TP Virtualisation - 2

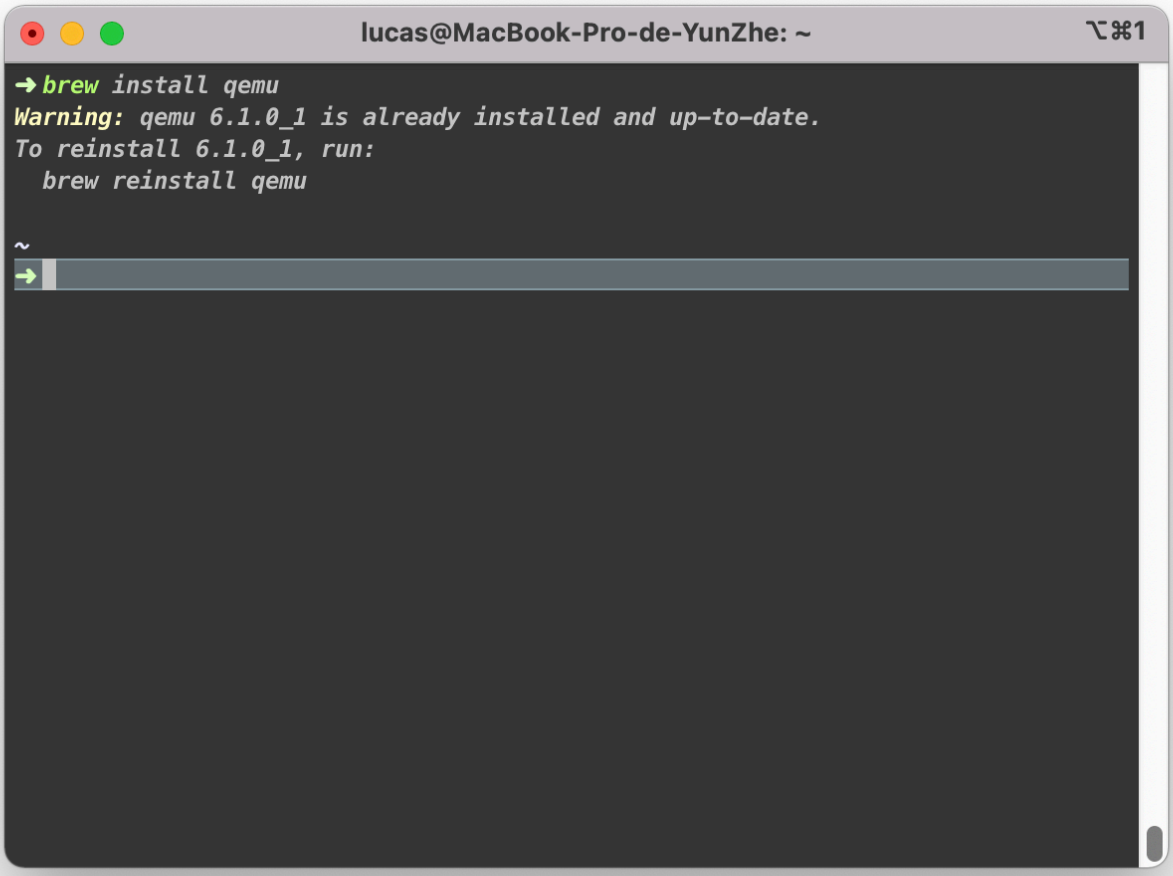
> Yunzhe GUO INFO 5

1.1 Installation de Qemu

1.1.1 Sur MAC OS

For this TP, I use Mac OS:

I use `Homebrew` to install `qemu`: `brew install qeum`

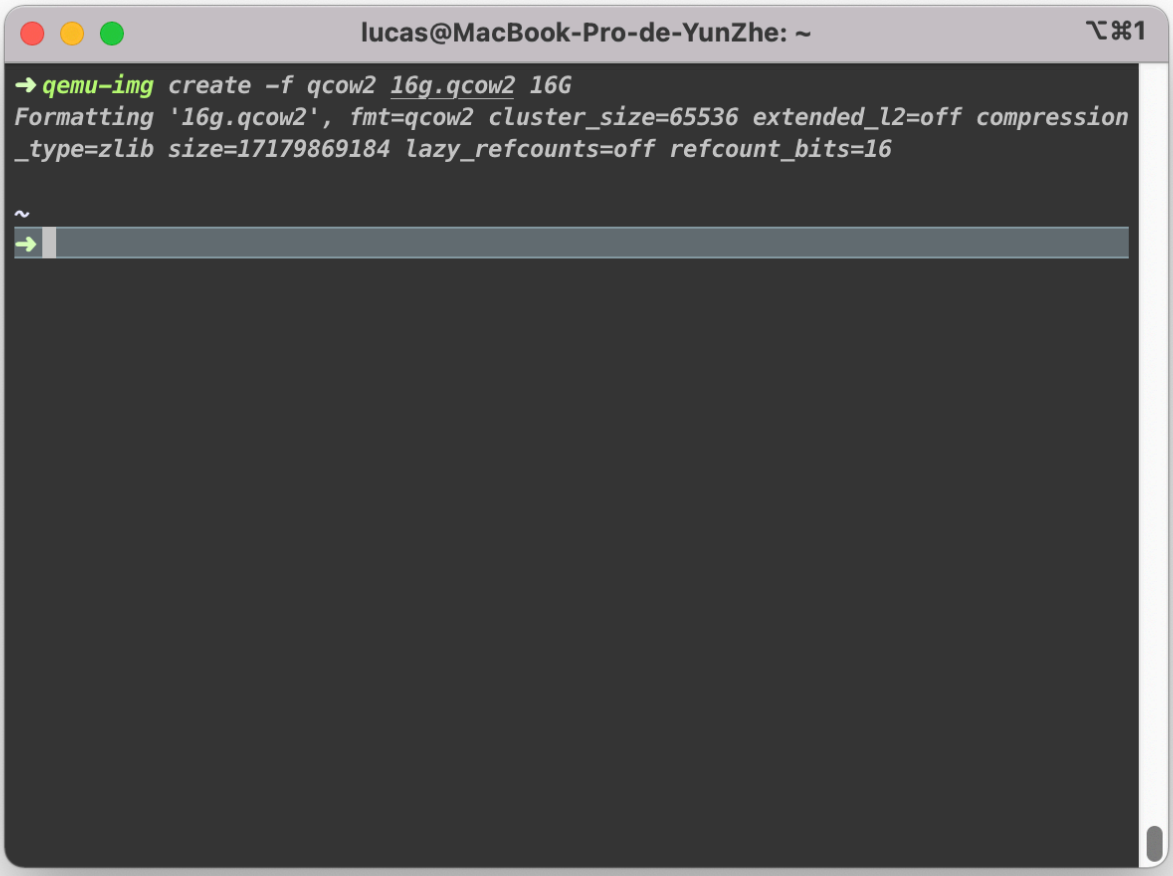


1.1.2 Premiers tests

1.1.2.1 Construction d'une image avec qemu-img

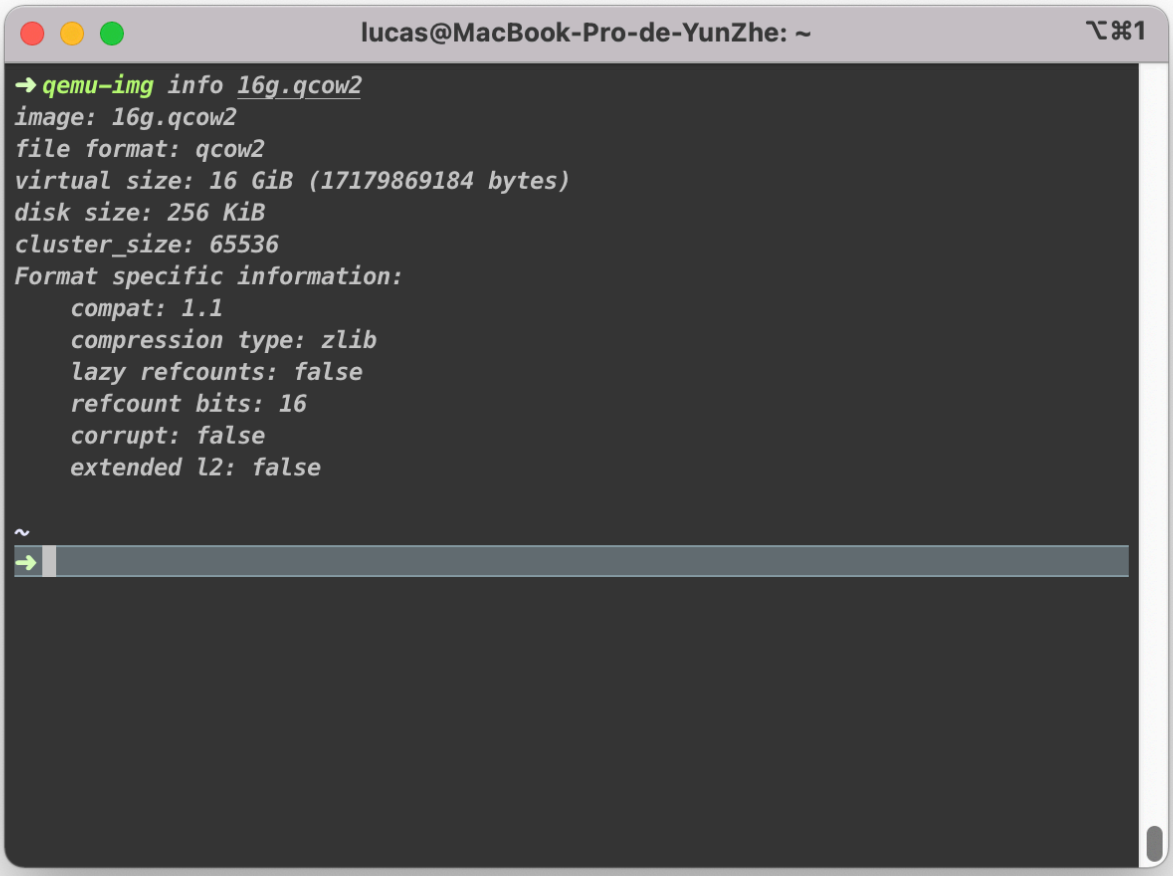
qemu-img vous permet de manipuler les images disque utilisées par qemu. Créez par exemple une image au format qcow2 :

```
qemu-img create -f qcow2 16g.qcow2 16G
```



Déterminez sa taille : `ls -lsh 16g.qcow2`, à rapprocher de la sortie de la commande

```
qemu-img info 16g.qcow2
```



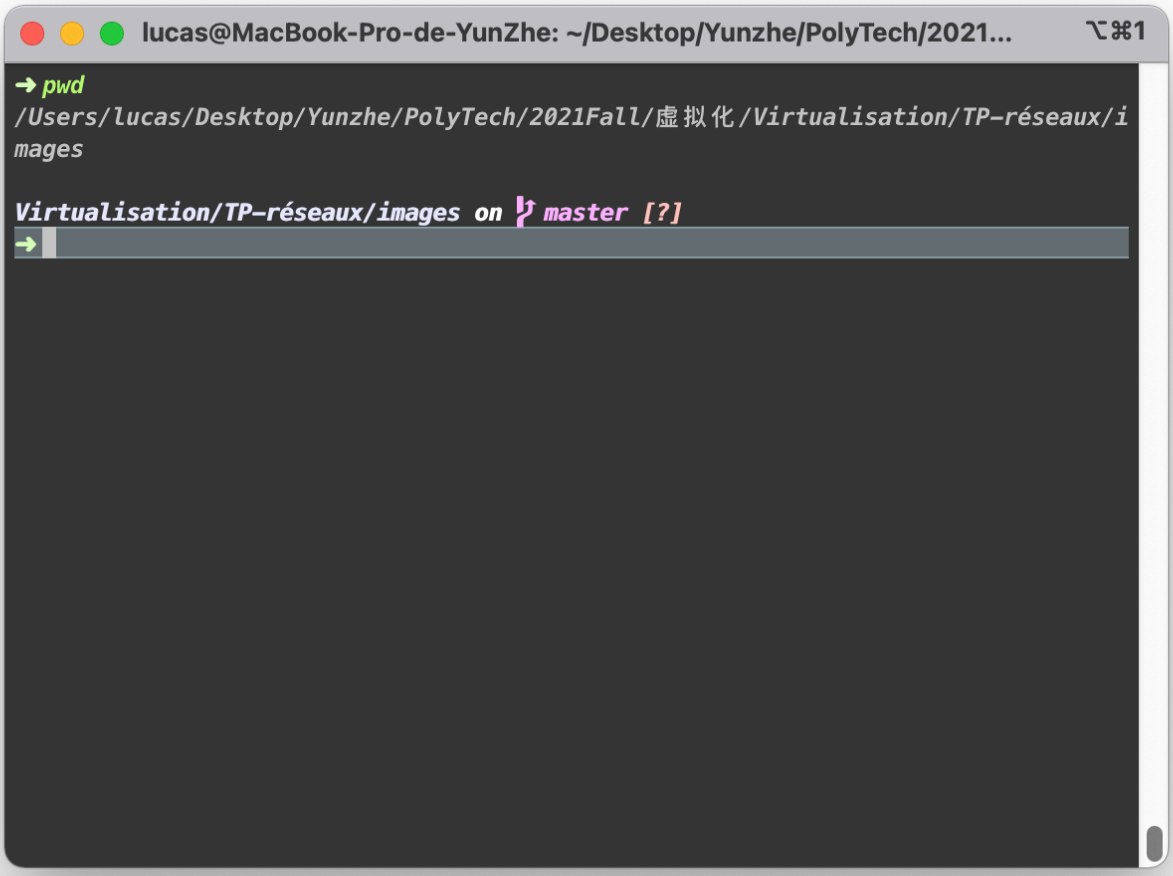
The disk size is 256kb, which means the 16G is virtual size.

1.1.2.2 Cas pratique : construction d'une image de démarrage Debian Buster

Il est aussi possible de "fabriquer" soi-même une image Debian Buster. Fabriquer une image permet de la personnaliser beaucoup plus. Néanmoins, l'opération demande du temps.

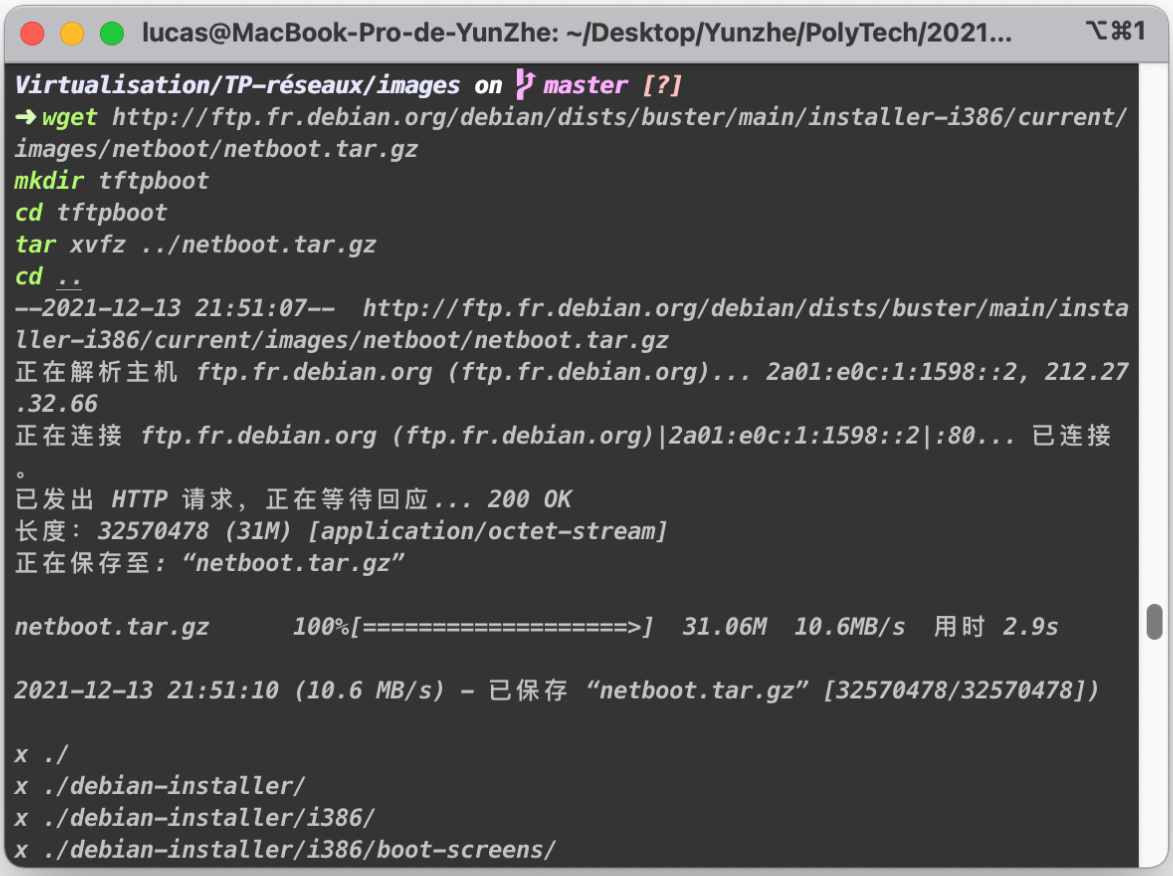
1. Commencez par créer un répertoire dans lequel vous installerez une image de base :

```
mkdir -p TP-réseaux/images/
cd TP-réseaux/images/
```



2. Téléchargez le code d'amorçage :

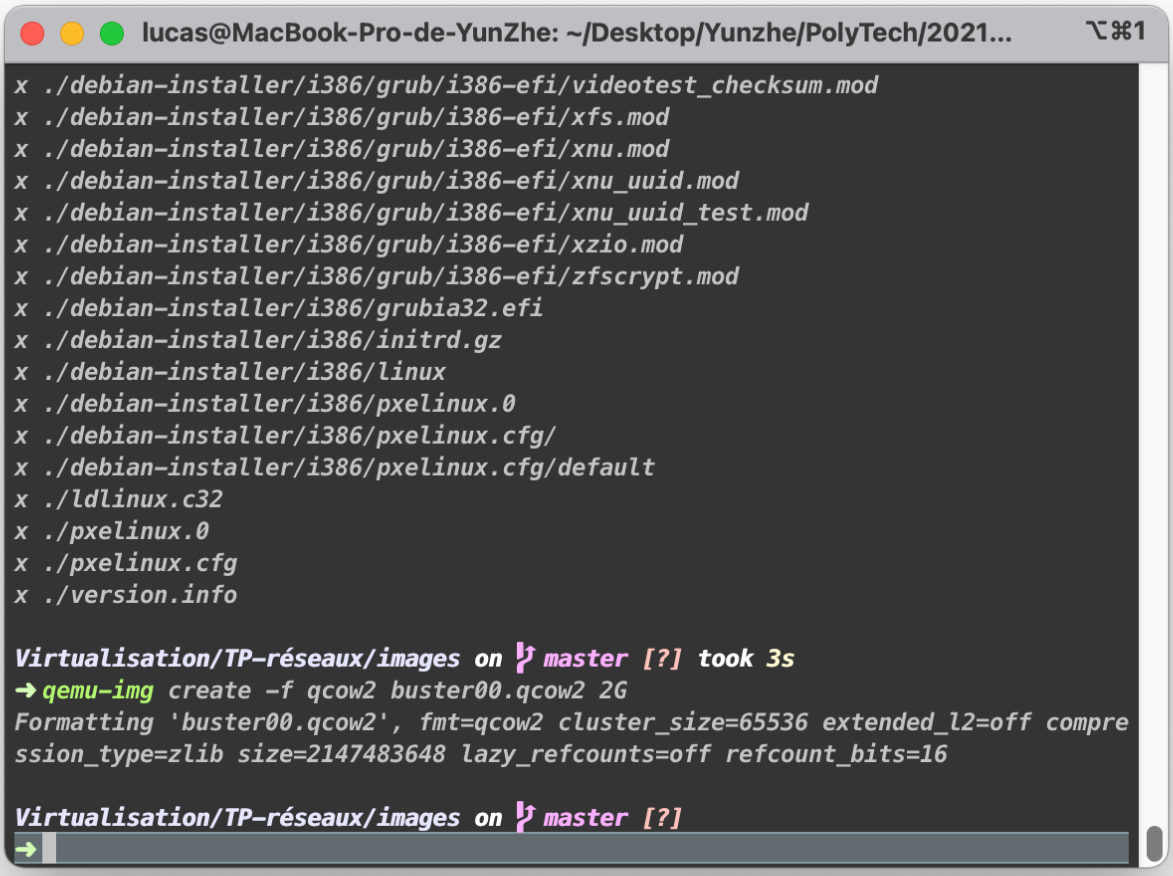
```
wget http://ftp.fr.debian.org/debian/dists/buster/main/installer-
i386/current/images/netboot/netboot.tar.gz
mkdir tftpboot
cd tftpboot
tar xvfz ../netboot.tar.gz
cd ..
```



3. Créez une image disque (vierge) de 2 Go :

```
qemu-img create -f qcow2 buster00.qcow2 2G
```

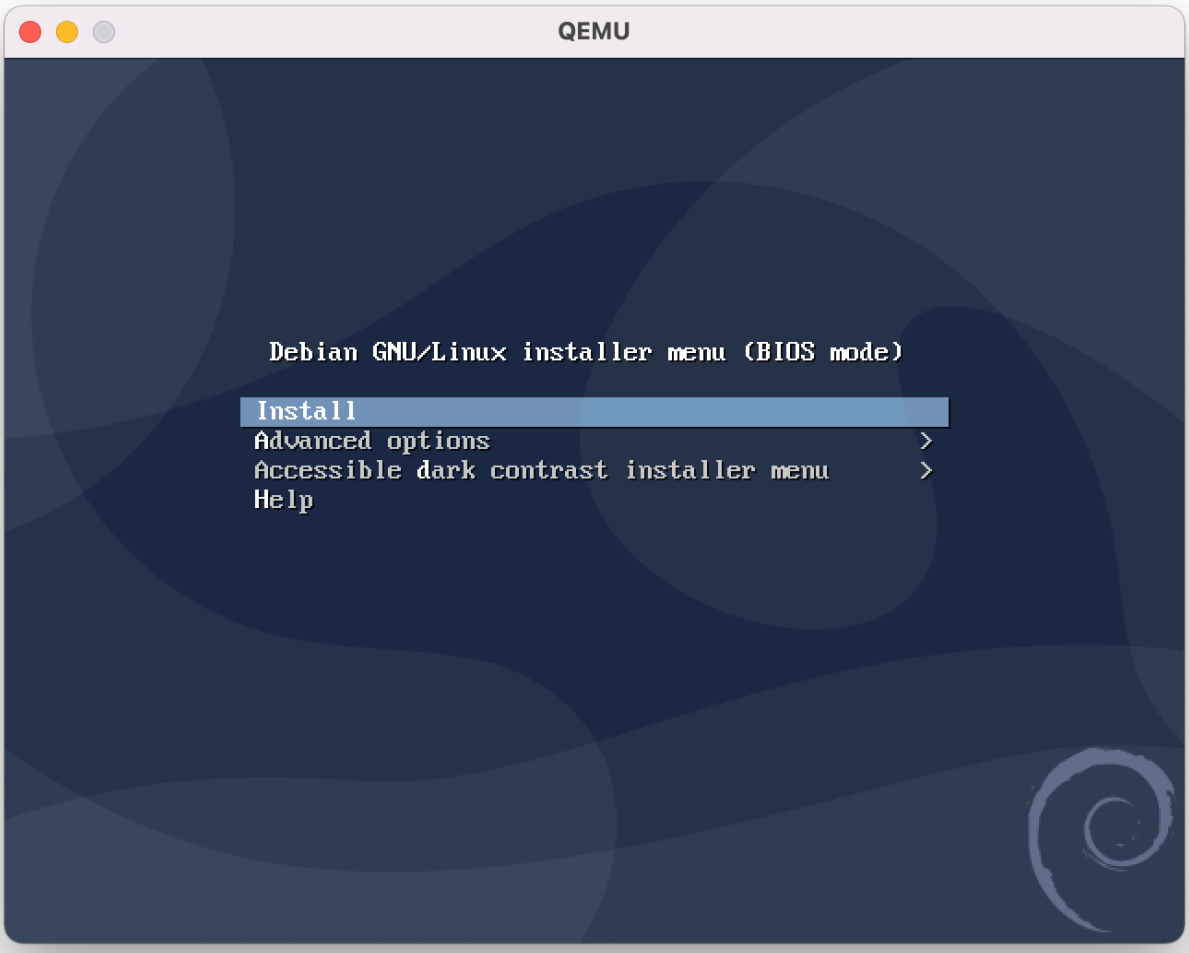
Vous remarquerez que l'espace disque utilisé ne correspond qu'aux blocs effectivement utilisés et non la capacité totale maximale.

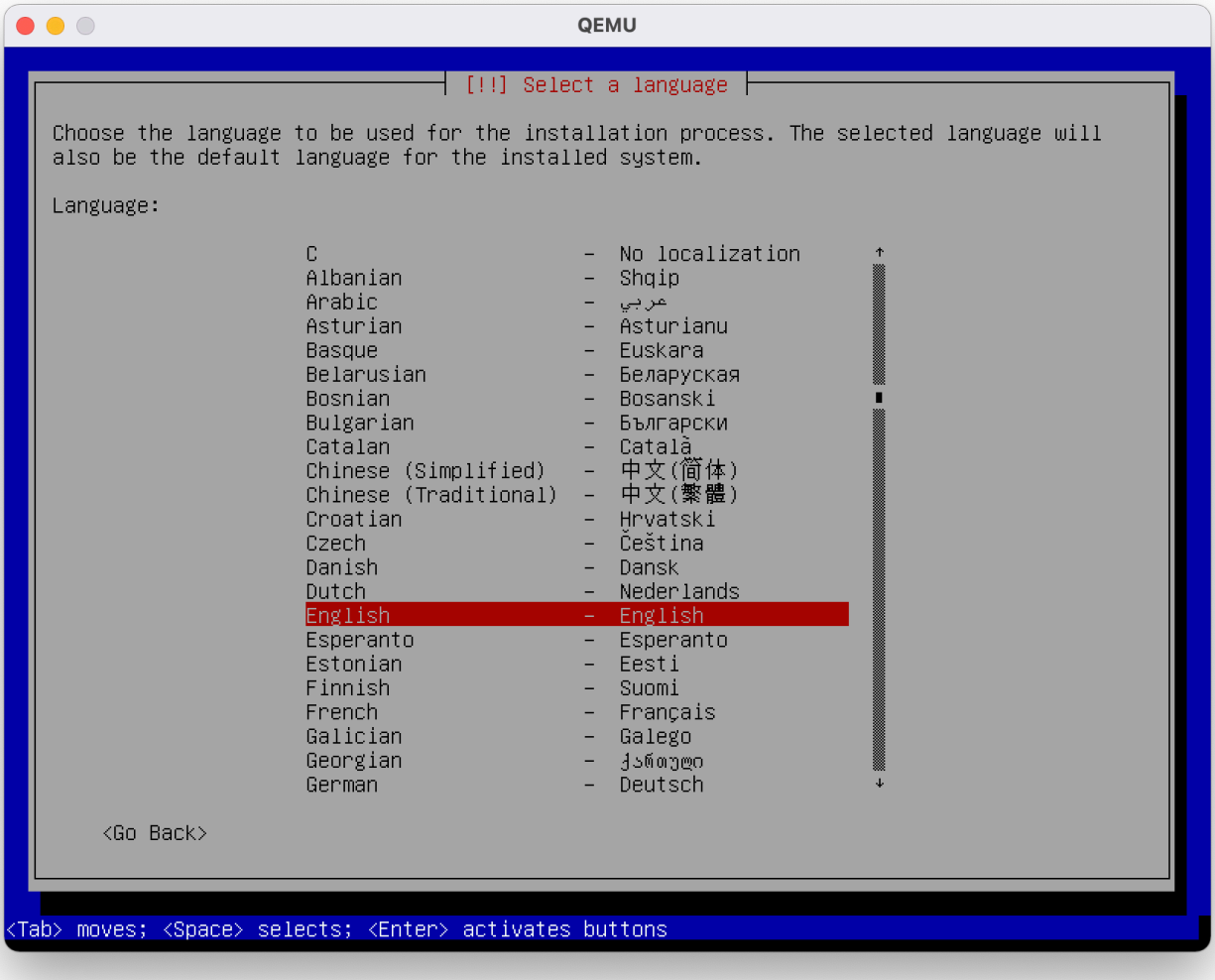


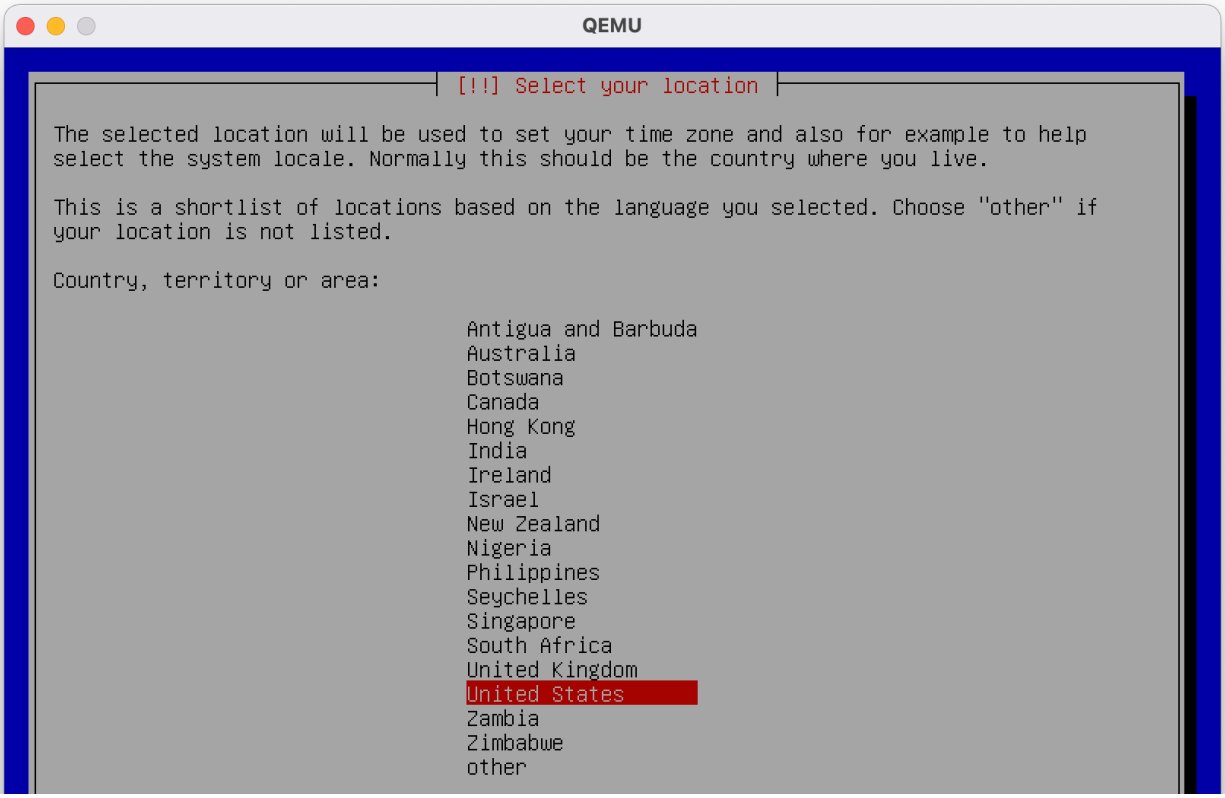
4. Démarrez ensuite une machine virtuelle Qemu au moyen de la commande suivante :

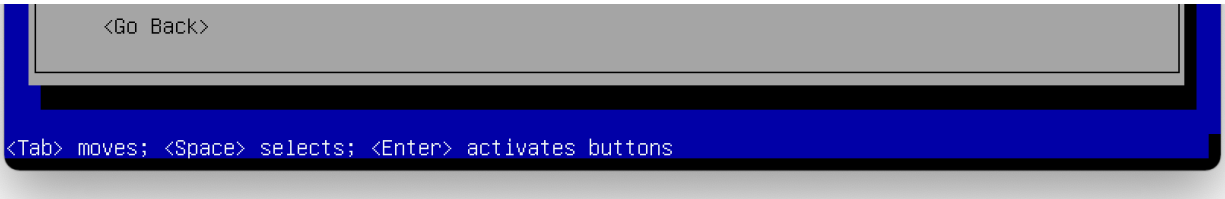
```
qemu-system-x86_64 -machine q35,accel=hvf -cpu host -m 512m -drive
file=buster00.qcow2,if=virtio,index=0 -boot n -device virtio-net,netdev=en0 -netdev
user,id=en0,tftp="$(pwd)"/tftpboot,bootfile=pxelinux.0
```

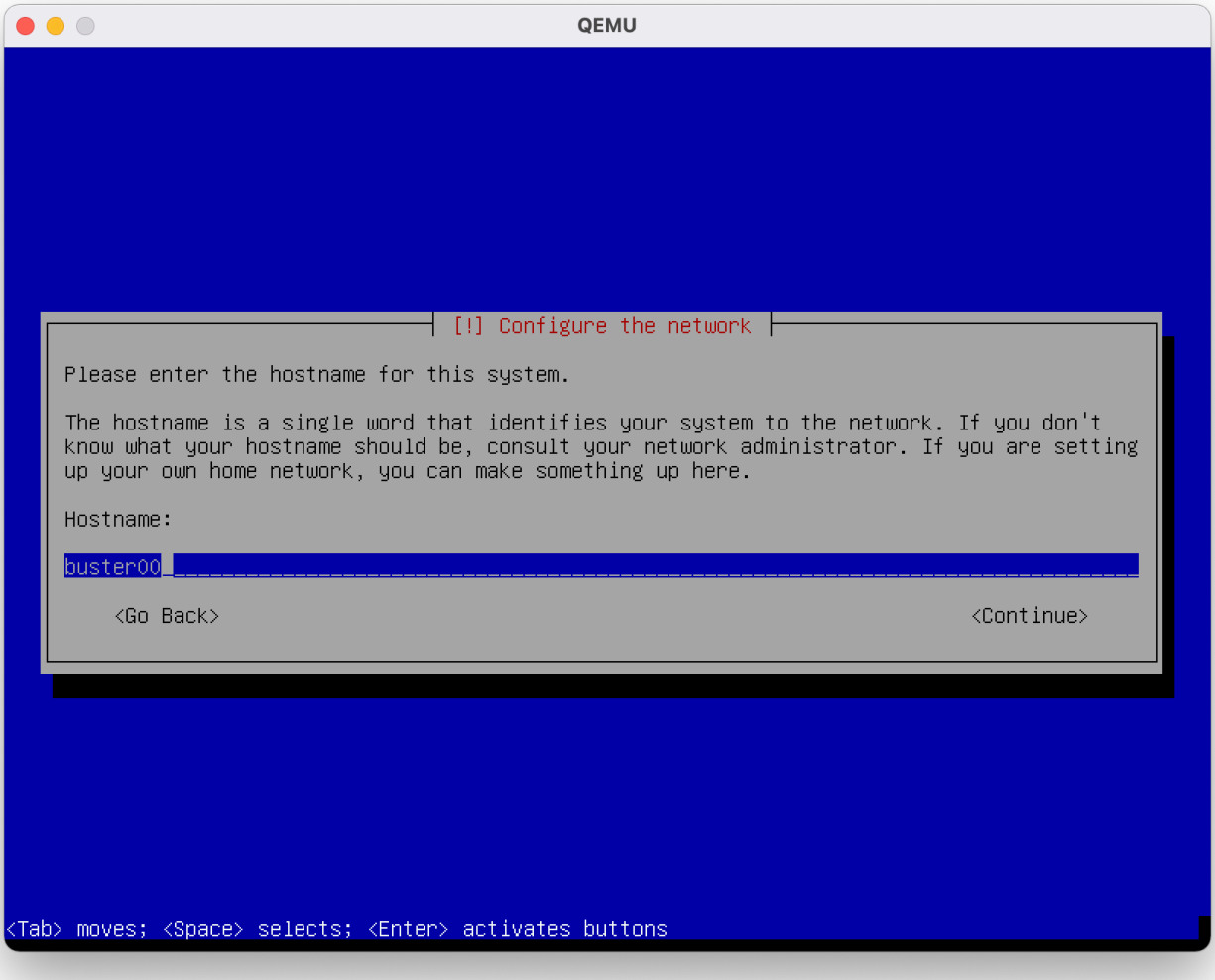
Il y a des images enregistrer quelque étape de la configuration.




QEMU
[!!] Select a language
Choose the language to be used for the installation process. The selected language will also be the default language for the installed system.
Language:
C - No localization
Albanian - Shqip
Arabic - عربي
Asturian - Asturianu
Basque - Euskara
Belarusian - Беларуская
Bosnian - Bosanski
Bulgarian - Български
Catalan - Català
Chinese (Simplified) - 中文(简体)
Chinese (Traditional) - 中文(繁體)
Croatian - Hrvatski
Czech - Čeština
Danish - Dansk
Dutch - Nederlands
English - English
Esperanto - Esperanto
Estonian - Eesti
Finnish - Suomi
French - Français
Galician - Galego
Georgian - ქართული
German - Deutsch
<Go Back>
<Tab> moves; <Space> selects; <Enter> activates buttons

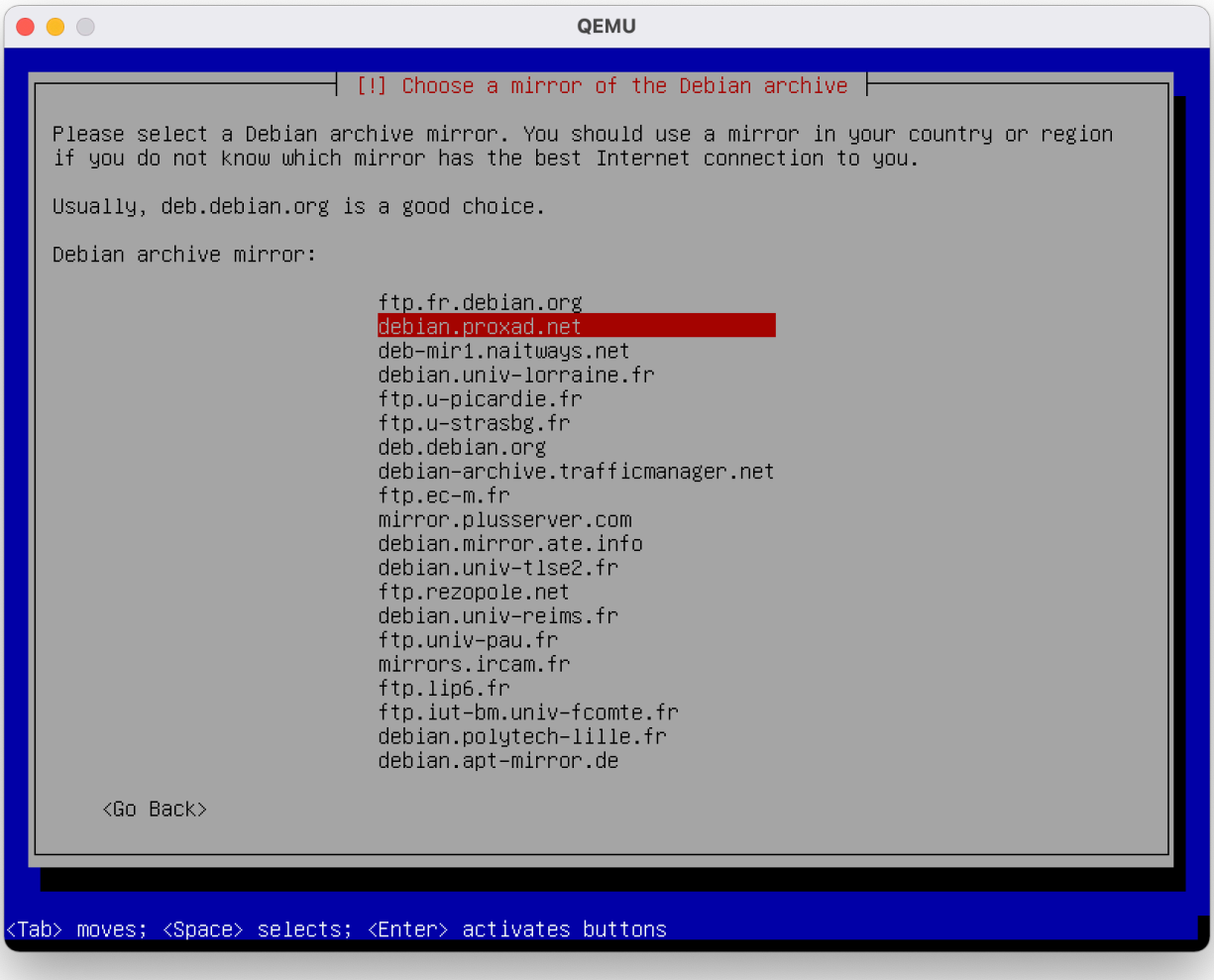

QEMU
[!!] Select your location
The selected location will be used to set your time zone and also for example to help select the system locale. Normally this should be the country where you live.
This is a shortlist of locations based on the language you selected. Choose "other" if your location is not listed.
Country, territory or area:
Antigua and Barbuda
Australia
Botswana
Canada
Hong Kong
India
Ireland
Israel
New Zealand
Nigeria
Philippines
Seychelles
Singapore
South Africa
United Kingdom
United States
Zambia
Zimbabwe
other

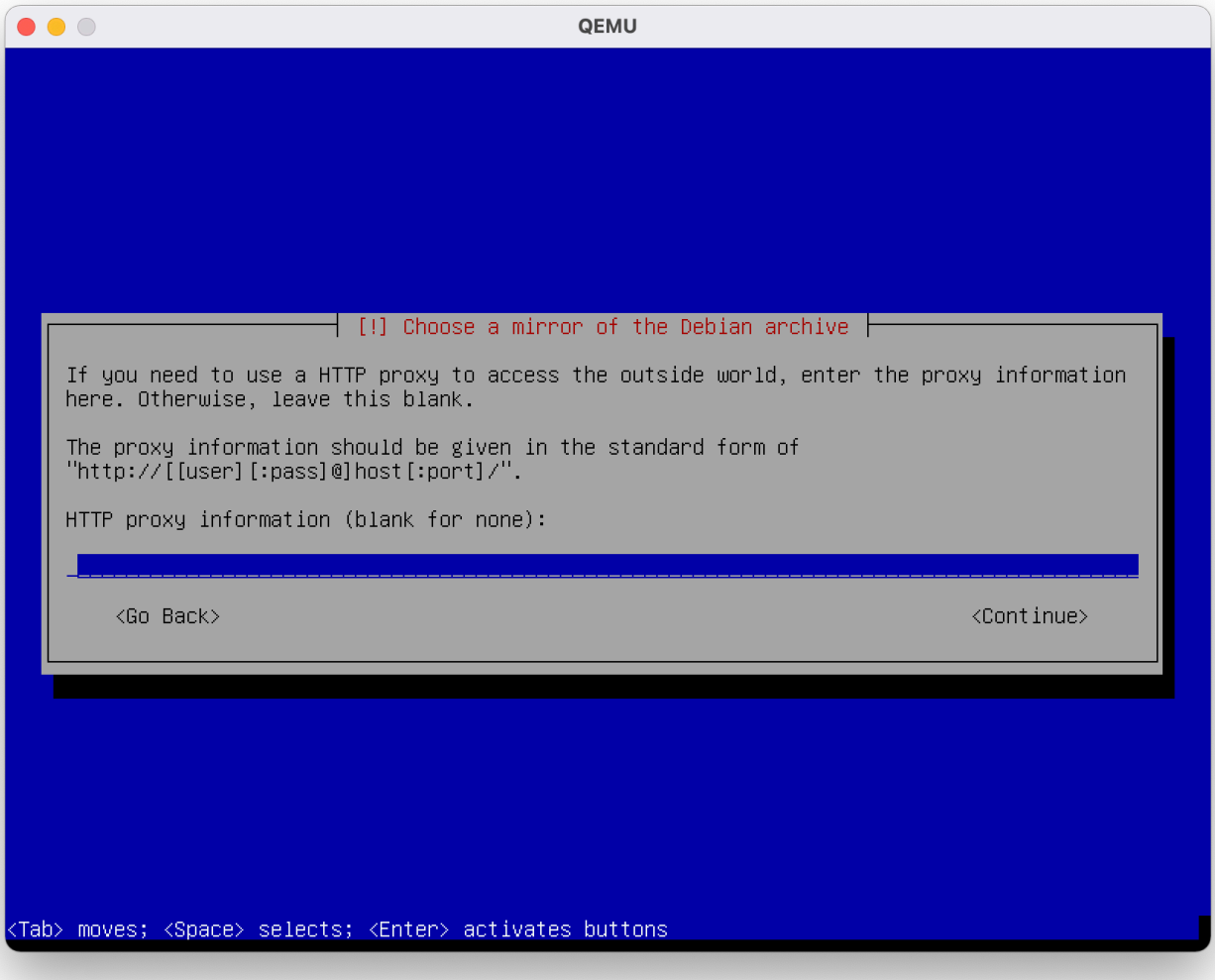

<Go Back>
<Tab> moves; <Space> selects; <Enter> activates buttons


QEMU
[!] Configure the network
Please enter the hostname for this system.
The hostname is a single word that identifies your system to the network. If you don't know what your hostname should be, consult your network administrator. If you are setting up your own home network, you can make something up here.
Hostname:
buster00
<Go Back>
<Continue>
<Tab> moves; <Space> selects; <Enter> activates buttons


QEMU
[!] Choose a mirror of the Debian archive
The goal is to find a mirror of the Debian archive that is close to you on the network -- be aware that nearby countries, or even your own, may not be the best choice.
Debian archive mirror country:
Croatia
Czechia
Denmark
El Salvador
Estonia
Finland
France
Germany
Greece
Hong Kong
Hungary
India

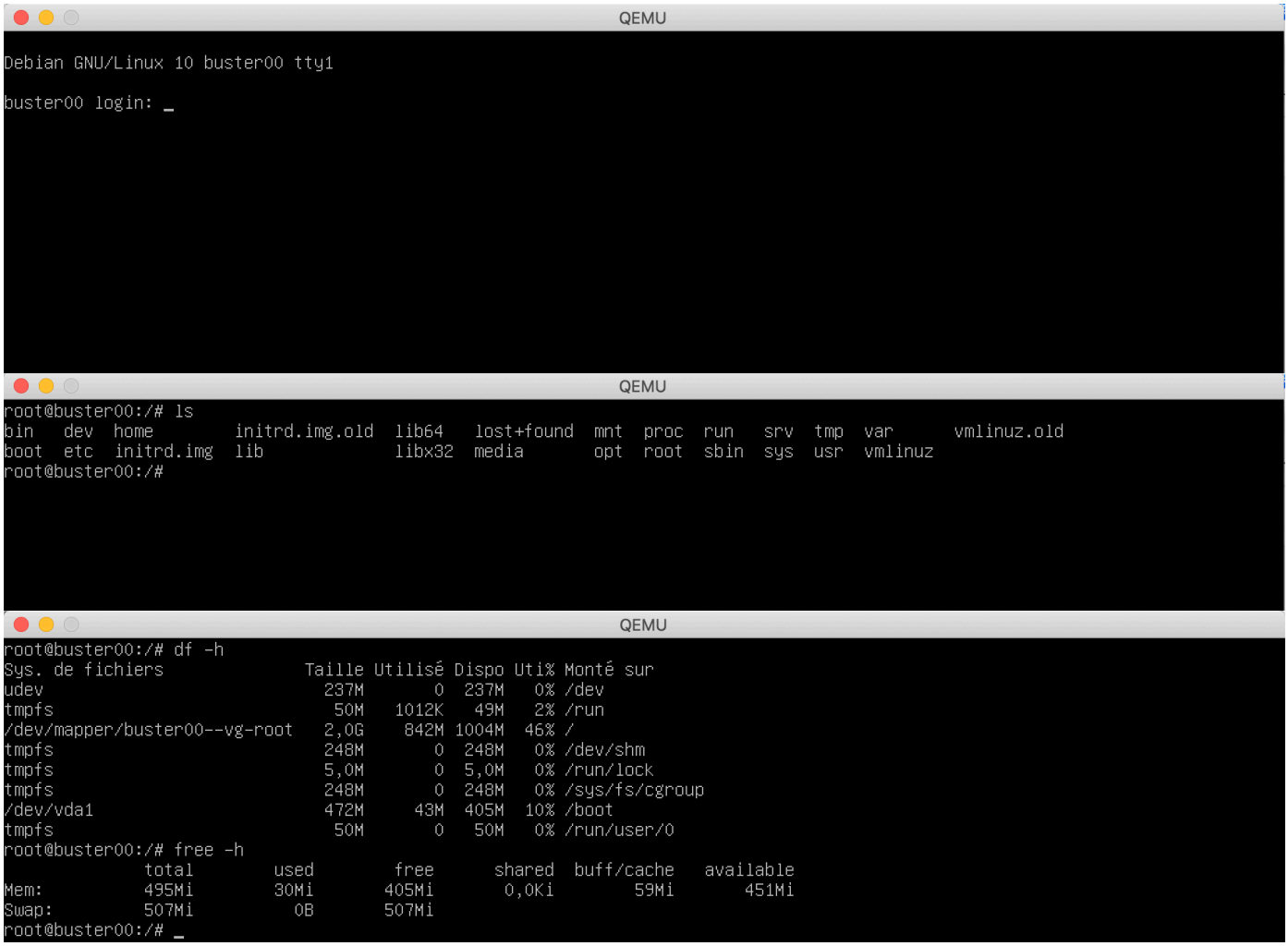

Indonesia
Iran, Islamic Republic of
Israel
Italy
Japan
Kazakhstan
Kenya
Korea, Republic of
Kyrgyzstan
Latvia
Lithuania
<Go Back>
<Tab> moves; <Space> selects; <Enter> activates buttons


QEMU
[!] Choose a mirror of the Debian archive
Please select a Debian archive mirror. You should use a mirror in your country or region
if you do not know which mirror has the best Internet connection to you.
Usually, deb.debian.org is a good choice.
Debian archive mirror:
ftp.fr.debian.org
debian.proxad.net
deb-mir1.naitways.net
debian.univ-lorraine.fr
ftp.u-picardie.fr
ftp.u-strasbg.fr
deb.debian.org
debian-archive.trafficmanager.net
ftp.ec-m.fr
mirror.plusserver.com
debian.mirror.ate.info
debian.univ-tlse2.fr
ftp.rezopole.net
debian.univ-reims.fr
ftp.univ-pau.fr
mirrors.ircam.fr
ftp.lip6.fr
ftp.iut-bm.univ-fcomte.fr
debian.polytech-lille.fr
debian.apt-mirror.de
<Go Back>
<Tab> moves; <Space> selects; <Enter> activates buttons



For launch the console:

```
qemu-system-x86_64 -machine q35,accel=hvf -cpu host -m 512m -drive
file=buster00.qcow2,if=virtio,index=0,snapshot=on
```



We can see that the disk size is 3G and the memory size is 512M. The disk size is defined in the file 16.qcow2, which cannot be changed anymore. But we can configure the memory size with the -m option of the `qemu-system-x86_64` command.

This time we set the option `-m 256m` and review the result of the command `df -h` and `free -h`.

```
root@buster00:~# df -h
Sys. de fichiers              Taille Utilisé Dispo Uti% Monté sur
udev                            110M       0  110M   0% /dev
tmpfs                            25M    892K   24M   4% /run
/dev/mapper/buster00--vg-root   2,0G    842M 1004M  46% /
tmpfs                           122M       0  122M   0% /dev/shm
tmpfs                           5,0M       0  5,0M   0% /run/lock
tmpfs                           122M       0  122M   0% /sys/fs/cgroup
/dev/vda1                       472M     43M  405M  10% /boot
tmpfs                            25M       0   25M   0% /run/user/0
root@buster00:~# free -h
              total        used        free      shared  buff/cache   available
Mem:          242Mi        30Mi       152Mi       0,0Ki        59Mi       202Mi
Swap:         507Mi          0B       507Mi
root@buster00:~#
```

We can see that the memory size can be configured as we need. It is therefore more flexible than VirtuelBox.

To set up a console on a serial port, we change the contents of the `/etc/default/grub` file.

```
GRUB_DEFAULT=0
GRUB_TIMEOUT=5
GRUB_DISTRIBUTOR=`lsb_release -i -s 2> /dev/null || echo Debian`
GRUB_CMDLINE_LINUX_DEFAULT="quiet console=ttyS0 console=tty0"
GRUB_CMDLINE_LINUX=""
```

After using `update-grub`:

```
root@buster00:~# update-grub
Création du fichier de configuration GRUB…
Image Linux trouvée : /boot/vmlinuz-4.19.0-13-686-pae
Image mémoire initiale trouvée : /boot/initrd.img-4.19.0-13-686-pae
fait
root@buster00:~# _
```

1.1.3 Benchmarks

1.1.3.1 Mesures de performances d'entrées-sorties

After the installation of `Bonnie++`, an I/O performance measurement is made

```
root@buster00:/dev# bonnie++ -d /tmp -s 512? -f -b -u root
Using uid:0, gid:0.
Writing intelligently...done
Rewriting...done
Reading intelligently...done
start 'em...done...done...done...done...done...
Create files in sequential order...done.
Stat files in sequential order...done.
Delete files in sequential order...done.
Create files in random order...done.
Stat files in random order...done.
Delete files in random order...done.
Version  1.98       ------Sequential Output------ --Sequential Input- --Random-
                    -Per Chr- --Block-- -Rewrite- -Per Chr- --Block-- --Seeks--
Name:Size etc        /sec %CP  /sec %CP  /sec %CP  /sec %CP  /sec %CP  /sec %CP
buster00       512M            572m  48  454m  57            843m  62 +++++ +++
Latency                       18171us    2800us              2133us    4195us
Version  1.98       ------Sequential Create------ --------Random Create--------
buster00           -Create-- --Read--- -Delete-- -Create-- --Read--- -Delete--
              files  /sec %CP  /sec %CP  /sec %CP  /sec %CP  /sec %CP  /sec %CP
                 16 1718851913   7 +++++ +++ 635471858   7 -270687753   7 +++++ +++ -660399028   7
Latency              5434us     530us    3052us    1536us     138us    2928us
1.98,1.98,buster00,1,1611960770,512M,,8192,5,,,585468,48,465273,57,,,863622,62,+++++,+++,16,,,,,2363,7,+++
++++,+++,2333,7,,18171us,2800us,,2133us,4195us,5434us,530us,3052us,1536us,138us,2928us
```