

### Lab on Partitioning with fdisk

For detail Reference: [http://tldp.org/HOWTO/Partition/fdisk\\_partitioning.html](http://tldp.org/HOWTO/Partition/fdisk_partitioning.html)

Please Note This is the lab sheet for quick reference to basic commands. Please Do study, RHCE course book or any "Redhat/Fedora system and network administration book" for detail. If you are new to Linux view the RHCE or other books related to Redhat Linux or web sites I have provided.

- Linux allows only 4 primary partitions.
- You can have a much larger number of logical partitions by sub-dividing one of the primary partitions. Only one of the primary partitions can be sub-divided.
- fdisk utility only support 16 partitions, if you have to create more than 16 use other partition utilities like sfdisk.
  - /dev/had for primary master
  - /dev/hdb for primary slave
  - /dev/hdc for secondary master
  - /dev/hdd for secondary slave
- fdisk is started by typing (as root) fdisk device at the command prompt. Device might be something like /dev/hda or /dev/sda
- 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 make to the partition table do not take effect until you issue the write (w) command.
- To make change take effect type after write (w) without rebooting type:  
#partprobe

#### Four primary partitions

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

Example:

I start fdisk from the shell prompt:

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

To create new partition:

```
Command (m for help): n
Command action
e extended
p primary partition (1-4)
Type p for primary partition

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): +384M
```

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
```

Prepared By: Shiba Ratna Tamrakar

```
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): +128M
```

```
Now the partition table looks like this:
Device Boot Start End Blocks Id System
/dev/hdb1 1 196 395104 83 Linux
/dev/hdb2 197 262 133056 83 Linux
```

I set up the remaining two partitions the same way I did the first. Finally, I make the first partition bootable:

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

```
And I make the second partition of type swap:
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)
Command (m for help): p
```

```
The end result:
Disk /dev/hdb: 64 heads, 63 sectors, 621 cylinders
Units = cylinders of 4032 * 512 bytes
```

```
Device Boot Start End Blocks Id System
/dev/hdb1 * 1 196 395104+ 83 Linux
/dev/hdb2 197 262 133056 82 Linux swap
/dev/hdb3 263 458 395136 83 Linux
/dev/hdb4 459 621 328608 83 Linux
```

Finally, I issue the write command (w) to write the table on the disk.

```
To make change take effect without rebooting
#partprobe
Note we can similarly create logical partition and LVM partition by changing type
to '8e' and RAID partition by changing partition type to 'fd'
```

## Lab on system administration Printer Cups

- Configuring and using printer
- Configuration files:
  - /etc/cups/cupsd.conf
  - /etc/cups/printers.conf
- Command to configure printer
  - #system-configure-printer
- Web interface for configuration
  - <http://localhost:631>
- To authenticate user must be the member of system Group (sys by default) listed in /etc/cupscupsd.conf
- To spool jobs to a queue :
  - #reject
  - #accept

## Cron

- It is used to schedule recurring events
- Use crontab to edit, install and view job schedules

**Syntax:**

```
crontab [-u user] file
crontab [-l:-r|-e]
-l      lists crontab jobs
-r      remove crontab
-e      edits crontab jobs using $EDITOR
```

*Note*

- cron jobs are stored in /var/spool/cron
- daemon for crontab: crond

Valid fields

Minute	Hour	Day of Month	Month	Day of week
0-59	0-23	1-31	1-12 or jan, Feb ...	0 or 7 = Sunday,1=Monday, ...

- Multiple values may be separated by commas
- \* indicates all valid values
- For further help:  
#man 5 crontab
- Controlling access to cron  
List of users to be allowed or denied will be listed in following files  
/etc/cron.allow and /etc/cron.deny respectively.

**Examples**

1. Cron job which will run du -h and saves output to out1 in every minute.

```
#cat > mycronjob
1 * * * * du -h >>myoutputfile
#crontab mycronjob
```

2. Cron job which will run du -h and saves output to out1 in every 1<sup>st</sup> minute of hour alternating in 2 hours.

```
#cat > mycronjob
1 */2 * * * du -h >>myoutputfile
#crontab mycronjob
```

3. Cron job to do task in every 1<sup>st</sup> day of 4<sup>th</sup> week of the month on time of 5:00 PM

```
#crontab -e
0 17 1 */4 * ls -l >>output1
```

To execute script files in a particular directory called /etc/rc.d/htb

```
#vi /etc/crontab
path=<...path in the file currently>:/etc/rc.d/htb
0 17 1 * root run-parts /etc/rc.d/htb

#timewarch 48 /home/d1
```

**tmpwatch**

- Any file with create time or touch time >= 48 hours  
/etc/cron.daily/tmpwatch

**System logging**

- To start system logging  
#service syslog start
- Configuration file  
/etc/syslog.conf
- Information files  
/var/log/messages contains all log information  
/var/log/dmesg contains kernel related logs

/var/log/mail contains mail related logs and so on.

- Format of log:  
Date/time:application [PID] messages
- Configure remote log server  
[how to configure remote log server]

### **Backup and Restore, compression**

- Compression tools
- gzip, gunzip
- bzip2, bunzip2
- compress, uncompress
- zip, unzip

To compress temp.txt file with gzip

```
# gzip -v temp.txt
```

To compress temp.txt with bzip2

```
#bzip -v temp.txt
```

Archiving

```
#tar [option] <file-to-be archive>
```

Creating archives arch.tar of files file1, file2 and file3

```
#tar cvf arch.tar file1 file2 file3
```

To view content of tar

```
#tar tvf arch.tar
```

To extract filex from archive

```
#tar xvf arch.tar
```

To create archive with compression with bzip2

```
#tar cjvf xyz.tar.bz2 file1 file2 file3
```

To extract archive with compression bzip2

```
#tar jvfx xyz.tar.bz2
```

To create archive with compression with gzip

```
#tar czvf xyz.tar.gz file1 file2 file3
```

To extract archive with compression bzip2

```
#tar zvfx xyz.tar.bz2
```

### **Controlling Tape devices**

```
#mt -f /dev/st0 rewind (Rewind)
```

```
#mt -f /dev/st0 sf 50 (Position)
```

```
#mt -f /dev/st0 offline (Eject)
```

```
#mt -f /dev/st0 erase (Erase)
```

```
#mt -f /dev/st0 rewoff (rewind,eject)
```

### **Using tar/star**

Parameters for tar

```
c create
t list
x extract
v verbose
j bzip2 compression
z gzip compression
```

### **Example:**

1. To backup a file or directory to SCSI tape  
#tar cf /dev/st0 file\_or\_dir
2. Tar with compression  
#tar cfz /dev/st0 file\_or\_dir
3. To extract a compressed archive, use:  
#tar zxf /dev/st0

### Using dump and restore

To backup /home directory actually mounted directory of partition /dev/hda8

```
#dump -0u -f /myarchive /dev/hda8
```

Or

```
#dump -0u -f /myarchive /home
```

### Dump dates is stored in /etc/dumpdates

-u options update dump date in the file.

### Creating Incremental backup

In incremental backup, only new and updated files/directory are backed up

1<sup>st</sup> increment to above backup

```
#dump -1u -f /myarchive1 /home
```

2<sup>nd</sup> rement backup

```
#dump -1u -f /myarchive1 /home
```

### Different backup

Now if we create -1 backup after creating -2, it will create backup of difference between 0 and 2. So it is called different backup

```
#dump -1u -f /diffbackup /home
```

### To restore files

```
#restore -rf /diffbackup
```

### To restore in interactive mode

```
#restore -if /myarchive1
```

```
restore>help
```

```
restore>ls
```

```
restore>cd to directory
```

### To add files to extracting list

```
restore> add filename
```

To extract files

```
restore>Extract
```

## Lab on Advanced file system

### RAID

#### Basic steps

1. Creating partition of type fd
2. Use mdadm command line utility to create RAID device of level 0, 1 or 5
3. Format RAID device /dev/md0 or md1
4. Mount the RAID device and edit /etc/fstab

#### Example

1. Fdisk /dev/had
  - a. n for netw partition
  - b. l for logical
  - c. do as instruction to choose default cylinder and size
  - d. type t to chande type of the device
  - e. choose filesystem and filesystem type to fd
2. mdadm -create /dev/md0 -chunk=64 -level=5 -raid-devices=3 /dev/had{10,11,12} -spare-devices=1 /dev/hda13
3. mke2fs -t ext3 /dev/md0
4. mount /dev/md0 /myRAIDdevice

To view the current RAID status

```
#cat /proc/mdstat
```

Or

```
#mdadm -detail /dev/md0
```

To remove a disk (/dev/hda12) from RAID array  
#mdadm -remove /dev/md0 /dev/hda12

To add new disk in RAID

1. create new drive of partition type fd (say /dev/hda14)
2. mdadm -add /dev/md0 /dev/hda14

Remove RAID device:

1. #unmount the /dev/md0
2. #mdadm -stop /dev/md0
3. Delete all partitions used by md0

Logical Volume Manager (LVM)

1. Create a partition of 83 (say partitions /dev/had{10,11,12,13})
2. To create physical volume  
#pvcreate /dev/had{10,11,12,13}
3. To display physical volume  
#pvdisplay /dev/hda10
4. To create volume group  
#vgcreate lvmtest0 /dev/had{10,11,12,13}
5. To display volume group  
#vgdisplay lvmtest0  
For status -s option  
#vgdisplay -s lvmtest0
6. To create logical volume named data0  
#lvcreate -L 28M -n data0 lvmtest0
7. To display logical volume  
#vgdisplay
8. Mkfs.ext3 /dev/lvmtest0/data0

To extend logical volume if free space exist.

```
#lvextend -L +12M /dev/lvmtest0/data0
```

To make change take in effect without rebooting other wise not shown by mount command.

```
#ext2online /dev/lvmtest0/data0
```

To reduce logical volume

```
#umount /dev/lvmtest0/data0  
#lvreduce -L 12M /dev/lvmtest0/data0  
#mount /dev/lvmtest0/data0 /mount_point
```

To extend or reduce Volume Group

Setps

1. Create partition of type 8e
2. #pvcreate /dev/hda14 (say we create hda14 partition of 83)
3. #vgextend lvmtest0 /dev/hda14
4. #vgdisplay lvmtest0

To reduce logical Group

To move data of disk which be being removed to other

```
#pvmove /dev/hda12  
#vgreduce lvmtest0 /dev/hda12
```

Removing LVM (logical Group)

1. Remove lines if exist in /etc/fstab for mouting
2. Umount LVM drive
3. #lvremove /dev/lvmtest0/dat{0,1}
4. #vgcreate -a n lvmtest0
5. #vgremove lvmtest0

Prepared By: Shiba Ratna Tamrakar

User Quota

```
#vi /etc/fstab
LABEL=/home /home ext3 defaults,usrquota 0 0
#touch /home/aquota.user
#mount -o remount,rw /home
#quotacheck -cvm /home
#quotaon /home
#edquota shiba
#quota
or
#repquota
```