

Práctica 1: Dockers

1. Prova a crear un contenidor nou i:

- Instal·la el programa youtube-dl (mira com s'instal·la i com es baixa només audio i converteix a mp3)

Abans de tot, hem d'iniciar el docker, utilitzarem la comanda: **sudo docker run --device /dev/snd:/dev/snd --name conPablo -it ubuntu:20.04** Com veiem a la imatge, no trobarà la imatge en local, així que la descarregarà automàticament.

```
125 enti@enti:~$ sudo docker run --device /dev/snd:/dev/snd --name conPablo -it ubuntu:20.04
Unable to find image 'ubuntu:20.04' locally
20.04: Pulling from library/ubuntu
ca1778b69356: Pull complete
Digest: sha256:db8bf6f4fb351aa7a26e27ba2686cf35a6a409f65603e59d4c203e58387dc6b3
Status: Downloaded newer image for ubuntu:20.04
root@9ecf3f1b39c6:/#
```

Fem un update ja que es com si tinguessim una màquina virtual dins d'una màquina virtual, així que es una de nova:

```
root@9ecf3f1b39c6:/# apt update
Get:1 http://archive.ubuntu.com/ubuntu focal InRelease [265 kB]
Get:2 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:3 http://archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:4 http://archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:5 http://archive.ubuntu.com/ubuntu focal/universe amd64 Packages [11.3 MB]
Get:6 http://security.ubuntu.com/ubuntu focal-security/universe amd64 Packages [1039 kB]
Get:7 http://archive.ubuntu.com/ubuntu focal/multiverse amd64 Packages [177 kB]
Get:8 http://archive.ubuntu.com/ubuntu focal/restricted amd64 Packages [33.4 kB]
Get:9 http://archive.ubuntu.com/ubuntu focal/main amd64 Packages [1275 kB]
Get:10 http://archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [1334 kB]
Get:11 http://archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [2341 kB]
Get:12 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [3150 kB]
Get:13 http://archive.ubuntu.com/ubuntu focal-updates/multiverse amd64 Packages [31.2 kB]
Get:14 http://archive.ubuntu.com/ubuntu focal-backports/main amd64 Packages [55.2 kB]
Get:15 http://security.ubuntu.com/ubuntu focal-security/multiverse amd64 Packages [28.5 kB]
Get:16 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [2669 kB]
Get:17 http://archive.ubuntu.com/ubuntu focal-backports/universe amd64 Packages [28.6 kB]
Get:18 http://security.ubuntu.com/ubuntu focal-security/restricted amd64 Packages [2203 kB]
Fetched 26.3 MB in 2s (10.9 MB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
All packages are up to date.
root@9ecf3f1b39c6:/#
```

Ara ens descarreguem els paquets **python3** i **python3-pip** per començar a treballar.

```
root@9ecf3f1b39c6:/# apt install python3 python3-pip
```

Per descarregar el programa yt-dl, hem d'utilitzar el gestor de paquets de Python que és pip (anteriorment descarregat). Escriurem la següent instrucció: **pip install yt-dlp**.

```
root@9ecf3f1b39c6:/# pip install yt-dlp
Collecting yt-dlp
  Downloading yt_dlp-2023.3.4-py2.py3-none-any.whl (2.9 MB)
    |#####| 2.9 MB 3.3 MB/s
Collecting websockets
  Downloading websockets-11.0.2-cp38-cp38-manylinux_2_5_x86_64.manylinux1_x86_64.manylinux_2_17_x86_64.manylinux2014_x86_64.whl (130 kB)
    |#####| 130 kB 49.0 MB/s
Collecting mutagen
  Downloading mutagen-1.46.0-py3-none-any.whl (193 kB)
    |#####| 193 kB 17.3 MB/s
Collecting certifi
  Downloading certifi-2022.12.7-py3-none-any.whl (155 kB)
    |#####| 155 kB 12.8 MB/s
Collecting brotli; platform_python_implementation == "CPython"
  Downloading Brotli-1.0.9-cp38-cp38-manylinux1_x86_64.whl (357 kB)
    |#####| 357 kB 45.3 MB/s
Collecting pycryptodomex
  Downloading pycryptodomex-3.17-cp35-abi3-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (2.1 MB)
    |#####| 2.1 MB 31.4 MB/s
Installing collected packages: websockets, mutagen, certifi, brotli, pycryptodomex, yt-dlp
Successfully installed brotli-1.0.9 certifi-2022.12.7 mutagen-1.46.0 pycryptodomex-3.17 websockets-11.0.2 yt-dlp-2023.3.4
```

- **Instal·la un reproductor de consola (mplayer) que permeti reproduir-lo.**

Podem utilitzar mplayer com a reproductor de consola. En el meu cas, ja l'havia descarregat, però l'ordre per instal·lar-lo és: "apt install mplayer".

```
root@9ecf3f1b39c6:/# apt install mplayer
```

També descarrego ffmpeg.

```
root@9ecf3f1b39c6:/# apt install ffmpeg
```

- **Comprova que es baixa l'audio d'un video i es pot reproduir.**

Per descarregar l'audio i reproduir-lo ho farem de la següent manera:

Primer ens descarreguem l'audio amb la següent comanda: **yt-dlp -x --audio-format mp3 https://www.youtube.com/watch?v=zcV7RptHqro -o /mp3/music.mp3**

```
root@9ecf3f1b39c6:/# yt-dlp -x --audio-format mp3 https://www.youtube.com/watch?v=zcV7RptHqro -o /mp3/music.mp3
[youtube] Extracting URL: https://www.youtube.com/watch?v=zcV7RptHqro
[youtube] zcV7RptHqro: Downloading webpage
[youtube] zcV7RptHqro: Downloading android player API JSON
[info] zcV7RptHqro: Downloading 1 format(s): 251
[dashsegments] Total fragments: 1
[download] Destination: /mp3/music.webm
[download] 100% of 3.82MiB in 00:00:00 at 15.32MiB/s
[ExtractAudio] Destination: /mp3/music.mp3
```

Una vegada es descarrega, ens mourem al directori creat /mp3/.

```
root@9ecf3f1b39c6:/mp3# ls
music.mp3
```

I per executar l'audio utilitzem el reproductor descarregat anteriorment: **mplayer music.mp3**

```
root@9ecf3f1b39c6:/mp3# mplayer music.mp3
MPlayer 1.3.0 (Debian), built with gcc-9 (C) 2000-2016 MPlayer Team
do_connect: could not connect to socket
connect: No such file or directory
Failed to open LIRC support. You will not be able to use your remote control.

Playing music.mp3.
libavformat version 58.29.100 (external)
Audio only file format detected.
Load subtitles in ./
=====
Opening audio decoder: [mpg123] MPEG 1.0/2.0/2.5 layers I, II, III
AUDIO: 48000 Hz, 2 ch, s16le, 32.0 kbit/2.08% (ratio: 4000->192000)
Selected audio codec: [mpg123] afm: mpg123 (MPEG 1.0/2.0/2.5 layers I, II, III)
=====
AO: [pulse] Init failed: Connection refused
Failed to initialize audio driver 'pulse'
AO: [alsa] 48000Hz 2ch s16le (2 bytes per sample)
Video: no video
Starting playback...
A: 9.7 (09.7) of 246.0 (04:06.0) 0.2%
```

2.Guarda el contenidor com a imatge (anomenada "reproductor") per a poder utilitzar-lo amb docker run. Ara aquesta imatge contindrà tots els paquets instal·lats abans.

En aquesta instrucció, utilitzo la comanda "docker commit" per guardar la imatge del contenidor que he creat, indicant el nom que li he assignat anteriorment i el nom que vull donar-li a la imatge.Utilitzem la comanda: **sudo docker commit conPablo reproductor**

```
1 enti@enti:~$ sudo docker commit conPablo reproductor
sha256:1f0a219b4ab0dbaf4cdba3fa37aa7b44d406d78016344314b41c77f2482f9445
```

Després per comprovar-ho fem: **sudo docker images**

```
enti@enti:~$ sudo docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
reproductor	latest	1f0a219b4ab0	46 seconds ago	923MB
ubuntu	20.04	88bd68917189	3 weeks ago	72.8MB
alpine	latest	9ed4aefc74f6	5 weeks ago	7.05MB
ubuntu	latest	08d22c0ceb15	8 weeks ago	77.8MB
ubuntu	18.04	3941d3b032a8	8 weeks ago	63.1MB

Podem comprovar que si que s'ha guardat.

Guardar el contenidor com una imatge em permet preservar l'estat actual del contenidor per poder accedir-hi posteriorment. A diferència de les màquines virtuals, els contenidors no preserven les accions que realitzes dins d'ells, ja que no tenen persistència.

3.Guarda una còpia de seguretat de la imatge en un fitxer tar. Esborra la imatge que has creat en Docker, demostra que l'has esborrat i recupera-la amb el fitxer tar que havies creat.

Demostra que ara hi és.

Per fer una còpia de seguretat: **sudo docker save -o backup_reproductor.tar reproductor:latest**

```
enti@enti:~$ sudo docker save -o backup_reproductor.tar reproductor:latest
```

```
enti@enti:~$ ls
backup_reproductor.tar
```

Ara esborrarem l'imatge per tornar-la a carregar, ja que hem fet el backup, per fer això necessitem l'IMAGE ID. Les instruccions son: **sudo docker images sudo docker rmi 1f0a219b4ab0**

```
enti@enti:~$ sudo docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
reproductor   latest    1f0a219b4ab0   15 minutes ago 923MB
ubuntu        20.04     88bd68917189   3 weeks ago   72.8MB
alpine        latest    9ed4aefc74f6   5 weeks ago   7.05MB
ubuntu        latest    08d22c0ceb15   8 weeks ago   77.8MB
ubuntu        18.04     3941d3b032a8   8 weeks ago   63.1MB
enti@enti:~$ sudo docker rmi 1f0a219b4ab0
Untagged: reproductor:latest
Deleted: sha256:1f0a219b4ab0dbaf4cdba3fa37aa7b44d406d78016344314b41c77f2482f9445
Deleted: sha256:cd212a9433962e74998150863f3249e30ccd0db926d2c49ee29e446315fc6fbb
```

A partir dd'aquí ja podem carregar la imatge del reproductor en backup de la següent forma:

sudo docker load -i backup_reproductor.tar

```
enti@enti:~$ sudo docker load -i backup_reproductor.tar
c9143211f7d7: Loading layer [=====>] 864.5MB/864.5MB
Loaded image: reproductor:latest
enti@enti:~$ sudo docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
reproductor   latest    1f0a219b4ab0   16 minutes ago 923MB
```

4.Arrenca un contenidor amb la imatge creada com a base que executi la comanda per baixar el fitxer i després la comanda per reproduir-lo (tot a la mateixa crida del contenidor).

La comanda es: **sudo docker run --device /dev/snd:/dev/snd --name contenedor -it reproductor bash -c "yt-dlp -x --audio-format mp3 --audio-quality 0 https://www.youtube.com/watch?v=zcV7RptHqro -o /mp3/music.mp3 && mplayer /mp3/music.mp3"**

```
115 enti@enti:~$ sudo docker run --device /dev/snd:/dev/snd --name contenedor -it reproductor bash -c "yt-dlp -x --audio-format mp3 --audio-quality 0 https://www.youtube.com/watch?v=zcV7RptHqro -o /mp3/n
usic.mp3 && mplayer /mp3/music.mp3"
[youtube] Extracting URL: https://www.youtube.com/watch?v=zcV7RptHqro
[youtube] zcV7RptHqro: Downloading webpage
[youtube] zcV7RptHqro: Downloading android player API JSON
[info] zcV7RptHqro: Downloading 1 format(s): 251
[download] /mp3/music.mp3 has already been downloaded
[ExtractAudio] Not converting audio /mp3/music.mp3; file is already in target format mp3
MPlayer 1.3.0 (Debian), built with gcc-9 (C) 2000-2016 MPlayer Team
do_connect: could not connect to socket
connect: No such file or directory
Failed to open LIRC support. You will not be able to use your remote control.

Playing /mp3/music.mp3.
libavformat version 58.29.100 (external)
Audio only file format detected.
Load subtitles in /mp3/
=====
Opening audio decoder: [mpg123] MPEG 1.0/2.0/2.5 layers I, II, III
AUDIO: 48000 Hz, 2 ch, s16le, 32.0 kbit/2.08% (ratio: 4800->192000)
Selected audio codec: [mpg123] afm: mpg123 (MPEG 1.0/2.0/2.5 layers I, II, III)
=====
AO: [pulse] Init failed: Connection refused
Failed to initialize audio driver 'pulse'
AO: [alsa] 48000Hz 2ch s16le (2 bytes per sample)
VCodec: no video
Starting playback...
  0:  4.8 (04.7) of 260.0 (04:20.0)  0.1%
```

5.Fes neteja de contenidors i imatges que no facis servir. Mostra TOTS els contenidors i imatges que hi ha en local abans i després de la neteja.

Abans:

```
enti@enti:~$ sudo docker ps -a
CONTAINER ID   IMAGE      COMMAND                  CREATED        STATUS        PORTS          NAMES
11a63d83673b   reproductor  "bash -c 'yt-dlp -x ...'"  6 minutes ago  Exited (1)    6 minutes ago  contenedor
9ecf3f1b39c6   ubuntu:20.04  "/bin/bash"             About an hour ago  Exited (1)    10 minutes ago  conPablo
dbcbdaf81848   alpine       "/bin/sh"               21 hours ago    Up 3 hours                c_bd
bf5f259c709e   alpine       "/bin/sh"               22 hours ago    Exited (0)    About an hour ago  c_control
4536a3eacf5c   alpine       "/bin/sh"               22 hours ago    Up 2 hours                c_web
b67cc0017da5   ubuntu:18.04  "/bin/bash"             8 days ago      Exited (1)    8 days ago      Pablocont
f1afe4d1dc2a   ubuntu       "/bin/bash"             8 days ago      Exited (100)  8 days ago      PabloCont
17f31534f0ce   ubuntu:18.04  "/bin/bash"             8 days ago      Exited (0)    8 days ago      bold_bouman
d42f4730cc10   ubuntu:18.04  "/bin/bash"             8 days ago      Exited (127)  8 days ago      mystifying_jackson
a01242787b18   ubuntu:18.04  "/bin/bash"             8 days ago      Exited (0)    8 days ago      practical_lederberg
```

Per borrar:

```
enti@enti:~$ sudo docker rm Pablocont mystifying_jackson practical_lederberg
Pablocont
mystifying_jackson
practical_lederberg
```

Després:

```
enti@enti:~$ sudo docker ps -a
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS              PORTS          NAMES
11a63d83673b   reproductor    "bash -c 'yt-dlp -x ..." 8 minutes ago  Exited (1) 8 minutes ago           contenedor
9ecf3f1b39c6   ubuntu:20.04   "/bin/bash"             About an hour ago  Exited (1) 12 minutes ago           conPablo
dbcbdaf81848   alpine         "/bin/sh"               21 hours ago    Up 3 hours                               c_bd
bf5f259c709e   alpine         "/bin/sh"               22 hours ago    Exited (0) About an hour ago           c_control
4536a3eacf5c   alpine         "/bin/sh"               22 hours ago    Up 2 hours                               c_web
enti@enti:~$
```