.4.4

{ removing IP }

.) nmcli con up "system eth0"

```
File Edit View Search Terminal Help
[root@server4 ~]# nmcli con modify "System eth0" -ipv4.addresses 172.25.4.200/24 -ipv4.dns 4.4.4.4
[root@server4 ~]#
[root@server4 ~]# nmcli con up "System eth0"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/5)
[root@server4 ~]# 
```

.) ip a

```
File Edit View Search Terminal Help
[root@server4 ~]# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether 52:54:00:04:0b brd ff:ff:ff:ff:ff:ff
    inet 172.25.4.11/24 brd 172.25.4.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet 172.25.4.100/24 brd 172.25.4.255 scope global secondary eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::5054:ff:fe00:40b/64 scope link
        valid_lft forever preferred_lft forever
[root@server4 ~]# 
```

.) cat /etc/resolv.conf

```
File Edit View Search Terminal Help
[root@server4 ~]# cat /etc/resolv.conf
# Generated by NetworkManager
nameserver 8.8.8.8
[root@server4 ~]# 
```

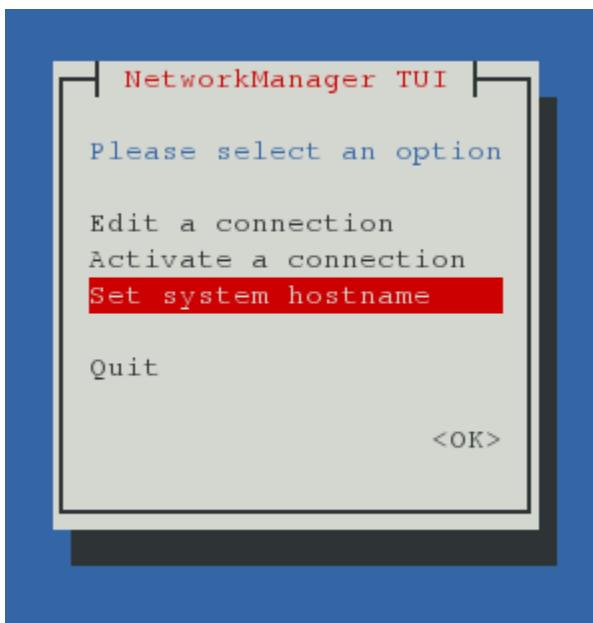
Host Name Modifying

steps:

.) nmtui

```
File Edit View Search Terminal Help  
[root@server4 ~]# nmtui
```

.) select set system host name



then give the host name then below screen shot will come



.) ctrl +D

.) hostname

```
File Edit View Search Terminal Help
[student@server4 ~]$ hostname
server2.example.com
[student@server4 ~]$ 
```

another method

.) hostnamectl set-hostname <HostName>

```
File Edit View Search Terminal Help
[student@server4 ~]$ hostnamectl set-hostname server22.example.com
==== AUTHENTICATING FOR org.freedesktop.hostname1.set-static-hostname ===
Authentication is required to set the statically configured local host name, as well as the pretty host name.
Authenticating as: Student User (student)
Password:
==== AUTHENTICATION COMPLETE ===
[student@server4 ~]$ hostname
server22.example.com
[student@server4 ~]$ 
```

.) ctrl + D

.) hostname

```
File Edit View Search Terminal Help
[student@server4 ~]$ hostname
server22.example.com
[student@server4 ~]$ 
```

Assigning IPV6

root@serverX

.) nmcli con mod “System eth0” ipv6.addresses fe80 :: 5054 : ff : fe00 : b01/64
 ipv6.method manual

.) nmcli con up “System eth0”

```
File Edit View Search Terminal Tabs Help
root@server16:~                                     x root@localhost:~
[root@server16 ~]# nmcli con mod "System eth0" ipv6.addresses fe80::5054:ff:fe00:b01/64 ipv6.method manual
[root@server16 ~]#
[root@server16 ~]# nmcli con up "System eth0"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/1)
[root@server16 ~]#
```

.) ip a

```
File Edit View Search Terminal Tabs Help
root@server16:~                                     x root@localhost:~
[root@server16 ~]# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether 52:54:00:00:10:0b brd ff:ff:ff:ff:ff:ff
    inet 172.25.16.11/24 brd 172.25.16.255 scope global dynamic eth0
        valid_lft 21592sec preferred_lft 21592sec
    inet6 fe80::5054:ff:fe00:b01/64 scope link
        valid_lft forever preferred_lft forever
    inet6 fe80::5054:ff:fe00:100b/64 scope link
        valid_lft forever preferred_lft forever
[root@server16 ~]#
```

root@desktopX

.) nmcli con mod "System eth0" ipv6.addresses fe80::5054:ff:fe00:a01/64
 ipv6.method manual

.) nmcli con up "System eth0"

```
File Edit View Search Terminal Tabs Help
root@server16:~# nmcli con mod "System eth0" ipv6.addresses fe80::5054:ff:fe00:a01/64 ipv6.method manual
root@localhost ~]#
[root@localhost ~]# nmcli con up "System eth0"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/1)
[root@localhost ~]# 
```

.) ip a

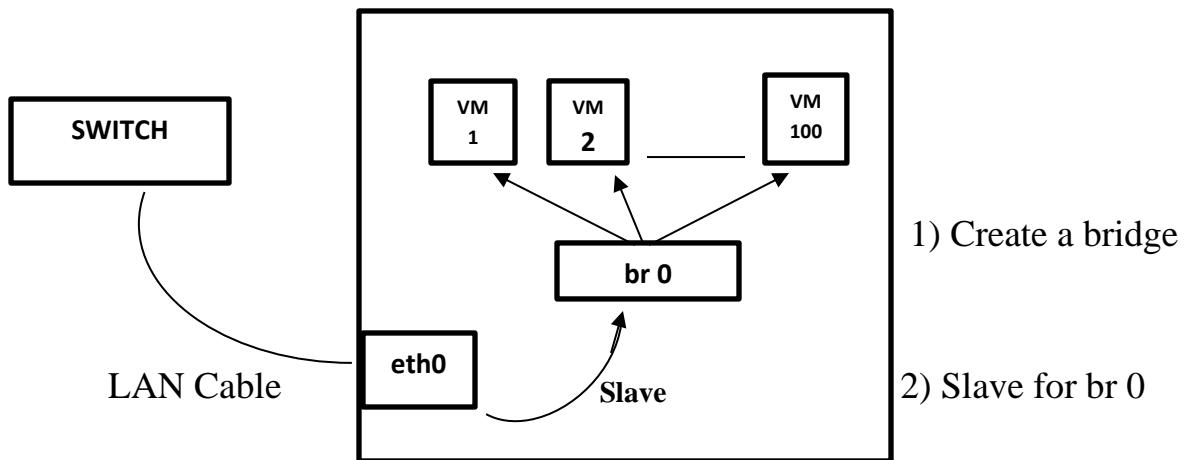
```
File Edit View Search Terminal Tabs Help
root@server16:~# ip a
root@localhost ~]# ip a
[root@localhost ~]# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
        inet 127.0.0.1/8 scope host lo
            valid_lft forever preferred_lft forever
        inet6 ::1/128 scope host
            valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether 52:54:00:10:0a brd ff:ff:ff:ff:ff:ff
        inet 172.25.16.10/24 brd 172.25.16.255 scope global dynamic eth0
            valid_lft 21595sec preferred_lft 21595sec
        inet6 fe80::5054:ff:fe00:a01/64 scope link
            valid_lft forever preferred_lft forever
        inet6 fe80::5054:ff:fe00:10a/64 scope link
            valid_lft forever preferred_lft forever
[root@localhost ~]# 
```

.) ping6 -I eth0 fe80::5054:ff:fe00:b01

```
File Edit View Search Terminal Tabs Help
root@server16:~# ping6 -I eth0 fe80::5054:ff:fe00:b01
PING fe80::5054:ff:fe00:b01(fe80::5054:ff:fe00:b01) from fe80::5054:ff:fe00:a01 eth0: 56 data bytes
64 bytes from fe80::5054:ff:fe00:b01: icmp_seq=1 ttl=64 time=3.64 ms
64 bytes from fe80::5054:ff:fe00:b01: icmp_seq=2 ttl=64 time=0.206 ms
64 bytes from fe80::5054:ff:fe00:b01: icmp_seq=3 ttl=64 time=0.166 ms
64 bytes from fe80::5054:ff:fe00:b01: icmp_seq=4 ttl=64 time=0.151 ms
64 bytes from fe80::5054:ff:fe00:b01: icmp_seq=5 ttl=64 time=0.257 ms
^C
--- fe80::5054:ff:fe00:b01 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4001ms
rtt min/avg/max/mdev = 0.151/0.885/3.645/1.380 ms
[root@localhost ~]# 
```

LINUX Bridge / Software Bridge

- .) We call it as BRIDGING
- .) Important in real time
- .) Bridge is a software ; In Linux by default it was installed



- .) Bridge is a mediator between Virtual Machine and Physical Entity
- .) If LAN failed bridge not failed

Steps

View Server

.) nmcli dev

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli dev
DEVICE  TYPE      STATE      CONNECTION
eth0    ethernet  connected  System eth0
lo     loopback  unmanaged  --
[student@server4 Desktop]$ █
```

.) nmcli con

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli con
NAME      UUID                                  TYPE      DEVICE
System eth0 5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03 802-3-ethernet eth0
[student@server4 Desktop]$ █
```

.) nmcli con add type bridge con-name br0 ifname br0

[if name means interface name]

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli con add type bridge con-name br0 ifname br0
Connection 'br0' (f4ed7eb3-c7fc-451c-b5a7-99159c4ea94e) successfully added.
[student@server4 Desktop]$ █
```

.) nmcli dev

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli dev
DEVICE  TYPE      STATE          CONNECTION
eth0    ethernet  connected    System eth0
br0    bridge    connecting   (getting IP configuration) br0
lo     loopback  unmanaged  --
[student@server4 Desktop]$ █
```

.) nmcli con

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli con
NAME           UUID
br0            f4ed7eb3-c7fc-451c-b5a7-99159c4ea94e
System eth0    5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03
[student@server4 Desktop]$
```

NAME	UUID	TYPE	DEVICE
br0	f4ed7eb3-c7fc-451c-b5a7-99159c4ea94e	bridge	br0
System eth0	5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03	802-3-ethernet	eth0

.) nmcli con add type bridge-slave con-name br0-slave1 ifname eth0

master br0

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli con add type bridge-slave con-name br0-slave1 ifname eth0 master br0
Connection 'br0-slave1' (4a079cb6-87a1-4186-a7a5-5238d7d30302) successfully added.
[student@server4 Desktop]$
```

.) nmcli con up br0-slave1

[First we need to active slave then bridge]

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli con up br0-slave1
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/2)
[student@server4 Desktop]$
```

.) nmcli con up br0

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli con up br0
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/3)
[student@server4 Desktop]$
```

.) ip a

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast master br0 state UP qlen 1000
    link/ether 52:54:00:00:04:0b brd ff:ff:ff:ff:ff:ff
3: br0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP
    link/ether 52:54:00:00:04:0b brd ff:ff:ff:ff:ff:ff
    inet 172.25.4.11/24 brd 172.25.4.255 scope global dynamic br0
        valid_lft 21593sec preferred_lft 21593sec
    inet6 fe80::5054:ff:fe00:40b/64 scope link
        valid_lft forever preferred_lft forever
[student@server4 Desktop]$ █
```

.) ping -I br0 <IP>

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ ping -I br0 172.25.4.11
PING 172.25.4.11 (172.25.4.11) from 172.25.4.11 br0: 56(84) bytes of data.
64 bytes from 172.25.4.11: icmp_seq=1 ttl=64 time=0.044 ms
64 bytes from 172.25.4.11: icmp_seq=2 ttl=64 time=0.043 ms
64 bytes from 172.25.4.11: icmp_seq=3 ttl=64 time=0.044 ms
64 bytes from 172.25.4.11: icmp_seq=4 ttl=64 time=0.044 ms
64 bytes from 172.25.4.11: icmp_seq=5 ttl=64 time=0.043 ms
64 bytes from 172.25.4.11: icmp_seq=6 ttl=64 time=0.048 ms
^C
--- 172.25.4.11 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 4999ms
rtt min/avg/max/mdev = 0.043/0.044/0.048/0.005 ms
[student@server4 Desktop]$ █
```

.) brctl show { bridge controller }

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ brctl show
bridge name      bridge id               STP enabled      interfaces
br0              8000.52540000040b        yes             eth0
[student@server4 Desktop]$ █
```

.) nmcli con add type bridge con-name br1 ifname br1

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli con add type bridge con-name br1 ifname br1
Connection 'br1' (7eb5125e-0884-4d8d-878e-6fd079fe4509) successfully added.
[student@server4 Desktop]$ █
```

.) nmcli con add type bridge-slave con-name br1-slave1 ifname eth0

master br1

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli con add type bridge-slave con-name br1-slave1 ifname eth0 master br1
Connection 'br1-slave1' (ed0a21af-5f8e-4a3d-a2fc-a8408acf56e6) successfully added.
[student@server4 Desktop]$ █
```

.) nmcli dev

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli dev
DEVICE  TYPE      STATE                      CONNECTION
br0     bridge    connected                  br0
eth0    ethernet  connected                br0-slave1
br1     bridge    connecting (getting IP configuration) br1
lo      loopback  unmanaged                --
[student@server4 Desktop]$ █
```

.) nmcli con

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli con
NAME      UUID                                  TYPE      DEVICE
br0-slave1 4a079cb6-87a1-4186-a7a5-5238d7d30302 802-3-ethernet  eth0
br0        f4ed7eb3-c7fc-451c-b5a7-99159c4ea94e  bridge      br0
System eth0 5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03 802-3-ethernet  --
br1-slave1 ed0a21af-5f8e-4a3d-a2fc-a8408acf56e6 802-3-ethernet  --
br1        7eb5125e-0884-4d8d-878e-6fd079fe4509  bridge      br1
[student@server4 Desktop]$ █
```

.) brctl show

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ brctl show
bridge name      bridge id          STP enabled    interfaces
br0              8000.52540000040b   yes           eth0
br1              8000.000000000000   yes
[student@server4 Desktop]$
```

.) nmcli con delete br0-slave1

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli con delete br0-slave1
[student@server4 Desktop]$ █
```

.) nmcli con delete br0

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli con delete br0
[student@server4 Desktop]$ █
```

.) nmcli dev

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli dev
DEVICE  TYPE      STATE                      CONNECTION
eth0    ethernet  connected                  System eth0
br1    bridge    connecting (getting IP configuration)  br1
lo     loopback  unmanaged                  --
[student@server4 Desktop]$ █
```

.) nmcli con

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli con
NAME      UUID                                     TYPE      DEVICE
System    eth0          5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03 802-3-ethernet eth0
br1-slave1 ed0a21af-5f8e-4a3d-a2fc-a8408acf56e6 802-3-ethernet --
br1        7eb5125e-0884-4d8d-878e-6fd079fe4509 bridge     br1
[student@server4 Desktop]$
```

.) brctl show

STP - Spaning Tree Protocol

STP identify loops

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ brctl show
bridge name      bridge id           STP enabled      interfaces
br1              8000.000000000000   yes
[student@server4 Desktop]$
```

.) sudo brctl stp br1 off { STP disabled }

.) brctl show

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ sudo brctl stp br1 off
[student@server4 Desktop]$
[student@server4 Desktop]$ brctl show
bridge name      bridge id           STP enabled      interfaces
br1              8000.000000000000   no
[student@server4 Desktop]$ █
```

.) nmcli dev disconnect eth0 { LAN card Failed }

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli dev disconnect eth0
[student@server4 Desktop]$ █
```

.) nmcli dev

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli dev
DEVICE  TYPE      STATE          CONNECTION
br1     bridge    connecting (getting IP configuration) br1
eth0    ethernet  disconnected   --
lo      loopback  unmanaged    --
[student@server4 Desktop]$
```

.) nmcli con

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli con
NAME      UUID           TYPE      DEVICE
System eth0 5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03 802-3-ethernet --
br1-slave1 ed0a21af-5f8e-4a3d-a2fc-a8408acf56e6 802-3-ethernet --
br1       7eb5125e-0884-4d8d-878e-6fd079fe4509 bridge      br1
[student@server4 Desktop]$ █
```

.) ping -I br1 <IP>

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ ping -I br1 172.25.4.11
ping: Warning: source address might be selected on device other than br1.
PING 172.25.4.11 (172.25.4.11) from 0.0.0.0 br1: 56(84) bytes of data.
From 127.0.0.1 icmp_seq=1 Destination Host Unreachable
From 127.0.0.1 icmp_seq=2 Destination Host Unreachable
From 127.0.0.1 icmp_seq=3 Destination Host Unreachable
From 127.0.0.1 icmp_seq=4 Destination Host Unreachable
^C
--- 172.25.4.11 ping statistics ---
7 packets transmitted, 0 received, +4 errors, 100% packet loss, time 6000ms
pipe 4
[student@server4 Desktop]$ █
```

.) nmcli con up br1-slave1

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli con up br1-slave1
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/7)
[student@server4 Desktop]$
```

.) nmcli dev

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli dev
DEVICE  TYPE      STATE   CONNECTION
br1     bridge    connected br1
eth0    ethernet  connected br1-slave1
lo      loopback  unmanaged --
[student@server4 Desktop]$ █
```

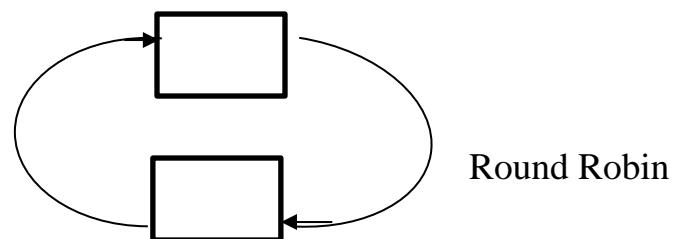
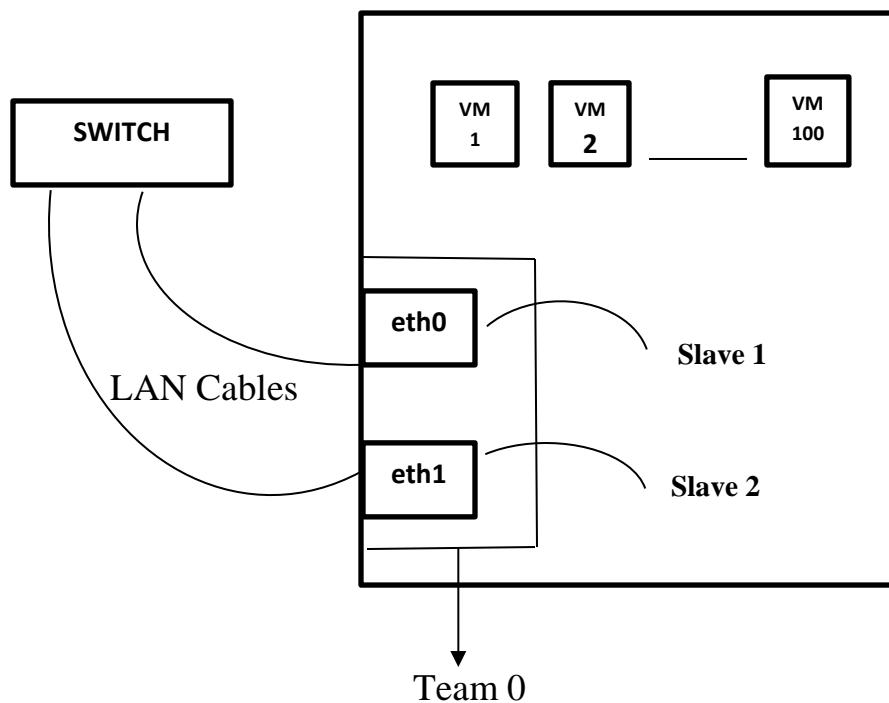
.) nmcli con

```
File Edit View Search Terminal Help
[student@server4 Desktop]$ nmcli con
NAME          UUID                                  TYPE      DEVICE
System eth0   5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03 802-3-ethernet --
br1-slave1   ed0a21af-5f8e-4a3d-a2fc-a8408acf56e6 802-3-ethernet eth0
br1         7eb5125e-0884-4d8d-878e-6fd079fe4509 bridge      br1
[student@server4 Desktop]$ █
```

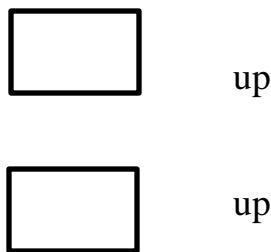
Day 32

Teaming / Bonding

json file configure with runner

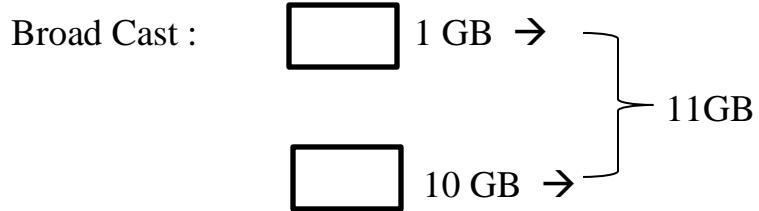


Round Robin



Active Backup

Load Balance : Load equally Distributed



.) man teamd.conf

runner.name (string, mandatory)

Name of team device. The following runners are available:

broadcast – Simple runner which directs the team device to transmit packets via all ports.

roundrobin – Simple runner which directs the team device to transmits packets in a round-robin fashion.

activebackup – Watches for link changes and selects active port to be used for data transfers.

loadbalance – To do passive load balancing, runner only sets up BPF hash function which will determine port for packet transmit. To do active load balancing, runner moves hashes among available ports trying to reach perfect balance.

steps :

view server

.) connect as root

.) nmcli dev

```
File Edit View Search Terminal Help
[root@server4 ~]# nmcli dev
DEVICE  TYPE      STATE      CONNECTION
eth0    ethernet  connected  System eth0
lo     loopback  unmanaged  --
[root@server4 ~]# █
```

.) lab team-bridge setup

```
File Edit View Search Terminal Help
[root@server4 ~]# lab teambridge setup
Setting up for link aggregation lab ... SUCCESS
[root@server4 ~]# █
```

.) nmcli dev

```
File Edit View Search Terminal Help
[root@server4 ~]# nmcli dev
DEVICE  TYPE      STATE      CONNECTION
eth0    ethernet  connected  System eth0
en01   ethernet  disconnected --
en02   ethernet  disconnected --
lo     loopback  unmanaged  --
[root@server4 ~]# █
```

```
.) nmcli con add type team con-name team0 ifname team0 config  
    {"runner": {"name": "activebackup"} }'
```

```
File Edit View Search Terminal Help  
[root@server4 ~]# nmcli con add type team con-name team0 ifname team0 config '{"runner": {"name": "activebackup"} }'  
Connection 'team0' (97dc1a10-d7ed-4143-a927-a898e6f52466) successfully added.  
[root@server4 ~]# █
```

.) nmcli con up team0

[not activated]

```
File Edit View Search Terminal Help  
[root@server4 ~]# nmcli con up team0  
Error: Device 'team0' is waiting for slaves before proceeding with activation.  
[root@server4 ~]# █
```

.) nmcli con mod team0 ipv4.addresses 192.168.100.1/24 ipv4.method manual

.) nmcli con up team0

```
File Edit View Search Terminal Help  
[root@server4 ~]# nmcli con mod team0 ipv4.addresses 192.168.100.1/24 ipv4.method manual  
[root@server4 ~]#  
[root@server4 ~]#  
[root@server4 ~]# nmcli con up team0  
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/3)  
[root@server4 ~]# █
```

[Now activated]

.) teamdctl team0 state

```
File Edit View Search Terminal Help  
[root@server4 ~]# teamdctl team0 state  
setup:  
    runner: activebackup  
runner:  
    active port:  
[root@server4 ~]# █
```

```
.) nmcli con add tpe team-slave con-name team0-port1 ifname eno1 master  
team0
```

```
File Edit View Search Terminal Help  
[root@server4 ~]# nmcli con add type team-slave con-name team0-port1 ifname eno1 master team0  
Connection 'team0-port1' (871aacca-39f0-4338-988d-cb5618c73a60) successfully added.  
[root@server4 ~]# █
```

```
.) nmcli con add tpe team-slave con-name team0-port2 ifname eno2 master  
team0
```

```
File Edit View Search Terminal Help  
[root@server4 ~]# nmcli con add type team-slave con-name team0-port2 ifname eno2 master team0  
Connection 'team0-port2' (602f3ba8-b427-409d-8e0b-3356f7e0d09c) successfully added.  
[root@server4 ~]# █
```

```
.) nmcli con up team0-port1
```

```
File Edit View Search Terminal Help  
[root@server4 ~]# nmcli con up team0-port1  
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/6)  
[root@server4 ~]# █
```

```
.) nmcli con up team0-port2
```

```
File Edit View Search Terminal Help  
[root@server4 ~]# nmcli con up team0-port2  
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/7)  
[root@server4 ~]# █
```

```
.) teamdctl team0 state
```

```
File Edit View Search Terminal Help
[root@server4 ~]# teamdctl team0 state
setup:
runner: activebackup
ports:
en01
link watches:
link summary: up
instance[link_watch_0]:
name: ethtool
link: up
en02
link watches:
link summary: up
instance[link_watch_0]:
name: ethtool
link: up
runner:
active port: en01
[root@server4 ~]# █
```

In Another Tab as student

```
.) ping -I team0 192.168.100.1
```

[check connecting or not]

```
File Edit View Search Terminal Tabs Help
root@server4:~ student@server4:~/Desktop
[student@server4 Desktop]$ ping -I team0 192.168.100.1
PING 192.168.100.1 (192.168.100.1) from 192.168.100.1 team0: 56(84) bytes of data.
64 bytes from 192.168.100.1: icmp_seq=1 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=2 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=3 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=4 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=5 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=6 ttl=64 time=0.046 ms
█
```

Come Back to Previous Tab

.) nmcli dev

```
File Edit View Search Terminal Tabs Help
root@server4:~
[root@server4 ~]# nmcli dev
DEVICE  TYPE      STATE      CONNECTION
eno1    ethernet  connected  team0-port1
eno2    ethernet  connected  team0-port2
eth0    ethernet  connected  System eth0
team0   team      connected  team0
lo     loopback  unmanaged  --
[root@server4 ~]# █
```

.) nmcli dev disconnect eno1

```
File Edit View Search Terminal Tabs Help
root@server4:~
[root@server4 ~]# nmcli dev disconnect eno1
[root@server4 ~]# █
```

.) teamdctl team0 state

```
File Edit View Search Terminal Tabs Help
root@server4:~
[root@server4 ~]# nmcli dev disconnect eno1
[root@server4 ~]#
[root@server4 ~]# teamdctl team0 state
setup:
  runner: activebackup
ports:
  eno2
    link watches:
      link summary: up
      instance[link_watch_0]:
        name: ethtool
        link: up
runner:
  active port: eno2
[root@server4 ~]# █
```

Check in other tab connecting or not because disconnected eno1
but it is connecting

```
File Edit View Search Terminal Tabs Help
root@server4:~ x student@server4:~/Desktop
64 bytes from 192.168.100.1: icmp_seq=79 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=80 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=81 ttl=64 time=0.055 ms
64 bytes from 192.168.100.1: icmp_seq=82 ttl=64 time=0.044 ms
64 bytes from 192.168.100.1: icmp_seq=83 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=84 ttl=64 time=0.049 ms
64 bytes from 192.168.100.1: icmp_seq=85 ttl=64 time=0.047 ms
64 bytes from 192.168.100.1: icmp_seq=86 ttl=64 time=0.044 ms
64 bytes from 192.168.100.1: icmp_seq=87 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=88 ttl=64 time=0.055 ms
64 bytes from 192.168.100.1: icmp_seq=89 ttl=64 time=0.044 ms
64 bytes from 192.168.100.1: icmp_seq=90 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=91 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=92 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=93 ttl=64 time=0.044 ms
64 bytes from 192.168.100.1: icmp_seq=94 ttl=64 time=0.047 ms
64 bytes from 192.168.100.1: icmp_seq=95 ttl=64 time=0.450 ms
64 bytes from 192.168.100.1: icmp_seq=96 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=97 ttl=64 time=0.047 ms
64 bytes from 192.168.100.1: icmp_seq=98 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=99 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=100 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=101 ttl=64 time=0.052 ms
64 bytes from 192.168.100.1: icmp_seq=102 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=103 ttl=64 time=0.047 ms
64 bytes from 192.168.100.1: icmp_seq=104 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=105 ttl=64 time=0.047 ms
64 bytes from 192.168.100.1: icmp_seq=106 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=107 ttl=64 time=0.076 ms
64 bytes from 192.168.100.1: icmp_seq=108 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=109 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=110 ttl=64 time=0.046 ms
[]
```

.) nmcli con

```
File Edit View Search Terminal Tabs Help
root@server4:~ x student@server4:~/Des
[root@server4 ~]# nmcli con
NAME          UUID
team0-port1   871aacca-39f0-4338-988d-cb5618c73a60
team0         97dc1a10-d7ed-4143-a927-a898e6f52466
System eth0   5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03
team0-port2   602f3ba8-b427-409d-8e0b-3356f7e0d09c
[root@server4 ~]#
```

.) nmcli con up team0-port1

```
File Edit View Search Terminal Tabs Help
root@server4:~                                     student@student@server4:~/Desktop
[ root@server4 ~]# nmcli con up team0-port1
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/8)
[ root@server4 ~]# █
```

.) teamdctl team0 state

```
File Edit View Search Terminal Tabs Help
root@server4:~
[ root@server4 ~]# teamdctl team0 state
setup:
  runner: activebackup
ports:
  eno2
    link watches:
      link summary: up
      instance[link_watch_0]:
        name: ethtool
        link: up
  eno1
    link watches:
      link summary: up
      instance[link_watch_0]:
        name: ethtool
        link: up
runner:
  active port: eno2
[ root@server4 ~]# █
```

.) nmcli con

```
File Edit View Search Terminal Tabs Help
root@server4:~                                     student@student@server4:~/Desktop
[ root@server4 ~]# nmcli con
NAME          UUID                                  TYPE      DEVICE
team0-port1   871aacca-39f0-4338-988d-cb5618c73a60 802-3-ethernet  eno1
team0         97dc1a10-d7ed-4143-a927-a898e6f52466  team       team0
System eth0   5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03 802-3-ethernet  eth0
team0-port2   602f3ba8-b427-409d-8e0b-3356f7e0d09c 802-3-ethernet  eno2
[ root@server4 ~]# █
```

.) nmcli dev disconnect eno2

.) nmcli dev

```
File Edit View Search Terminal Tabs Help
root@server4:~
[root@server4 ~]# nmcli dev disconnect eno2
[root@server4 ~]#
[root@server4 ~]# nmcli dev
DEVICE  TYPE      STATE      CONNECTION
eno1    ethernet  connected  team0-port1
eth0    ethernet  connected  System eth0
team0   team      connected  team0
eno2    ethernet  disconnected  --
lo     loopback  unmanaged  --
[root@server4 ~]#
```

.)nmcli con

```
File Edit View Search Terminal Tabs Help
root@server4:~                                         student@server4:~/Des
[root@server4 ~]# nmcli con
NAME      UUID                                     TYPE      DEVICE
team0-port1 871aacca-39f0-4338-988d-cb5618c73a60 802-3-ethernet  eno1
team0      97dc1a10-d7ed-4143-a927-a898e6f52466  team      team0
System eth0 5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03 802-3-ethernet  eth0
team0-port2 602f3ba8-b427-409d-8e0b-3356f7e0d09c 802-3-ethernet  --
[root@server4 ~]#
```

Check in other tab connecting or not because disconnected eno2
but it is connecting

```
File Edit View Search Terminal Tabs Help
root@server4:~                                     student@student4:~/Desktop
64 bytes from 192.168.100.1: icmp_seq=216 ttl=64 time=0.044 ms
64 bytes from 192.168.100.1: icmp_seq=217 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=218 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=219 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=220 ttl=64 time=0.044 ms
64 bytes from 192.168.100.1: icmp_seq=221 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=222 ttl=64 time=0.071 ms
64 bytes from 192.168.100.1: icmp_seq=223 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=224 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=225 ttl=64 time=0.047 ms
64 bytes from 192.168.100.1: icmp_seq=226 ttl=64 time=0.061 ms
64 bytes from 192.168.100.1: icmp_seq=227 ttl=64 time=0.055 ms
64 bytes from 192.168.100.1: icmp_seq=228 ttl=64 time=0.052 ms
64 bytes from 192.168.100.1: icmp_seq=229 ttl=64 time=0.044 ms
64 bytes from 192.168.100.1: icmp_seq=230 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=231 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=232 ttl=64 time=0.086 ms
64 bytes from 192.168.100.1: icmp_seq=233 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=234 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=235 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=236 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=237 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=238 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=239 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=240 ttl=64 time=0.048 ms
64 bytes from 192.168.100.1: icmp_seq=241 ttl=64 time=0.044 ms
64 bytes from 192.168.100.1: icmp_seq=242 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=243 ttl=64 time=0.042 ms
64 bytes from 192.168.100.1: icmp_seq=244 ttl=64 time=0.047 ms
64 bytes from 192.168.100.1: icmp_seq=245 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=246 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=247 ttl=64 time=0.045 ms
```

.) teamdctl team0 state

```
File Edit View Search Terminal Tabs Help
root@server4:~
[root@server4 ~]# teamdctl team0 state
setup:
runner: activebackup
ports:
  eno1
    link watches:
      link summary: up
      instance[link_watch_0]:
        name: ethtool
        link: up
runner:
  active port: eno1
[root@server4 ~]#
```

.) nmcli con up team-port2

```
File Edit View Search Terminal Tabs Help
root@server4:~* student@server4:~/Desktop
[ root@server4 ~]# nmcli con up team0-port2
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/9)
[ root@server4 ~]#
```

.) teamdctl team0 state

```
File Edit View Search Terminal Tabs Help
root@server4:~
[ root@server4 ~]# teamdctl team0 state
setup:
runner: activebackup
ports:
eno2
    link watches:
        link summary: up
        instance[link_watch_0]:
            name: ethtool
            link: up
eno1
    link watches:
        link summary: up
        instance[link_watch_0]:
            name: ethtool
            link: up
runner:
active port: eno1
[ root@server4 ~]#
```

.) nmcli con

```
File Edit View Search Terminal Tabs Help
root@server4:~* student@server4:~/Desl
[ root@server4 ~]# nmcli con
NAME          UUID                                  TYPE      DEVICE
team0-port1   871aacca-39f0-4338-988d-cb5618c73a60 802-3-ethernet  eno1
team0         97dc1a10-d7ed-4143-a927-a898e6f52466  team       team0
System eth0   5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03 802-3-ethernet  eth0
team0-port2   602f3ba8-b427-409d-8e0b-3356f7e0d09c 802-3-ethernet  eno2
[ root@server4 ~]#
```

.) nmcli dev

```
File Edit View Search Terminal Tabs Help
root@server4:~
[root@server4 ~]# nmcli dev
DEVICE  TYPE      STATE   CONNECTION
en0     ethernet  connected team0-port1
en1     ethernet  connected team0-port2
eth0    ethernet  connected System eth0
team0   team      connected team0
lo      loopback unmanaged --
[root@server4 ~]# █
```

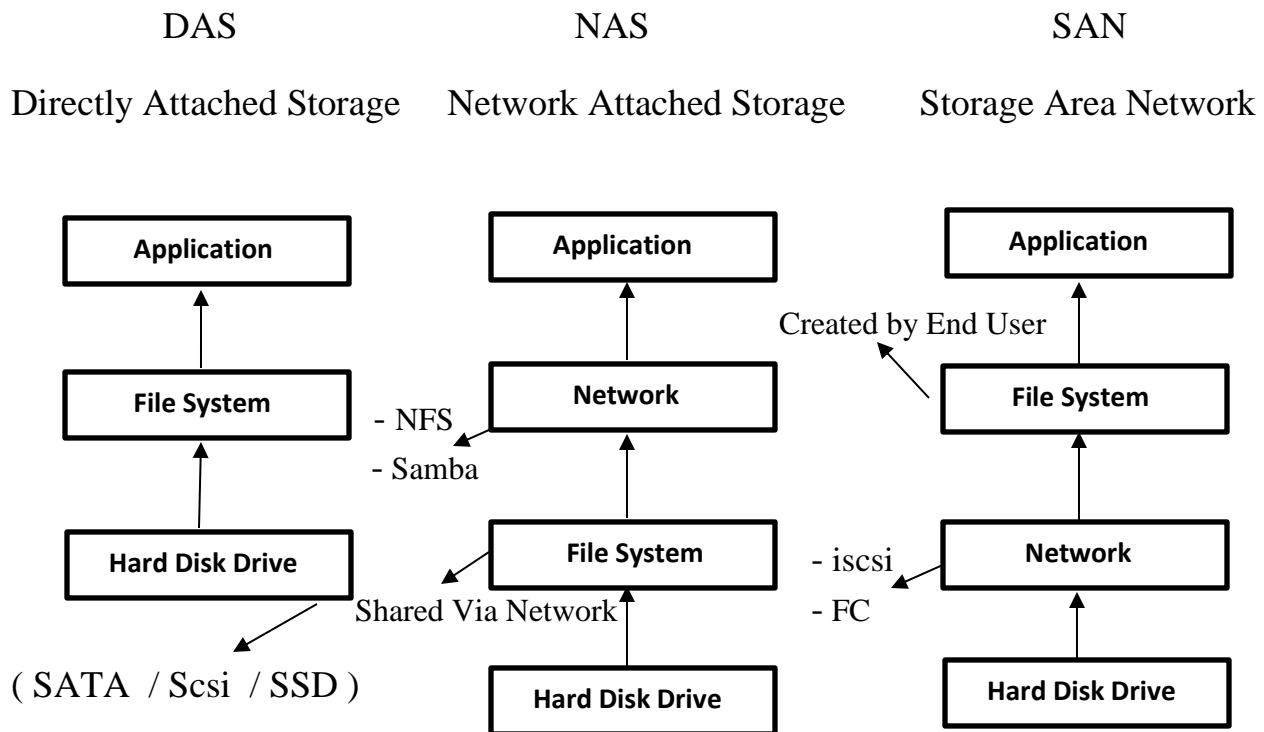
check the connection

```
File Edit View Search Terminal Tabs Help
root@server4:~                                     student@server4:~/Desktop
64 bytes from 192.168.100.1: icmp_seq=282 ttl=64 time=0.044 ms
64 bytes from 192.168.100.1: icmp_seq=283 ttl=64 time=0.044 ms
64 bytes from 192.168.100.1: icmp_seq=284 ttl=64 time=0.044 ms
64 bytes from 192.168.100.1: icmp_seq=285 ttl=64 time=0.081 ms
64 bytes from 192.168.100.1: icmp_seq=286 ttl=64 time=0.048 ms
64 bytes from 192.168.100.1: icmp_seq=287 ttl=64 time=0.047 ms
64 bytes from 192.168.100.1: icmp_seq=288 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=289 ttl=64 time=0.088 ms
64 bytes from 192.168.100.1: icmp_seq=290 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=291 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=292 ttl=64 time=0.052 ms
64 bytes from 192.168.100.1: icmp_seq=293 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=294 ttl=64 time=0.048 ms
64 bytes from 192.168.100.1: icmp_seq=295 ttl=64 time=0.048 ms
64 bytes from 192.168.100.1: icmp_seq=296 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=297 ttl=64 time=0.058 ms
64 bytes from 192.168.100.1: icmp_seq=298 ttl=64 time=0.051 ms
64 bytes from 192.168.100.1: icmp_seq=299 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=300 ttl=64 time=0.047 ms
64 bytes from 192.168.100.1: icmp_seq=301 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=302 ttl=64 time=0.054 ms
64 bytes from 192.168.100.1: icmp_seq=303 ttl=64 time=0.044 ms
64 bytes from 192.168.100.1: icmp_seq=304 ttl=64 time=0.046 ms
64 bytes from 192.168.100.1: icmp_seq=305 ttl=64 time=0.054 ms
64 bytes from 192.168.100.1: icmp_seq=306 ttl=64 time=0.043 ms
64 bytes from 192.168.100.1: icmp_seq=307 ttl=64 time=0.045 ms
64 bytes from 192.168.100.1: icmp_seq=308 ttl=64 time=0.047 ms
64 bytes from 192.168.100.1: icmp_seq=309 ttl=64 time=0.046 ms
^C
--- 192.168.100.1 ping statistics ---
309 packets transmitted, 309 received, 0% packet loss, time 308193ms
rtt min/avg/max/mdev = 0.041/0.050/0.450/0.033 ms
[student@server4 Desktop]$ █
```

DAY 33

Storage

3 types of storages



NFS - Network File System

CIFS – Common Internet File System (Samba)

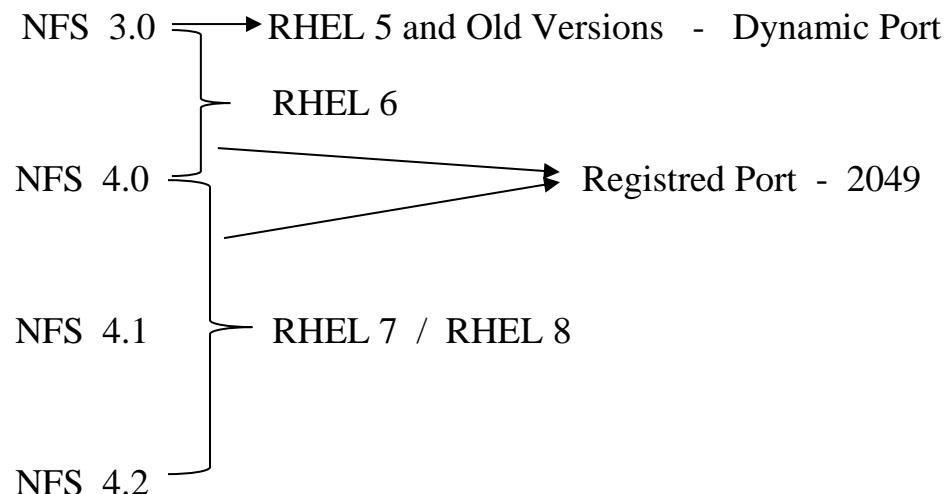
iscsi – Internet Small Computer System Interface

FC – Fiber Channel

NFS

- .) It is a file sharing solution for linux to linux / unix – like OS
- .) currently windows also supporting NFS client
- .) It is originally developed by Sun Micro Systems in 1984 as DFS over TCP
(DFS - Distributed File System)
- .) It is a IP based File Sharing Solution

Versions :



NFS Server	NFS Client
P – nfs – utils	1) P – nfs – utils
S – nfs – server	2) show mount -e (nfs server)
F.S – nfs	3) mkdir /mnt/share
rpc – bind	4) vim /etc/fstab
mountd	IP : /share /mnt/share nfs defaults 0 0 :wq!
To export	5) mount -a
1) mkdir /share	
2) vim /etc/exports	
/share *(ro,sync)	
:wq!	
3) exportfs -rv	
[r- reload v- verbose]	
reboot not required	

Steps :

connect as root@serverX

.) rpm -qa nfs-utils { to check packages }

```
File Edit View Search Terminal Help
[root@server17 ~]# rpm -qa nfs-utils
nfs-utils-1.3.0-0.el7.x86_64
[root@server17 ~]# 
```

.) systemctl status nfs-server

```
File Edit View Search Terminal Help
[root@server17 ~]# systemctl status nfs-server
nfs-server.service - NFS Server
   Loaded: loaded (/usr/lib/systemd/system/nfs-server.service; disabled)
     Active: inactive (dead)

[root@server17 ~]# 
```

.) systemctl enable nfs-server

```
File Edit View Search Terminal Help
[root@server17 ~]# systemctl enable nfs-server
ln -s '/usr/lib/systemd/system/nfs-server.service' '/etc/systemd/system/nfs.target.wants/nfs-server.service'
[root@server17 ~]# 
```

.) systemctl start nfs-server

```
File Edit View Search Terminal Help
[root@server17 ~]# systemctl start nfs-server
[root@server17 ~]# 
```

.) systemctl status nfs-server

```
File Edit View Search Terminal Help
[root@server17 ~]# systemctl status nfs-server
nfs-server.service - NFS Server
   Loaded: loaded (/usr/lib/systemd/system/nfs-server.service; enabled)
     Active: active (exited) since Wed 2019-11-13 18:10:51 IST; 5s ago
   Process: 1687 ExecStart=/usr/sbin/rpc.nfsd $RPCNFSDARGS $RPCNFSCOUNT (code=exited, status=0/SUCCESS)
   Process: 1684 ExecStartPre=/usr/sbin/exportfs -r (code=exited, status=0/SUCCESS)
   Process: 1683 ExecStartPre=/usr/libexec/nfs-utils/scripts/nfs-server.preconfig (code=exited, status=0/SUCCESS)
 Main PID: 1687 (code=exited, status=0/SUCCESS)
 CGroup: /system.slice/nfs-server.service

Nov 13 18:10:50 server17.example.com systemd[1]: Starting NFS Server...
Nov 13 18:10:51 server17.example.com systemd[1]: Started NFS Server.
[root@server17 ~]# 
```

.) firewall-cmd --add-service={nfs, rpc-bind, mountd} { immediate }

```
File Edit View Search Terminal Help
[root@server17 ~]# firewall-cmd --add-service={nfs, rpc-bind, mountd}
success
[root@server17 ~]# 
```

.) firewall-cmd --add-service={nfs, rpc-bind, mountd} --permanent

```
File Edit View Search Terminal Help
[root@server17 ~]# firewall-cmd --add-service={nfs, rpc-bind, mountd} --permanent
success
[root@server17 ~]# 
```

.) mkdir /nfsshare

.) mkdir /nfspublic

```
File Edit View Search Terminal Help
[root@server17 ~]# mkdir /nfsshare
[root@server17 ~]#
[root@server17 ~]# mkdir /nfspublic
[root@server17 ~]#
[root@server17 ~]# 
```

.) vim /etc/exports

In vim

```
/nfsshare *example.com(ro, sync)
```

```
/nfspublic *(rw, sync)
```

```
:wq!
```

```
File Edit View Search Terminal Help
/nfsshare *example.com(ro, sync)
/nfspublic *(rw, sync) █
~
```

.) cat /etc/exports

```
File Edit View Search Terminal Help
[root@server17 ~]# vim /etc/exports
[root@server17 ~]#
[root@server17 ~]# cat /etc/exports
/nfsshare *example.com(ro, sync)
/nfspublic *(rw, sync)
[root@server17 ~]# █
```

.) exportfs -rv

[r- reload v- verboss]

```
File Edit View Search Terminal Help
[root@server17 ~]# exportfs -rv
exporting *example.com:/nfsshare
exporting *:/nfspublic
[root@server17 ~]# █
```

Connect as root@desktopX

.) rpm -qa nfs-utils

```
File Edit View Search Terminal Tabs Help
root@server17:~]# rpm -qa nfs-utils
[nfs-utils-1.3.0-0.el7.x86_64
[root@server17 ~]#
```

.) showmount -e serverX.example.com

```
File Edit View Search Terminal Tabs Help
root@server17:~]# showmount -e server17.example.com
Export list for server17.example.com:
/nfspublic *
/nfsshare *example.com
[root@server17 ~]#
```

.) mkdir /mnt/public

.) mkdir /mnt/share

```
File Edit View Search Terminal Tabs Help
root@server17:~]# mkdir /mnt/public
[root@server17 ~]# mkdir /mnt/share
[root@server17 ~]#
[root@server17 ~]#
```

.) vim /etc/fstab

In vim

170.25.X.11:/nfsshare	/mnt/share	nfs	defaults	0	0
-----------------------	------------	-----	----------	---	---

170.25.X.11:/nfspublic	/mnt/public	nfs	defaults	0	0
------------------------	-------------	-----	----------	---	---

:wq!

```
File Edit View Search Terminal Tabs Help
root@server17:~]# root@desktop17:~
```

```
# /etc/fstab
# Created by anaconda on Wed May 7 01:22:57 2014
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
UUID=9bf6b9f7-92ad-441b-848e-0257cbb883d1 /          xfs      defaults        1  1
172.25.17.11:/nfsshare /mnt/share      nfs      defaults        0      0
172.25.17.11:/nfspublic /mnt/public     nfs      defaults        0      0
```

.) tail -3 /etc/fstab

```
File Edit View Search Terminal Tabs Help
root@server17:~]# tail -3 /etc/fstab
172.25.17.11:/nfsshare /mnt/share nfs defaults 0 0
172.25.17.11:/nfspublic /mnt/public nfs defaults 0 0
[root@desktop17 ~]# 
```

.) mount -a

.) df -hT

```
File Edit View Search Terminal Tabs Help
root@server17:~]# mount -a
[root@desktop17 ~]#
[root@desktop17 ~]# df -hT
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/vdal        xfs      10G  3.0G  7.0G  30% /
devtmpfs         devtmpfs 482M   0  482M  0% /dev
tmpfs            tmpfs    498M  80K  497M  1% /dev/shm
tmpfs            tmpfs    498M  14M  485M  3% /run
tmpfs            tmpfs    498M   0  498M  0% /sys/fs/cgroup
172.25.17.11:/nfsshare nfs4   10G  3.0G  7.1G  30% /mnt/share
[root@desktop17 ~]# 
```

.) mount | grep ^172

```
File Edit View Search Terminal Tabs Help
root@server17:~]# mount |grep ^172
172.25.17.11:/nfsshare on /mnt/share type nfs4 (rw,relatime,vers=4.0,rsize=131072,wsize=131072,namlen=255,hard,proto=tcp,port=0,timeo=600,retrans=2,sec=sys,clientaddr=172.25.17.10,local_lock=none,addr=172.25.17.11)
172.25.17.11:/nfspublic on /mnt/public type nfs4 (rw,relatime,vers=4.0,rsize=131072,wsize=131072,namlen=255,hard,proto=tcp,port=0,timeo=600,retrans=2,sec=sys,clientaddr=172.25.17.10,local_lock=none,addr=172.25.17.11)
[root@desktop17 ~]# 
```

.) touch /mnt/share/data

```
File Edit View Search Terminal Tabs Help
root@server17:~]# touch /mnt/share/data
touch: cannot touch '/mnt/share/data': Read-only file system
[root@desktop17 ~]# 
```

we are unable to do touch

.) touch /mnt/public/data

```
File Edit View Search Terminal Tabs Help
root@server17:~]# touch /mnt/public/data
touch: cannot touch '/mnt/public/data': Permission denied
[root@desktop17 ~]# 
```

we are unable to do touch

root@serverX

.) ls -ld /nfspublic/

```
File Edit View Search Terminal Tabs Help
root@server17:~ [x] root@deskt
[root@server17 ~]# ls -ld /nfspublic/
drwxr-xr-x. 2 root root 6 Nov 13 18:12 /nfspublic/
[root@server17 ~]# 
```

.) chown nfsnobody /nfspublic/ [chown nobody - RHEL8]

```
File Edit View Search Terminal Tabs Help
root@server17:~ [x] root@deskt
[root@server17 ~]# chown nobody /nfspublic/
[root@server17 ~]#
[root@server17 ~]# ls -ld /nfspublic/
drwxr-xr-x. 2 nobody root 6 Nov 13 18:12 /nfspublic/
[root@server17 ~]# 
```

.) grep nfsnobody /etc/passwd

```
File Edit View Search Terminal Tabs Help
root@server17:~ [x] root@desktop1
[root@server17 ~]# grep nfsnobody /etc/passwd
nfsnobody:x:65534:65534:Anonymous NFS User:/var/lib/nfs:/sbin/nologin
[root@server17 ~]# 
```

DAY 34

NFS Secure

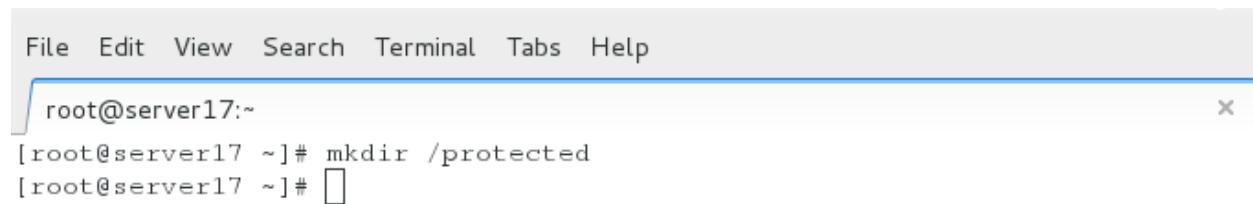
.) NFS is a plain text communication , So that it is not secure ; that's why we use
NFS secure

Continue with previous excersize

steps :

root@serverX

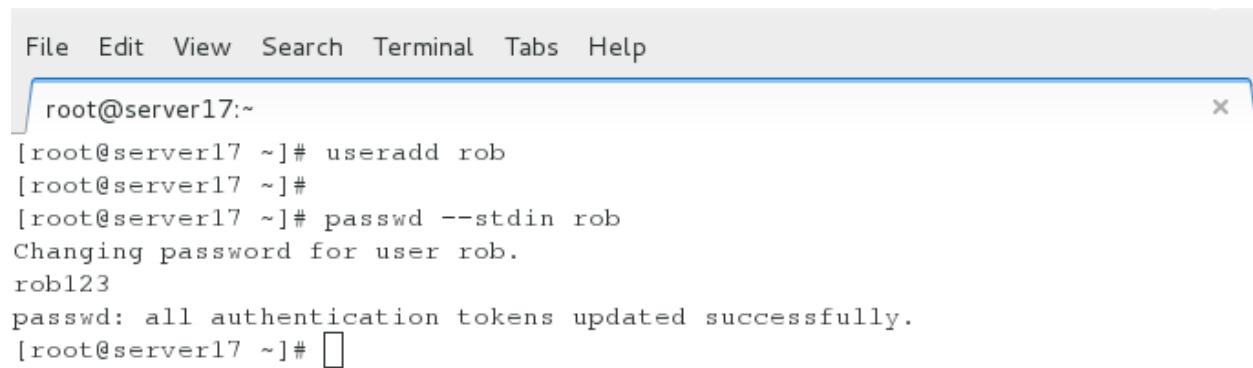
.) mkdir /protected



A screenshot of a terminal window with a light gray background. At the top, there is a menu bar with options: File, Edit, View, Search, Terminal, Tabs, and Help. Below the menu bar, the title bar shows "root@server17:~". The main area of the terminal contains the following command and its output:
[root@server17 ~]# mkdir /protected
[root@server17 ~]#

.) useradd rob

.) passwd --stdin rob



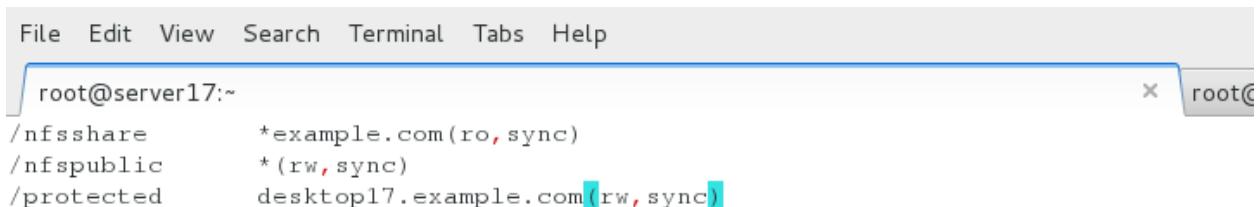
A screenshot of a terminal window with a light gray background. At the top, there is a menu bar with options: File, Edit, View, Search, Terminal, Tabs, and Help. Below the menu bar, the title bar shows "root@server17:~". The main area of the terminal contains the following commands and their outputs:
[root@server17 ~]# useradd rob
[root@server17 ~]#
[root@server17 ~]# passwd --stdin rob
Changing password for user rob.
rob123
passwd: all authentication tokens updated successfully.
[root@server17 ~]#

.) vim /etc/exports

In Vim add

```
/protected desktop17.example.com(rw, sync)
```

```
:wq!
```



```
File Edit View Search Terminal Tabs Help
root@server17:~ /protected desktop17.example.com(rw, sync)
x root@des...
```

```
/nfsshare      *example.com(ro, sync)
/nfspublic     *(rw, sync)
/protected      desktop17.example.com(rw, sync)
```

.) cat /etc/exports



```
File Edit View Search Terminal Tabs Help
root@server17:~ /protected desktop17.example.com(rw, sync)
x root@des...
```

```
[root@server17 ~]# vim /etc/exports
[root@server17 ~]#
[root@server17 ~]# cat /etc/exports
/nfsshare      *example.com(ro, sync)
/nfspublic     *(rw, sync)
/protected      desktop17.example.com(rw, sync)
```

```
[root@server17 ~]# 
```

.) exportsfs -rv



```
File Edit View Search Terminal Tabs Help
root@server17:~ /protected desktop17.example.com:/protected
x root@des...
```

```
[root@server17 ~]# exportsfs -rv
exporting desktop17.example.com:/protected
exporting *example.com:/nfsshare
exporting *:/nfspublic
[root@server17 ~]# 
```

.) chown rob. /prprotected/

.) ls -ld /protected/

```
File Edit View Search Terminal Tabs Help
root@server17:~ x root@server17:~ x
[root@server17 ~]# chown rob. /protected/
[root@server17 ~]#
[root@server17 ~]# ls -ld /protected/
drwxr-xr-x. 2 rob rob 6 Nov 13 18:47 /protected/
[root@server17 ~]# 
```

root@desktopX

.) vim /etc/fstab

In vim add

172.25.X.11:/protected /mnt/protected nfs defaults 0 0

```
File Edit View Search Terminal Tabs Help
root@server17:~ x root@desktop17:~ x
#
# /etc/fstab
# Created by anaconda on Wed May 7 01:22:57 2014
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
#UUID=9bf6b9f7-92ad-441b-848e-0257cbb883d1 /          xfs      defaults    1  1
172.25.17.11:/nfsshare /mnt/share     nfs      defaults    0      0
172.25.17.11:/nfspublic /mnt/public   nfs      defaults    0      0
172.25.17.11:/protected /mnt/protected nfs      defaults    0      0
```

.) mount -a

[not done]

```
File Edit View Search Terminal Tabs Help
root@server17:~ x root@desktop17:~ x
[root@desktop17 ~]# vim /etc/fstab
[root@desktop17 ~]#
[root@desktop17 ~]# mount -a
mount.nfs: mount point /mnt/protected does not exist
[root@desktop17 ~]# 
```

.) mkdir /mnt/protected

The screenshot shows two terminal windows side-by-side. The left window (root@server17) has the command `mkdir /mnt/protected` entered. The right window (root@desktop17) has the command `mount -a` entered. Both windows show the prompt `[root@... ~]#`.

```
File Edit View Search Terminal Tabs Help
root@server17:~ [root@server17:~]
[root@server17 ~]# mkdir /mnt/protected
[root@server17 ~]#
[root@server17 ~]# mount -a
root@server17:~ [root@server17:~]
root@server17:~ [root@server17:~]
```

.) mount -a

.) mount | grep ^172

The screenshot shows a single terminal window (root@server17) displaying the output of the command `mount | grep ^172`. The output lists several NFS shares, with one entry for the protected directory mounted at `/mnt/protected`.

```
File Edit View Search Terminal Tabs Help
root@server17:~ [root@server17:~]
[root@server17 ~]# mount -a
[root@server17 ~]# mount | grep ^172
172.25.17.11:/nfsshare on /mnt/share type nfs4 (rw,relatime,vers=4.0,rsize=131072,wsize=131072,namlen=255,hard,proto=tcp,port=0,timeo=600,retrans=2,sec=sys,clientaddr=172.25.17.10,local_lock=none,addr=172.25.17.11)
172.25.17.11:/nfspublic on /mnt/public type nfs4 (rw,relatime,vers=4.0,rsize=131072,wsize=131072,namlen=255,hard,proto=tcp,port=0,timeo=600,retrans=2,sec=sys,clientaddr=172.25.17.10,local_lock=none,addr=172.25.17.11)
172.25.17.11:/protected on /mnt/protected type nfs4 (rw,relatime,vers=4.0,rsize=131072,wsize=131072,namlen=255,hard,proto=tcp,port=0,timeo=600,retrans=2,sec=sys,clientaddr=172.25.17.10,local_lock=none,addr=172.25.17.11)
[root@server17 ~]#
```

.) touch /mnt/protected/test

[not done]

The screenshot shows a terminal window (root@server17) with the command `touch /mnt/protected/test` entered. The output shows a permission denied error.

```
File Edit View Search Terminal Tabs Help
root@server17:~ [root@server17:~]
[root@server17 ~]# touch /mnt/protected/test
touch: cannot touch '/mnt/protected/test': Permission denied
[root@server17 ~]#
```

.) useradd rob

.) su - rob [mask]

.) touch /mnt/protected/test

[as a mask it was done ; but this is not secure]

The screenshot shows a terminal window (root@server17) with the command `useradd rob` entered. The window then switches to the user `rob` (rob@server17) and runs the command `touch /mnt/protected/test`, which succeeds without permission denial.

```
File Edit View Search Terminal Tabs Help
root@server17:~ [root@server17:~]
[root@server17 ~]# useradd rob
[root@server17 ~]#
[root@server17 ~]# su - rob
[rob@server17 ~]$ touch /mnt/protected/test
[rob@server17 ~]$
```

.) id ldapuser0

[It'll show : no such user]

The screenshot shows two terminal windows side-by-side. Both have a standard window title bar with 'File Edit View Search Terminal Tabs Help'. The left window's title bar says 'root@server17:~'. The right window's title bar says 'root@desktop17:~'. In the left window, the command 'id ldapuser0' is run, resulting in the output 'id: ldapuser0: no such user'. In the right window, there is a single blank line.

```
File Edit View Search Terminal Tabs Help
root@server17:~
[root@desktop17 ~]# id ldapuser0
id: ldapuser0: no such user
[root@desktop17 ~]# 
```

```
File Edit View Search Terminal Tabs Help
root@server17:~
root@desktop17:~
```

.) lab nfskrb5 setup

The screenshot shows two terminal windows side-by-side. Both have a standard window title bar with 'File Edit View Search Terminal Tabs Help'. The left window's title bar says 'root@server17:~'. The right window's title bar says 'root@desktop17:~'. In the left window, the command 'lab nfskrb5 setup' is run, followed by 'Installing packages ...', 'Updating authconfig for ldap & krb5 ...', and 'SUCCESS'. In the right window, there is a single blank line.

```
File Edit View Search Terminal Tabs Help
root@server17:~
root@desktop17 ~]# lab nfskrb5 setup
Installing packages ...
Updating authconfig for ldap & krb5 ...
SUCCESS
[root@desktop17 ~]# 
```

```
File Edit View Search Terminal Tabs Help
root@server17:~
root@desktop17:~
```

.) id ldapuser0

[Now It'll show details]

The screenshot shows two terminal windows side-by-side. Both have a standard window title bar with 'File Edit View Search Terminal Tabs Help'. The left window's title bar says 'root@server17:~'. The right window's title bar says 'root@desktop17:~'. In the left window, the command 'id ldapuser0' is run, resulting in the output 'uid=1700(ldapuser0) gid=1700(ldapuser0) groups=1700(ldapuser0)'. In the right window, there is a single blank line.

```
File Edit View Search Terminal Tabs Help
root@server17:~
root@desktop17 ~]# id ldapuser0
uid=1700(ldapuser0) gid=1700(ldapuser0) groups=1700(ldapuser0)
[root@desktop17 ~]# 
```

```
File Edit View Search Terminal Tabs Help
root@server17:~
root@desktop17:~
```

.) getent passwd ldapuser0

The screenshot shows two terminal windows side-by-side. Both have a standard window title bar with 'File Edit View Search Terminal Tabs Help'. The left window's title bar says 'root@server17:~'. The right window's title bar says 'root@desktop17:~'. In the left window, the command 'getent passwd ldapuser0' is run, resulting in the output 'ldapuser0:*:1700:1700:LDAP Test User 0:/home/guests/ldapuser0:/bin/bash'. In the right window, there is a single blank line.

```
File Edit View Search Terminal Tabs Help
root@server17:~
root@desktop17 ~]# getent passwd ldapuser0
ldapuser0:*:1700:1700:LDAP Test User 0:/home/guests/ldapuser0:/bin/bash
[root@desktop17 ~]# 
```

```
File Edit View Search Terminal Tabs Help
root@server17:~
root@desktop17:~
```

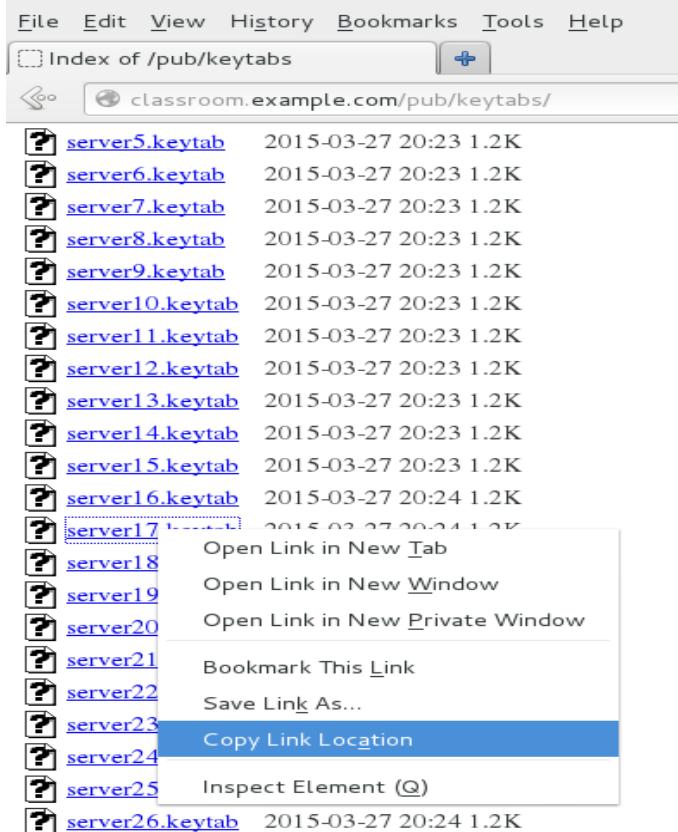
.) wget O /etc/krb5.keytab <path> [O – capital]

[Path at classroom.example.com/pub in select keytabs]



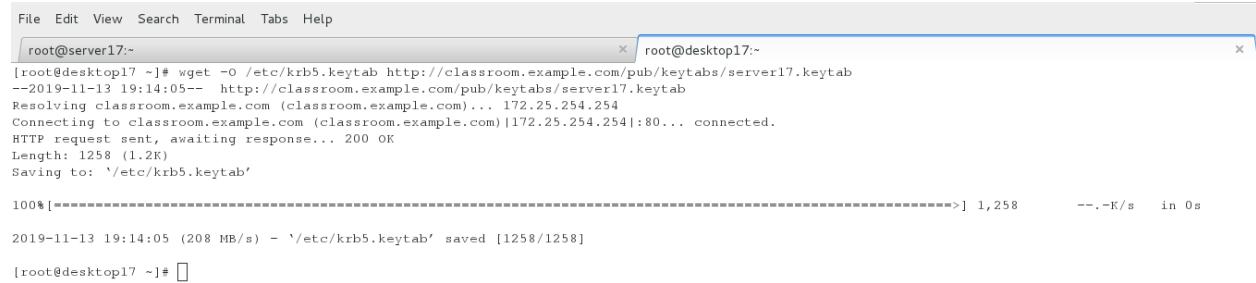
Index of /pub

Name	Last modified	Size	Description
Parent Directory		-	
EXAMPLE-CA-CERT	2015-02-22 20:57	1.2K	
builds/	2014-07-11 02:59	-	
example-ca.crt	2015-02-22 20:57	1.2K	
keytabs/	2015-03-27 20:24	-	
materials/	2014-10-30 01:16	-	
tls/	2015-02-22 20:57	-	
webapp.wsgi	2015-03-17 11:50	397	



I copied server17.keytab because I used kiosk 17 system

.) wget O /etc/krb5.keytab <path>



```
File Edit View Search Terminal Tabs Help
root@server17:~]# wget -O /etc/krb5.keytab http://classroom.example.com/pub/keytabs/server17.keytab
--2019-11-13 19:14:05--  http://classroom.example.com/pub/keytabs/server17.keytab
Resolving classroom.example.com (classroom.example.com)... 172.25.254.254
Connecting to classroom.example.com (classroom.example.com)|172.25.254.254|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1258 (1.2K)
Saving to: '/etc/krb5.keytab'

100% [=====] 1,258 --.-K/s   in 0s

2019-11-13 19:14:05 (208 MB/s) - '/etc/krb5.keytab' saved [1258/1258]

[root@desktop17 ~]#
```

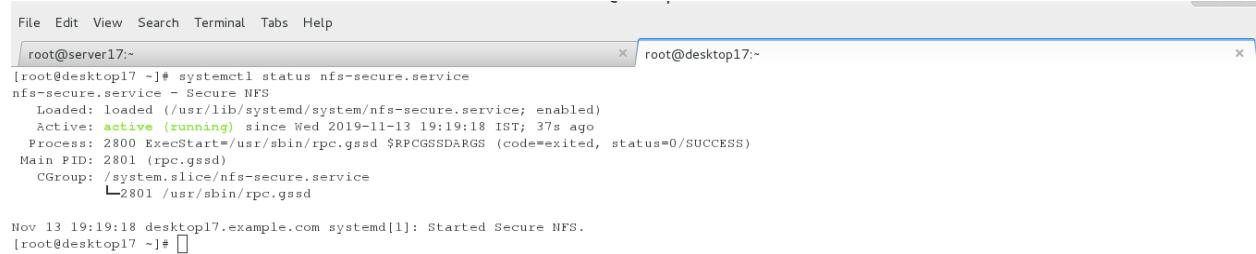
.) systemctl enable nfs-secure.service

.) systemctl start nfs-secure.service



```
[root@desktop17 ~]#
[root@desktop17 ~]#
[root@desktop17 ~]# systemctl enable nfs-secure.service
ln -s '/usr/lib/systemd/system/nfs-secure.service' '/etc/systemd/system/nfs.target.wants/nfs-secure.service'
[root@desktop17 ~]# systemctl start nfs-secure.service
[root@desktop17 ~]#
```

.) systemctl status nfs-secure.service

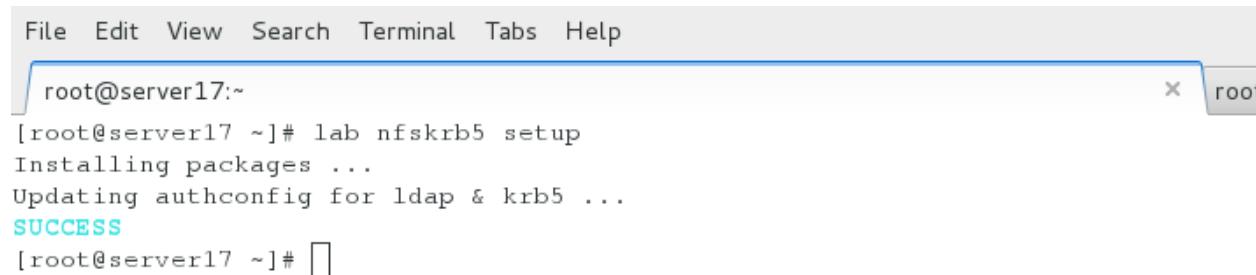


```
File Edit View Search Terminal Tabs Help
root@server17:~]# systemctl status nfs-secure.service
nfs-secure.service - Secure NFS
   Loaded: loaded (/usr/lib/systemd/system/nfs-secure.service; enabled)
   Active: active (running) since Wed 2019-11-13 19:19:18 IST; 37s ago
     Process: 2800 ExecStart=/usr/sbin/rpc.gssd $RPCGSSDARGS (code=exited, status=0/SUCCESS)
    Main PID: 2801 (rpc.gssd)
   Group: /system.slice/nfs-secure.service
      ▾ 2801 /usr/sbin/rpc.gssd

Nov 13 19:19:18 desktop17.example.com systemd[1]: Started Secure NFS.
[root@desktop17 ~]#
```

root@serverX

.) lab nfskrb5 setup



```
File Edit View Search Terminal Tabs Help
root@server17:~]
[root@server17 ~]# lab nfskrb5 setup
Installing packages ...
Updating authconfig for ldap & krb5 ...
SUCCESS
[root@server17 ~]#
```

.) id ldapuser0

```
File Edit View Search Terminal Tabs Help
root@server17:~ x root@desk
[root@server17 ~]# id ldapuser0
uid=1700(ldapuser0) gid=1700(ldapuser0) groups=1700(ldapuser0)
[root@server17 ~]# 
```

.) getent passwd ldapuser0

```
File Edit View Search Terminal Tabs Help
root@server17:~ x root@desk
[root@server17 ~]# getent passwd ldapuser0
ldapuser0:*:1700:1700:LDAP Test User 0:/home/guests/ldapuser0:/bin/bash
[root@server17 ~]# 
```

.) wget -O /etc/krb5.keytab

```
File Edit View Search Terminal Tabs Help
root@server17:~ x root@desktop17:-
[root@server17 ~]# wget -O /etc/krb5.keytab http://classroom.example.com/pub/keytabs/server17.keytab
--2019-11-13 19:25:20-- http://classroom.example.com/pub/keytabs/server17.keytab
Resolving classroom.example.com (classroom.example.com)... 172.25.254.254
Connecting to classroom.example.com (classroom.example.com)|172.25.254.254|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1258 (1.2K)
Saving to: '/etc/krb5.keytab'

100% [=====] 1,258 --.-K/s in 0s

2019-11-13 19:25:20 (194 MB/s) - '/etc/krb5.keytab' saved [1258/1258]
[root@server17 ~]# 
```

.) systemctl enable nfs-secure-server.service

```
File Edit View Search Terminal Tabs Help
root@server17:~ x root@desktop17:-
[root@server17 ~]# systemctl enable nfs-secure-server.service
ln -s '/usr/lib/systemd/system/nfs-secure-server.service' '/etc/systemd/system/nfs.target.wants/nfs-secure-server.service'
[root@server17 ~]# 
```

.) systemctl start nfs-secure-server.service

.) systemctl status nfs-secure-server.service

```
File Edit View Search Terminal Tabs Help
root@server17:~]# systemctl start nfs-secure-server.service
[root@server17 ~]#
[root@server17 ~]# systemctl status nfs-secure-server.service
nfs-secure-server.service - Secure NFS Server
   Loaded: loaded (/usr/lib/systemd/system/nfs-secure-server.service; enabled)
     Active: active (running) since Wed 2019-11-13 19:25:53 IST; 9s ago
   Process: 30641 ExecStart=/usr/sbin/rpc.svcgssd $RPCSVCGSSDARGS (code=exited, status=0/SUCCESS)
 Main PID: 30642 (rpc.svcgssd)
    CGroup: /system.slice/nfs-secure-server.service
           └─30642 /usr/sbin/rpc.svcgssd

Nov 13 19:25:53 server17.example.com systemd[1]: Started Secure NFS Server.
[root@server17 ~]# 
```

.) ls -ld /protected/

```
File Edit View Search Terminal Tabs Help
root@server17:~]
[root@server17 ~]# ls -ld /protected/
drwxr-xr-x. 2 rob rob 17 Nov 13 19:03 /protected/
[root@server17 ~]# 
```

.) rm -f /protected/test

.) ls -l /protected/

```
File Edit View Search Terminal Tabs Help
root@server17:~]
[root@server17 ~]# rm -f /protected/test
[root@server17 ~]#
[root@server17 ~]# ls -l /protected/
total 0
[root@server17 ~]# 
```

.) chown ldapuser0. /protected/

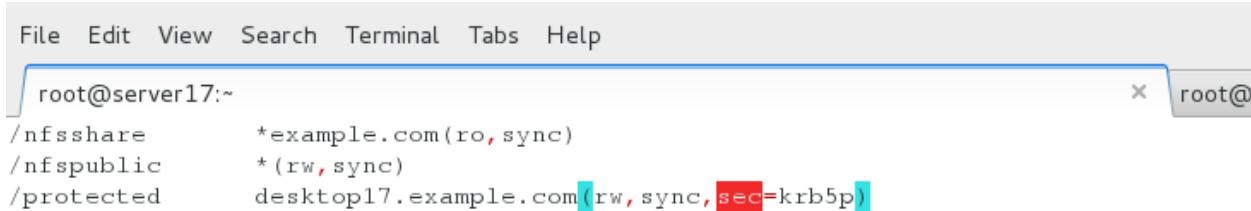
.) ls -ld /protected

```
File Edit View Search Terminal Tabs Help
root@server17:~]
[root@server17 ~]# chown ldapuser0. /protected/
[root@server17 ~]#
[root@server17 ~]# ls -ld /protected/
drwxr-xr-x. 2 ldapuser0 ldapuser0 6 Nov 13 19:26 /protected/
[root@server17 ~]# 
```

.) vim /etc/exports

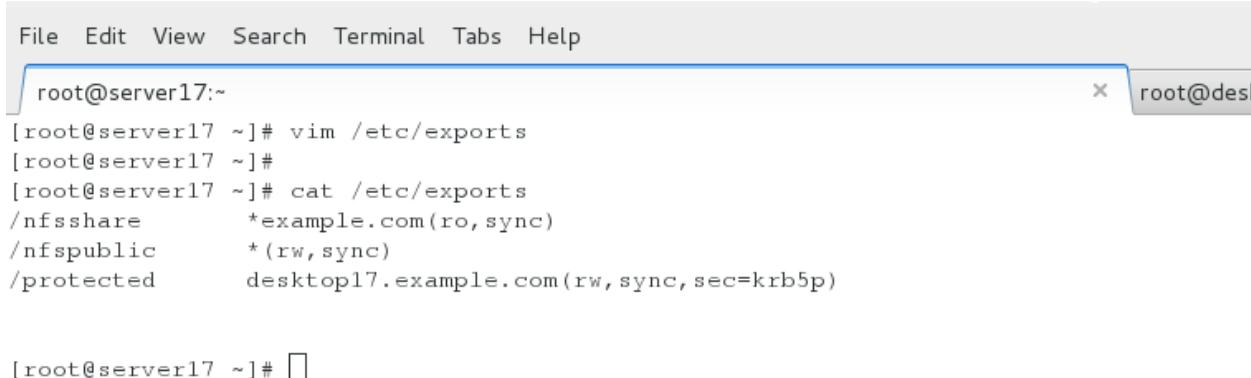
In Vim do a correction that

```
/protected    desktopX.example.com(rw,sync,sec=krb5p)
```



```
File Edit View Search Terminal Tabs Help
root@server17:~ x root@des
/nfsshare      *example.com(ro, sync)
/nfspublic      *(rw, sync)
/protected      desktop17.example.com(rw, sync, sec=krb5p)
```

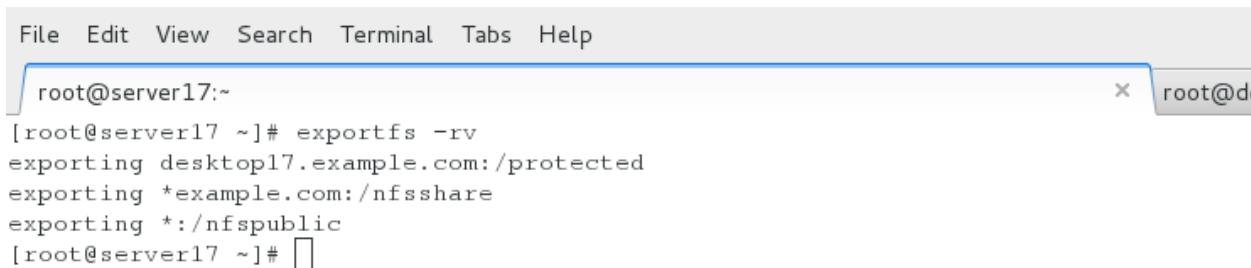
.) cat /etc/exports



```
File Edit View Search Terminal Tabs Help
root@server17:~ x root@des
[root@server17 ~]# vim /etc/exports
[root@server17 ~]#
[root@server17 ~]# cat /etc/exports
/nfsshare      *example.com(ro, sync)
/nfspublic      *(rw, sync)
/protected      desktop17.example.com(rw, sync, sec=krb5p)

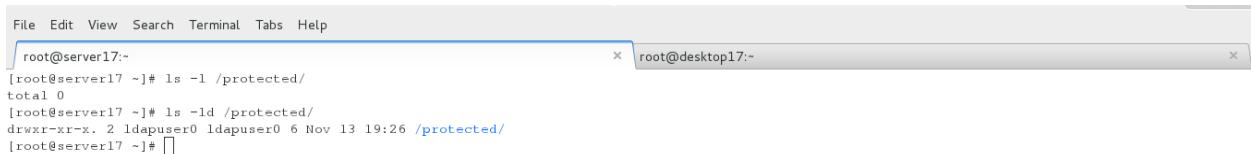
[root@server17 ~]# 
```

.) exportfs -rv



```
File Edit View Search Terminal Tabs Help
root@server17:~ x root@des
[root@server17 ~]# exportfs -rv
exporting desktop17.example.com:/protected
exporting *example.com:/nfsshare
exporting *:/nfspublic
[root@server17 ~]# 
```

.) ls -l /protected



```
File Edit View Search Terminal Tabs Help
root@server17:~ x root@desktop17:-
[root@server17 ~]# ls -l /protected/
total 0
[root@server17 ~]# ls -ld /protected/
drwxr-xr-x. 2 ldapuser0 ldapuser0 6 Nov 13 19:26 /protected/
[root@server17 ~]# 
```

root@desktopX

.) umount /mnt/protected

```
File Edit View Search Terminal Tabs Help
root@server17:~]# umount /mnt/protected
root@server17:~]# 
```

.) vim /etc/fstab

In Vim do a correction that

172.25.17.11:/protected /mnt/protected nfs defaults,sec=krb5p 0 0

```
File Edit View Search Terminal Tabs Help
root@server17:~]# vim /etc/fstab
root@server17:~]# 
```

```
# /etc/fstab
# Created by anaconda on Wed May 7 01:22:57 2014
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
#UUID=9bf6b9f7-92ad-441b-848e-0257cbb883d1 /           xfs      defaults          1  1
172.25.17.11:/nfsshare /mnt/share   nfs      defaults          0      0
172.25.17.11:/nfspublic /mnt/public  nfs      defaults          0      0
172.25.17.11:/protected /mnt/protected nfs defaults,sec=krb5p 0      0
```

.) tail -5 /etc/fstab

```
File Edit View Search Terminal Tabs Help
root@server17:~]# vim /etc/fstab
root@server17:~]# 
```

```
[root@desktop17 ~]# tail -5 /etc/fstab
172.25.17.11:/nfsshare /mnt/share   nfs      defaults          0      0
172.25.17.11:/nfspublic /mnt/public  nfs      defaults          0      0
172.25.17.11:/protected /mnt/protected nfs defaults,sec=krb5p 0      0
```

```
[root@desktop17 ~]# 
```

.) mount -a

.) df -hT

```
File Edit View Search Terminal Tabs Help
root@server17:~]# mount -a
root@server17:~]# 
```

```
[root@desktop17 ~]# df -hT
Filesystem      Type     Size  Used Avail Use% Mounted on
/dev/vda1        xfs    10G   3.1G  7.0G  31% /
devtmpfs         devtmpfs 482M    0  482M  0% /dev/shm
tmpfs            tmpfs   498M   80K  497M  1% /run
tmpfs            tmpfs   498M   14M  484M  3% /sys/fs/cgroup
172.25.17.11:/nfsshare  nfs4   10G   3.1G  7.0G  31% /mnt/share
172.25.17.11:/protected  nfs   10G   3.1G  7.0G  31% /mnt/protected
[root@desktop17 ~]# 
```

.) su - ldapuser0

.) touch /mnt/protected/data

[unable to do touch ; permission denied]

```
File Edit View Search Terminal Tabs Help
root@server17:~# su - ldapuser0
Creating home directory for ldapuser0.
[ldapuser0@desktop17 ~]$ 
[ldapuser0@desktop17 ~]$ touch /mnt/protected/data
touch: cannot touch '/mnt/protected/data': Permission denied
[ldapuser0@desktop17 ~]$ 
```

.) logout

.) ssh ldapuser0@localhost

password : kerberos

```
File Edit View Search Terminal Tabs Help
root@server17:~# logout
[ldapuser0@desktop17 ~]$ 
[ldapuser0@desktop17 ~]$ ssh ldapuser0@localhost
The authenticity of host 'localhost (::)' can't be established.
ECDSA key fingerprint is eb:24:0e:07:96:26:b1:04:c2:37:0c:78:2d:bc:b0:08.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'localhost' (ECDSA) to the list of known hosts.
ldapuser0@localhost's password:
Last login: Wed Nov 13 19:33:16 2019
[ldapuser0@desktop17 ~]$ 
```

.) touch /mnt/protected/data

```
File Edit View Search Terminal Tabs Help
root@server17:~# 
[ldapuser0@desktop17 ~]$ touch /mnt/protected/data
[ldapuser0@desktop17 ~]$ 
```

Now it was done

IN VIM

0	0	
backup	fscl	
enable / disable	0 → no check	
1	0	1 → one time check
		2 → two times check

DAY 35

SAMBA

called as **CIFS** - Common Internet File System

To share files & folders from linux to windows we use samba

In Windows - Services behind to share

1) Net Bios-SSN Port No : 139

2) MicroSoft -DS Port No : 445

Net Bios-SSN at Session Service

MicroSoft-DS at Directory Services

.) netstat or ss { to identify what are the services we have }

P → samba & samba-client

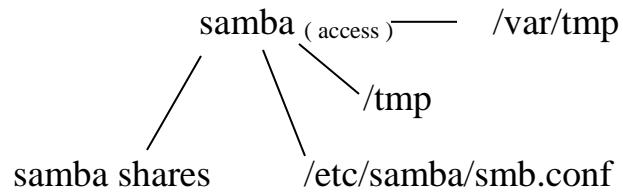
S → smd & nmd

F.S → samba

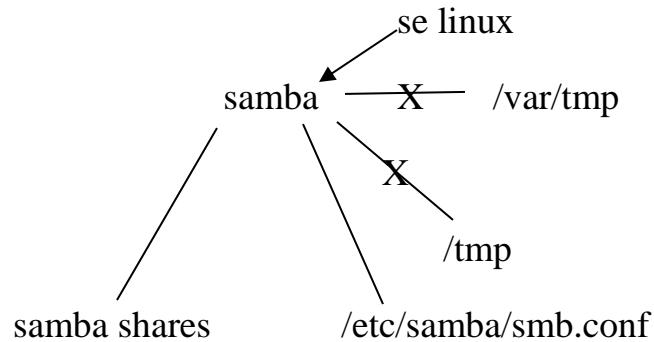
mkdir /sambashare

[change se linux file context]

I . DAC Model → UGO



SE Linux → Mac Model



II . ls -ldZ /sambashare [Z - capital]

man semanage fcontext

III . vim /etc/samba/smb.conf

a) WORK GROUP = MY GROUP [Modify this MY GROUP]

In last line define share

[share] share def

path = /sambashare

hosts allow = 172.25.0.0/16

or

172.25.X.0/24

browseable = YES
read only = YES } Optional

b) restart smb nmb

IV . useradd -s /sbin/nologin <UN> [if user doesn't exist]

a) If user exist

Don't do anything

b) set samba passwd for the user

smbpasswd -a <UN>

Steps :

.) yum install samba samba-client -y

```
File Edit View Search Terminal Help
[root@server4 ~]# yum install samba samba-client -y
Loaded plugins: langpacks
rhel_dvd
(1/2): rhel_dvd/group_gz | 4.1 kB 00:00:00
(2/2): rhel_dvd/primary_db | 134 kB 00:00:00
| 3.4 MB 00:00:00
Resolving Dependencies
--> Running transaction check
--> Package samba.x86_64 0:4.1.1-31.el7 will be installed
--> Package samba-client.x86_64 0:4.1.1-31.el7 will be installed
--> Finished Dependency Resolution
Dependencies Resolved

Transaction Summary
-----
Package           Arch      Version            Repository        Size
-----
Installing:
 samba           x86_64   4.1.1-31.el7       rhel_dvd          527 k
 samba-client    x86_64   4.1.1-31.el7       rhel_dvd          513 k

Transaction Summary
-----
Install 2 Packages

Total download size: 1.0 M
Installed size: 2.9 M
Downloading packages:
(1/2): samba-4.1.1-31.el7.x86_64.rpm | 527 kB 00:00:00
(2/2): samba-client-4.1.1-31.el7.x86_64.rpm | 513 kB 00:00:00
Total
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : samba-4.1.1-31.el7.x86_64
[1/2]

```

.) ss -ant

[don't have 445,139 ports]

```
File Edit View Search Terminal Help
[root@server4 ~]# ss -ant
State     Recv-Q Send-Q          Local Address:Port          Peer Address:Port
LISTEN    0      100              127.0.0.1:25          *:*
LISTEN    0      128              *:38782             *:*
LISTEN    0      128              *:111              *:*
LISTEN    0      128              *:22               *:*
TIME-WAIT 0      0                172.25.4.11:46782    172.25.254.254:80
ESTAB    0      0                172.25.4.11:22        172.25.4.250:47627
TIME-WAIT 0      0                172.25.4.11:46783    172.25.254.254:80
TIME-WAIT 0      0                172.25.4.11:46784    172.25.254.254:80
TIME-WAIT 0      0                172.25.4.11:46785    172.25.254.254:80
TIME-WAIT 0      0                172.25.4.11:46786    172.25.254.254:80
LISTEN    0      100              :::125             :::*
LISTEN    0      128              :::111             :::*
LISTEN    0      128              :::59474            :::*
LISTEN    0      128              :::22              :::*
[root@server4 ~]#
```

.) systemctl enable smd nmd

```
File Edit View Search Terminal Help
[root@server4 ~]# systemctl enable smb nmb
ln -s '/usr/lib/systemd/system/smb.service' '/etc/systemd/system/multi-user.target.wants/smb.service'
ln -s '/usr/lib/systemd/system/nmb.service' '/etc/systemd/system/multi-user.target.wants/nmb.service'
[root@server4 ~]# 
```

.) systemctl start smd nmd

.) systemctl status smd nmd

```
File Edit View Search Terminal Help
[root@server4 ~]# systemctl start smb nmb
[root@server4 ~]#
[root@server4 ~]#
[root@server4 ~]# systemctl status smb nmb
smb.service - Samba SMB Daemon
   Loaded: loaded (/usr/lib/systemd/system/smb.service; enabled)
     Active: active (running) since Fri 2019-11-15 18:07:21 IST; 8s ago
       Main PID: 1743 (smbd)
      Status: "smbd: ready to serve connections..."
         CGroupl: /system.slice/smb.service
             └─1743 /usr/sbin/smbd
                  ├ 1744 /usr/sbin/smbd

Nov 15 18:07:21 server4.example.com smbd[1743]: [2019/11/15 18:07:21.294781,  0] ..//lib/util/become_daemon.c:136(daemon_ready)
Nov 15 18:07:21 server4.example.com systemd[1]: Started Samba SMB Daemon.

nmb.service - Samba NMB Daemon
   Loaded: loaded (/usr/lib/systemd/system/nmb.service; enabled)
     Active: active (running) since Fri 2019-11-15 18:07:18 IST; 11s ago
       Main PID: 1742 (nmbd)
      Status: "nmbd: ready to serve connections..."
         CGroupl: /system.slice/nmb.service
             └─1742 /usr/sbin/nmbd

Nov 15 18:07:17 server4.example.com systemd[1]: Starting Samba NMB Daemon...
Nov 15 18:07:18 server4.example.com systemd[1]: Started Samba NMB Daemon.
[root@server4 ~]# 
```

.) ss -ant

[Now we can 445 ,139 ports]

```
File Edit View Search Terminal Help
[root@server4 ~]# ss -ant
State      Recv-Q Send-Q          Local Address:Port                               Peer Address:Port
LISTEN     0      100              127.0.0.1:25                           *:*
LISTEN     0      50               *:445
LISTEN     0      128              *:38782
LISTEN     0      50               *:139
LISTEN     0      128              *:111
LISTEN     0      128              *:22
LISTEN     0      128              127.0.0.1:631
ESTAB      0      0                172.25.4.11:22                         172.25.4.250:47627
LISTEN     0      100              ::1:25
LISTEN     0      90               :::445
LISTEN     0      90               :::139
LISTEN     0      128              :::111
LISTEN     0      128              :::59474
LISTEN     0      128              :::22
LISTEN     0      128              :::1631
[root@server4 ~]# 
```

.) firewall-cmd --add-service=samba

```
File Edit View Search Terminal Help
[root@server4 ~]# firewall-cmd --add-service=samba
success
[root@server4 ~]# 
```

.) firewall-cmd --add-service=samba --permanent

```
File Edit View Search Terminal Help
[root@server4 ~]# firewall-cmd --add-service=samba --permanent
success
[root@server4 ~]# 
```

.) mkdir /sambashare

.) ls -ldZ /sambashare

```
File Edit View Search Terminal Help
[root@server4 ~]# mkdir /sambashare
[root@server4 ~]#
[root@server4 ~]# ls -ldZ /sambashare
drwxr-xr-x. root root unconfined_u:object_r:default_t:s0 /sambashare
[root@server4 ~]# 
```

.) rpm -qc samba { to check }

```
File Edit View Search Terminal Help
[root@server4 ~]# rpm -qc samba
[root@server4 ~]# 
```

.) rpm -ql samba { to check }

[no etc info]

```
File Edit View Search Terminal Help
[root@server4 ~]# rpm -ql samba
/usr/openldap/schema
/usr/openldap/schema/samba.schema
/usr/bin/eventlogadm
/usr/bin/smbstatus
/usr/lib/systemd/system/nmb.service
/usr/lib/systemd/system/smb.service
/usr/lib64/samba/auth
/usr/lib64/samba/auth/script.so
/usr/lib64/samba/auth/unix.so
/usr/lib64/samba/auth/wbc.so
/usr/lib64/samba/vfs
/usr/lib64/samba/vfs/acl_tdb.so
/usr/lib64/samba/vfs/acl_xattr.so
/usr/lib64/samba/vfs/aio_fork.so
/usr/lib64/samba/vfs/aio_linux.so
/usr/lib64/samba/vfs/aio_posix.so
/usr/lib64/samba/vfs/aio_pthread.so
/usr/lib64/samba/vfs/audit.so
/usr/lib64/samba/vfs/btrfs.so
/usr/lib64/samba/vfs/cap.so
/usr/lib64/samba/vfs/catia.so
/usr/lib64/samba/vfs/commit.so
/usr/lib64/samba/vfs/crossrename.so
/usr/lib64/samba/vfs/default_quota.so
/usr/lib64/samba/vfs/dirsort.so
/usr/lib64/samba/vfs/expand_msdfs.so
/usr/lib64/samba/vfs/extd_audit.so
/usr/lib64/samba/vfs/fake_perms.so
/usr/lib64/samba/vfs/fileid.so
/usr/lib64/samba/vfs/full_audit.so
/usr/lib64/samba/vfs/linux_xfs_sgid.so
/usr/lib64/samba/vfs/media_harmony.so
/usr/lib64/samba/vfs/netatalk.so
/usr/lib64/samba/vfs/preopen.so
/usr/lib64/samba/vfs/readahead.so
/usr/lib64/samba/vfs/readonly.so
/usr/lib64/samba/vfs/recycle.so
/usr/lib64/samba/vfs/scannedonly.so
/usr/lib64/samba/vfs/shadow_copy.so
/usr/lib64/samba/vfs/shadow_copy2.so
/usr/lib64/samba/vfs/smb_traffic_analyzer.so
/usr/lib64/samba/vfs/streams_depot.so
```

.) vim /etc/samba/smb.conf { for reference }

[copy samba_share_t and paste it like comment]

[chcon for temporary]

```
# Run the "ls -ldZ /path/to/directory" command to view the current SELinux
# label for a given directory.
#
# Set SELinux labels only on files and directories you have created. Use the
# chcon command to temporarily change a label:
# chcon -t samba_share_t /path/to/directory
```

.) man semanage fcontext { for reference }

[copy restorecon -R -v /web and paste it like a comment]

```
-r RANGE, --range RANGE
      MLS/MCS Security Range (MLS/MCS Systems only) SELinux Range for SELinux login mapping defaults to the SELinux user record range. SELinux
      Range for SELinux user defaults to s0.

EXAMPLE
remember to run restorecon after you set the file context
Add file-context for everything under /web
# semanage fcontext -a -t httpd_sys_content_t "/web(/.*)?"
# restorecon -R -v /web
```

```
File Edit View Search Terminal Help
[root@server4 ~]# vim /etc/samba/smb.conf
[root@server4 ~]#
[root@server4 ~]# #samba_share_t
[root@server4 ~]#
[root@server4 ~]# man semanage fcontext
[root@server4 ~]#
[root@server4 ~]# # restorecon -R -v /web
```

.) semanage fcontext -a -t samba_share_t “sambashare(./.*)?”

```
File Edit View Search Terminal Help
[root@server4 ~]# semanage fcontext -a -t samba_share_t "/sambashare(/.*)?"
[root@server4 ~]# 
```

.) restorecon -R -v /sambashare

```
File Edit View Search Terminal Help
[root@server4 ~]# restorecon -R -v /sambashare
restorecon reset /sambashare context unconfined_u:object_r:default_t:s0->unconfined_u:object_r:samba_share_t:s0
[root@server4 ~]# 
```

.) ls -ldZ /sambashare

```
File Edit View Search Terminal Help
[root@server4 ~]# ls -ldZ /sambashare
drwxr-xr-x. root root unconfined_u:object_r:samba_share_t:s0 /sambashare
[root@server4 ~]# 
```

.) vim /etc/samba/smb.conf

workgroup = MY GROUP

change this to

workgroup = MY COMPANY

```
# workgroup = MYCOMPANY
server string = Samba Server Version %v

; netbios name = MYSERVER

; interfaces = lo eth0 192.168.12.2/24 192.168.13.2/24
; hosts allow = 127. 192.168.12. 192.168.13.

; max protocol = SMB2
```

Now go to the last line in vim and type below details

```
[share]
```

```
comment = this is for prod
```

```
path = /sambashare
```

```
hosts allow = 172.25.0.0/16 [ 172.25.X.X/32 - specific ]
```

```
:wq!
```

```
# A publicly accessible directory that is read only, except for users in the
# "staff" group (which have write permissions):
;      [public]
;      comment = Public Stuff
;      path = /home/samba
;      public = yes
;      writable = yes
;      printable = no
;      write list = +staff

[share]
comment = this is for prod
path = /sambashare
hosts allow = 172.25.0.0/16
:wq!□
```

.) tail -4 /etc/samba/smb.conf

```
File Edit View Search Terminal Help
[root@server4 ~]# vim /etc/samba/smb.conf
[root@server4 ~]#
[root@server4 ~]# tail -4 /etc/samba/smb.conf
[share]
comment = this is for prod
path = /sambashare
hosts allow = 172.25.0.0/16
[root@server4 ~]# □
```

.) systemctl restart smb nmb

```
File Edit View Search Terminal Help
[root@server4 ~]# systemctl restart smb nmb
[root@server4 ~]# □
```

.) id rob

```
File Edit View Search Terminal Help
[root@server4 ~]# id rob
id: rob: no such user
[root@server4 ~]# 
```

.) useradd -s /sbin/nologin rob

.) smbpasswd -a rob

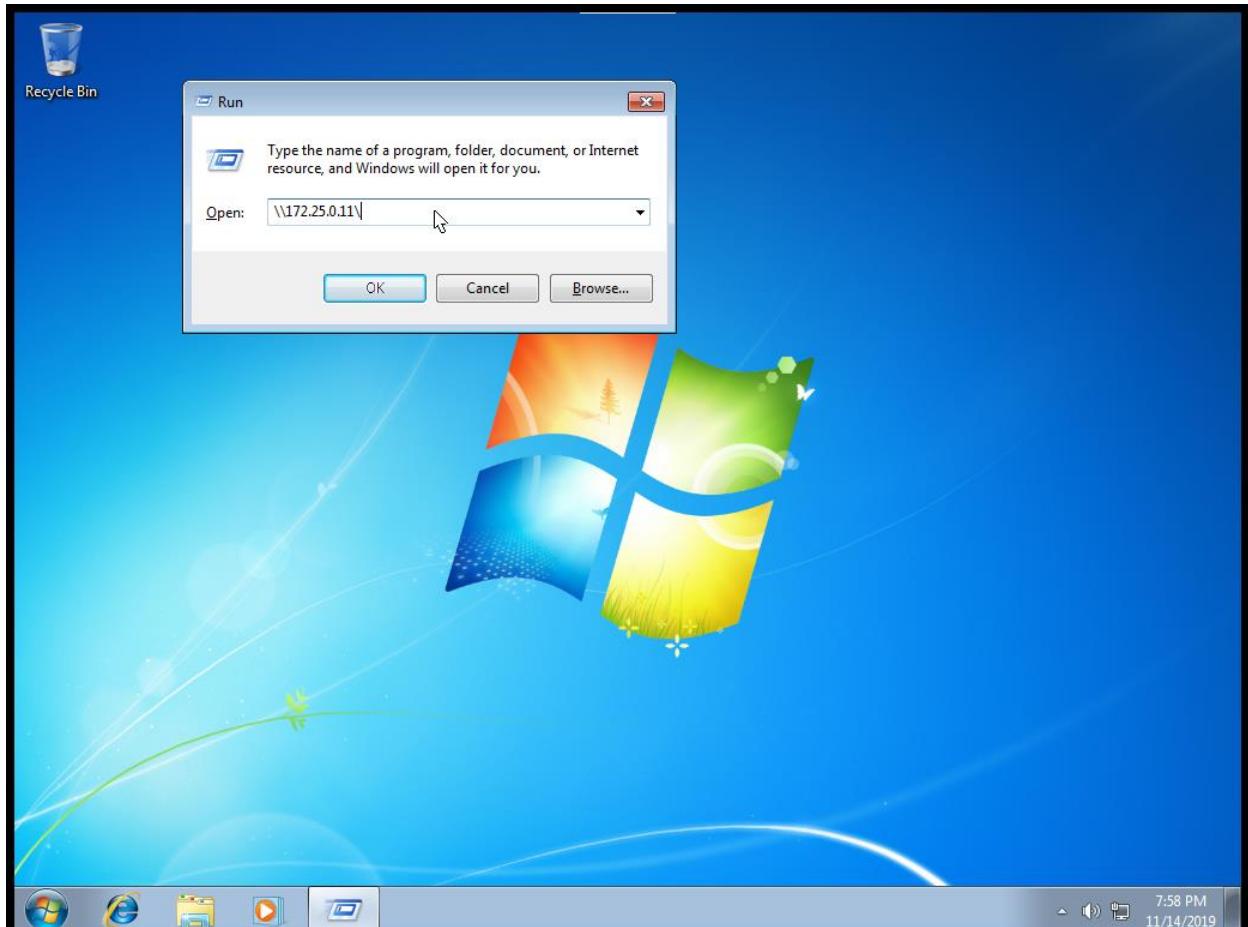
```
File Edit View Search Terminal Help
[root@server4 ~]# useradd -s /sbin/nologin rob
[root@server4 ~]#
[root@server4 ~]# smbpasswd -a rob
New SMB password:
Retype new SMB password:
Added user rob.
[root@server4 ~]# 
```

Now Check In Windows

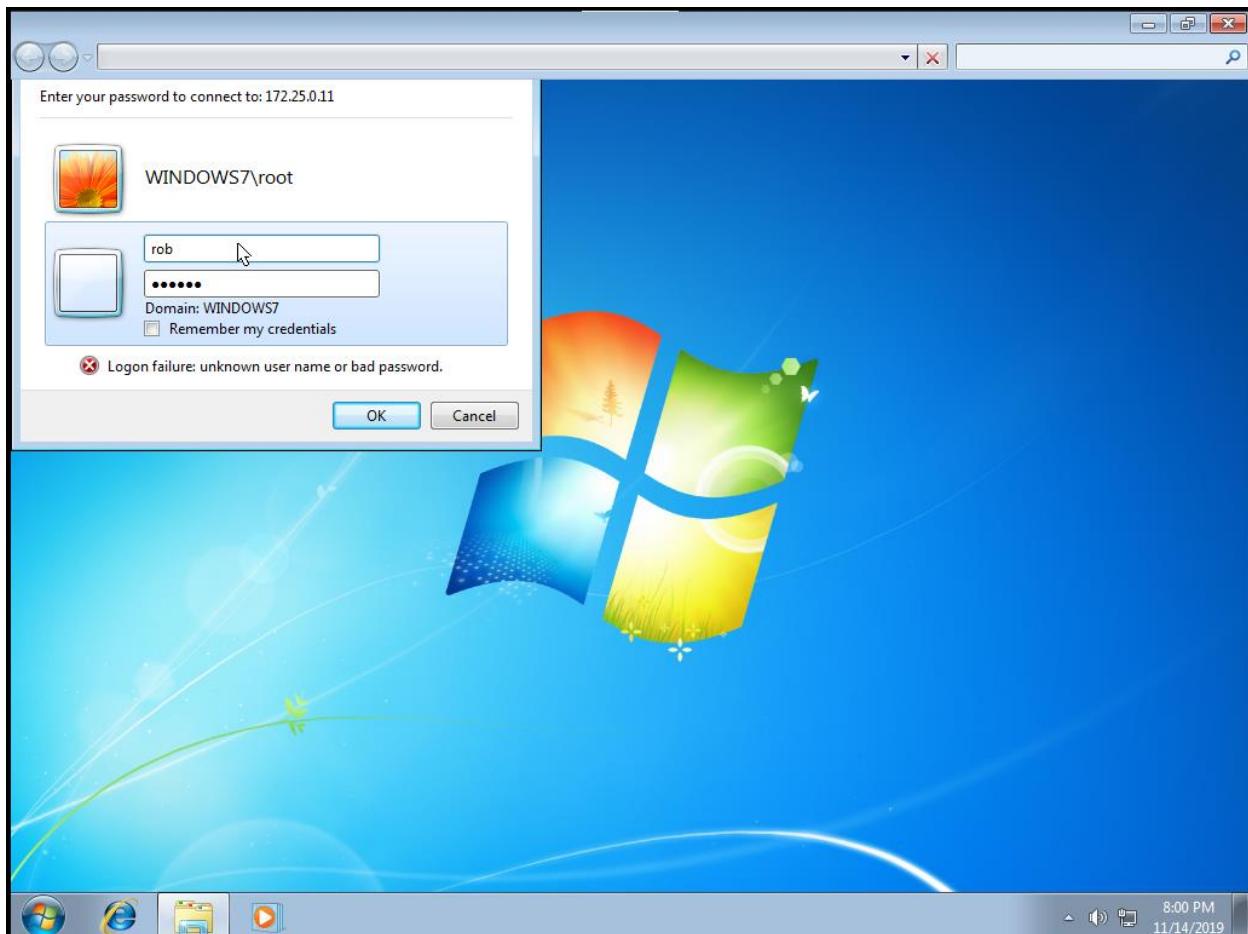
Password : entersoftlabs



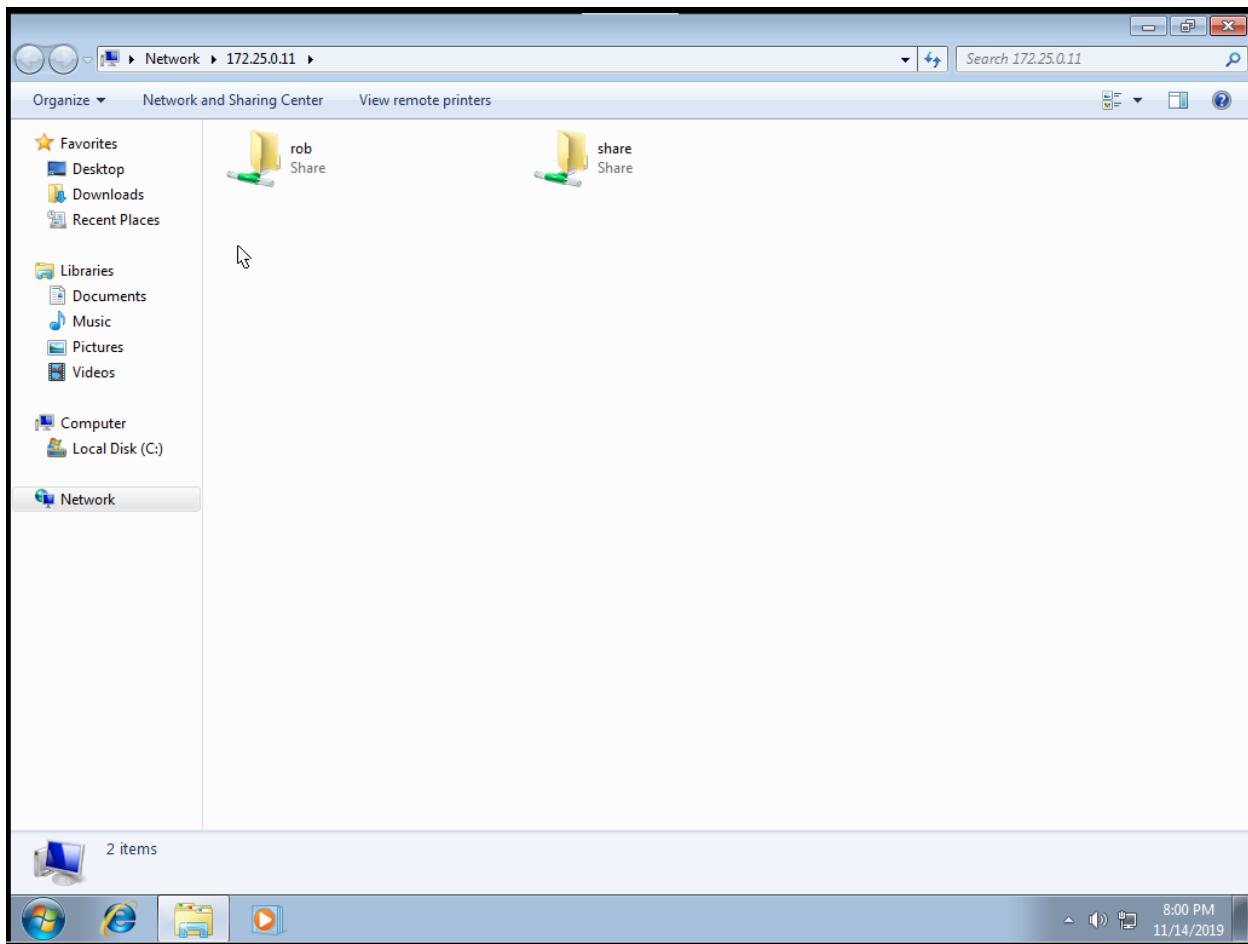
click on run



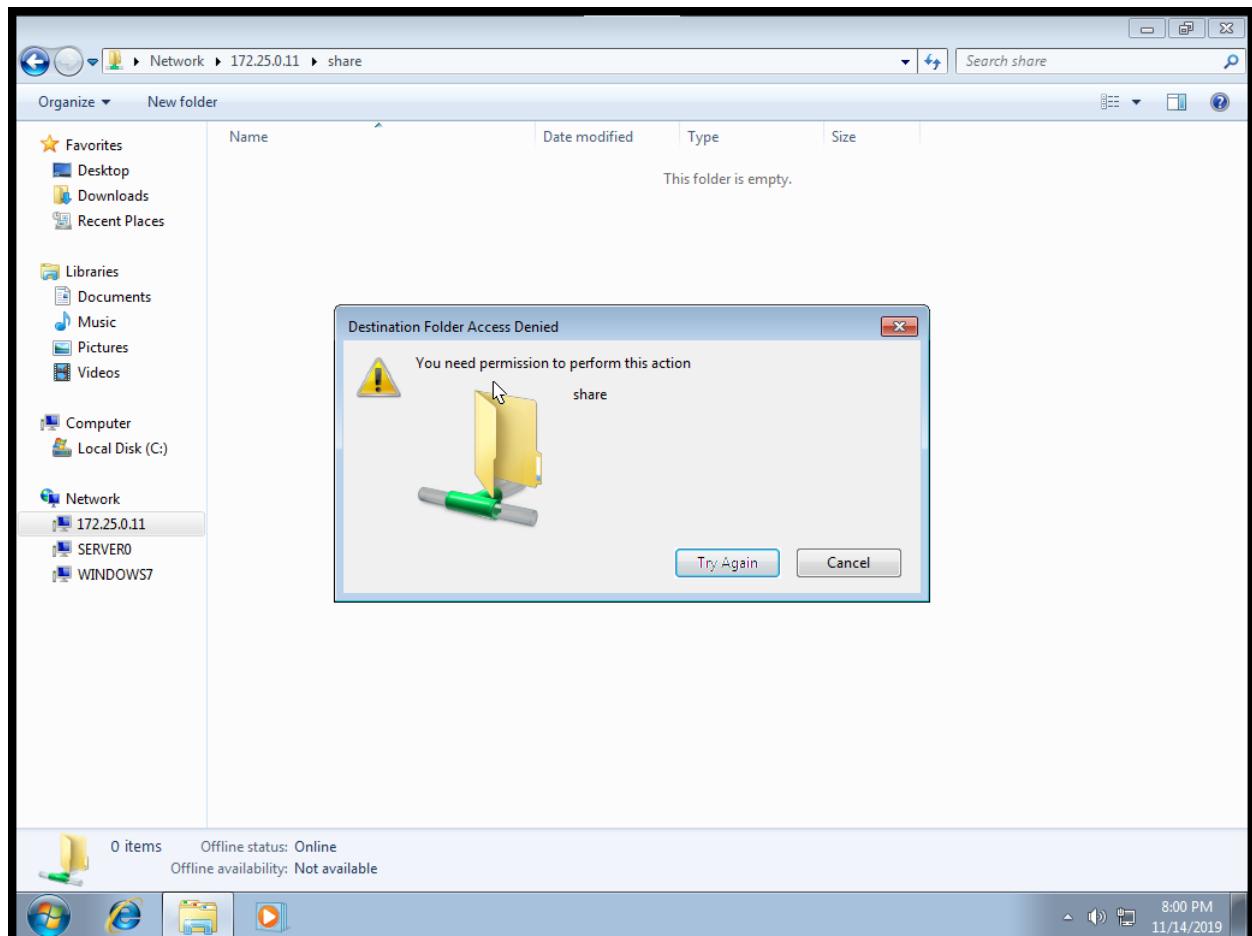
Now login as rob



We can see 2 items are there



We are unable to create a folder because we don't have permissions



DAY 36

Mount sambashare

Continue with Previousday

to mount sambashare we need a package

P → cifs-utils

root@desktopX

.) yum install samba-client -y

```
File Edit View Search Terminal Tabs Help
root@server4:~ [root@desktop4 ~]# yum install samba-client -y
Loaded plugins: langpacks
rhel_dvd
(1/2): rhel_dvd/group_gz
(2/2): rhel_dvd/primary_db
Resolving Dependencies
--> Running transaction check
--> Package samba-client.x86_64 0:4.1.1-31.el7 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

=====
| Package           | Arch      | Version        | Repository | Size
|-----|-----|-----|-----|-----|
| Installing:      |          |               |            |       |
| samba-client     | x86_64   | 4.1.1-31.el7 | rhel_dvd  | 513 k
|-----|-----|-----|-----|-----|
Transaction Summary
=====
| Install 1 Package
Total download size: 513 k
Installed size: 1.4 M
Downloading packages:
samba-client-4.1.1-31.el7.x86_64.rpm
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : samba-client-4.1.1-31.el7.x86_64
  Verifying   : samba-client-4.1.1-31.el7.x86_64
                                           1/1
                                           1/1

Installed:
  samba-client.x86_64 0:4.1.1-31.el7

Complete!
[root@desktop4 ~]#
```

.) smbclient //serverX/share -U rob [U - capital]

```
File Edit View Search Terminal Tabs Help
root@server4:~                                     root@desktop4:~
[root@desktop4 ~]# smbclient //server4/share -U rob
Enter rob's password:
Domain=[MYCOMPANY] OS=[Unix] Server=[Samba 4.1.1]
smb: \> 
```

.)mkdir /mnt/sambashare

.) mount //serverX/share /mnt/sambashare

[not done]

```
File Edit View Search Terminal Tabs Help
root@server4:~                                     root@desktop4:~
[root@desktop4 ~]# mkdir /mnt/sambashare
[root@desktop4 ~]#
[root@desktop4 ~]# mount //server4/share /mnt/sambashare
mount: wrong fs type, bad option, bad superblock on //server4/share,
      missing codepage or helper program, or other error
      (for several filesystems (e.g. nfs, cifs) you might
       need a /sbin/mount.<type> helper program)

      In some cases useful info is found in syslog - try
      dmesg | tail or so.
[root@desktop4 ~]# 
```

.) yum install cifs-utils -y

```
File Edit View Search Terminal Tabs Help
root@server4:~                                     root@desktop4:~
[root@desktop4 ~]# yum install cifs-utils -y
Loaded plugins: langpacks
rhel_dvd
(1/2): rhel_dvd/group_gz                                | 4.1 kB  00:00:00
(2/2): rhel_dvd/primary_db                             | 134 kB  00:00:00
Resolving Dependencies
--> Running transaction check
--> Package cifs-utils.x86_64 0:6.2-6.el7 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

=====
Package           Arch      Version        Repository      Size
=====
Installing:
cifs-utils        x86_64   6.2-6.el7      rhel_dvd       83 k

Transaction Summary
=====
Install 1 Package

Total download size: 83 k
Installed size: 174 k
Downloading packages:
cifs-utils-6.2-6.el7.x86_64.rpm                                         | 83 kB  00:00:00

Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : cifs-utils-6.2-6.el7.x86_64                                         1/1
  Verifying  : cifs-utils-6.2-6.el7.x86_64                                         1/1

Installed:
  cifs-utils.x86_64 0:6.2-6.el7

Complete!
[root@desktop4 ~]* 
```

.) mount //serverX/share .mnt/sambashare

[It'll ask samba password]

```
File Edit View Search Terminal Tabs Help
root@server4:~                                     root@desktop4:~
[root@desktop4 ~]# mount //server4/share /mnt/sambashare
Password for root@//server4/share: 
```

.) vim <UN>

username=rob [without space]

password=rob123 [without space]

:wq!

```
File Edit View Search Terminal Tabs Help
root@server4:~                                     root@desktop4:~
username=rob
password=rob123
-
-
-
-
```

.) cat <UN>

```
File Edit View Search Terminal Tabs Help
root@server4:~                                     root@desktop4:~
[root@desktop4 ~]# vim rob
[root@desktop4 ~]#
[root@desktop4 ~]# cat rob
username=rob
password=rob123
[root@desktop4 ~]# 
```

.) vim /etc/fstab

//serverX/public /mnt/share cifs credentials=/root/rob,multiuser,sec=ntlmssp

:wq!

```
File Edit View Search Terminal Tabs Help
root@server4:~                                     root@desktop4:~
#
# /etc/fstab
# Created by anaconda on Wed May  7 01:22:57 2014
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
#UUID=9bf6b9f7-92ad-441b-848e-0257ccb883d1  /          xfs      defaults        1 1
//server4/share          /mnt/sambashare    cifs    credentials=/root/rob,multiuser,sec=ntlmssp  0      0
-
```

.) tail -1 /etc/fstab

```
File Edit View Search Terminal Tabs Help
root@server4:~ [root@desktop4 ~]# vim /etc/fstab
[root@desktop4 ~]# tail -1 /etc/fstab
//server4/share      /mnt/sambashare    cifs    credentials=/root/rob,multiuser,sec=ntlmssp    0      0
[root@desktop4 ~]#
```

.) mount -a

.) df -hT

```
File Edit View Search Terminal Tabs Help
root@server4:~ [root@desktop4 ~]# mount -a
[root@desktop4 ~]#
[root@desktop4 ~]# df -hT
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/vdal        xfs       10G  3.1G  7.0G  31% /
devtmpfs        devtmpfs  482M   0  482M  0% /dev
tmpfs           tmpfs     498M  80K  497M  1% /dev/shm
tmpfs           tmpfs     498M  14M  485M  3% /run
tmpfs           tmpfs     498M   0  498M  0% /sys/fs/cgroup
//server4/share cifs      10G  3.1G  7.0G  31% /mnt/sambashare
[root@desktop4 ~]#
```

One more Example for sambashare by Nithyanand Sir

[below screenshots from sir's system]

.) history

```
File Edit View Search Terminal Help
33 mkdir /data
34 man semanage fcontext
35 # semanage fcontext -a -t httpd_sys_content_t "/web(/.*)?"
36         # restorecon -R -v /web
37 semanage fcontext -a -t samba_share_t "/data(/.*)?"
38 restorecon -R -v /data
39 touch /data/report{1..3}.txt
40 echo "Hello Sambashare" >/data/report{1..3}.txt
41 echo "Hello Sambashare" >/data/report1.txt
42 echo "Hello Sambashare" >/data/report2.txt
43 echo "Hello Sambashare" >/data/report3.txt
44 ls -ldZ /data/report1.txt
45 vim /etc/samba/smb.conf
46 tail -11 /etc/samba/smb.conf
47 vim /etc/samba/smb.conf
```

vim /etc/samba/smb.conf

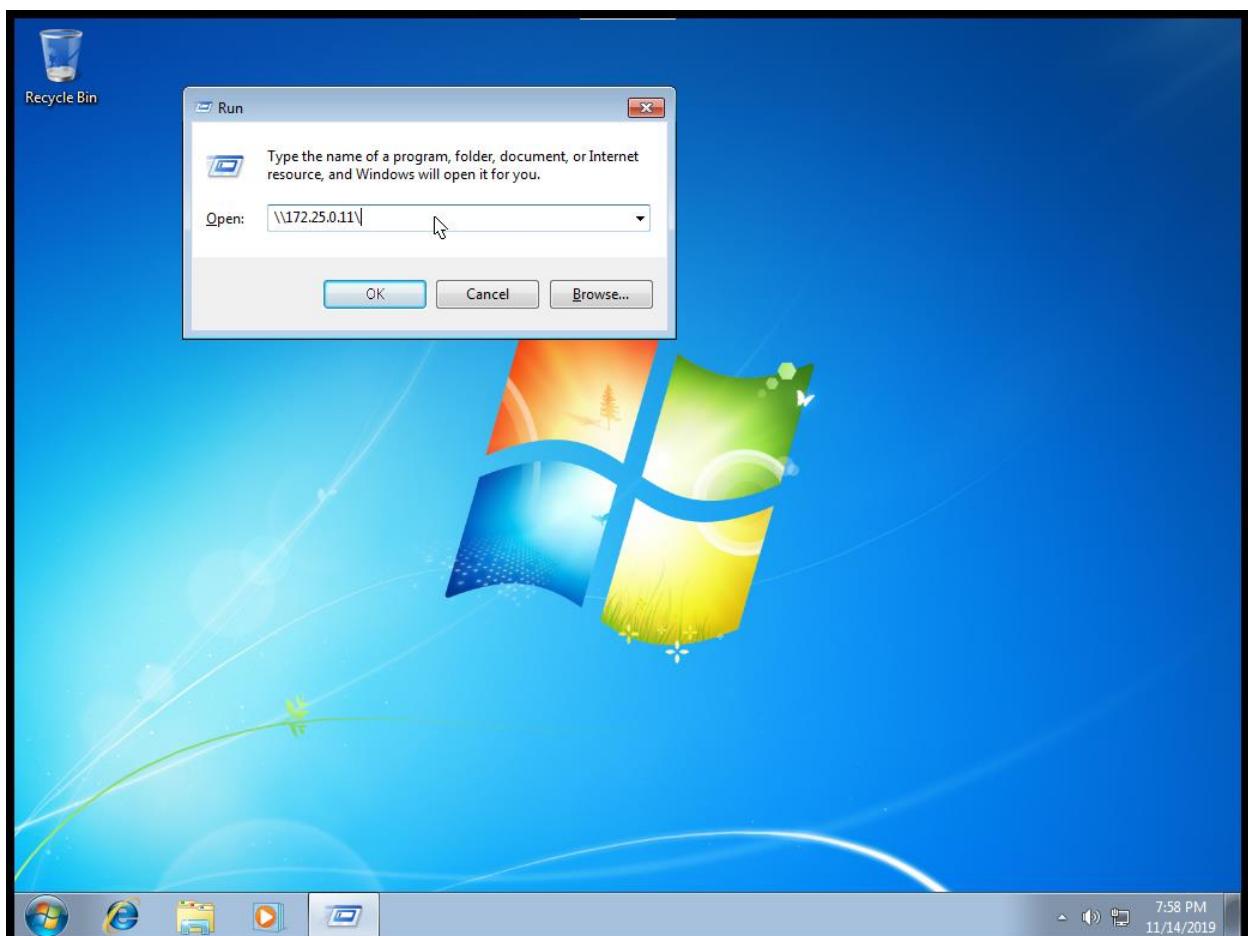
```
[public]
comment = for public with read and write
path = /data
hosts allow = 172.25.0.0/24
writable = no
write list = smith , saara
valid users = rob ,smith, saara
:wq!■
```

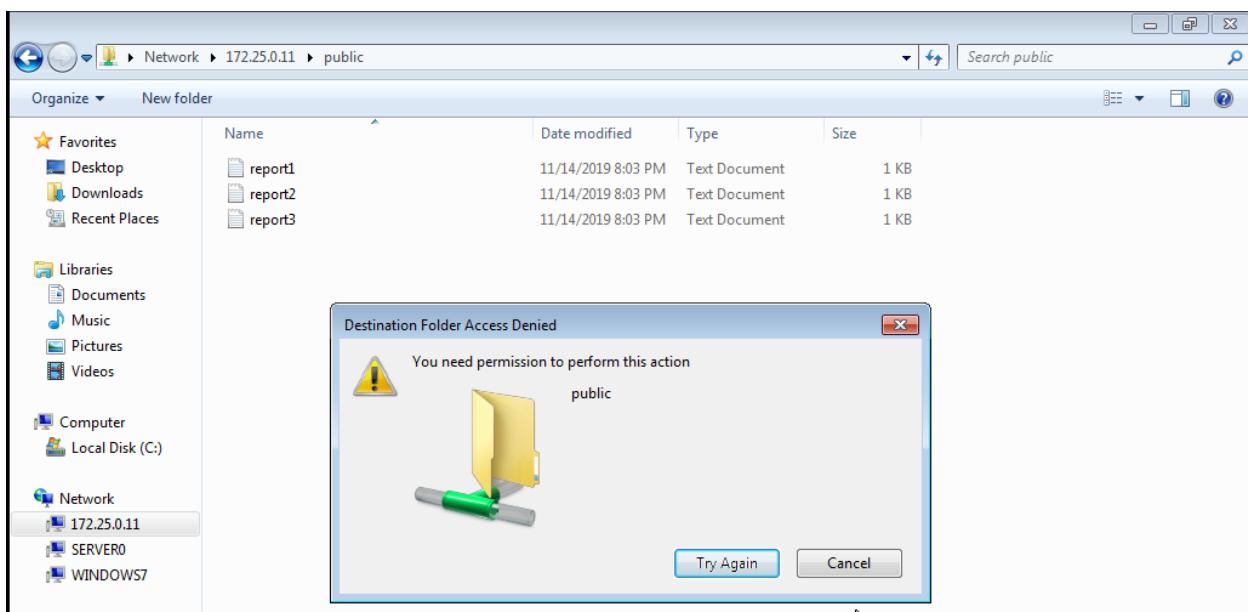
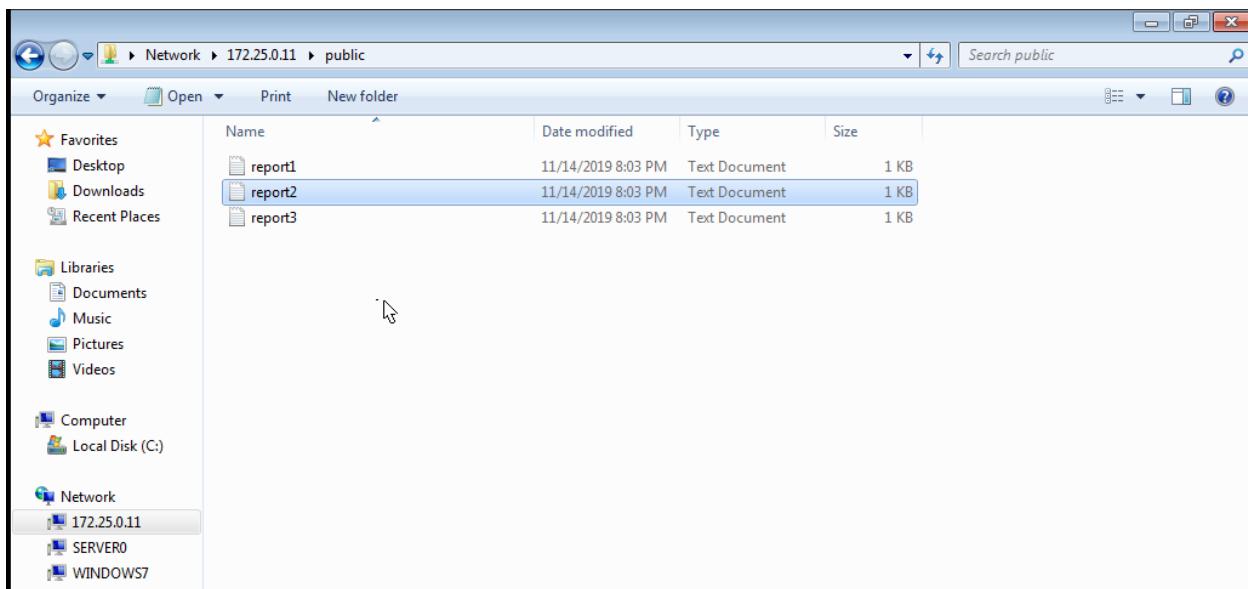
```
.) tail -7 /etc/samba/smb.conf
```

```
.) systemctl restart smb nmb
```

```
[public]
comment = for public with read and write
path = /data
hosts allow = 172.25.0.0/24
writable = no
write list = smith , saara
valid users = rob ,smith, saara
[root@server0 ~]# systemctl restart smb nmb
[root@server0 ~]#
```

Now go to windows and use run

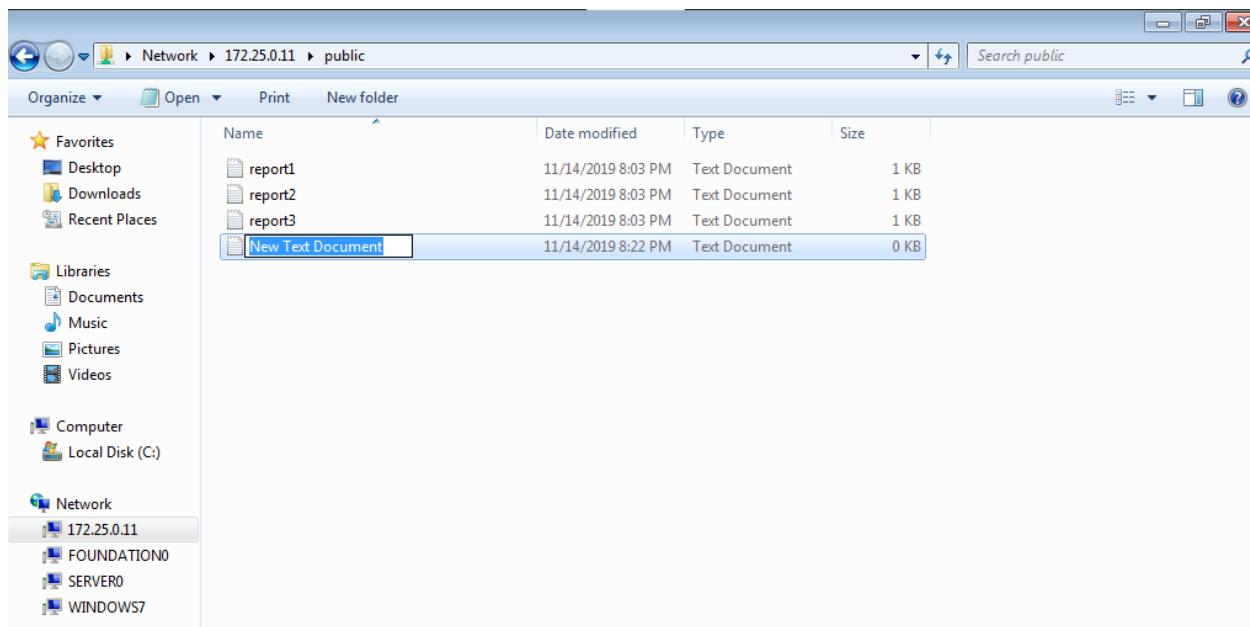
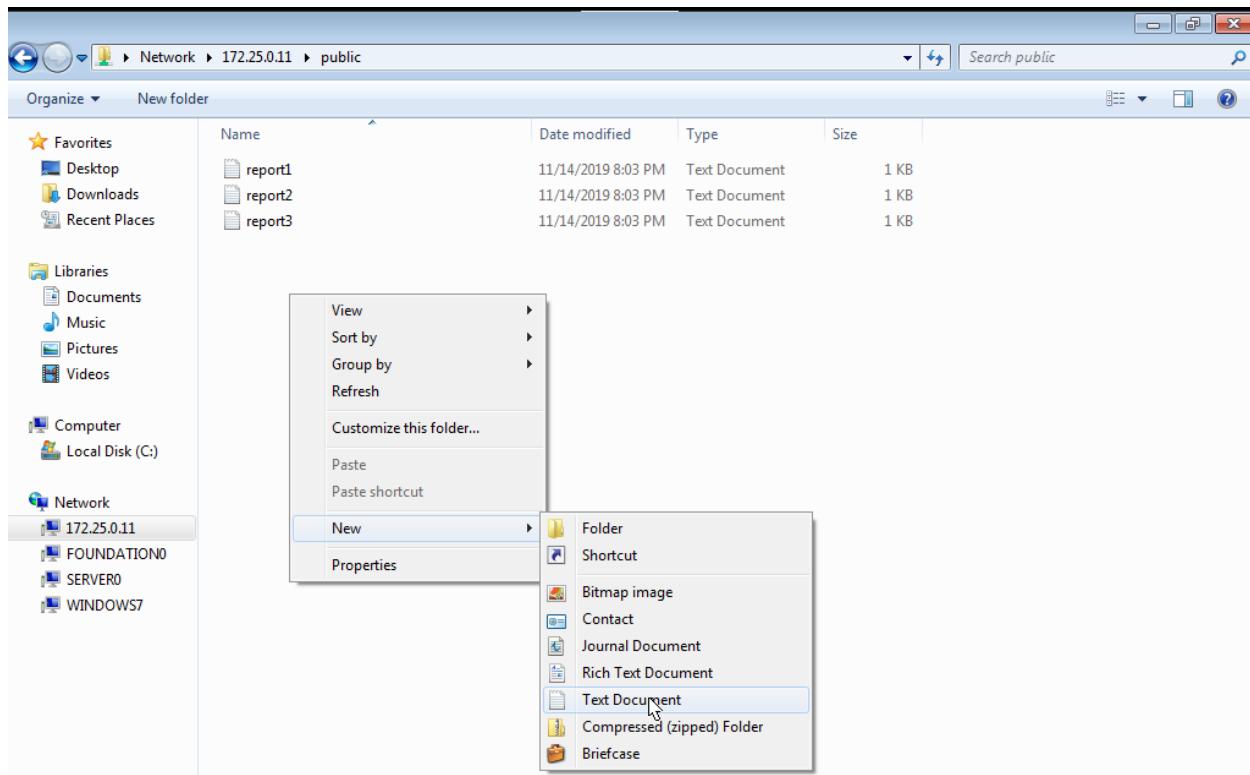


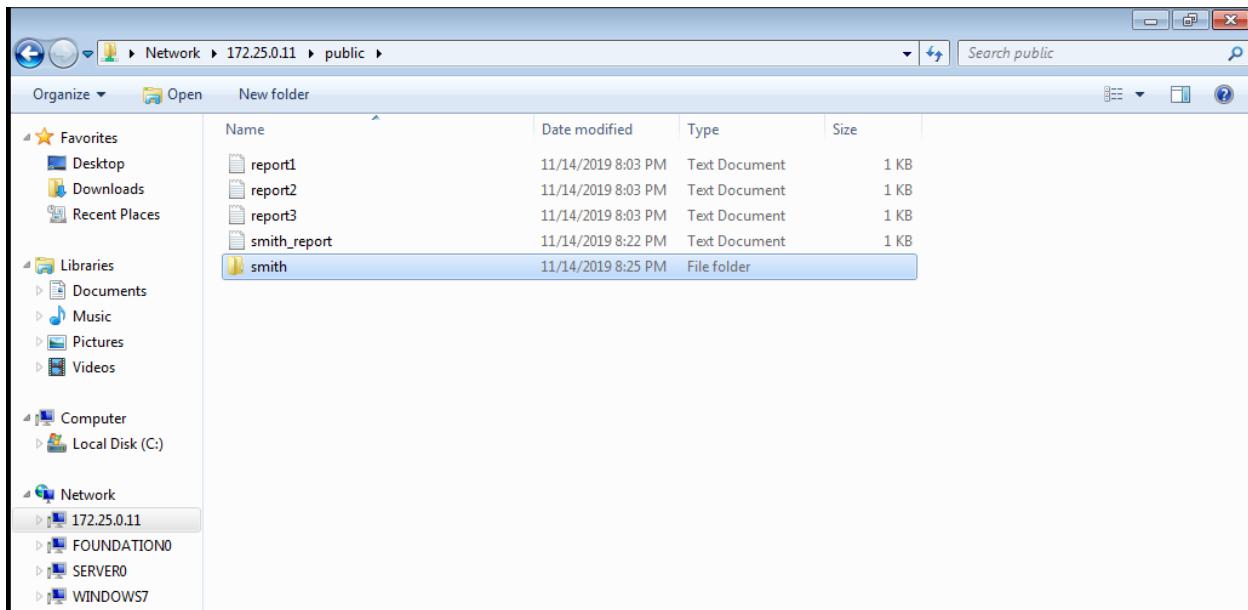


[we don't have permissions to do any action]

```
[root@server0 ~]# setfacl -Rm u:smith:rwx /data
[root@server0 ~]# setfacl -Rm u:saara:rwx /data
[root@server0 ~]# setfacl -dm u:smith:rwx /data
[root@server0 ~]# setfacl -dm u:saara:rwx /data
[root@server0 ~]# getfacl /data
getfacl: Removing leading '/' from absolute path names
# file: data
# owner: root
# group: root
user::rwx
user:smith:rwx
user:saara:rwx
group::r-x
mask::rwx
other::r-x
default:user::rwx
default:user:smith:rwx
default:user:saara:rwx
default:group::r-x
default:mask::rwx
default:other::r-x
[root@server0 ~]#
```

Now we can do creating folder or file





```
[root@server0 ~]# ls -l /data/
total 32
-rw-rw-r--+ 1 root root 17 Nov 14 20:03 report1.txt
-rw-rw-r--+ 1 root root 17 Nov 14 20:03 report2.txt
-rw-rw-r--+ 1 root root 17 Nov 14 20:03 report3.txt
-rwxrwxr--+ 1 smith smith 10 Nov 14 20:22 smith_report.txt
[root@server0 ~]# ll
total 12
-rw----- 1 root root 8619 May 7 2014 anaconda-ks.cfg
[root@server0 ~]# ls -l /data/
total 36
-rw-rw-r--+ 1 root root 17 Nov 14 20:03 report1.txt
-rw-rw-r--+ 1 root root 17 Nov 14 20:03 report2.txt
-rw-rw-r--+ 1 root root 17 Nov 14 20:03 report3.txt
drwxrwxr-x+ 2 smith smith 6 Nov 14 20:24 smith
-rwxrwxr--+ 1 smith smith 10 Nov 14 20:22 smith_report.txt
[root@server0 ~]#
```

+ means acl available

.) history

```
49 tail -11 /etc/samba/smb.conf
50 systemctl restart smb nmb
51 useradd -s /sbin/nologin smith
52 useradd -s /sbin/nologin saara
53 useradd -s /sbin/nologin ryan
54 smbpasswd -a smith
55 smbpasswd -a saara
56 smbpasswd -a ryan
57 history
58 ls -ld /data
59 setfacl -Rm u:smith:rwx /data
60 setfacl -Rm u:saara:rwx /data
61 setfacl -dm u:smith:rwx /data
62 setfacl -dm u:saara:rwx /data
63 getfacl /data
64 history
65 ls -l /data/
66 ll
67 ls -l /data/
68 history
[root@server0 ~]#
```

Continue...

```
File Edit View Search Terminal Help
[root@server0 ~]# systemctl enable smb nmb
[root@server0 ~]# systemctl start smb nmb
[root@server0 ~]# firewall-cmd --permanent --add-service=samba
success
[root@server0 ~]# firewall-cmd --add-service=samba
Warning: ALREADY_ENABLED
[root@server0 ~]# ls -ld /sambashare/
drwxr-xr-x. 2 root root 6 Nov 14 19:41 /sambashare/
[root@server0 ~]# vim /etc/samba/smb.conf
[root@server0 ~]# ls -ld /data
drwxrwxr-x+ 3 root root 95 Nov 14 20:25 /data
[root@server0 ~]# ls -ldZ /sambashare/
drwxr-xr-x. root root unconfined_u:object_r:samba_share_t:s0 /sambashare/
[root@server0 ~]# ls -ldZ /data
drwxrwxr-x+ root root unconfined_u:object_r:samba_share_t:s0 /data
[root@server0 ~]# vim /etc/samba/smb.conf
[root@server0 ~]# ls -l /data
total 36
-rw-rw-r--+ 1 root root 17 Nov 14 20:03 report1.txt
-rw-rw-r--+ 1 root root 17 Nov 14 20:03 report2.txt
-rw-rw-r--+ 1 root root 17 Nov 14 20:03 report3.txt
drwxrwxr-x+ 2 smith smith 6 Nov 14 20:24 smith
-rwxrwxr--+ 1 smith smith 10 Nov 14 20:22 smith_report.txt
[root@server0 ~]#
```

```
[root@server0 ~]# id lisa
id: lisa: no such user
[root@server0 ~]# vim /etc/samba/smb.conf
[root@server0 ~]# id nitya
id: nitya: no such user
[root@server0 ~]#
```

```
[root@desktop0 ~]# smbclient //server0/share -U lisa
Enter lisa's password:
session setup failed: NT_STATUS_LOGON_FAILURE
[root@desktop0 ~]# smbclient //server0/share -U ryan
Enter ryan's password:
Domain=[MYCOMPANY] OS=[Unix] Server=[Samba 4.1.1]
smb: \> ls
.
..
D      0 Thu Nov 14 19:41:38 2019
D      0 Fri Nov 15 15:33:29 2019

        40913 blocks of size 262144. 28591 blocks available
smb: \> !ls
anaconda-ks.cfg
smb: \> put anaconda-ks.cfg
NT_STATUS_ACCESS_DENIED opening remote file \anaconda-ks.cfg
smb: \> █
```



A screenshot of a terminal window with two tabs. The active tab shows the following command-line session:

```
File Edit View Search Terminal Tabs Help
root@server0:~          root@desktop0:~
[root@desktop0 ~]# smbclient //server0/data -U ryan
Enter ryan's password:
Domain=[MYCOMPANY] OS=[Unix] Server=[Samba 4.1.1]
tree connect failed: NT_STATUS_BAD_NETWORK_NAME
[root@desktop0 ~]# █
```

```
[root@desktop0 ~]# smbclient //server0/public -U smith
Enter smith's password:
Domain=[MYCOMPANY] OS=[Unix] Server=[Samba 4.1.1]
smb: \> ls
.
..
report1.txt      N    17 Thu Nov 14 20:03:43 2019
report2.txt      N    17 Thu Nov 14 20:03:45 2019
report3.txt      N    17 Thu Nov 14 20:03:49 2019
smith_report.txt A    10 Thu Nov 14 20:22:57 2019
smith            D      0 Thu Nov 14 20:24:58 2019

        40913 blocks of size 262144. 28590 blocks available
smb: \>
```

```
smb: \> mkdir nitya
smb: \> ls
.
..
report1.txt
report2.txt
report3.txt
smith_report.txt
smith
nitya

D      0 Fri Nov 15 19:44:51 2019
D      0 Fri Nov 15 15:33:29 2019
N     17 Thu Nov 14 20:03:43 2019
N     17 Thu Nov 14 20:03:45 2019
N     17 Thu Nov 14 20:03:49 2019
A     10 Thu Nov 14 20:22:57 2019
D      0 Thu Nov 14 20:24:58 2019
D      0 Fri Nov 15 19:44:51 2019

40913 blocks of size 262144. 28590 blocks available
```

```
smb: \> put anaconda-ks.cfg
putting file anaconda-ks.cfg as \anaconda-ks.cfg (233.8 kb/s) (average 233.8 kb
/s)
smb: \> ls
.
..
report1.txt
report2.txt
report3.txt
smith_report.txt
smith
nitya
anaconda-ks.cfg

D      0 Fri Nov 15 19:45:03 2019
D      0 Fri Nov 15 15:33:29 2019
N     17 Thu Nov 14 20:03:43 2019
N     17 Thu Nov 14 20:03:45 2019
N     17 Thu Nov 14 20:03:49 2019
A     10 Thu Nov 14 20:22:57 2019
D      0 Thu Nov 14 20:24:58 2019
D      0 Fri Nov 15 19:44:51 2019
A     8619 Fri Nov 15 19:45:03 2019

40913 blocks of size 262144. 28591 blocks available
smb: \>
```

```
smb: \> get smith_report.txt
getting file \smith_report.txt of size 10 as smith_report.txt (0.1 KiloBytes/se
c) (average 0.1 KiloBytes/sec)
smb: \> !ls
anaconda-ks.cfg  smith_report.txt
smb: \>
```

Mount

.) mkdir /mnt/data

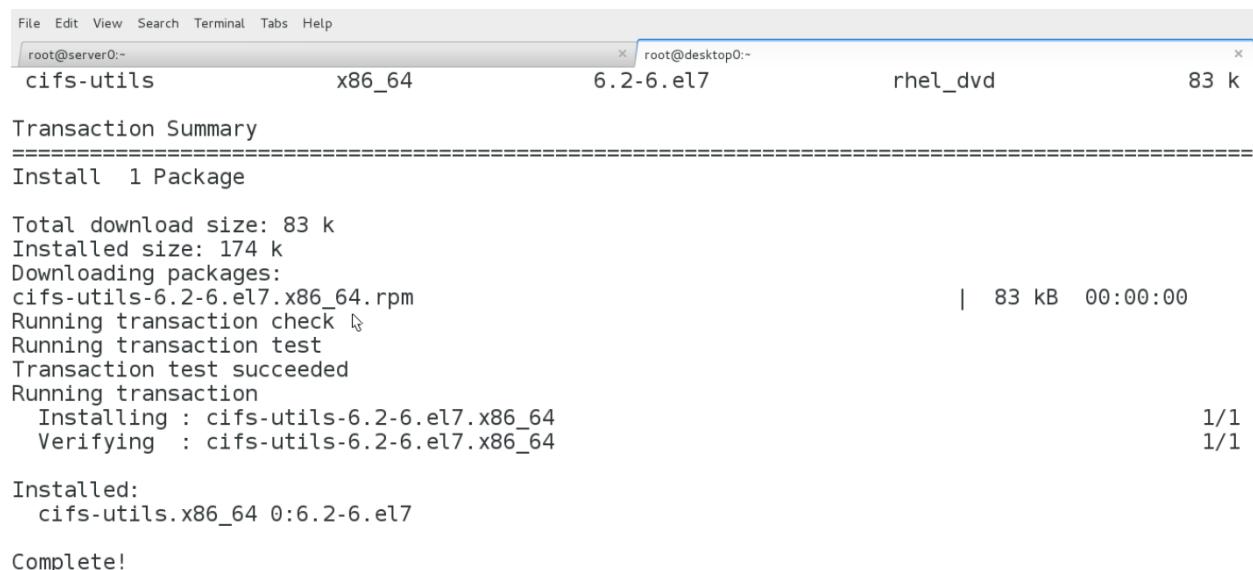
.) mount //serverX/public /mnt/data

```
[root@desktop0 ~]# mkdir /mnt/data
[root@desktop0 ~]# mount //server0/public /mnt/data
mount: wrong fs type, bad option, bad superblock on //server0/public,
      missing codepage or helper program, or other error
      (for several filesystems (e.g. nfs, cifs) you might
       need a /sbin/mount.<type> helper program)

      In some cases useful info is found in syslog - try
      dmesg | tail or so.
[root@desktop0 ~]# █
```

[not done]

.) installing package



```
File Edit View Search Terminal Tabs Help
root@server0:~          root@desktop0:-
cifs-utils      x86_64      6.2-6.el7      rhel_dvd      83 k
=====
Transaction Summary
=====
Install 1 Package

Total download size: 83 k
Installed size: 174 k
Downloading packages:
cifs-utils-6.2-6.el7.x86_64.rpm
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : cifs-utils-6.2-6.el7.x86_64      1/1
  Verifying  : cifs-utils-6.2-6.el7.x86_64      1/1

Installed:
  cifs-utils.x86_64 0:6.2-6.el7

Complete!
```

.) mount //serverX/public /mnt/data [It'll ask samba password

```
[root@desktop0 ~]# mount //server0/public /mnt/data
Password for root@//server0/public: █
```



.) vim rob

```
File Edit View Search Terminal Tabs Help
root@server0:~                                     root@desktop0:~
username=rob
password=rob123
~
```

.) vim /etc/fstab

```
File Edit View Search Terminal Tabs Help
root@server0:~                                     root@desktop0:~
#
# /etc/fstab
# Created by anaconda on Wed May  7 01:22:57 2014
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
UUID=9bf6b9f7-92ad-441b-848e-0257cbb883d1 /          xfs      defaults    1 1
//server0/public /mnt/data  cifs  credentials=/root/rob,multiuser,sec=ntlmssp 0 0
~
```

.) mount -a

.) df -hT

```
[root@desktop0 ~]# vim rob
[root@desktop0 ~]# vim /etc/fstab
[root@desktop0 ~]# mount -a
[root@desktop0 ~]# df -hT
Filesystem      Type   Size  Used Avail Use% Mounted on
/dev/vda1        xfs    10G  3.1G  7.0G  31% /
devtmpfs        devtmpfs 482M    0  482M  0% /dev
tmpfs           tmpfs   498M   80K  497M  1% /dev/shm
tmpfs           tmpfs   498M   14M  485M  3% /run
tmpfs           tmpfs   498M    0  498M  0% /sys/fs/cgroup
//server0/public cifs    10G  3.1G  7.0G  31% /mnt/data
```

Mount Done

But If do the mistakes ;The below screenshots about mistakes

Mistake 1:

If we give space in vim rob

before that do .) umount /mnt/data

.) vim rob

```
File Edit View Search Terminal Tabs Help
root@server0:-
username = rob
password = rob123
~  
~  
[root@desktop0 ~]# umount /mnt/data
[root@desktop0 ~]# vim rob
[root@desktop0 ~]# mount -a
mount error(13): Permission denied
Refer to the mount.cifs(8) manual page (e.g. man mount.cifs)
```

[permission denied ; so don't give spaces]

[permission denied means credentials mistake]

Now correct the mistake and mount again

.) vim rob

```
File Edit View Search Terminal Tabs Help
root@server0:-
username=rob
password=rob123  
~  
~  
. ) mount -a  
. ) df -hT  
  
[root@desktop0 ~]# vim rob
[root@desktop0 ~]# mount -a
[root@desktop0 ~]# df -hT
Filesystem      Type   Size  Used Avail Use% Mounted on
/dev/vdal        xfs    10G  3.1G  7.0G  31% /
devtmpfs        devtmpfs 482M    0  482M   0% /dev
tmpfs           tmpfs   498M   80K  497M   1% /dev/shm
tmpfs           tmpfs   498M   14M  485M   3% /run
tmpfs           tmpfs   498M    0  498M   0% /sys/fs/cgroup
//server0/public cifs    10G  3.1G  7.0G  31% /mnt/data
```

Mistake 2 :

same as well in vim /etc/fstab , If we give any spelling mistake

.) umount /mnt/data

.) vim /etc/fstab

instead of credentialns sir given crdentials

.) mount -a

```
[root@desktop0 ~]# umount /mnt/data
```

```
[root@desktop0 ~]# vim /etc/fstab
```

```
[root@desktop0 ~]# mount -a
```

Password for root@//server0/public: █

[It'll ask password means that thers is a mistake]

Now correct the mistake and do mount again

```
[root@desktop0 ~]# vim /etc/fstab
```

```
[root@desktop0 ~]# mount -a
```

```
[root@desktop0 ~]# df -hT
```

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/vda1	xfs	10G	3.1G	7.0G	31%	/
devtmpfs	devtmpfs	482M	0	482M	0%	/dev
tmpfs	tmpfs	498M	80K	497M	1%	/dev/shm
tmpfs	tmpfs	498M	14M	485M	3%	/run
tmpfs	tmpfs	498M	0	498M	0%	/sys/fs/cgroup
//server0/public	cifs	10G	3.1G	7.0G	31%	/mnt/data

Day 37

Web Server

- .) It is a regular activity in real time
- .) In windows - **IIS** (Internet Information Services)
- .) IIS is a web server software package designed for Windows Server. It is used for hosting websites and other content on the Web , IIS developed by MicroSoft
- .) In Linux - 1) Apache

- 2) nginx (/engine/x)
 - 3) lighttpd (lighty)
-
- ```
graph TD; A[nginx /engine/x] --> C[Light weight]; B[lighttpd lighty] --> C;
```

Package → httpd

Service → httpd

F.S → httpd

Configuration File → /etc/httpd/conf/httpd.conf

or

/etc/httpd/conf.d/<name>.conf - [ real time ]

Document Root → /var/www/html - To keep Web Content

Direct Index → index.html

Steps :

root@serverX

.) yum install httpd -y

```
File Edit View Search Terminal Help
[root@server4 ~]# yum install httpd -y
Loaded plugins: langpacks
rhel_dvd
(1/2): rhel_dvd/group_gz
(2/2): rhel_dvd/primary_db
Resolving Dependencies
--> Running transaction check
--> Package httpd.x86_64 0:2.4.6-17.el7 will be installed
--> Processing Dependency: httpd-tools = 2.4.6-17.el7 for package: httpd-2.4.6-17.el7.x86_64
--> Processing Dependency: /etc/mime.types for package: httpd-2.4.6-17.el7.x86_64
--> Processing Dependency: libapr-1.so.0()(64bit) for package: httpd-2.4.6-17.el7.x86_64
--> Processing Dependency: libaputil-1.so.0()(64bit) for package: httpd-2.4.6-17.el7.x86_64
--> Running transaction check
--> Package apr.x86_64 0:1.4.8-3.el7 will be installed
--> Package apr-util.x86_64 0:1.5.2-6.el7 will be installed
--> Package httpd-tools.x86_64 0:2.4.6-17.el7 will be installed
--> Package mailcap.noarch 0:2.1.41-2.el7 will be installed
--> Finished Dependency Resolution
```

.) systemctl enable httpd

```
File Edit View Search Terminal Help
[root@server4 ~]# systemctl enable httpd
ln -s '/usr/lib/systemd/system/httpd.service' '/etc/systemd/system/multi-user.target.wants/httpd.service'
[root@server4 ~]#
```

.) systemctl start httpd

.) systemctl status httpd

```
File Edit View Search Terminal Help
[root@server4 ~]# systemctl start httpd
[root@server4 ~]#
[root@server4 ~]# systemctl status httpd
httpd.service - The Apache HTTP Server
 Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled)
 Active: active (running) since Tue 2019-11-19 17:44:04 IST; 9s ago
 Main PID: 1716 (httpd)
 Status: "Total requests: 0; Current requests/sec: 0; Current traffic: 0 B/sec"
 CGroup: /system.slice/httpd.service
 └─1716 /usr/sbin/httpd -DFOREGROUND
 ├─1717 /usr/sbin/httpd -DFOREGROUND
 ├─1718 /usr/sbin/httpd -DFOREGROUND
 ├─1719 /usr/sbin/httpd -DFOREGROUND
 ├─1720 /usr/sbin/httpd -DFOREGROUND
 └─1721 /usr/sbin/httpd -DFOREGROUND

Nov 19 17:44:04 server4.example.com systemd[1]: Started The Apache HTTP Server.
[root@server4 ~]#
```

.) firewall-cmd --add-service=http

```
File Edit View Search Terminal Help
[root@server4 ~]# firewall-cmd --add-service=http
success
[root@server4 ~]#
```

.) firewall-cmd --add-service=http --permanent

```
File Edit View Search Terminal Help
[root@server4 ~]# firewall-cmd --add-service=http --permanent
success
[root@server4 ~]#
```

.) curl serverX.example.com

```
File Edit View Search Terminal Help
[root@server4 ~]# curl server4.example.com
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.1//EN" "http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd">

<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en">
 <head>
 <title>Test Page for the Apache HTTP Server on Red Hat Enterprise Linux</title>
 <meta http-equiv="Content-Type" content="text/html; charset=UTF-8" />
 <style type="text/css">
 /*<![CDATA[*/
 body {
 background-color: #fff;
 color: #000;
 font-size: 0.9em;
 font-family: sans-serif,helvetica;
 margin: 0;
 padding: 0;
 }
 :link {
 color: #c00;
 }
 :visited {
 color: #c00;
 }
 a:hover {
 color: #f50;
 }

```

In Browser if we give url serverX.example.com



This page is used to test the proper operation of the Apache HTTP server after it has been installed. If you can read this page, it means that the Apache HTTP server installed at this site is working properly.

**If you are a member of the general public:**

The fact that you are seeing this page indicates that the website you just visited is either experiencing problems, or is undergoing routine maintenance.

If you would like to let the administrators of this website know that you've seen this page instead of the page you expected, you should send them e-mail. In general, mail sent to the name "webmaster" and directed to the website's domain should reach the appropriate person.

For example, if you experienced problems while visiting www.example.com, you should send e-mail to "webmaster@example.com".

For information on Red Hat Enterprise Linux, please visit the [Red Hat, Inc. website](#). The documentation for Red Hat Enterprise Linux is [available on the Red Hat, Inc. website](#).

**If you are the website administrator:**

You may now add content to the directory `/var/www/html/`. Note that until you do so, people visiting your website will see this page, and not your content. To prevent this page from ever being used, follow the instructions in the file `/etc/httpd/conf.d/welcome.conf`.

You are free to use the image below on web sites powered by the Apache HTTP Server:



Now I am going to change

.) echo "Hello World This is my first page" >/var/www/html/index.html

.) curl server0.example.com

A terminal session on a Red Hat Enterprise Linux system. The user runs the command 'echo "Hello World This is My First Page" >/var/www/html/index.html' to create a test file. Then, they run 'curl server4.example.com' to retrieve the page, which displays the contents 'Hello World This is My First Page'.

Now check in Browser ( serverX.example.com )



.) less /etc/httpd/conf/httpd.conf

```
File Edit View Search Terminal Help
#
This is the main Apache HTTP server configuration file. It contains the
configuration directives that give the server its instructions.
See <URL:http://httpd.apache.org/docs/2.4/> for detailed information.
In particular, see
<URL:http://httpd.apache.org/docs/2.4/mod/directives.html>
for a discussion of each configuration directive.
#
Do NOT simply read the instructions in here without understanding
what they do. They're here only as hints or reminders. If you are unsure
consult the online docs. You have been warned.
#
Configuration and logfile names: If the filenames you specify for many
of the server's control files begin with "/" (or "drive:/" for Win32), the
server will use that explicit path. If the filenames do *not* begin
with "/", the value of ServerRoot is prepended -- so 'log/access_log'
with ServerRoot set to '/www' will be interpreted by the
server as '/www/log/access_log', whereas 'log/access_log' will be
interpreted as '/log/access_log'.
#
ServerRoot: The top of the directory tree under which the server's
configuration, error, and log files are kept.
#
Do not add a slash at the end of the directory path. If you point
ServerRoot at a non-local disk, be sure to specify a local disk on the
Mutex directive, if file-based mutexes are used. If you wish to share the
same ServerRoot for multiple httpd daemons, you will need to change at
least PidFile.
#
#ServerRoot "/etc/httpd"
#
Listen: Allows you to bind Apache to specific IP addresses and/or
ports, instead of the default. See also the <VirtualHost>
directive.
#
Change this to Listen on specific IP addresses as shown below to
prevent Apache from glomming onto all bound IP addresses.
#
#Listen 12.34.56.78:80
Listen 80
/etc/httpd/conf/httpd.conf
```

```
.) cd /var/www/html/
.) mv index.html main.html
.) ll
```

```
File Edit View Search Terminal Help
[root@server4 ~]# cd /var/www/html/
[root@server4 html]#
[root@server4 html]# mv index.html main.html
[root@server4 html]#
[root@server4 html]# ll
total 4
-rw-r--r--. 1 root root 34 Nov 19 17:47 main.html
[root@server4 html]#
```

```
.) cd
.) curl serverX.example.com
```

```
File Edit View Search Terminal Help
[root@server4 ~]# curl server4.example.com
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.1//EN" "http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd">

<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en">
 <head>
 <title>Test Page for the Apache HTTP Server on Red Hat Enterprise Linux</title>
 <meta http-equiv="Content-Type" content="text/html; charset=UTF-8" />
 <style type="text/css">
 /*<![CDATA[*/
 body {
 background-color: #fff;
 color: #000;
 font-size: 0.9em;
 font-family: sans-serif, helvetica;
 margin: 0;
 padding: 0;
 }
 :link {
 color: #c00;
 }
 :visited {
 color: #c00;
 }
 a:hover {
 color: #f50;
 }
 <![CDATA]]>
```

Again It is showing the web page code , means that previous process is temporary ; to change permanently need to do changes in vim

```
.) vim /etc/httpd/conf.d/exam.conf
```

```
<VirtualHost 172.25.X.11:80>
```

```
 ServerName serverX.example.com
```

```
 DocumentRoot /var/www/html
```

```
 DirectoryIndex main.html
```

```
<VirtualHost>
```

```
File Edit View Search Terminal Help
<VirtualHost 172.25.4.11:80>
ServerName server4.example.com
DocumentRoot /var/www/html
DirectoryIndex main.html
</VirtualHost>
```

```
.) cat /etc/httpd/conf.d/exam.conf
```

```
File Edit View Search Terminal Help
[root@server4 ~]# vim /etc/httpd/conf.d/exam.conf
[root@server4 ~]#
[root@server4 ~]# cat /etc/httpd/conf.d/exam.conf
<VirtualHost 172.25.4.11:80>
 ServerName server4.example.com
 DocumentRoot /var/www/html
 DirectoryIndex main.html
</VirtualHost>

[root@server4 ~]# █
```

```
.) systemctl restart httpd.service
```

```
.) curl server0.example.com
```

```
File Edit View Search Terminal Help
[root@server4 ~]# systemctl restart httpd.service
[root@server4 ~]#
[root@server4 ~]# curl server4.example.com
Hello World This is My First Page
[root@server4 ~]# █
```

## Web Hosting

Dedicated - one server for one company

Shared - one server share with ‘n’ companies

VPS - one VM for one company ( Initially Expensive )

Cloud - Instance usage for one company ( Self Service as per company )

Except SHARED remaining all dedicated

.) How to identify Dedicated or shared ?

ping hostname and copy IP then ping with Ip , we can see in result

sitename/cpanel - to check dedicated or not

.) Dedicated , VPS, Cloud for these 3 we can use SSH

ssh → IP/hostname

.) Shared Hosting also called as Virtual Hosting

Steps :

root@serverX

.) vim /etc/httpd/conf.d/exam.conf

```
<VirtualHost 172.25.X.11:80>
```

```
 ServerName wwwX.example.com
```

```
 DocumentRoot /var/www/virtual
```

```
 DirectoryIndex index.html
```

```
<VirtualHost>
```

```
File Edit View Search Terminal Help
```

```
<VirtualHost 172.25.4.11:80>
 ServerName server4.example.com
 DocumentRoot /var/www/html
 DirectoryIndex main.html
</VirtualHost>
#####
<VirtualHost 172.25.4.11:80>
 ServerName www4.example.com
 DocumentRoot /var/www/virtual
 DirectoryIndex index.html
</VirtualHost>
```

.) cat /etc/httpd/conf.d/exam.conf

```
File Edit View Search Terminal Help
```

```
[root@server4 ~]# vim /etc/httpd/conf.d/exam.conf
[root@server4 ~]#
[root@server4 ~]# cat /etc/httpd/conf.d/exam.conf
<VirtualHost 172.25.4.11:80>
 ServerName server4.example.com
 DocumentRoot /var/www/html
 DirectoryIndex main.html
</VirtualHost>
#####
<VirtualHost 172.25.4.11:80>
 ServerName www4.example.com
 DocumentRoot /var/www/virtual
 DirectoryIndex index.html
</VirtualHost>
[root@server4 ~]#
```

.) mkdir /var/www/virtual  
.) echo "My Virtual Hosting" >/var/www/virtual/index.html

```
File Edit View Search Terminal Help
[root@server4 ~]# mkdir /var/www/virtual
[root@server4 ~]#
[root@server4 ~]# echo "My Virtual Hosting" >/var/www/virtual/index.html
[root@server4 ~]#
```

.) systemctl restart httpd.service  
.) curl wwwX.example.com

```
File Edit View Search Terminal Help
[root@server4 ~]# systemctl restart httpd.service
[root@server4 ~]#
[root@server4 ~]# curl www4.example.com
My Virtual Hosting
[root@server4 ~]#
```

## To Secure

If we have some backup in our WebSite ; There is a chance to steal the Information.

I'm creating a directory ( backup ) and also creating some files in that directory this all information kept in my website

```
.) mkdir /var/www/html/backup
.touch /var/www/html/backup/data{1..10}.txt
.touch /var/www/html/backup/movie{1..10}.txt
```

```
File Edit View Search Terminal Help
[root@server4 ~]# mkdir /var/www/html/backup
[root@server4 ~]#
[root@server4 ~]# touch /var/www/html/backup/data{1..10}.txt
[root@server4 ~]# touch /var/www/html/backup/movie{1..10}.txt
[root@server4 ~]# █
```

If I give My website url/backup ( serverX.example.com/backup/ ) all the information is visible anyone can easily steal the information



## Index of /backup

<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Description</u>
<a href="#">Parent Directory</a>		-	
<a href="#">data1.txt</a>	2019-11-19 18:24	0	
<a href="#">data2.txt</a>	2019-11-19 18:24	0	
<a href="#">data3.txt</a>	2019-11-19 18:24	0	
<a href="#">data4.txt</a>	2019-11-19 18:24	0	
<a href="#">data5.txt</a>	2019-11-19 18:24	0	
<a href="#">data6.txt</a>	2019-11-19 18:24	0	
<a href="#">data7.txt</a>	2019-11-19 18:24	0	
<a href="#">data8.txt</a>	2019-11-19 18:24	0	
<a href="#">data9.txt</a>	2019-11-19 18:24	0	
<a href="#">data10.txt</a>	2019-11-19 18:24	0	
<a href="#">movie1.txt</a>	2019-11-19 18:24	0	
<a href="#">movie2.txt</a>	2019-11-19 18:24	0	
<a href="#">movie3.txt</a>	2019-11-19 18:24	0	
<a href="#">movie4.txt</a>	2019-11-19 18:24	0	
<a href="#">movie5.txt</a>	2019-11-19 18:24	0	
<a href="#">movie6.txt</a>	2019-11-19 18:24	0	
<a href="#">movie7.txt</a>	2019-11-19 18:24	0	
<a href="#">movie8.txt</a>	2019-11-19 18:24	0	
<a href="#">movie9.txt</a>	2019-11-19 18:24	0	
<a href="#">movie10.txt</a>	2019-11-19 18:24	0	

Called Directory Traversal Vulnerability

To secure our data in the website need to changes in vim

.) vim /etc/httpd/conf.d/exam.conf

```
<Directory /var/www/html/backup>
```

```
 require local
```

```
<Directory>
```

[ in 2<sup>nd</sup> line we can write require local or require IP adderess ]

[ I wrote require local ]

```
File Edit View Search Terminal Help
<VirtualHost 172.25.4.11:80>
ServerName server4.example.com
DocumentRoot /var/www/html
DirectoryIndex main.html
</VirtualHost>
#####
<VirtualHost 172.25.4.11:80>
ServerName www4.example.com
DocumentRoot /var/www/virtual
DirectoryIndex index.html
</VirtualHost>
#####
<Directory /var/www/html/backup>
require local
</Directory>
```

.) cat /etc/httpd/conf.d/exam.conf

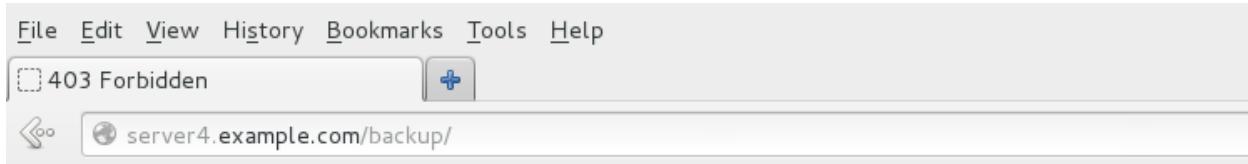
```
File Edit View Search Terminal Help
[root@server4 ~]# vim /etc/httpd/conf.d/exam.conf
[root@server4 ~]#
[root@server4 ~]# cat /etc/httpd/conf.d/exam.conf
<VirtualHost 172.25.4.11:80>
ServerName server4.example.com
DocumentRoot /var/www/html
DirectoryIndex main.html
</VirtualHost>
#####
<VirtualHost 172.25.4.11:80>
ServerName www4.example.com
DocumentRoot /var/www/virtual
DirectoryIndex index.html
</VirtualHost>
#####
<Directory /var/www/html/backup>
require local
</Directory>

[root@server4 ~]# █
```

.) systemctl restart httpd.service

```
File Edit View Search Terminal Help
[root@server4 ~]# systemctl restart httpd.service
[root@server4 ~]#
```

Now go to the website and check ( serverX.example.com/backup/ )



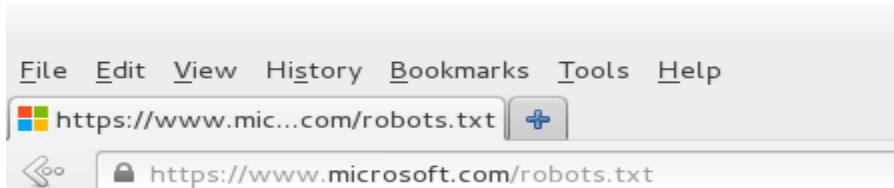
## Forbidden

You don't have permission to access /backup/ on this server.

It is showing don't have permission to access

In DocumentRoot if we write robots.txt file to secure

But the robots.txt is also one of the information leakage



The screenshot shows a web browser window with the address bar containing "https://www.microsoft.com/robots.txt". The page content displays the robots.txt file for Microsoft's website.

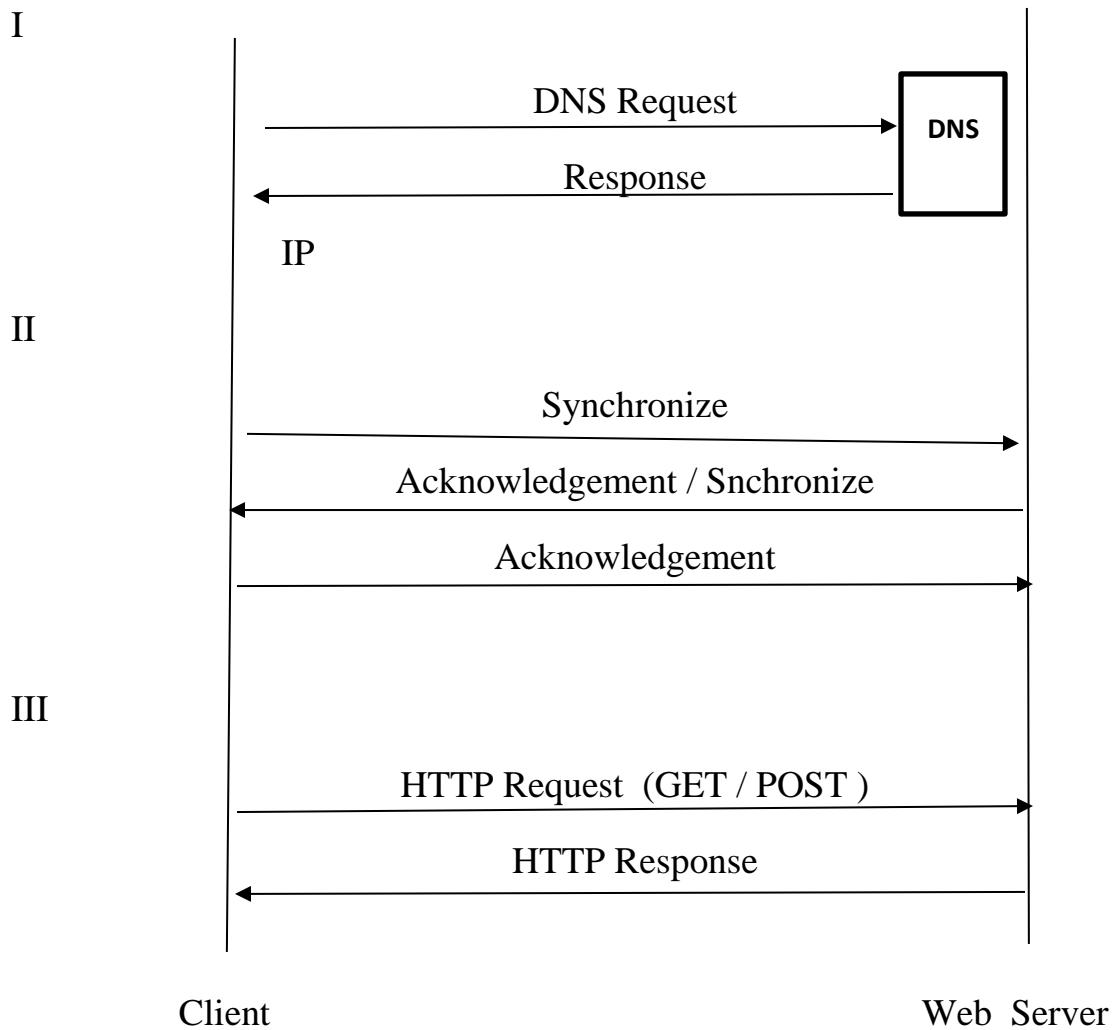
```
Robots.txt file for www.microsoft.com

User-agent: *
Disallow: /en-us/windows/si/matrix.html
Disallow: /en-us/windows/si/matrix.html
Disallow: /*/security/search-results.aspx?
Disallow: /*/music/*/search/
Disallow: /*/search/
Disallow: /*/music/*/Search/
Disallow: /*/Search/
Disallow: /*/newsearch/
Disallow: *action=catalogsearch&
Disallow: /*/store/d/groove-music-pass/cfq7ttc0k5dq/0001
Allow: /*/store/*/search/
Allow: /*/store/*/layout/
Allow: /*/store/music/groove-music-pass/*
Allow: *action=catalogsearch&catalog_mode=grid&page=2$
Allow: *action=catalogsearch&catalog_mode=grid&page=3$
Allow: *action=catalogsearch&catalog_mode=grid&page=4$
Allow: *action=catalogsearch&catalog_mode=grid&page=5$
Allow: *action=catalogsearch&catalog_mode=grid&page=6$
Allow: *action=catalogsearch&catalog_mode=grid&page=7$
Allow: *action=catalogsearch&catalog_mode=grid&page=8$
Allow: *action=catalogsearch&catalog_mode=list&page=2$
Allow: *action=catalogsearch&catalog_mode=list&page=3$
Allow: *action=catalogsearch&catalog_mode=list&page=4$
Allow: *action=catalogsearch&catalog_mode=list&page=5$
Allow: *action=catalogsearch&catalog_mode=list&page=6$
Allow: *action=catalogsearch&catalog_mode=list&page=7$
Allow: *action=catalogsearch&catalog_mode=list&page=8$
Disallow: *action=accessorysearch&product=*&*
Allow: *action=accessorysearch&product=*&*
Disallow: *action=accessorysearch&
Allow: *action=accessorysearch&page=2$
Allow: *action=accessorysearch&page=3$
Allow: *action=accessorysearch&page=4$
Allow: *action=accessorysearch&page=5$
Allow: *action=accessorysearch&page=6$
Allow: *action=accessorysearch&page=7$
Allow: *action=accessorysearch&page=8$
Disallow: *action=productCompareAction&
Disallow: *action=productLinkAction&
Disallow: *action=overlay&
Disallow: *action=quickSearch&
Disallow: *action=writeReview
Disallow: *rep=hc
Disallow: *fe=true
Disallow: *?intc=
Disallow: *&solved=
Disallow: /music/*/wall/
```

## Day 38

### HTTP Communication

TCP 3 way Hand Shake



It is a plain text communication , so preffer HTTPS

HTTP Status Codes :

200 → OK

301 → Moved

400+ → Client Side Error

500+ → Server Side Error

## HTTPS ( Secure HTTP ) Communication

Ports : 443 & 8443

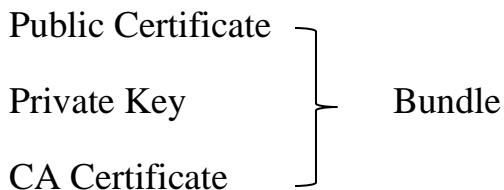
Package → mod\_ssl

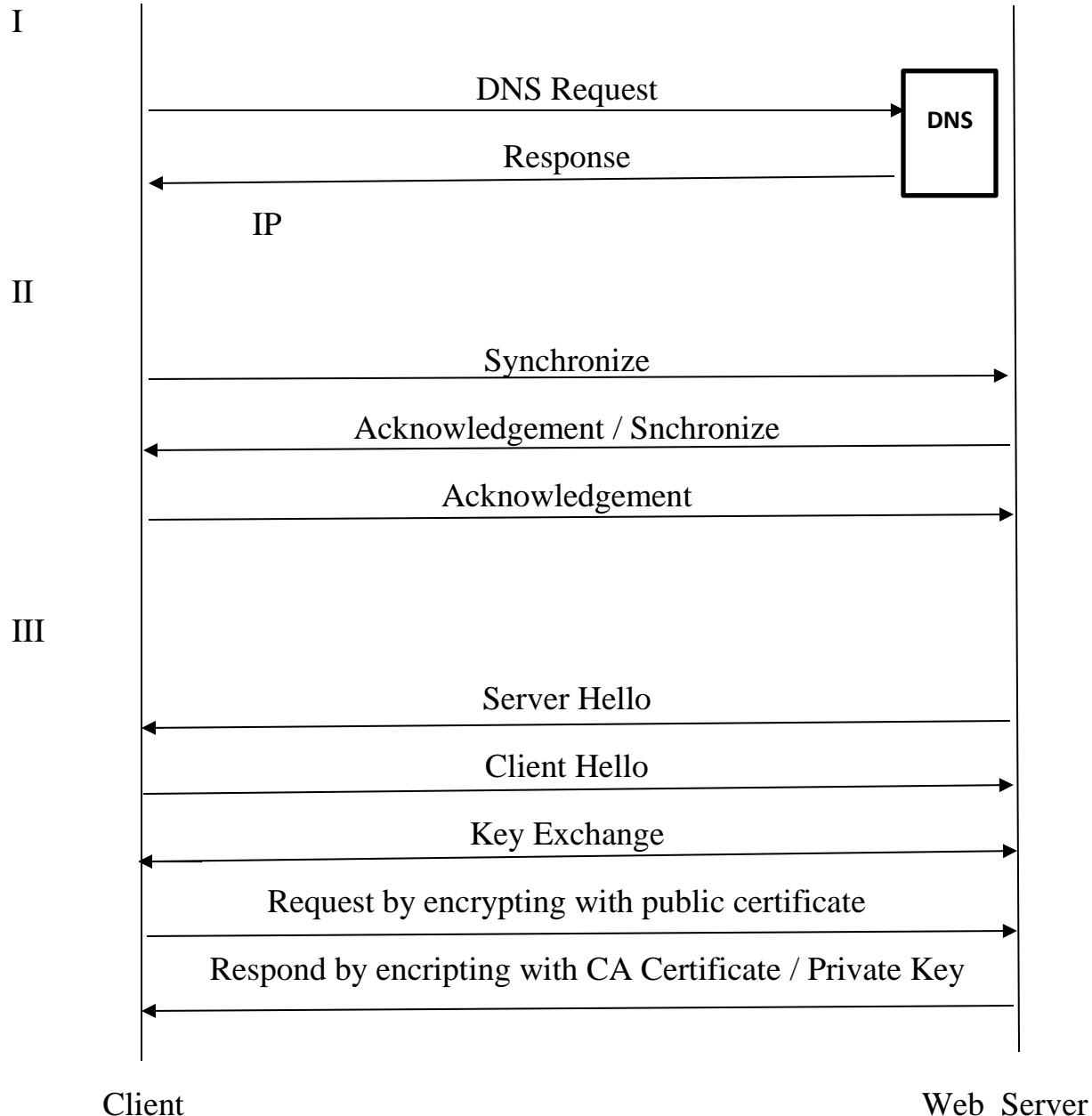
1) Generate → Self Signed Certificate

openssl to generate it

2) buy SSL

3) Configure in webserver





Paddle Symbol [ ] to check whether it is genuine or not

Steps :

ssh -X root@serverX

.) yum install httpd mod\_ssl -y

```
File Edit View Search Terminal Tabs Help
root@server4:~# yum install httpd mod_ssl -y
[root@server4 ~]# yum install httpd mod_ssl -y
Loaded plugins: langpacks
rhel_dvd
(1/2): rhel_dvd/group_gz
(2/2): rhel_dvd/primary_db
Resolving Dependencies
--> Running transaction check
--> Package httpd.x86_64 0:2.4.6-17.el7 will be installed
--> Processing Dependency: httpd-tools = 2.4.6-17.el7 for package: httpd-2.4.6-17.el7.x86_64
--> Processing Dependency: /etc/mime.types for package: httpd-2.4.6-17.el7.x86_64
--> Processing Dependency: libapr-1.so.0()(64bit) for package: httpd-2.4.6-17.el7.x86_64
--> Processing Dependency: libaprutil-1.so.0()(64bit) for package: httpd-2.4.6-17.el7.x86_64
--> Package mod_ssl.x86_64 1:2.4.6-17.el7 will be installed
--> Running transaction check
--> Package apr.x86_64 0:1.4.8-3.el7 will be installed
--> Package apr-util.x86_64 0:1.5.2-6.el7 will be installed
--> Package httpd-tools.x86_64 0:2.4.6-17.el7 will be installed
--> Package mailcap.noarch 0:2.1.41-2.el7 will be installed
--> Finished Dependency Resolution

Dependencies Resolved
```

.) systemctl enable httpd.service

```
File Edit View Search Terminal Tabs Help
root@server4:~# systemctl enable httpd.service
ln -s '/usr/lib/systemd/system/httpd.service' '/etc/systemd/system/multi-user.target.wants/httpd.service'
[root@server4 ~]#
```

.) systemctl start httpd.service

.) systemctl status httpd.service

```
File Edit View Search Terminal Tabs Help
root@server4:~#
[root@server4 ~]# systemctl start httpd.service
[root@server4 ~]#
[root@server4 ~]# systemctl status httpd.service
httpd.service - The Apache HTTP Server
 Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled)
 Active: active (running) since Wed 2019-11-20 19:44:27 IST; 11s ago
 Main PID: 2380 (httpd)
 Status: "Total requests: 0; Current requests/sec: 0; Current traffic: 0 B/sec"
 CGroup: /system.slice/httpd.service
 └─2380 /usr/sbin/httpd -DFOREGROUND
 ├─2381 /usr/sbin/httpd -DFOREGROUND
 ├─2382 /usr/sbin/httpd -DFOREGROUND
 ├─2383 /usr/sbin/httpd -DFOREGROUND
 ├─2384 /usr/sbin/httpd -DFOREGROUND
 └─2385 /usr/sbin/httpd -DFOREGROUND

Nov 20 19:44:27 server4.example.com systemd[1]: Started The Apache HTTP Server.
[root@server4 ~]#
```

.) firewall-cmd --add-service={http,https}

```
File Edit View Search Terminal Tabs Help
root@server4:~ [root@server4 ~]# firewall-cmd --add-service={http,https}
success
[root@server4 ~]#
```

.) firewall-cmd --add-service={http,https} --permanent

```
File Edit View Search Terminal Tabs Help
root@server4:~ [root@server4 ~]# firewall-cmd --add-service={http,https} --permanent
success
[root@server4 ~]#
```

.) echo "Hello World" >/var/www/html/index.html

```
File Edit View Search Terminal Tabs Help
root@server4:~ [root@server4 ~]# echo "Hello World" >/var/www/html/index.html
[root@server4 ~]#
```

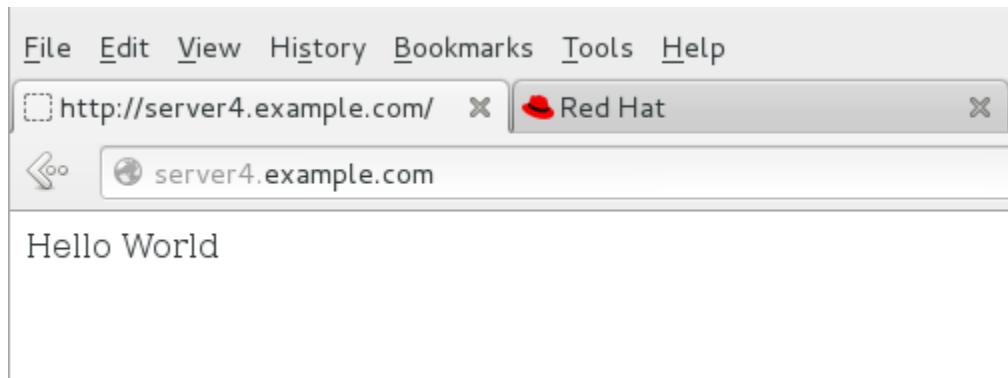
ssh -X root@desktopX

.) firefox &

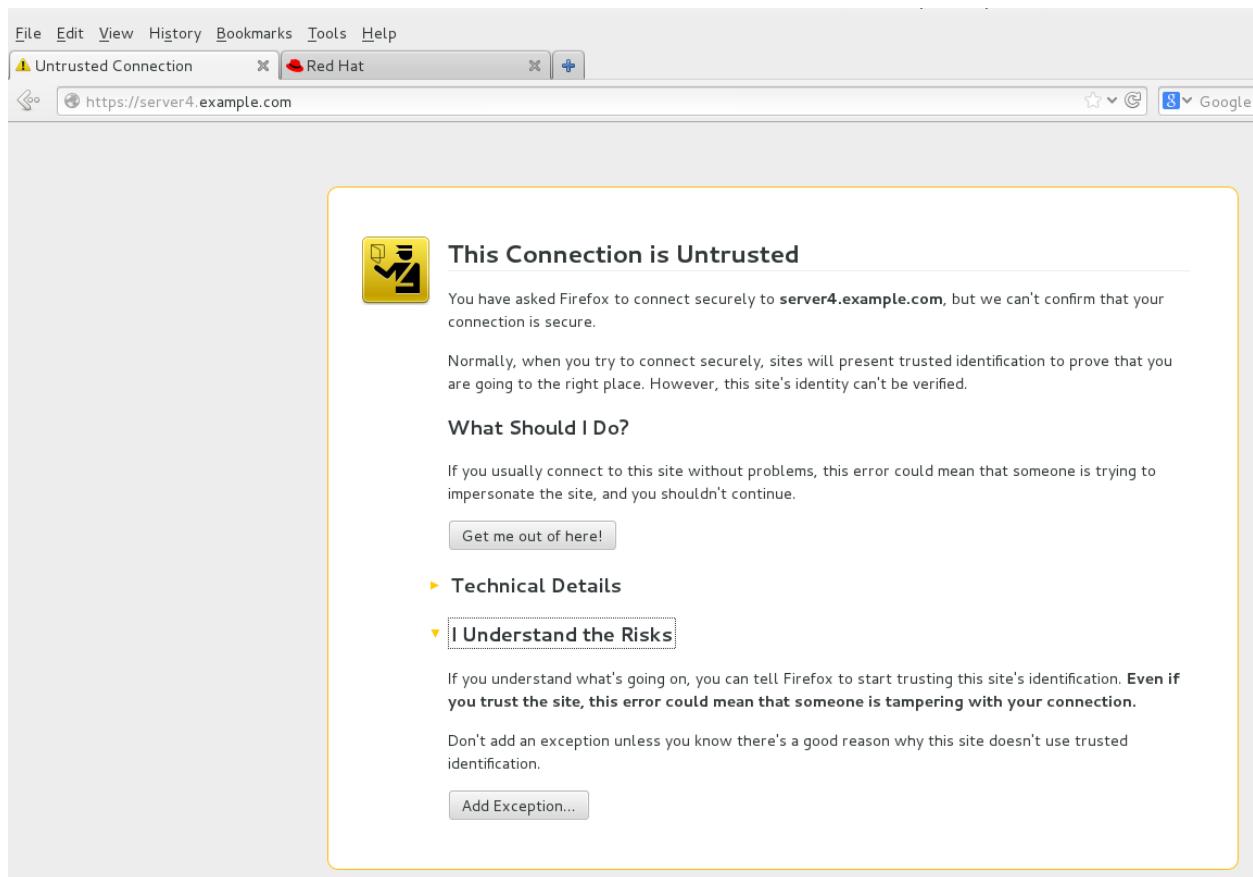
```
File Edit View Search Terminal Tabs Help
root@server4:~ [root@desktop4 ~]# firefox &
[1] 2318
[root@desktop4 ~]#
(process:2318): GLib-CRITICAL **: g_slice_set_config: assertion `sys_page_size == 0' failed

```

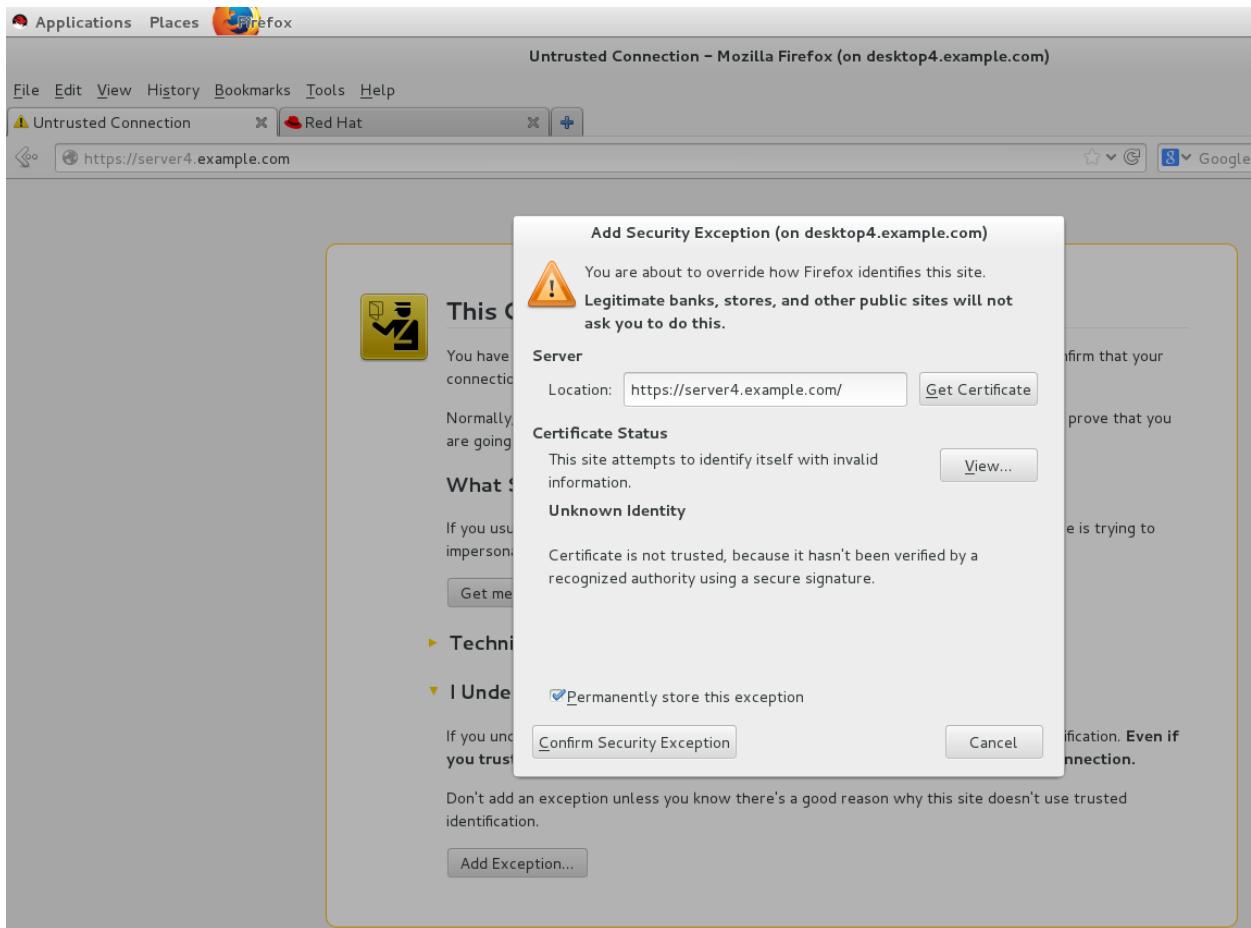
it will go to the firefox and open serverX.example.com



and next give https ://serverX.example.com



next click on I understand the Risks and then click on add Exception



click on get Confirm Security Exception



Hello World

Now the globe symbol changed to paddle symbol

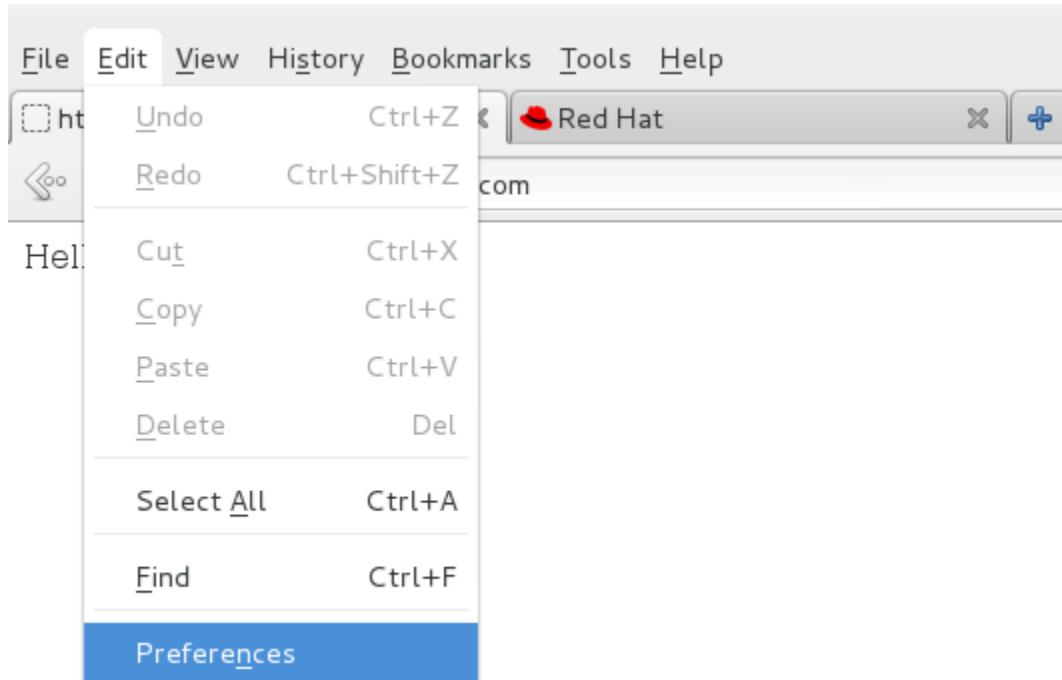
Now click on paddle symbol and click on more information

Two windows are overlaid. The top window is titled 'Certificate Viewer:"server4.example.com"' and has tabs for 'General' and 'Details'. It displays the message 'Could not verify this certificate for unknown reasons.' Below this, it shows 'Issued To' information: Common Name (CN) server4.example.com, Organization (O) SomeOrganization, Organizational Unit (OU) SomeOrganizationalUnit, and Serial Number 6C:60. It also shows 'Issued By' information: Common Name (CN) server4.example.com, Organization (O) SomeOrganization, and Organizational Unit (OU) SomeOrganizationalUnit. Under 'Validity', it shows Issued On 11/21/2019 and Expires On 11/20/2020. Under 'Fingerprints', it shows SHA1 Fingerprint E7:A1:2A:8B:04:23:53:EA:40:6C:A5:54:91:F6:E3:D0:EE:39:69:A6 and MD5 Fingerprint 7B:25:20:9F:9D:B0:B5:0B:8B:90:A2:5E:40:06:0B:6C. A 'Close' button is at the bottom right. The bottom window is titled 'Page Info - https://server4.example.com/' and has tabs for 'General', 'Permissions', and 'Security'. The 'Security' tab is selected. It shows 'Website Identity' with Website: server4.example.com, Owner: This website does not supply ownership information, and Verified by: SomeOrganization. It also shows 'Privacy &amp; History' and 'Technical Details' sections. The 'Technical Details' section includes a note about encryption: Connection Encrypted: High-grade Encryption (AES-128, 128 bit keys). The page you are viewing was encrypted before being transmitted over the Internet. Encryption makes it very difficult for unauthorized people to view information traveling between computers. It is therefore very unlikely that anyone read this page.

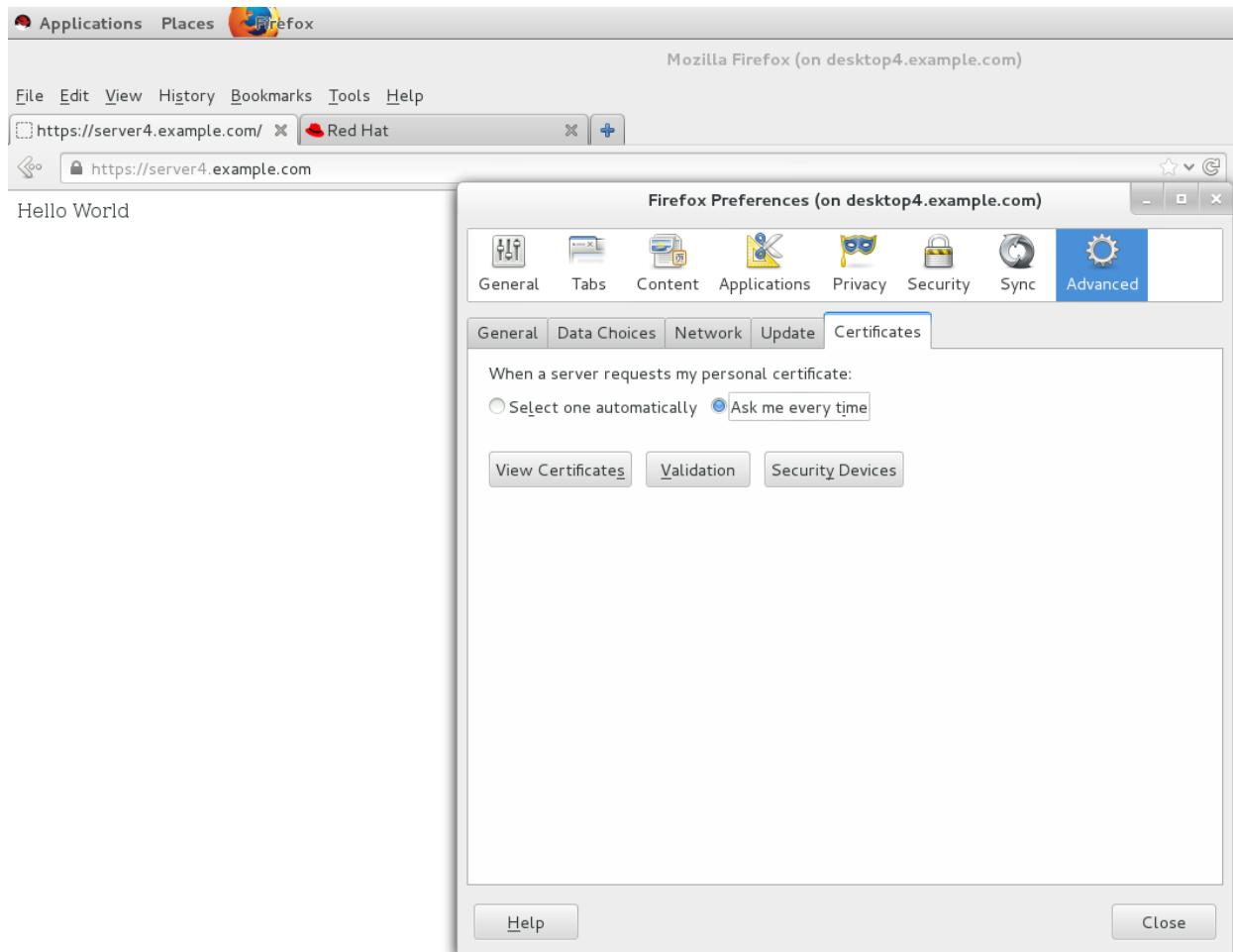
Here see the Organization name and all the info

next go to the menu bar and go to

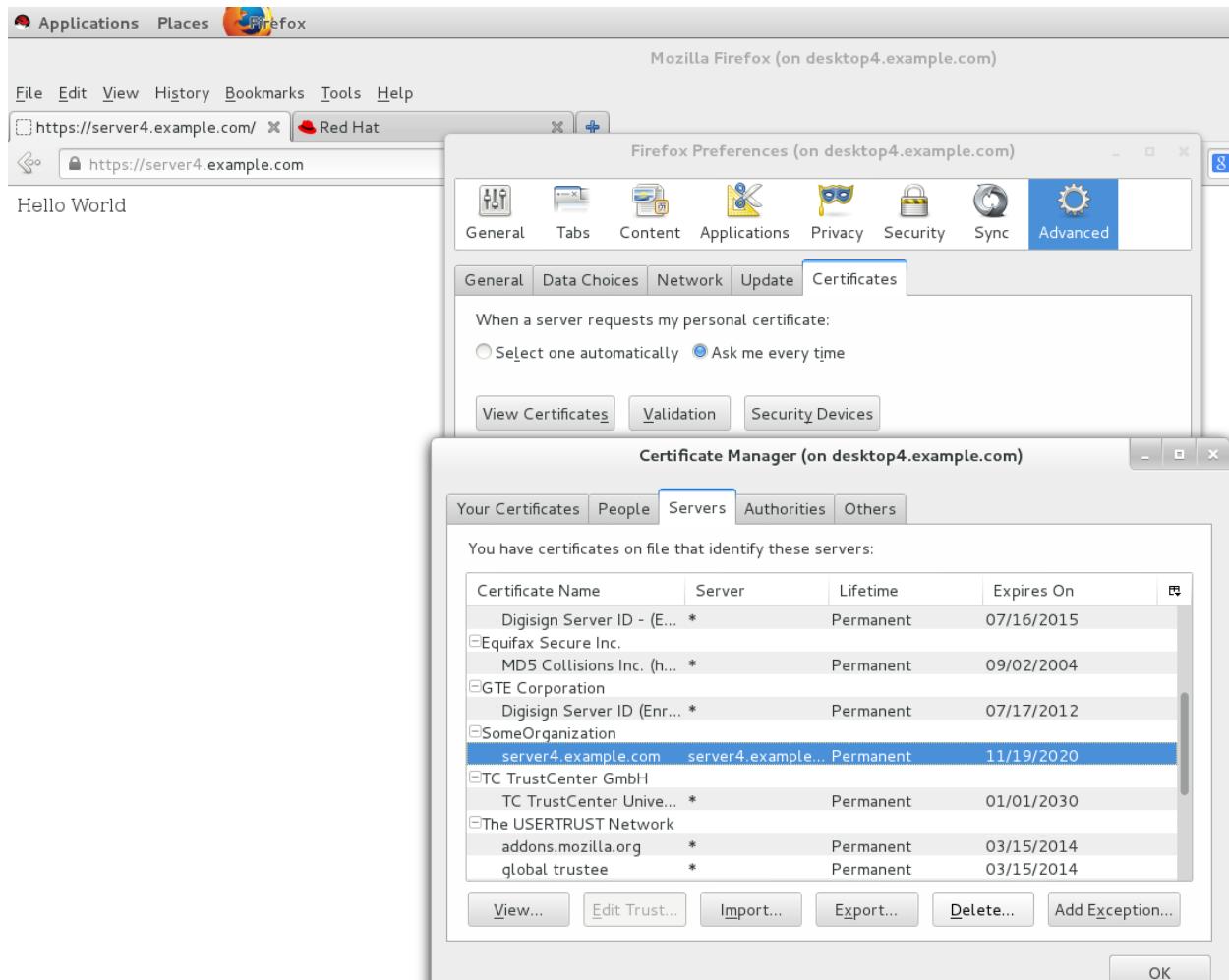
edit → preferences



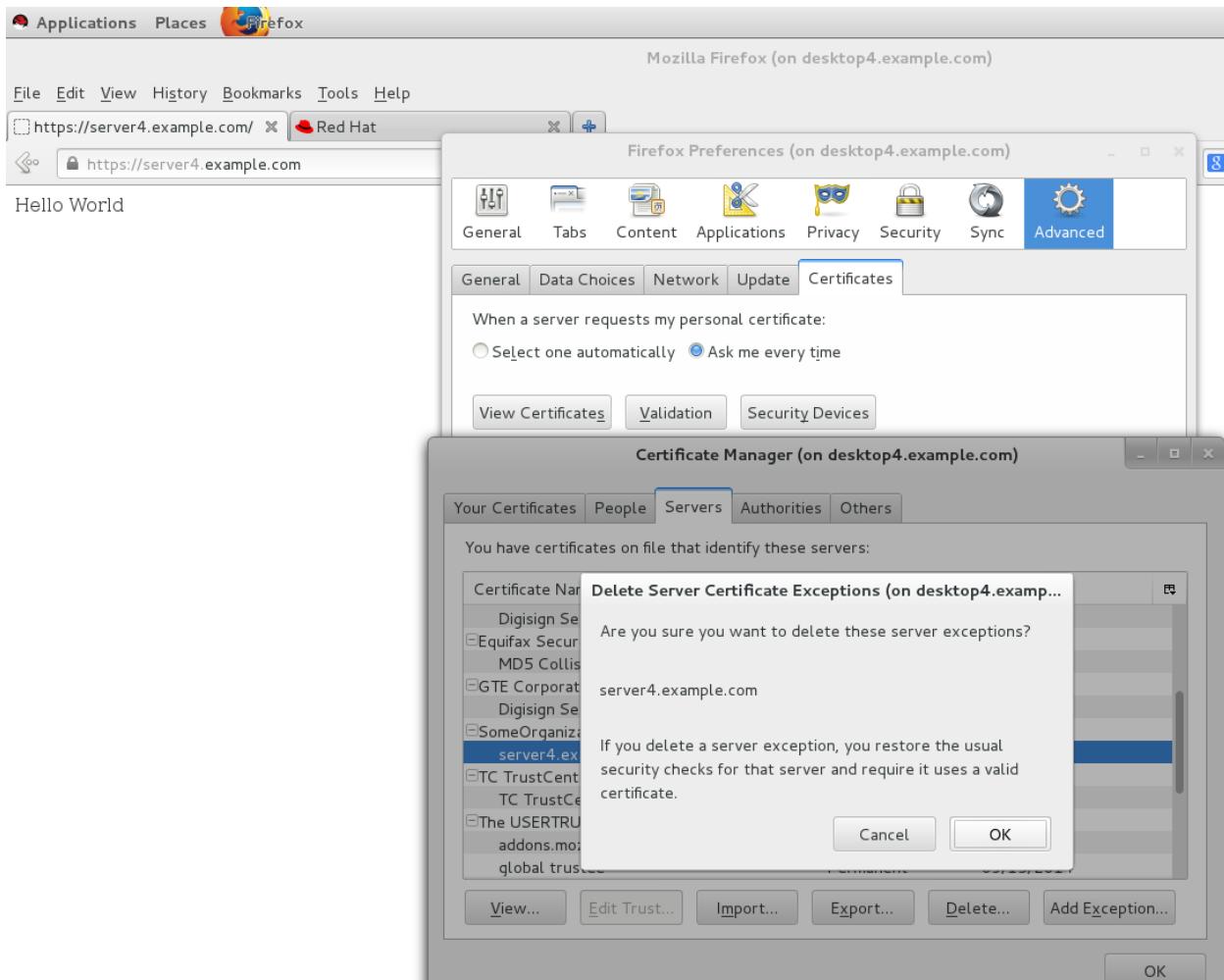
→ advanced → certificates



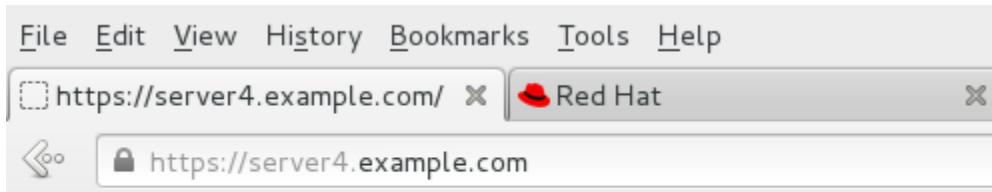
→ view certificates → Servers



delete the certificate



reload the webpage again paddle symbol some again



root@serverX

.) grep SSL /etc/httpd/conf.d/ssl.conf

```
File Edit View Search Terminal Tabs Help
root@server4:~ [root@server4 ~]# grep SSL /etc/httpd/conf.d/ssl.conf
When we also provide SSL we have to listen to the
SSL Global Context
All SSL configuration in this context applies both to
the main server and all SSL-enabled virtual hosts.
SSLPassPhraseDialog exec:/usr/libexec/httpd-ssl-pass-dialog
Configure the SSL Session Cache: First the mechanism
SSLSessionCache shmcbs:/run/httpd/sslcache(512000)
SSLSessionCacheTimeout 300
SSL library. The seed data should be of good random quality.
SSLRandomSeed startup file:/dev/urandom 256
SSLRandomSeed connect builtin
#SSLRandomSeed startup file:/dev/random 512
#SSLRandomSeed connect file:/dev/random 512
#SSLRandomSeed connect file:/dev/urandom 512
Use "SSLCryptoDevice" to enable any supported hardware
SSLCryptoDevice builtin
#SSLCryptoDevice ubsec
SSL Virtual Host Context
Use separate log files for the SSL virtual host; note that LogLevel
SSL Engine Switch:
Enable/Disable SSL for this virtual host.
```

.) less /etc/httpd/conf.d/ssl.conf

{ from here copy some lines ; those lines are useful in vim }

```
Server Certificate:
Point SSLCertificateFile at a PEM encoded certificate. If
the certificate is encrypted, then you will be prompted for a
pass phrase. Note that a kill -HUP will prompt again. A new
certificate can be generated using the genkey(1) command.
SSLCertificateFile /etc/pki/tls/certs/localhost.crt

Server Private Key:
If the key is not combined with the certificate, use this
directive to point at the key file. Keep in mind that if
you've both a RSA and a DSA private key you can configure
both in parallel (to also allow the use of DSA ciphers, etc.)
SSLCertificateKeyFile /etc/pki/tls/private/localhost.key

Server Certificate Chain:
Point SSLCertificateChainFile at a file containing the
concatenation of PEM encoded CA certificates which form the
certificate chain for the server certificate. Alternatively
the referenced file can be the same as SSLCertificateFile
when the CA certificates are directly appended to the server
certificate for convinience.
SSLCertificateChainFile /etc/pki/tls/certs/server-chain.crt

Certificate Authority (CA):
Set the CA certificate verification path where to find CA
certificates for client authentication or alternatively one
huge file containing all of them (file must be PEM encoded)
#SSLCACertificateFile /etc/pki/tls/certs/ca-bundle.crt
```

```
.) openssl req -new -x509 -nodes -out entersoft.crt -keyout entersoft.key
-days 30
```

[ In this give the correct information ]

```
File Edit View Search Terminal Tabs Help
root@server4:~
[root@server4 ~]# openssl req -new -x509 -nodes -out entersoft.crt -keyout entersoft.key -days 30
Generating a 2048 bit RSA private key
.....+++
.....+++
writing new private key to 'entersoft.key'

You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.

Country Name (2 letter code) [XX]:IN
State or Province Name (full name) []:TELANGANA
Locality Name (eg, city) [Default City]:HYDERABAD
Organization Name (eg, company) [Default Company Ltd]:Entersoft IT Solutions labs Pvt Ltd
Organizational Unit Name (eg, section) []:Training
Common Name (eg, your name or your server's hostname) []:server4.example.com
Email Address []:
[root@server4 ~]#
```

.) ll

.) chmod 600 entersoft.key [ key must 600 ]

.) ll

```
File Edit View Search Terminal Tabs Help
root@server4:~
[root@server4 ~]# ll
total 20
-rw----- 1 root root 8619 May 7 2014 anaconda-ks.cfg
-rw-r--r-- 1 root root 1444 Nov 20 19:58 entersoft.crt
-rw-r--r-- 1 root root 1704 Nov 20 19:58 entersoft.key
[root@server4 ~]#
[root@server4 ~]# chmod 600 entersoft.key
[root@server4 ~]#
[root@server4 ~]# ll
total 20
-rw----- 1 root root 8619 May 7 2014 anaconda-ks.cfg
-rw-r--r-- 1 root root 1444 Nov 20 19:58 entersoft.crt
-rw----- 1 root root 1704 Nov 20 19:58 entersoft.key
[root@server4 ~]#
```

```
.) cp entersoft.crt /etc/pki/tls/certs
.) cp entersoft.key /etc/pki/tls/private
.) ls -l /etc/pki/tls/private
```

```
File Edit View Search Terminal Tabs Help
root@server4:~
[root@server4 ~]# cp entersoft.crt /etc/pki/tls/certs
[root@server4 ~]# cp entersoft.key /etc/pki/tls/private
[root@server4 ~]# ls -l /etc/pki/tls/private
total 8
-rw----- 1 root root 1704 Nov 20 20:01 entersoft.key
-rw----- 1 root root 1679 Nov 20 19:43 localhost.key
[root@server4 ~]#
```

```
.) vim /etc/httpd/conf.d/exam.conf
```

```
File Edit View Search Terminal Tabs Help
root@server4:~
<VirtualHost 172.25.4.11:80>
ServerName server4.example.com
DocumentRoot /var/www/html
DirectoryIndex index.html
</VirtualHost>

<VirtualHost 172.25.4.11:443>
ServerName server4.example.com
DocumentRoot /var/www/html
DirectoryIndex index.html
SSLEngine on
SSLCertificateFile /etc/pki/tls/certs/entersoft.crt
SSLCertificateKeyFile /etc/pki/tls/private/entersoft.key
</VirtualHost>
~
```

.) cat /etc/httpd/conf.d/exam.conf

```
File Edit View Search Terminal Tabs Help
root@server4:~ [x] root@ca
[root@server4 ~]# vim /etc/httpd/conf.d/exam.conf
[root@server4 ~]#
[root@server4 ~]# cat /etc/httpd/conf.d/exam.conf
<VirtualHost 172.25.4.11:80>
ServerName server4.example.com
DocumentRoot /var/www/html
DirectoryIndex index.html
</VirtualHost>
#####
<VirtualHost 172.25.4.11:443>
ServerName server4.example.com
DocumentRoot /var/www/html
DirectoryIndex index.html
SSLEngine on
SSLCertificateFile /etc/pki/tls/certs/entersoft.crt
SSLCertificateKeyFile /etc/pki/tls/private/entersoft.key
</VirtualHost>

[root@server4 ~]#
```

.) systemctl restart httpd.service

```
File Edit View Search Terminal Tabs Help
root@server4:~ [x] root
[root@server4 ~]# systemctl restart httpd.service
[root@server4 ~]#
```

root@desktopX

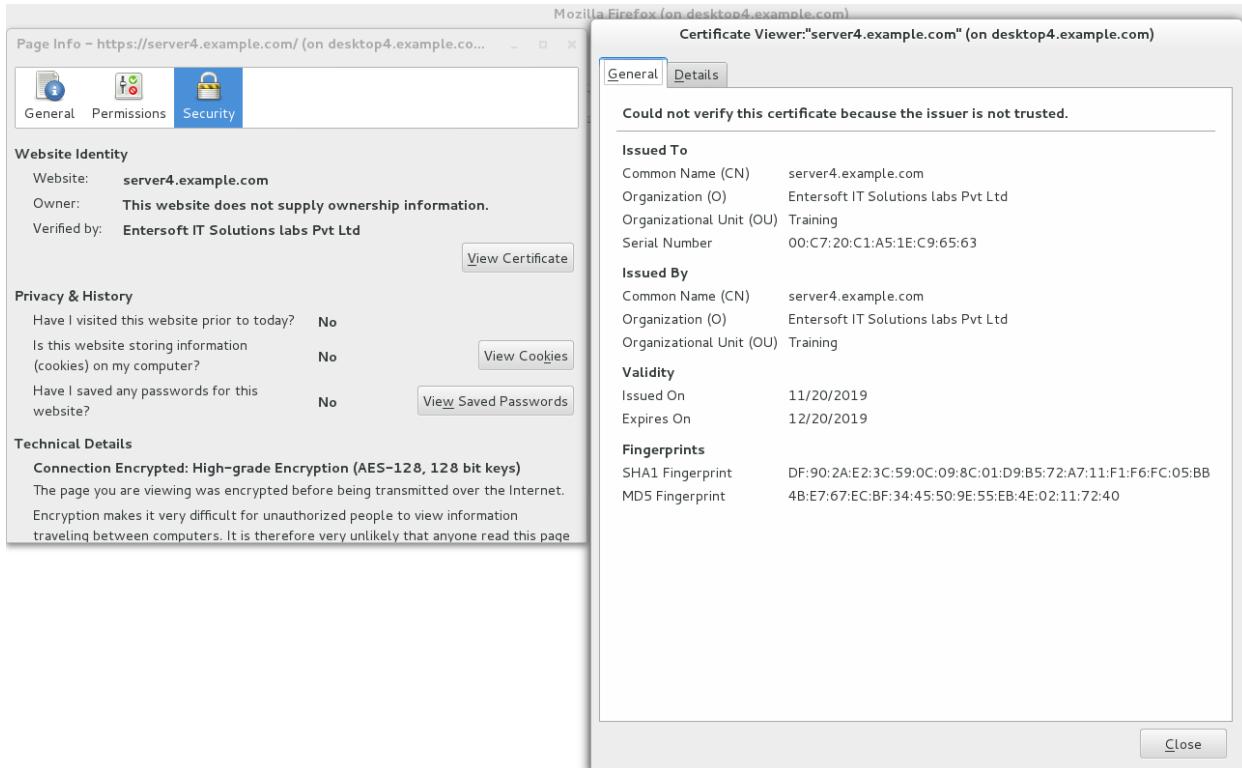
.) firefox &

```
File Edit View Search Terminal Tabs Help
root@server4:~ [x] root@desktop4:~
[root@desktop4 ~]# firefox &
[2] 30968
You have mail in /var/spool/mail/root
[root@desktop4 ~]#
(process:30968): GLib-CRITICAL **: g_slice_set_config: assertion `sys_page_size == 0' failed

```

it'll go to the firefox click on paddle symbol → page info → view certificate

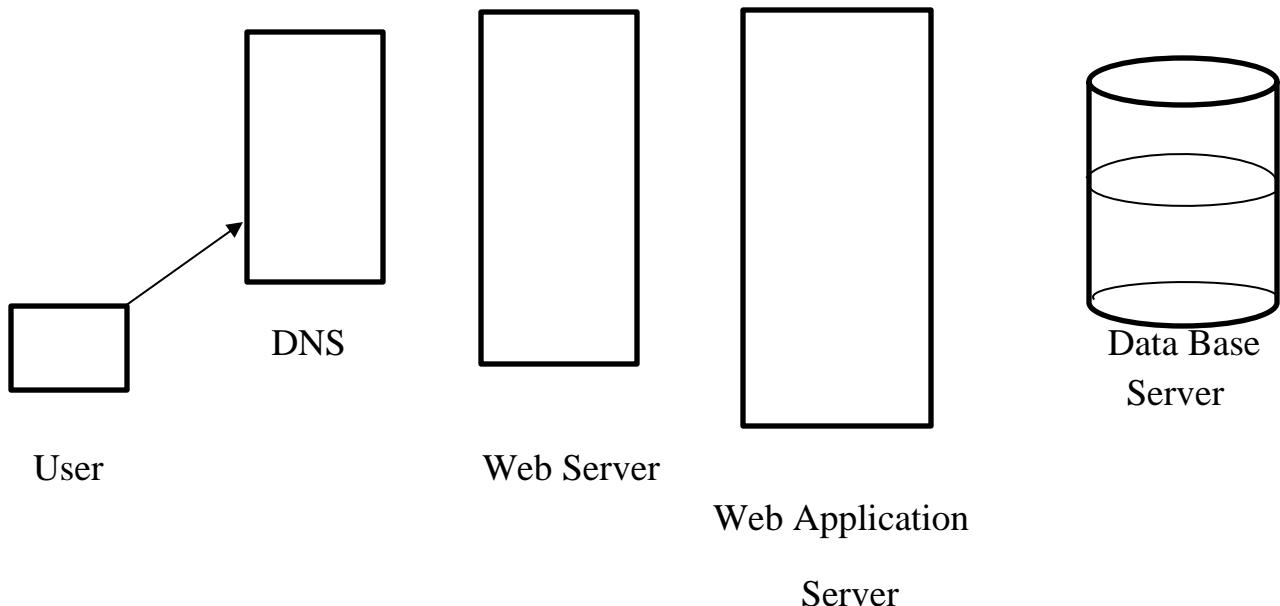
In that we can see the changes



Here We can see the organization details and expiry date all are changed

## Day 39

### Web Application Deployment



#### Web Server

iis  
Apache  
nginx  
lighttpd

#### Web Application Server

Asp.net - asp  
Apache Tomcat - jsp  
wsgi - python  
Ruby on Rails - ruby

#### Data Base Server

MS sql Server  
My sql / Maria DB  
Oracle  
Postgres  
Mongo DB

P → mod\_wsgi

S → httpd

F.S → 8080 / tcp - tomcat

12000 / tcp - we are using this one

Steps :

root@serverX

.) yum install mod\_wsgi -y

```
File Edit View Search Terminal Help
[root@server4 ~]# yum install mod_wsgi -y
Loaded plugins: langpacks
rhel_dvd
(1/2): rhel_dvd/group.gz
(2/2): rhel_dvd/primary_db
Resolving Dependencies
--> Running transaction check
--> Package mod_wsgi.x86_64 0:3.4-11.el7 will be installed
--> Processing Dependency: httpd-mmn = 20120211x8664 for package: mod_wsgi-3.4-11.el7.x86_64
--> Running transaction check
--> Package httpd.x86_64 0:2.4.6-17.el7 will be installed
--> Processing Dependency: httpd-tools = 2.4.6-17.el7 for package: httpd-2.4.6-17.el7.x86_64
--> Processing Dependency: /etc/mime.types for package: httpd-2.4.6-17.el7.x86_64
--> Processing Dependency: libapr-1.so.0()(64bit) for package: httpd-2.4.6-17.el7.x86_64
--> Processing Dependency: libaprutil-1.so.0()(64bit) for package: httpd-2.4.6-17.el7.x86_64
--> Running transaction check
--> Package apr.x86_64 0:1.4.8-3.el7 will be installed
--> Package apr-util.x86_64 0:1.5.2-6.el7 will be installed
--> Package httpd-tools.x86_64 0:2.4.6-17.el7 will be installed
--> Package mailcap.noarch 0:2.1.41-2.el7 will be installed
--> Finished Dependency Resolution
| 4.1 kB 00:00:00
| 134 kB 00:00:00
| 3.4 MB 00:00:00
```

.) systemctl enable httpd.service

```
File Edit View Search Terminal Help
[root@server4 ~]# systemctl enable httpd.service
ln -s '/usr/lib/systemd/system/httpd.service' '/etc/systemd/system/multi-user.target.wants/httpd.service'
[root@server4 ~]#
```

.) systemctl start httpd.service

.) systemctl status httpd.service

```
File Edit View Search Terminal Help
[root@server4 ~]# systemctl start httpd.service
[root@server4 ~]#
[root@server4 ~]# systemctl status httpd.service
httpd.service - The Apache HTTP Server
 Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled)
 Active: active (running) since Thu 2019-11-21 20:24:22 IST; 9s ago
 Main PID: 1715 (httpd)
 Status: "Processing requests..."
 CGroup: /system.slice/httpd.service
 └─1715 /usr/sbin/httpd -DFOREGROUND
 ├─1716 /usr/sbin/httpd -DFOREGROUND
 ├─1717 /usr/sbin/httpd -DFOREGROUND
 ├─1718 /usr/sbin/httpd -DFOREGROUND
 ├─1719 /usr/sbin/httpd -DFOREGROUND
 └─1720 /usr/sbin/httpd -DFOREGROUND

Nov 21 20:24:22 server4.example.com systemd[1]: Started The Apache HTTP Server.
[root@server4 ~]#
```

.) firewall-cmd --add-port=12000/tcp

```
File Edit View Search Terminal Help
[root@server4 ~]# firewall-cmd --add-port=12000/tcp
success
[root@server4 ~]#
```

.) firewall-cmd --add-port=12000/tcp --permanent

```
File Edit View Search Terminal Help
[root@server4 ~]# firewall-cmd --add-port=12000/tcp --permanent
success
[root@server4 ~]#
```

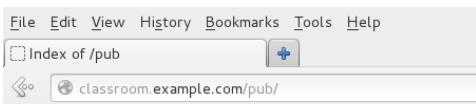
```
.) mkdir /var/www/webapp
```

```
.) cd /var/www/webapp
```

```
File Edit View Search Terminal Help
[root@server4 ~]# mkdir /var/www/webapp
[root@server4 ~]#
[root@server4 ~]# cd /var/www/webapp
[root@server4 webapp]#
```

```
.) wget http://classroom.example.com /pub/webapp.wsgi
```

[ copy link location from classroom.example.com/pub ]



## Index of /pub

Name	Last modified	Size	Description
Parent Directory		-	
EXAMPLE-CA-CERT	2015-02-22 20:57	1.2K	
builds/	2014-07-11 02:59	-	
example-ca.crt	2015-02-22 20:57	1.2K	
keytabs/	2015-03-27 20:24	-	
materials/	2014-10-30 01:16	-	
tls/	2015-02-22 20:57	-	
webapp.wsgi	2015-03-17 11:50	397	

- Open Link in New Tab
- Open Link in New Window
- Open Link in New Private Window
- Bookmark This Link
- Save Link As...
- Copy Link Location**
- Inspect Element (Q)

```
File Edit View Search Terminal Help
[root@server4 webapp]# wget http://classroom.example.com/pub/webapp.wsgi
--2019-11-21 20:26:14-- http://classroom.example.com/pub/webapp.wsgi
Resolving classroom.example.com (classroom.example.com)... 172.25.254.254
Connecting to classroom.example.com (classroom.example.com)|172.25.254.254|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 397
Saving to: 'webapp.wsgi'

100% [=====] 397 --.-K/s in 0s

2019-11-21 20:26:14 (58.4 MB/s) - 'webapp.wsgi' saved [397/397]
[root@server4 webapp]#
```

```
.) vim /etc/httpd/conf.d/exam.conf
```

```
 Listen 12000
```

```
<VirtualHost 172.25.X.11:12000>
```

```
 ServerName webappX.example.com
```

```
 WSGIScriptAlias / /var/www/webapp/webapp.wsgi
```

```
</VirtualHost>
```

```
File Edit View Search Terminal Help
Listen 12000
<VirtualHost 172.25.4.11:12000>
ServerName webapp4.example.com
WSGIScriptAlias / /var/www/webapp/webapp.wsgi
</VirtualHost>
~
```

```
.) cat /etc/httpd/conf.d/exam.conf
```

```
File Edit View Search Terminal Help
[root@server4 webapp]# vim /etc/httpd/conf.d/exam.conf
[root@server4 webapp]#
[root@server4 webapp]# cat /etc/httpd/conf.d/exam.conf
Listen 12000
<VirtualHost 172.25.4.11:12000>
ServerName webapp4.example.com
WSGIScriptAlias / /var/www/webapp/webapp.wsgi
</VirtualHost>
[root@server4 webapp]#
```

```
.) systemctl restart httpd.service
```

```
[not done here because we need to manage the port number]
```

```
File Edit View Search Terminal Help
[root@server4 webapp]# systemctl restart httpd.service
Job for httpd.service failed. See 'systemctl status httpd.service' and 'journalctl -xn' for details.
[root@server4 webapp]#
```

.) man semanage port [ copy from here ]

**EXAMPLE**

```
List all port definitions
semanage port -l
Allow Apache to listen on tcp port 81
semanage port -a -t http_port_t -p tcp 81
Allow sshd to listen on tcp port 8991
semanage port -a -t ssh_port_t -p tcp 8991
```

**SEE ALSO**

**selinux (8)**, **semanage (8)**

.) semanage port -a -t http\_port\_t -p tcp 12000

```
File Edit View Search Terminal Help
[root@server4 webapp]# man semanage port
[root@server4 webapp]#
[root@server4 webapp]# semanage port -a -t http_port_t -p tcp 12000
[root@server4 webapp]# █
```

.) systemctl restart httpd.service

.) curl webappX.example.com:12000

```
File Edit View Search Terminal Help
[root@server4 webapp]# systemctl restart httpd.service
[root@server4 webapp]#
[root@server4 webapp]#
[root@server4 webapp]# curl webapp4.example.com:12000
UNIX EPOCH time is now: 1574348567.04
[root@server4 webapp]# █
```

.) curl webappX.example.com:12000 [ check it continuously with a small gap ]

```
File Edit View Search Terminal Help
[root@server4 webapp]# curl webapp4.example.com:12000
UNIX EPOCH time is now: 1574348580.93
[root@server4 webapp]#
[root@server4 webapp]#
[root@server4 webapp]# curl webapp4.example.com:12000
UNIX EPOCH time is now: 1574348583.49
[root@server4 webapp]#
[root@server4 webapp]#
[root@server4 webapp]# curl webapp4.example.com:12000
UNIX EPOCH time is now: 1574348590.69
[root@server4 webapp]#
```

see the result ; results are changing because it is a DYNAMIC WEBPAGE

## **Day 40**

### **DataBase**

It is a collection of Tables

Tables – combination of rows and columns

DBMS – DataBase Management System – every time we have to repeat

RDBMS – Relational DataBase Management System – only one time

### **Maria DB**

It is free to use

I P → mariadb-server or groupinstall

1) mariadb

2) mariadb-client

mysql -U <UN> -p [ U – username p – password ]

II S → mariadb

III FS → mysql

config file - /etc/my.cnf

in yum we can check

- .) yum info package
- .) yum group info package ( group id )

Steps :

root@serverX

- .) yum info httpd

```
File Edit View Search Terminal Help
[root@server17 ~]# yum info httpd
Loaded plugins: langpacks
Available Packages
Name : httpd
Arch : x86_64
Version : 2.4.6
Release : 17.el7
Size : 1.2 M
Repo : rhel_dvd
Summary : Apache HTTP Server
URL : http://httpd.apache.org/
License : ASL 2.0
Description : The Apache HTTP Server is a powerful, efficient, and extensible
 : web server.

[root@server17 ~]#
```

- .) yum groupinfo httpd

```
File Edit View Search Terminal Help
[root@server17 ~]# yum groupinfo httpd
Loaded plugins: langpacks
Warning: group/environment httpd does not exist.
[root@server17 ~]#
```

.) yum groupinfo webserver

```
File Edit View Search Terminal Help
[root@server17 ~]# yum groupinfo webserver
Loaded plugins: langpacks

Group: Web Server
 Group-Id: web-server
 Description: Allows the system to act as a web server, and run Perl and Python web applications.
Mandatory Packages:
 +httpd
Default Packages:
 +crypto-utils
 +httpd-manual
 +mod_fcgid
 +mod_ssl
Optional Packages:
 certmonger
 libmemcached
 memcached
 mod_auth_kerb
 mod_nss
 mod_revocator
 mod_security
 mod_security_crs
 perl-CGI
 perl-CGI-Session
 python-memcached
 squid
[root@server17 ~]#
```

.) yum groupinfo “Server With GUI” [ S , W , GUI - Capitals ]

```
File Edit View Search Terminal Help
[root@server17 ~]# yum groupinfo "Server With GUI"
Loaded plugins: langpacks

Environment Group: Server with GUI
 Environment-Id: graphical-server-environment
 Description: Server for operating network infrastructure services, with a GUI.
Mandatory Groups:
 =base
 =core
 =desktop-debugging
 =dial-up
 =fonts
 =gnome-desktop
 =guest-agents
 =guest-desktop-agents
 =input-methods
 =internet-browser
 =multimedia
 =print-client
 =x11
Optional Groups:
 +backup-server
 +directory-server
 +dns-server
 +file-server
 +ftp-server
 +ha
 +hardware-monitoring
 +identity-management-server
 +infiniband
 +java-platform
 +kde-desktop
 +large-systems
 +load-balancer
 +mail-server
```

---

.) yum groupinstall mariadb mariadb-client [ installing 13 packages ]

```
File Edit View Search Terminal Help
[root@server17 ~]# yum groupinstall mariadb mariadb-client
Loaded plugins: langpacks
Resolving Dependencies
--> Running transaction check
---> Package MySQL-python.x86_64 0:1.2.3-11.el7 will be installed
---> Package mariadb.x86_64 1:5.5.35-3.el7 will be installed
---> Package mariadb-server.x86_64 1:5.5.35-3.el7 will be installed
--> Processing Dependency: perl(DBI) for package: 1:mariadb-server-5.5.35-3.el7.x86_64
--> Processing Dependency: perl(Data::Dumper) for package: 1:mariadb-server-5.5.35-3.el7.x86_64
--> Processing Dependency: perl-DBD-MySQL for package: 1:mariadb-server-5.5.35-3.el7.x86_64
--> Processing Dependency: perl-DBI for package: 1:mariadb-server-5.5.35-3.el7.x86_64
---> Package mysql-connector-odbc.x86_64 0:5.2.5-6.el7 will be installed
--> Processing Dependency: libodbc.so.2()(64bit) for package: mysql-connector-odbc-5.2.5-6.el7.x86_64
--> Processing Dependency: libodbcinst.so.2()(64bit) for package: mysql-connector-odbc-5.2.5-6.el7.x86_64
```

.) systemctl enable mariadb

```
File Edit View Search Terminal Help
[root@server17 ~]# systemctl enable mariadb
ln -s '/usr/lib/systemd/system/mariadb.service' '/etc/systemd/system/multi-user.target.wants/mariadb.service'
[root@server17 ~]#
```

.) systemctl start mariadb

.) systemctl status mariadb

```
File Edit View Search Terminal Help
[root@server17 ~]# systemctl start mariadb
[root@server17 ~]#
[root@server17 ~]# systemctl status mariadb
mariadb.service - MariaDB database server
 Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled)
 Active: active (running) since Wed 2019-11-27 18:35:36 IST; 8s ago
 Process: 2140 ExecStartPost=/usr/libexec/mariadb-wait-ready $MAINPID (code=exited, status=0/SUCCESS)
 Process: 2061 ExecStartPre=/usr/libexec/mariadb-prepare-db-dir *n (code=exited, status=0/SUCCESS)
 Main PID: 2139 (mysqld_safe)
 Groups: /system.slice/mariadb.service
 └─2139 /bin/sh /usr/bin/mysqld_safe --basedir=/usr
 ├─2297 /usr/libexec/mysqld --basedir=/usr --datadir=/var/lib/mysql --plugin-dir=/usr/lib64/mysql/plugin --log-error=/var/log/mariadb/mar...
Nov 27 18:35:32 server17.example.com mariadb-prepare-db-dir[2061]: The latest information about MariaDB is available at http://mariadb.org/.
Nov 27 18:35:32 server17.example.com mariadb-prepare-db-dir[2061]: You can find additional information about the MySQL part at:
Nov 27 18:35:32 server17.example.com mariadb-prepare-db-dir[2061]: http://dev.mysql.com
Nov 27 18:35:32 server17.example.com mariadb-prepare-db-dir[2061]: Support MariaDB development by buying support/new features from
Nov 27 18:35:32 server17.example.com mariadb-prepare-db-dir[2061]: Skysql Ab. You can contact us about this at sales@skysql.com.
Nov 27 18:35:32 server17.example.com mariadb-prepare-db-dir[2061]: Alternatively consider joining our community based development effort:
Nov 27 18:35:32 server17.example.com mariadb-prepare-db-dir[2061]: http://mariadb.com/en/contributing-to-the-mariadb-project/
Nov 27 18:35:32 server17.example.com mysqld_safe[2139]: 191127 18:35:32 mysqld_safe Logging to '/var/log/mariadb/mariadb.log'.
Nov 27 18:35:32 server17.example.com mysqld_safe[2139]: 191127 18:35:32 mysqld_safe Starting mysqld daemon with databases from /var/lib/mysql
Nov 27 18:35:36 server17.example.com systemd[1]: Started MariaDB database server.
[root@server17 ~]#
```

.) firewall-cmd --add-service=mysql

```
File Edit View Search Terminal Help
[root@server17 ~]# firewall-cmd --add-service=mysql
success
[root@server17 ~]#
```

.) firewall-cmd --add-service=mysql --permanent

```
File Edit View Search Terminal Help
[root@server17 ~]# firewall-cmd --add-service=mysql --permanent
success
[root@server17 ~]#
```

.) firewall-cmd --remove-service=mysql

```
File Edit View Search Terminal Help
[root@server17 ~]# firewall-cmd --remove-service=mysql
success
[root@server17 ~]#
```

.) firewall-cmd --remove-service=mysql --permanent

( Here no need to allow additional communications )

```
File Edit View Search Terminal Help
[root@server17 ~]# firewall-cmd --remove-service=mysql --permanent
success
[root@server17 ~]#
```

.) mysql -u root -p

password : - (none)

```
File Edit View Search Terminal Help
[root@server17 ~]# mysql -u root -p
Enter password:
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 2
Server version: 5.5.35-MariaDB MariaDB Server

Copyright (c) 2000, 2013, Oracle, Monty Program Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]>
```

## mysql

(none)> show databases;

```
File Edit View Search Terminal Help
MariaDB [(none)]> show databases;
+-----+
| Database |
+-----+
| information_schema |
| mysql |
| performance_schema |
| test |
+-----+
4 rows in set (0.00 sec)
```

MariaDB [(none)]>

(none)> use mysql;

```
File Edit View Search Terminal Help
MariaDB [(none)]> use mysql
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A
```

Database changed

MariaDB [mysql]>

(mysql)> show tables;

```
File Edit View Search Terminal
MariaDB [mysql]> show tables;
+-----+
| Tables_in_mysql |
+-----+
| columns_priv |
| db |
| event |
| func |
| general_log |
| help_category |
| help_keyword |
| help_relation |
| help_topic |
| host |
| ndb_binlog_index |
| plugin |
| proc |
| procs_priv |
| proxies_priv |
| servers |
| slow_log |
| tables_priv |
| time_zone |
| time_zone_leap_second |
| time_zone_name |
| time_zone_transition |
| time_zone_transition_type |
| user |
+-----+
24 rows in set (0.00 sec)

MariaDB [mysql]>
```

> select \* from user;

```
File Edit View Search Terminal Help

MariaDB [mysql]> select * from user;
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Host | User | Password | Select_priv | Insert_priv | Update_priv | Delete_priv | Create_priv | Drop_priv | Reload_priv | Shutdown_priv | | | | | | | | | | |
| Process_priv | File_priv | Grant_priv | References_priv | Index_priv | Alter_priv | Show_db_priv | Super_priv | Create_tmp_table_priv | Lock_tables_priv |
| Execute_priv | Repl_slave_priv | Repl_client_priv | Create_view_priv | Show_view_priv | Create_routine_priv | Alter_routine_priv | Create_user_priv | Event_priv | Trigger_priv | Create_tablespace_priv | ssl_type | ssl_cipher | x509_issuer | x509_subject | max_questions | max_updates | max_connections | max_user_connections | plugin | authentication_string |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| localhost | root | | Y | Y | Y | Y | Y | Y | Y | Y | Y | |
| Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 0 | 0 | | | | | | | | | | | |
| server17.example.com | root | | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| ^ . | ^ . | | | | | | | | | | | |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
```

> desc user;

```
File Edit View Search Terminal Help

MariaDB [mysql]>
MariaDB [mysql]> desc user;
+-----+-----+-----+-----+-----+
| Field | Type | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| Host | char(60) | NO | PRI | | |
| User | char(16) | NO | PRI | | |
| Password | char(41) | NO | | | |
| Select_priv | enum('N', 'Y') | NO | | N | |
| Insert_priv | enum('N', 'Y') | NO | | N | |
| Update_priv | enum('N', 'Y') | NO | | N | |
| Delete_priv | enum('N', 'Y') | NO | | N | |
| Create_priv | enum('N', 'Y') | NO | | N | |
| Drop_priv | enum('N', 'Y') | NO | | N | |
| Reload_priv | enum('N', 'Y') | NO | | N | |
| Shutdown_priv | enum('N', 'Y') | NO | | N | |
+-----+-----+-----+-----+-----+
```

```
> select host,user,password from user;
```

[ no password means not secured ]

```
File Edit View Search Terminal Help
MariaDB [mysql]> select host,user,password from user;
+-----+-----+-----+
| host | user | password |
+-----+-----+-----+
| localhost | root | |
| server17.example.com | root | |
| 127.0.0.1 | root | |
| ::1 | root | |
| localhost | | |
| server17.example.com | | |
+-----+-----+-----+
6 rows in set (0.00 sec)
```

```
MariaDB [mysql]> █
```

ctrl + D

```
File Edit View Search Terminal Help
MariaDB [mysql]> Bye
[root@server17 ~]# █
```

root@serverX

.) cat .mysql\_history

```
File Edit View Search Terminal Help
[root@server17 ~]# cat .mysql_history
show databases;
use mysql
show tables;
select * from user;
desc user;
select host,user,password from user;
[root@server17 ~]# █
```

## .) mysql\_secure\_installation

password : - ( none )

new password : redhat

re-enter : redhat

```
File Edit View Search Terminal Help
[root@server17 ~]# mysql_secure_installation
/usr/bin/mysql_secure_installation: line 379: find_mysql_client: command not found

NOTE: RUNNING ALL PARTS OF THIS SCRIPT IS RECOMMENDED FOR ALL MariaDB
 SERVERS IN PRODUCTION USE! PLEASE READ EACH STEP CAREFULLY!

In order to log into MariaDB to secure it, we'll need the current
password for the root user. If you've just installed MariaDB, and
you haven't set the root password yet, the password will be blank,
so you should just press enter here.

Enter current password for root (enter for none):
OK, successfully used password, moving on...

Setting the root password ensures that nobody can log into the MariaDB
root user without the proper authorisation.

Set root password? [Y/n] Y
New password:
Re-enter new password:
Password updated successfully!
Reloading privilege tables..
... Success!

Normally, root should only be allowed to connect from 'localhost'. This
ensures that someone cannot guess at the root password from the network.

Disallow root login remotely? [Y/n] Y
... Success!

By default, MariaDB comes with a database named 'test' that anyone can
access. This is also intended only for testing, and should be removed
before moving into a production environment.

Remove test database and access to it? [Y/n] Y
- Dropping test database...
... Success!
- Removing privileges on test database...
... Success!

Reloading the privilege tables will ensure that all changes made so far
will take effect immediately.

Reload privilege tables now? [Y/n] Y
... Success!

Cleaning up...

All done! If you've completed all of the above steps, your MariaDB
installation should now be secure.

Thanks for using MariaDB!
[root@server17 ~]#
```

```
.) mysql -u root -p
```

```
password: redhat
```

```
File Edit View Search Terminal Help
[root@server17 ~]# mysql -u root -p
Enter password:
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 11
Server version: 5.5.35-MariaDB MariaDB Server

Copyright (c) 2000, 2013, Oracle, Monty Program Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]>
```

## mysql

```
> show database;
```

```
File Edit View Search Terminal Help
MariaDB [(none)]> show databases;
+-----+
| Database |
+-----+
| information_schema |
| mysql |
| performance_schema |
+-----+
3 rows in set (0.00 sec)
```

```
MariaDB [(none)]>
```

```
> use mysql;
```

```
File Edit View Search Terminal Help
MariaDB [(none)]> use mysql;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [mysql]>
```

```
> select host,user,password from user;
```

```
File Edit View Search Terminal Help
MariaDB [mysql]> select host,user,password from user;
+-----+-----+
| host | user | password
+-----+-----+
| localhost | root | *84BB5DF4823DA319BBF86C99624479A198E6EEE9 |
| 127.0.0.1 | root | *84BB5DF4823DA319BBF86C99624479A198E6EEE9 |
| ::1 | root | *84BB5DF4823DA319BBF86C99624479A198E6EEE9 |
+-----+-----+
3 rows in set (0.00 sec)

MariaDB [mysql]> █
```

```
> create database mariadb; [mariadb - database name]
```

```
File Edit View Search Terminal Help
MariaDB [mysql]> create database mariadb;
Query OK, 1 row affected (0.00 sec)

MariaDB [mysql]> █
```

```
> show databases;
```

```
File Edit View Search Terminal Help
MariaDB [mysql]> show databases;
+-----+
| Database
+-----+
| information_schema |
| mariadb |
| mysql |
| performance_schema |
+-----+
4 rows in set (0.00 sec)
```

```
MariaDB [mysql]> █
```

```
ctrl + D
```

root@serverX

.) cat .mysql\_history

```
File Edit View Search Terminal Help
[root@server17 ~]# cat .mysql_history
show databases;
use mysql
show tables;
select * from user;
desc user;
select host,user,password from user;
show databases;
use mysql;
select host,user,password from user;
create database mariadb;
show databases;
[root@server17 ~]#
```

.) wget classroom.example.com.com/pub/materials/mariadb/inventory.dump

[ to do wget need to copy link location ]



## Index of /pub/materials/mariadb

Name	Last modified	Size	Description
Parent Directory	-		
<a href="#">inventory.dump</a>	2014-06-11 21:06	3.7K	
<a href="#">mariadb-users.s</a>			Open Link in New Tab
<a href="#">mariadb.dump</a>			Open Link in New Window
			Open Link in New Private Window
			Bookmark This Link
			Save Link As...
			Copy Link Location
			Inspect Element (Q)

.) wget classroom.example.com.com/pub/materials/mariadb/inventory.dump

```
File Edit View Search Terminal Help
[root@server17 ~]# wget http://classroom.example.com/pub/materials/mariadb/inventory.dump
--2019-11-27 18:46:10-- http://classroom.example.com/pub/materials/mariadb/inventory.dump
Resolving classroom.example.com (classroom.example.com)... 172.25.254.254
Connecting to classroom.example.com (classroom.example.com)|172.25.254.254|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 3787 (3.7K)
Saving to: 'inventory.dump'

100%[=====] 3,787 --.-K/s in 0s

2019-11-27 18:46:10 (392 MB/s) - 'inventory.dump' saved [3787/3787]

[root@server17 ~]#
```

.) ll

```
File Edit View Search Terminal Help
[root@server17 ~]# ll
total 16
-rw-----. 1 root root 8619 May 7 2014 anaconda-ks.cfg
-rw-r--r--. 1 root root 3787 Jun 11 2014 inventory.dump
[root@server17 ~]#
```

.) mysql -u root -p mariadb <inventory.dum

password : redhat

```
File Edit View Search Terminal Help
[root@server17 ~]# mysql -u root -p mariadb <inventory.dump
Enter password:
ERROR 1045 (28000): Access denied for user 'root'@'localhost' (using password: NO)
[root@server17 ~]#
```

.) mysql -u root -p

```
File Edit View Search Terminal Help
[root@server17 ~]# mysql -u root -p
Enter password:
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 15
Server version: 5.5.35-MariaDB MariaDB Server

Copyright (c) 2000, 2013, Oracle, Monty Program Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]>
```

## mysql

> show databases;

```
File Edit View Search Terminal Help
MariaDB [(none)]> show databases;
+-----+
| Database |
+-----+
| information_schema |
| mariadb |
| mysql |
| performance_schema |
+-----+
4 rows in set (0.00 sec)
```

MariaDB [(none)]>

> use mariadb;

```
File Edit View Search Terminal Help
MariaDB [(none)]> use mariadb;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [mariadb]>
```

> select \* from manufacturer;

```
File Edit View Search Terminal Help
MariaDB [mariadb]> select * from manufacturer;
+----+-----+-----+-----+
| id | name | seller | phone_number |
+----+-----+-----+-----+
| 1 | SanDisk | John Miller | +1 (941) 329-8855 |
| 2 | Kingston | Mike Taylor | +1 (341) 375-9999 |
| 3 | Asus | Wilson Jackson | +1 (432) 367-8899 |
| 4 | Lenovo | Allen Scott | +1 (876) 213-4439 |
+----+-----+-----+-----+
4 rows in set (0.00 sec)
```

MariaDB [mariadb]>

```
> select * from manufacturer where seller="John Miller";
```

```
File Edit View Search Terminal Help
MariaDB [mariadb]> select * from manufacturer where seller="John Miller";
+---+-----+-----+-----+
| id | name | seller | phone_number |
+---+-----+-----+-----+
| 1 | SanDisk | John Miller | +1 (941) 329-8855 |
+---+-----+-----+-----+
1 row in set (0.00 sec)
```

```
MariaDB [mariadb]>
```

```
> select * from manufacturer where seller like "%John%";
```

```
File Edit View Search Terminal Help
MariaDB [mariadb]> select * from manufacturer where seller like "%John%";
Empty set (0.00 sec)
```

```
MariaDB [mariadb]>
```

```
> select * from manufacturer where seller like "John%";
```

```
File Edit View Search Terminal Help
MariaDB [mariadb]> select * from manufacturer where seller like "John%";
+---+-----+-----+-----+
| id | name | seller | phone_number |
+---+-----+-----+-----+
| 1 | SanDisk | John Miller | +1 (941) 329-8855 |
+---+-----+-----+-----+
1 row in set (0.00 sec)
```

```
MariaDB [mariadb]>
```

```
> select * from manufacturer where seller like "%John%";
```

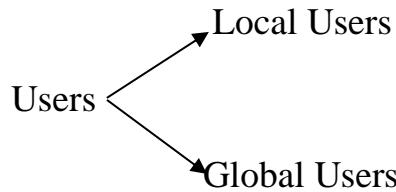
```
File Edit View Search Terminal Help
MariaDB [mariadb]> select * from manufacturer where seller like "%John%";
+---+-----+-----+-----+
| id | name | seller | phone_number |
+---+-----+-----+-----+
| 1 | SanDisk | John Miller | +1 (941) 329-8855 |
+---+-----+-----+-----+
1 row in set (0.00 sec)
```

```
MariaDB [mariadb]>
```

## Day 41

### Creating DataBase Users

mysql / mariadb port no : 3306



Steps :

root@serverX

. ) mysql -u root -p

```
File Edit View Search Terminal Help
[root@server17 ~]# mysql -u root -p
Enter password:
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 16
Server version: 5.5.35-MariaDB MariaDB Server

Copyright (c) 2000, 2013, Oracle, Monty Program Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]>
```

## mysql

> show databases;

```
File Edit View Search Terminal Help
MariaDB [(none)]> show databases;
+-----+
| Database |
+-----+
| information_schema |
| mariadb |
| mysql |
| performance_schema |
+-----+
4 rows in set (0.00 sec)
```

MariaDB [(none)]>

>create database inventory;

```
File Edit View Search Terminal Help
MariaDB [(none)]> create database inventory;
Query OK, 1 row affected (0.00 sec)
```

MariaDB [(none)]>

> show databases;

```
File Edit View Search Terminal Help
MariaDB [(none)]> show databases;
+-----+
| Database |
+-----+
| information_schema |
| inventory |
| mariadb |
| mysql |
| performance_schema |
+-----+
5 rows in set (0.00 sec)
```

MariaDB [(none)]>

```
> delete database mariadb;
```

```
File Edit View Search Terminal Help
MariaDB [(none)]> delete database mariadb;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MariaDB server version for the right syntax to use
near 'database mariadb' at line 1
MariaDB [(none)]>
```

```
> delete mariadb;
```

```
File Edit View Search Terminal Help
MariaDB [(none)]> delete mariadb;
ERROR 1046 (3D000): No database selected
MariaDB [(none)]>
```

```
> drop database mariadb;
```

```
File Edit View Search Terminal Help
MariaDB [(none)]> drop database mariadb;
Query OK, 3 rows affected (0.03 sec)

MariaDB [(none)]>
```

```
> show databases;
```

```
File Edit View Search Terminal Help
MariaDB [(none)]> show databases;
+-----+
| Database |
+-----+
| information_schema |
| inventory |
| mysql |
| performance_schema |
+-----+
4 rows in set (0.00 sec)
```

```
MariaDB [(none)]>
```

```
> ctrl + D
```

root@serverX

.) mysql -u root -p inventory < inventory.dump

password : redhat

.) mysql -u root -p

```
File Edit View Search Terminal Help
[root@server17 ~]# mysql -u root -p inventory <inventory.dump
Enter password:
[root@server17 ~]#
[root@server17 ~]# mysql -u root -p
Enter password:
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 20
Server version: 5.5.35-MariaDB MariaDB Server

Copyright (c) 2000, 2013, Oracle, Monty Program Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]>
```

mysql

> use inventory;

```
File Edit View Search Terminal Help
MariaDB [(none)]> use inventory;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [inventory]>
```

```
> show tables;
```

```
File Edit View Search Terminal Help
MariaDB [inventory]> show tables;
+-----+
| Tables_in_inventory |
+-----+
| category |
| manufacturer |
| product |
+-----+
3 rows in set (0.00 sec)
```

```
MariaDB [inventory]>
```

```
> select * from manufacturer;
```

```
File Edit View Search Terminal Help
MariaDB [inventory]> select * from manufacturer;
+----+-----+-----+-----+
| id | name | seller | phone_number |
+----+-----+-----+-----+
| 1 | SanDisk | John Miller | +1 (941) 329-8855 |
| 2 | Kingston | Mike Taylor | +1 (341) 375-9999 |
| 3 | Asus | Wilson Jackson | +1 (432) 367-8899 |
| 4 | Lenovo | Allen Scott | +1 (876) 213-4439 |
+----+-----+-----+-----+
4 rows in set (0.00 sec)
```

```
MariaDB [inventory]>
```

```
> select * from manufacturer where seller like "%John";
```

```
File Edit View Search Terminal Help
MariaDB [inventory]> select * from manufacturer where seller like "%john";
Empty set (0.00 sec)
```

```
MariaDB [inventory]>
```

```
> select * from manufacturer where seller like "%John%";
```

```
File Edit View Search Terminal Help
MariaDB [inventory]> select * from manufacturer where seller like "%john%";
+----+-----+-----+-----+
| id | name | seller | phone_number |
+----+-----+-----+-----+
| 1 | SanDisk | John Miller | +1 (941) 329-8855 |
+----+-----+-----+
1 row in set (0.00 sec)

MariaDB [inventory]> □
```

Creating users :

```
> create user rob@localhost identified by 'rob123'; (local user)
```

```
File Edit View Search Terminal Help
MariaDB [inventory]> create user rob@localhost identified by 'rob123';
Query OK, 0 rows affected (0.00 sec)

MariaDB [inventory]> □
```

```
> create user smith identified by 'smith123'; (global user)
```

```
File Edit View Search Terminal Help
MariaDB [inventory]> create user smith identified by 'smith123';
Query OK, 0 rows affected (0.00 sec)

MariaDB [inventory]> □
```

```
> create user saara@'%' identified by 'saara123'; (global user)
```

```
File Edit View Search Terminal Help
MariaDB [inventory]> create user saara@'%' identified by 'saara123';
Query OK, 0 rows affected (0.00 sec)

MariaDB [inventory]> □
```

How to check users :

> use mysql

```
File Edit View Search Terminal Help
MariaDB [inventory]> use mysql;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [mysql]>
```

> select host,user,password from user;

```
File Edit View Search Terminal Help
MariaDB [mysql]> select host,user,password from user;
+-----+-----+
| host | user | password |
+-----+-----+
| localhost | root | *84BB5DF4823DA319BBF86C99624479A198E6EEE9 |
| 127.0.0.1 | root | *84BB5DF4823DA319BBF86C99624479A198E6EEE9 |
| ::1 | root | *84BB5DF4823DA319BBF86C99624479A198E6EEE9 |
| % | smith | *8E5A357584BAB2584C1F59B229782D2020F351CC |
| localhost | rob | *2783D20D766ECD3F4408F2B29782F118E411C8A9 |
| % | saara | *BD2C2D6AE27AD2125D7998F680C23AB664EC4073 |
+-----+-----+
6 rows in set (0.00 sec)

MariaDB [mysql]>
```

How to grant permissions :

```
> grant ALL on inventory.* to rob@localhost;
```

[ inventory.\* - database which was created by us ]

```
File Edit View Search Terminal Help
MariaDB [mysql]> grant ALL on inventory.* to rob@localhost;
Query OK, 0 rows affected (0.00 sec)
```

```
MariaDB [mysql]> █
```

```
> grant Select on inventory.manufacturer to saara;
```

```
File Edit View Search Terminal Help
MariaDB [mysql]> grant select on inventory.manufacturer to saara;
Query OK, 0 rows affected (0.00 sec)
```

```
MariaDB [mysql]> █
```

```
> grant select , delete on inventory.* to smith@'%';
```

```
File Edit View Search Terminal Help
MariaDB [mysql]> grant select,delete on inventory.* to smith@'%';
Query OK, 0 rows affected (0.00 sec)
```

```
MariaDB [mysql]> █
```

Reloading Privileges :

```
> flush privileges;
```

```
File Edit View Search Terminal Help
MariaDB [mysql]> flush privileges;
Query OK, 0 rows affected (0.01 sec)
```

```
MariaDB [mysql]> █
```

```
> ctrl + D
```

root@serverX

.) firewall-cmd --add-service=mysql

```
File Edit View Search Terminal Help
[root@server17 ~]# firewall-cmd --add-service=mysql
success
[root@server17 ~]#
```

.) firewall-cmd --add-service=mysql --permanent

```
File Edit View Search Terminal Help
[root@server17 ~]# firewall-cmd --add-service=mysql --permanent
success
[root@server17 ~]#
```

root@desktopX

.) yum groupinstall mariadb-client -y

```
File Edit View Search Terminal Tabs Help
root@server17:~]# yum groupinstall mariadb-client -y
root@desktop17:~]
Loaded plugins: langpacks
rhel_dvd
(1/2): rhel_dvd/group_gz
(2/2): rhel_dvd/primary_db
Resolving Dependencies
--> Running transaction check
--> Package MySQL-python.x86_64 0:1.2.3-11.el7 will be installed
--> Package mariadb.x86_64 1:5.5.35-3.el7 will be installed
--> Package mysql-connector-odbc.x86_64 0:5.2.5-6.el7 will be installed
--> Processing Dependency: libodbc.so.2()(64bit) for package: mysql-connector-odbc-5.2.5-6.el7.x86_64
--> Processing Dependency: libodbcinst.so.2()(64bit) for package: mysql-connector-odbc-5.2.5-6.el7.x86_64
--> Running transaction check
--> Package unixODBC.x86_64 0:2.3.1-10.el7 will be installed
--> Finished Dependency Resolution

Dependencies Resolved
```

.) mysql -u root -p -h 172.25.X.11 { to create }

password : redhat

[ Access Denied ]

```
File Edit View Search Terminal Tabs Help
root@server17:~]# mysql -u root -p -h 172.25.17.11
Enter password:
ERROR 1045 (28000): Access denied for user 'root'@'desktop17.example.com' (using password: YES)
[root@desktop17 ~]#
```

```
.) mysql -u rob -p -h 172.25.X.11
```

password : redhat

[ Access Denied ]

A screenshot of a terminal window titled "root@server17:~". It shows the command "mysql -u rob -p -h 172.25.17.11" being run. The password is entered, resulting in the error message: "ERROR 1045 (28000): Access denied for user 'rob'@'desktop17.example.com' (using password: YES)".

```
File Edit View Search Terminal Tabs Help
root@server17:~
[root@desktop17 ~]# mysql -u rob -p -h 172.25.17.11
Enter password:
ERROR 1045 (28000): Access denied for user 'rob'@'desktop17.example.com' (using password: YES)
[root@desktop17 ~]#
```

```
.) mysql -u smith -p -h 172.25.X.11 { to create }
```

password : smith123

A screenshot of a terminal window titled "root@server17:~". It shows the command "mysql -u smith -p -h 172.25.17.11" being run. The password is entered, and the MySQL monitor starts. The output includes the welcome message, connection id, server version, and copyright information. The prompt "MariaDB [(none)]>" is shown.

```
File Edit View Search Terminal Tabs Help
root@server17:~
[root@desktop17 ~]# mysql -u smith -p -h 172.25.17.11
Enter password:
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 24
Server version: 5.5.35-MariaDB MariaDB Server

Copyright (c) 2000, 2013, Oracle, Monty Program Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]>
```

## mysql

```
> use inventory;
```

A screenshot of a terminal window titled "root@server17:~". It shows the command "use inventory" being run. The output indicates that the database has been successfully selected, and the prompt "MariaDB [inventory]>" is shown.

```
File Edit View Search Terminal Tabs Help
root@server17:~
[root@desktop17 ~]# use inventory;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [inventory]>
```

```
> show tables;
```

A screenshot of a terminal window titled "root@server17:~". It shows the command "show tables;" being run in the "inventory" database. The output lists three tables: "category", "manufacturer", and "product". The prompt "MariaDB [inventory]>" is shown.

```
File Edit View Search Terminal Tabs Help
root@server17:~
[root@desktop17 ~]# MariaDB [inventory]> show tables;
+-----+
| Tables_in_inventory |
+-----+
| category |
| manufacturer |
| product |
+-----+
3 rows in set (0.00 sec)

MariaDB [inventory]>
```

```
> ctrl + D
```

root@desktopX

.) mysql -u saara -p -h 170.25.X.11

password : saara123

```
File Edit View Search Terminal Tabs Help
root@server17:~ mysql -u saara -p -h 170.25.17.11
root@desktop17:~ Enter password:
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 25
Server version: 5.5.35-MariaDB MariaDB Server

Copyright (c) 2000, 2013, Oracle, Monty Program Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]>
```

mysql

> use inventory;

```
File Edit View Search Terminal Tabs Help
root@server17:~ use inventory;
root@desktop17:~ Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [inventory]>
```

> show tables;

```
File Edit View Search Terminal Tabs Help
root@server17:~ show tables;
root@desktop17:~ +-----+
+-----+-----+
| Tables_in_inventory |-----+
| manufacturer |-----+
+-----+
1 row in set (0.00 sec)

MariaDB [inventory]>
```

> select \* from manufacturer;

```
File Edit View Search Terminal Tabs Help
root@server17:~ select * from manufacturer;
root@desktop17:~ +-----+-----+
+-----+-----+
| id | name | seller | phone_number |
+-----+-----+
| 1 | SanDisk | John Miller | +1 (941) 329-8855 |
| 2 | Kingston | Mike Taylor | +1 (341) 375-9999 |
| 3 | Asus | Wilson Jackson | +1 (432) 367-8899 |
| 4 | Lenovo | Allen Scott | +1 (876) 213-4439 |
+-----+-----+
4 rows in set (0.00 sec)

MariaDB [inventory]>
```

> delete table manufacturer wher id=1;

File Edit View Search Terminal Tabs Help  
root@server17:~  
MariaDB [inventory]> delete table manufacturer where id=1;  
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MariaDB server version for the right syntax to use near 'table manufacturer where id=1' at line 1  
MariaDB [inventory]>

> delete table manufacturer;

File Edit View Search Terminal Tabs Help  
root@server17:~  
MariaDB [inventory]> delete table manufacturer;  
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MariaDB server version for the right syntax to use near 'table manufacturer' at line 1  
MariaDB [inventory]>

> ctrl + D

root@desktopX

.) mysql -u smith -p -h 172.25.X.11

password : smith123

File Edit View Search Terminal Tabs Help  
root@server17:~  
[root@desktop17 ~]# mysql -u smith -p -h 172.25.17.11  
Enter password:  
Welcome to the MariaDB monitor. Commands end with ; or \g.  
Your MariaDB connection id is 28  
Server version: 5.5.35-MariaDB MariaDB Server  
  
Copyright (c) 2000, 2013, Oracle, Monty Program Ab and others.  
  
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.  
MariaDB [(none)]>

mysql

> use inventory;

File Edit View Search Terminal Tabs Help  
root@server17:~  
MariaDB [(none)]> use inventory;  
Reading table information for completion of table and column names  
You can turn off this feature to get a quicker startup with -A  
  
Database changed  
MariaDB [inventory]>

> select \* from manufacturer;

A screenshot of a terminal window titled "root@server17:~". The command "select \* from manufacturer;" is run, resulting in the following table output:

id	name	seller	phone_number
1	SanDisk	John Miller	+1 (941) 329-8855
2	Kingston	Mike Taylor	+1 (341) 375-9999
3	Asus	Wilson Jackson	+1 (432) 367-8899
4	Lenovo	Allen Scott	+1 (876) 213-4439

4 rows in set (0.00 sec)

MariaDB [inventory]>

> delete table manufacturer where id=1;

A screenshot of a terminal window titled "root@server17:~". The command "delete table manufaturer where id=1;" is run, resulting in the following error message:

MariaDB [inventory]> delete table manufaturer where id=1;  
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MariaDB server version for the right syntax to use near 'table manufaturer where id=1' at line 1  
MariaDB [inventory]>

> ctrl + D

root@serverX

.) vim /etc/my.cnf { to secure }

after - # instructions in http://-----

type - skip-networking=1

after that save it and exit

A screenshot of a terminal window titled "root@server17:~". The file "/etc/my.cnf" is being edited, showing the following configuration:

```
File Edit View Search Terminal Tabs Help
root@server17:~ x r
[mysqld]
datadir=/var/lib/mysql
socket=/var/lib/mysql/mysql.sock
Disabling symbolic-links is recommended to prevent assorted security risks
symbolic-links=0
Settings user and group are ignored when systemd is used.
If you need to run mysqld under a different user or group,
customize your systemd unit file for mariadb according to the
instructions in http://fedoraproject.org/wiki/Systemd
skip-networking=1
[mysqld_safe]
log-error=/var/log/mariadb/mariadb.log
pid-file=/var/run/mariadb/mariadb.pid
#
include all files from the config directory
#
!includedir /etc/my.cnf.d
```

.) systemctl restart mariadb.service

```
File Edit View Search Terminal Tabs Help
root@server17:~
[root@server17 ~]# vim /etc/my.cnf
[root@server17 ~]#
[root@server17 ~]# systemctl restart mariadb.service
[root@server17 ~]#
```

.) ss -ant

[ Now we can't see the port no 11 ]

```
File Edit View Search Terminal Tabs Help
root@server17:~
root@server17 ~]# ss -ant
State Recv-Q Send-Q Local Address:Port Peer Address:Port
LISTEN 0 100 127.0.0.1:25 *:*
LISTEN 0 128 *:57773 *:*
LISTEN 0 128 *:111 *:*
LISTEN 0 128 *:22 *:*
ESTAB 0 0 172.25.17.11:22 172.25.17.250:42652
LISTEN 0 100 ::1:25 :::*
LISTEN 0 128 :::47202 :::*
LISTEN 0 128 :::111 :::*
LISTEN 0 128 :::22 :::*
[root@server17 ~]#
```

.) mysql -u saara -p 172.25.X.11

[ connecting from outside → No Access ] ( Remote User )

```
File Edit View Search Terminal Tabs Help
root@server17:~
root@server17 ~]# mysql -u saara -p 172.25.17.11
Enter password:
ERROR 1044 (42000): Access denied for user 'saara'@'%' to database '172.25.17.11'
[root@server17 ~]#
```

## **Day 42**

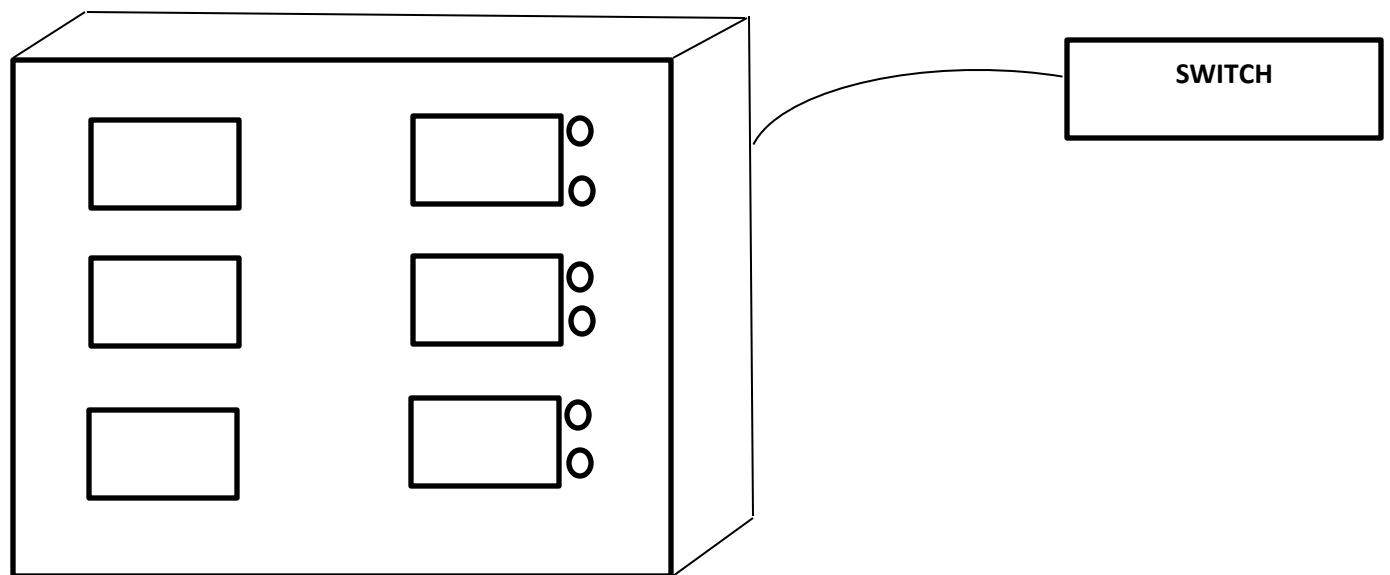
### SAN – Storage Area Network

.) cat /etc/yum.repos.d /redhat.repo  
.) cat /etc/yum.repos.d /rhel\_dvd.repo

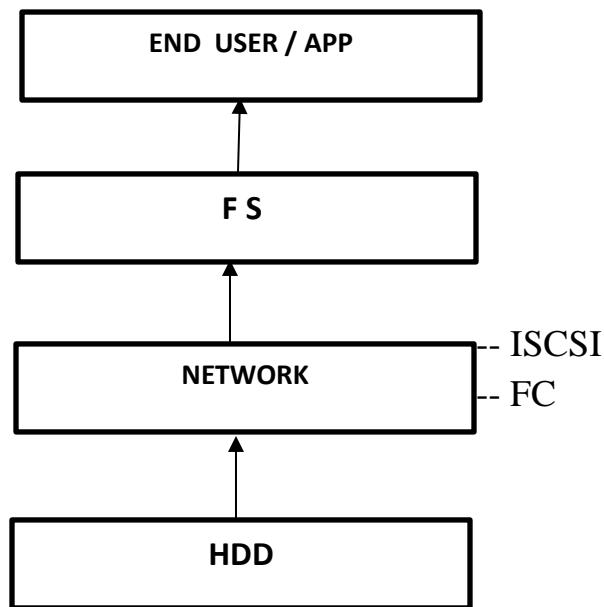
To storage via Network

- 1) Hardware SAN
- 2) Software SAN

Remote Storage Concept



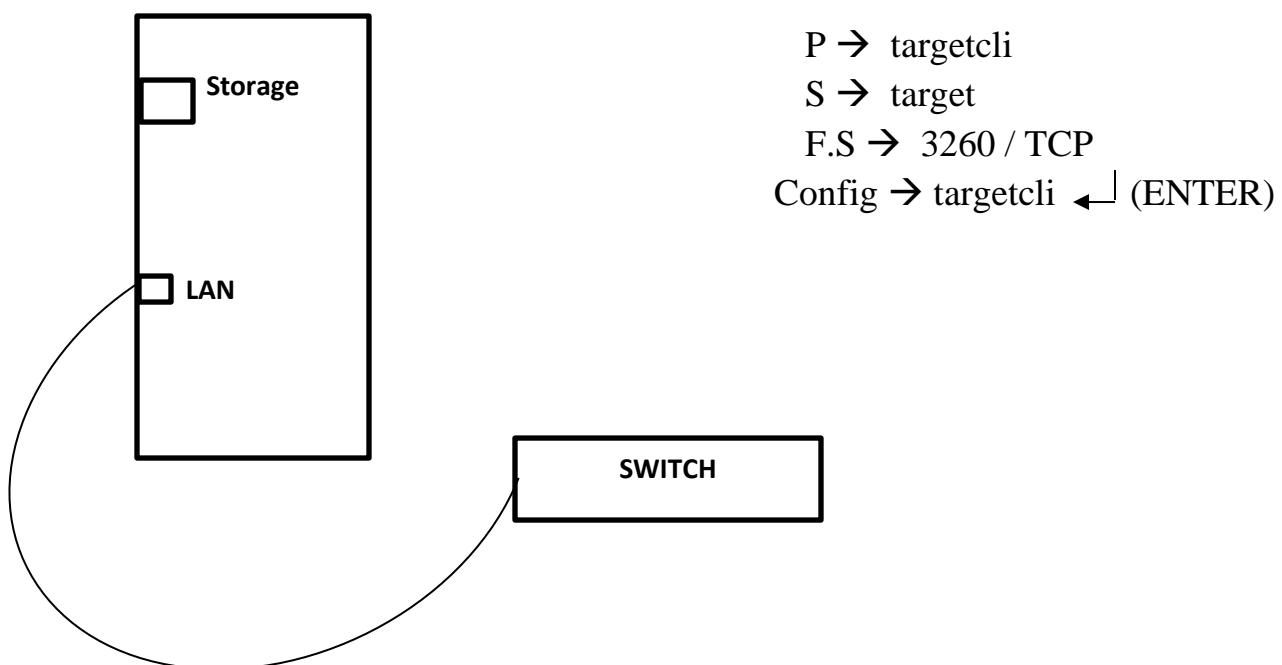
## 1) Hardware SAN



ISCSI – Internet Small Computer System Interface

FC – Fibre Channel

## 2) Software SAN



Steps :

. ) ssh root@server X

. ) fdisk /dev/vdb

n

Enter

Enter

+ 3G

```
File Edit View Search Terminal Help
[root@server16 ~]# fdisk /dev/vdb
Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table
Building a new DOS disklabel with disk identifier 0xe02e0649.

Command (m for help): n
Partition type:
 p primary (0 primary, 0 extended, 4 free)
 e extended
Select (default p):
Using default response p
Partition number (1-4, default 1):
First sector (2048-20971519, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-20971519, default 20971519): +3G
Partition 1 of type Linux and of size 3 GiB is set

Command (m for help):
```

t

8e

p

w

### .) partprobe

```
Command (m for help): t
Selected partition 1
Hex code (type L to list all codes): 8e
Changed type of partition 'Linux' to 'Linux LVM'

Command (m for help): p

Disk /dev/vdb: 10.7 GB, 10737418240 bytes, 20971520 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0xe02e0649

 Device Boot Start End Blocks Id System
/dev/vdb1 2048 6293503 3145728 8e Linux LVM

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
[root@server16 ~]# partprobe /dev/vdb
[root@server16 ~]#
[root@server16 ~]#
```

### .) pvcreate /dev/vdb1

```
File Edit View Search Terminal Help
[root@server16 ~]# pvcreate /dev/vdb1
 Physical volume "/dev/vdb1" successfully created
[root@server16 ~]#
```

.) vgcreate iscsi\_vg /dev/vdb1

```
File Edit View Search Terminal Help
[root@server16 ~]# vgcreate iscsi_vg /dev/vdb1
 Volume group "iscsi_vg" successfully created
[root@server16 ~]#
```

.) lvcreate -n vol1 -L 3G iscsi\_vg

```
File Edit View Search Terminal Help
[root@server16 ~]# lvcreate -n vol1 -L 3G iscsi_vg
 Volume group "iscsi_vg" has insufficient free space (767 extents): 768 required.
[root@server16 ~]#
```

.) lvcreate -n vol1 -l 767 iscsi\_vg

```
File Edit View Search Terminal Help
[root@server16 ~]# lvcreate -n vol1 -l 767 iscsi_vg
 Logical volume "vol1" created
[root@server16 ~]#
```

.) lvs (or) lvdisplay

```
File Edit View Search Terminal Help
[root@server16 ~]# lvdisplay
--- Logical volume ---
 LV Path /dev/iscsi_vg/vol1
 LV Name vol1
 VG Name iscsi_vg
 LV UUID dyGJ5X-YLal-xCKq-dLV4-UeLz-kER1-dIT45e
 LV Write Access read/write
 LV Creation host, time server16.example.com, 2019-12-16 13:02:42 +0530
 LV Status available
 # open 0
 LV Size 3.00 GiB
 Current LE 767
 Segments 1
 Allocation inherit
 Read ahead sectors auto
 - currently set to 8192
 Block device 252:0

[root@server16 ~]#
```

## remote storage

.) yum install targetcli

```
File Edit View Search Terminal Help
[root@server16 ~]# yum install targetcli
Loaded plugins: langpacks
rhel_dvd
(1/2): rhel_dvd/group_gz
(2/2): rhel_dvd/primary_db
Resolving Dependencies
--> Running transaction check
--> Package targetcli.noarch 0:2.1.fb34-1.el7 will be installed
--> Processing Dependency: python-rtslib >= 2.1.fb41 for package: targetcli-2.1.fb34-1.el7.noarch
--> Processing Dependency: python-configshell for package: targetcli-2.1.fb34-1.el7.noarch
--> Running transaction check
--> Package python-configshell.noarch 1:1.fb11-3.el7 will be installed
--> Processing Dependency: pyparsing for package: 1:python-configshell-1.1.fb11-3.el7.noarch
--> Processing Dependency: python-urwid for package: 1:python-configshell-1.1.fb11-3.el7.noarch
-->> Package python-rtslib.noarch 0:2.1.fb46-1.el7 will be installed
--> Processing Dependency: python-kmod for package: python-rtslib-2.1.fb46-1.el7.noarch
--> Running transaction check
--> Package pyparsing.noarch 0:1.5.6-9.el7 will be installed
--> Package python-kmod.x86_64 0:0.9-4.el7 will be installed
-->> Package python-urwid.x86_64 0:1.1.1-3.el7 will be installed
[]
```

.) systemctl enable target

```
File Edit View Search Terminal Help
[root@server16 ~]# systemctl enable target
ln -s '/usr/lib/systemd/system/target.service' '/etc/systemd/system/multi-user.target.wants/target.service'
[root@server16 ~]# []
```

.) systemctl start target

.) systemctl status target

```
File Edit View Search Terminal Help
[root@server16 ~]# systemctl start target
[root@server16 ~]#
[root@server16 ~]# systemctl status target
target.service - Restore LIO kernel target configuration
 Loaded: loaded (/usr/lib/systemd/system/target.service; enabled)
 Active: active (exited) since Mon 2019-12-16 13:03:54 IST; 7s ago
 Process: 1827 ExecStart=/usr/bin/targetctl restore (code=exited, status=0/SUCCESS)
 Main PID: 1827 (code=exited, status=0/SUCCESS)

Dec 16 13:03:54 server16.example.com target[1827]: No saved config file at /etc/target/saveconfig.json, ok, exiting
Dec 16 13:03:54 server16.example.com systemd[1]: Started Restore LIO kernel target configuration.
[root@server16 ~]# []
```

.) firewall-cmd --add-port=3260/tcp

```
File Edit View Search Terminal Help
[root@server16 ~]# firewall-cmd --add-port=3260/tcp
success
[root@server16 ~]# []
```

.) firewall-cmd --add-port=3260/tcp --permanent

```
File Edit View Search Terminal Help
[root@server16 ~]# firewall-cmd --add-port=3260/tcp --permanent
success
[root@server16 ~]#
```

.) targetcli

/> ls

```
File Edit View Search Terminal Help
[root@server16 ~]# targetcli
Warning: Could not load preferences file /root/.targetcli/prefs.bin.
targetcli shell version 2.1.fb34
Copyright 2011-2013 by Datera, Inc and others.
For help on commands, type 'help'.

/> ls
o- L [...]
 o- backstores [...]
 | o- block [Storage Objects: 0]
 | o- fileio [Storage Objects: 0]
 | o- pscsi [Storage Objects: 0]
 | o- ramdisk [Storage Objects: 0]
 o- iscsi [Targets: 0]
 o- loopback [Targets: 0]
/>
```

/> backstores/block create remote-disk /dev/iscsi\_vg/voll

```
File Edit View Search Terminal Help
/> backstores/block create remote-disk /dev/iscsi_vg/voll
Created block storage object remote-disk using /dev/iscsi_vg/voll.
/>
```

/> ls

```
File Edit View Search Terminal Help
/> ls
o- L [...]
 o- backstores [...]
 | o- block [Storage Objects: 1]
 | | o- remote-disk [/dev/iscsi_vg/voll (3.0GiB) write-thru deactivated]
 | o- fileio [Storage Objects: 0]
 | o- pscsi [Storage Objects: 0]
 | o- ramdisk [Storage Objects: 0]
 o- iscsi [Targets: 0]
 o- loopback [Targets: 0]
/>
```

```
/> backstores/block delete remote_disk
```

```
File Edit View Search Terminal Help
/> backstores/block delete remote-disk
Deleted storage object remote-disk.
/>
```

```
/> backstores/block create remote_disk1 /dev/iscsi_vg/voll
```

```
/> ls
```

```
File Edit View Search Terminal Help
/> backstores/block create remote-disk1 /dev/iscsi_vg/voll
Created block storage object remote-disk1 using /dev/iscsi_vg/voll.
/>
/> ls
o- L [....]
o- backstores [....]
| o- block [Storage Objects: 1]
| | o- remote-disk1 [/dev/iscsi_vg/voll (3.0GiB) write-thru deactivated]
| o- fileio [Storage Objects: 0]
| o- pscsi [Storage Objects: 0]
| o- ramdisk [Storage Objects: 0]
o- iscsi [Targets: 0]
o- loopback [Targets: 0]
/>
```

## TPG - Target Portal Group

- 1) LUN – Logical Unit Number ( What )
- 2) ACL – Access Control List ( To Whom )
- 3) Portal ( Where it is Available )

IQN - iscsi Qualified Name ( must be unique )

iqn.yyyy.mm.reversedomain:hostname

domain : host.example.com / host.net8.example.com

reverse domain : com.example.host / com.example.net8

```
/> iscsi/ create iqn.2019-12.com.example:serverX
```

```
File Edit View Search Terminal Help
/> iscsi/ create iqn.2019-12.com.example:server16
Created target iqn.2019-12.com.example:server16.
Created TPG 1.
/> □
```

```
/> iscsi/ iqn.2019-12.com.example:serverX/tpg1/luns create
```

```
 /backstores/block/remote_disk1
```

```
File Edit View Search Terminal Help
/> iscsi/iqn.2019-12.com.example:server16/tpg1/luns create /backstores/block/remote-disk1
Created LUN 0.
/> □
```

```
/> iscsi/iqn.2019-12.com.example:serverX/tpg1/acls create
```

```
 iqn.2019-12.com.example:serverX
```

```
File Edit View Search Terminal Help
/> iscsi/iqn.2019-12.com.example:server16/tpg1/acls create iqn.2019-12.com.example:server16
Created Node ACL for iqn.2019-12.com.example:server16
Created mapped LUN 0.
/> □
```

```
/> iscsi/iqn.2019-12.com.example:serverX/tpg1/portals/ create
```

```
 172.25.X.11 3260
```

```
 <IP> <Port>
```

```
File Edit View Search Terminal Help
/> iscsi/iqn.2019-12.com.example:server16/tpg1/portals/ create 172.25.16.11 3260
Using default IP port 3260
Created network portal 172.25.16.11:3260.
/> □
```

ctrl + D

.) cat .targetcli/history.txt

```
File Edit View Search Terminal Help
/> exit
Global pref auto_save_on_exit=true
Last 10 configs saved in /etc/target/backup.
Configuration saved to /etc/target/saveconfig.json
[root@server16 ~]#
[root@server16 ~]#
[root@server16 ~]# cat .targetcli/history.txt
ls
backstores/block create remote-disk /dev/iscsi_vg/voll
ls
backstores/block delete remote-disk
backstores/block create remote-disk1 /dev/iscsi_vg/voll
ls
iscsi/ create iqn.2019-12.com.example:server16
iscsi/iqn.2019-12.com.example:server16/tpg1/luns create /backstores/block/remote-disk1
iscsi/iqn.2019-12.com.example:server16/tpg1/acls create iqn.2019-12.com.example:server16
iscsi/iqn.2019-12.com.example:server16/tpg1/portals/ create 172.25.16.11 3260
```

.) cat /etc/iscsi/initiatorname.iscsi

```
File Edit View Search Terminal Help
[root@server16 ~]# cat /etc/iscsi/initiatorname.iscsi
InitiatorName=iqn.1994-05.com.redhat:9e96ff23da37
[root@server16 ~]#
```

.) vim /etc/iscsi/initiatorname.iscsi

InitiatorName=iqn.2019-12.com.example.:serverX

```
File Edit View Search Terminal Help
InitiatorName=iqn.2019-12.com.example:server16
~
```

.) cat /etc/iscsi/initiatorname.iscsi

```
File Edit View Search Terminal Help
[root@server16 ~]# vim /etc/iscsi/initiatorname.iscsi
[root@server16 ~]#
[root@server16 ~]#
[root@server16 ~]# cat /etc/iscsi/initiatorname.iscsi
InitiatorName=iqn.2019-12.com.example:server16
[root@server16 ~]#
```

.)ssh root@desktop

.) rpm -qa iscsi-initiator-utils

```
File Edit View Search Terminal Tabs Help
root@server16:~ x root@desktop16:~
[root@desktop16 ~]# rpm -qa iscsi-initiator-utils
iscsi-initiator-utils-6.2.0.873-21.el7.x86_64
[root@desktop16 ~]#
```

.) rpm -q iscsi\*

```
File Edit View Search Terminal Tabs Help
root@server16:~ x root@desktop16:~
[root@desktop16 ~]# rpm -q iscsi*
package iscsi* is not installed
[root@desktop16 ~]#
```

.) yum list iscsi-initiator-utils

```
File Edit View Search Terminal Tabs Help
root@server16:~ x root@desktop16:~
[root@desktop16 ~]# yum list iscsi-initiator-utils
Loaded plugins: langpacks
rhel_dvd
(1/2): rhel_dvd/group_gz
(2/2): rhel_dvd/primary_db
Installed Packages
iscsi-initiator-utils.x86_64 6.2.0.873-21.el7 @rhel_dvd
Available Packages
iscsi-initiator-utils.i686 6.2.0.873-21.el7 rhel_dvd
[root@desktop16 ~]#
```

.) yum install iscsi-initiator-utils

```
File Edit View Search Terminal Tabs Help
root@server16:~ x root@desktop16:~
[root@desktop16 ~]# yum install iscsi-initiator-utils
Loaded plugins: langpacks
Package iscsi-initiator-utils-6.2.0.873-21.el7.x86_64 already installed and latest version
Nothing to do
[root@desktop16 ~]#
```

[ It was already installed ]

.) cat /etc/iscsi/initiatorname.iscsi

```
File Edit View Search Terminal Tabs Help
root@server16:~ x root@desktop16:~
[root@desktop16 ~]# cat /etc/iscsi/initiatorname.iscsi
InitiatorName=iqn.1994-05.com.redhat:9e96ff23da37
[root@desktop16 ~]#
```

.) vim /etc/iscsi/initiatorname.iscsi

InitiatorName=iqn.2019-12.com.example.:desktopX

```
File Edit View Search Terminal Tabs Help
root@server16:~ root@desktop16:~
InitiatorName=iqn.2019-12.com.example.:desktop16
~
~
```

.) cat /etc/iscsi/initiatorname.iscsi

```
File Edit View Search Terminal Tabs Help
root@server16:~ root@desktop16:~
[root@desktop16 ~]# vim /etc/iscsi/initiatorname.iscsi
[root@desktop16 ~]#
[root@desktop16 ~]# cat /etc/iscsi/initiatorname.iscsi
InitiatorName=iqn.2019-12.com.example.:desktop16
[root@desktop16 ~]#
```

.) man iscsadm [ discover (copy example) ]

#### EXAMPLES

Discover targets at a given IP address:

```
iscsadm --mode discoverydb --type sendtargets --portal 192.168.1.10 --discover
```

Login, must use a node record id found by the discovery:

```
iscsadm --mode node --targetname iqn.2001-05.com.doe:test --portal 192.168.1.1:3260 --login
```

Logout:

```
iscsadm --mode node --targetname iqn.2001-05.com.doe:test --portal 192.168.1.1:3260 --logout
```

List node records:

```
iscsadm --mode node
```

Display all data for a given node record:

```
iscsadm --mode node --targetname iqn.2001-05.com.doe:test --portal 192.168.1.1:3260
```

.) iscsadm --mode discoverydb --type sendtargets --portal 172.25.X.11

--discover

```
File Edit View Search Terminal Tabs Help
root@server16:~ root@desktop16:~
[root@desktop16 ~]# man iscsadm
[root@desktop16 ~]#
[root@desktop16 ~]# iscsadm --mode discoverydb --type sendtargets --portal 172.25.16.11 --discover
172.25.16.11:3260,1 iqn.2019-12.com.example:server16
[root@desktop16 ~]#
```

.) man iscsiadm [ login (copy) ]

#### EXAMPLES

Discover targets at a given IP address:

```
iscsiadm --mode discoverydb --type sendtargets --portal 192.168.1.10 --discover
```

Login, must use a node record id found by the discovery:

```
iscsiadm --mode node --targetname iqn.2001-05.com.doe:test --portal 192.168.1.1:3260 --login
```

Logout:

```
iscsiadm --mode node --targetname iqn.2001-05.com.doe:test --portal 192.168.1.1:3260 --logout
```

List node records:

```
iscsiadm --mode node
```

Display all data for a given node record:

```
iscsiadm --mode node --targetname iqn.2001-05.com.doe:test --portal 192.168.1.1:3260
```

.) iscsiadm --mode node --targetname iqn.2019-12.com.example:server  
--portal 172.25.X.11:3260 --login

```
File Edit View Search Terminal Tabs Help
root@server16:~
[root@desktop16 ~]# man iscsiadm
[root@desktop16 ~]#
[root@desktop16 ~]#
[root@desktop16 ~]# iscsiadm --mode node --targetname iqn.2019-12.com.example:server16 --portal 172.25.16.11:3260 --login
Logging in to [iface: default, target: iqn.2019-12.com.example:server16, portal: 172.25.16.11,3260] (multiple)
iscsiadm: Could not login to [iface: default, target: iqn.2019-12.com.example:server16, portal: 172.25.16.11,3260].
iscsiadm: initiator reported error (24 - iSCSI login failed due to authorization failure)
iscsiadm: Could not log into all portals
[root@desktop16 ~]#
```

.) lsblk

```
File Edit View Search Terminal Tabs Help
root@server16:~
[root@desktop16 ~]# lsblk
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
vda 253:0 0 10G 0 disk
└─vda1 253:1 0 10G 0 part /
vdb 253:16 0 10G 0 disk
[root@desktop16 ~]#
[root@desktop16 ~]#
```

.) fdisk /dev/vdb

n

Enter

Enter

Enter

+1900 MB

w

.) partprobe

```
File Edit View Search Terminal Tabs Help
root@server16:~ x root@desktop16:~
[root@desktop16 ~]# fdisk /dev/vdb
Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table
Building a new DOS disklabel with disk identifier 0x146b48ab.

Command (m for help): n
Partition type:
 p primary (0 primary, 0 extended, 4 free)
 e extended
Select (default p):
Using default response p
Partition number (1-4, default 1):
First sector (2048-20971519, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-20971519, default 20971519): +1900M
Partition 1 of type Linux and of size 1.9 GiB is set

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
[root@desktop16 ~]# partprobe /dev/vdb
[root@desktop16 ~]#
```

.) mkfs.xfs /dev/vdb1

```
File Edit View Search Terminal Tabs Help
root@server16:~ root@desktop16:~
[root@desktop16 ~]# mkfs.xfs /dev/vdb1
meta-data=/dev/vdb1 isize=256 agcount=4, agsize=121600 blks
 = sectsz=512 attr=2, projid32bit=1
 = crc=0
data = bsize=4096 blocks=486400, imaxpct=25
 = sunit=0 swidth=0 blks
naming =version 2 bsize=4096 ascii-ci=0 ftype=0
log =internal log bsize=4096 blocks=2560, version=2
 = sectsz=512 sunit=0 blks, lazy-count=1
realtime =none extsz=4096 blocks=0, rtextents=0
[root@desktop16 ~]#
```

.) lsblk -f

```
File Edit View Search Terminal Tabs Help
root@server16:~ root@desktop16:~
[root@desktop16 ~]# lsblk -f
NAME FSTYPE LABEL UUID MOUNTPOINT
vda
└─vda1 xfs dal 9bf6b9f7-92ad-441b-848e-0257cbb883d1 /
vdb
└─vdb1 xfs vdb a0d0d506-c77f-440b-821e-c4e1dbde9b01
[root@desktop16 ~]#
```

.) mkdir /mnt/remote

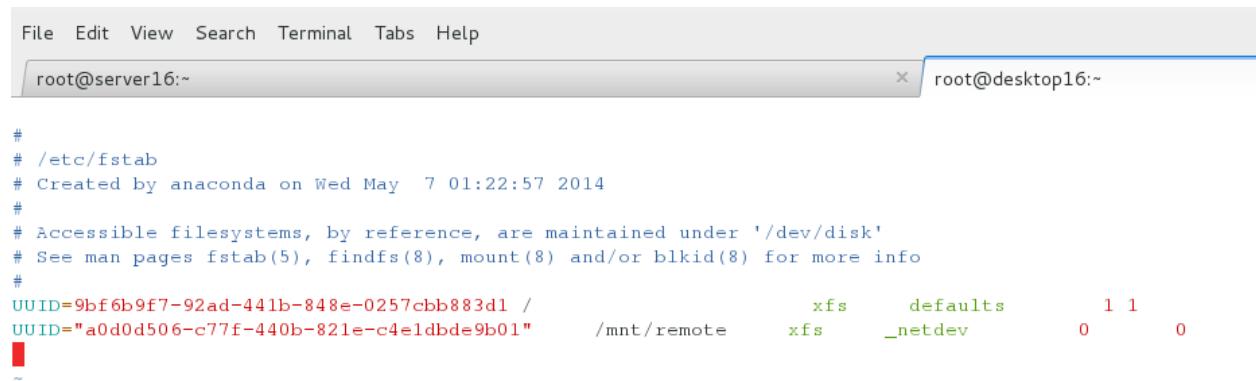
.) blkid

[ copy UUID ]

```
File Edit View Search Terminal Tabs Help
root@server16:~ root@desktop16:~
[root@desktop16 ~]# mkdir /mnt/remote
[root@desktop16 ~]#
[root@desktop16 ~]# blkid
/dev/vdal: UUID="9bf6b9f7-92ad-441b-848e-0257cbb883d1" TYPE="xfs"
/dev/vdb1: UUID="a0d0d506-c77f-440b-821e-c4e1dbde9b01" TYPE="xfs"
[root@desktop16 ~]#
```

.) vim /etc/fstab

```
UUID="" /mnt/remote xfs _netdev 0 0
:wq!
```



```

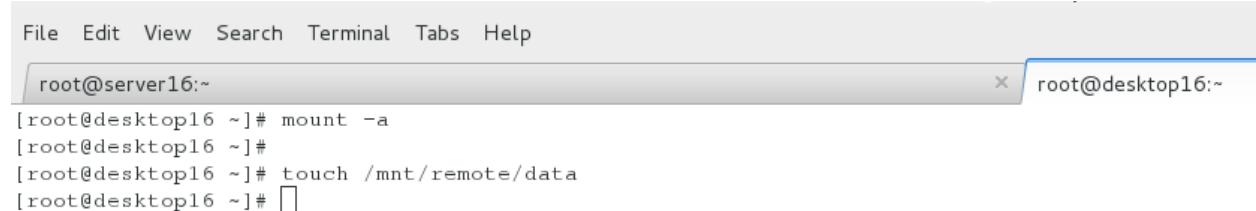
/etc/fstab
Created by anaconda on Wed May 7 01:22:57 2014

Accessible filesystems, by reference, are maintained under '/dev/disk'
See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info

UUID="" /mnt/remote xfs _netdev 0 0
█
```

.) mount -a

.) touch /mnt/remote/data



```
[root@server16:~]
[root@desktop16 ~]# mount -a
[root@desktop16 ~]#
[root@desktop16 ~]# touch /mnt/remote/data
[root@desktop16 ~]# █
```

.) umount /mnt/remote [ before reboot we should umount ]

.) man iscsadm [ logout (copy) ]

#### EXAMPLES

Discover targets at a given IP address:

```
iscsiadm --mode discoverydb --type sendtargets --portal 192.168.1.10 --discover
```

Login, must use a node record id found by the discovery:

```
iscsiadm --mode node --targetname iqn.2001-05.com.doe:test --portal 192.168.1.1:3260 --login
```

Logout:

```
iscsiadm --mode node --targetname iqn.2001-05.com.doe:test --portal 192.168.1.1:3260 --logout
```

List node records:

```
iscsiadm --mode node
```

Display all data for a given node record:

```
iscsiadm --mode node --targetname iqn.2001-05.com.doe:test --portal 192.168.1.1:3260
```

.) iscsiadm --mode node --targetname iqn.2019-12.com.example:server

--portal 172.25.X.11:3260 --logout

```
File Edit View Search Terminal Tabs Help
root@server16:~]# man iscsiadm
[root@server16 ~]# iscsiadm --mode node --targetname iqn.2019-12.com.example:server16 --portal 172.25.16.11:3260 --logout
iscsiadm: No matching sessions found
[root@server16 ~]#
[root@server16 ~]# reboot
Connection to desktop16 closed by remote host.
Connection to desktop16 closed.
[kiosk@foundation16 Desktop]$
```

.) reboot

.) ssh root@desktop

.) lsblk

```
File Edit View Search Terminal Tabs Help
root@server16:~]#
[kiosk@foundation16 Desktop]$ ssh -X root@desktop16
root@desktop16's password:
Last login: Mon Dec 16 13:15:03 2019 from 172.25.16.250

(process:1645): dconf-WARNING **: failed to commit changes to dconf: Could not connect: Connection refused
[root@desktop16 ~]# lsblk
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
vda 253:0 0 10G 0 disk
└─vda1 253:1 0 10G 0 part /
 └─vda2 253:2 0 593.5K 0 part
vdb 253:16 0 10G 0 disk
└─vdb1 253:17 0 1.9G 0 part /mnt/remote
[root@desktop16 ~]#
```

## Day 43

### Port Forwarding

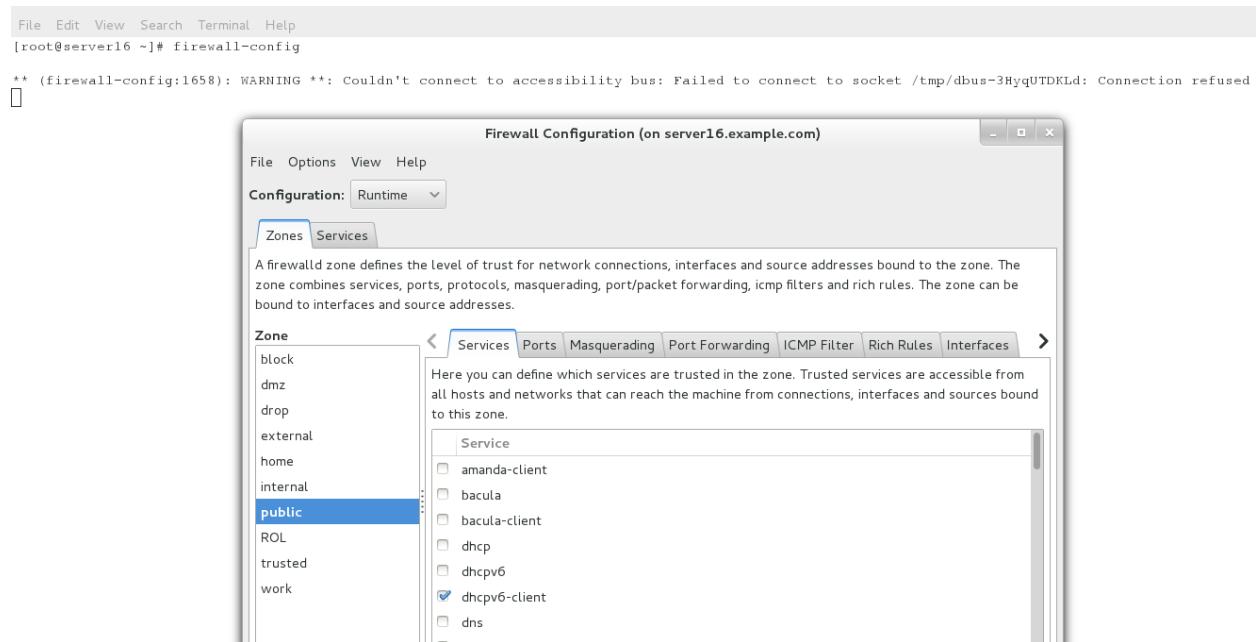
To communicate we can assign other port numbers also

In this method Graphical is easy

Steps :

ssh root@serverX

. ) firewall-config



Connection → Permanent [ change it Runtime to Permanent ]

## Rich Rules

The screenshot shows the FirewallD configuration interface. The top navigation bar includes File, Options, View, Help, and a Configuration dropdown set to Permanent. Below the navigation is a tabs section with Zones and Services selected. A note states: "A firewalld zone defines the level of trust for network connections, interfaces and source addresses bound to the zone. The zone combines services, ports, protocols, masquerading, port/packet forwarding, icmp filters and rich rules. The zone can be bound to interfaces and source addresses." The main area is titled "Zone" and lists available zones: block, dmz, drop, external, home, internal, and public. The public zone is currently selected. Below the zone list is a table header: Family, Action, Element, Src, Dest, log, Audit. At the bottom of the main area are Add, Edit, and Remove buttons, along with an "Add Rich Rule" button. The status bar at the bottom indicates "Connected.", "Default Zone: public", "Lockdown: disabled", and "Panic Mode: disabled".

Add

Family → ipv4

The dialog is titled "Rich Rule (on server16.example.com)". It contains instructions: "Please enter a rich rule." and "For host or network white or blacklisting deactivate the element." The configuration fields include:

- Family:** ipv4
- Element:** service
- Action:** accept (selected), with Type: icmp-host-prohibited
- Source:** (empty)
- Destination:** (empty)
- Prefix:** (empty)
- Log:** Level: warning
- Audit:** (empty)

At the bottom are Cancel and OK buttons.

## Element → forward-port

**Rich Rule (on server16.example.com)**

Please enter a rich rule.

For host or network white or blacklisting deactivate the element.

Family:

Element:

Action:   with Type:

With limit:  /

Source:   inverted

Destination:   inverted

Prefix:

Log: Level:

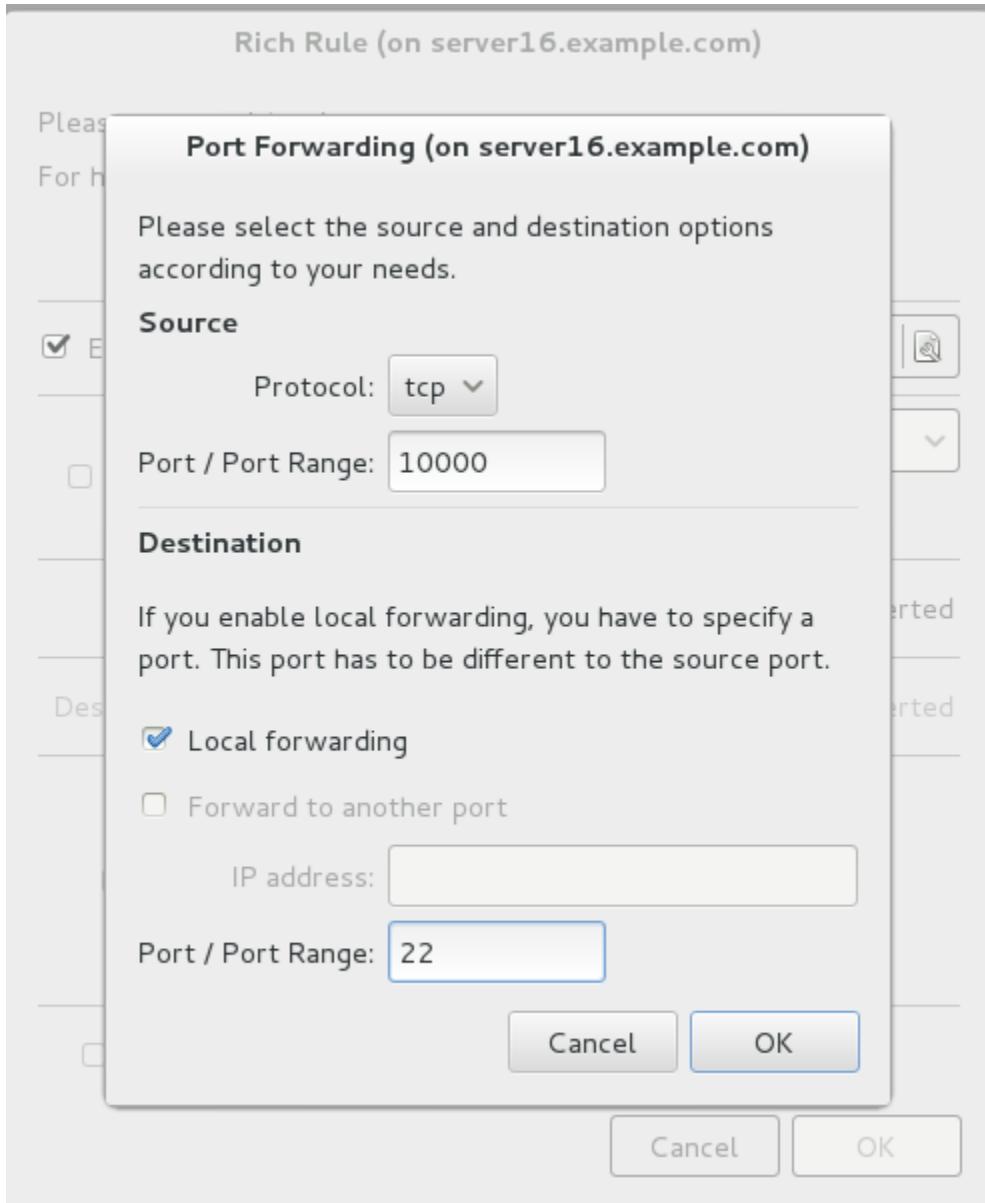
With limit:  /

Audit:  With limit:  /

Click on Next block right side to the forward-port

In Source Port Range → 10000 [ I given 10000 ]

In Destination Port Range → 22



OK

Source → 172.25.X.10/32 [ IP ]

OK

Rich Rule (on server16.example.com)

Please enter a rich rule.

For host or network white or blacklisting deactivate the element.

Family: ipv4

Element: forward-port  

Address (on server16.example.com)

Please enter an ipv4 address with the form address[/mask].  
The mask can be a network mask or a number

Log: Level: warning

With limit:  /

Audit:  With limit:  /

**Rich Rule (on server16.example.com)**

Please enter a rich rule.

For host or network white or blacklisting deactivate the element.

Family: ipv4

Element: forward-port 10000/tcp >22

Action: accept with Type: icmp-host-prohibited

Source: 172.25.16.10/32

Destination:

Prefix:

Log: Level: warning

Audit: With limit:

**Cancel** **OK**

File Options View Help

Configuration: Permanent

Zones Services

A firewalld zone defines the level of trust for network connections, interfaces and source addresses bound to the zone. The zone combines services, ports, protocols, masquerading, port/packet forwarding, icmp filters and rich rules. The zone can be bound to interfaces and source addresses.

Zone	Services	Ports	Masquerading	Port Forwarding	ICMP Filter	Rich Rules	Interfaces	Sources
block								
dmz								
drop								
external								
home								
internal								
<b>public</b>								
ROL								
trusted								
work								

Here you can set rich language rules for the zone.

Family	Action	Element	Src	Dest	log	Audit
ipv4	forward-port	10000/tcp >22	172.25.16.10/32			

Add Edit Remove

Connected. Default Zone: public Lockdown: disabled Panic Mode: disabled

click on options and select Reload Firewall

ssh root@desktopX

.) ssh -p 10000 root@serverX

```
File Edit View Search Terminal Tabs Help
root@server16:~ x root@server16:~
[root@desktop16 ~]# ssh -p 10000 root@server16
The authenticity of host '[server16]:10000 ([172.25.16.11]:10000)' can't be established.
ECDSA key fingerprint is eb:24:0e:07:96:26:b1:04:c2:37:0c:78:2d:bc:b0:08.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '[server16]:10000,[172.25.16.11]:10000' (ECDSA) to the list of known hosts.
root@server16's password:
Last login: Mon Dec 16 11:28:11 2019 from 172.25.16.250
[root@server16 ~]#
```

.) firewall-cmd --list-all

```
File Edit View Search Terminal Tabs Help
root@server16:~ x root@server16:~
[root@server16 ~]# firewall-cmd --list-all
public (default, active)
 interfaces: eth0
 sources:
 services: dhcpcv6-client ssh
 ports:
 masquerade: no
 forward-ports:
 icmp-blocks:
 rich rules:
 rule family="ipv4" source address="172.25.16.10/32" forward-port port="10000" protocol="tcp" to-port="22"
[root@server16 ~]#
```

.) ctrl + D

```
File Edit View Search Terminal Tabs Help
root@server16:~ x root@desktop16:~
[root@server16 ~]# logout
Connection to server16 closed.
[root@desktop16 ~]#
```

.) ssh -p 10001 root@serverX [ to test ]

```
File Edit View Search Terminal Tabs Help
root@server16:~ x root@desktop16:~
[root@desktop16 ~]# ssh -p 10001 root@server16
ssh: connect to host server16 port 10001: No route to host
[root@desktop16 ~]#
```

[ Now Test both cases 10001 and 10000 ]

```
File Edit View Search Terminal Tabs Help
root@server16:~ x root@server16:~
[root@desktop16 ~]# ssh -p 10001 root@server16
ssh: connect to host server16 port 10001: No route to host
[root@desktop16 ~]#
[root@desktop16 ~]# ssh -p 10000 root@server16
root@server16's password:
Last login: Mon Dec 16 11:33:52 2019 from desktop16.example.com
[root@server16 ~]#
```

## Web Server with Port Forwarding

Steps :

ssh root@serverX

.) yum install -y httpd

```
File Edit View Search Terminal Tabs Help
root@server16:~ x root@desktop16:~
[root@server16 ~]# yum install -y httpd
Loaded plugins: langpacks
rhel_dvd
(1/2): rhel_dvd/group_gz
(2/2): rhel_dvd/primary_db
Resolving Dependencies
--> Running transaction check
--> Package httpd.x86_64 0:2.4.6-17.el7 will be installed
--> Processing Dependency: httpd-tools = 2.4.6-17.el7 for package: httpd-2.4.6-17.el7.x86_64
--> Processing Dependency: /etc/mime.types for package: httpd-2.4.6-17.el7.x86_64
--> Processing Dependency: libapr-1.so.0()(64bit) for package: httpd-2.4.6-17.el7.x86_64
--> Processing Dependency: libaprutil-1.so.0()(64bit) for package: httpd-2.4.6-17.el7.x86_64
--> Running transaction check
--> Package apr.x86_64 0:1.4.8-3.el7 will be installed
--> Package apr-util.x86_64 0:1.5.2-6.el7 will be installed
--> Package httpd-tools.x86_64 0:2.4.6-17.el7 will be installed
--> Package mailcap.noarch 0:2.1.41-2.el7 will be installed
[]
```

.) firewall-cmd --add-service=httpd

```
File Edit View Search Terminal Tabs Help
root@server16:~ x
[root@server16 ~]# firewall-cmd --add-service=http
success
[root@server16 ~]#
```

.) firewll-cmd --add-service=httpd --permanent

```
File Edit View Search Terminal Tabs Help
root@server16:~ [root@server16 ~]# firewall-cmd --add-service=httpd --permanent
success
[root@server16 ~]#
```

.) firewall-cmd --reload

```
File Edit View Search Terminal Tabs Help
root@server16:~ [root@server16 ~]# firewall-cmd --reload
success
[root@server16 ~]#
```

.) systemctl enable httpd.service

```
File Edit View Search Terminal Tabs Help
root@server16:~ [root@server16 ~]# systemctl enable httpd.service
ln -s '/usr/lib/systemd/system/httpd.service' '/etc/systemd/system/multi-user.target.wants/httpd.service'
[root@server16 ~]#
```

.) systemctl start httpd.service

.) systemctl status httpd.service

```
File Edit View Search Terminal Tabs Help
root@server16:~ × root@desk
[root@server16 ~]# systemctl start httpd.service
[root@server16 ~]#
[root@server16 ~]# systemctl status httpd.service
httpd.service - The Apache HTTP Server
 Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled)
 Active: active (running) since Mon 2019-12-16 11:37:39 IST; 11s ago
 Main PID: 2828 (httpd)
 Status: "Total requests: 0; Current requests/sec: 0; Current traffic: 0 B/sec"
 CGroup: /system.slice/httpd.service
 └─2828 /usr/sbin/httpd -DFOREGROUND
 ├─2829 /usr/sbin/httpd -DFOREGROUND
 ├─2830 /usr/sbin/httpd -DFOREGROUND
 ├─2831 /usr/sbin/httpd -DFOREGROUND
 ├─2832 /usr/sbin/httpd -DFOREGROUND
 └─2833 /usr/sbin/httpd -DFOREGROUND

Dec 16 11:37:39 server16.example.com systemd[1]: Started The Apache HTTP Server.
[root@server16 ~]#
```

.) curl 172.25.X.11

```
File Edit View Search Terminal Tabs Help
root@server16:~ × root@desktop16:~
[root@server16 ~]# curl 172.25.16.11
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.1//EN" "http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd">

<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en">
 <head>
 <title>Test Page for the Apache HTTP Server on Red Hat Enterprise Linux</title>
 <meta http-equiv="Content-Type" content="text/html; charset=UTF-8" />
 <style type="text/css">
 /*<![CDATA[*/
 body {
 background-color: #fff;
 color: #000;
 font-size: 0.9em;
 font-family: sans-serif, helvetica;
 margin: 0;
 padding: 0;
 }
 :link {
 color: #c00;
 }
 :visited {
 color: #c00;
 }
 <![CDATA]]>

```

[ It'll show the script ]

In firefox give 172.25.X.11



**If you are a member of the general public:**

The fact that you are seeing this page indicates that the website you just visited is either experiencing problems, or is undergoing routine maintenance.

If you would like to let the administrators of this website know that you've seen this page instead of the page you expected, you should send them e-mail. In general, mail sent to the name "webmaster" and directed to the website's domain should reach the appropriate person.

For example, if you experienced problems while visiting www.example.com, you should send e-mail to "webmaster@example.com".

For information on Red Hat Enterprise Linux, please visit the [Red Hat, Inc. website](#). The documentation for Red Hat Enterprise Linux is [available on the Red Hat, Inc. website](#).

**If you are the website administrator:**

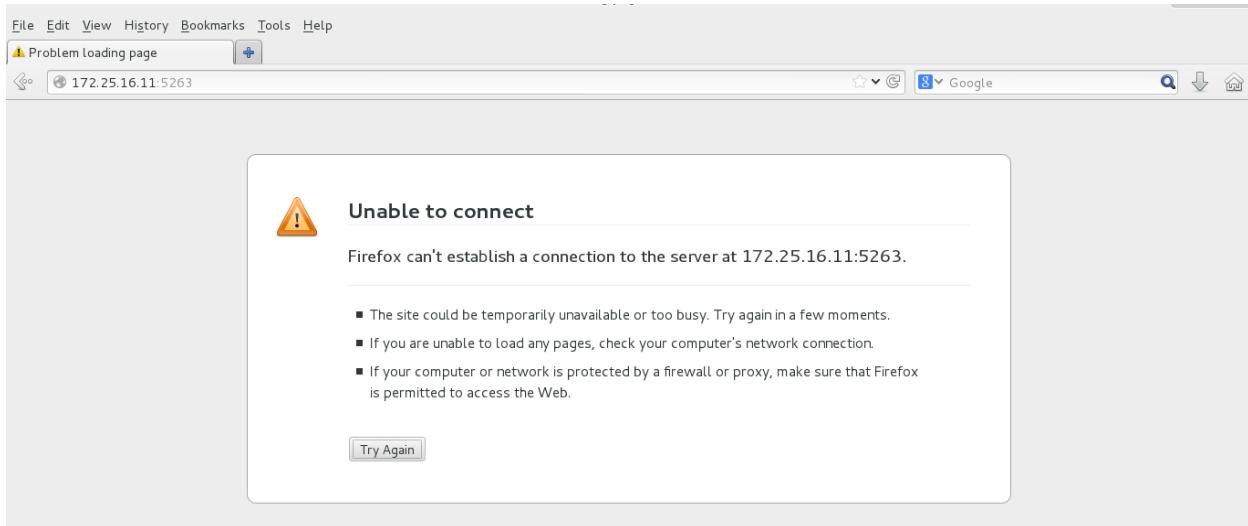
You may now add content to the directory `/var/www/html/`. Note that until you do so, people visiting your website will see this page, and not your content. To prevent this page from ever being used, follow the instructions in the file `/etc/httpd/conf.d/welcome.conf`.

You are free to use the image below on web sites powered by the Apache HTTP Server:



Now give 172.25.X.11 : 5263

[ error page will appear ]

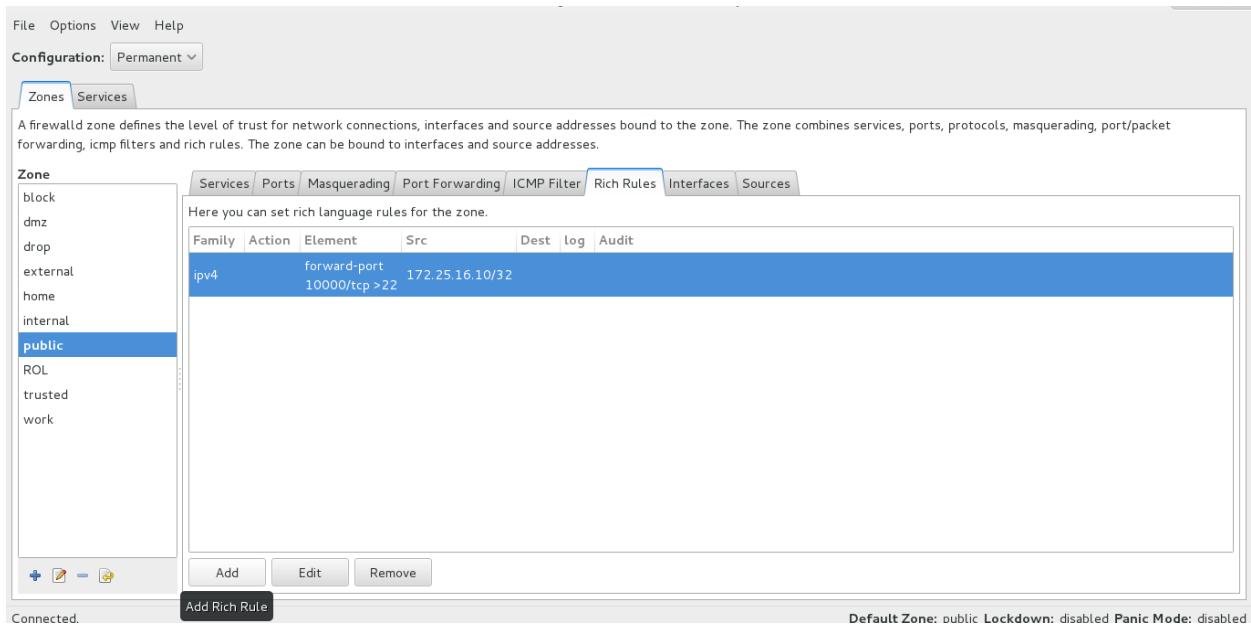


## .) firewall-config

Configuration → Permanent

Rich Rules

Add

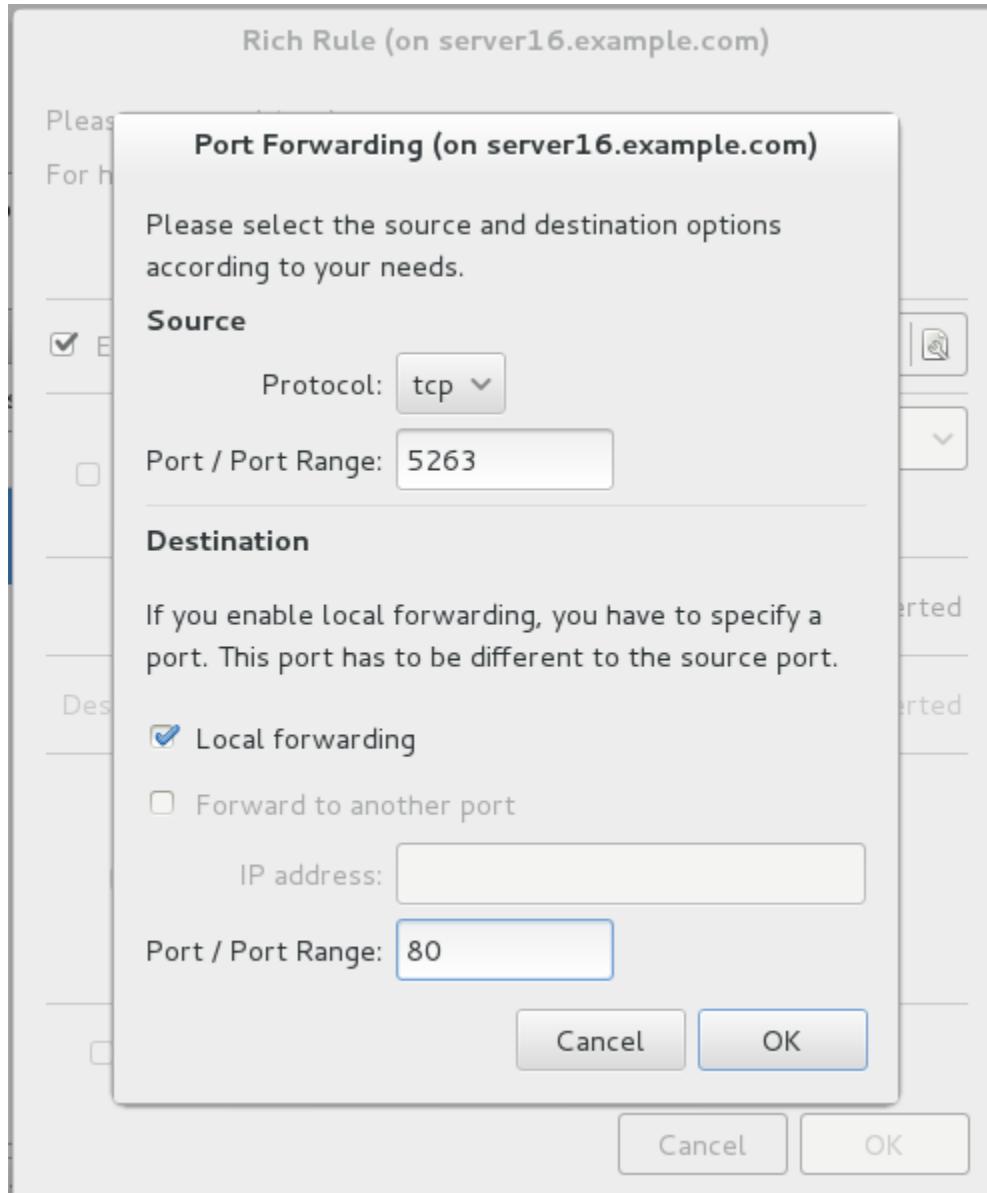


Family → ipv4

Element → forward-port

In Source Port Range → 5263

In Destination Port Range → 80



Source → 172.25.X.10/32

Reload

The screenshot shows the FirewallD configuration interface. On the left, a sidebar lists zones: block, dmz, drop, external, home, internal, and public (which is selected). The main pane shows a table of rich rules under the 'Rich Rules' tab. The table has columns: Family, Action, Element, Src, Dest, log, and Audit. Two rules are listed:

Family	Action	Element	Src	Dest	log	Audit
ipv4	forward-port	5263/tcp >80		172.25.16.10/32		
ipv4	forward-port	10000/tcp >22		172.25.16.10/32		

At the bottom of the main pane are buttons for Add, Edit, and Remove.

ssh root@desktop

. ) firefox [ firefox will be open ]

The screenshot shows a terminal session on a Linux system. The terminal window title is 'root@server16:~'. The command entered is '[root@desktop16 ~]# firefox'. The output shows a GLib-CRITICAL assertion failure message: '(process:1839): GLib-CRITICAL \*\*: g\_slice\_set\_config: assertion `sys\_page\_size == 0' failed'. Below the terminal is a Firefox browser window. The title bar says 'Red Hat - We make open source technologies for the enterprise - Mozilla Firefox (on desktop16.example.com)'. The address bar shows 'Red Hat, Inc. (US) | https://www.redhat.com/en'. The page content is the Red Hat homepage.

In firefox give 127.25.X.11 : 5263



This page is used to test the proper operation of the Apache HTTP server after it has been installed. If you can read this page, it means that the Apache HTTP server installed at this site is working properly.

**If you are a member of the general public:**

The fact that you are seeing this page indicates that the website you just visited is either experiencing problems, or is undergoing routine maintenance.

If you would like to let the administrators of this website know that you've seen this page instead of the page you expected, you should send them e-mail. In general, mail sent to the name "webmaster" and directed to the website's domain should reach the appropriate person.

For example, if you experienced problems while visiting www.example.com, you should send e-mail to "webmaster@example.com".

For information on Red Hat Enterprise Linux, please visit the [Red Hat, Inc. website](#). The documentation for Red Hat Enterprise Linux is [available on the Red Hat, Inc. website](#).

**If you are the website administrator:**

You may now add content to the directory `/var/www/html/`. Note that until you do so, people visiting your website will see this page, and not your content. To prevent this page from ever being used, follow the instructions in the file `/etc/httpd/conf.d/welcome.conf`.

You are free to use the image below on web sites powered by the Apache HTTP Server:



.) ss -ant

A screenshot of a terminal window with two tabs. The left tab shows the command [root@server16 ~]# ss -ant and its output, which lists network connections. The right tab shows the command root@desktop16:~ and its output, which is mostly blank. The terminal window has a standard Linux-style interface with a menu bar and tabs.

## Shell Script

Steps :

ssh root@serverX

.) vim /root/random

#!/bin/bash

case \$@ in

postconf)

echo “postroll”

;;

postroll)

echo “postconf”

;;

\*)

echo “/root/random postconf | postroll”

;;

esac

:wq!

```
File Edit View Search Terminal Tabs Help
root@server16:~
#!/bin/bash
case $@ in
postconf)
 echo "postroll"
 ;;
postroll)
 echo "postconf"
 ;;
*)
 echo "/root/random postconf|postroll"
 ;;
esac
~
```

.) cat /root/random

```
File Edit View Search Terminal Tabs Help
root@server16:~
[root@server16 ~]# vim /root/random
[root@server16 ~]#
[root@server16 ~]#
[root@server16 ~]# cat /root/random
#!/bin/bash
case $@ in
postconf)
 echo "postroll"
 ;;
postroll)
 echo "postconf"
 ;;
*)
 echo "/root/random postconf|postroll"
 ;;
esac
[root@server16 ~]#
```

.) chmod +x /root/random

```
File Edit View Search Terminal Tabs Help
root@server16:~
[root@server16 ~]# chmod +x /root/random
[root@server16 ~]#
```

.) /root/random postconf

output : postroll

```
File Edit View Search Terminal Tabs Help
root@server16:~
[root@server16 ~]# /root/random postconf
postroll
[root@server16 ~]#
```

.) /root/random postroll

output : postconf

```
File Edit View Search Terminal Tabs Help
root@server16:~
[root@server16 ~]# /root/random postroll
postconf
[root@server16 ~]#
```

.) /root/random [ without input ]

output : /root/random postconf | postroll

```
File Edit View Search Terminal Tabs Help
root@server16:~
[root@server16 ~]# /root/random
/root/random postconf|postroll
[root@server16 ~]#
```

.) /root/random sdbbsdb [ random input ]

```
File Edit View Search Terminal Tabs Help
root@server16:~
[root@server16 ~]# /root/random sdbbsdb
/root/random postconf|postroll
[root@server16 ~]#
```

## Creating users in Shell Script

Steps:

ssh root@serverX

.) vim /root/createusers

```
#!bin/bash
a=' '
case $@ in
 testfile)
 for user in $(cat $1)
 do
 echo "adding this user:" $user
 useradd -s /bin/false $user
 done
 ;;
 $a)
 echo "Usage: /root/createusers testfile"
 ;;
 *)
 echo "Input File Not Found"
 ;;
esac
:wq!
```

```
File Edit View Search Terminal Tabs Help
root@server16:~#
#!/bin/bash
a=''
case $@ in
testfile)
 for user in $(cat $1)
 do
 echo "adding this user:" $user
 useradd -s /bin/false $user
 done
 ;;
$a)
 echo "Usage: /root/createusers testfile"
;;
*)
 echo "Input File Not Found"
;;
esac
```

.) cat /root/createusers

```
File Edit View Search Terminal Tabs Help
root@server16:~[
[root@server16 ~]# vim /root/createusers
[root@server16 ~]#
[root@server16 ~]# cat /root/createusers
#!/bin/bash
a=''
case $@ in
testfile)
 for user in $(cat $1)
 do
 echo "adding this user:" $user
 useradd -s /bin/false $user
 done
 ;;
$a)
 echo "Usage: /root/createusers testfile"
;;
*)
 echo "Input File Not Found"
;;
esac
```

[root@server16 ~]# □

.) chmod +x /root/createusers

.) cat /etc/passwd

```
File Edit View Search Terminal Tabs Help
root@server16:~>
[root@server16 ~]# chmod +x /root/createusers
[root@server16 ~]#
[root@server16 ~]# cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
```

.) vim testfile

In vim

ram

hari

pavan

:wq!

```
File Edit View Search Terminal Tabs Help
root@server16:~>
[root@server16 ~]#
[root@server16 ~]# ram
[root@server16 ~]# hari
[root@server16 ~]# pavan
~_
~_
~_
```

.) cat testfile

```
File Edit View Search Terminal Tabs Help
root@server16:~
[root@server16 ~]# vim testfile
[root@server16 ~]#
[root@server16 ~]# cat testfile
ram
hari
pavan
[root@server16 ~]#
```

.) /root /createusers testfile

```
[root@server16 ~]# /root/createusers testfile
adding this user: ram
adding this user: hari
adding this user: pavan
[root@server16 ~]#
[root@server16 ~]#
```

.) cat /etc/passwd

```
ram:x:1001:1001::/home/ram:/bin/false
hari:x:1002:1002::/home/hari:/bin/false
pavan:x:1003:1003::/home/pavan:/bin/false
[root@server16 ~]#
```

.) /root/createusers

output : Usage: /root/createusers testfile

```
File Edit View Search Terminal Tabs Help
[root@server16:~]
[root@server16 ~]#
[root@server16 ~]# /root/createusers
Usage: /root/createusers testfile
[root@server16 ~]#
```

.) /root/createusers dhbdvav [ random input ]

output : Input File Not Found

```
File Edit View Search Terminal Tabs Help
[root@server16:~]
[root@server16 ~]#
[root@server16 ~]# /root/createusers
Usage: /root/createusers testfile
[root@server16 ~]#
[root@server16 ~]#
[root@server16 ~]#
[root@server16 ~]# /root/createusers dhbdvav
Input File Not Found
[root@server16 ~]#
```

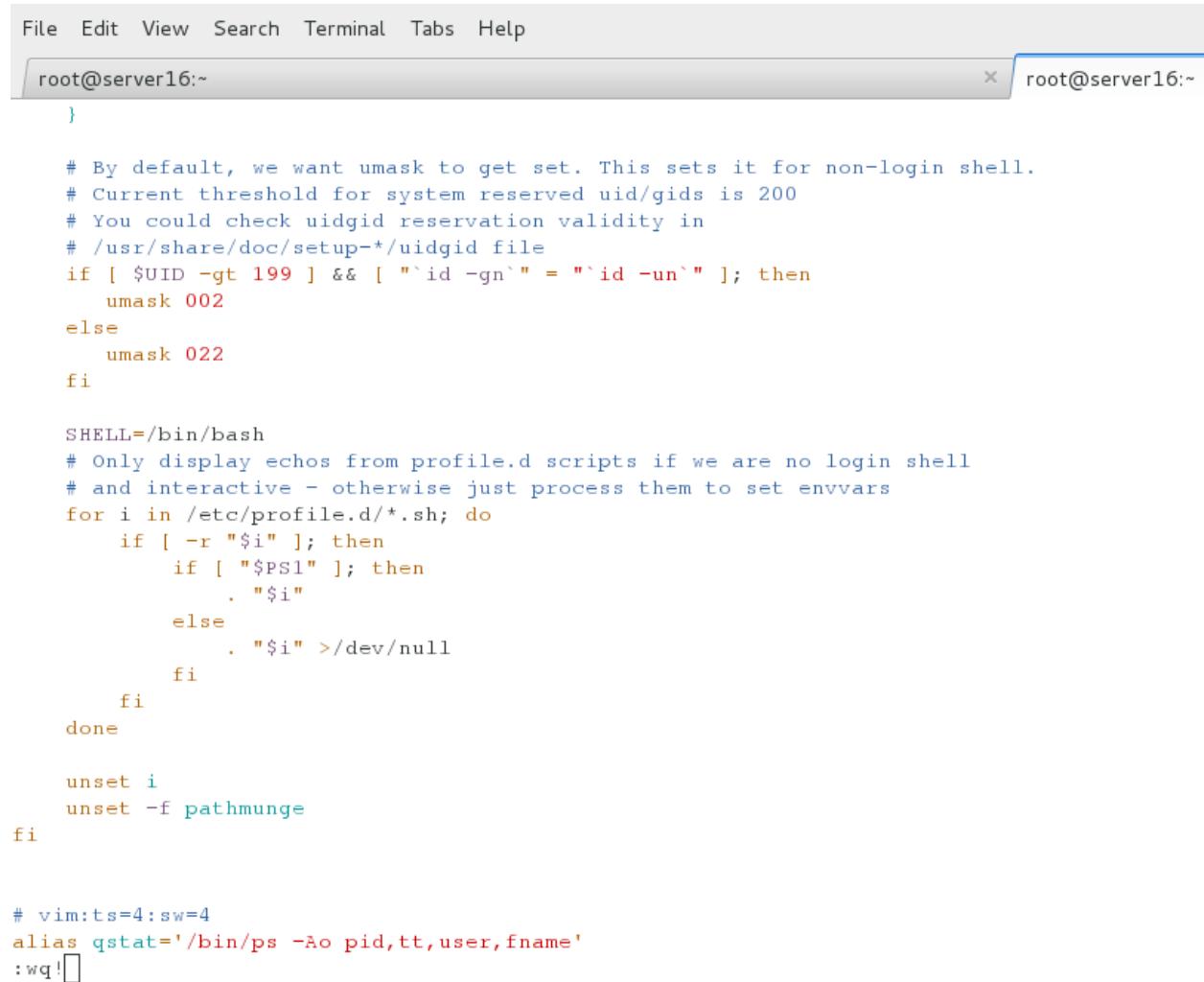
## Day 44

### Coustmising Environment

It is a important concept ,which is defined by environment variables. Some are set by the system, others by us, yet others by the shell, or any program that loads another program. A variable is a character string to which we assign a value.

Steps :

```
.) vim /etc/bashrc
alias qstat='/bin/ps -Ao pid,tt,user, fname'
:wq!
```



The screenshot shows a terminal window with a light gray background. At the top, there's a menu bar with options: File, Edit, View, Search, Terminal, Tabs, Help. Below the menu is a toolbar with icons for file operations. The main area of the terminal is a code editor displaying the contents of the /etc/bashrc file. The code is written in Bash script syntax. It includes comments explaining the default umask setting and the processing of profile.d scripts. The terminal title bar shows "root@server16:~".

```
File Edit View Search Terminal Tabs Help
root@server16:~ x root@server16:~
}

By default, we want umask to get set. This sets it for non-login shell.
Current threshold for system reserved uid/gids is 200
You could check uidgid reservation validity in
/usr/share/doc/setup-*/uidgid file
if [$UID -gt 199] && ["`id -gn`" = "`id -un`"]; then
 umask 002
else
 umask 022
fi

SHELL=/bin/bash
Only display echos from profile.d scripts if we are no login shell
and interactive - otherwise just process them to set envvars
for i in /etc/profile.d/*.sh; do
 if [-r "$i"]; then
 if ["$PS1"]; then
 . "$i"
 else
 . "$i" >/dev/null
 fi
 fi
done

unset i
unset -f pathmunge
fi

vim:ts=4:sw=4
alias qstat='/bin/ps -Ao pid,tt,user, fname'
:wq! █
```

```
.)source /etc/bashrc
{ changing or updevice }
.) qstat
```

The screenshot shows a terminal window with a light gray header bar containing the menu items: File, Edit, View, Search, Terminal, Tabs, Help. Below the header, the title bar displays "root@server16:~". The main area of the terminal shows the following command sequence and process listing:

```
[root@server16 ~]# vim /etc/bashrc
[root@server16 ~]# source /etc/bashrc
[root@server16 ~]#
[root@server16 ~]# qstat
 PID TT USER COMMAND
 1 ? root systemd
 2 ? root kthreadd
 3 ? root ksoftirq
 5 ? root kworker/
 7 ? root migratio
 8 ? root rcu_bh
 9 ? root rcuob/0
 10 ? root rcu_sche
 11 ? root rcuos/0
 12 ? root watchdog
 13 ? root khelper
 14 ? root kdevtmpf
 15 ? root netns
 16 ? root writebac
 17 ? root kintegri
 18 ? root bioset
 19 ? root kblockd
 20 ? root khubd
 21 ? root md
 24 ? root kswapd0
 25 ? root ksmld
 26 ? root khugepag
 27 ? root fsnotify
 28 ? root crypto
 37 ? root kthrotld
 39 ? root kmpath_r
 40 ? root kpsmouse
```

File Edit View Search Terminal Tabs Help

root@server16:~

x root@server16:~

```
1426 ttys0 root agetty
1434 ? gdm dbus-lau
1468 ? gdm dbus-dae
1472 ? gdm at-spi-b
1476 ? gdm dbus-dae
1481 ? gdm at-spi2-
1486 ? gdm gnome-se
1495 ? root upowerd
1547 ? gdm gnome-sh
1548 ? colord colord
1554 ? gdm pulseaud
1561 ? gdm dconf-se
1573 ? gdm ibus-dae
1578 ? gdm ibus-dco
1582 ? gdm ibus-xll
1594 ? gdm ibus-eng
1673 ? root kworker/
1675 ? gdm mission-
1683 ? gdm gnome-ke
1689 ? gdm goa-daem
29325 ? root sshd
29329 pts/0 root bash
29370 pts/0 root dbus-lau
29371 ? root dbus-dae
29375 ? root dconf-se
29879 ? root sshd
29884 pts/1 root bash
29944 ? root kworker/
30067 ? root kworker/
30184 ? root kworker/
30209 ? root sleep
30212 pts/1 root ps
[root@server16 ~]#
```

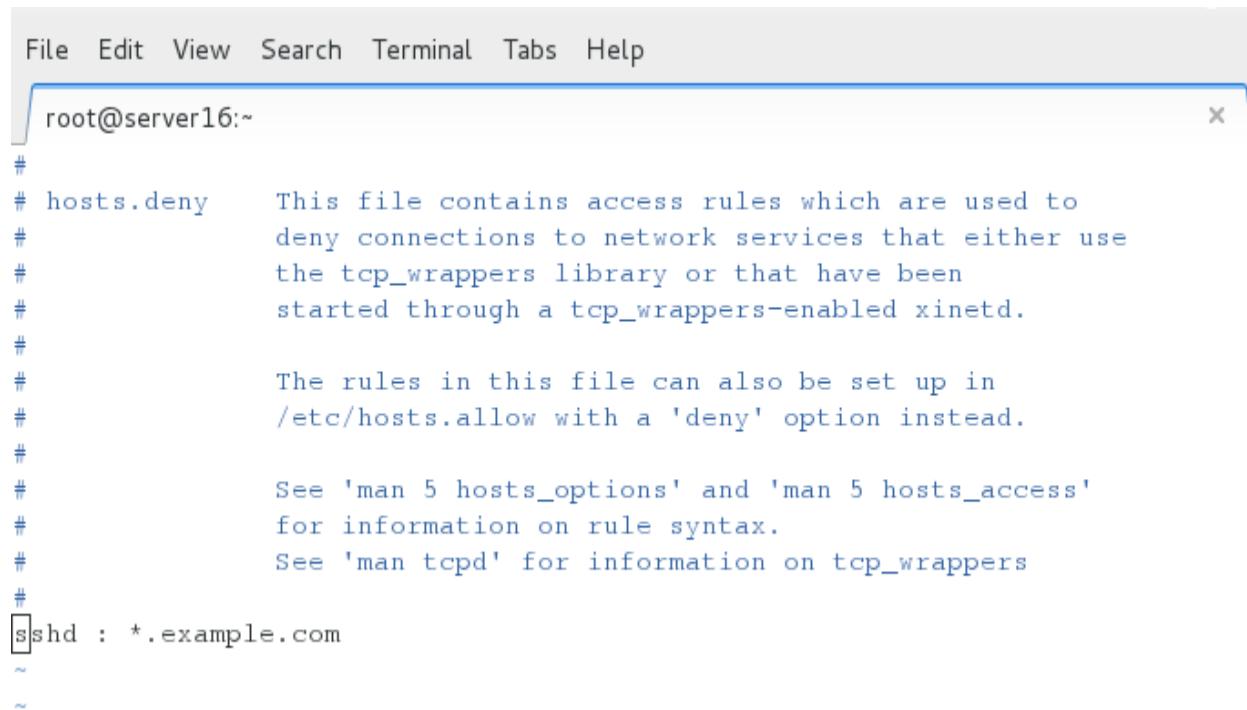
## TCP Wrappers

TCP Wrappers is a host-based networking ACL system, used to filter network access to Internet Protocol servers on operating systems such as Linux

Steps :

root@serverX

.) vim /etc/hosts.deny



The screenshot shows a terminal window with a menu bar at the top. The menu bar includes 'File', 'Edit', 'View', 'Search', 'Terminal', 'Tabs', and 'Help'. Below the menu bar, the title bar displays 'root@server16:~'. The main area of the terminal shows the contents of the /etc/hosts.deny file. The file contains several comments explaining its purpose and how it interacts with hosts.allow. At the bottom of the file, there is a single rule: 'sshd : \*.example.com'. The terminal window has a light gray background and a dark gray header bar.

```
File Edit View Search Terminal Tabs Help
root@server16:~
#
hosts.deny This file contains access rules which are used to
deny connections to network services that either use
the tcp_wrappers library or that have been
started through a tcp_wrappers-enabled xinetd.
#
The rules in this file can also be set up in
/etc/hosts.allow with a 'deny' option instead.
#
See 'man 5 hosts_options' and 'man 5 hosts_access'
for information on rule syntax.
See 'man tcpd' for information on tcp_wrappers
#
sshd : *.example.com
~
```

.) cat /etc/hosts.deny

```
File Edit View Search Terminal Tabs Help
root@server16:~#
[root@server16 ~]# vim /etc/hosts.deny
[root@server16 ~]#
[root@server16 ~]# cat /etc/hosts.deny
#
hosts.deny This file contains access rules which are used to
deny connections to network services that either use
the tcp_wrappers library or that have been
started through a tcp_wrappers-enabled xinetd.
#
The rules in this file can also be set up in
/etc/hosts.allow with a 'deny' option instead.
#
See 'man 5 hosts_options' and 'man 5 hosts_access'
for information on rule syntax.
See 'man tcpd' for information on tcp_wrappers
#
sshd : *.example.com
[root@server16 ~]#
```

.) mail -s “test mail for student” student@serverX

hi i this is test mails

```
File Edit View Search Terminal Tabs Help
student@server16:~# root@des
[root@server16 ~]# vim /etc/hosts.deny
[root@server16 ~]# mail -s "test mail for student" student@server16
hi this is test mails
EOT
```

.) su - student

.) mail

```
[root@server16 ~]# su - student
[student@server16 ~]$ mail
Heirloom Mail version 12.5 7/5/10. Type ? for help.
"/var/spool/mail/student": 1 message 1 new
>N 1 root Mon Dec 16 15:55 18/648 "test mail for student"
& 1
Message 1:
From root@server16.example.com Mon Dec 16 15:55:30 2019
Return-Path: <root@server16.example.com>
X-Original-To: student@server16
Delivered-To: student@server16.example.com
Date: Mon, 16 Dec 2019 15:55:30 +0530
To: student@server16.example.com
Subject: test mail for student
User-Agent: Heirloom mailx 12.5 7/5/10
Content-Type: text/plain; charset=us-ascii
From: root@server16.example.com (root)
Status: R

hi this is test mails

& □
```

.)In firefox classroom.example.com [ Check in Firefox ]



## Mail Server

Mail server is also known as mail transfer agent , In this we send or receive mail in a network with same domain name

Steps :

root@serverX

. ) systemctl status postfix.service

```
File Edit View Search Terminal Tabs Help
root@server15:~ [root@server15 ~]# systemctl status postfix.service
postfix.service - Postfix Mail Transport Agent
 Loaded: loaded (/usr/lib/systemd/system/postfix.service; enabled)
 Active: active (running) since Wed 2020-01-08 18:42:42 IST; 3min 11s ago
 Process: 1247 ExecStart=/usr/sbin/postfix start (code=exited, status=0/SUCCESS)
 Process: 1244 ExecStartPre=/usr/libexec/postfix/chroot-update (code=exited, status=0/SUCCESS)
 Process: 1138 ExecStartPre=/usr/libexec/postfix/aliasesdb (code=exited, status=0/SUCCESS)
 Main PID: 1388 (master)
 CGroup: /system.slice/postfix.service
 └─1388 /usr/libexec/postfix/master -w
 ├─1394 pickup -l -t unix -u
 ├─1395 qmgr -l -t unix -u

Jan 08 18:42:39 localhost systemd[1]: Starting Postfix Mail Transport Agent...
Jan 08 18:42:42 server15.example.com postfix/master[1388]: daemon started -- version 2.10.1, configuration /etc/postfix
Jan 08 18:42:42 server15.example.com systemd[1]: Started Postfix Mail Transport Agent.
[root@server15 ~]#
```

. ) lab smtp-nullclient setup

```
File Edit View Search Terminal Tabs Help
root@server15:~ [root@server15 ~]# lab smtp-nullclient setup
Setting up server machine...
Setting up mutt...
[root@server15 ~]#
```

## .) systemctl status postfix.service

```
File Edit View Search Terminal Tabs Help
root@server15:~ root@desktop15:~
[root@server15 ~]# systemctl status postfix.service
postfix.service - Postfix Mail Transport Agent
 Loaded: loaded (/usr/lib/systemd/system/postfix.service; enabled)
 Active: active (running) since Wed 2020-01-08 18:42:42 IST; 4min 34s ago
 Process: 1247 ExecStart=/usr/sbin/postfix start (code=exited, status=0/SUCCESS)
 Process: 1244 ExecStartPre=/usr/libexec/postfix/chroot-update (code=exited, status=0/SUCCESS)
 Process: 1138 ExecStartPre=/usr/libexec/postfix/aliasesdb (code=exited, status=0/SUCCESS)
 Main PID: 1388 (master)
 CGroup: /system.slice/postfix.service
 └─1388 /usr/libexec/postfix/master -w
 ├ 1394 pickup -l -t unix -u
 └─1395 qmgr -l -t unix -u

Jan 08 18:42:39 localhost systemd[1]: Starting Postfix Mail Transport Agent...
Jan 08 18:42:42 server15.example.com postfix/master[1388]: daemon started -- version 2.10.1, configuration /etc/postfix
Jan 08 18:42:42 server15.example.com systemd[1]: Started Postfix Mail Transport Agent.
[root@server15 ~]#
```

.) vim /etc/postfix/main.cf

```
File Edit View Search Terminal Tabs Help
root@server15:~#
[root@server15 ~]# vim /etc/postfix/main.cf
[root@server15 ~]#
```

```
File Edit View Search Terminal Tabs Help
root@server15:~
parameter also controls delivery of mail to user@[ip.address].
#
See also the proxy_interfaces parameter, for network addresses that
are forwarded to us via a proxy or network address translator.
#
Note: you need to stop/start Postfix when this parameter changes.
#
inet_interfaces = all
inet_interfaces = $myhostname
inet_interfaces = $myhostname, localhost
inet_interfaces = localhost

Enable IPv4, and IPv6 if supported
inet_protocols = all

The proxy_interfaces parameter specifies the network interface
addresses that this mail system receives mail on by way of a
proxy or network address translation unit. This setting extends
the address list specified with the inet_interfaces parameter.
#
You must specify your proxy/NAT addresses when your system is a
backup MX host for other domains, otherwise mail delivery loops
will happen when the primary MX host is down.
#
#proxy_interfaces =
#proxy_interfaces = 1.2.3.4

The mydestination parameter specifies the list of domains that this
machine considers itself the final destination for.
#
These domains are routed to the delivery agent specified with the
local_transport parameter setting. By default, that is the UNIX
```

inet\_interfaces = localhost [ change this ]

inet\_interfaces = loopback-only

File Edit View Search Terminal Tabs Help

```
root@server15:~
parameter also controls delivery of mail to user@[ip.address].

See also the proxy_interfaces parameter, for network addresses that
are forwarded to us via a proxy or network address translator.

Note: you need to stop/start Postfix when this parameter changes.

inet_interfaces = all
inet_interfaces = $myhostname
inet_interfaces = $myhostname, localhost
inet_interfaces = loopback-only

Enable IPv4, and IPv6 if supported
inet_protocols = all

The proxy_interfaces parameter specifies the network interface
addresses that this mail system receives mail on by way of a
proxy or network address translation unit. This setting extends
the address list specified with the inet_interfaces parameter.

You must specify your proxy/NAT addresses when your system is a
backup MX host for other domains, otherwise mail delivery loops
will happen when the primary MX host is down.

#proxy_interfaces =
#proxy_interfaces = 1.2.3.4

The mydestination parameter specifies the list of domains that this
machine considers itself the final destination for.

These domains are routed to the delivery agent specified with the
local_transport parameter setting. By default, that is the UNIX
-- INSERT --
```

```
File Edit View Search Terminal Tabs Help
root@server15:~#
mailq_path: The full pathname of the Postfix mailq command. This
is the Sendmail-compatible mail queue listing command.
#
mailq_path = /usr/bin/mailq.postfix

setgid_group: The group for mail submission and queue management
commands. This must be a group name with a numerical group ID that
is not shared with other accounts, not even with the Postfix account.
#
setgid_group = postdrop

html_directory: The location of the Postfix HTML documentation.
#
html_directory = no

manpage_directory: The location of the Postfix on-line manual pages.
#
manpage_directory = /usr/share/man

sample_directory: The location of the Postfix sample configuration files
This parameter is obsolete as of Postfix 2.1.
#
sample_directory = /usr/share/doc/postfix-2.10.1/samples

readme_directory: The location of the Postfix README files.
#
readme_directory = /usr/share/doc/postfix-2.10.1/README_FILES
mynetworks=127.0.0.0/8,[::1]/128
mydestination=
myorigin=desktop15.example.com
relayhost=[smtp15.example.com]
local_transport=error:local delivery disabled
:wq!□
```

in the last line

readme\_directory = /usr/share/doc/postfix-2.10.1/README\_FILES

mynetworks=127.0.0.0/8,[::1]/128

mydestination=

myorigin=desktop15.example.com

relayhost=[smtp15.example.com]

local\_transport=error:local delivery disabled

:wq!

.) vim /etc/postfix/main.cf

```
File Edit View Search Terminal Tabs Help
root@server15:~
[root@server15 ~]# vim /etc/postfix/main.cf
[root@server15 ~]#
```

root@desktopX

.) lab smtp-nullclient setup

```
File Edit View Search Terminal Tabs Help
root@server15:~ X root@de...
[root@desktop15 ~]# lab smtp-nullclient setup
Setting up desktop machine...
Setting up dovecot...
Generating new dovecot certificate...
Setting up postfix... Generating new postfix certificates...
Setting up firewall...
Setting up user student...
Installing httpd to share cert...
[root@desktop15 ~]#
```

root@serverX

.) systemctl restart postfix.service

.) systemctl status postfix.service

```
File Edit View Search Terminal Tabs Help
root@server15:~ X root@desktop15:~
[root@server15 ~]# systemctl restart postfix.service
[root@server15 ~]# systemctl status postfix.service
postfix.service - Postfix Mail Transport Agent
 Loaded: loaded (/usr/lib/systemd/system/postfix.service; enabled)
 Active: active (running) since Wed 2020-01-08 18:55:44 IST; 9s ago
 Process: 1825 ExecStop=/usr/sbin/postfix stop (code=exited, status=0/SUCCESS)
 Process: 1839 ExecStart=/usr/sbin/postfix start (code=exited, status=0/SUCCESS)
 Process: 1837 ExecStartPre=/usr/libexec/postfix/chroot-update (code=exited, status=0/SUCCESS)
 Process: 1834 ExecStartPre=/usr/libexec/postfix/aliasesdb (code=exited, status=0/SUCCESS)
 Main PID: 1911 (master)
 CGroup: /system.slice/postfix.service
 └─1911 /usr/libexec/postfix/master -w
 ├─1912 pickup -l -t unix -u
 ├─1913 qmgr -l -t unix -u

Jan 08 18:55:43 server15.example.com systemd[1]: Starting Postfix Mail Transport Agent...
Jan 08 18:55:44 server15.example.com postfix/master[1911]: daemon started -- version 2.10.1, configuration /etc/postfix
Jan 08 18:55:44 server15.example.com systemd[1]: Started Postfix Mail Transport Agent.
[root@server15 ~]#
```

.) mail -s "test mail null client setup" student@localhost

A screenshot of a terminal window with a blue header bar containing the menu items: File, Edit, View, Search, Terminal, Tabs, Help. Below the header is a grey input field containing the command: [root@server15 ~]# mail -s "test mail null client setup" student@localhost. The output of the command is displayed below the input field: This is a Test Mail EOT. The terminal prompt [root@server15 ~]# is visible at the bottom.

```
File Edit View Search Terminal Tabs Help
root@server15:~
[root@server15 ~]# mail -s "test mail null client setup" student@localhost
This is a Test Mail
EOT
[root@server15 ~]#
```

root@desktopX

.) mail

A screenshot of a terminal window with a blue header bar containing the menu items: File, Edit, View, Search, Terminal, Tabs, Help. Below the header is a grey input field containing the command: [root@desktop15 ~]# mail. The output of the command is displayed below the input field: No mail for root. The terminal prompt [root@desktop15 ~]# is visible at the bottom.

```
File Edit View Search Terminal Tabs Help
root@server15:~
[root@desktop15 ~]# mail
No mail for root
[root@desktop15 ~]#
```

root@serverX

.) yum install mutt -y

A screenshot of a terminal window with a blue header bar containing the menu items: File, Edit, View, Search, Terminal, Tabs, Help. Below the header is a grey input field containing the command: [root@server15 ~]# yum install mutt -y. The output of the command is displayed below the input field: Loaded plugins: langpacks. Package 5:mutt-1.5.21-26.el7.x86\_64 already installed and latest version. Nothing to do. The terminal prompt [root@server15 ~]# is visible at the bottom.

```
File Edit View Search Terminal Tabs Help
root@server15:~
[root@server15 ~]# yum install mutt -y
Loaded plugins: langpacks
Package 5:mutt-1.5.21-26.el7.x86_64 already installed and latest version
Nothing to do
[root@server15 ~]#
```

in mutt

.) [ YES / NO ] : yes

.) A to accept

```
File Edit View Search Terminal Tabs Help
root@server15:~ × r
q:Exit ?:Help
This certificate belongs to:
imap15.example.com postmaster@example.com

IMAP server

This certificate was issued by:
imap15.example.com postmaster@example.com

IMAP server

This certificate is valid
from Wed, 8 Jan 2020 13:24:42 UTC
to Thu, 7 Jan 2021 13:24:42 UTC
SHA1 Fingerprint: 52CF 1D4C 1C2E 3C29 4802 54CA 1E62 AAA3 E447 2AF2
MD5 Fingerprint: 2080 4242 CD8A DDCE A312 8EED A659 DA94

-- Mutt: SSL Certificate check (certificate 1 of 1 in chain)
(r)eject, accept (o)nce, (a)ccept always
```

canage user name root to student

user : student

password : student

```
File Edit View Search Terminal Tabs Help
root@server15:~ x ro
q:Exit ?:Help
This certificate belongs to:
imap15.example.com postmaster@example.com

IMAP server

This certificate was issued by:
imap15.example.com postmaster@example.com

IMAP server

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MD5 Fingerprint: 2080 4242 CD8A DDCE A312 8EED A659 DA94

-- Mutt: SSL Certificate check (certificate 1 of 1 in chain)
Username at imap15.example.com: root
```

```
File Edit View Search Terminal Tabs Help
root@server15:~ x
q:Exit ?:Help
This certificate belongs to:
imap15.example.com postmaster@example.com

IMAP server

This certificate was issued by:
imap15.example.com postmaster@example.com

IMAP server

This certificate is valid
from Wed, 8 Jan 2020 13:24:42 UTC
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MD5 Fingerprint: 2080 4242 CD8A DDCE A312 8EED A659 DA94

-- Mutt: SSL Certificate check (certificate 1 of 1 in chain)
Username at imap15.example.com: student
```

```
File Edit View Search Terminal Tabs Help
root@server15:~ x
q:Exit ? :Help
This certificate belongs to:
imap15.example.com postmaster@example.com

IMAP server

This certificate was issued by:
imap15.example.com postmaster@example.com

IMAP server

This certificate is valid
from Wed, 8 Jan 2020 13:24:42 UTC
to Thu, 7 Jan 2021 13:24:42 UTC
SHA1 Fingerprint: 52CF 1D4C 1C2E 3C29 4802 54CA 1E62 AAA3 E447 2AF2
MD5 Fingerprint: 2080 4242 CD8A DDCE A312 8EED A659 DA94

-- Mutt: SSL Certificate check (certificate 1 of 1 in chain)
Password for student@imap15.example.com:
```

After login we can see the mails

```
File Edit View Search Terminal Tabs Help
root@server15:~ x root@desktop15:~
j:Quit d:Del u:Undel r:Save m:Mail r:Reply g:Group l:Help
 1 N Jan 08 root (0.6K) test mail null client setup

--Mutt: imap://imap15.example.com/INBOX [Msgs:1 New:1 0.6K]---(date/date)----- (all) ---
```

Press enter to open

```
File Edit View Search Terminal Tabs Help
x root@server15:~ x root@desktop15:~
i.Bailt -PrevPg <Space> NextPg v.View Attachm d:Del r:Reply j:Next ?:Help
Date: Wed, 08 Jan 2020 18:57:41 +0530
From: root <root@desktop15.example.com>
To: student@localhost.example.com
Subject: test mail null client setup
User-Agent: Heirloom mailx 12.5 7/5/10

This is a Test Mail
```

```
W - 1/1: root test mail null client setup -- (all)
```

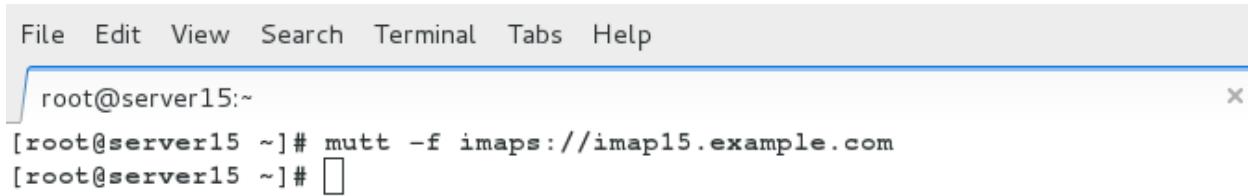
D to delete

```
File Edit View Search Terminal Tabs Help
x root@server15:~ x root@desktop15:~
i.Quit d:Del u:Undel s:Save m:Mail r:Reply g:Group ?:Help
1 D Jan 08 root (1) test mail null client setup

1< Mail: imap://imap15.example.com/INBOX [Msgs:1 Del:1 0.6K]---(date/date)----- (all) ---
Purge 1 deleted message? [(yes)/no]:
```

again check with

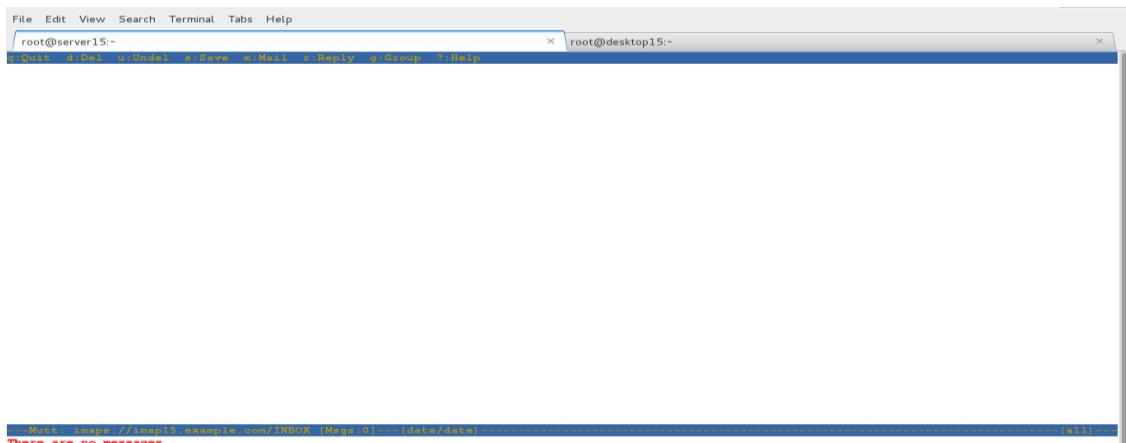
.) mutt -f imaps://imap15.example.com



File Edit View Search Terminal Tabs Help

[root@server15 ~]# mutt -f imaps://imap15.example.com

[root@server15 ~]#



File Edit View Search Terminal Tabs Help

[root@server15 ~]

[root@server15 ~]# mutt -f imaps://imap15.example.com

[root@server15 ~]#

root@desktop15:~

[root@desktop15 ~]

Mutt, imaps://imap15.example.com/INBOX (Msg:0)---(date/date)

There are no messages.

Right now there are no messages