**Section-9 Storage Administration**

**Preparing Your Software based Raid**

So first we note down the disks names and then we use fdisk utility to configure partitions.

fdisk -l | grep sd

Disk /dev/sda: 85.9 GB, 85899345920 bytes, 167772160 sectors

/dev/sda1   \*        2048     1026047      512000   83  Linux

/dev/sda2         1026048   167772159    83373056   8e  Linux LVM

Disk /dev/sdb: 21.5 GB, 21474836480 bytes, 41943040 sectors

Disk /dev/sdc: 21.5 GB, 21474836480 bytes, 41943040 sectors

Disk /dev/sdd: 21.5 GB, 21474836480 bytes, 41943040 sectors

**[root@client ~]# fdisk /dev/sdb**

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 0x7709d77b.

**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): 1**

**First sector (2048-41943039, default 2048):**

**Using default value 2048**

**Last sector, +sectors or +size{K,M,G} (2048-41943039, default 41943039): +200M**

Partition 1 of type Linux and of size 200 MiB 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): 2**

**First sector (411648-41943039, default 411648):**

**Using default value 411648**

**Last sector, +sectors or +size{K,M,G} (411648-41943039, default 41943039): +200**

Partition 2 of type Linux and of size 100.5 KiB 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 (411849-41943039, default 413696):**

**Using default value 413696**

**Last sector, +sectors or +size{K,M,G} (413696-41943039, default 41943039): +200M**

Partition 3 of type Linux and of size 200 MiB is set

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

The partition table has been altered!

Calling ioctl() to re-read partition table.

Syncing disks.

**[root@client ~]# fdisk -l /dev/sdb**

Disk /dev/sdb: 21.5 GB, 21474836480 bytes, 41943040 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: 0x7709d77b

   Device Boot      Start         End      Blocks   Id  System

/dev/sdb1            2048      411647      204800   83  Linux

/dev/sdb2          411648      411848         100+  83  Linux

/dev/sdb3          413696      823295      204800   83  Linux

**[root@client ~]# fdisk /dev/sdb**

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): m**

Command action

   a   toggle a bootable flag

   b   edit bsd disklabel

   c   toggle the dos compatibility flag

   d   delete a partition

   g   create a new empty GPT partition table

   G   create an IRIX (SGI) partition table

   l   list known partition types

   m   print this menu

   n   add a new partition

   o   create a new empty DOS partition table

   p   print the partition table

   q   quit without saving changes

   s   create a new empty Sun disklabel

   t   change a partition's system id

   u   change display/entry units

   v   verify the partition table

   w   write table to disk and exit

   x   extra functionality (experts only)

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

Disk /dev/sdb: 21.5 GB, 21474836480 bytes, 41943040 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: 0x7709d77b

   Device Boot      Start         End      Blocks   Id  System

/dev/sdb1            2048      411647      204800   83  Linux

/dev/sdb2          411648      411848         100+  83  Linux

/dev/sdb3          413696      823295      204800   83  Linux

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

**Partition number (1-3, default 3): 1**

**Hex code (type L to list all codes): m**

Changed type of partition 'Linux' to 'unknown'

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

**Partition number (1-3, default 3): 1**

**Hex code (type L to list all codes): L**

**Hex code (type L to list all codes): fd**

Changed type of partition 'Empty' to 'Linux raid autodetect'

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

**Partition number (1-3, default 3): 2**

**Hex code (type L to list all codes): fd**

Changed type of partition 'Linux' to 'Linux raid autodetect'

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

**Partition number (1-3, default 3): 3**

**Hex code (type L to list all codes): fd**

Changed type of partition 'Linux' to 'Linux raid autodetect'

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

Disk /dev/sdb: 21.5 GB, 21474836480 bytes, 41943040 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: 0x7709d77b

Device Boot      Start         End      Blocks   Id  System

/dev/sdb1            2048      411647      204800   fd  Linux raid autodetect

/dev/sdb2          411648      411848         100+  fd  Linux raid autodetect

/dev/sdb3          413696      823295      204800   fd  Linux raid autodetect

**Configuring Raid Device**

# yum install mdadm

# mdadm -C /dev/md0 -l raid5 -n 3 /dev/sdb1 /dev/sdc1/dev/sdd1 -x 3 /dev/sdb2 /dev/sdc2 /dev/sdd2

-n : shows the number of active devices

# ls -al  /dev/md\*

# mdadm --detail /dev/md0

# cat /proc/mdstat (these settings used to boot the device when the system boots up)

Now we will configure the mdadm.conf file so that when the system boots up these devices shows as an active devices

# mdadm --detail --scan --verbose

# mdadm --detail --scan --verbose > /etc/mdadm.conf

Now we will create a mount point and assign a file system to it

# mkdir /mnt/raid5

# mkfs -t ext4 /dev/md0

So based on our device size it has taken less amount of time

# mount -t ext4 /dev/md0 /mnt/raid5

# df -h

As you can it show you around 400 MB in size as in raid5 case the third disk is used for information so the remaining resource will be around 400MB and also some MBs will be used by the system as well.

# cd /mnt/raid5

# mkdir backup

# cd backup

# cp -rf /etc/\* .

# ls

Now we will change the configuration in fstab so when the system reboots it shows active in the configuration.

# vi /etc/fstab

/dev/md0    /mnt/raid5    ext4    defaults    0 2

Now we will not be rebooting our system to check this we will simply un-mount the md0 and then run the mount -a command to re-read the fstab file.

# umount /mnt/raid5

# df -h

# mount -a

# df –h

**Manging Failover and Recovery of Raid Devices**

# mdadm --detail /dev/md0

Now if we fail sdc1 what would happen so lets try this

# mdadm --fail /dev/md0 /dev/sdc1

Also if you look for the /mnt/raid5 folder the files that are there are still not effected.

# ls -ltr /mnt/raid5/backup

Now if we fail another device sdb1

# mdadm --fail /dev/md0 /dev/sdb1

Now after three devices fail if something happens at this point we will lose our data, so we need another spare devices.

# mdadm --add /dev/md0 /dev/sdb3

# mdadm --add /dev/md0 /dev/sdc3

# mdadm --add /dev/md0 /dev/sdd3

Now if we run detail command of mdadm it will show us that more three devices have been added to md0 raid5 array

Now if you remember when run the command

# mdadm --detail --scan --verbose

it showed us this information, now this information is different from /etc/mdadm.conf file so we have to overwrite that file

# cat /etc/mdadm.conf

# mdadm --detail --scan --verbose > /etc/mdadm.conf