TP 2 Compte rendu Fabien Mauhourat

Configuration de la machine de base :

Configuration des interfaces réseau :

- enp0s3 → nat
- enp0s8 → réseau privé

sudo vim /etc/netplan/50-cloud-init.yaml :

```
network:
  ethernets:
    enp0s3:
      dhcp4: true
    enp0s8:
      dhcp4: true
  version: 2
```

Appliquer la configuration :

sudo netplan apply

Vérifier l'attribution des IPs par le DHCP :

ip addr show | grep enp

```
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP
group default qlen 1000
  inet 192.168.59.201/24 brd 192.168.59.255 scope global dynamic enp0s3
3: enp0s8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP
group default qlen 1000
  inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic enp0s8
```

Installation de LXC

Installation lxc :

sudo apt update && sudo apt install lxc lxc-templates

Vérification de la configuration pour lxc :

sudo lxc-checkconfig

Vérifier l'interface NAT de lxc :

ip addr show | grep lxc

```
fabien@virt:~$ ip a| grep lxc
4: lxcbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    inet 10.0.4.1/24 scope global lxcbr0
fabien@virt:~$
```

Un premier conteneur

Création du conteneur ubuntu :

sudo lxc-create -n ubuntu_template -t download -- -d ubuntu -r bionic -a amd64
sudo lxc-create -n ubuntu_template -t ubuntu

Questions :

1. sudo lxc-ls -f

```
fabien@virt:~$ sudo lxc-ls -f
NAME            STATE   AUTOSTART GROUPS IPV4 IPV6 UNPRIVILEGED
ubuntu_template STOPPED 0         -      -    -    false
fabien@virt:~$
```

2. sudo lxc-start -n ubuntu_template

3.
a. sudo lxc-ls -f
sudo lxc-info -n ubuntu_template

```
fabien@virt:~$ sudo lxc-ls -f
NAME            STATE   AUTOSTART GROUPS IPV4       IPV6 UNPRIVILEGED
ubuntu_template RUNNING 0         -      10.0.4.143 -    false
fabien@virt:~$ sudo lxc-info -n ubuntu_template
Name:           ubuntu_template
State:          RUNNING
PID:            4250
IP:             10.0.4.143
CPU use:        0.38 seconds
BlkIO use:      5.99 MiB
Memory use:     28.89 MiB
KMem use:       5.14 MiB
Link:           vethNPSBRW
 TX bytes:      1.75 KiB
 RX bytes:      2.57 KiB
 Total bytes:   4.32 KiB
fabien@virt:~$
```

b. df -h

```
fabien@virt:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            463M     0  463M   0% /dev
tmpfs            99M  1,1M   98M   2% /run
/dev/sda2       9,8G  4,5G  4,9G  48% /
tmpfs           493M     0  493M   0% /dev/shm
tmpfs           5,0M     0  5,0M   0% /run/lock
tmpfs           493M     0  493M   0% /sys/fs/cgroup
/dev/loop0       89M   89M     0 100% /snap/core/7270
Partage         196G  129G   67G  66% /partage
tmpfs            99M     0   99M   0% /run/user/1000
fabien@virt:~$
```

c. Filesystem du container : /var/lib/lxc/ubuntu_template

sudo tree -L 2 /var/lib/lxc/ubuntu_template

```
fabien@virt:~$ sudo tree -L 2 /var/lib/lxc/ubuntu_template
/var/lib/lxc/ubuntu_template
├── config
└── rootfs
    ├── bin
    ├── boot
    ├── dev
    ├── etc
    ├── home
    ├── lib
    ├── lib64
    ├── media
    ├── mnt
    ├── opt
    ├── proc
    ├── root
    ├── run
    ├── sbin
    ├── srv
    ├── sys
    ├── tmp
    ├── usr
    └── var

20 directories, 1 file
fabien@virt:~$
```

d. ps -ef | grep $(sudo lxc-info -n ubuntu_template -p | awk '{print $2}')

```
fabien@virt:~$ ps -ef | grep $(sudo lxc-info -n ubuntu_template -p | awk '{print $2}')
root      4250  4245  0 07:56 ?        00:00:00 /sbin/init
root      4310  4250  0 07:56 ?        00:00:00 /lib/systemd/systemd-journald
systemd+  4314  4250  0 07:56 ?        00:00:00 /lib/systemd/systemd-networkd
systemd+  4343  4250  0 07:56 ?        00:00:00 /lib/systemd/systemd-resolved
root      4344  4250  0 07:56 ?        00:00:00 /lib/systemd/systemd-logind
syslog    4345  4250  0 07:56 ?        00:00:00 /usr/sbin/rsyslogd -n
message+  4346  4250  0 07:56 ?        00:00:00 /usr/bin/dbus-daemon --system --address=systemd: --nofork --nopidfile --systemd-activation --syslog-only
root      4347  4250  0 07:56 ?        00:00:00 /usr/bin/python3 /usr/bin/networkd-dispatcher --run-startup-triggers
root      4348  4250  0 07:56 ?        00:00:00 /usr/sbin/cron -f
root      4353  4250  0 07:56 pts/0    00:00:00 /sbin/agetty -o -p -- \u --noclear --keep-baud pts/0 115200,38400,9600 vt220
root      4354  4250  0 07:56 pts/1    00:00:00 /sbin/agetty -o -p -- \u --noclear --keep-baud pts/1 115200,38400,9600 vt220
root      4355  4250  0 07:56 pts/2    00:00:00 /sbin/agetty -o -p -- \u --noclear --keep-baud console 115200,38400,9600 vt220
root      4356  4250  0 07:56 ?        00:00:00 /sbin/agetty -o -p -- \u --noclear --keep-baud pts/3 115200,38400,9600 vt220
root      4357  4250  0 07:56 pts/2    00:00:00 /sbin/agetty -o -p -- \u --noclear --keep-baud pts/2 115200,38400,9600 vt220
fabien@virt:~$
```

4. sudo lxc-attach -n ubuntu_template

a. id
whoami
hostname

```
fabien@virt:~$ sudo lxc-attach -n ubuntu_template
root@ubuntu_template:/# whoami
root
root@ubuntu_template:/# hostname
ubuntu_template
root@ubuntu_template:/# id
uid=0(root) gid=0(root) groups=0(root)
root@ubuntu_template:/#
```

b. lsblk

On remarque que le conteneur utilise la même partition que l'hôte et donc partage son utilisation :

```
root@ubuntu_template:/# lsblk
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
loop0    7:0    0 88.5M  1 loop
sda      8:0    0   10G  0 disk
|-sda1   8:1    0    1M  0 part
`-sda2   8:2    0   10G  0 part /
sr0     11:0    1 73.6M  0 rom
root@ubuntu_template:/#
```

```
fabien@virt:~$ lsblk
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
loop0    7:0    0 88,5M  1 loop /snap/core/7270
sda      8:0    0   10G  0 disk
├─sda1   8:1    0    1M  0 part
└─sda2   8:2    0   10G  0 part /
sr0     11:0    1 73,6M  0 rom
fabien@virt:~$
```

c. ps -ef

On remarque que les processus du container sont les mêmes que sur l'hôte mais avec des identifiants différents :

```
root@ubuntu_template:/# ps -ef
UID          PID  PPID  C STIME TTY          TIME CMD
root           1     0  0 07:56 ?        00:00:00 /sbin/init
root          37     1  0 07:56 ?        00:00:00 /lib/systemd/systemd-journald
systemd+      40     1  0 07:56 ?        00:00:00 /lib/systemd/systemd-networkd
systemd+      66     1  0 07:56 ?        00:00:00 /lib/systemd/systemd-resolved
root          67     1  0 07:56 ?        00:00:00 /lib/systemd/systemd-logind
syslog        68     1  0 07:56 ?        00:00:00 /usr/sbin/rsyslogd -n
message+      69     1  0 07:56 ?        00:00:00 /usr/bin/dbus-daemon --system --address=systemd: --nofork --nopidfile --systemd-activation --syslog-only
root          70     1  0 07:56 ?        00:00:00 /usr/bin/python3 /usr/bin/networkd-dispatcher --run-startup-triggers
root          71     1  0 07:56 ?        00:00:00 /usr/sbin/cron -f
root          76     1  0 07:56 pts/0    00:00:00 /sbin/agetty -o -p -- \u --noclear --keep-baud pts/0 115200,38400,9600 vt220
root          77     1  0 07:56 pts/1    00:00:00 /sbin/agetty -o -p -- \u --noclear --keep-baud pts/1 115200,38400,9600 vt220
root          78     1  0 07:56 pts/2    00:00:00 /sbin/agetty -o -p -- \u --noclear --keep-baud console 115200,38400,9600 vt220
root          79     1  0 07:56 pts/3    00:00:00 /sbin/agetty -o -p -- \u --noclear --keep-baud pts/3 115200,38400,9600 vt220
root          80     1  0 07:56 pts/2    00:00:00 /sbin/agetty -o -p -- \u --noclear --keep-baud pts/2 115200,38400,9600 vt220
root          90     0  0 08:15 pts/3    00:00:00 /bin/bash
root         106    90  0 08:22 pts/3    00:00:00 ps -ef
root@ubuntu_template:/#
```

5. exit

sudo lxc-stop -n ubuntu_template

```
root@ubuntu_template:/# exit
exit
fabien@virt:~$ sudo lxc-stop -n ubuntu_template
fabien@virt:~$ sudo lxc-ls -f
NAME            STATE   AUTOSTART GROUPS IPV4 IPV6 UNPRIVILEGED
ubuntu_template STOPPED 0         -      -    -    false
fabien@virt:~$
```

Limitation de ressources en ligne de commande

1. Ligne de commande

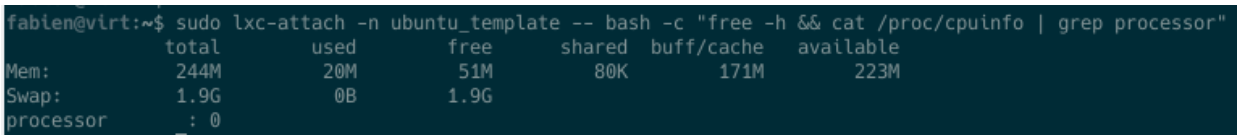
sudo lxc-start -n ubuntu_template

sudo lxc-attach -n ubuntu_template -- bash -c "free -h && cat /proc/cpuinfo | grep processor"

```
fabien@virt:~$ sudo lxc-attach -n ubuntu_template -- bash -c "free -h && cat /proc/cpuinfo | grep processor"
               total        used        free      shared  buff/cache   available
Mem:           985M         19M        965M         80K        288K        965M
Swap:          1.9G          0B        1.9G
processor       : 0
processor       : 1
fabien@virt:~$
```

lxc-cgroup -n ubuntu_template cpuset.cpus 0
lxc-cgroup -n ubuntu_template memory.limit_in_bytes 256000000

sudo lxc-attach -n ubuntu_template -- bash -c "free -h && cat /proc/cpuinfo | grep processor"

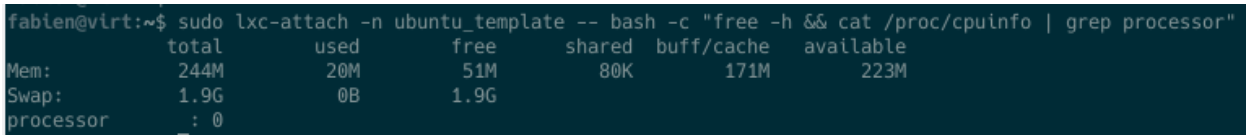


2. Fichier de configuration

Configuration du container : /var/lib/lxc/ubuntu_template/config
Pour tous les containers : /etc/lxc/default.conf

lxc.cgroup.cpuset.cpus = 0
lxc.cgroup.memory.limit_in_bytes = 256000000

sudo lxc-attach -n ubuntu_template -- bash -c "free -h && cat /proc/cpuinfo | grep processor"



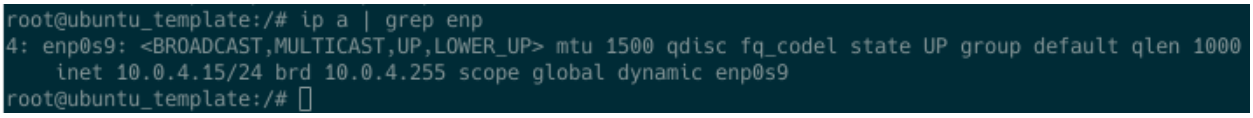
Gestion du réseau en mode physique

vim /var/lib/lxc/ubuntu_template/config

lxc.net.0.type = phys
lxc.net.0.link = enp0s9
lxc.net.0.flags = up

lxc-start -n debian10
lxc-attach -n debian10

sed -i 's/eth0/enp0s9/g' /etc/netplan/10-lxc.yaml

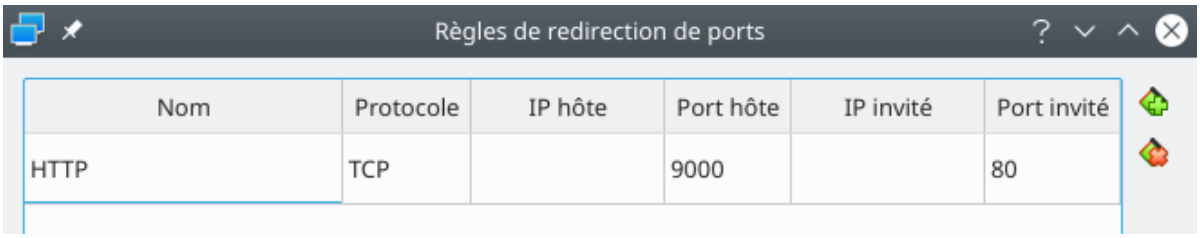


Sur l’hôte l’interface n’est plus visible avec la commande ip addr show.

Installation d’un package dans le conteneur

lxc-attach -n ubuntu_template -- /bin/bash -c "apt update && apt -y install apache2 && systemctl start apache2 && systemctl enable apache2"

Mettre en place une règle de redirection de port :



Vérification depuis l’hôte :

curl -Lsvo /dev/null http://127.0.0.1:9000

```
fabien@arch-desk ~> curl -Lsvo /dev/null http://127.0.0.1:9000
*   Trying 127.0.0.1:9000...
* TCP_NODELAY set
* Connected to 127.0.0.1 (127.0.0.1) port 9000 (#0)
> GET / HTTP/1.1
> Host: 127.0.0.1:9000
> User-Agent: curl/7.65.3
> Accept: */*
>
* Mark bundle as not supporting multiuse
< HTTP/1.1 200 OK
< Date: Sat, 05 Oct 2019 09:01:11 GMT
< Server: Apache/2.4.29 (Ubuntu)
< Last-Modified: Sat, 05 Oct 2019 08:59:18 GMT
< ETag: "2aa6-5942608aef521"
< Accept-Ranges: bytes
< Content-Length: 10918
< Vary: Accept-Encoding
< Content-Type: text/html
<
{ [1205 bytes data]
* Connection #0 to host 127.0.0.1 left intact
fabien@arch-desk ~>
fabien@arch-desk ~>
```

Scripting

Fichier TP2.sh

Boucle pour supprimer les conteneurs :

for i in $(sudo lxc-ls -f | awk '$0 ~ /^ubuntu/ && $0 !~ /.*template.*/ && $0 ~ /RUNNING/ {print $1}'); do sudo lxc-stop -n $i; done

for i in $(sudo lxc-ls -f | awk '$0 ~ /^ubuntu/ && $0 !~ /.*template.*/ {print $1}'); do sudo lxc-destroy -n $i; done

Modification du template

sudo vim /usr/share/lxc/templates/lxc-ubuntu :

Ajouter les limites dans la fonction copy_configuration():

```
cat <<EOF >> $path/config
lxc.cgroup.cpuset.cpus = 0
lxc.cgroup.memory.limit_in_bytes = 256000000
EOF
```

Installer le paquet iputils :

packages="iputils-ping,iputils-tracepath"