

ADMINISTRATION IT

LAB 01 - LINUX BACKUP

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TASK 1: PREPARE THE BACKUP DISK

1. Before plugging the disk, examine the special files in the /dev directory that represent hard disks. List all files called

- /dev/hd*
- /dev/sd*

Which disks and which partitions on these disks are visible?

```
osboxes@osboxes:/dev$ ls sd*  
sda  sda1  sda2  sda3  sda4  sda5
```

We can see 1 disk (sda) and 5 partitions (sda1/sda2/.../sda5) here.

Which partitions are mounted? Use the command mount without parameters to find out.

```
osboxes@osboxes:/dev$ mount | grep sda  
/dev/sda2 on / type ext4 (rw,relatime,data=ordered)  
/dev/sda5 on /home type ext4 (rw,relatime,data=ordered)  
/dev/sda3 on /boot type ext4 (rw,relatime,data=ordered)
```

We can see that only sda2, sda3 and sda5 are mounted.**

2. Attach the disk to your computer.

Consult again the special files in /dev. Which new files appeared? These represent the disk and its partitions you just attached.

```
osboxes@osboxes:/dev$ ls sd*  
sda  sda1  sda2  sda3  sda4  sda5  sdb
```

We can see that a new file sdb appeared.



3. Create a partition table on the disk and create two partitions of equal size using the parted tool.

You can consult [Gentoo Linux Documentation — Preparing the Disks](#) as a reference on how to use parted.

- Using superuser privileges invoke parted with a single parameter which is the special file representing the disk. Be careful not to confuse the special file for the disk (ending in a letter) and for the partitions (ending in a number).
- Display the existing partitions with the print command. If the disk is completely blank you will get an error message about a missing disk label.

- Use the `mktable` command to create a partition table (overwriting any existing one). It should have Master Boot Record (MBR) layout (i.e. label type `msdos`).
- Display the free space with the command `print free` (roughly the size of the disk minus some overhead). Write the value down.

We have 1074 MB of size available

- Use the `mkpart` command to create the partitions.
 - The first partition will
 - be a primary partition
 - have a file system type of `fat32`
 - start at 0
 - end at about half the free space.
 - The second partition will
 - be a primary partition
 - have a file system type of `ext4`
 - start at half the free space
 - end at the free space.
- Quit parted and verify that there are now two special files in `/dev` that correspond to the two partitions.

4.Format the two partitions using the `mkfs` command.

- The first partition should have the file system type `fat`.
- The second partition should have the file system type `ext4`.

5.Create two empty directories in the `/mnt` directory as mount points, called `backup1` and `backup2`. Mount the newly created file systems in these directories.

6.How much free space is available on these filesystems? Use the `df` command to find out. What does the `-h` option do?

```
osboxes@osboxes:~$ df -h /mnt/backup1
Filesystem      Size  Used Avail Use% Mounted on
/dev/sdb1        512M  4.0K  512M   1% /mnt/backup1
osboxes@osboxes:~$ df -h /mnt/backup2
Filesystem      Size  Used Avail Use% Mounted on
/dev/sdb2       488M  2.3M  456M   1% /mnt/backup2
osboxes@osboxes:~$
```

Here we can see that we have 512 MB for `backup1` and 456 MB for `backup2` folder. Option `-h` print the sizes in powers of 1024, which are more readable for us.

TASK 2: PERFORM BACKUPS USING TAR AND ZIP

In this task you will perform different backup tasks. For each write a quick reference that you would consult as a system administrator when you have forgotten the exact invocation of the command. Do this using the `tar` command and then using the `zip` command.



The backup tasks are the following:

- Do a backup of a user's home directory to the backup disk (VFAT partition). Create a compressed archive. Do the files in the archive have a relative path so that you can restore them later to any place?

```
tar -cvzf osboxes-backup.tar.gz /home/osboxes
```

```
zip -r /mnt/backup1/osboxes-backup.zip
```

Yes, they have relative path. “tar” don’t store absolute paths in this case. We can restore wherever we want.

- List the content of the archive.

```
tar -tvf osboxes-backup.tar.gz
```

```
unzip -l osboxes-backup.zip
```

- Do a restore of the archive to a different place, say /tmp .

```
tar -xvzf osboxes-backup.tar.gz -C /tmp/restoreBackup
```

```
unzip /mnt/backup1/osboxes-backup.zip
```

- Do an incremental backup that saves only files that were modified after, say, September 23, 2016, 10:42:33. Do this only for tar , not for zip .

- Use the find command to determine the files that should be included in the backup.
- Use tar ‘s -T option to read the names of the files to be archived from a file

```
touch -d "23 Sep 2016 10:42:33" /tmp/backupDate
```

```
find /home/osboxes -newer /tmp/backupDate -type f > /tmp/newFilesToBackup
```

```
tar -cvf /mnt/backup1/incrementalBackup.tar.gz -T /tmp/newFilesToBackup
```

TASK 3: BACKUP OF FILE METADATA

In this task you will examine how well the backup commands preserve file metadata. Consult the man pages and perform tests using tar and zip and examine whether you can restore:

- the last modification time
- the permissions
- the owner



In the lab report describe the tests you did and their results.

We did some tests and here is what we find out for fat32 and ext4 partitions :

We have made few backups using tar and zip. In the table below you'll find out the results made on each partitions. Here we have the results for backup1 which is the **fat32** partition. (If OK it means the metadatas are preserved, NOK means not preserved.)

Metadata	TAR	ZIP
the last modification	OK	OK

the permissions	NOK	NOK
the owner	NOK	NOK

In order to test, we created some files and we changed few things like owner, group before the backup.


Here are the results for backup2 which is on **ext4** partitions :

Metadata	TAR	ZIP
the last modification	OK	OK
the permissions	OK	OK
the owner	NOK	NOK

We can see that the owner always change. The user who untar or unzip the backup becomes the new owner. The last modification time and permissions are kept.

There are options in case we need to keep the owner. For untar the options **—same-owner** will do the job. For unzip the options is **-X**. This is the case on linux filesystems only.

TASK 4: SYMBOLIC AND HARD LINKS

In this task you will examine whether the backup commands preserve symbolic and hard  links. Consult the man pages and perform tests using tar and zip. In the lab report describe the tests you did and their results.

All **FAT** filesystems doesn't support symbolic/hard links so we only tested on the **ext4** partitions :

Metadata	TAR	ZIP
hard links	OK	NOK
symbolic links	OK	NOK

We can see that basic zip command don't preserve the links but store the file referred to. For UNIX systems, the **—symlinks** option can be used to preserve only symbolic links. For tar, the links are preserved.