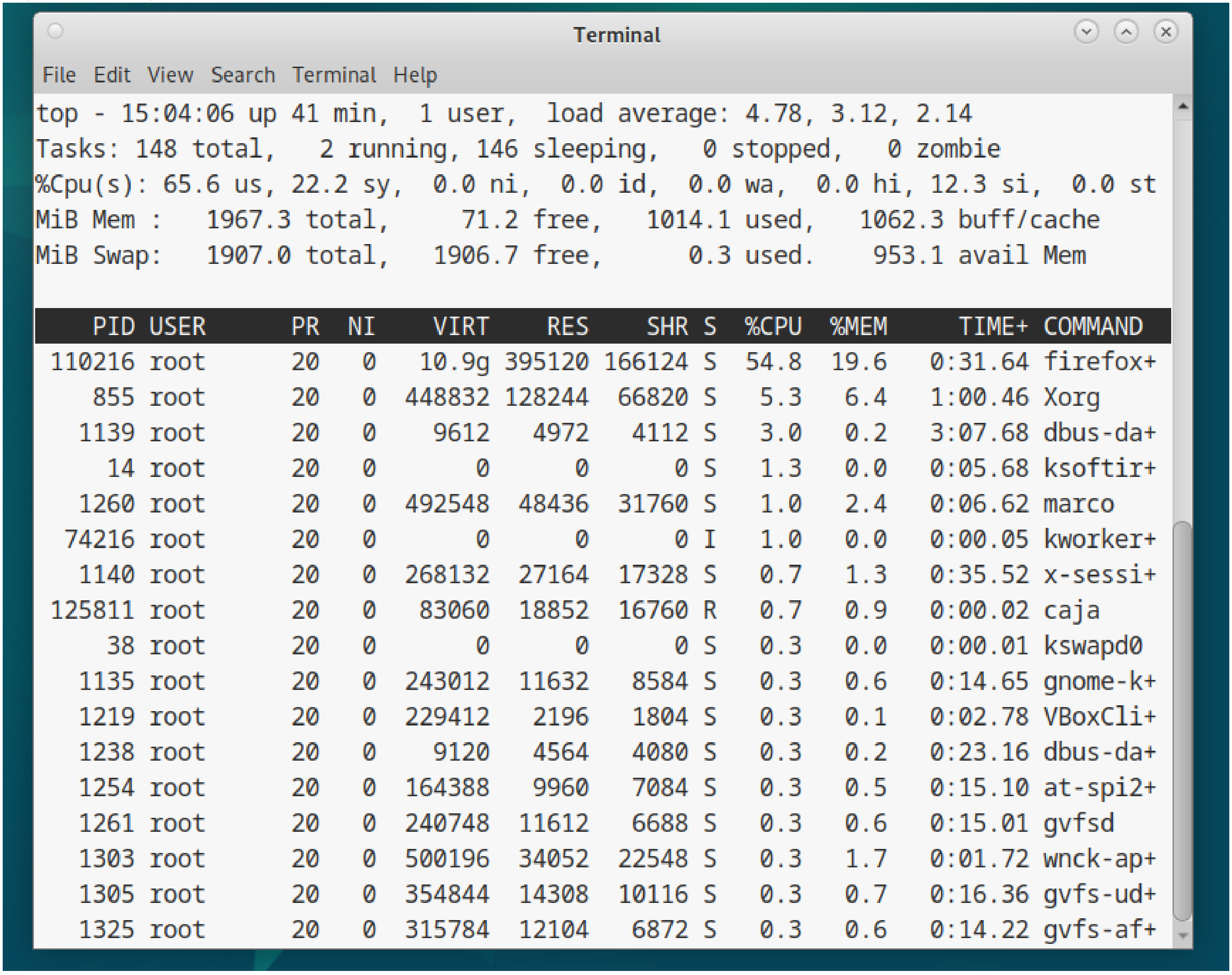
[Fort]Práctica 3: Securizando Aplicaciones

1. Abre un navegador y realiza una descarga

Revisa con el TOP el consumo de CPU

Firefox (Proceso 110216) está consumiendo en torno al 60% de la CPU como podemos ver en la siguiente captura:

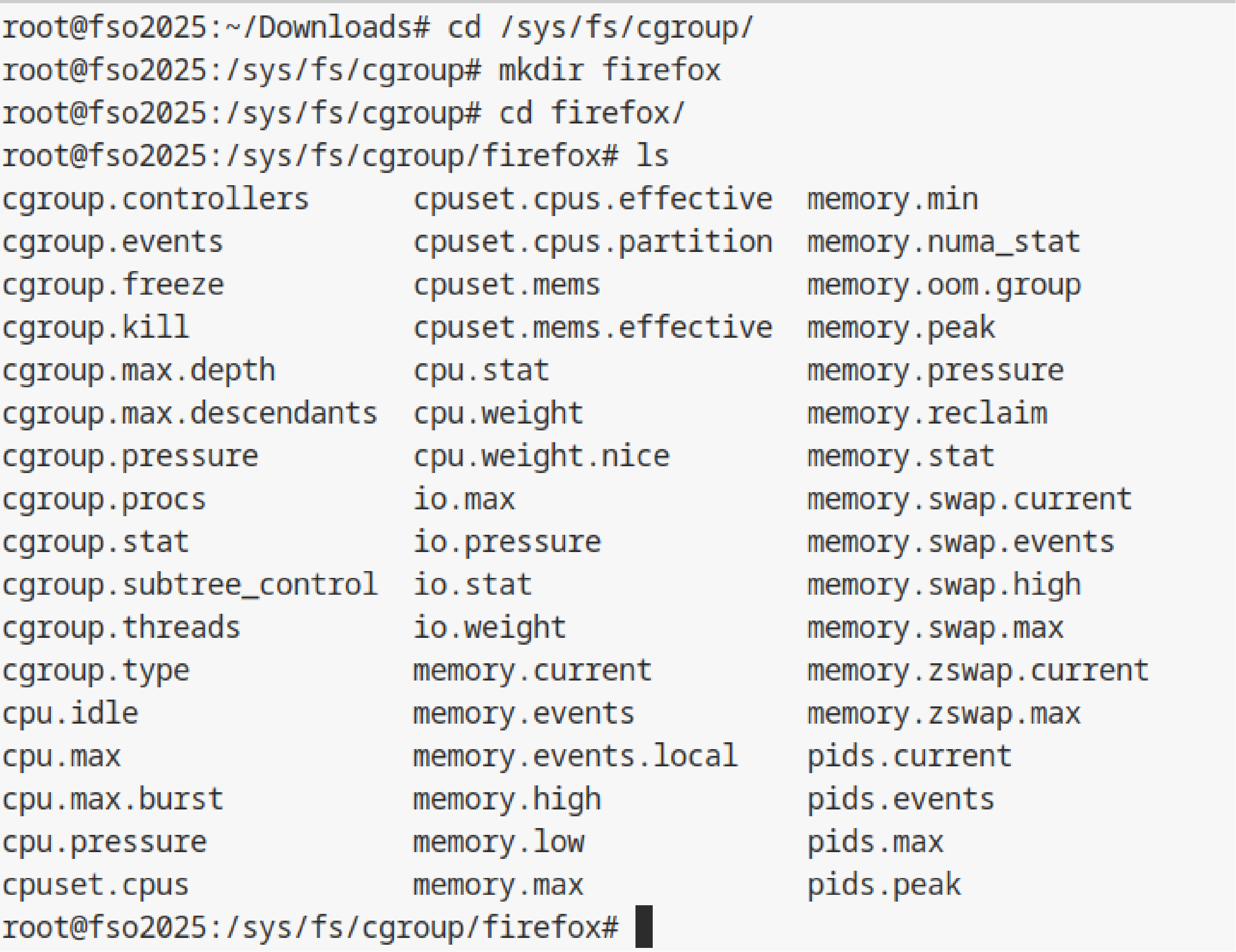


```
top - 15:04:06 up 41 min,  1 user,  load average: 4.78, 3.12, 2.14
Tasks: 148 total,   2 running, 146 sleeping,   0 stopped,   0 zombie
%Cpu(s): 65.6 us, 22.2 sy,  0.0 ni,  0.0 id,  0.0 wa,  0.0 hi, 12.3 si,  0.0 st
MiB Mem :   1967.3 total,     71.2 free,   1014.1 used,   1062.3 buff/cache
MiB Swap:   1907.0 total,   1906.7 free,      0.3 used.    953.1 avail Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
 110216 root      20   0   10.9g 395120 166124 S  54.8  19.6   0:31.64 firefox+
    855 root      20   0  448832 128244  66820 S   5.3   6.4   1:00.46 Xorg
   1139 root      20   0    9612   4972   4112 S   3.0   0.2   3:07.68 dbus-da+
     14 root      20   0       0      0      0 S   1.3   0.0   0:05.68 ksoftir+
   1260 root      20   0  492548  48436  31760 S   1.0   2.4   0:06.62 marco
  74216 root      20   0       0      0      0 I   1.0   0.0   0:00.05 kworker+
   1140 root      20   0  268132  27164  17328 S   0.7   1.3   0:35.52 x-sessi+
 125811 root      20   0   83060  18852  16760 R   0.7   0.9   0:00.02 caja
     38 root      20   0       0      0      0 S   0.3   0.0   0:00.01 kswapd0
   1135 root      20   0  243012  11632   8584 S   0.3   0.6   0:14.65 gnome-k+
   1219 root      20   0  229412   2196   1804 S   0.3   0.1   0:02.78 VBoxCli+
   1238 root      20   0    9120   4564   4080 S   0.3   0.2   0:23.16 dbus-da+
   1254 root      20   0  164388   9960   7084 S   0.3   0.5   0:15.10 at-spi2+
   1261 root      20   0  240748  11612   6688 S   0.3   0.6   0:15.01 gvfsd
   1303 root      20   0  500196  34052  22548 S   0.3   1.7   0:01.72 wnck-ap+
   1305 root      20   0  354844  14308  10116 S   0.3   0.7   0:16.36 gvfs-ud+
   1325 root      20   0  315784  12104   6872 S   0.3   0.6   0:14.22 gvfs-af+
```

Usa cpulimit para reducir el consumo de CPU a 1/5 del que usa

Para realizar esto ejecutaremos los siguientes comandos:

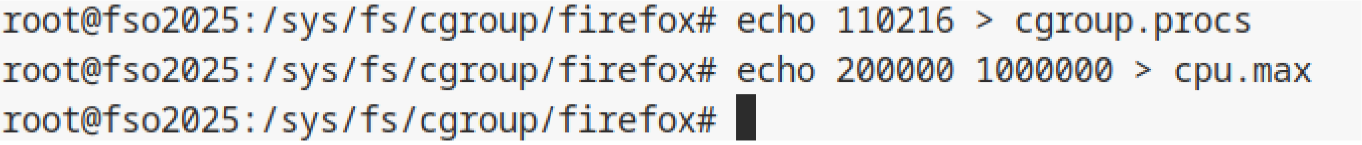
```
cd /sys/fs/cgroup/
mkdir firefox #Creamos el cgroup para firefox
cd firefox
```



```
root@fso2025:~/Downloads# cd /sys/fs/cgroup/
root@fso2025:/sys/fs/cgroup# mkdir firefox
root@fso2025:/sys/fs/cgroup# cd firefox/
root@fso2025:/sys/fs/cgroup/firefox# ls
cgroup.controllers      cpuset.cpus.effective  memory.min
cgroup.events           cpuset.cpus.partition  memory.numa_stat
cgroup.freeze           cpuset.mems            memory.oom.group
cgroup.kill             cpuset.mems.effective  memory.peak
cgroup.max.depth        cpu.stat               memory.pressure
cgroup.max.descendants  cpu.weight             memory.reclaim
cgroup.pressure         cpu.weight.nice        memory.stat
cgroup.procs            io.max                 memory.swap.current
cgroup.stat             io.pressure            memory.swap.events
cgroup.subtree_control  io.stat                memory.swap.high
cgroup.threads          io.weight              memory.swap.max
cgroup.type             memory.current         memory.zswap.current
cpu.idle                memory.events          memory.zswap.max
cpu.max                 memory.events.local    pids.current
cpu.max.burst           memory.high            pids.events
cpu.pressure            memory.low             pids.max
cpuset.cpus             memory.max             pids.peak
root@fso2025:/sys/fs/cgroup/firefox# 
```

Tras eso añadimos firefox al cgroup y procedemos a limitar su consumo de CPU

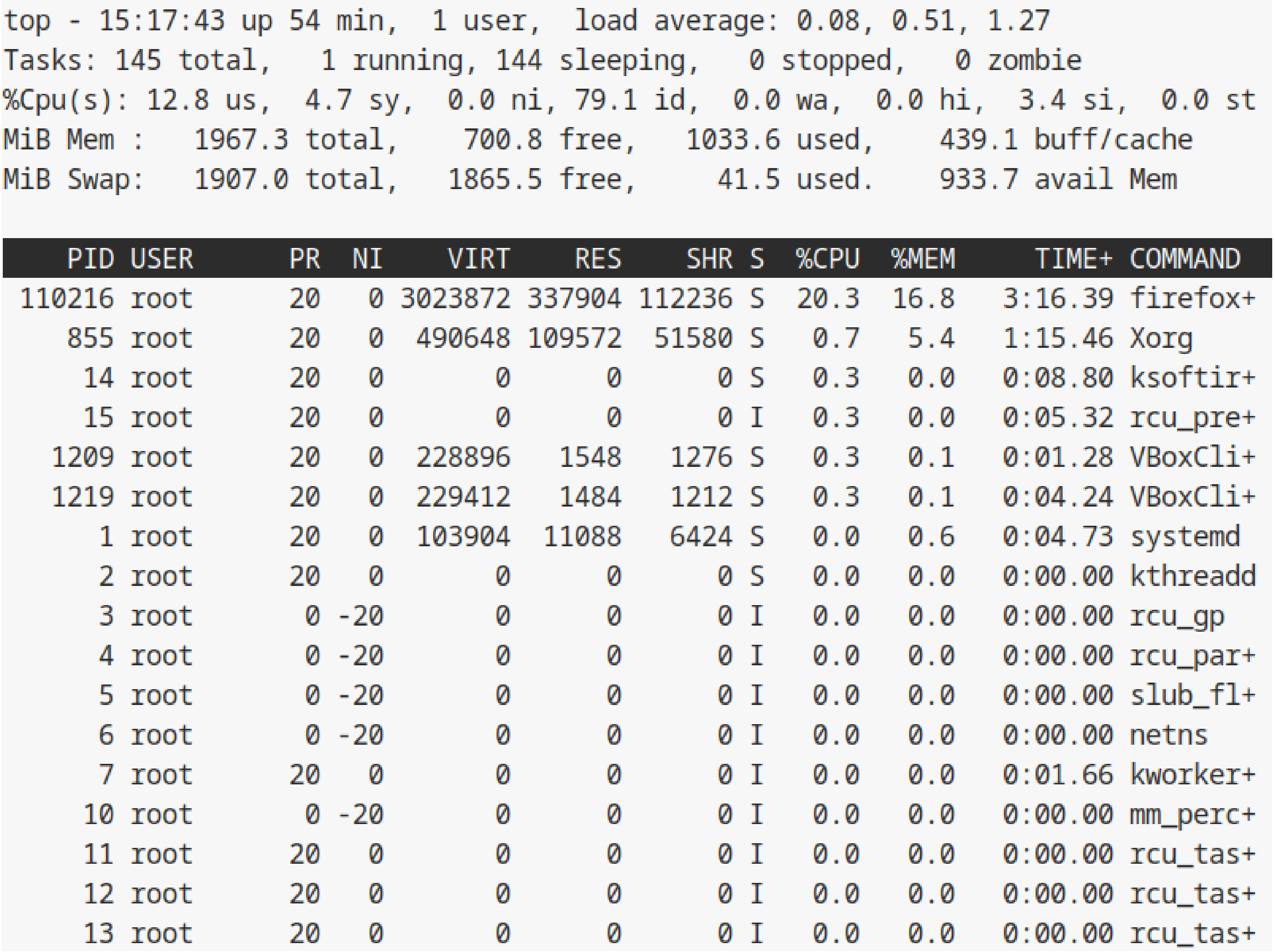
```
echo 110216 > cgroup.procs#Metemos el proceso de firefox en el cgroup
echo 200000 1000000 > cpu.max #Limitamos el uso de CPU al 20%
```



```
root@fso2025:/sys/fs/cgroup/firefox# echo 110216 > cgroup.procs
root@fso2025:/sys/fs/cgroup/firefox# echo 200000 1000000 > cpu.max
root@fso2025:/sys/fs/cgroup/firefox# 
```

Resultado

Como se puede observar, el consumo ha bajado y ahora consume un 20% máximo.



```
top - 15:17:43 up 54 min,  1 user,  load average: 0.08, 0.51, 1.27
Tasks: 145 total,   1 running, 144 sleeping,   0 stopped,   0 zombie
%Cpu(s): 12.8 us,  4.7 sy,  0.0 ni, 79.1 id,  0.0 wa,  0.0 hi,  3.4 si,  0.0 st
MiB Mem :   1967.3 total,    700.8 free,   1033.6 used,    439.1 buff/cache
MiB Swap:   1907.0 total,   1865.5 free,     41.5 used.    933.7 avail Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
 110216 root      20   0 3023872 337904 112236 S  20.3  16.8   3:16.39 firefox+
    855 root      20   0  490648 109572  51580 S   0.7   5.4   1:15.46 Xorg
     14 root      20   0       0      0      0 S   0.3   0.0   0:08.80 ksoftir+
     15 root      20   0       0      0      0 I   0.3   0.0   0:05.32 rcu_pre+
   1209 root      20   0  228896   1548   1276 S   0.3   0.1   0:01.28 VBoxCli+
   1219 root      20   0  229412   1484   1212 S   0.3   0.1   0:04.24 VBoxCli+
      1 root      20   0  103904  11088   6424 S   0.0   0.6   0:04.73 systemd
      2 root      20   0       0      0      0 S   0.0   0.0   0:00.00 kthreadd
      3 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 rcu_gp
      4 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 rcu_par+
      5 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 slub_fl+
      6 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 netns
      7 root      20   0       0      0      0 I   0.0   0.0   0:01.66 kworker+
     10 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 mm_perc+
     11 root      20   0       0      0      0 I   0.0   0.0   0:00.00 rcu_tas+
     12 root      20   0       0      0      0 I   0.0   0.0   0:00.00 rcu_tas+
     13 root      20   0       0      0      0 I   0.0   0.0   0:00.00 rcu_tas+
```

2. Crea un container Debian y arráncalo

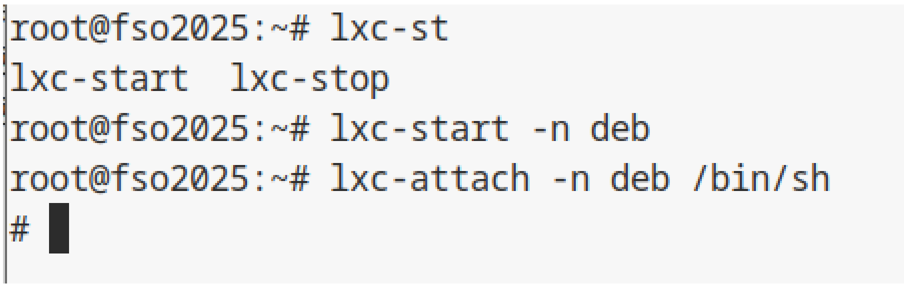
Para arrancar un container debian usamos el siguiente comando:

```
lxc-create -t debian -n deb
```

Establece una contraseña para el usuario root del container

Para ello debemos entrar primero a la máquina con el siguiente comando para abrir la terminal del contenedor:

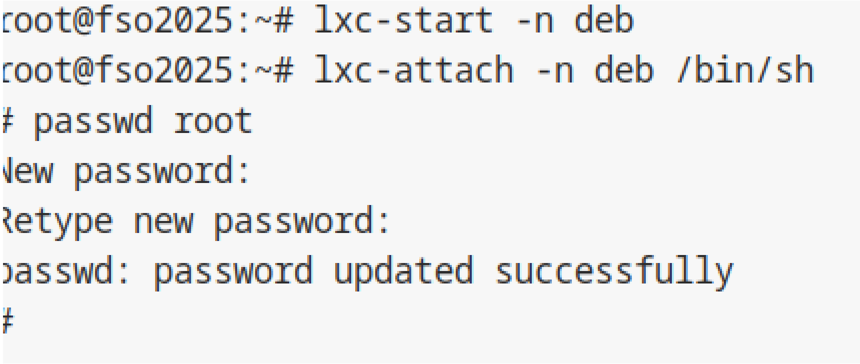
```
lxc-start #Arrancamos la máquina
lxc-attach -n deb /bin/sh #Llamamos a la terminal
```



```
root@fso2025:~# lxc-st
lxc-start  lxc-stop
root@fso2025:~# lxc-start -n deb
root@fso2025:~# lxc-attach -n deb /bin/sh
#
```

Tras eso procedemos a establecer la contraseña del root con el siguiente comando:

```
passwd root
```

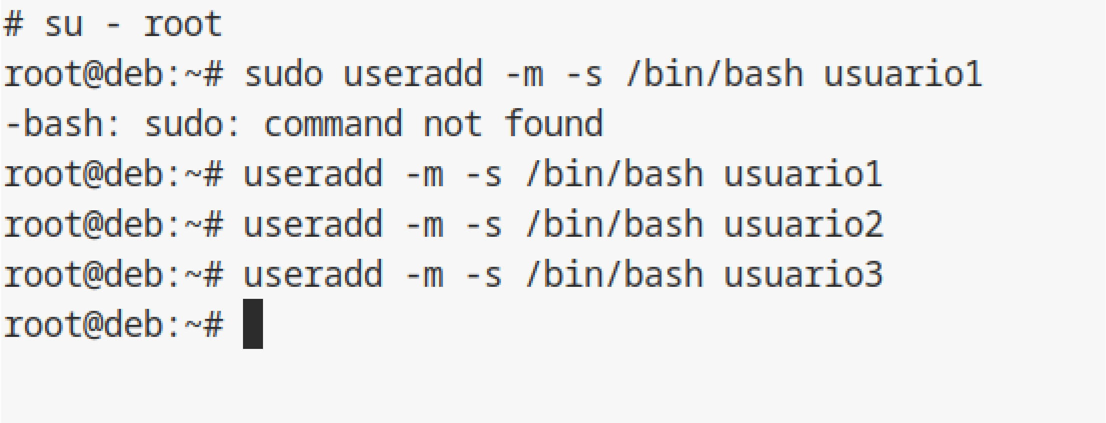


```
root@fso2025:~# lxc-start -n deb
root@fso2025:~# lxc-attach -n deb /bin/sh
# passwd root
New password:
Retype new password:
passwd: password updated successfully
#
```

Añade 3 usuarios

Desde el mismo sitio que hemos establecido la contraseña para el root procedemos a crear los 3 usuarios:

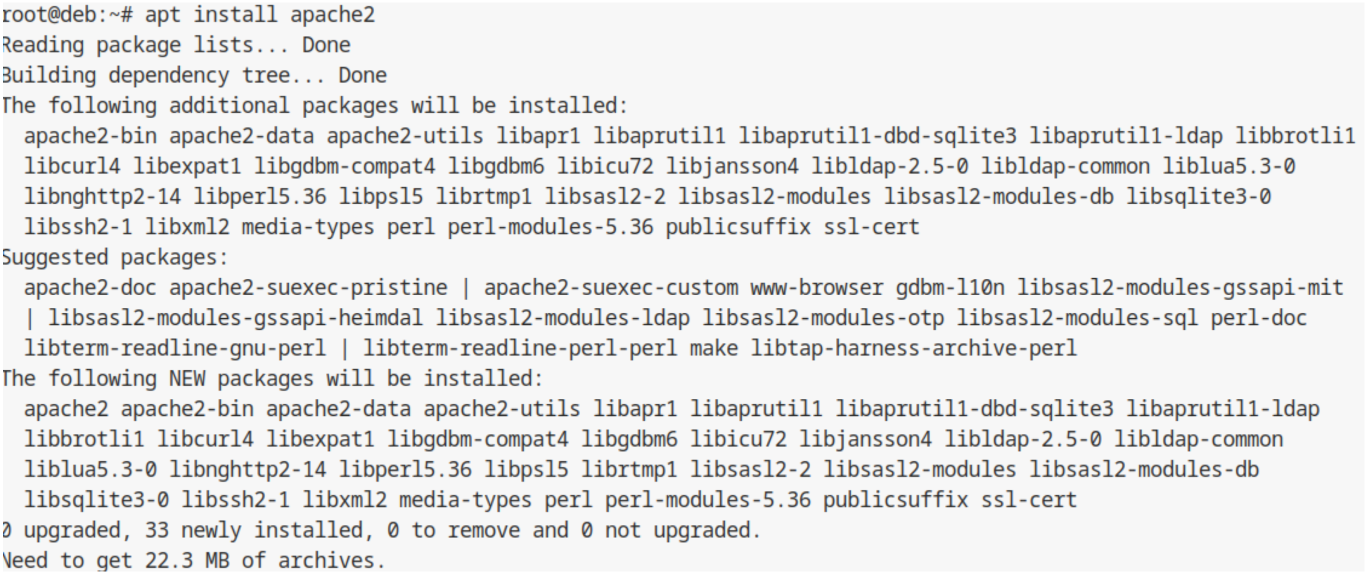
```
su - root
useradd -m -s /bin/bash usuario1
useradd -m -s /bin/bash usuario2
useradd -m -s /bin/bash usuario3
```



```
# su - root
root@deb:~# sudo useradd -m -s /bin/bash usuario1
-bash: sudo: command not found
root@deb:~# useradd -m -s /bin/bash usuario1
root@deb:~# useradd -m -s /bin/bash usuario2
root@deb:~# useradd -m -s /bin/bash usuario3
root@deb:~#
```

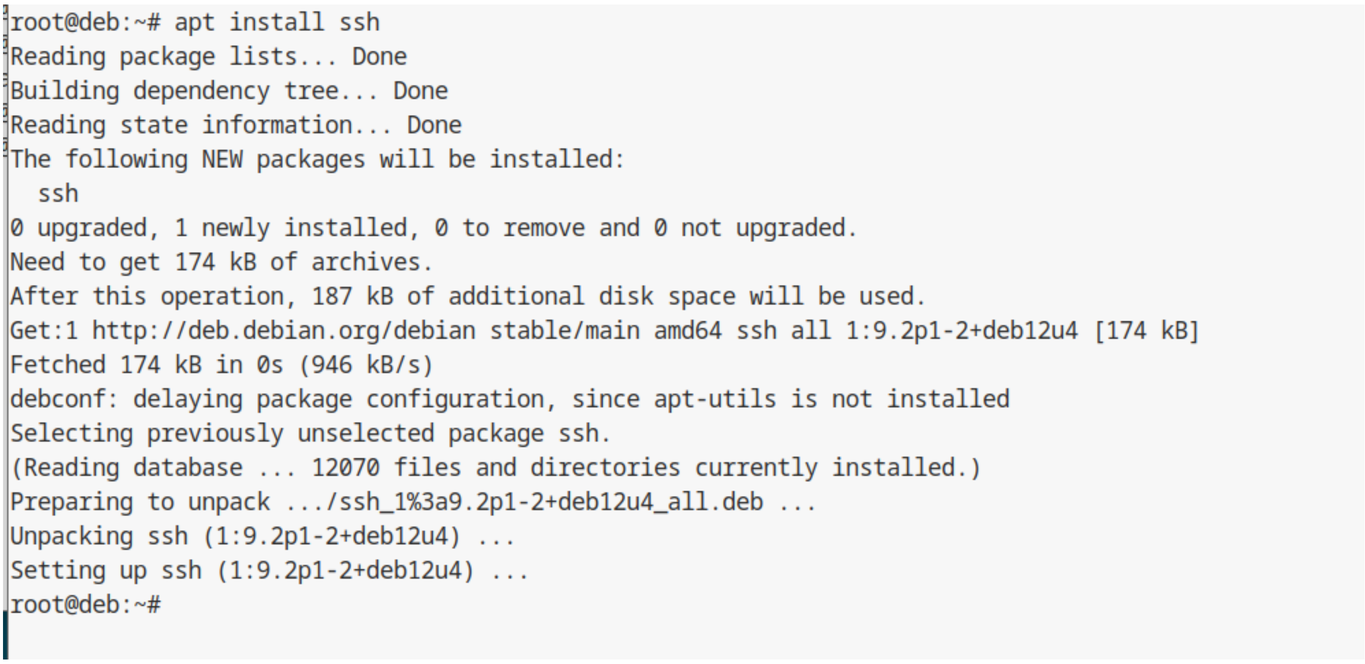
Instala apache 2 y ssh en el container

Comenzamos instalando apache 2:



```
root@deb:~# apt install apache2
Reading package lists... Done
Building dependency tree... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap libbrotli1
  libcurl4 libexpat1 libgdbm-compat4 libgdbm6 libicu72 libjansson4 libldap-2.5-0 libldap-common liblua5.3-0
  libnghttp2-14 libperl5.36 libpsl5 librtmp1 libsasl2-2 libsasl2-modules libsasl2-modules-db libsqlite3-0
  libssh2-1 libxml2 media-types perl perl-modules-5.36 publicsuffix ssl-cert
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom www-browser gdbm-l10n libsasl2-modules-gssapi-mit
  | libsasl2-modules-gssapi-heimdal libsasl2-modules-ldap libsasl2-modules-otp libsasl2-modules-sql perl-doc
  libterm-readline-gnu-perl | libterm-readline-perl-perl make libtap-harness-archive-perl
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap
  libbrotli1 libcurl4 libexpat1 libgdbm-compat4 libgdbm6 libicu72 libjansson4 libldap-2.5-0 libldap-common
  liblua5.3-0 libnghttp2-14 libperl5.36 libpsl5 librtmp1 libsasl2-2 libsasl2-modules libsasl2-modules-db
  libsqlite3-0 libssh2-1 libxml2 media-types perl perl-modules-5.36 publicsuffix ssl-cert
0 upgraded, 33 newly installed, 0 to remove and 0 not upgraded.
Need to get 22.3 MB of archives.
```

Tras eso procedemos a instalar SSH:

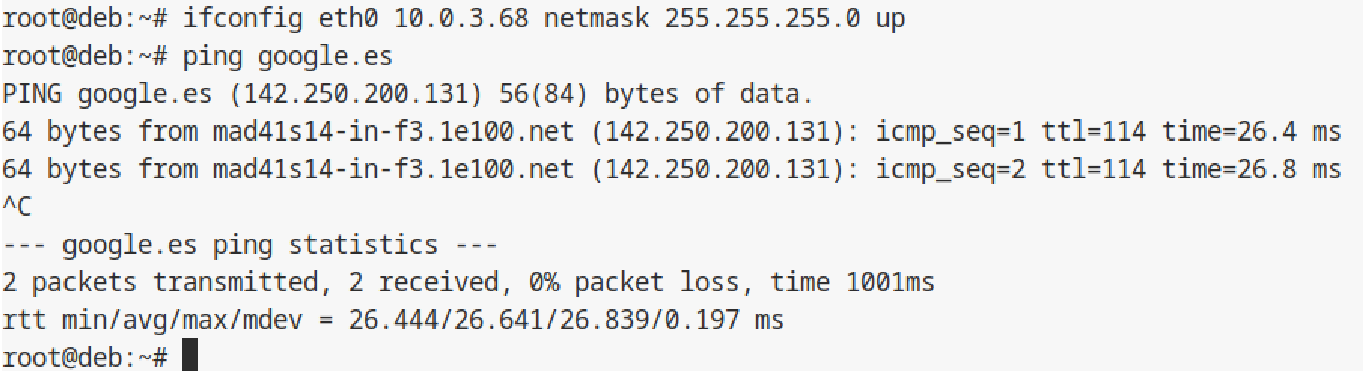


```
root@deb:~# apt install ssh
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  ssh
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 174 kB of archives.
After this operation, 187 kB of additional disk space will be used.
Get:1 http://deb.debian.org/debian stable/main amd64 ssh all 1:9.2p1-2+deb12u4 [174 kB]
Fetched 174 kB in 0s (946 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package ssh.
(Reading database ... 12070 files and directories currently installed.)
Preparing to unpack .../ssh_1%3a9.2p1-2+deb12u4_all.deb ...
Unpacking ssh (1:9.2p1-2+deb12u4) ...
Setting up ssh (1:9.2p1-2+deb12u4) ...
root@deb:~#
```

Cambia la dirección de red en el container para usar una dirección de red estática

Para establecer una IP estática usamos el siguiente comando:

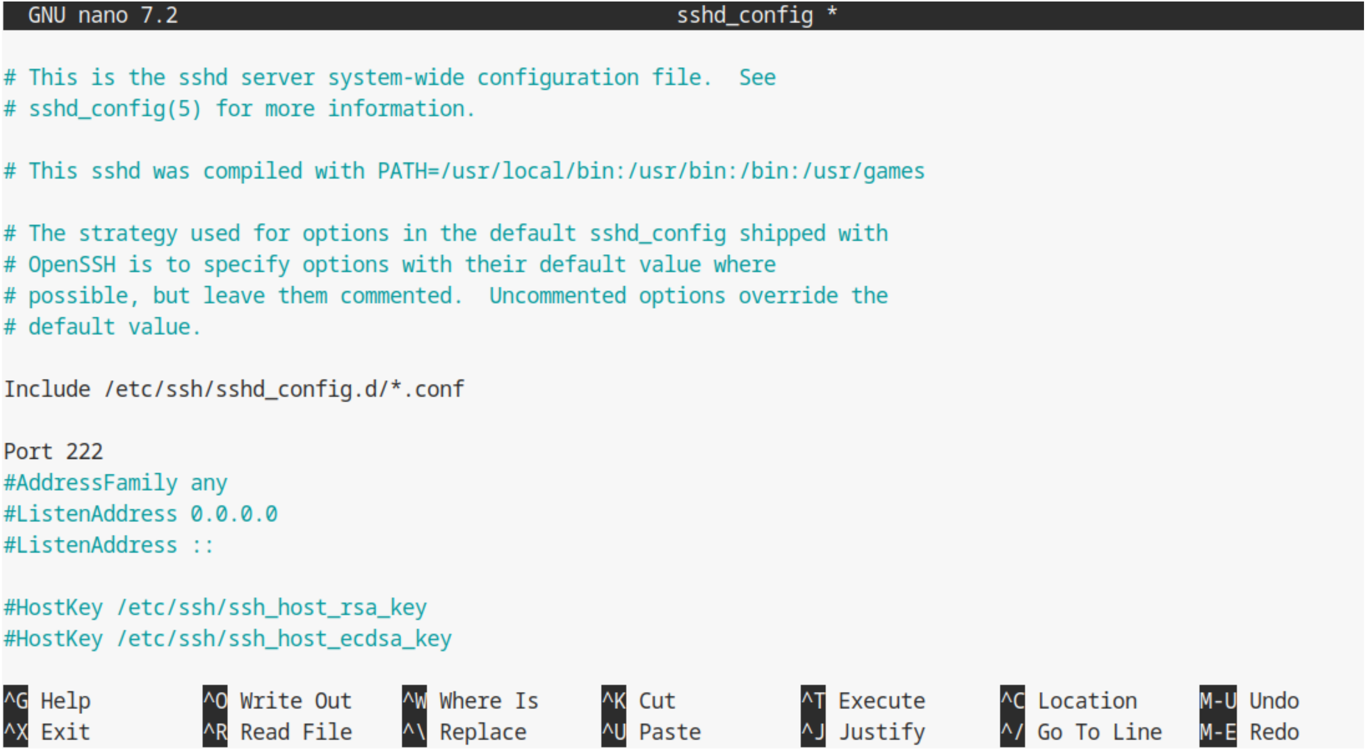
```
sudo ifconfig eth0 10.0.3.68 netmask 255.255.255.0 up
```



```
root@deb:~# ifconfig eth0 10.0.3.68 netmask 255.255.255.0 up
root@deb:~# ping google.es
PING google.es (142.250.200.131) 56(84) bytes of data.
64 bytes from mad41s14-in-f3.1e100.net (142.250.200.131): icmp_seq=1 ttl=114 time=26.4 ms
64 bytes from mad41s14-in-f3.1e100.net (142.250.200.131): icmp_seq=2 ttl=114 time=26.8 ms
^C
--- google.es ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1001ms
rtt min/avg/max/mdev = 26.444/26.641/26.839/0.197 ms
root@deb:~#
```

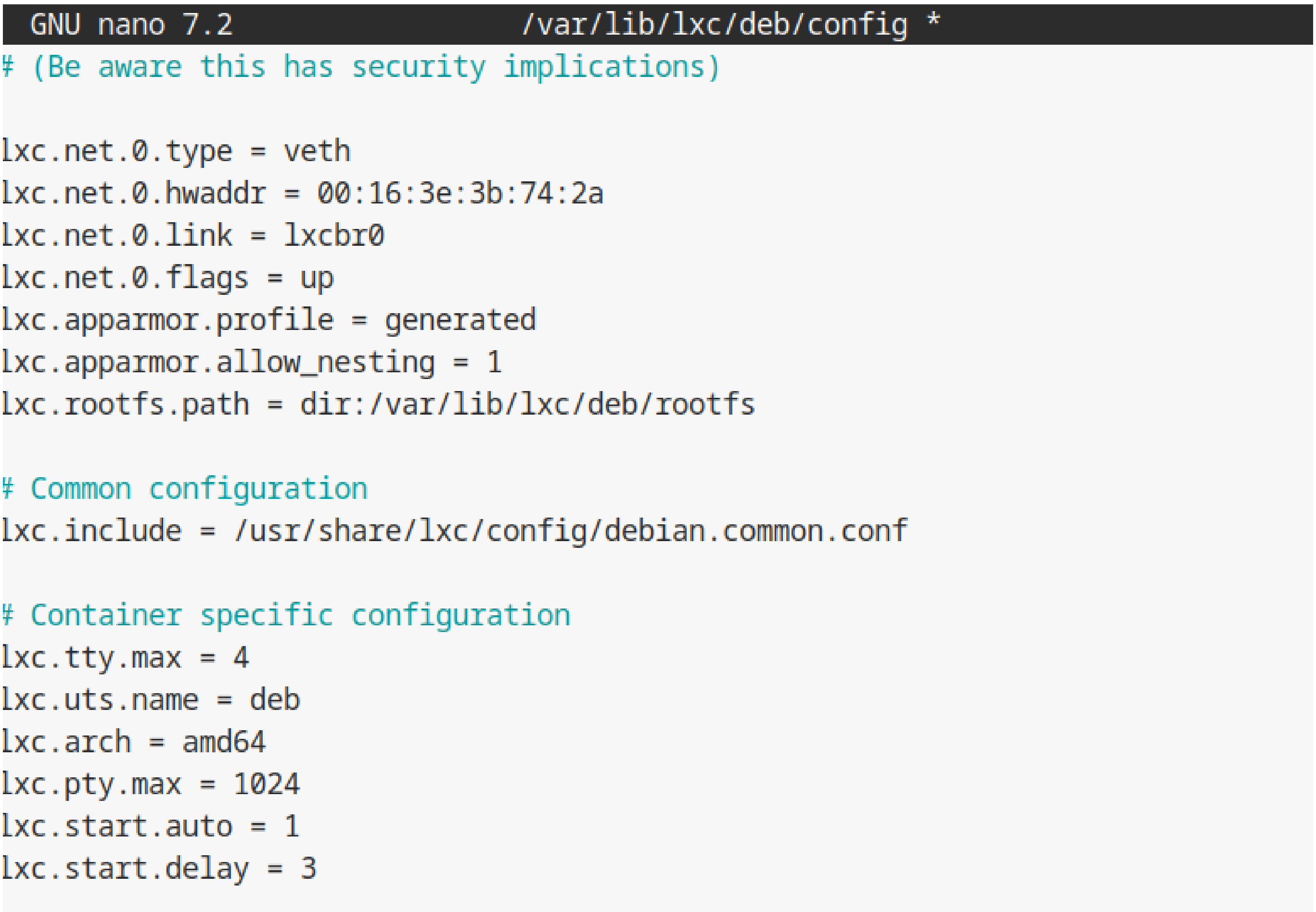
Cambial el puerto de SSH al 222

Vamos a la ruta /etc/ssh y modificamos el archivo sshd_config:



```
# This is the sshd server system-wide configuration file.  See
# sshd_config(5) for more information.

# This sshd was compiled with PATH=/usr/local/bin:/usr/bin:/bin:/usr/games

# The strategy used for options in the default sshd_config shipped with
# OpenSSH is to specify options with their default value where
# possible, but leave them commented.  Uncommented options override the
# default value.

Include /etc/ssh/sshd_config.d/*.conf

Port 222
#AddressFamily any
#ListenAddress 0.0.0.0
#ListenAddress ::

#HostKey /etc/ssh/ssh_host_rsa_key
#HostKey /etc/ssh/ssh_host_ecdsa_key
```

Modifica el archivo de configuración del container



```
 GNU nano 7.2                    /var/lib/lxc/deb/config *
# (Be aware this has security implications)

lxc.net.0.type = veth
lxc.net.0.hwaddr = 00:16:3e:3b:74:2a
lxc.net.0.link = lxcbr0
lxc.net.0.flags = up
lxc.apparmor.profile = generated
lxc.apparmor.allow_nesting = 1
lxc.rootfs.path = dir:/var/lib/lxc/deb/rootfs

# Common configuration
lxc.include = /usr/share/lxc/config/debian.common.conf

# Container specific configuration
lxc.tty.max = 4
lxc.uts.name = deb
lxc.arch = amd64
lxc.pty.max = 1024
lxc.start.auto = 1
lxc.start.delay = 3
```

Crea un csgroup