Tasks

- Configure yum on server and client
- Perform the following:
    - Disable SELINUX
    - Verify the status of firewall and disable it.
    - Display:
        - Ip address
        - DNS address
        - Kernel version
        - Logged in username
        - Current working directory
        - Current runlevel
        - Currently mounted partitions
        - Size of /var (in human readable format).
        - Installed OS name
        - First process
        - Total memory and CPU information
        - Number of packages in /var/ftp/pub
        - Current working shell
- Create a volume group of 20gb by following the standard procedure and use this vg and create 2 LVMs with 12gb (of ext4 file system) and mount it at /std01 and 8gb with XFS file system and mount it at /std02.
- Extend the 8gb LVM to a total of 15gb by adding appropriate size and verify.
- Create a standard partition of 5gb with xfs file system and mount it on /shareddir.
- Create a directory in /shareddir and allow the following.
- RWX permission to owner and group.
- No read, no write and no execute permissions to others.
- Allow read only access to hr group (create hr group, if not present).
- Allow read-write access to sales group (create, if not done already).
- Verify ftp server and remove/uninstall ftp if already installed. Configure and access data using ftp.
- Create an http website using the following code:
    - <html>
    - <body bgcolor='pink'>
    - <h1 align='center'>
    - Hello demo
    - <h1 />
    - </body>
    - </html>
- Enable firewall and add the following port numbers and services to it and verify:
    - 80, 443, 22, 123, samba
- Use linux send mail server to send and receive email from it.
- Create a new directory /sambashare and access it on windows and verify if you are able to read and write the contents/files on it.
- Use NMTUI to change (on server and client):
- Hostname to server.ltimindtree.com

Task Solution - Configure yum on server and client

On server, go to “/etc/yum.repos.d” directory and configure the config file using configuration.

```
[root@server ~]# cd /etc/yum.repos.d/
[root@server yum.repos.d]# ls
ysbase.repo  ys.repo
[root@server yum.repos.d]#
```

Create 2 files and add below configuration to files individually.

“ysbase.repo”

```
[root@server yum.repos.d]# cat ysbase.repo
[baseyumserver]
name="baseyumserver"
baseurl=file:///var/ftp/pub/BaseOS
gpgcheck=0
enabled=1
[root@server yum.repos.d]#
```

“ys.repo”

```
[root@server yum.repos.d]# cat ys.repo
[yumserver]
name="yumserver"
baseurl=file:///var/ftp/pub/AppStream
gpgcheck=0
enabled=1
[root@server yum.repos.d]#
```

Run below command:

```
[root@server yum.repos.d]# yum clean all; yum repolist
13 files removed
repo id                                 repo name
baseyumserver                           baseyumserver
yumserver                               yumserver
[root@server yum.repos.d]#
```

Go to file /etc/selinux/config and edit line 22 and change it to “disabled”

```
14 # to persistently set the bootloader to boot with selinux=0:
15 #
16 #    grubby --update-kernel ALL --args selinux=0
17 #
18 # To revert back to SELinux enabled:
19 #
20 #    grubby --update-kernel ALL --remove-args selinux
21 #
22 SELINUX=disabled
```

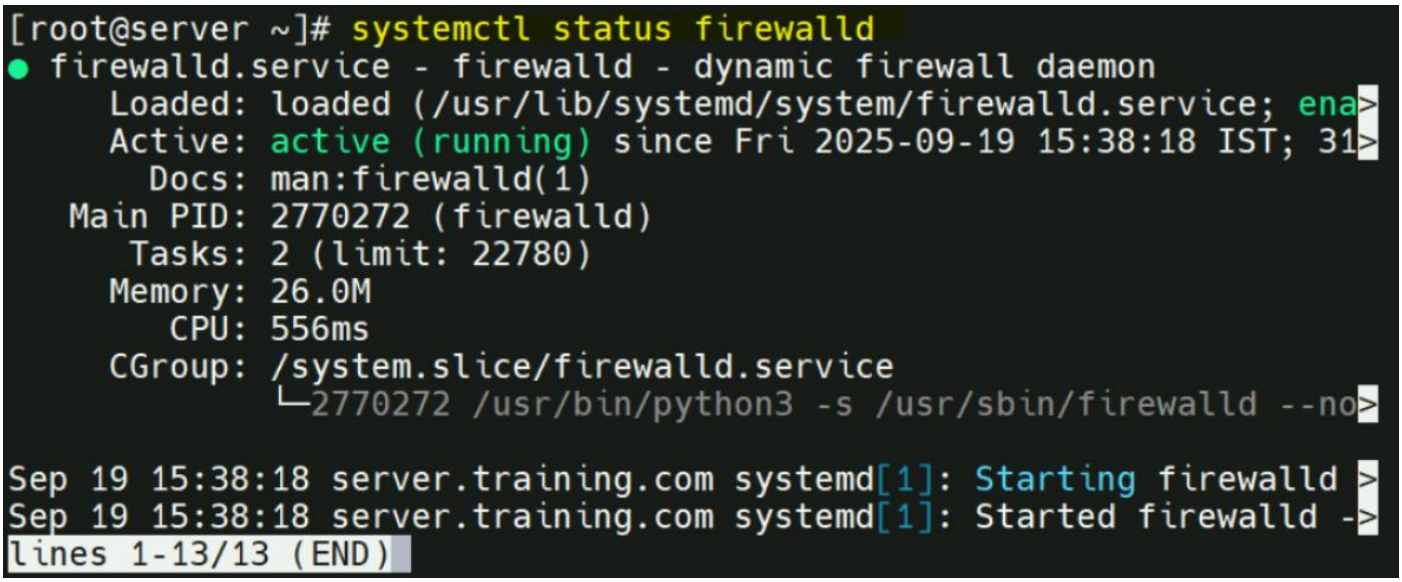
Save and quit, and reboot the server using “init 0” command.

And verify after reboot:

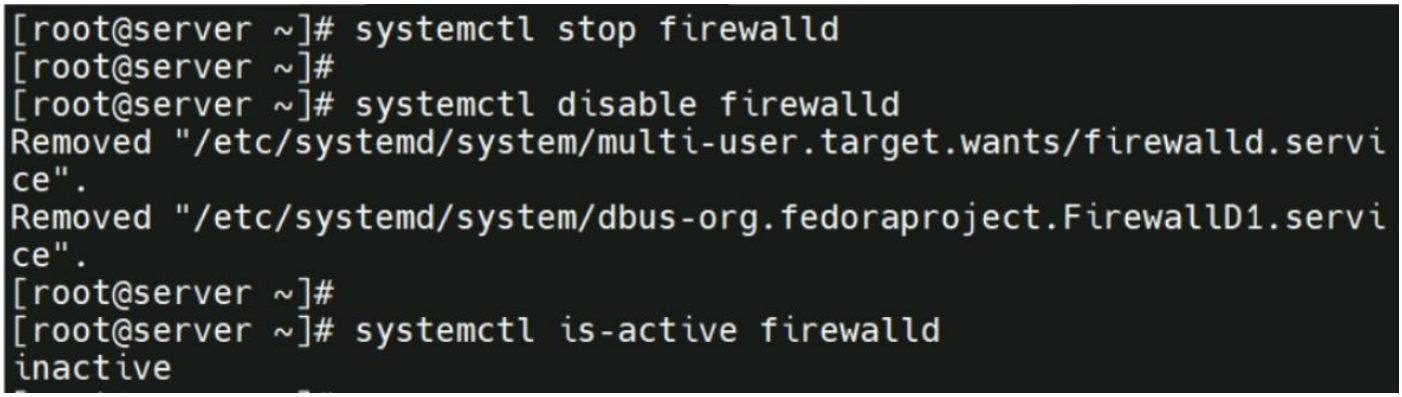
```
[root@server ~]# sestatus
SELinux status:                 disabled
[root@server ~]#
[root@server ~]# getenforce
Disabled
[root@server ~]#
[root@server ~]#
```

Task Solution - Verify the status of firewall and disable it.

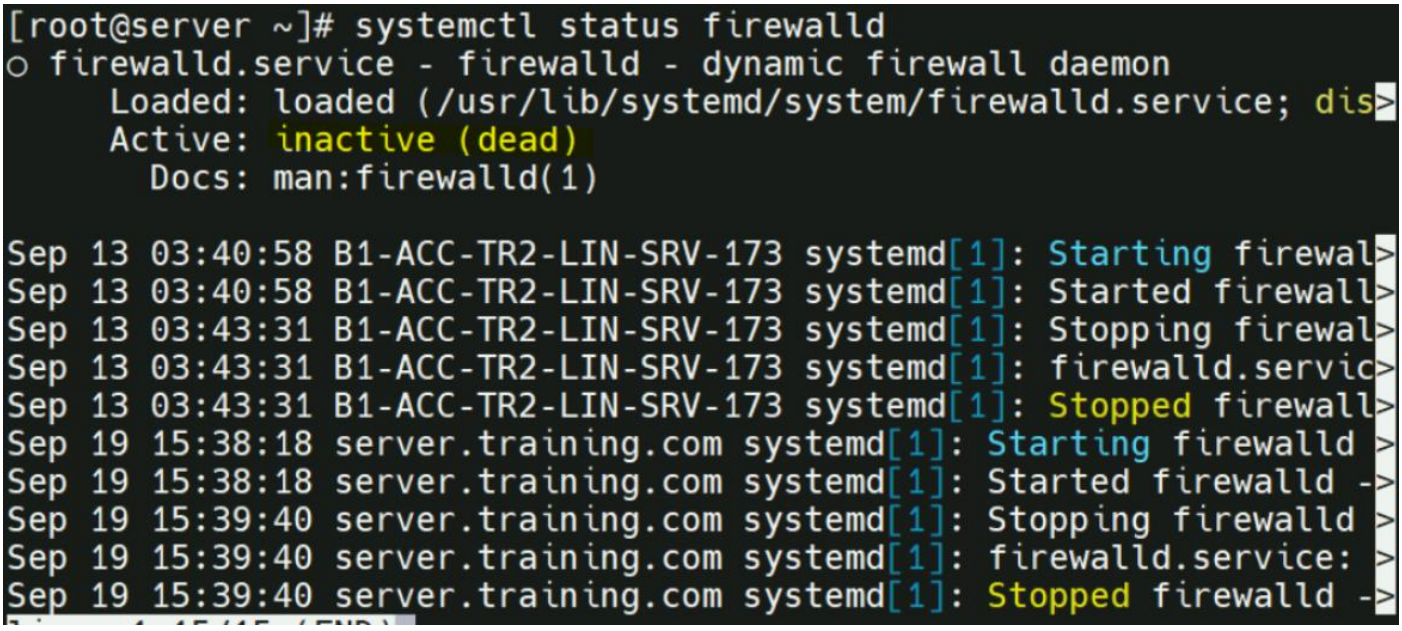
Checking current status:




Now, stopping and disabling firewall.




Checking status:



Hostname:

```
[root@server ~]# hostname
server.training.com
[root@server ~]#
```

DNS address

```
[root@server ~]# cat /etc/resolv.conf
# Generated by NetworkManager
search training.com
```

Kernel version

```
[root@server ~]# uname -r
5.14.0-583.el9.x86_64
```

Logged in username

```
[root@server ~]# whoami
root
[root@server ~]#
[root@server ~]# who
root     pts/0        2025-09-16 04:39 (172.22.53.195)
[root@server ~]#
[root@server ~]# w
 15:44:40 up 7 days,  3:57,  1 user,  load average: 0.11, 0.09, 0.04
USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
root     pts/0     Tue04    0.00s  0.50s  0.00s w
[root@server ~]#
```

Current working directory

```
[root@server ~]# pwd
/root
```

Current runlevel

```
[root@server ~]# runlevel
N 5
[root@server ~]#
[root@server ~]# systemctl get-default
graphical.target
[root@server ~]#
```

Currently mounted partitions

```
[root@server ~]# df -h
Filesystem            Size  Used Avail Use% Mounted on
devtmpfs              4.0M     0  4.0M   0% /dev
tmpfs                 1.8G     0  1.8G   0% /dev/shm
tmpfs                 725M   13M  712M   2% /run
/dev/mapper/cs-root    10G  4.5G  5.5G  46% /
/dev/sda1             2.0G  489M  1.5G  25% /boot
/dev/mapper/cs-home   5.0G   81M  4.9G   2% /home
/dev/mapper/cs-tmp    5.0G   68M  4.9G   2% /tmp
/dev/mapper/cs-var     20G   14G  6.4G  68% /var
/dev/sda2            1022M   16K 1022M   1% /boot/efi
tmpfs                 363M   52K  363M   1% /run/user/42
tmpfs                 363M   36K  363M   1% /run/user/0
/dev/mapper/vg-lv1    6.8G   24K  6.5G   1% /lvm1
/dev/mapper/vg-lv2     10G  104M  9.9G   2% /lvm2
```

Size of /var (in human readable format).

```
[root@server ~]# du -sh /var
14G     /var
```

Installed OS name

```
[root@server ~]# cat /etc/os-release
NAME="CentOS Stream"
VERSION="9"
ID="centos"
ID_LIKE="rhel fedora"
VERSION_ID="9"
PLATFORM_ID="platform:el9"
PRETTY_NAME="CentOS Stream 9"
ANSI_COLOR="0;31"
LOGO="fedora-logo-icon"
CPE_NAME="cpe:/o:centos:centos:9"
HOME_URL="https://centos.org/"
BUG_REPORT_URL="https://issues.redhat.com/"
REDHAT_SUPPORT_PRODUCT="Red Hat Enterprise Linux 9"
REDHAT_SUPPORT_PRODUCT_VERSION="CentOS Stream"
```

First process

```
[root@server ~]# pgrep systemd
1
657
669
884
1120
1303
[root@server ~]# pidof systemd
1309 1303 1127 1120 1
```

Total memory and CPU information

Memory:

```
[root@server ~]# free -h
              total        used        free      shared  buff/cache   available
Mem:           3.5Gi       993Mi       252Mi        18Mi       2.6Gi       2.6Gi
Swap:          4.0Gi       0.0Ki       4.0Gi
```

CPU:

```
[root@server ~]# lscpu
Architecture:             x86_64
  CPU op-mode(s):         32-bit, 64-bit
  Address sizes:          45 bits physical, 48 bits virtual
  Byte Order:             Little Endian
CPU(s):                   2
  On-line CPU(s) list:    0,1
Vendor ID:                GenuineIntel
  BIOS Vendor ID:         GenuineIntel
  Model name:             Intel(R) Xeon(R) Platinum 8173M CPU @ 2.00GHz
    BIOS Model name:      Intel(R) Xeon(R) Platinum 8173M CPU @ 2.00GHz
    CPU family:           6
    Model:                85
    Thread(s) per core:   1
    Core(s) per socket:   1
    Socket(s):            2
    Stepping:             4
    BogoMIPS:             3990.62
```

Number of packages in /var/ftp/pub

```
[root@server ~]# cd /var/ftp/pub/
[root@server pub]#
[root@server pub]# ls -R | grep .rpm | wc -l
7429
```

Current working shell

```
[root@server ~]# echo $SHELL
/bin/bash
```

Task Solution – Create a volume group of 20gb by following the standard procedure and use this vg and create 2 LVMs with 12gb (of ext4 file system) and mount it at /std01 and 8gb with XFS file system and mount it at /std02.

---

Listing current partitions (delete if any already existing):

```
[root@server ~]# lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sda           8:0    0   60G  0 disk
├─sda1        8:1    0    2G  0 part /boot
├─sda2        8:2    0    1G  0 part /boot/efi
└─sda3        8:3    0   44G  0 part
  ├─cs-root 253:0    0   10G  0 lvm  /
  ├─cs-swap 253:1    0    4G  0 lvm  [SWAP]
  ├─cs-tmp  253:2    0    5G  0 lvm  /tmp
  ├─cs-var  253:3    0   20G  0 lvm  /var
  └─cs-home 253:4    0    5G  0 lvm  /home
sdb           8:16   0   30G  0 disk
sdc           8:32   0   30G  0 disk
sr0          11:0    1 1024M  0 rom
```

Creating volume group (VG) of 20GB:

```
[root@server ~]# fdisk /dev/sdb

Welcome to fdisk (util-linux 2.37.4).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.


Command (m for help): n
Partition type
   p   primary (0 primary, 0 extended, 4 free)
   e   extended (container for logical partitions)
Select (default p):

Using default response p.
Partition number (1-4, default 1):
First sector (2048-62914559, default 2048):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-62914559, default 62914559):
 +10G

Created a new partition 1 of type 'Linux' and of size 10 GiB.

Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.
```

Similarly for /dev/sdc

```
[root@server ~]# lsblk /dev/sdb /dev/sdc
NAME   MAJ:MIN RM SIZE RO TYPE MOUNTPOINTS
sdb      8:16   0  30G  0 disk
└─sdb1   8:17   0  10G  0 part
sdc      8:32   0  30G  0 disk
└─sdc1   8:33   0  10G  0 part
```

Verify VG:

```
[root@server ~]# pvcreate /dev/sdb1 /dev/sdc1
  Physical volume "/dev/sdb1" successfully created.
  Physical volume "/dev/sdc1" successfully created.
[root@server ~]#
[root@server ~]# vgcreate vg /dev/sdb1 /dev/sdc1
  Volume group "vg" successfully created
[root@server ~]#
[root@server ~]# vgs
  VG #PV #LV #SN Attr   VSize  VFree
  cs   1   5   0 wz--n- 44.00g  4.00m
  vg   2   0   0 wz--n- 19.99g 19.99g
```

Display default LV:

```
[root@server ~]# lvs
  LV   VG Attr       LSize  Pool Origin Data%  Meta%  Move Log Cpy%Sync Co
nvert
  home cs -wi-ao----  5.00g

  root cs -wi-ao---- 10.00g

  swap cs -wi-ao----  4.00g

  tmp  cs -wi-ao----  5.00g

  var  cs -wi-ao---- 20.00g
```

Creating logical volumes (LV)

```
[root@server ~]# lvcreate -n lv1 -L +12G vg
WARNING: ext4 signature detected on /dev/vg/lv1 at offset 1080. Wipe it? [
y/n]: y
  Wiping ext4 signature on /dev/vg/lv1.
  Logical volume "lv1" created.
[root@server ~]#
[root@server ~]# lvcreate -n lv2 -l 100%FREE vg
WARNING: xfs signature detected on /dev/vg/lv2 at offset 0. Wipe it? [y/n]
: y
  Wiping xfs signature on /dev/vg/lv2.
  Logical volume "lv2" created.
[root@server ~]#
[root@server ~]#
```

Creating EXT4 file system:

```
[root@server ~]# mkfs.ext4 /dev/vg/lv1
mke2fs 1.46.5 (30-Dec-2021)
Discarding device blocks: done
Creating filesystem with 3145728 4k blocks and 786432 inodes
Filesystem UUID: d5bab6c8-d105-4722-a607-bbb44c7e4265
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 265
4208

Allocating group tables: done
Writing inode tables: done
Creating journal (16384 blocks): done
Writing superblocks and filesystem accounting information: done
```

Creating XFS file system:

```
[root@server ~]# mkfs.xfs /dev/vg/lv2
meta-data=/dev/vg/lv2            isize=512    agcount=4, agsize=523776 blk
s
         =                       sectsz=512   attr=2, projid32bit=1
         =                       crc=1        finobt=1, sparse=1, rmapbt=0
         =                       reflink=1    bigtime=1 inobtcount=1 nrext
64=0
data     =                       bsize=4096   blocks=2095104, imaxpct=25
         =                       sunit=0      swidth=0 blks
naming   =version 2              bsize=4096   ascii-ci=0, ftype=1
log      =internal log           bsize=4096   blocks=16384, version=2
         =                       sectsz=512   sunit=0 blks, lazy-count=1
realtime =none                   extsz=4096   blocks=0, rtextents=0
Discarding blocks...Done.
```

Creating directories for mounting the LVM:

```
[root@server ~]# mkdir    /std01    /std02
```

Mounting:

```
[root@server ~]# mount  /dev/vg/lv1 /std01
[root@server ~]#
[root@server ~]# mount  /dev/vg/lv2 /std02
```

Verify:

```
[root@server ~]# df -hT /std01  /std02
Filesystem          Type  Size  Used Avail Use% Mounted on
/dev/mapper/vg-lv1 ext4    12G   24K   12G   1% /std01
/dev/mapper/vg-lv2 xfs    8.0G   89M  7.9G   2% /std02
```

Task Solution – Extend the 8gb LVM to a total of 15gb by adding appropriate size and verify.

Create another 15GB partitions and mounting it to LVM with 8GB.

Listing current partitions:

```
[root@server ~]# lsblk /dev/sdb
NAME        MAJ:MIN RM SIZE RO TYPE MOUNTPOINTS
sdb           8:16   0  30G  0 disk
└─sdb1        8:17   0  10G  0 part
  └─vg-lv1 253:5    0  12G  0 lvm  /std01
```

Creating 15GB partition:

```
[root@server ~]# fdisk /dev/sdb

Welcome to fdisk (util-linux 2.37.4).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

This disk is currently in use - repartitioning is probably a bad idea.
It's recommended to umount all file systems, and swapoff all swap
partitions on this disk.


Command (m for help): n
Partition type
   p   primary (1 primary, 0 extended, 3 free)
   e   extended (container for logical partitions)
Select (default p):

Using default response p.
Partition number (2-4, default 2):
First sector (20973568-62914559, default 20973568):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (20973568-62914559, default
62914559): +15G

Created a new partition 2 of type 'Linux' and of size 15 GiB.

Command (m for help): w
The partition table has been altered.
Syncing disks.
```

```
[root@server ~]# lsblk /dev/sdb
NAME        MAJ:MIN RM SIZE RO TYPE MOUNTPOINTS
sdb           8:16   0  30G  0 disk
├─sdb1        8:17   0  10G  0 part
│ └─vg-lv1 253:5    0  12G  0 lvm  /std01
└─sdb2        8:18   0  15G  0 part
```

Creating PV for this partition:

```
[root@server ~]# pvcreate /dev/sdb2
  Physical volume "/dev/sdb2" successfully created.
```

Extending existing VG:

```
[root@server ~]# vgextend vg /dev/sdb2
  Volume group "vg" successfully extended
[root@server ~]#
[root@server ~]# vgs vg
  VG #PV #LV #SN Attr   VSize   VFree
  vg   3   2   0 wz--n- <34.99g <15.00g
```

Extending current LV and growing the filesystem:

```
[root@server ~]# lvextend -l +100%FREE /dev/vg/lv2
  Size of logical volume vg/lv2 changed from 7.99 GiB (2046 extents) to <22.99 GiB (588
5 extents).
  Logical volume vg/lv2 successfully resized.
[root@server ~]#
[root@server ~]# xfs_growfs /std02
meta-data=/dev/mapper/vg-lv2     isize=512    agcount=4, agsize=523776 blks
         =                       sectsz=512   attr=2, projid32bit=1
         =                       crc=1        finobt=1, sparse=1, rmapbt=0
         =                       reflink=1    bigtime=1 inobtcount=1 nrext64=0
data     =                       bsize=4096   blocks=2095104, imaxpct=25
         =                       sunit=0      swidth=0 blks
naming   =version 2              bsize=4096   ascii-ci=0, ftype=1
log      =internal log           bsize=4096   blocks=16384, version=2
         =                       sectsz=512   sunit=0 blks, lazy-count=1
realtime =none                   extsz=4096   blocks=0, rtextents=0
data blocks changed from 2095104 to 6026240
[root@server ~]# df -hT /std02
Filesystem         Type  Size  Used Avail Use% Mounted on
/dev/mapper/vg-lv2 xfs    23G  197M   23G   1% /std02
```

```
[root@server ~]# df -hT | tail -2
/dev/mapper/vg-lv1  ext4       12G   24K   12G   1% /std01
/dev/mapper/vg-lv2  xfs        23G  197M   23G   1% /std02
```

Task Solution – Create a standard partition of 5gb with XFS file system and mount it on /shareddir.

Creating a new 5GB partition:

```
[root@server ~]# fdisk /dev/sdc

Welcome to fdisk (util-linux 2.37.4).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

This disk is currently in use - repartitioning is probably a bad idea.
It's recommended to umount all file systems, and swapoff all swap
partitions on this disk.


Command (m for help): n
Partition type
   p   primary (1 primary, 0 extended, 3 free)
   e   extended (container for logical partitions)
Select (default p):

Using default response p.
Partition number (2-4, default 2):
First sector (20973568-62914559, default 20973568):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (20973568-62914559, default 62914559): +5G

Created a new partition 2 of type 'Linux' and of size 5 GiB.

Command (m for help): w
The partition table has been altered.
Syncing disks.
```

Verify:

```
[root@server ~]# lsblk /dev/sdc
NAME       MAJ:MIN RM SIZE RO TYPE MOUNTPOINTS
sdc          8:32   0  30G  0 disk
├─sdc1       8:33   0  10G  0 part
│ ├─vg-lv1 253:5    0  12G  0 lvm  /std01
│ └─vg-lv2 253:6    0  23G  0 lvm  /std02
└─sdc2       8:34   0   5G  0 part
```

Creating XFS file system and mount point:

```
[root@server ~]# mkfs.xfs /dev/sdc2
meta-data=/dev/sdc2              isize=512    agcount=4, agsize=327680 blks
         =                       sectsz=512   attr=2, projid32bit=1
         =                       crc=1        finobt=1, sparse=1, rmapbt=0
         =                       reflink=1    bigtime=1 inobtcount=1 nrext64=0
data     =                       bsize=4096   blocks=1310720, imaxpct=25
         =                       sunit=0      swidth=0 blks
naming   =version 2              bsize=4096   ascii-ci=0, ftype=1
log      =internal log           bsize=4096   blocks=16384, version=2
         =                       sectsz=512   sunit=0 blks, lazy-count=1
realtime =none                   extsz=4096   blocks=0, rtextents=0
Discarding blocks...
Done.
[root@server ~]#
[root@server ~]# mkdir /sharedDir
```

Verify:

```
[root@server ~]# mount /dev/sdc2  /sharedDir
[root@server ~]# df -hT /sharedDir
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sdc2      xfs   5.0G   68M  4.9G   2% /sharedDir
```

Task Solution – Create a directory in /shareddir and allow the following.

- RWX permission to owner and group.
- No read, no write and no execute permissions to others.
- Allow read only access to hr group (create hr group, if not present).
- Allow read-write access to sales group (create, if not done already).

---

RWX permission to owner and group & No read, no write and no execute permissions to others.

```
[root@server ~]# ls -ld /sharedDir
drwxr-xr-x 2 root root 6 Sep 19 16:38 /sharedDir
[root@server ~]#
[root@server ~]# chmod 770 /sharedDir
[root@server ~]# ls -ld /sharedDir
drwxrwx--- 2 root root 6 Sep 19 16:38 /sharedDir
```

Checking and creating HR & sales groups:

```
[root@server ~]# cat /etc/group | grep HR
[root@server ~]# cat /etc/group | grep sales
[root@server ~]#
[root@server ~]# groupadd HR
[root@server ~]# groupadd sales
[root@server ~]#
[root@server ~]# cat /etc/group | grep HR
HR:x:5016:
[root@server ~]# cat /etc/group | grep sales
sales:x:5017:
```

Current permissions:

```
[root@server ~]# ls -ld /sharedDir
drwxrwx--- 2 root root 6 Sep 19 16:38 /sharedDir
[root@server ~]#
[root@server ~]# getfacl  /sharedDir
getfacl: Removing leading '/' from absolute path names
# file: sharedDir
# owner: root
# group: root
user::rwx
group::rwx
other::---
```

Applying ACL:

```
[root@server ~]# getfacl  /sharedDir
getfacl: Removing leading '/' from absolute path names
# file: sharedDir
# owner: root
# group: root
user::rwx
group::rwx
other::---

[root@server ~]# setfacl -m g:HR:r-- /sharedDir
[root@server ~]# setfacl -m g:sales:rw- /sharedDir
[root@server ~]# getfacl  /sharedDir
getfacl: Removing leading '/' from absolute path names
# file: sharedDir
# owner: root
# group: root
user::rwx
group::rwx
group:HR:r--
group:sales:rw-
mask::rwx
other::---
```

Enable firewall and add the following port numbers and services (80, 443, 22, 123, samba) to it and verify:

Enabling, starting and checking status if firewall is ON or NOT.

```
[root@server ~]# systemctl enable firewalld
Created symlink /etc/systemd/system/dbus-org.fedoraproject.FirewallD1.service → /usr/li
b/systemd/system/firewalld.service.
Created symlink /etc/systemd/system/multi-user.target.wants/firewalld.service → /usr/li
b/systemd/system/firewalld.service.
[root@server ~]#
[root@server ~]# systemctl start firewalld
[root@server ~]# systemctl status firewalld
● firewalld.service - firewalld - dynamic firewall daemon
     Loaded: loaded (/usr/lib/systemd/system/firewalld.service; enabled; preset: enabl>
     Active: active (running) since Fri 2025-09-19 17:59:35 IST; 3s ago
       Docs: man:firewalld(1)
   Main PID: 2821063 (firewalld)
      Tasks: 2 (limit: 22780)
     Memory: 23.1M
        CPU: 530ms
     CGroup: /system.slice/firewalld.service
             └─2821063 /usr/bin/python3 -s /usr/sbin/firewalld --nofork --nopid
```

Checking all default firewall entries:

```
[root@server ~]# firewall-cmd --list-all
public (active)
  target: default
  icmp-block-inversion: no
  interfaces: ens160
  sources:
  services: cockpit dhcpv6-client ssh
  ports:
  protocols:
  forward: yes
  masquerade: no
  forward-ports:
  source-ports:
  icmp-blocks:
  rich rules:
[root@server ~]#
```

Adding all firewall ports and services and restarting firewall.

```
[root@server ~]# firewall-cmd --add-port=80/tcp --permanent
success
[root@server ~]# firewall-cmd --add-port=443/tcp --permanent
success
[root@server ~]# firewall-cmd --add-port=22/tcp --permanent
success
[root@server ~]# firewall-cmd --add-port=123/tcp --permanent
success
[root@server ~]# firewall-cmd --add-service=samba --permanent
success
[root@server ~]# firewall-cmd --reload
success
[root@server ~]# firewall-cmd --list-all
public (active)
  target: default
  icmp-block-inversion: no
  interfaces: ens160
  sources:
  services: cockpit dhcpv6-client samba ssh
  ports: 80/tcp 443/tcp 22/tcp 123/tcp
  protocols:
  forward: yes
```