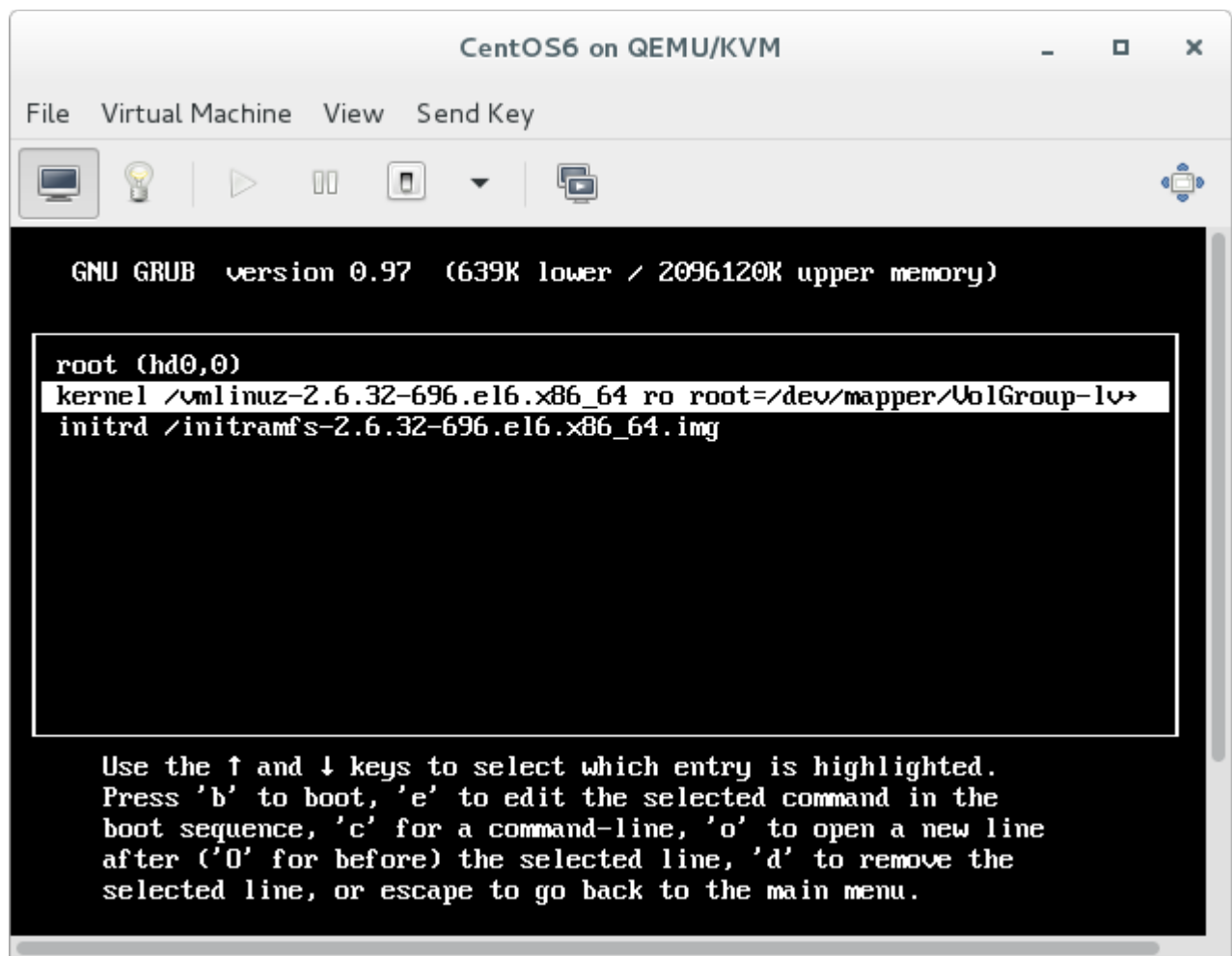# Linux Admin Exam
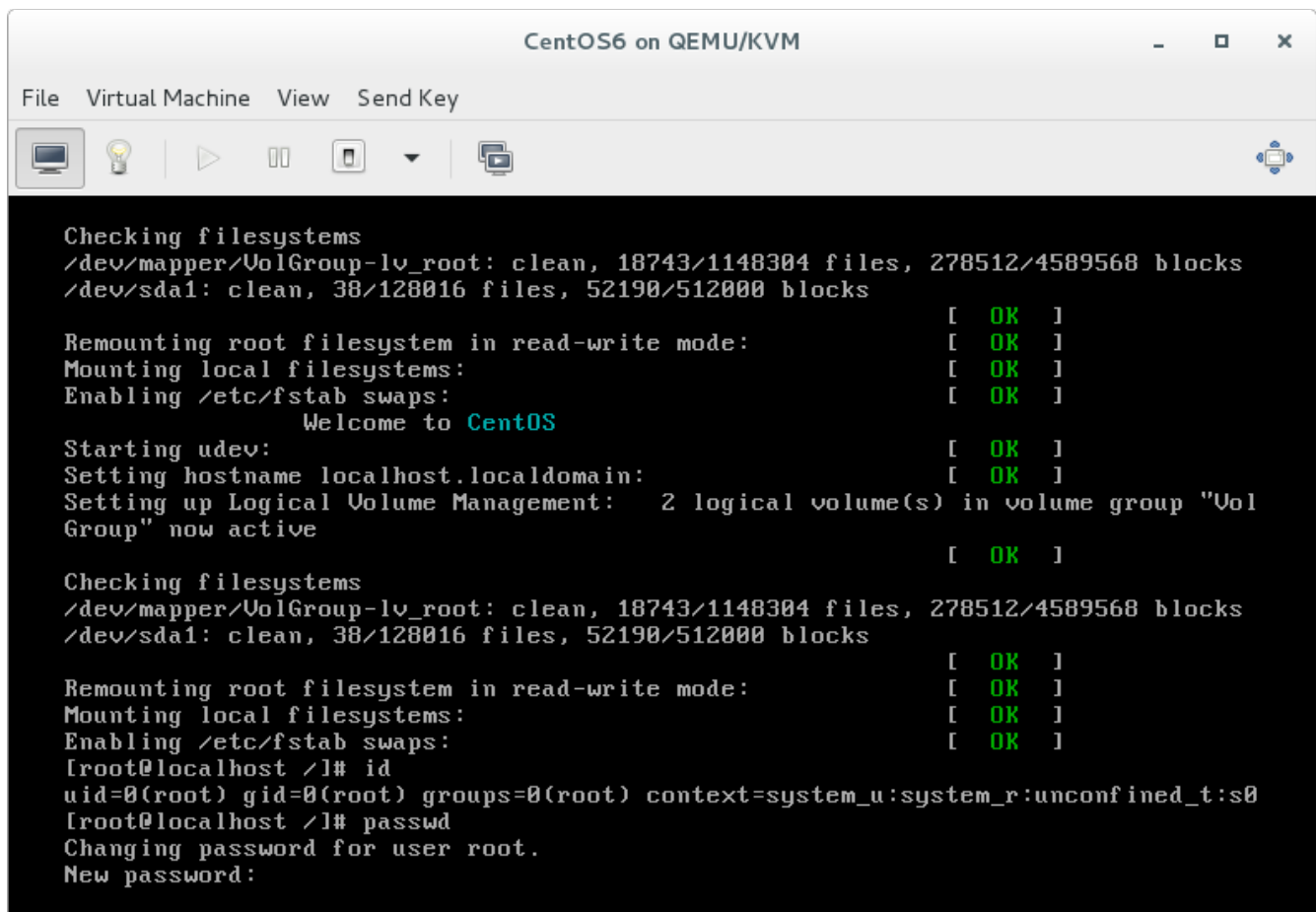
Certification Project

Question 1: Reset root password as "Linux_Exam" CentOS6

Boot in runlevel 1 (Single user mode)

There may be times when a system administrator may need to operate the system at a lower runlevel to perform diagnostic tasks, like changing root password in runlevel 1.

Question 2: Configure network in your system as following:
Set hostname as squid.prjlinux.com, IP as 192.168.0.199 and Netmask – 255.255.255.0

[root@localhost ~]#
[root@localhost ~]# **nmtui**
[root@localhost ~]#

```
                 root@squid:~      _  □  ×
   File  Edit  View  Search  Terminal  Help


              ┌──┤ NetworkManager TUI ├──┐

               Please select an option

               ┌──────────────────────┐
               │Edit a connection     │
               Activate a connection
               Set system hostname

               Quit

                                  <OK>

```

[root@localhost ~]#
[root@squid ~]# **cat /etc/sysconfig/network-scripts/ifcfg-enp0s25**
TYPE=Ethernet
BOOTPROTO=static
DEFROUTE=yes
IPV4_FAILURE_FATAL=no
IPV6INIT=no
IPV6_AUTOCONF=yes
IPV6_DEFROUTE=yes
IPV6_PEERDNS=yes
IPV6_PEERROUTES=yes
IPV6_FAILURE_FATAL=no
IPV6_ADDR_GEN_MODE=stable-privacy
NAME=enp0s25
UUID=9af4f091-a0a5-43af-89f1-d64a58a11c6a
DEVICE=enp0s25
ONBOOT=yes
IPADDR=192.168.0.199
PREFIX=24
[root@squid ~]#
[root@squid ~]#
[root@squid ~]# **hostname**
squid.prjlinux.com
[root@squid ~]#
[root@squid ~]#

```
[root@squid ~]# ifconfig enp0s25
enp0s25: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 192.168.0.199  netmask 255.255.255.0  broadcast 192.168.0.255
        ether 00:21:cc:ca:cf:d3  txqueuelen 1000  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
        device interrupt 20  memory 0xf3900000-f3920000

[root@squid ~]#
```

Question 3: Create a user linus with UID 1200 and group with GID 1020.

```
[root@localhost ~]#
[root@localhost ~]# groupadd -g 1020 linusGroup
[root@localhost ~]#
[root@localhost ~]# grep linus /etc/group
linusGroup:x:1020:
[root@localhost ~]#
[root@localhost ~]# gpasswd linusGroup
Changing the password for group linusGroup
New Password:
Re-enter new password:
[root@localhost ~]#
[root@localhost ~]# grep linus /etc/gshadow
linusGroup:
$6$lyypPXQRLN$YNUoApnmWDaM8bK4vpIg/2OaRB/JwjSmStOeAzUfkznL5owD79taSGm4O5Y
JER7SBUBhy8dejM7fFH6lbXddf0::
[root@localhost ~]#
[root@localhost ~]# grep linus /etc/passwd
[root@localhost ~]#
[root@localhost ~]# useradd -u 1200 -g linusGroup linus
[root@localhost ~]#
[root@localhost ~]# grep linus /etc/passwd
linus:x:1200:1020::/home/linus:/bin/bash
[root@localhost ~]#
[root@localhost ~]# groups linus
linus : linusGroup
[root@localhost ~]#
[root@localhost ~]# passwd linus
Changing password for user linus.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
```

[root@localhost ~]#
[root@localhost ~]# **grep linus /etc/shadow**
linus:
6vFDt9eVf$FG0lr9i9yP79Nc4blRpi2n3.oIkQjZF1IKyjzscWi16OTAWCkxXN0.Z.kCLt.BKGoiyo2e
NPmzumv/Poq05pn0:17318:0:99999:7:::
[root@localhost ~]#

Question 4 : Create three empty files file1 file2 file3 under the directory /container.

[root@localhost ~]#
[root@localhost ~]# **mkdir /container**
[root@localhost ~]#
[root@localhost ~]# **ls -lhd /container/**
drwxr-xr-x. 2 root root 4.0K Jun 1 10:37 /container/
[root@localhost ~]#
[root@localhost ~]# **touch /container/file1 /container/file2 /container/file3**
[root@localhost ~]#
[root@localhost ~]# **ls -lRh /container/**
/container/:
total 0
-rw-r--r--. 1 root root 0 Jun 1 10:39 file1
-rw-r--r--. 1 root root 0 Jun 1 10:39 file2
-rw-r--r--. 1 root root 0 Jun 1 10:39 file3
[root@localhost ~]#

Question 5 : Change the ownership for a directory /container recursively as linus.

[root@localhost ~]#
[root@localhost ~]# **chown -R linus /container/**
[root@localhost ~]#
[root@localhost ~]# **chgrp -R linusGroup /container/**
[root@localhost ~]#
[root@localhost ~]# **ls -lRh /container**
/container:
total 0
-rw-r--r--. 1 linus linusGroup 0 Jun 1 10:39 file1
-rw-r--r--. 1 linus linusGroup 0 Jun 1 10:39 file2
-rw-r--r--. 1 linus linusGroup 0 Jun 1 10:39 file3
[root@localhost ~]#

Question 6 : Create a file as info and this file should be created automatically when a user is added.

[root@localhost ~]#
[root@localhost ~]# **cat /etc/default/useradd**

```
# useradd defaults file
GROUP=100
HOME=/home
INACTIVE=-1
EXPIRE=
SHELL=/bin/bash
SKEL=/etc/skel
CREATE_MAIL_SPOOL=yes

[root@localhost ~]#
[root@localhost ~]# ls -lha /etc/skel/
total 32K
drwxr-xr-x.   3 root root 4.0K May 26 21:26 .
drwxr-xr-x. 145 root root  12K Jun  1 07:33 ..
-rw-r--r--.   1 root root   18 Aug  2  2016 .bash_logout
-rw-r--r--.   1 root root  193 Aug  2  2016 .bash_profile
-rw-r--r--.   1 root root  231 Aug  2  2016 .bashrc
drwxr-xr-x.   4 root root 4.0K May 26 21:26 .mozilla
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# echo "This file is created when a user is added" > /etc/skel/fileAutoCreated
[root@localhost ~]#
[root@localhost ~]# ls -lah /etc/skel/
total 36K
drwxr-xr-x.   3 root root 4.0K Jun  1 10:50 .
drwxr-xr-x. 145 root root  12K Jun  1 10:31 ..
-rw-r--r--.   1 root root   18 Aug  2  2016 .bash_logout
-rw-r--r--.   1 root root  193 Aug  2  2016 .bash_profile
-rw-r--r--.   1 root root  231 Aug  2  2016 .bashrc
-rw-r--r--.   1 root root   42 Jun  1 10:50 fileAutoCreated
drwxr-xr-x.   4 root root 4.0K May 26 21:26 .mozilla
[root@localhost ~]#
[root@localhost ~]# useradd linus2
[root@localhost ~]#
[root@localhost ~]# su linus2
[linus2@localhost root]$
[linus2@localhost root]$ ls -lah
ls: cannot open directory .: Permission denied
[linus2@localhost root]$ cd /home/linus
linus/  linus2/
[linus2@localhost root]$ cd /home/linus2
[linus2@localhost ~]$
[linus2@localhost ~]$ ls -lah
total 36K
drwx------. 5 linus2 linus2 4.0K Jun  1 10:51 .
drwxr-xr-x. 7 root   root   4.0K Jun  1 10:51 ..
-rw-r--r--. 1 linus2 linus2   18 Aug  2  2016 .bash_logout
```

-rw-r--r--. 1 linus2 linus2 193 Aug 2 2016 .bash_profile
-rw-r--r--. 1 linus2 linus2 231 Aug 2 2016 .bashrc
drwxrwxr-x. 3 linus2 linus2 4.0K Jun 1 10:51 .cache
drwxrwxr-x. 3 linus2 linus2 4.0K Jun 1 10:51 .config
-rw-r--r--. 1 linus2 linus2   42 Jun 1 10:50 **fileAutoCreated**
drwxr-xr-x. 4 linus2 linus2 4.0K May 26 21:26 .mozilla
[linus2@localhost ~]$ **cat fileAutoCreated**
This file is created when a user is added
[linus2@localhost ~]$
[linus2@localhost ~]$

Question 7 : Configure the server (192.168.0.199) as a logging server. Configure the client (192.168.0.200) as a logging client.

```
[root@localhost ~]#
[root@localhost ~]# ip a s eth0
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether 52:54:00:f7:e8:c5 brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.145/24 brd 192.168.122.255 scope global dynamic eth0
       valid_lft 3281sec preferred_lft 3281sec
    inet6 fe80::4d63:28f2:ba65:e430/64 scope link
       valid_lft forever preferred_lft forever
[root@localhost ~]#
[root@localhost ~]# ping -c 3 192.168.0.199
PING 192.168.0.199 (192.168.0.199) 56(84) bytes of data.
64 bytes from 192.168.0.199: icmp_seq=1 ttl=64 time=0.261 ms
64 bytes from 192.168.0.199: icmp_seq=2 ttl=64 time=0.293 ms
64 bytes from 192.168.0.199: icmp_seq=3 ttl=64 time=0.272 ms

--- 192.168.0.199 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2000ms
rtt min/avg/max/mdev = 0.261/0.275/0.293/0.018 ms
[root@localhost ~]#
[root@localhost ~]# ssh akmtir@192.168.0.199
akmtir@192.168.0.199's password:
Last login: Thu Jun  1 15:44:30 2017 from 192.168.122.145
[akmtir@squid ~]$
[akmtir@squid ~]$ id
uid=1000(akmtir) gid=1000(akmtir) groups=1000(akmtir),10(wheel) context=unconfined_u:unconfined_r:unconfined_t:s0-s0:c0.c1023
[akmtir@squid ~]$
[akmtir@squid ~]$ ip a s enp0s25
2: enp0s25: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc pfifo_fast state DOWN qlen 1000
    link/ether 00:21:cc:ca:cf:d3 brd ff:ff:ff:ff:ff:ff
    inet 192.168.0.199/24 brd 192.168.0.255 scope global enp0s25
       valid_lft forever preferred_lft forever
[akmtir@squid ~]$ exit
logout
Connection to 192.168.0.199 closed.
[root@localhost ~]# _
```

Question 8 : Deny cron access to user Jackson. Note: This restriction must not affect any other user.

[root@squid ~]#
[root@squid ~]# **useradd Jackson**
[root@squid ~]#
[root@squid ~]# **su - Jackson**
[Jackson@squid ~]$
[Jackson@squid ~]$
[Jackson@squid ~]$ **crontab -e**
no crontab for Jackson - using an empty one
crontab: no changes made to crontab
[Jackson@squid ~]$
[Jackson@squid ~]$
 [Jackson@squid ~]$ **exit**
logout
[root@squid ~]# **id**
uid=0(root) gid=0(root) groups=0(root) context=unconfined_u:unconfined_r:unconfined_t:s0-s0:c0.c1023
[root@squid ~]#
[root@squid ~]# **vi /etc/cron.deny**
[root@squid ~]#
[root@squid ~]# **cat /etc/cron.deny**
Jackson
[root@squid ~]#
[root@squid ~]# **su - Jackson**
Last login: Thu Jun 1 15:25:42 CEST 2017 on pts/1
[Jackson@squid ~]$
[Jackson@squid ~]$ **id**
uid=1202(Jackson) gid=1202(Jackson) groups=1202(Jackson)
context=unconfined_u:unconfined_r:unconfined_t:s0-s0:c0.c1023
[Jackson@squid ~]$
[Jackson@squid ~]$ **crontab -e**
You (Jackson) are not allowed to use this program (crontab)
See crontab(1) for more information
[Jackson@squid ~]$

Question 9 : Configure disk quota for user Paul in /Production as 530 Mb (approx).

[root@squid ~]#
[root@squid ~]# **lsblk**
NAME   MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
sda   8:0   0 238.5G 0 disk
├─sda1 8:1   0   476M 0 part /boot
├─sda2 8:2   0 204.9G 0 part /

```
├──sda3   8:3   0   3.7G  0 part [SWAP]
├──sda4   8:4   0   512B  0 part
└──sda5   8:5   0   8G    0 part
sr0      11:0   1   1024M 0 rom
[root@squid ~]#
[root@squid ~]#
[root@squid ~]# mkfs.ext4 /dev/sda5
mke2fs 1.42.9 (28-Dec-2013)
Discarding device blocks: done
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
524288 inodes, 2097152 blocks
104857 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=2147483648
64 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632

Allocating group tables: done
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done

[root@squid ~]#
[root@squid ~]#
[root@squid ~]# blkid
/dev/sda2: LABEL="root" UUID="e5f91ed6-8668-4a6a-8775-a198e917627c" TYPE="ext3"
/dev/sda1: UUID="bef73eac-db3b-4992-b76b-7979b263844f" TYPE="ext3"
/dev/sda3: LABEL="Swap" UUID="c8cee8ce-b800-4b73-971b-6462071fc75a" TYPE="swap"
```
/dev/sda5: UUID="2692c9fe-8cb2-49d7-a003-fc7345905aec" TYPE="ext4"
```
[root@squid ~]#
[root@squid ~]# vi /etc/fstab
[root@squid ~]#
[root@squid ~]# mkdir /Production
[root@squid ~]#
[root@squid ~]# cat /etc/fstab

#
# /etc/fstab
# Created by anaconda on Fri May 26 21:22:46 2017
#
```

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=e5f91ed6-8668-4a6a-8775-a198e917627c /   ext3   defaults   1 1
UUID=bef73eac-db3b-4992-b76b-7979b263844f /boot   ext3   defaults   1 2
UUID=c8cee8ce-b800-4b73-971b-6462071fc75a swap   swap   defaults   0 0

UUID=2692c9fe-8cb2-49d7-a003-fc7345905aec /Production   ext4   defaults,usrquota 0 0
[root@squid ~]#
[root@squid ~]# **mount | grep Production**
/dev/sda5 on /Production type ext4 (rw,relatime,seclabel,quota,usrquota,data=ordered)
[root@squid ~]#
[root@squid ~]#
[root@squid ~]# **quotacheck -cu /Production/**
[root@squid ~]#
[root@squid ~]# **ls -lha /Production/**
total 32K
drwxr-xr-x. 3 root root 4.0K Jun 2 08:26 .
dr-xr-xr-x. 24 root root 4.0K Jun 2 08:23 ..
-rw-------. 1 root root 6.0K Jun 2 08:26 aquota.user
drwx------. 2 root root 16K Jun 2 08:18 lost+found
[root@squid ~]#
[root@squid ~]#
[root@squid ~]# quotaon /Production/
[root@squid ~]#
[root@squid ~]# useradd Paul
[root@squid ~]#
[root@squid Production]# edquota -u Paul
[root@squid Production]#
[root@squid Production]# repquota -vsiu /Production/
*** Report for user quotas on device /dev/sda5
Block grace time: 7days; Inode grace time: 7days
                  Space limits   File limits
User   used   soft   hard grace   used soft hard grace
----
root   --   20K   0K   0K   2   0   0
Paul   --   0K   500M   530M   0   0   0

Statistics:
Total blocks: 7
Data blocks: 1
Entries: 2
Used average: 2.000000

[root@squid Production]#
[root@squid Production]# **su - Paul**
Last login: Fri Jun 2 09:11:14 CEST 2017 on pts/1

[Paul@squid ~]$
[Paul@squid ~]$
[Paul@squid ~]$ **cp Linux_Administration.tar.gz /Production**
sda5: *warning*, user block quota exceeded.
sda5: *write failed, user block limit reached.*
cp: error writing '/Production/Linux_Administration.tar.gz': Disk quota exceeded
cp: failed to extend '/Production/Linux_Administration.tar.gz': Disk quota exceeded
[Paul@squid ~]$
[Paul@squid ~]$

Question 10 : Create a 10 GB primary partition and mount it on /newhd. Format the partition as ext3.

[root@localhost ~]#
[root@squid ~]# **fdisk /dev/sda**
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): p

Disk /dev/sda: 256.1 GB, 256059432448 bytes, 500116079 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: 0x00034bf7

   Device Boot   Start   End   Blocks   Id System
/dev/sda1   *   2048   976895   487424   83 Linux
/dev/sda2   976896   430663679   214843392   83 Linux
/dev/sda3   430663680   438474751   3905536   82 Linux swap / Solaris

Command (m for help): n
Partition type:
   p   primary (3 primary, 0 extended, 1 free)
   e   extended
Select (default e): **p**
Selected partition 4
First sector (438474752-500116078, default 438474752):
Using default value 438474752
Last sector, +sectors or +size{K,M,G} (438474752-500116078, default 500116078): **+10G**

Partition 4 of type Linux and of size 10 GiB is set

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

Disk /dev/sda: 256.1 GB, 256059432448 bytes, 500116079 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: 0x00034bf7

```
   Device Boot    Start       End     Blocks  Id  System
/dev/sda1   *      2048     976895     487424  83  Linux
/dev/sda2          976896  430663679  214843392  83  Linux
/dev/sda3        430663680  438474751    3905536  82  Linux swap / Solaris
/dev/sda4        438474752  459446271   10485760  83  Linux
```

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@squid ~]#
[root@squid ~]#
[root@squid ~]# **partprobe**
[root@squid ~]#
[root@squid ~]# **mkfs.ext3 /dev/sda4**
mke2fs 1.42.9 (28-Dec-2013)
Discarding device blocks: done
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
655360 inodes, 2621440 blocks
131072 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=2684354560
80 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632

Allocating group tables: done
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done

[root@squid ~]#
[root@squid ~]#
[root@squid ~]# **lsblk /dev/sda**
NAME   MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
sda   8:0   0 238.5G 0 disk
├─sda1 8:1   0   476M 0 part /boot
├─sda2 8:2   0 204.9G 0 part /
├─sda3 8:3   0   3.7G 0 part [SWAP]
└─sda4 8:4   0   10G 0 part
[root@squid ~]#
[root@squid ~]#
[root@squid ~]# **mkdir /newhd**
[root@squid ~]#
[root@squid ~]# **mount /dev/sda4 /newhd/**
[root@squid ~]# [root@squid ~]#
[root@squid ~]# **lsblk /dev/sda**
NAME   MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
sda   8:0   0 238.5G 0 disk
├─sda1 8:1   0   476M 0 part /boot
├─sda2 8:2   0 204.9G 0 part /
├─sda3 8:3   0   3.7G 0 part [SWAP]
└─*sda4 8:4   0   10G 0 part /newhd*
[root@squid ~]#

Question 11 : Create a 1024 MB swap partition.

[root@squid ~]#
[root@squid ~]# **fdisk /dev/sda**
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): **p**

Disk /dev/sda: 256.1 GB, 256059432448 bytes, 500116079 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: 0x00034bf7

```
  Device Boot    Start       End      Blocks  Id  System
/dev/sda1   *     2048     976895     487424  83  Linux
/dev/sda2        976896  430663679  214843392  83  Linux
/dev/sda3      430663680  438474751   3905536  82  Linux swap / Solaris
```

Command (m for help): n
Partition type:
   p   primary (3 primary, 0 extended, 1 free)
   e   extended
Select (default e): e
Selected partition 4
First sector (438474752-500116078, default 438474752):
Using default value 438474752
Last sector, +sectors or +size{K,M,G} (438474752-500116078, default 500116078):
Using default value 500116078
Partition 4 of type Extended and of size 29.4 GiB is set

Command (m for help): **n**
All primary partitions are in use
Adding logical partition **5**
First sector (438476800-500116078, default 438476800):
Using default value 438476800
Last sector, +sectors or +size{K,M,G} (438476800-500116078, default 500116078): **+1024M**
Partition 5 of type Linux and of size **1 GiB** is set

Command (m for help): **t**
Partition number (1-5, default 5): **5**
Hex code (type L to list all codes): **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
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@squid ~]#
[root@squid ~]# partprobe /dev/sda
[root@squid ~]#
[root@squid ~]#
[root@squid ~]# partx -a /dev/sda
partx: /dev/sda: error adding partitions 1-5
[root@squid ~]#
[root@squid ~]#
[root@squid ~]# mkswap /dev/sda5
Setting up swapspace version 1, size = 1048572 KiB
no label, UUID=b0e05c46-1b96-4187-a930-47f65509e983
[root@squid ~]#
[root@squid ~]# swapon /dev/sda5
[root@squid ~]#
[root@squid ~]# swapon -s
```

Filename	Type	Size	Used	Priority
/dev/sda3	partition	3905532	0	-1
/dev/sda5	*partition*	*1048572*	*0*	*-2*

```
[root@squid ~]#
[root@squid ~]#
[root@squid ~]# lsblk /dev/sda
NAME   MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
sda     8:0    0 238.5G  0 disk
├──sda1  8:1    0   476M  0 part /boot
```

```
 ├──sda2  8:2   0 204.9G  0 part /
 ├──sda3  8:3   0   3.7G  0 part [SWAP]
 ├──sda4  8:4   0   512B  0 part
 └──sda5  8:5   0     1G  0 part [SWAP]
```
[root@squid ~]#
root@squid ~]#
[root@squid ~]# **blkid /dev/sda5**
/dev/sda5: UUID="**b0e05c46-1b96-4187-a930-47f65509e983**" TYPE="swap"
[root@squid ~]#
[root@squid ~]# **vi /etc/fstab**
[root@squid ~]#
[root@squid ~]# **cat /etc/fstab**

```
#
# /etc/fstab
# Created by anaconda on Fri May 26 21:22:46 2017
#
# 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=e5f91ed6-8668-4a6a-8775-a198e917627c /              ext3   defaults      1 1
UUID=bef73eac-db3b-4992-b76b-7979b263844f /boot           ext3    defaults      1 2
UUID=c8cee8ce-b800-4b73-971b-6462071fc75a swap            swap    defaults      0 0
```

UUID=b0e05c46-1b96-4187-a930-47f65509e983 swap   swap   defaults   0 0
[root@squid ~]#
[root@squid ~]#

Question 12 : Create a 2048 MB swap file.

[root@squid ~]#
[root@squid ~]# **dd if=/dev/zero of=/swapfile bs=1M count=2048**
2048+0 records in
2048+0 records out
2147483648 bytes (2.1 GB) copied, 2.32631 s, 923 MB/s
[root@squid ~]#
[root@squid ~]# **ls -lh /swapfile**
-rw-r--r--. 1 root root 2.0G Jun 1 20:53 /swapfile
[root@squid ~]#
[root@squid ~]#
[root@squid ~]# **mkswap /swapfile**
Setting up swapspace version 1, size = 2097148 KiB
no label, UUID=db8cb1d5-58c1-4f96-b35a-3826eab03981
[root@squid ~]#
[root@squid ~]# **swapon /swapfile**

swapon: /swapfile: insecure permissions 0644, 0600 suggested.
[root@squid ~]#
[root@squid ~]#
[root@squid ~]# **swapon -s**

Filename	Type	Size	Used	Priority
/dev/sda3	partition	3905532	0	-1
/dev/sda5	partition	1048572	0	-2
/swapfile	**file**	**2097148**	**0**	**-3**

[root@squid ~]#
[root@squid ~]#
[root@squid ~]# swapoff -v /swapfile
swapoff /swapfile
[root@squid ~]#
[root@squid ~]# swapoff -v /dev/sda5
swapoff /dev/sda5
[root@squid ~]#
[root@squid ~]# rm -rf /swapfile
[root@squid ~]#
[root@squid ~]# swapon -s

Filename	Type	Size	Used	Priority
/dev/sda3	partition	3905532	0	-1

[root@squid ~]#

Question 13 : Create a logical partition. Format the partition as ext3.

[root@squid ~]# **fdisk /dev/sda**
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): **p**

Disk /dev/sda: 256.1 GB, 256059432448 bytes, 500116079 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: 0x00034bf7

Device Boot	Start	End	Blocks	Id	System
/dev/sda1 *	2048	976895	487424	83	Linux
/dev/sda2	976896	430663679	214843392	83	Linux
/dev/sda3	430663680	438474751	3905536	82	Linux swap / Solaris

/dev/sda4   438474752 500116078 30820663+ 5 Extended

Command (m for help): **n**
All primary partitions are in use
Adding logical partition 5
First sector (438476800-500116078, default 438476800):
Using default value 438476800
Last sector, +sectors or +size{K,M,G} (438476800-500116078, default 500116078): **+10G**
Partition 5 of type Linux and of size 10 GiB is set

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@squid ~]#
[root@squid ~]# **lsblk /dev/sda**
NAME   MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
sda   8:0   0 238.5G 0 disk
├─sda1 8:1   0   476M 0 part /boot
├─sda2 8:2   0 204.9G 0 part /
├─sda3 8:3   0   3.7G 0 part [SWAP]
├─sda4 8:4   0   512B 0 part
└─**sda5 8:5   0   1G 0 part**
[root@squid ~]#
[root@squid ~]# **mkfs.ext3 /dev/sda5**
mke2fs 1.42.9 (28-Dec-2013)
Discarding device blocks: done
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@squid ~]#
[root@squid ~]#
[root@squid ~]# fdisk /dev/sda
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): p

Disk /dev/sda: 256.1 GB, 256059432448 bytes, 500116079 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: 0x00034bf7

   Device Boot     Start        End      Blocks  Id  System
/dev/sda1   *      2048      976895      487424  83  Linux
/dev/sda2        976896   430663679   214843392  83  Linux
/dev/sda3     430663680   438474751     3905536  82  Linux swap / Solaris
/dev/sda4     438474752   500116078    30820663+  5  Extended
/dev/sda5     438476800   459448319    10485760  83  Linux

Command (m for help): q

[root@squid ~]#
[root@squid ~]# blkid /dev/sda*
/dev/sda: PTTYPE="dos"
/dev/sda1: UUID="bef73eac-db3b-4992-b76b-7979b263844f" TYPE="ext3"
/dev/sda2: LABEL="root" UUID="e5f91ed6-8668-4a6a-8775-a198e917627c" TYPE="ext3"
/dev/sda3: LABEL="Swap" UUID="c8cee8ce-b800-4b73-971b-6462071fc75a" TYPE="swap"
/dev/sda5: UUID="c902c663-557a-43b5-b326-97854fd6eab3" SEC_TYPE="ext2" TYPE="ext3"
[root@squid ~]#
```

Question 14 : Create a Volume Group with name "newvolume" Create a Logical Volume with name "newlogic" format with ext3 filesystem. Mount the partition under /new-disk

[root@squid ~]#
[root@squid ~]# **lsblk**
NAME   MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
sda   8:0   0 238.5G 0 disk
├─sda1   8:1   0   476M 0 part /boot
├─sda2   8:2   0 204.9G 0 part /
├─sda3   8:3   0   3.7G 0 part [SWAP]
├─sda4   8:4   0   512B 0 part
├─sda5   8:5   0   8G 0 part
├─**sda6   8:6   0   8G 0 part**
└─**sda7   8:7   0   8G 0 part**
sr0   11:0   1 1024M 0 rom
[root@squid ~]#
[root@squid ~]#
[root@squid ~]# **pvcreate /dev/sda6 /dev/sda7**
  Physical volume "/dev/sda6" successfully created.
  Physical volume "/dev/sda7" successfully created.
[root@squid ~]#
[root@squid ~]# **pvdisplay**
  "/dev/sda7" is a new physical volume of "8.00 GiB"
  --- NEW Physical volume ---
  PV Name   /dev/sda7
  VG Name
  PV Size   8.00 GiB
  Allocatable   NO
  PE Size   0
  Total PE   0
  Free PE   0
  Allocated PE   0
  PV UUID   WItUdT-q0xN-uMdx-3DZh-6Bs5-nWed-RcL030

  "/dev/sda6" is a new physical volume of "8.00 GiB"
  --- NEW Physical volume ---
  PV Name   /dev/sda6
  VG Name
  PV Size   8.00 GiB
  Allocatable   NO
  PE Size   0
  Total PE   0
  Free PE   0
  Allocated PE   0
  PV UUID   KvoSNL-1bCh-Khyp-GTV9-FcNw-eEje-7aC68w

```
[root@squid ~]#
[root@squid ~]# vgcreate newvolume /dev/sda6 /dev/sda7
  Volume group "newvolume" successfully created
[root@squid ~]#
[root@squid ~]# vgdisplay
  --- Volume group ---
  VG Name               newvolume
  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               15.99 GiB
  PE Size               4.00 MiB
  Total PE              4094
  Alloc PE / Size       0 / 0
  Free  PE / Size       4094 / 15.99 GiB
  VG UUID               onaYhW-fwAz-fJzZ-MGdv-fEOo-cLHq-JMisuF

[root@squid ~]#
[root@squid ~]#
[root@squid ~]# lvcreate -n newlogic -L 5G newvolume
  Logical volume "newlogic" created.
[root@squid ~]#
[root@squid ~]# lvdisplay
  --- Logical volume ---
  LV Path               /dev/newvolume/newlogic
  LV Name               newlogic
  VG Name               newvolume
  LV UUID               dSLBFI-MB1x-4fBS-OLkL-tRkW-BIj8-UwEpyz
  LV Write Access       read/write
  LV Creation host, time squid.prjlinux.com, 2017-06-02 07:53:19 +0200
  LV Status             available
  # open                0
  LV Size               5.00 GiB
  Current LE            1280
  Segments              1
  Allocation            inherit
  Read ahead sectors    auto
```

  - currently set to   256
  Block device   253:0

[root@squid ~]#
[root@squid ~]#
[root@squid ~]# **mkfs.ext3 /dev/newvolume/newlogic**
mke2fs 1.42.9 (28-Dec-2013)
Discarding device blocks: done
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
327680 inodes, 1310720 blocks
65536 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=1342177280
40 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
      32768, 98304, 163840, 229376, 294912, 819200, 884736

Allocating group tables: done
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done

[root@squid ~]#
[root@squid ~]#
[root@squid ~]# **mkdir /new-disk**
[root@squid ~]#
[root@squid ~]# **mount /dev/newvolume/newlogic /new-disk**
[root@squid ~]#
[root@squid ~]#
[root@squid ~]# **mount | grep new-disk**
/dev/mapper/newvolume-newlogic on /new-disk type ext3 (rw,relatime,seclabel,data=ordered)
[root@squid ~]#

Question 15 : Resize the logical volume to 10 GB.

[root@squid ~]#
[root@squid ~]# man resize2fs
[root@squid ~]#
[root@squid ~]# resize2fs /dev/newvolume/newlogic 5G
resize2fs 1.42.9 (28-Dec-2013)
The filesystem is already 1310720 blocks long. Nothing to do!

[root@squid ~]#
[root@squid ~]# **resize2fs /dev/newvolume/newlogic 10G**
resize2fs 1.42.9 (28-Dec-2013)
The containing partition (or device) is only 1310720 (4k) blocks.
You requested a new size of 2621440 blocks.

[root@squid ~]#
[root@squid ~]# **lvextend -L +5G /dev/newvolume/newlogic**
 Size of logical volume newvolume/newlogic changed from 5.00 GiB (1280 extents) to 10.00 GiB
(2560 extents).
  Logical volume newvolume/newlogic successfully resized.
[root@squid ~]#
[root@squid ~]# **lvdisplay**
 --- Logical volume ---
 LV Path   /dev/newvolume/newlogic
  LV Name   newlogic
  VG Name   newvolume
  LV UUID   dSLBFI-MB1x-4fBS-OLkL-tRkW-BIj8-UwEpyz
  LV Write Access   read/write
  LV Creation host, time squid.prjlinux.com, 2017-06-02 07:53:19 +0200
  LV Status   available
  # open   1
 LV Size   10.00 GiB
  Current LE   2560
  Segments   2
  Allocation   inherit
  Read ahead sectors   auto
  - currently set to   256
  Block device   253:0

[root@squid ~]#

Question 16 : Install Apache web server and create a virtual host newhost.prjlinux.com. Include appropriate index.html.

[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# **yum install httpd**
Loaded plugins: fastestmirror, langpacks
base | 3.6 kB 00:00:00
epel/x86_64/metalink | 26 kB 00:00:00
epel | 4.3 kB 00:00:00
extras | 3.4 kB 00:00:00
google-chrome | 951 B 00:00:00
updates | 3.4 kB 00:00:00
(1/2): epel/x86_64/updateinfo | 805 kB 00:00:03
(2/2): epel/x86_64/primary_db | 4.7 MB 00:00:12
google-chrome/primary | 2.1 kB 00:00:00
Loading mirror speeds from cached hostfile
 * base: mirrors.supportex.net
 * epel: mirror.spreitzer.ch
 * extras: mirrors.supportex.net
 * updates: centos.mirror.triple-it.nl
google-chrome   3/3
Resolving Dependencies
--> Running transaction check
---> Package httpd.x86_64 0:2.4.6-45.el7.centos.4 will be installed
--> Processing Dependency: httpd-tools = 2.4.6-45.el7.centos.4 for package: httpd-2.4.6-45.el7.centos.4.x86_64
--> Running transaction check
---> Package httpd-tools.x86_64 0:2.4.6-45.el7.centos.4 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

==
=============
 Package   Arch   Version   Repository   Size
==
=============
Installing:
 httpd   x86_64   2.4.6-45.el7.centos.4   updates   2.7 M
Installing for dependencies:
 httpd-tools   x86_64   2.4.6-45.el7.centos.4   updates   84 k

Transaction Summary
==
=============

Install 1 Package (+1 Dependent package)

Total download size: 2.8 M
Installed size: 9.5 M
Is this ok [y/d/N]: y
Downloading packages:
(1/2): httpd-tools-2.4.6-45.el7.centos.4.x86_64.rpm | 84 kB 00:00:00
(2/2): httpd-2.4.6-45.el7.centos.4.x86_64.rpm | 2.7 MB 00:00:11

Total   257 kB/s | 2.8 MB 00:11
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : httpd-tools-2.4.6-45.el7.centos.4.x86_64   1/2
  Installing : httpd-2.4.6-45.el7.centos.4.x86_64   2/2
  Verifying : httpd-tools-2.4.6-45.el7.centos.4.x86_64   1/2
  Verifying : httpd-2.4.6-45.el7.centos.4.x86_64   2/2

Installed:
  httpd.x86_64 0:2.4.6-45.el7.centos.4

Dependency Installed:
  httpd-tools.x86_64 0:2.4.6-45.el7.centos.4

Complete!
[root@localhost ~]#
[root@localhost ~]# **firewall-cmd --permanent --add-service=http --add-service=https**
success
[root@localhost ~]#
[root@localhost ~]# **firewall-cmd --reload**
success
[root@localhost ~]#
[root@localhost ~]# **firewall-cmd --list-all**
public (active)
  target: default
  icmp-block-inversion: no
  interfaces: wlp3s0
  sources:
  services: dhcpv6-client *http https* samba smtp ssh
  ports:
  protocols:
  masquerade: no
  forward-ports:
  sourceports:
  icmp-blocks:
  rich rules:

[root@localhost ~]#
[root@localhost ~]# **systemctl enable httpd.service**
Created symlink from /etc/systemd/system/multi-user.target.wants/httpd.service to
/usr/lib/systemd/system/httpd.service.
[root@localhost ~]#
[root@localhost ~]# **systemctl start httpd.service**
[root@localhost ~]#
[root@localhost ~]# **systemctl status httpd.service**
● httpd.service - The Apache HTTP Server
  Loaded: loaded (/usr/lib/systemd/system/httpd.service; *enabled*; vendor preset: disabled)
  Active: active (*running*) since Wed 2017-05-31 17:15:39 CEST; 9s ago
   Docs: man:httpd(8)
       man:apachectl(8)
 Main PID: 9046 (httpd)
  Status: "Total requests: 0; Current requests/sec: 0; Current traffic: 0 B/sec"
  CGroup: /system.slice/httpd.service
       ├─9046 /usr/sbin/httpd -DFOREGROUND
       ├─9050 /usr/sbin/httpd -DFOREGROUND
       ├─9051 /usr/sbin/httpd -DFOREGROUND
       ├─9052 /usr/sbin/httpd -DFOREGROUND
       ├─9053 /usr/sbin/httpd -DFOREGROUND
   └─9054 /usr/sbin/httpd -DFOREGROUND

May 31 17:15:39 localhost.localdomain systemd[1]: Starting The Apache HTTP Server...
May 31 17:15:39 localhost.localdomain httpd[9046]: AH00558: httpd: Could not reliab...e
May 31 17:15:39 localhost.localdomain systemd[1]: Started The Apache HTTP Server.
Hint: Some lines were ellipsized, use -l to show in full.
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# **lsof -i | grep http**
httpd   9046 root   4u IPv6 97054   0t0 TCP *:http (LISTEN)
httpd   9050 apache   4u IPv6 97054   0t0 TCP *:http (LISTEN)
httpd   9051 apache   4u IPv6 97054   0t0 TCP *:http (LISTEN)
httpd   9052 apache   4u IPv6 97054   0t0 TCP *:http (LISTEN)
httpd   9053 apache   4u IPv6 97054   0t0 TCP *:http (LISTEN)
httpd   9054 apache   4u IPv6 97054   0t0 TCP *:http (LISTEN)
httpd   9090 apache   4u IPv6 97054   0t0 TCP *:http (LISTEN)
httpd   9094 apache   4u IPv6 97054   0t0 TCP *:http (LISTEN)
httpd   9095 apache   4u IPv6 97054   0t0 TCP *:http (LISTEN)
[root@localhost ~]#
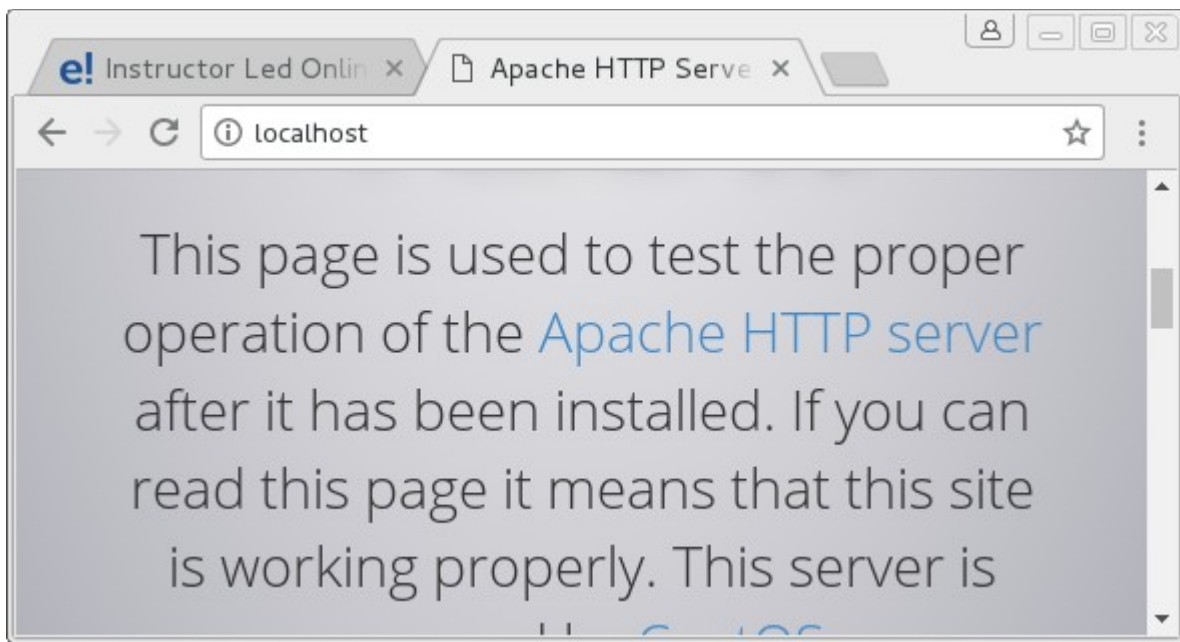
[root@localhost ~]#
[root@localhost ~]# **tail -2 /var/log/httpd/access_log**
127.0.0.1 - - [31/May/2017:17:31:30 +0200] "GET /noindex/css/open-sans.css HTTP/1.1" 200 5081
"http://127.0.0.1/" "*ELinks*/0.12pre6 (textmode; Linux; 176x42-2)"
127.0.0.1 - - [31/May/2017:17:31:30 +0200] "GET /noindex/css/bootstrap.min.css HTTP/1.1" 200
19341 "http://127.0.0.1/" "ELinks/0.12pre6 (textmode; Linux; 176x42-2)"
[root@localhost ~]#
For Name resolutions, I have used the /etc/hosts file as a DNS.
[root@localhost ~]# **echo "127.0.0.1   newhost.prjlinux.com" >> /etc/hosts**
[root@localhost ~]#
[root@localhost html]# **cat /etc/hosts**
127.0.0.1   localhost localhost.localdomain localhost4 localhost4.localdomain4
::1   localhost localhost.localdomain localhost6 localhost6.localdomain6
127.0.0.1   prjlinux.com
127.0.0.1   newhost.prjlinux.com
[root@localhost html]#
[root@localhost ~]#
[root@localhost ~]# **mkdir /var/www/html/newhost**
[root@localhost ~]# **echo "New Virtual Host" > /var/www/html/newhost/index.html**
[root@localhost ~]#
[root@localhost ~]# **cat /var/www/html/newhost/index.html**
New Virtual Host
[root@localhost ~]#
[root@localhost ~]# **cd /var/www/html/**
[root@localhost html]#
[root@localhost html]# **ls -l**
total 8

-rw-r--r--. 1 root root   44 May 31 20:48 index.html
drwxr-xr-x. 2 root root 4096 May 31 20:27 newhost
[root@localhost html]#
[root@localhost html]# **cat index.html**
Apache Root Server /var/www/html/index.html
[root@localhost html]#
[root@localhost html]#
[root@localhost html]# **chown -R apache:apache ***
[root@localhost html]#
[root@localhost html]# **ls -lR**
.:
total 8
-rw-r--r--. 1 apache apache   44 May 31 20:48 index.html
drwxr-xr-x. 2 apache apache 4096 May 31 20:27 newhost

./newhost:
total 4
-rw-r--r--. 1 apache apache 17 May 31 20:27 index.html
[root@localhost html]#
[root@localhost html]#
[root@localhost html]# **vi /etc/httpd/conf/httpd.conf**
[root@localhost html]#
[root@localhost html]#
[root@localhost html]# **httpd -t**
AH00548: NameVirtualHost has no effect and will be removed in the next release
/etc/httpd/conf/httpd.conf:357
Syntax OK
[root@localhost html]#
[root@localhost html]# **systemctl restart httpd.service**
[root@localhost html]#
[root@localhost html]# **tail -12 /etc/httpd/conf/httpd.conf**
*NameVirtualHost *:80*

*<VirtualHost *:80>*
  ServerName prjlinux.com
  DocumentRoot /var/www/html
</VirtualHost>

*<VirtualHost *:80>*
  ServerName newhost.prjlinux.com
  DocumentRoot /var/www/html/newhost
</VirtualHost>

[root@localhost html]#

Apache Root Server /var/www/html/index.html

New Virtual Host
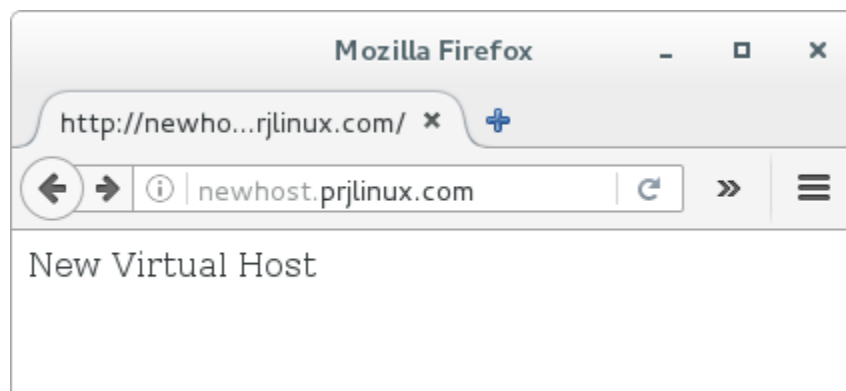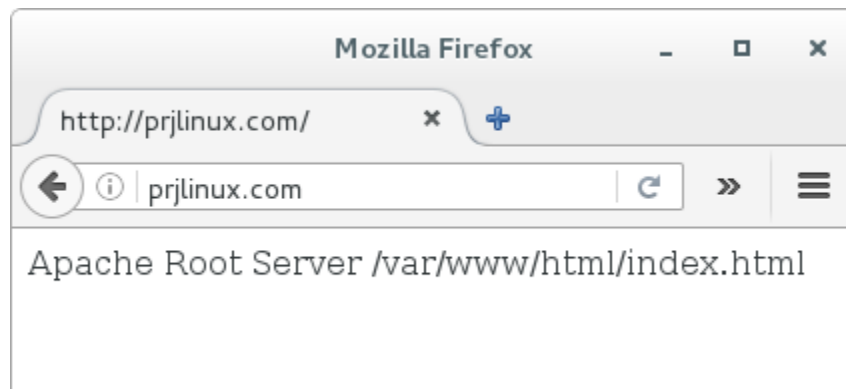
Question 17 : Set SELinux in enforcing mode. Create a new directory /new/www/host and change the context to httpd_sys_content_t.

[root@localhost ~]# [root@localhost html]#
[root@localhost html]# **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@localhost html]#
[root@localhost html]# **cat /etc/selinux/config**

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 three two values:
#    targeted - Targeted processes are protected,
#    minimum - Modification of targeted policy. Only selected processes are protected.
#    mls - Multi Level Security protection.
SELINUXTYPE=targeted

[root@localhost html]#
[root@localhost ~]# mkdir -p /new/www/host
[root@localhost ~]#
[root@localhost ~]# ls -RlhZ /new/
/new/:
drwxr-xr-x. root root unconfined_u:object_r:default_t:s0 www

/new/www:
drwxr-xr-x. root root unconfined_u:object_r:default_t:s0 host

/new/www/host:
-rw-r--r--. root root unconfined_u:object_r:default_t:s0 index.html
[root@localhost ~]#
[root@localhost ~]# cat /new/www/host/index.html
<html>
<head>
<title>SELinux and Apache</title>
</head>

<body>
<h2>Changing the directory context to httpd_sys_content_t</h2>
</body>

</html>
[root@localhost ~]#
[root@localhost ~]# semanage fcontext -a -t httpd_sys_content_t '/new(/.*)?'
[root@localhost ~]#
[root@localhost ~]# restorecon -R -v /new
restorecon reset /new context unconfined_u:object_r:default_t:s0-
>unconfined_u:object_r:httpd_sys_content_t:s0
restorecon reset /new/www context unconfined_u:object_r:default_t:s0-
>unconfined_u:object_r:httpd_sys_content_t:s0
restorecon reset /new/www/host context unconfined_u:object_r:default_t:s0-
>unconfined_u:object_r:httpd_sys_content_t:s0
restorecon reset /new/www/host/index.html context unconfined_u:object_r:default_t:s0-
>unconfined_u:object_r:httpd_sys_content_t:s0
[root@localhost ~]#
```

[root@localhost ~]# **ls -RlhZ /new/**
/new/:
drwxr-xr-x. root root unconfined_u:object_r:***httpd_sys_content_t***:s0 www

/new/www:
drwxr-xr-x. root root unconfined_u:object_r:***httpd_sys_content_t***:s0 host

/new/www/host:
-rw-r--r--. root root unconfined_u:object_r:***httpd_sys_content_t***:s0 index.html
[root@localhost ~]#
[root@localhost html]#
[root@localhost html]# **chown -R apache:apache /new**
[root@localhost html]#
[root@localhost html]# **ls -lRZ /new/**
/new/:
drwxr-xr-x. ***apache apache*** unconfined_u:object_r:httpd_sys_content_t:s0 www

/new/www:
drwxr-xr-x. apache apache unconfined_u:object_r:httpd_sys_content_t:s0 host

/new/www/host:
-rw-r--r--. apache apache unconfined_u:object_r:httpd_sys_content_t:s0 index.html
[root@localhost html]#
[root@localhost html]#
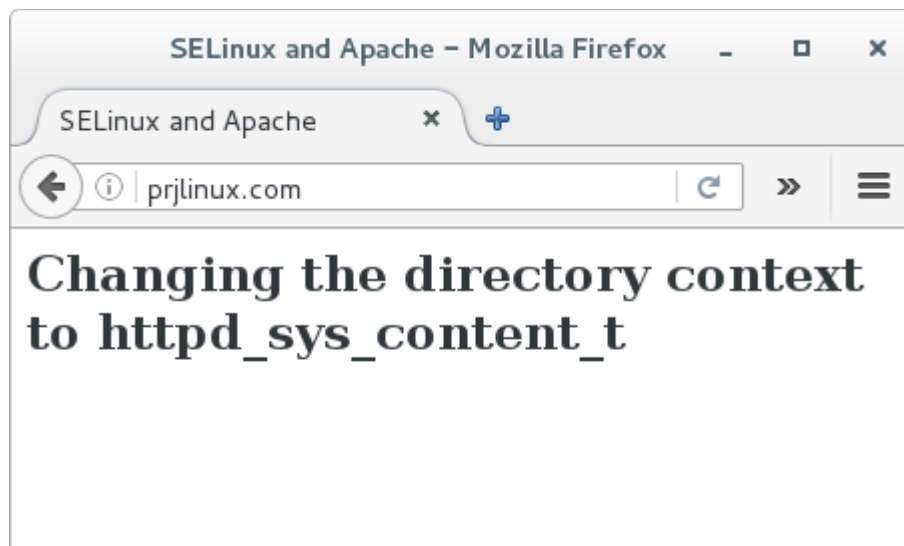
Question 18 : Configure Network Time Protocol to synchronize the time at boot time.

[root@localhost ~]#
[root@localhost ~]# **vi /etc/ntp.conf**
[root@localhost ~]#
[root@localhost ~]# **sed -n '10,26p' /etc/ntp.conf**
Permit all access over the loopback interface. This could
be tightened as well, but to do so would effect some of
the administrative functions.
restrict 127.0.0.1
restrict ::1

Hosts on local network are less restricted.
#restrict 192.168.1.0 mask 255.255.255.0 nomodify notrap

Use *public servers from the pool.ntp.org project.*
Please consider joining the pool (http://www.pool.ntp.org/join.html).
server 0.centos.pool.ntp.org iburst
server 1.centos.pool.ntp.org iburst2
server 2.centos.pool.ntp.org iburst
server 3.centos.pool.ntp.org iburst

#broadcast 192.168.1.255 autokey   # broadcast server
[root@localhost ~]#
[root@localhost ~]# **systemctl restart ntpd.service**
[root@localhost ~]#
[root@localhost ~]# **systemctl enable ntpd.service**
Created symlink from /etc/systemd/system/multi-user.target.wants/ntpd.service to /usr/lib/systemd/system/ntpd.service.
[root@localhost ~]#
[root@localhost ~]# **systemctl start ntpd.service**
[root@localhost ~]#
[root@localhost ~]# systemctl status ntpd.service
● ntpd.service - Network Time Service
   Loaded: loaded (/usr/lib/systemd/system/ntpd.service; *enabled*; vendor preset: disabled)
   Active: inactive (dead) since Wed 2017-05-31 16:11:29 CEST; 18min ago
 Main PID: 6967 (code=exited, status=0/SUCCESS)

May 31 16:03:15 localhost.localdomain ntpd[6967]: Listen normally on 7 wlp3s0 fe80:...3
May 31 16:03:15 localhost.localdomain ntpd[6967]: Listening on routing socket on fd...s
May 31 16:03:15 localhost.localdomain ntpd[6967]: 0.0.0.0 c016 06 restart
May 31 16:03:15 localhost.localdomain ntpd[6967]: 0.0.0.0 c012 02 freq_set kernel 0...M
May 31 16:03:15 localhost.localdomain ntpd[6967]: 0.0.0.0 c011 01 freq_not_set
May 31 16:03:16 localhost.localdomain ntpd[6967]: 0.0.0.0 c61c 0c clock_step -5.061...s
May 31 16:03:11 localhost.localdomain ntpd[6967]: 0.0.0.0 c614 04 freq_mode

May 31 16:03:12 localhost.localdomain ntpd[6967]: 0.0.0.0 c618 08 no_sys_peer
May 31 16:11:29 localhost.localdomain systemd[1]: Stopping Network Time Service...
May 31 16:11:29 localhost.localdomain systemd[1]: Stopped Network Time Service.
Hint: Some lines were ellipsized, use -l to show in full.
[root@localhost ~]#
[root@localhost ~]# **timedatectl set-ntp yes**
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# **timedatectl status**
      Local time: Wed 2017-05-31 16:32:41 CEST
  Universal time: Wed 2017-05-31 14:32:41 UTC
        RTC time: Wed 2017-05-31 14:32:41
       Time zone: Europe/Zurich (CEST, +0200)
     NTP enabled: yes
NTP synchronized: yes
 RTC in local TZ: no
      DST active: yes
 Last DST change: DST began at
                  Sun 2017-03-26 01:59:59 CET
                  Sun 2017-03-26 03:00:00 CEST
 Next DST change: DST ends (the clock jumps one hour backwards) at
                  Sun 2017-10-29 02:59:59 CEST
                  Sun 2017-10-29 02:00:00 CET
[root@localhost ~]#

Question 19 : Test your Network connectivity.

[root@localhost ~]#
[root@localhost ~]# **ping -c 1 yahoo.com**
PING yahoo.com (206.190.36.45) 56(84) bytes of data.
64 bytes from ir1.fp.vip.gq1.yahoo.com (206.190.36.45): icmp_seq=1 ttl=50 time=233 ms

--- yahoo.com ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 233.183/233.183/233.183/0.000 ms
[root@localhost ~]#

Question 20 : Shutdown system using command line.

[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# **systemctl poweroff**
[root@localhost ~]#
[root@localhost ~]# **init 0**
[root@localhost ~]#
[root@localhost ~]# **shutdown**