Disk Partition

- Linux allows only 4 primary partitions for PATA or SATA dard disk.
- You can have a much larger number of logical partitions by sub-dividing one of the primary partitions (extended partition). Only one of the primary partitions can be subdivided.
- fdisk utility only support 16 partitions, if you need more than 16 partitions, other partition utilities like sfdisk.

/dev/sad	for primary master
/dev/sdb	for primary slave
/dev/sdc	for secondary master
/dev/sdd	for secondary slave

- fdisk is started by typing (as root) fdisk and device name at the command prompt.

Device might be something like /dev/hda or /dev/sda

```
fdisk /dev/sdb
```

- The basic fdisk commands you need are: p print the partition table n create a new partition d delete a partition q quit without saving changes w write the new partition table and exit
- Changes you made to the partition table do not take effect until you issue the write (w) command.
- In old Linux systems, to make change in partition take effect (RHEL 4 or older):

```
partptobe
```

Four primary partitions

- Decide on the size of your swap space and where it ought to sliced Divide up the remaining space for the three other partitions.

Example:

1. Run terminal and type “fdisk /dev/sdb”

```
fdisk /dev/sdb  Command (m for help): p
Disk /dev/sdb: 64 heads, 63 sectors, 621 cylinders
Units = cylinders of 4032 * 512 bytes
```

2. To create new partition:

```
Command (m for help): n
Command action
  e   extended    p   primary
partition (1-4) Type p for
primary partition p
Partition number (1-4): 1
First cylinder (1-621, default 1):<RETURN>
Using default value 1
```

```
Last cylinder or +size or +sizeM or +sizeK (1-621, default 621): +500M

Next, I set up the partition I want to use for swap:
Command (m for help): n
Command action
   e   extended
   p   primary partition (1-4)
p
Partition number (1-4): 2
First cylinder (197-621, default 197):<RETURN>
Using default value 197
Last cylinder or +size or +sizeM or +sizeK (197-621, default 621): +2G

Now the partition table looks like this:
   Device Boot    Start      End    Blocks   Id  System
/dev/sdb1            1       196    395104   83  Linux
/dev/sdb2          197       262    133056   83  Linux
```

3. Set up the remaining partitions the same way I did the first. Finally, it’s time to change partition to be bootable:

```
Command (m for help): a
Partition number (1-4): 1
```

4. Converting sdb2 to swap partition

```
Command (m for help): t
Partition number (1-4): 2
Hex code (type L to list codes): 82
Changed system type of partition 2 to 82 (Linux swap)
```

5. The end result:

```
Command (m for help): p
Disk /dev/sdb: 64 heads, 63 sectors, 621 cylinders
Units = cylinders of 4032 * 512 bytes

   Device Boot    Start      End    Blocks   Id  System
/dev/sdb1   *        1       196    395104+  83  Linux
/dev/sdb2          197       262    133056   82  Linux swap
/dev/sdb3          263       458    395136   83  Linux
/dev/sdb5          459       621    328608   83  Linux
```

6. Finally, press ‘w’ to save and exit from fdisk command.

7. To make change take effect without rebooting in RHEL v4 or older systems.

```
partprobe       #new system does not require this command
```

File system Management

Making filesystem

```
mke2fs  [options] /dev/<hd_>
```

[Options]

-b	block size in bytes
-c	interval
-I	interval
-L	Volume label
-j	ext3 journaling

mount command

```
mount [-t fstype] [options] <device/network> mountpoint
```

To mount all devices in fstab

```
mount -a
```

To unmount all devices in fstab (Do not run it)

```
umount -a
```

To display what or who is acting on mount_point (say /backup)

```
fuser -v /backup
```

To kill the user/process on mount_point (say /backup)

```
fuser -km /backup
```

Re-mounting file system say /dev/sda1 as read/write, currently mounted as read-only. Say:

root partition i.e. / is mounted in read-only mode.

```
mount -o remount,rw /dev/sda1 /
```

Labeling file systems

To set disk label of /dev/sda7 to dbdisk

```
e2label /dev/sda7 dbdisk
```

To view label of /dev/sda7

```
e2label /dev/sda7
```

mount file system using label

```
mount –t vfat –o uid=515,gid=515 LABEL=dbdisk /mnt/dbdisk
```

To mount already mounted filesystem as another

```
mount –bind /mnt/dbdisk /mnt/dbdisk_new
```

To show the share folders of nfs server (say: 192.168.0.100)

```
showmount –e 192.168.0.100
```

To show the share point of windows file share or SMB (say: 192.168.0.2 and user admin)

```
smbclient –L 192.168.0.2 –U admin
```

To mount nfs share directories (Say 192.168.0.2 is also sharing /bkp through nfs)

```
mount -t nfs 192.168.0.2:/nfs /mnt/
```

To mount samba shared directories (say share is shared via Samba service)

```
mount –t cifs //192.168.0.2/share /mnt/remote_smb
```

About /etc/fstab

It is the file from where Linux system reads the file system information on startup.

Adding /dev/sdb1 in fstab

```
cat >> /etc/fstab
     /dev/sdb1     /backup      ext4    defaults        0        0
Press ctrl+d to save and exit from cat command mode.
```

Adding virtual memory (via fstab)

```
mkswap /dev/sda2
cat >> /etc/fstab #adding swap partition in fstab
      /dev/sda2     swap    swap    defaults 0 0
Press ctrl+d to save and exit from cat command mode
swapon -a #reads swap information from /etc/fstab
swapon -s # displays swap usage summary by device.
```

To create swap file

```
dd if=/dev/zero of=/swapfile bs=1024K
count=1024 mkswap /swapfile cat
>>/etc/rc.d/rc.local swapon /swapfile
Press ctrl+d to save and exit from cat command mode
```

Quota Management

Configuring Disk Quotas

To implement disk quotas, use the following steps:

1. Enable quotas per file system by modifying the /etc/fstab file.
2. Remount the file system(s).
3. Create the quota database files and generate the disk usage table.
4. Assign quota policies.

Enabling Quota for /dev/sdb1 (use vi /etc/fstab to edit file)

In /etc/fstab modify and add usrquota and/or grpquota options

```
/dev/sdb1     /backup      ext4    defaults,usrquota,grpquota    0 0
```

Creating the Quota Database Files

```
quotacheck –cug /backup
```

Assigning Quotas per User (say: shiba)

```
edquota shiba
Disk quotas for user shiba (uid 500):
Filesystem          blocks     soft       hard        inodes  soft  hard
/dev/sdb1            440436    48576      1048576    37418    0     0
```

Where:

soft limit (for blocks) is size in KB which is prompted as warning message for limiting quota *hard limit(for blocks)* is the size in KB, when files size of used reaches to size of hard limit, not more data or files can be added by the user in the particular disk. Similarly, *inodes* represents numbers of files that a user can created.

Checking status of quota

```
quota shiba
repquota /dev/sdb1 #reporting quota status of all users in /dev/sdb1
```

Note: /etc/rc.d/rc.local is always runs at the os boot process, before user login

Further study:

- http://tldp.org/HOWTO/Partition/fdisk_partitioning.html
- https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/6/html/Storage_Administration_Guide/ch-diskquotas.html#s1-disk-quotas-configuring
- http://www.linuxhomenetworking.com/wiki/index.php/Quick_HOWTO_:_Ch28_:_Managing_Disk_Usage_with_Quotas#Create_The_Partition_Quota_Configuration_Files