eh1act03 – Disk quotas

GENERAL CONDITIONS
1- Deadline: **11-04-2025**
2- Teacher will check that your operating system is working properly

SOME BASIC IDEAS

1- A **disk quota** is a system that allows system administrators to set limits on the:
- Amount of disk space that a user or group can consume on a file system
- Amount of files and folders that a user or group can create on a file system

2- The key concepts of disk quota are:
- **Blocks:** Usually a 1KiB of data storage space on your hard drive

- **Inodes:** Usually, one inode is created on an special area of your hard drive for each file and directories that is created.

- **Soft Limit:** The soft limit is the maximum amount of disk space or inodes that a user can consume before receiving a warning. If the user exceeds the soft limit, they will be able to continue using the file system, but they will receive periodic warnings.

- **Hard Limit:** The hard limit is the absolute maximum amount of disk space or inodes that a user can consume. If a user reaches the hard limit, they will not be able to allocate any more disk space, and any further attempts to do so will fail.

- **Grace period:** To give current users some time to reduce their file usage, a grace period can be configured. This specifies the allowed time a user/group can exceed their soft limit (but no the hard limit).

3- Installation: **sudo aptitude install quota quotatool**

4- How to **setup quotas** on a filesystem (usually a hard drive partition):

- Determine where is located **/home**:

df -Th /home

- Edit **fstab** to **enable quotas** on the filesystem where the **/home** directory is located. For instance, if **/home** is located on **sda1** that is mounted on **/**, then add options **usrquota** and **usrgroup** to the **4th column**. Example:
  ```
  # / was on /dev/sda1 during installation
  UUID=253e575c-b4bb-4add-a6cc-d1a8576409c3  /      ext4   errors=remount-ro,usrquota,grpquota 0     1
  ```

- Remount the filesystem. For instance, following the the previous example:

sudo mount -o remount /

5- Create files **aquota.user** and **aquota.group** required to store informacion about the limits and usage of the filesystem, and they need to exist before we turn on (activate) quotas. For instance, following the previous example, Run:

sudo quotacheck -ugm /

and check that **aquota.user** and **aquota.group** were created in folder **/**.

6- Turn on (activate) **quotas**. Following the previous example, Run:

sudo quotaon -v /

7- Now, set a user **quota**. For instance, if you want to create the following quotas for a user called **eh1**:

- Blocks – Soft limit: 300MiB
- Blocks – Hard Limit: 320MiB
- Inodes – Soft limit: 1300
- Inodes – Hard limit: 1400

you shold run the following command:

sudo setquota -u eh1 300M 320M 1300 1400 /

8- Now, set a **grace period**. For instance, if you want to set a **2 days** grace period for **blocks** and **inodes**:

sudo setquota -t 172800 172800 /

The above command sets both the block and inode grace times to 172800 seconds, or 2 days. This setting applies to all users. Note that the values *must* be specified in seconds.

9- If you want to check quotas for user **eh1**, run:

sudo quota -vs eh1

10- If you want to show a report of all configured quotas on a filesystem, run:

sudo repquota -s /

PRACTICAL EXERCISE

PART 1 – Quotas: Installation, configuration and monitoring

1- Remove any hard drive attached to your virtual machine but the main hard drive

2- Install the packages required to manage user **quotas** on your system.

3- Create a group called **eh1** on your system with GID equal to **1500**.

4- Create a user called **eh1** on your system wiht the following characteristics:
a) The **User identifier** will be **1500**
b) By **default** is **member** of the **eh1** group
c) The **Home directory** will be **/home/eh1**
d) The **default shell** will be the **bash** program,
e) The **password** (the version with no encryption for the user) will be **FjeClot25@**
f) Additionally, the new user will be **member** of the **sudo** and **vboxsf** groups.
g) /etc/skel will be the **skeleton** directory for the new user.

5- Determine where **/home** is located.

6- Edit **/etc/fstab** to **enable quotas** on the filesystem where the **/home** directory is located.

7- Remount the filesystem where **/home** is located.

8- Create **aquota.user** and **aquota.group**.

9- Turn on quotas.

10- Set the block disk and inode quota for **eh1** to:
- Block disk soft limit: **500MiB**
- Bloc disk hard limit: **520MiB**
- Inode soft limit: **6000**
- Inode hard limit: **6200**
- Grace period: **3 days**

11- Set the block disk and inode quota for **your user by default** to:
- Block disk soft limit: **1000MiB**
- Bloc disk hard limit: **1200MiB**
- Inode soft limit: **10000**
- Inode hard limit: **11000**
- Grace period: **7 days**

12- Set the period grace to **3 days**.

13- Show a report of all configured quotas.

14- Show quotas that apply to user **eh1**.

PART 2 – Quotas: Testing and verifying its correct operation

1- Log in the system as **eh1** user. Create a **505MiB** file running:

```
dd if=/dev/zero of=bigFile.img bs=1M count=505
```

2- Show **quotas** that apply to **eh1**. Check that his/her period grace has started and what is the space used by files created by **eh1** on the system.

3- As **eh1**, Remove **bigFile.img** and check that his/her períod grace and used space are correct again.

4- As **eh1**, remove **bigFile.img**. Afterwards, create a folder called **test**. Gain access to test and create **6050** files running the command:

```
for (( r=1; r<=6050; r++ )); do echo "Hello Wolrd" > file$r; done
```

Check the message shown by the operating system. Afterwards,check that his/her period grace has started and how many files were created by **eh1** on the system.

5- As **eh1**, Remove **file1** to **file6050** and check that his/her períod grace and files created are correct again.

PART 3 – Check your practical exercise
1- Show contents of **/etc/fstab**
2- Show **aquota.user** and **aquota.group** on your system.
3- Show a report of all configured **quotas**.
4- Show quotas that apply to user **eh1**.
5- As a **eh1** user, create a **510MiB** file called **bigFile2.img** and show your quotas.
6- Show clearly that your period grace has started and space used by files created by **eh1** on the system.
7- As a **eh1** user, remove **bigFile2.img.** Afterwards, create a **6100** new files called **newfile1** to **newfile6100** and show your quotas.
8- Show clearly that your period grace has started and and how many files were created by **eh1** on the system.
9- As **eh1**, Remove **newfile1** to **newfile6100** and check that his/her períod grace and files created are correct again.