EPAM University Programs

DevOps external course

Module 2 Virtualization and Cloud Basic

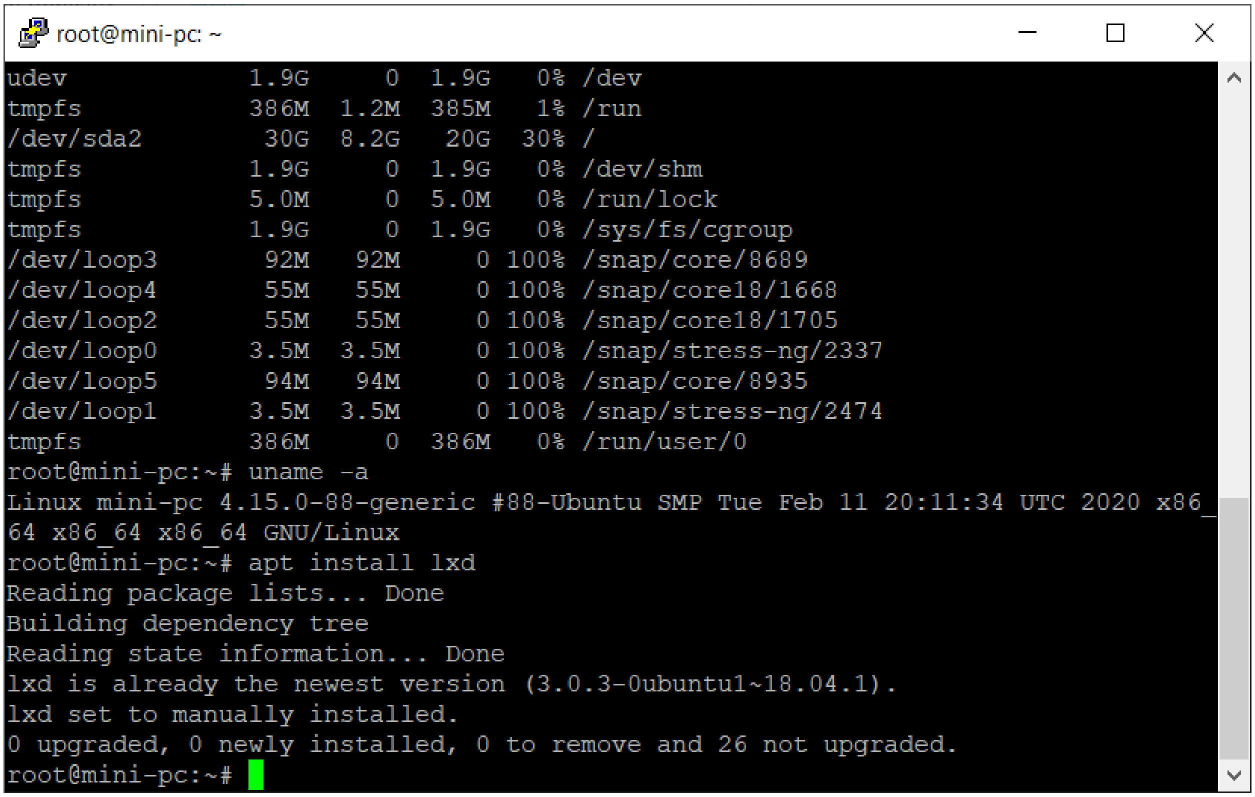
TASK 2.4

Работа с lxc в Ubuntu

Documentation - https://help.ubuntu.com/lts/serverguide/lxd.html

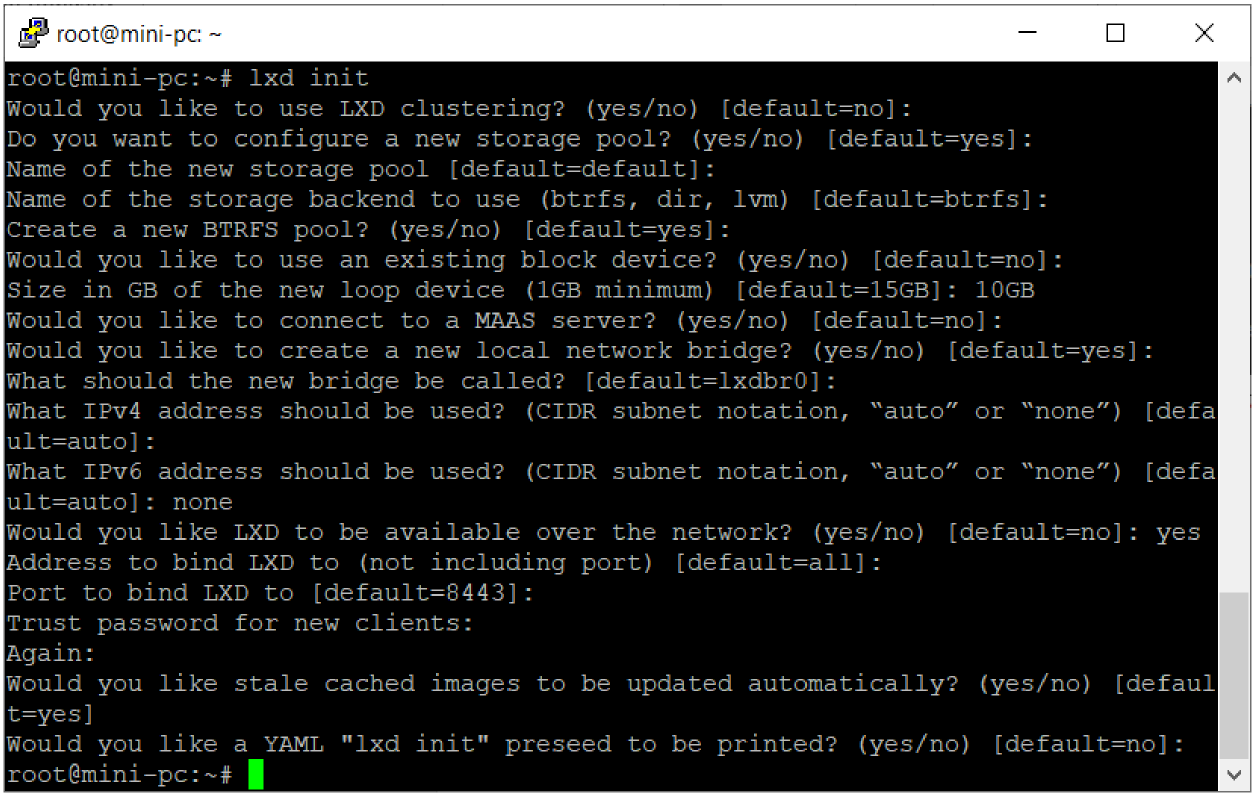
https://linuxcontainers.org/lxd/getting-started-cli/

1. Установить lxc

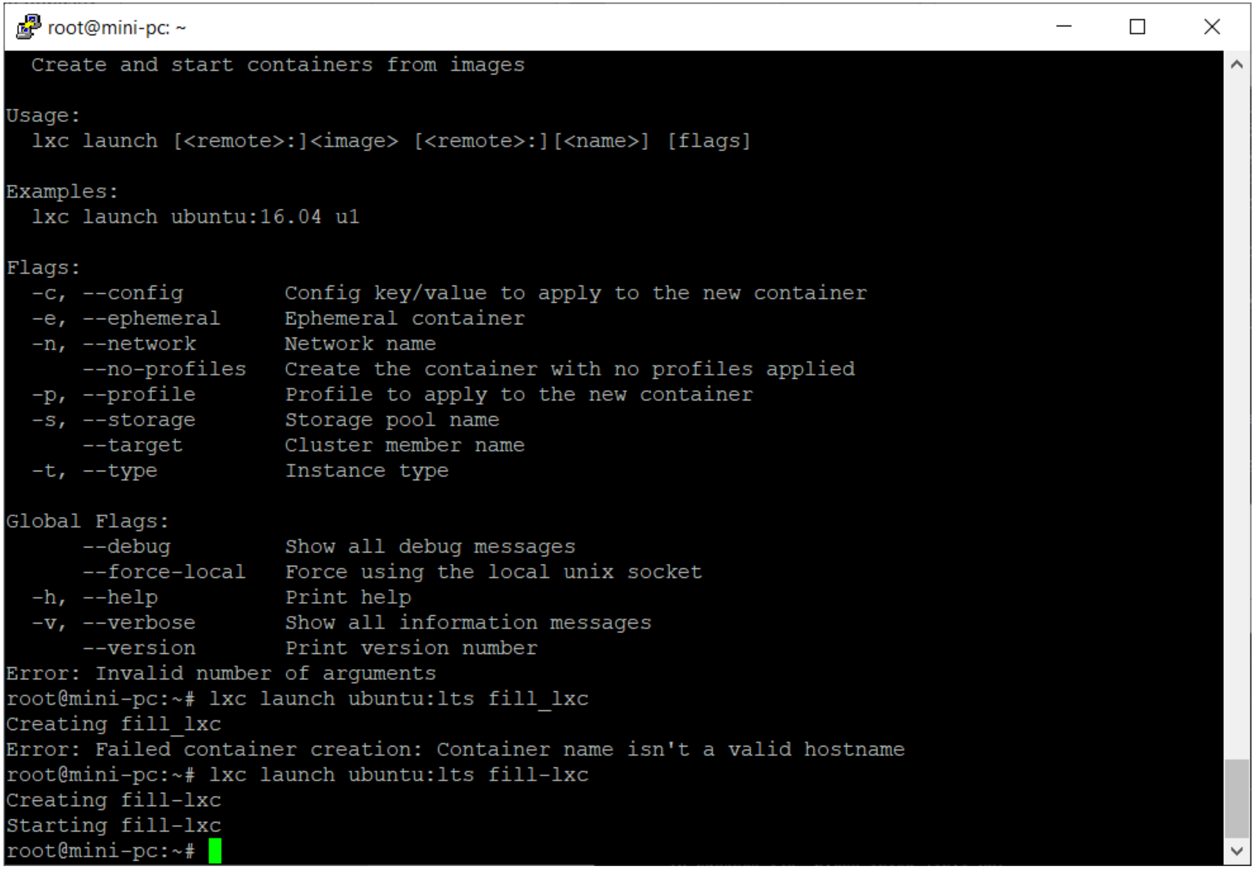


```
udev            1.9G     0  1.9G   0% /dev
tmpfs           386M  1.2M  385M   1% /run
/dev/sda2        30G  8.2G   20G  30% /
tmpfs           1.9G     0  1.9G   0% /dev/shm
tmpfs           5.0M     0  5.0M   0% /run/lock
tmpfs           1.9G     0  1.9G   0% /sys/fs/cgroup
/dev/loop3       92M   92M     0 100% /snap/core/8689
/dev/loop4       55M   55M     0 100% /snap/core18/1668
/dev/loop2       55M   55M     0 100% /snap/core18/1705
/dev/loop0      3.5M  3.5M     0 100% /snap/stress-ng/2337
/dev/loop5       94M   94M     0 100% /snap/core/8935
/dev/loop1      3.5M  3.5M     0 100% /snap/stress-ng/2474
tmpfs           386M     0  386M   0% /run/user/0
root@mini-pc:~# uname -a
Linux mini-pc 4.15.0-88-generic #88-Ubuntu SMP Tue Feb 11 20:11:34 UTC 2020 x86_
64 x86_64 x86_64 GNU/Linux
root@mini-pc:~# apt install lxd
Reading package lists... Done
Building dependency tree
Reading state information... Done
lxd is already the newest version (3.0.3-0ubuntu1~18.04.1).
lxd set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 26 not upgraded.
root@mini-pc:~#
```

2. Запустить lxc launch для любой из версий Убунту

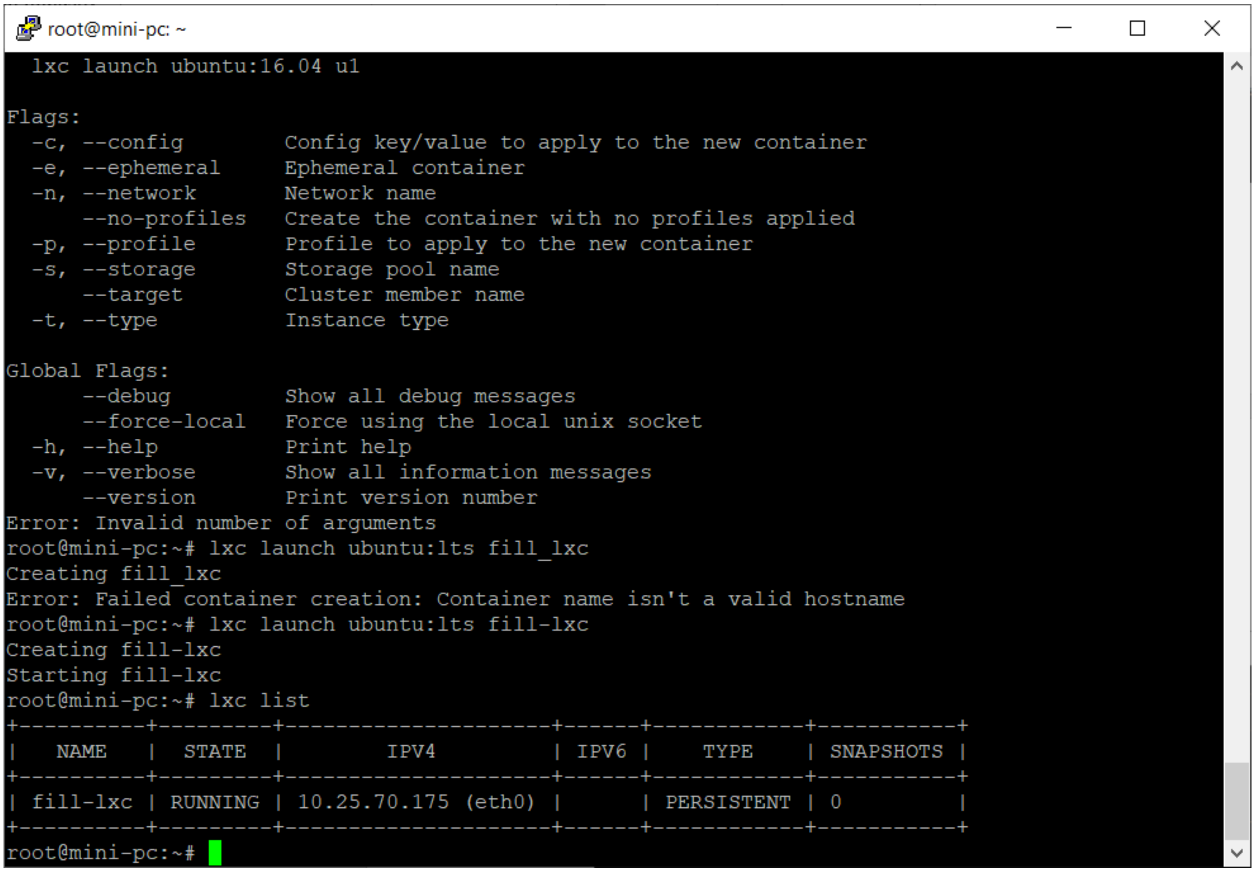


```
root@mini-pc:~# lxd init
Would you like to use LXD clustering? (yes/no) [default=no]:
Do you want to configure a new storage pool? (yes/no) [default=yes]:
Name of the new storage pool [default=default]:
Name of the storage backend to use (btrfs, dir, lvm) [default=btrfs]:
Create a new BTRFS pool? (yes/no) [default=yes]:
Would you like to use an existing block device? (yes/no) [default=no]:
Size in GB of the new loop device (1GB minimum) [default=15GB]: 10GB
Would you like to connect to a MAAS server? (yes/no) [default=no]:
Would you like to create a new local network bridge? (yes/no) [default=yes]:
What should the new bridge be called? [default=lxdbr0]:
What IPv4 address should be used? (CIDR subnet notation, “auto” or “none”) [defa
ult=auto]:
What IPv6 address should be used? (CIDR subnet notation, “auto” or “none”) [defa
ult=auto]: none
Would you like LXD to be available over the network? (yes/no) [default=no]: yes
Address to bind LXD to (not including port) [default=all]:
Port to bind LXD to [default=8443]:
Trust password for new clients:
Again:
Would you like stale cached images to be updated automatically? (yes/no) [defaul
t=yes]
Would you like a YAML "lxd init" preseed to be printed? (yes/no) [default=no]:
root@mini-pc:~#
```



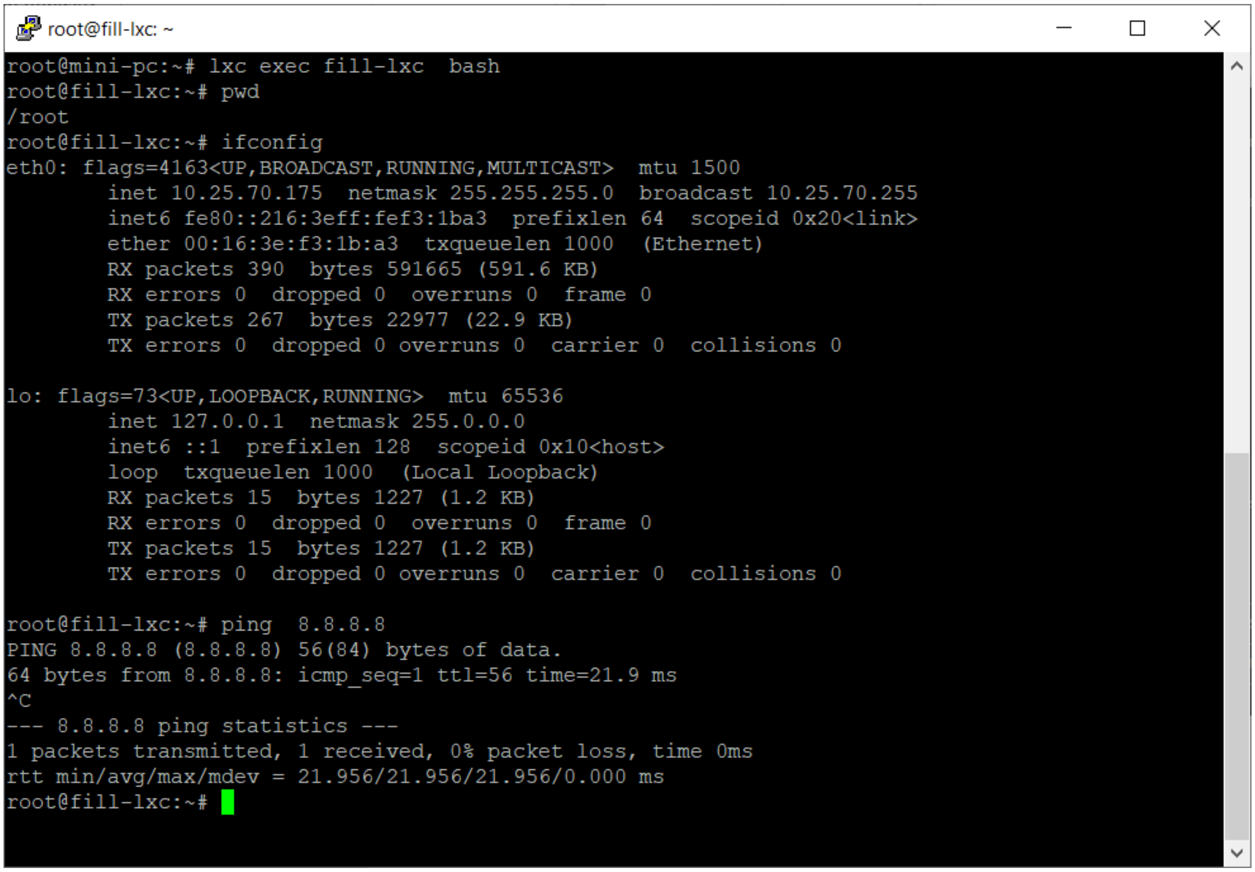
```
  Create and start containers from images

Usage:
  lxc launch [<remote>:]<image> [<remote>:][<name>] [flags]

Examples:
  lxc launch ubuntu:16.04 u1

Flags:
  -c, --config         Config key/value to apply to the new container
  -e, --ephemeral      Ephemeral container
  -n, --network        Network name
      --no-profiles    Create the container with no profiles applied
  -p, --profile        Profile to apply to the new container
  -s, --storage        Storage pool name
      --target         Cluster member name
  -t, --type           Instance type

Global Flags:
      --debug          Show all debug messages
      --force-local    Force using the local unix socket
  -h, --help           Print help
  -v, --verbose        Show all information messages
      --version        Print version number
Error: Invalid number of arguments
root@mini-pc:~# lxc launch ubuntu:lts fill_lxc
Creating fill_lxc
Error: Failed container creation: Container name isn't a valid hostname
root@mini-pc:~# lxc launch ubuntu:lts fill-lxc
Creating fill-lxc
Starting fill-lxc
root@mini-pc:~#
```

3. По окончании загрузки убедиться, что машина стартовала lxc list



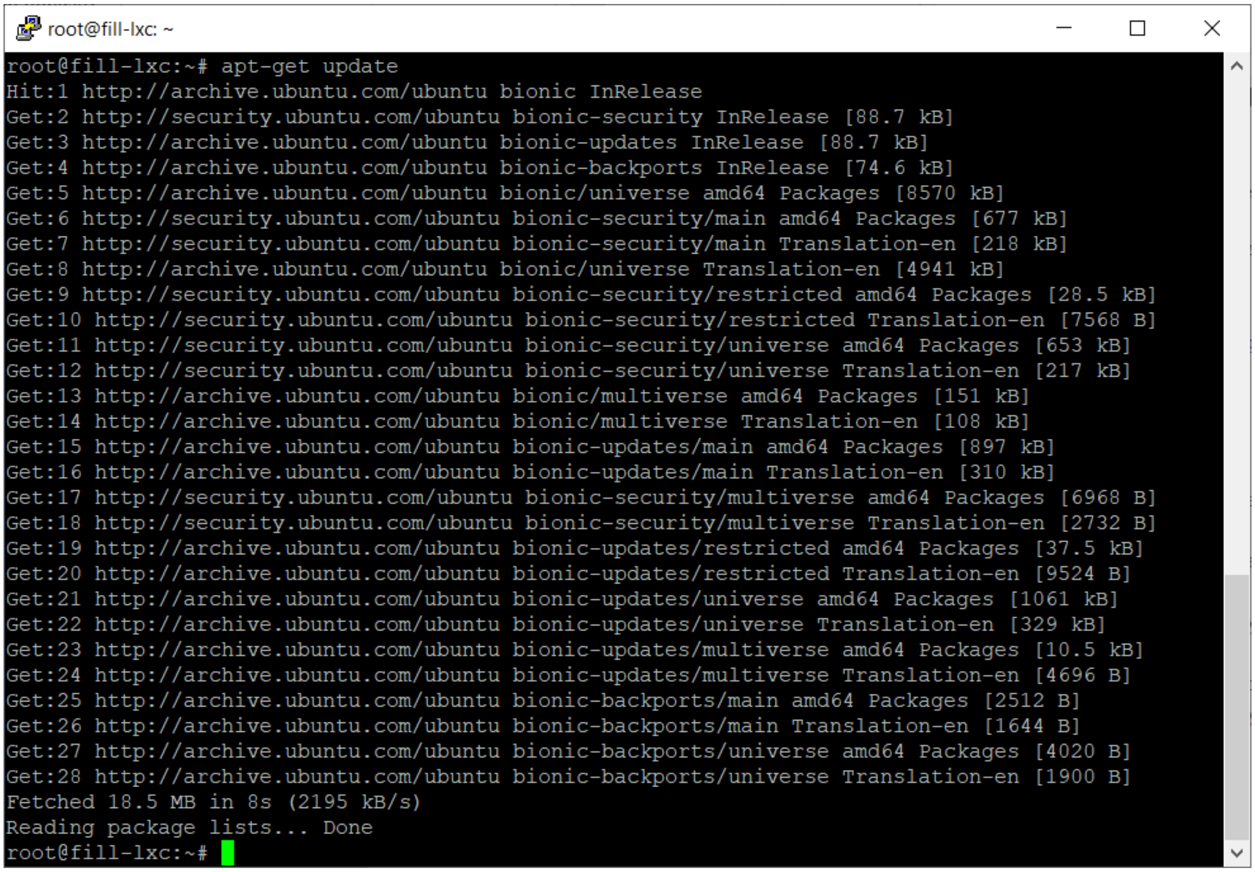
```
  lxc launch ubuntu:16.04 u1

Flags:
  -c, --config         Config key/value to apply to the new container
  -e, --ephemeral      Ephemeral container
  -n, --network        Network name
      --no-profiles    Create the container with no profiles applied
  -p, --profile        Profile to apply to the new container
  -s, --storage        Storage pool name
      --target         Cluster member name
  -t, --type           Instance type

Global Flags:
      --debug          Show all debug messages
      --force-local    Force using the local unix socket
  -h, --help           Print help
  -v, --verbose        Show all information messages
      --version        Print version number
Error: Invalid number of arguments
root@mini-pc:~# lxc launch ubuntu:lts fill_lxc
Creating fill_lxc
Error: Failed container creation: Container name isn't a valid hostname
root@mini-pc:~# lxc launch ubuntu:lts fill-lxc
Creating fill-lxc
Starting fill-lxc
root@mini-pc:~# lxc list
+----------+---------+---------------------+------+------------+-----------+
|   NAME   |  STATE  |        IPV4         | IPV6 |    TYPE    | SNAPSHOTS |
+----------+---------+---------------------+------+------------+-----------+
| fill-lxc | RUNNING | 10.25.70.175 (eth0) |      | PERSISTENT | 0         |
+----------+---------+---------------------+------+------------+-----------+
root@mini-pc:~#
```

4. Зайдите в контейнер с командной строкой bash /bin/bash



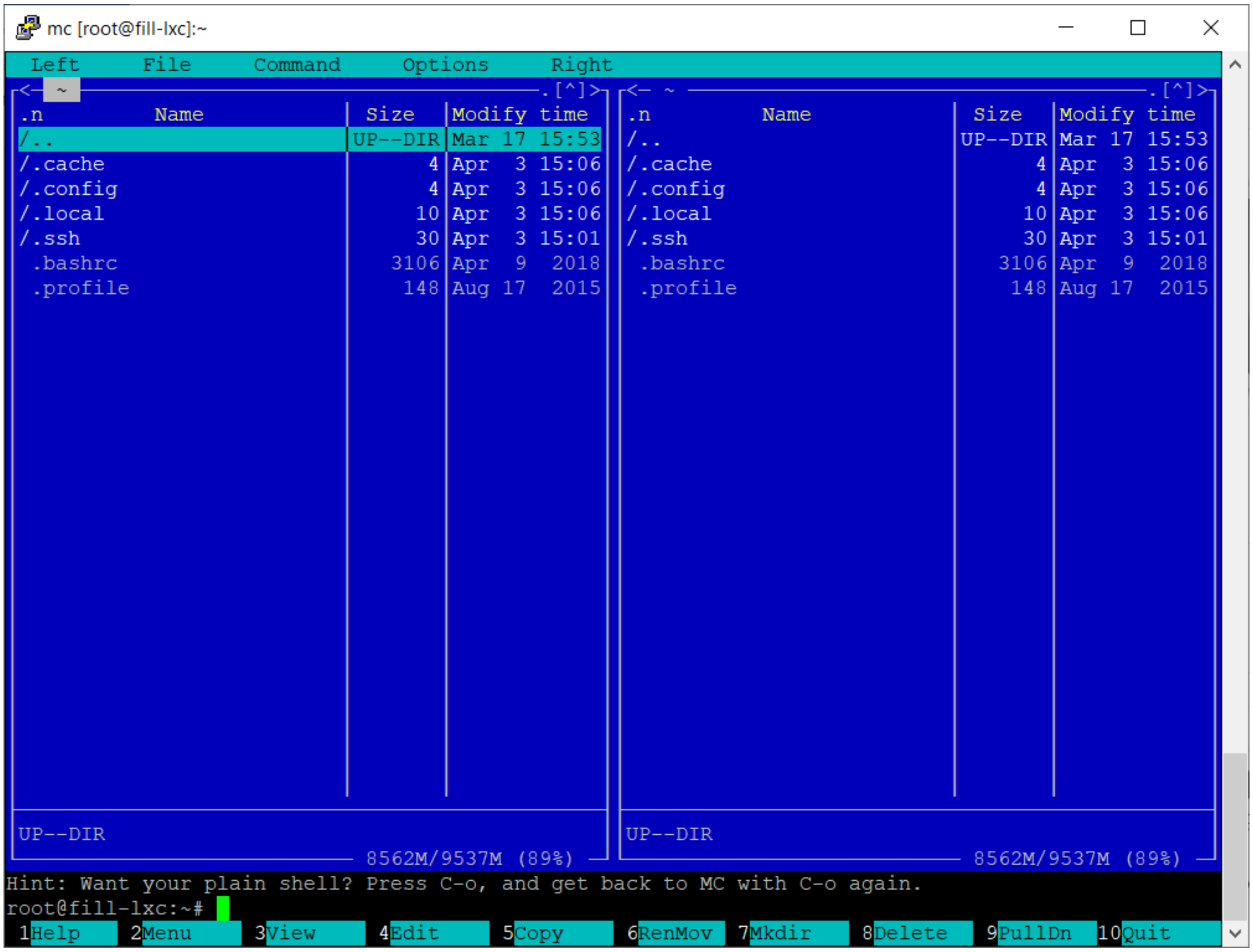
```
root@mini-pc:~# lxc exec fill-lxc  bash
root@fill-lxc:~# pwd
/root
root@fill-lxc:~# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.25.70.175  netmask 255.255.255.0  broadcast 10.25.70.255
        inet6 fe80::216:3eff:fef3:1ba3  prefixlen 64  scopeid 0x20<link>
        ether 00:16:3e:f3:1b:a3  txqueuelen 1000  (Ethernet)
        RX packets 390  bytes 591665 (591.6 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 267  bytes 22977 (22.9 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 15  bytes 1227 (1.2 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 15  bytes 1227 (1.2 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

root@fill-lxc:~# ping  8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=56 time=21.9 ms
^C
--- 8.8.8.8 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 21.956/21.956/21.956/0.000 ms
root@fill-lxc:~# 
```

5. Запустите обновление apt-get update



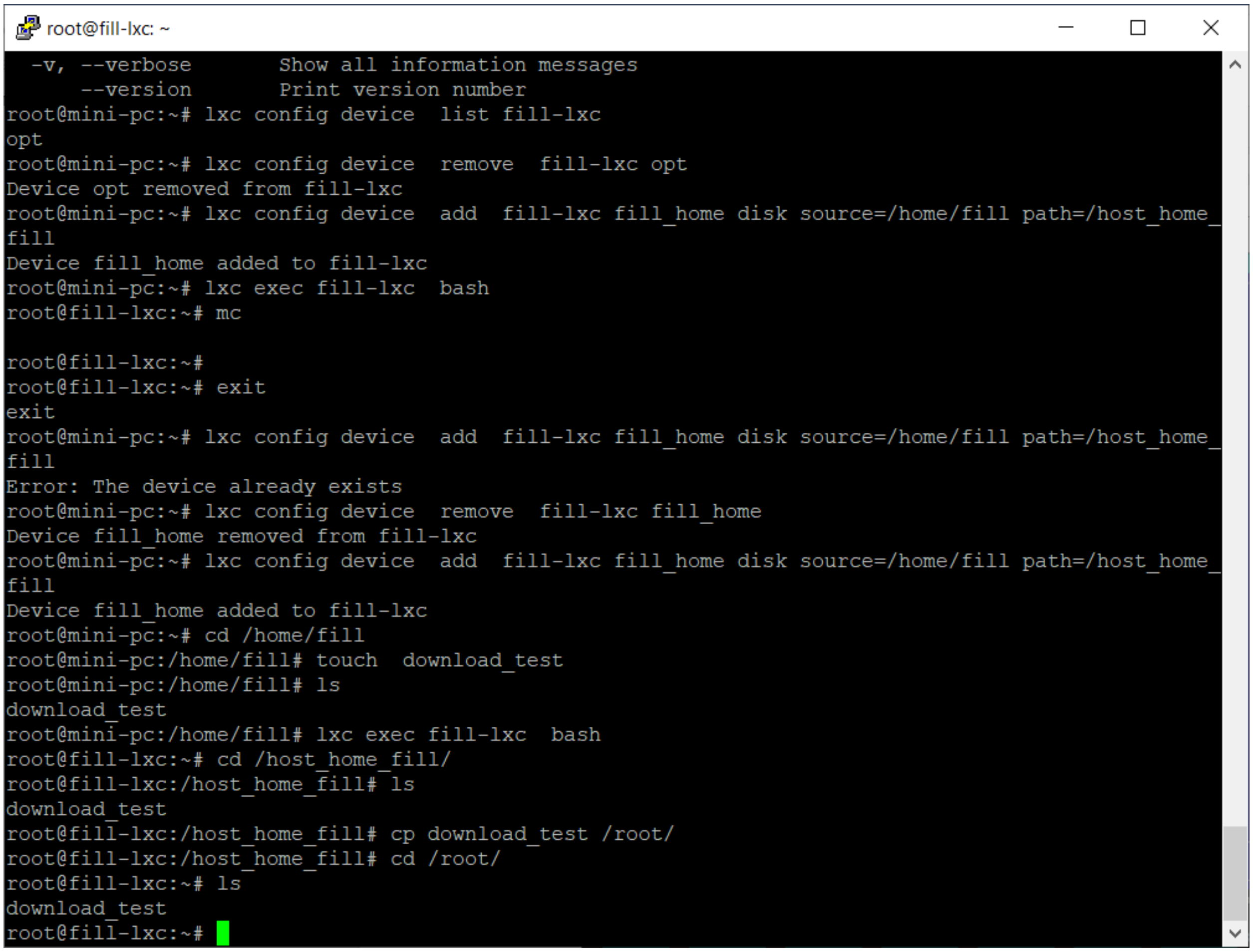
```
root@fill-lxc:~# apt-get update
Hit:1 http://archive.ubuntu.com/ubuntu bionic InRelease
Get:2 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Get:3 http://archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:4 http://archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Get:5 http://archive.ubuntu.com/ubuntu bionic/universe amd64 Packages [8570 kB]
Get:6 http://security.ubuntu.com/ubuntu bionic-security/main amd64 Packages [677 kB]
Get:7 http://security.ubuntu.com/ubuntu bionic-security/main Translation-en [218 kB]
Get:8 http://archive.ubuntu.com/ubuntu bionic/universe Translation-en [4941 kB]
Get:9 http://security.ubuntu.com/ubuntu bionic-security/restricted amd64 Packages [28.5 kB]
Get:10 http://security.ubuntu.com/ubuntu bionic-security/restricted Translation-en [7568 B]
Get:11 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 Packages [653 kB]
Get:12 http://security.ubuntu.com/ubuntu bionic-security/universe Translation-en [217 kB]
Get:13 http://archive.ubuntu.com/ubuntu bionic/multiverse amd64 Packages [151 kB]
Get:14 http://archive.ubuntu.com/ubuntu bionic/multiverse Translation-en [108 kB]
Get:15 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages [897 kB]
Get:16 http://archive.ubuntu.com/ubuntu bionic-updates/main Translation-en [310 kB]
Get:17 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 Packages [6968 B]
Get:18 http://security.ubuntu.com/ubuntu bionic-security/multiverse Translation-en [2732 B]
Get:19 http://archive.ubuntu.com/ubuntu bionic-updates/restricted amd64 Packages [37.5 kB]
Get:20 http://archive.ubuntu.com/ubuntu bionic-updates/restricted Translation-en [9524 B]
Get:21 http://archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packages [1061 kB]
Get:22 http://archive.ubuntu.com/ubuntu bionic-updates/universe Translation-en [329 kB]
Get:23 http://archive.ubuntu.com/ubuntu bionic-updates/multiverse amd64 Packages [10.5 kB]
Get:24 http://archive.ubuntu.com/ubuntu bionic-updates/multiverse Translation-en [4696 B]
Get:25 http://archive.ubuntu.com/ubuntu bionic-backports/main amd64 Packages [2512 B]
Get:26 http://archive.ubuntu.com/ubuntu bionic-backports/main Translation-en [1644 B]
Get:27 http://archive.ubuntu.com/ubuntu bionic-backports/universe amd64 Packages [4020 B]
Get:28 http://archive.ubuntu.com/ubuntu bionic-backports/universe Translation-en [1900 B]
Fetched 18.5 MB in 8s (2195 kB/s)
Reading package lists... Done
root@fill-lxc:~#
```

6. Установите (apt-get install) любую программу в контейнер. Например mc. Проверьте работоспособность



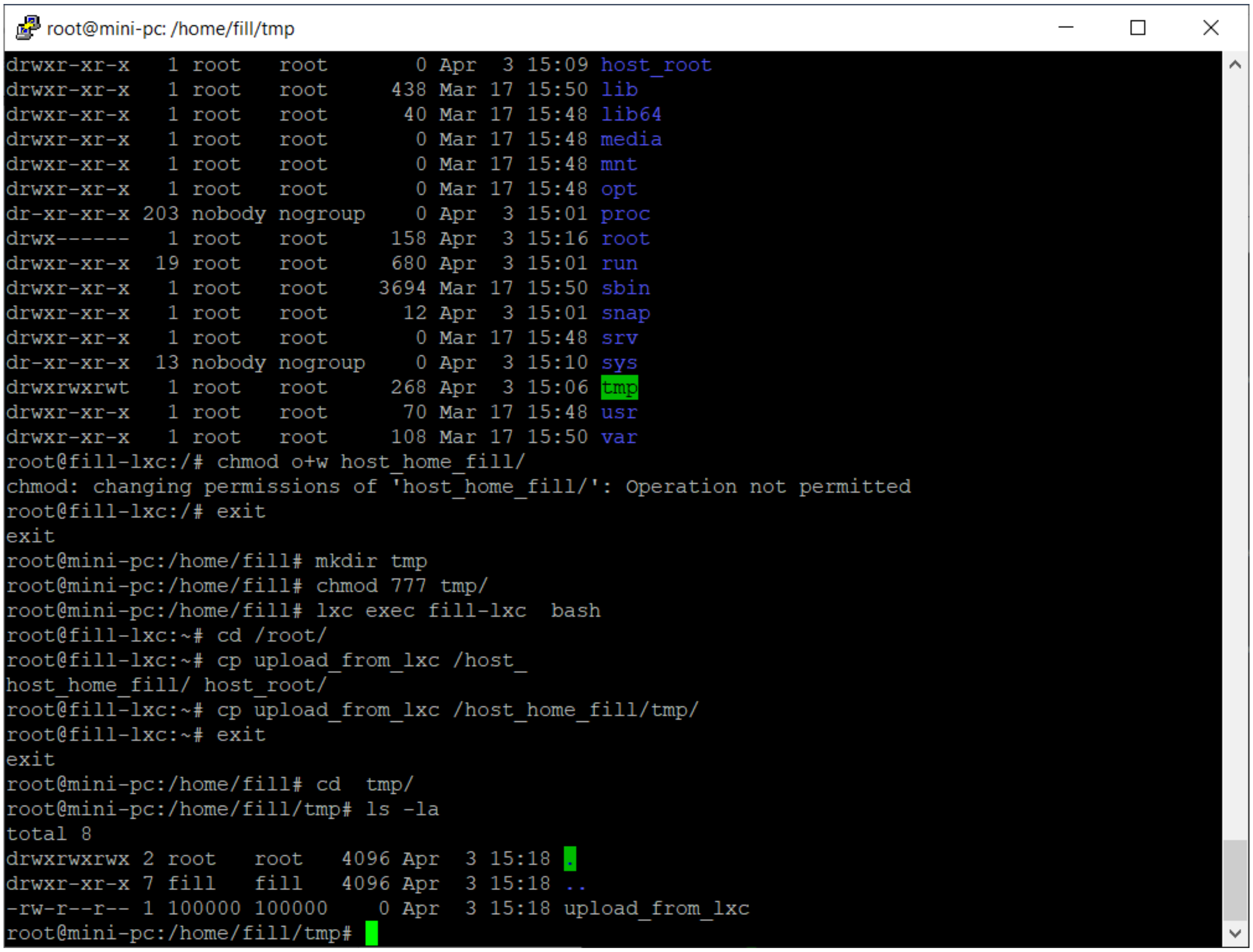
```
  Left     File     Command      Options      Right
┌<─ ~ ───────────────────────────────────.[^]>┐┌<─ ~ ───────────────────────────────────.[^]>┐
│.n          Name           │ Size  │Modify time ││.n          Name           │ Size  │Modify time │
│/..                        │UP--DIR│Mar 17 15:53││/..                        │UP--DIR│Mar 17 15:53│
│/.cache                    │      4│Apr  3 15:06││/.cache                    │      4│Apr  3 15:06│
│/.config                   │      4│Apr  3 15:06││/.config                   │      4│Apr  3 15:06│
│/.local                    │     10│Apr  3 15:06││/.local                    │     10│Apr  3 15:06│
│/.ssh                      │     30│Apr  3 15:01││/.ssh                      │     30│Apr  3 15:01│
│ .bashrc                   │   3106│Apr  9  2018││ .bashrc                   │   3106│Apr  9  2018│
│ .profile                  │    148│Aug 17  2015││ .profile                  │    148│Aug 17  2015│
│                           │       │            ││                           │       │            │
├───────────────────────────────────────────────┤├───────────────────────────────────────────────┤
│UP--DIR                                        ││UP--DIR                                        │
└───────────────────────────── 8562M/9537M (89%) ─┘└───────────────────────────── 8562M/9537M (89%) ─┘
Hint: Want your plain shell? Press C-o, and get back to MC with C-o again.
root@fill-lxc:~# 
 1Help     2Menu     3View     4Edit     5Copy     6RenMov   7Mkdir    8Delete   9PullDn  10Quit
```

7. Загрузите в контейнер файл



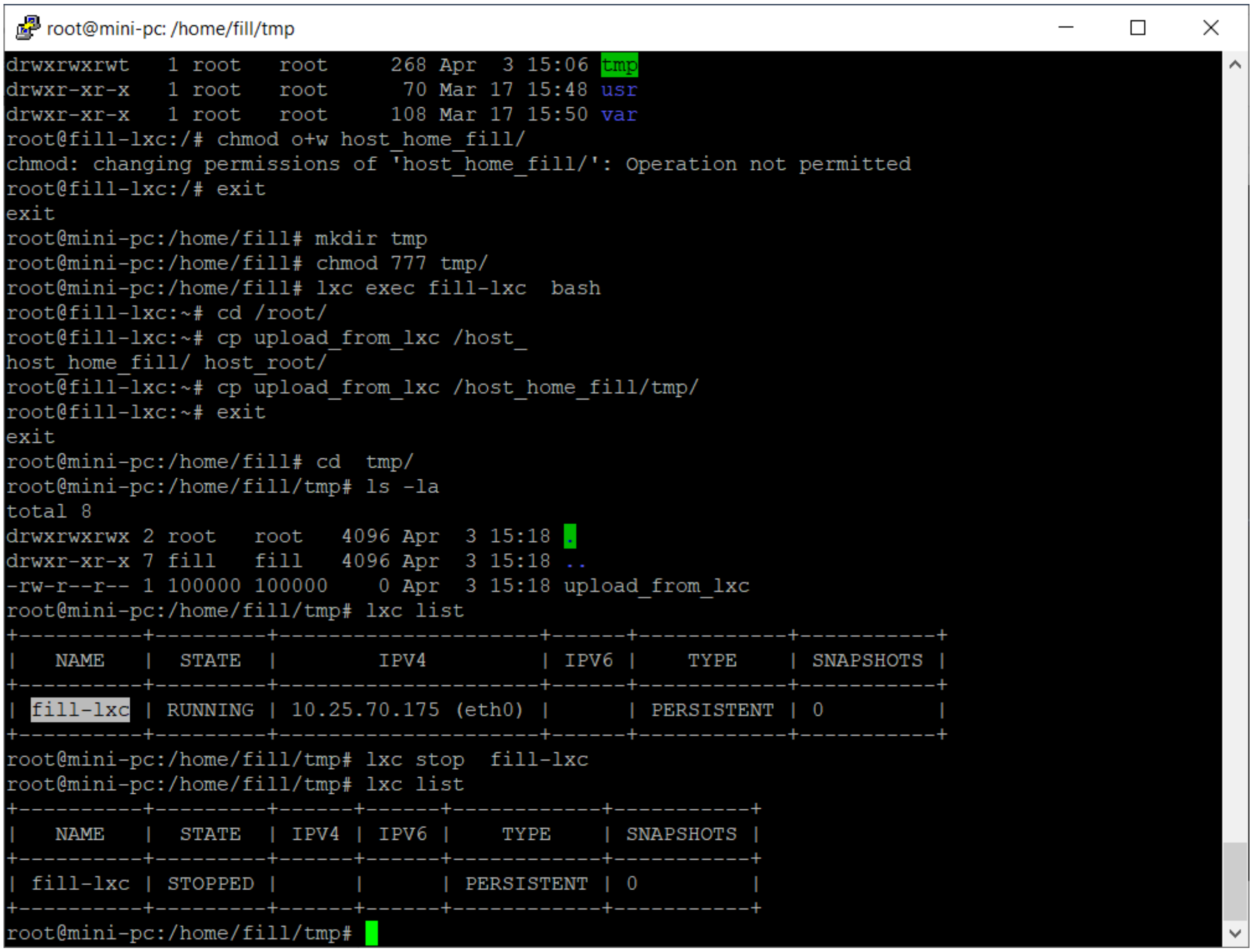
```
  -v, --verbose       Show all information messages
      --version       Print version number
root@mini-pc:~# lxc config device  list fill-lxc
opt
root@mini-pc:~# lxc config device  remove  fill-lxc opt
Device opt removed from fill-lxc
root@mini-pc:~# lxc config device  add  fill-lxc fill_home disk source=/home/fill path=/host_home_
fill
Device fill_home added to fill-lxc
root@mini-pc:~# lxc exec fill-lxc  bash
root@fill-lxc:~# mc

root@fill-lxc:~#
root@fill-lxc:~# exit
exit
root@mini-pc:~# lxc config device  add  fill-lxc fill_home disk source=/home/fill path=/host_home_
fill
Error: The device already exists
root@mini-pc:~# lxc config device  remove  fill-lxc fill_home
Device fill_home removed from fill-lxc
root@mini-pc:~# lxc config device  add  fill-lxc fill_home disk source=/home/fill path=/host_home_
fill
Device fill_home added to fill-lxc
root@mini-pc:~# cd /home/fill
root@mini-pc:/home/fill# touch  download_test
root@mini-pc:/home/fill# ls
download_test
root@mini-pc:/home/fill# lxc exec fill-lxc  bash
root@fill-lxc:~# cd /host_home_fill/
root@fill-lxc:/host_home_fill# ls
download_test
root@fill-lxc:/host_home_fill# cp download_test /root/
root@fill-lxc:/host_home_fill# cd /root/
root@fill-lxc:~# ls
download_test
root@fill-lxc:~# 
```

и скачайте с контейнера другой файл



```
drwxr-xr-x   1 root   root       0 Apr  3 15:09 host_root
drwxr-xr-x   1 root   root     438 Mar 17 15:50 lib
drwxr-xr-x   1 root   root      40 Mar 17 15:48 lib64
drwxr-xr-x   1 root   root       0 Mar 17 15:48 media
drwxr-xr-x   1 root   root       0 Mar 17 15:48 mnt
drwxr-xr-x   1 root   root       0 Mar 17 15:48 opt
dr-xr-xr-x 203 nobody nogroup    0 Apr  3 15:01 proc
drwx------   1 root   root     158 Apr  3 15:16 root
drwxr-xr-x  19 root   root     680 Apr  3 15:01 run
drwxr-xr-x   1 root   root    3694 Mar 17 15:50 sbin
drwxr-xr-x   1 root   root      12 Apr  3 15:01 snap
drwxr-xr-x   1 root   root       0 Mar 17 15:48 srv
dr-xr-xr-x  13 nobody nogroup    0 Apr  3 15:10 sys
drwxrwxrwt   1 root   root     268 Apr  3 15:06 tmp
drwxr-xr-x   1 root   root      70 Mar 17 15:48 usr
drwxr-xr-x   1 root   root     108 Mar 17 15:50 var
root@fill-lxc:/# chmod o+w host_home_fill/
chmod: changing permissions of 'host_home_fill/': Operation not permitted
root@fill-lxc:/# exit
exit
root@mini-pc:/home/fill# mkdir tmp
root@mini-pc:/home/fill# chmod 777 tmp/
root@mini-pc:/home/fill# lxc exec fill-lxc  bash
root@fill-lxc:~# cd /root/
root@fill-lxc:~# cp upload_from_lxc /host_
host_home_fill/ host_root/
root@fill-lxc:~# cp upload_from_lxc /host_home_fill/tmp/
root@fill-lxc:~# exit
exit
root@mini-pc:/home/fill# cd  tmp/
root@mini-pc:/home/fill/tmp# ls -la
total 8
drwxrwxrwx 2 root   root   4096 Apr  3 15:18 .
drwxr-xr-x 7 fill   fill   4096 Apr  3 15:18 ..
-rw-r--r-- 1 100000 100000    0 Apr  3 15:18 upload_from_lxc
root@mini-pc:/home/fill/tmp# 
```

Stop LXC container



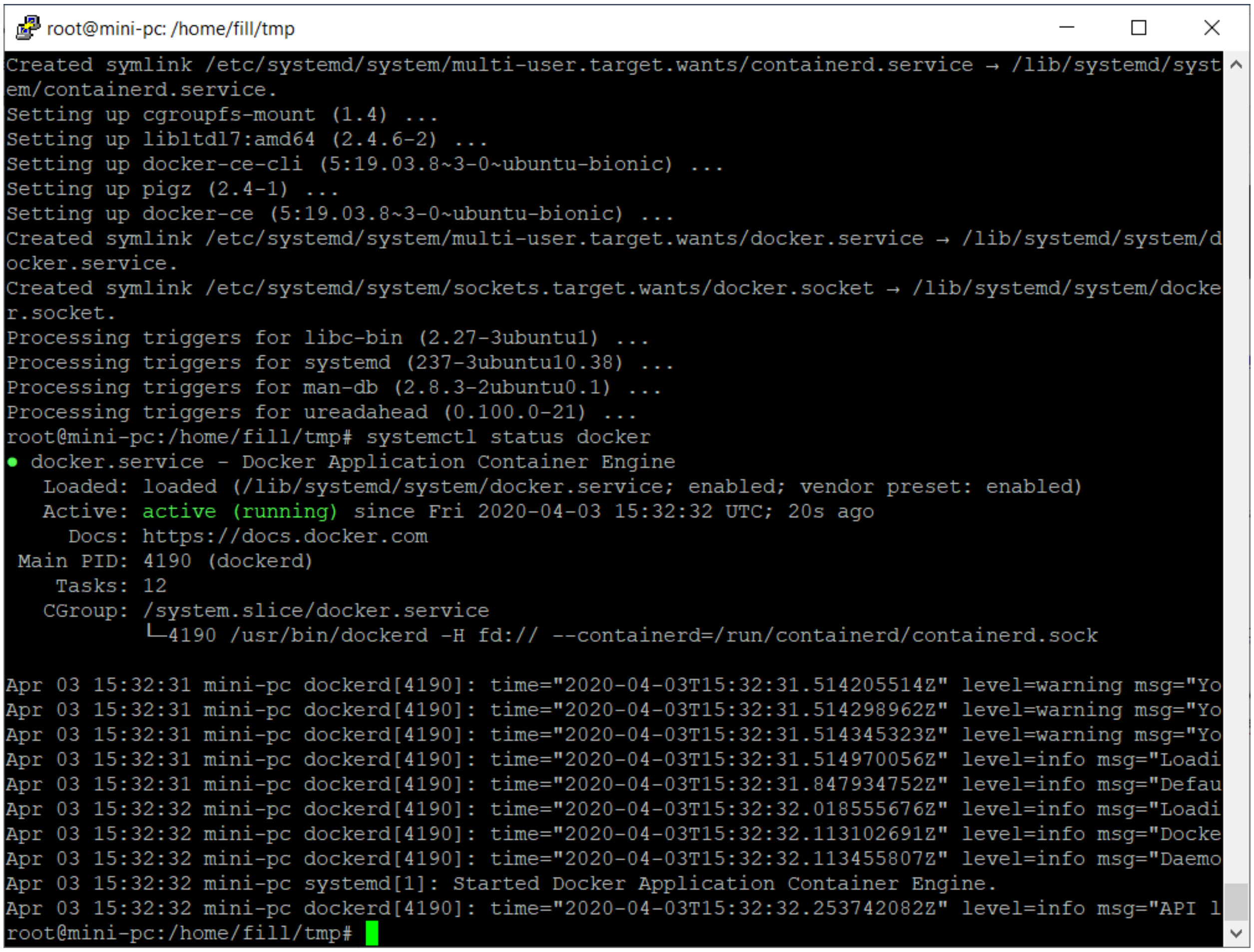
```
drwxrwxrwt   1 root   root     268 Apr  3 15:06 tmp
drwxr-xr-x   1 root   root      70 Mar 17 15:48 usr
drwxr-xr-x   1 root   root     108 Mar 17 15:50 var
root@fill-lxc:/# chmod o+w host_home_fill/
chmod: changing permissions of 'host_home_fill/': Operation not permitted
root@fill-lxc:/# exit
exit
root@mini-pc:/home/fill# mkdir tmp
root@mini-pc:/home/fill# chmod 777 tmp/
root@mini-pc:/home/fill# lxc exec fill-lxc  bash
root@fill-lxc:~# cd /root/
root@fill-lxc:~# cp upload_from_lxc /host_
host_home_fill/ host_root/
root@fill-lxc:~# cp upload_from_lxc /host_home_fill/tmp/
root@fill-lxc:~# exit
exit
root@mini-pc:/home/fill# cd  tmp/
root@mini-pc:/home/fill/tmp# ls -la
total 8
drwxrwxrwx 2 root   root   4096 Apr  3 15:18 .
drwxr-xr-x 7 fill   fill   4096 Apr  3 15:18 ..
-rw-r--r-- 1 100000 100000    0 Apr  3 15:18 upload_from_lxc
root@mini-pc:/home/fill/tmp# lxc list
+----------+---------+---------------------+------+------------+-----------+
|   NAME   |  STATE  |        IPV4         | IPV6 |    TYPE    | SNAPSHOTS |
+----------+---------+---------------------+------+------------+-----------+
| fill-lxc | RUNNING | 10.25.70.175 (eth0) |      | PERSISTENT | 0         |
+----------+---------+---------------------+------+------------+-----------+
root@mini-pc:/home/fill/tmp# lxc stop  fill-lxc
root@mini-pc:/home/fill/tmp# lxc list
+----------+---------+------+------+------------+-----------+
|   NAME   |  STATE  | IPV4 | IPV6 |    TYPE    | SNAPSHOTS |
+----------+---------+------+------+------------+-----------+
| fill-lxc | STOPPED |      |      | PERSISTENT | 0         |
+----------+---------+------+------+------------+-----------+
root@mini-pc:/home/fill/tmp#
```

Работа с Docker в Ubuntu

Documentation - https://www.digitalocean.com/community/tutorials/how-to-install-and-use-docker-on-ubuntu-18-04

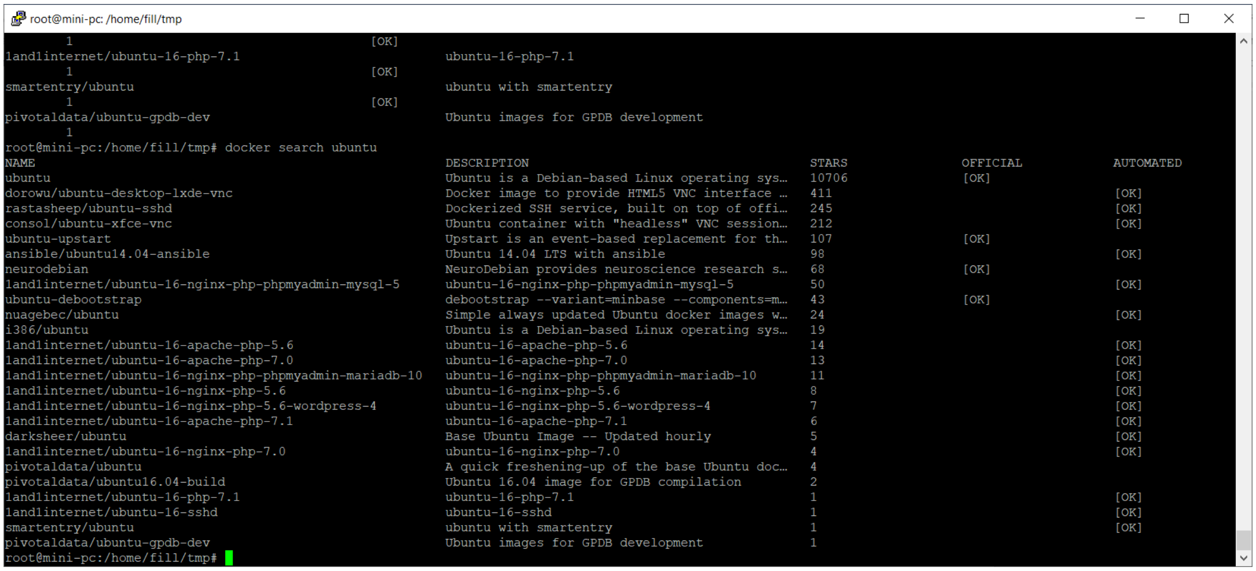
https://docs.docker.com

1. Установить docker



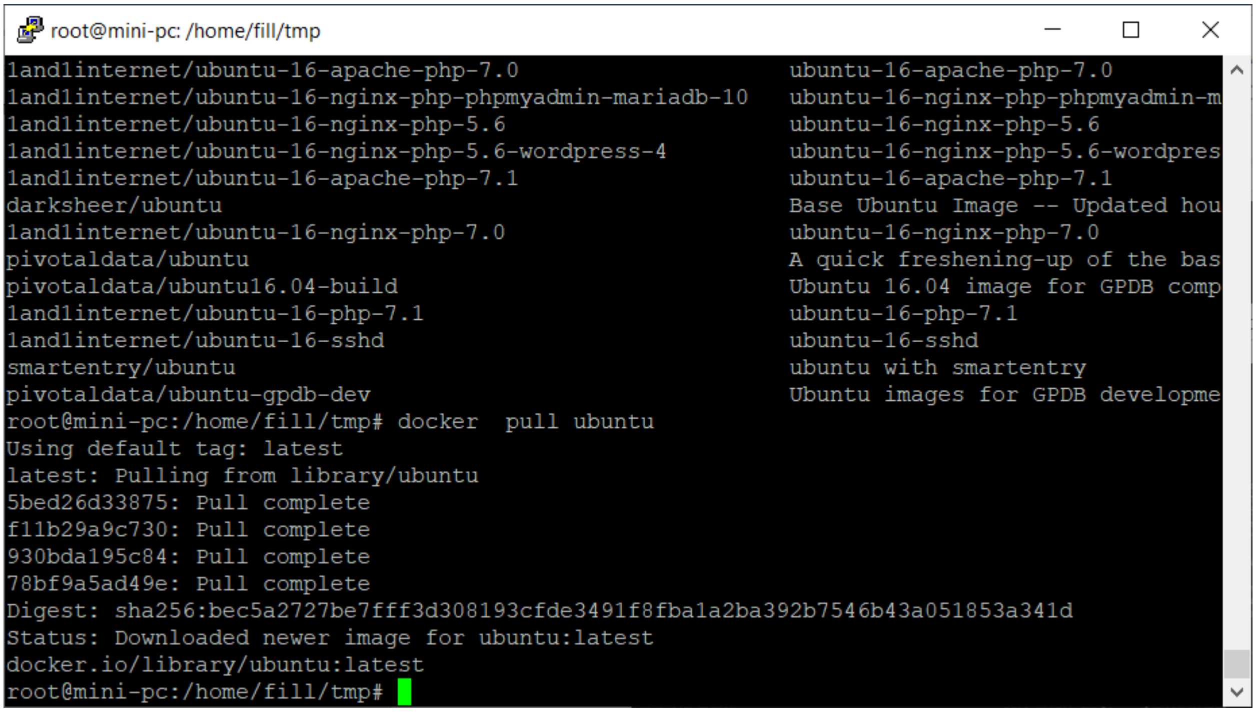
```
Created symlink /etc/systemd/system/multi-user.target.wants/containerd.service → /lib/systemd/syst
em/containerd.service.
Setting up cgroupfs-mount (1.4) ...
Setting up libltdl7:amd64 (2.4.6-2) ...
Setting up docker-ce-cli (5:19.03.8~3-0~ubuntu-bionic) ...
Setting up pigz (2.4-1) ...
Setting up docker-ce (5:19.03.8~3-0~ubuntu-bionic) ...
Created symlink /etc/systemd/system/multi-user.target.wants/docker.service → /lib/systemd/system/d
ocker.service.
Created symlink /etc/systemd/system/sockets.target.wants/docker.socket → /lib/systemd/system/docke
r.socket.
Processing triggers for libc-bin (2.27-3ubuntu1) ...
Processing triggers for systemd (237-3ubuntu10.38) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Processing triggers for ureadahead (0.100.0-21) ...
root@mini-pc:/home/fill/tmp# systemctl status docker
● docker.service - Docker Application Container Engine
   Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor preset: enabled)
   Active: active (running) since Fri 2020-04-03 15:32:32 UTC; 20s ago
     Docs: https://docs.docker.com
 Main PID: 4190 (dockerd)
    Tasks: 12
   CGroup: /system.slice/docker.service
           └─4190 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock

Apr 03 15:32:31 mini-pc dockerd[4190]: time="2020-04-03T15:32:31.514205514Z" level=warning msg="Yo
Apr 03 15:32:31 mini-pc dockerd[4190]: time="2020-04-03T15:32:31.514298962Z" level=warning msg="Yo
Apr 03 15:32:31 mini-pc dockerd[4190]: time="2020-04-03T15:32:31.514345323Z" level=warning msg="Yo
Apr 03 15:32:31 mini-pc dockerd[4190]: time="2020-04-03T15:32:31.514970056Z" level=info msg="Loadi
Apr 03 15:32:31 mini-pc dockerd[4190]: time="2020-04-03T15:32:31.847934752Z" level=info msg="Defau
Apr 03 15:32:32 mini-pc dockerd[4190]: time="2020-04-03T15:32:32.018555676Z" level=info msg="Loadi
Apr 03 15:32:32 mini-pc dockerd[4190]: time="2020-04-03T15:32:32.113102691Z" level=info msg="Docke
Apr 03 15:32:32 mini-pc dockerd[4190]: time="2020-04-03T15:32:32.113455807Z" level=info msg="Daemo
Apr 03 15:32:32 mini-pc systemd[1]: Started Docker Application Container Engine.
Apr 03 15:32:32 mini-pc dockerd[4190]: time="2020-04-03T15:32:32.253742082Z" level=info msg="API l
root@mini-pc:/home/fill/tmp#
```

2. Запустить поиск сконфигурированных решений для “ubuntu”



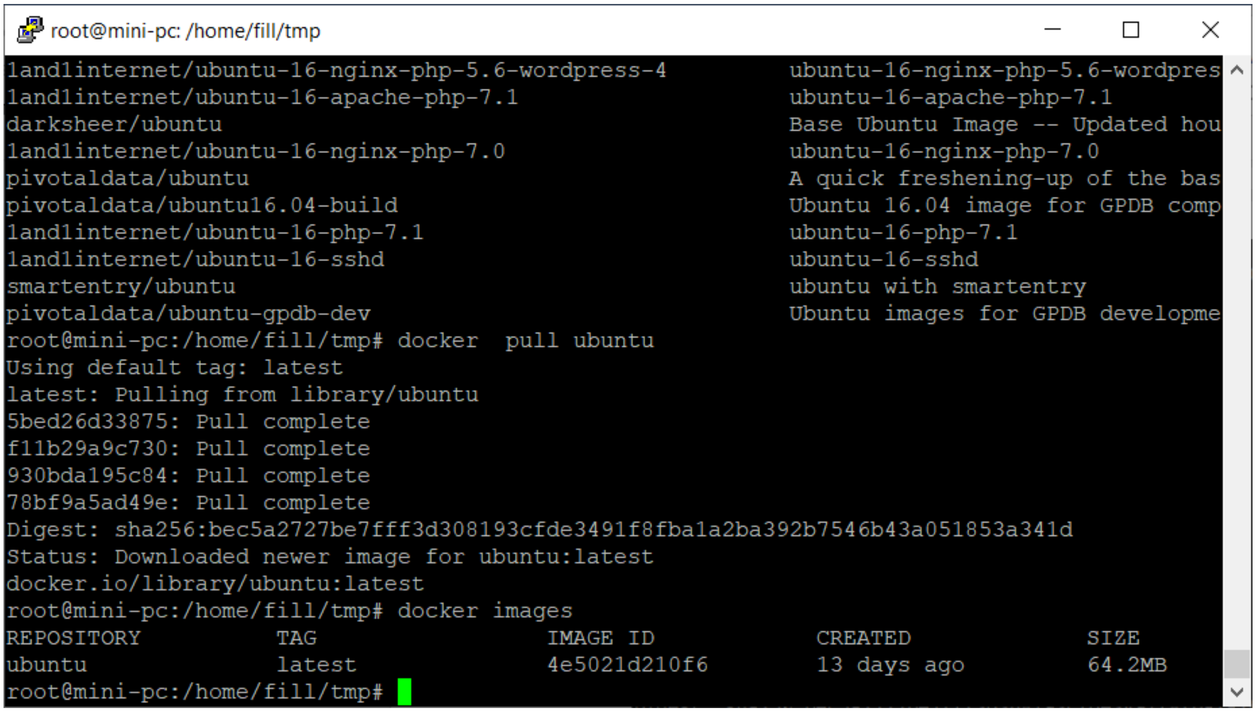
```
        1                                       [OK]
1and1internet/ubuntu-16-php-7.1                           ubuntu-16-php-7.1
        1                                       [OK]
smartentry/ubuntu                                         ubuntu with smartentry
        1                                       [OK]
pivotaldata/ubuntu-gpdb-dev                               Ubuntu images for GPDB development
        1
root@mini-pc:/home/fill/tmp# docker search ubuntu
NAME                                                      DESCRIPTION                                     STARS               OFFICIAL            AUTOMATED
ubuntu                                                    Ubuntu is a Debian-based Linux operating sys…   10706               [OK]
dorowu/ubuntu-desktop-lxde-vnc                            Docker image to provide HTML5 VNC interface …   411                                     [OK]
rastasheep/ubuntu-sshd                                    Dockerized SSH service, built on top of offi…   245                                     [OK]
consol/ubuntu-xfce-vnc                                    Ubuntu container with "headless" VNC session…   212                                     [OK]
ubuntu-upstart                                            Upstart is an event-based replacement for th…   107                 [OK]
ansible/ubuntu14.04-ansible                               Ubuntu 14.04 LTS with ansible                   98                                      [OK]
neurodebian                                               NeuroDebian provides neuroscience research s…   68                  [OK]
1and1internet/ubuntu-16-nginx-php-phpmyadmin-mysql-5      ubuntu-16-nginx-php-phpmyadmin-mysql-5          50                                      [OK]
ubuntu-debootstrap                                        debootstrap --variant=minbase --components=m…   43                  [OK]
nuagebec/ubuntu                                           Simple always updated Ubuntu docker images w…   24                                      [OK]
i386/ubuntu                                               Ubuntu is a Debian-based Linux operating sys…   19
1and1internet/ubuntu-16-apache-php-5.6                    ubuntu-16-apache-php-5.6                        14                                      [OK]
1and1internet/ubuntu-16-apache-php-7.0                    ubuntu-16-apache-php-7.0                        13                                      [OK]
1and1internet/ubuntu-16-nginx-php-phpmyadmin-mariadb-10   ubuntu-16-nginx-php-phpmyadmin-mariadb-10       11                                      [OK]
1and1internet/ubuntu-16-nginx-php-5.6                     ubuntu-16-nginx-php-5.6                         8                                       [OK]
1and1internet/ubuntu-16-nginx-php-5.6-wordpress-4         ubuntu-16-nginx-php-5.6-wordpress-4             7                                       [OK]
1and1internet/ubuntu-16-apache-php-7.1                    ubuntu-16-apache-php-7.1                        6                                       [OK]
darksheer/ubuntu                                          Base Ubuntu Image -- Updated hourly             5                                       [OK]
1and1internet/ubuntu-16-nginx-php-7.0                     ubuntu-16-nginx-php-7.0                         4                                       [OK]
pivotaldata/ubuntu                                        A quick freshening-up of the base Ubuntu doc…   4
pivotaldata/ubuntu16.04-build                             Ubuntu 16.04 image for GPDB compilation         2
1and1internet/ubuntu-16-php-7.1                           ubuntu-16-php-7.1                               1                                       [OK]
1and1internet/ubuntu-16-sshd                              ubuntu-16-sshd                                  1                                       [OK]
smartentry/ubuntu                                         ubuntu with smartentry                          1                                       [OK]
pivotaldata/ubuntu-gpdb-dev                               Ubuntu images for GPDB development              1
root@mini-pc:/home/fill/tmp#
```

3. Скачать любой из образов на локальную машину.



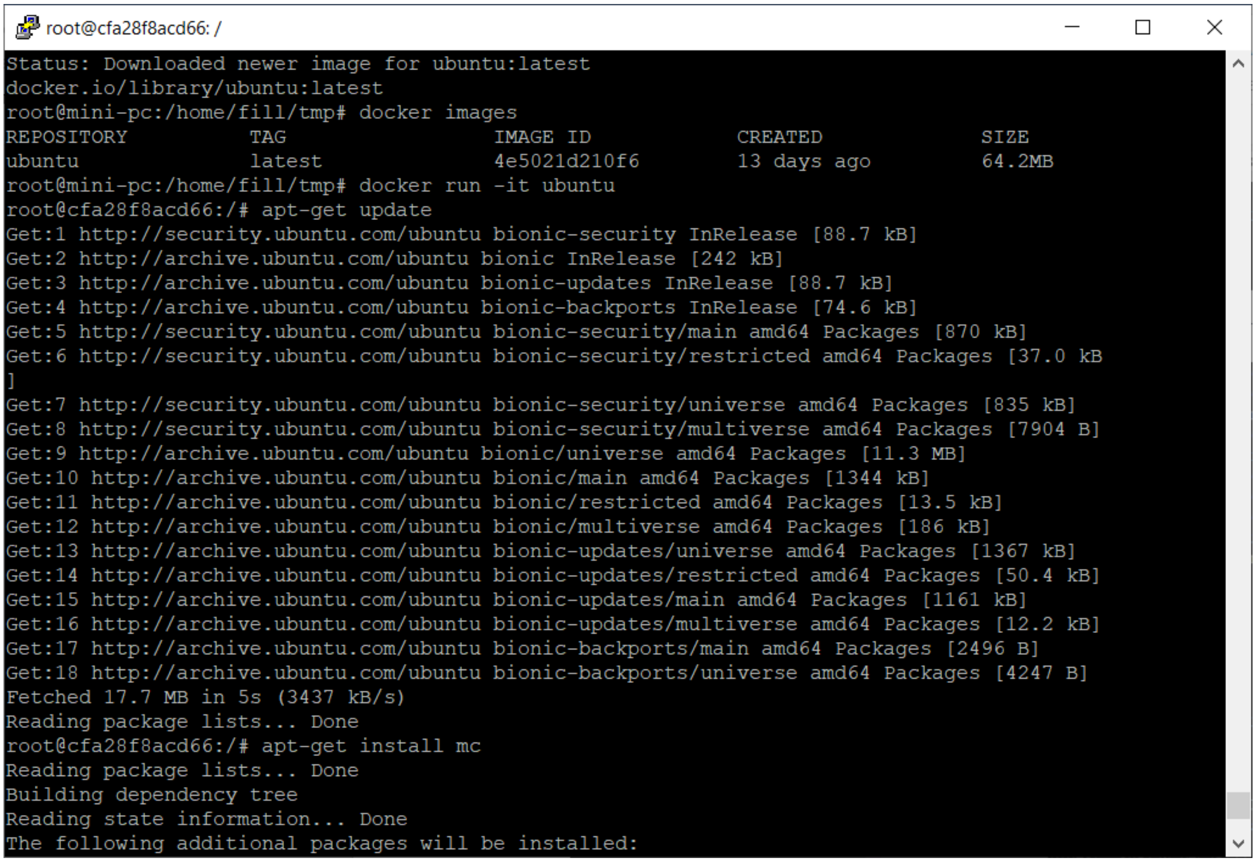
```
1and1internet/ubuntu-16-apache-php-7.0                    ubuntu-16-apache-php-7.0
1and1internet/ubuntu-16-nginx-php-phpmyadmin-mariadb-10   ubuntu-16-nginx-php-phpmyadmin-m
1and1internet/ubuntu-16-nginx-php-5.6                     ubuntu-16-nginx-php-5.6
1and1internet/ubuntu-16-nginx-php-5.6-wordpress-4         ubuntu-16-nginx-php-5.6-wordpres
1and1internet/ubuntu-16-apache-php-7.1                    ubuntu-16-apache-php-7.1
darksheer/ubuntu                                          Base Ubuntu Image -- Updated hou
1and1internet/ubuntu-16-nginx-php-7.0                     ubuntu-16-nginx-php-7.0
pivotaldata/ubuntu                                        A quick freshening-up of the bas
pivotaldata/ubuntu16.04-build                             Ubuntu 16.04 image for GPDB comp
1and1internet/ubuntu-16-php-7.1                           ubuntu-16-php-7.1
1and1internet/ubuntu-16-sshd                              ubuntu-16-sshd
smartentry/ubuntu                                         ubuntu with smartentry
pivotaldata/ubuntu-gpdb-dev                               Ubuntu images for GPDB developme
root@mini-pc:/home/fill/tmp# docker  pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
5bed26d33875: Pull complete
f11b29a9c730: Pull complete
930bda195c84: Pull complete
78bf9a5ad49e: Pull complete
Digest: sha256:bec5a2727be7fff3d308193cfde3491f8fba1a2ba392b7546b43a051853a341d
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest
root@mini-pc:/home/fill/tmp#
```

4. Запустить команду просмотра загруженных на компьютер образов.



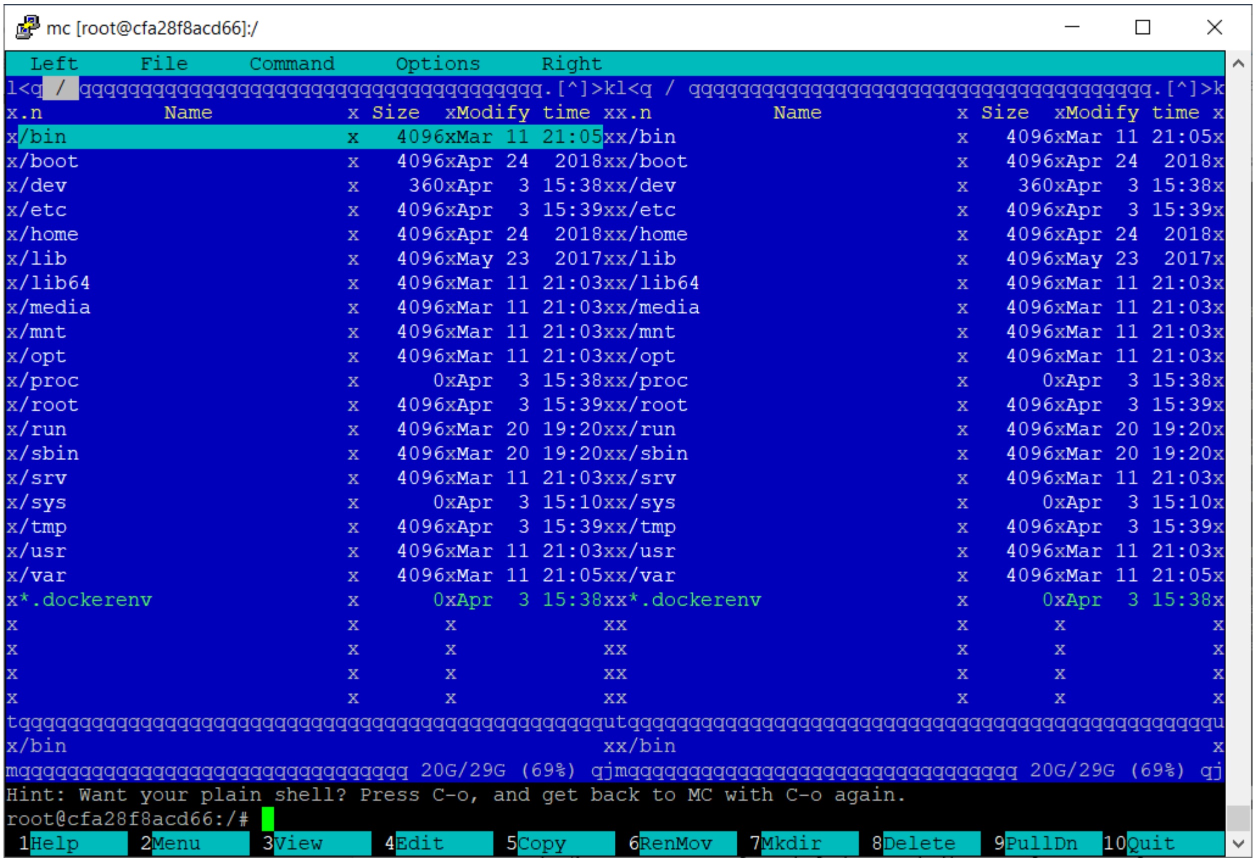
```
1and1internet/ubuntu-16-nginx-php-5.6-wordpress-4         ubuntu-16-nginx-php-5.6-wordpres
1and1internet/ubuntu-16-apache-php-7.1                    ubuntu-16-apache-php-7.1
darksheer/ubuntu                                          Base Ubuntu Image -- Updated hou
1and1internet/ubuntu-16-nginx-php-7.0                     ubuntu-16-nginx-php-7.0
pivotaldata/ubuntu                                        A quick freshening-up of the bas
pivotaldata/ubuntu16.04-build                             Ubuntu 16.04 image for GPDB comp
1and1internet/ubuntu-16-php-7.1                           ubuntu-16-php-7.1
1and1internet/ubuntu-16-sshd                              ubuntu-16-sshd
smartentry/ubuntu                                         ubuntu with smartentry
pivotaldata/ubuntu-gpdb-dev                               Ubuntu images for GPDB developme
root@mini-pc:/home/fill/tmp# docker  pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
5bed26d33875: Pull complete
f11b29a9c730: Pull complete
930bda195c84: Pull complete
78bf9a5ad49e: Pull complete
Digest: sha256:bec5a2727be7fff3d308193cfde3491f8fba1a2ba392b7546b43a051853a341d
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest
root@mini-pc:/home/fill/tmp# docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
ubuntu              latest              4e5021d210f6        13 days ago         64.2MB
root@mini-pc:/home/fill/tmp#
```

5. Запустите обновление apt-get update (screenshot)



```
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest
root@mini-pc:/home/fill/tmp# docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
ubuntu              latest              4e5021d210f6        13 days ago         64.2MB
root@mini-pc:/home/fill/tmp# docker run -it ubuntu
root@cfa28f8acd66:/# apt-get update
Get:1 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Get:2 http://archive.ubuntu.com/ubuntu bionic InRelease [242 kB]
Get:3 http://archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:4 http://archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Get:5 http://security.ubuntu.com/ubuntu bionic-security/main amd64 Packages [870 kB]
Get:6 http://security.ubuntu.com/ubuntu bionic-security/restricted amd64 Packages [37.0 kB
]
Get:7 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 Packages [835 kB]
Get:8 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 Packages [7904 B]
Get:9 http://archive.ubuntu.com/ubuntu bionic/universe amd64 Packages [11.3 MB]
Get:10 http://archive.ubuntu.com/ubuntu bionic/main amd64 Packages [1344 kB]
Get:11 http://archive.ubuntu.com/ubuntu bionic/restricted amd64 Packages [13.5 kB]
Get:12 http://archive.ubuntu.com/ubuntu bionic/multiverse amd64 Packages [186 kB]
Get:13 http://archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packages [1367 kB]
Get:14 http://archive.ubuntu.com/ubuntu bionic-updates/restricted amd64 Packages [50.4 kB]
Get:15 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages [1161 kB]
Get:16 http://archive.ubuntu.com/ubuntu bionic-updates/multiverse amd64 Packages [12.2 kB]
Get:17 http://archive.ubuntu.com/ubuntu bionic-backports/main amd64 Packages [2496 B]
Get:18 http://archive.ubuntu.com/ubuntu bionic-backports/universe amd64 Packages [4247 B]
Fetched 17.7 MB in 5s (3437 kB/s)
Reading package lists... Done
root@cfa28f8acd66:/# apt-get install mc
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
```

6. Установите (apt-get install) любую программу в контейнер. Например mc. Проверьте работоспособность

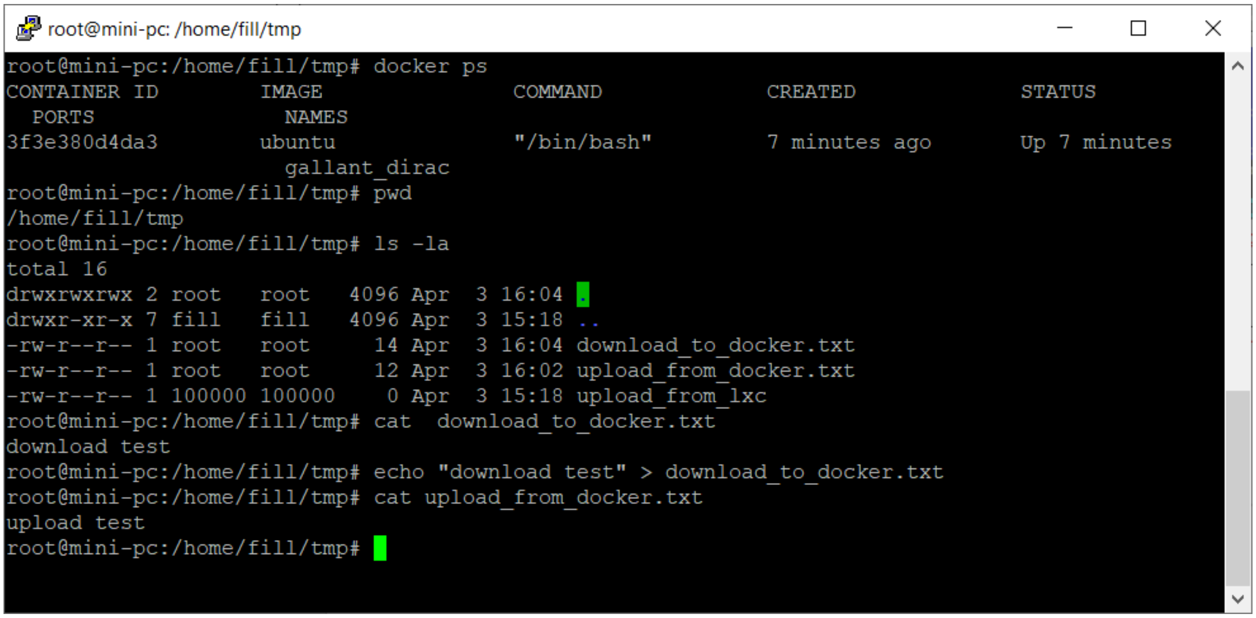


```
  Left      File      Command      Options      Right
l<q / qqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqq.[^]>kl<q / qqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqq.[^]>k
x.n           Name          x Size  xModify time xx.n          Name          x Size  xModify time x
x/bin                       x   4096xMar 11 21:05xx/bin                      x   4096xMar 11 21:05x
x/boot                      x   4096xApr 24  2018xx/boot                     x   4096xApr 24  2018x
x/dev                       x    360xApr  3 15:38xx/dev                      x    360xApr  3 15:38x
x/etc                       x   4096xApr  3 15:39xx/etc                      x   4096xApr  3 15:39x
x/home                      x   4096xApr 24  2018xx/home                     x   4096xApr 24  2018x
x/lib                       x   4096xMay 23  2017xx/lib                      x   4096xMay 23  2017x
x/lib64                     x   4096xMar 11 21:03xx/lib64                    x   4096xMar 11 21:03x
x/media                     x   4096xMar 11 21:03xx/media                    x   4096xMar 11 21:03x
x/mnt                       x   4096xMar 11 21:03xx/mnt                      x   4096xMar 11 21:03x
x/opt                       x   4096xMar 11 21:03xx/opt                      x   4096xMar 11 21:03x
x/proc                      x      0xApr  3 15:38xx/proc                     x      0xApr  3 15:38x
x/root                      x   4096xApr  3 15:39xx/root                     x   4096xApr  3 15:39x
x/run                       x   4096xMar 20 19:20xx/run                      x   4096xMar 20 19:20x
x/sbin                      x   4096xMar 20 19:20xx/sbin                     x   4096xMar 20 19:20x
x/srv                       x   4096xMar 11 21:03xx/srv                      x   4096xMar 11 21:03x
x/sys                       x      0xApr  3 15:10xx/sys                      x      0xApr  3 15:10x
x/tmp                       x   4096xApr  3 15:39xx/tmp                      x   4096xApr  3 15:39x
x/usr                       x   4096xMar 11 21:03xx/usr                      x   4096xMar 11 21:03x
x/var                       x   4096xMar 11 21:05xx/var                      x   4096xMar 11 21:05x
x*.dockerenv                x      0xApr  3 15:38xx*.dockerenv               x      0xApr  3 15:38x
x                           x       x            xx                          x       x            x
x                           x       x            xx                          x       x            x
x                           x       x            xx                          x       x            x
x                           x       x            xx                          x       x            x
tqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqutqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqu
x/bin                                            xx/bin                                            x
mqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqq 20G/29G (69%) qjmqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqq 20G/29G (69%) qj
Hint: Want your plain shell? Press C-o, and get back to MC with C-o again.
root@cfa28f8acd66:/#
 1Help      2Menu      3View      4Edit      5Copy      6RenMov    7Mkdir     8Delete    9PullDn   10Quit
```

7. Загрузите в контейнер файл и скачайте с контейнера другой файл

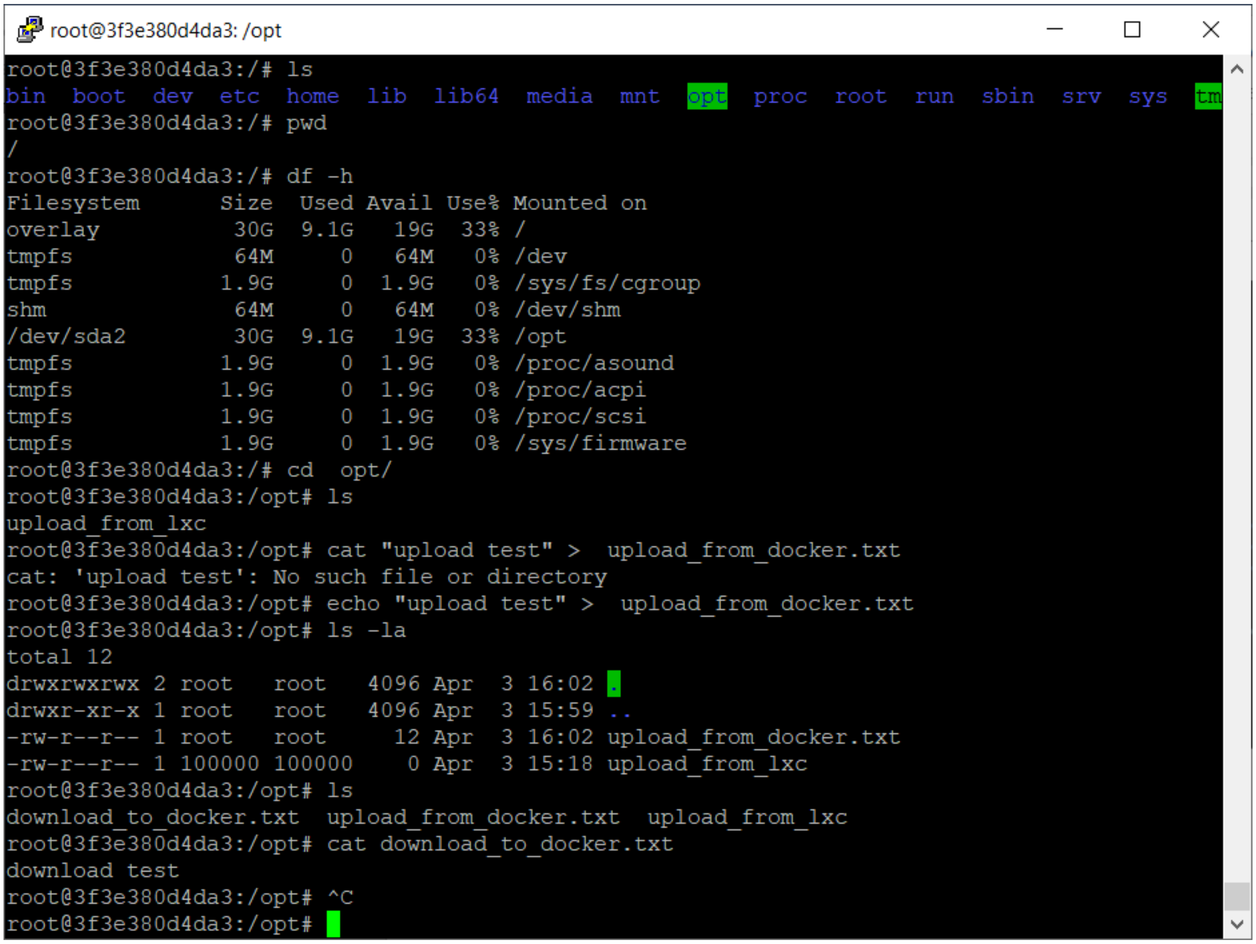
add shared folder to container ubuntu "docker run -it -v /home/fill/tmp:/opt ubuntu"

HOST putty screenshot:



```
root@mini-pc:/home/fill/tmp# docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS
  PORTS               NAMES
3f3e380d4da3        ubuntu              "/bin/bash"         7 minutes ago       Up 7 minutes
                      gallant_dirac
root@mini-pc:/home/fill/tmp# pwd
/home/fill/tmp
root@mini-pc:/home/fill/tmp# ls -la
total 16
drwxrwxrwx 2 root   root   4096 Apr  3 16:04 .
drwxr-xr-x 7 fill   fill   4096 Apr  3 15:18 ..
-rw-r--r-- 1 root   root     14 Apr  3 16:04 download_to_docker.txt
-rw-r--r-- 1 root   root     12 Apr  3 16:02 upload_from_docker.txt
-rw-r--r-- 1 100000 100000    0 Apr  3 15:18 upload_from_lxc
root@mini-pc:/home/fill/tmp# cat  download_to_docker.txt
download test
root@mini-pc:/home/fill/tmp# echo "download test" > download_to_docker.txt
root@mini-pc:/home/fill/tmp# cat upload_from_docker.txt
upload test
root@mini-pc:/home/fill/tmp#
```

Ubuntu container Screenshot:



```
root@3f3e380d4da3:/# ls
bin  boot  dev  etc  home  lib  lib64  media  mnt  opt  proc  root  run  sbin  srv  sys  tm
root@3f3e380d4da3:/# pwd
/
root@3f3e380d4da3:/# df -h
Filesystem      Size  Used Avail Use% Mounted on
overlay          30G  9.1G   19G  33% /
tmpfs            64M     0   64M   0% /dev
tmpfs           1.9G     0  1.9G   0% /sys/fs/cgroup
shm              64M     0   64M   0% /dev/shm
/dev/sda2        30G  9.1G   19G  33% /opt
tmpfs           1.9G     0  1.9G   0% /proc/asound
tmpfs           1.9G     0  1.9G   0% /proc/acpi
tmpfs           1.9G     0  1.9G   0% /proc/scsi
tmpfs           1.9G     0  1.9G   0% /sys/firmware
root@3f3e380d4da3:/# cd  opt/
root@3f3e380d4da3:/opt# ls
upload_from_lxc
root@3f3e380d4da3:/opt# cat "upload test" >  upload_from_docker.txt
cat: 'upload test': No such file or directory
root@3f3e380d4da3:/opt# echo "upload test" >  upload_from_docker.txt
root@3f3e380d4da3:/opt# ls -la
total 12
drwxrwxrwx 2 root   root   4096 Apr  3 16:02 .
drwxr-xr-x 1 root   root   4096 Apr  3 15:59 ..
-rw-r--r-- 1 root   root     12 Apr  3 16:02 upload_from_docker.txt
-rw-r--r-- 1 100000 100000    0 Apr  3 15:18 upload_from_lxc
root@3f3e380d4da3:/opt# ls
download_to_docker.txt  upload_from_docker.txt  upload_from_lxc
root@3f3e380d4da3:/opt# cat download_to_docker.txt
download test
root@3f3e380d4da3:/opt# ^C
root@3f3e380d4da3:/opt# 
```

.

8. Прочитать документацию и кратко описать основные 7 команд Dockerfile

Команда **FROM** — данную команду можно назвать одной из самых необходимых при создании Докерфайла. Она определяет базовый образ для начала процесса построения контейнера. Это может быть любой образ, в том числе и созданные вами до этого. Если указанный вами образ не найден на хосте, Докер попытается найти и скачать его. Данная команда в Докерфайле всегда должна быть указана первой

Команда **MAINTAINER** — данная команда не является исполняемой, и просто определяет значение поля автора образа. Лучше всего ее указывать сразу после команды FROM.

Команда **ADD** — данная команда берет два аргумента, путь откуда скопировать файл и путь куда скопировать файлы в собственную файловую систему контейнера. Если же source путем является **URL** (т.е адрес веб-страницы) — то вся страница будет скачена и помещена в контейнер.

Команда **VOLUME** — данная команда используется для организации доступа вашего контейнера к директории на хосте (тоже самое, что и монтирование директории)

Команда **RUN** - является основной командой для исполнения команд при написании Докерфайла. Она берет команду как аргумент и запускает ее из образа. В отличие от CMD данная команда используется для построения образа (можно запустить несколько RUN подряд, в отличие от CMD)

Команда **ENV** используется для установки переменных среды (одной или многих). Данные переменные выглядят следующим образом «ключ = значение» и они доступны внутри контейнера скриптам и различным приложениям. Данный функционал Докера, по сути, очень сильно увеличивает гибкость в плане различных сценариев запуска приложений.

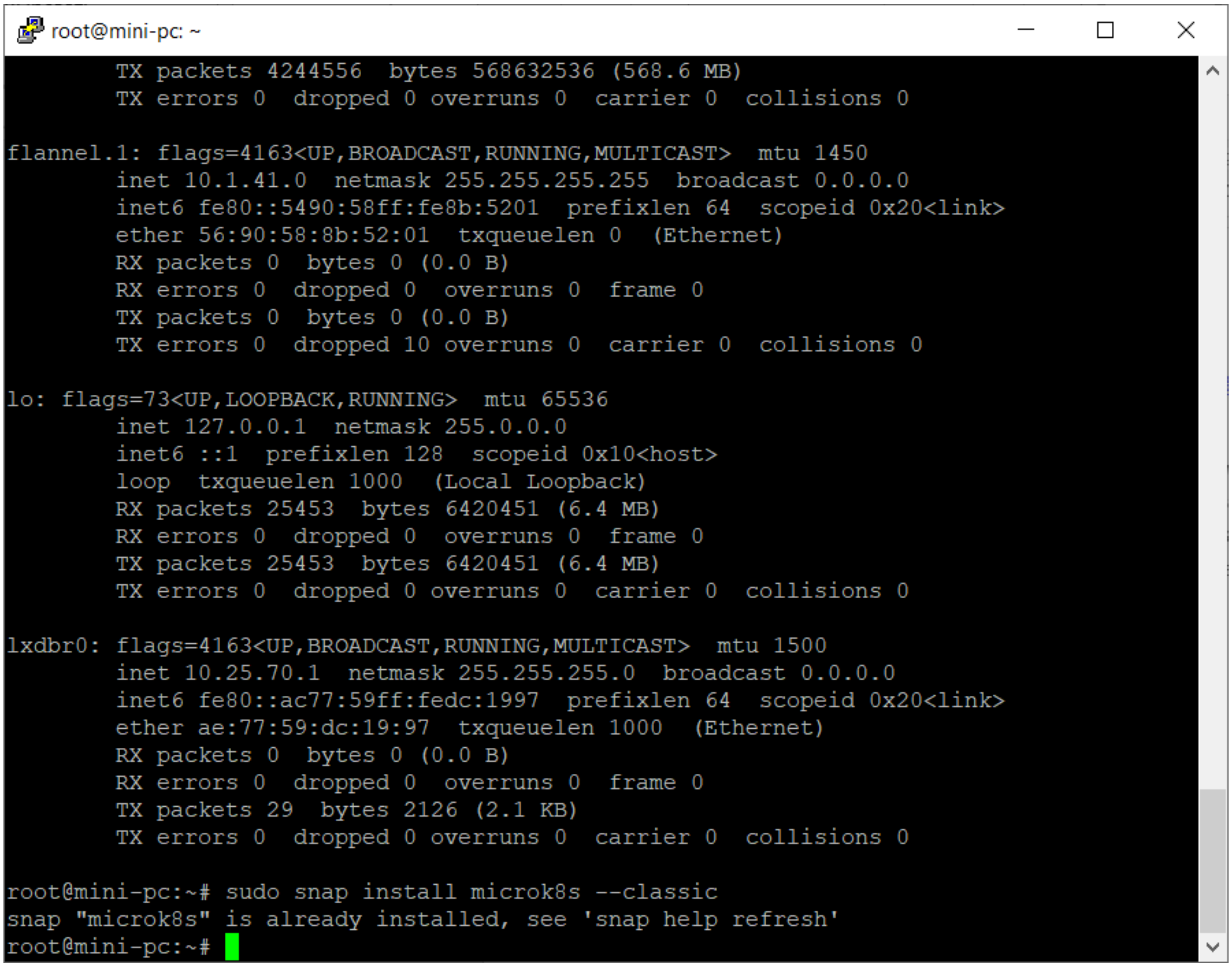
Команда **WORKDIR** указывает директорию, из которой будет выполняться команда CMD.

Команда **CMD** — похожая на команду RUN, используется для выполнения определенных программ, но, в отличие от RUN данная команда обычно применяется для запуска/инициации приложений или команд уже после их установки с помощью RUN в момент построения контейнера.

Работа с Kubernetes в Ubuntu

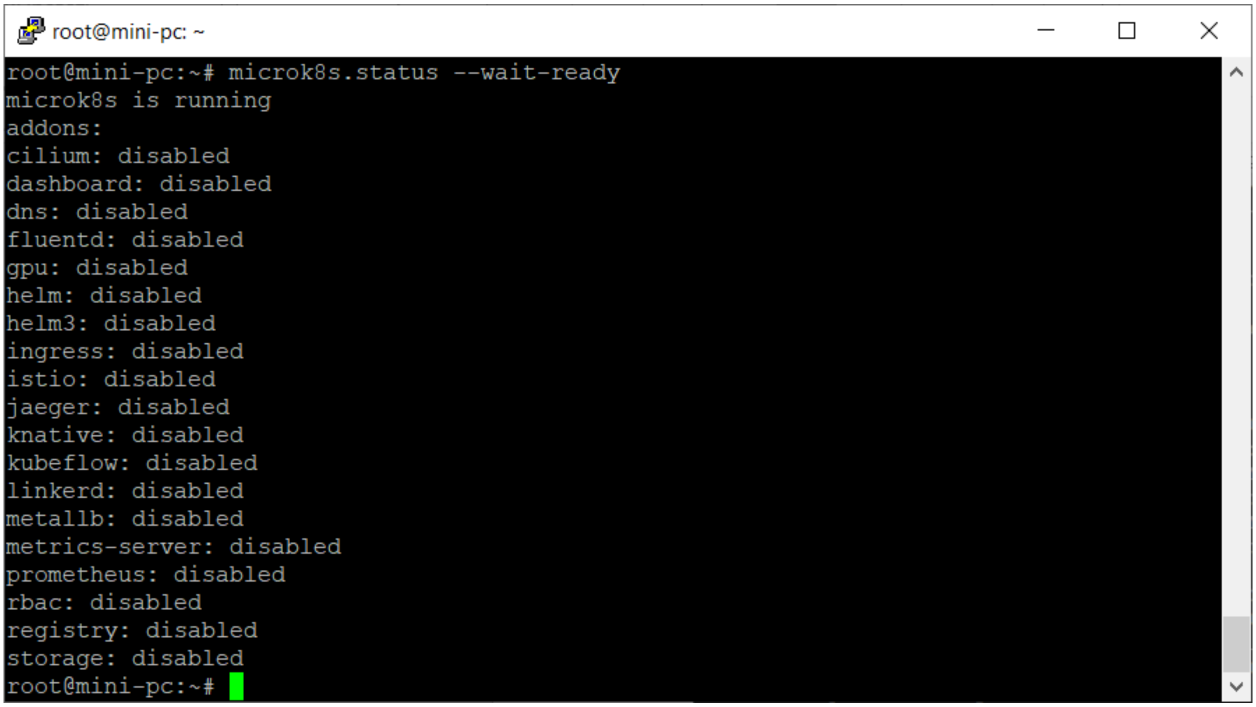
https://ubuntu.com/kubernetes/install ;   https://microk8s.io/docs/

1. Установить microk8s



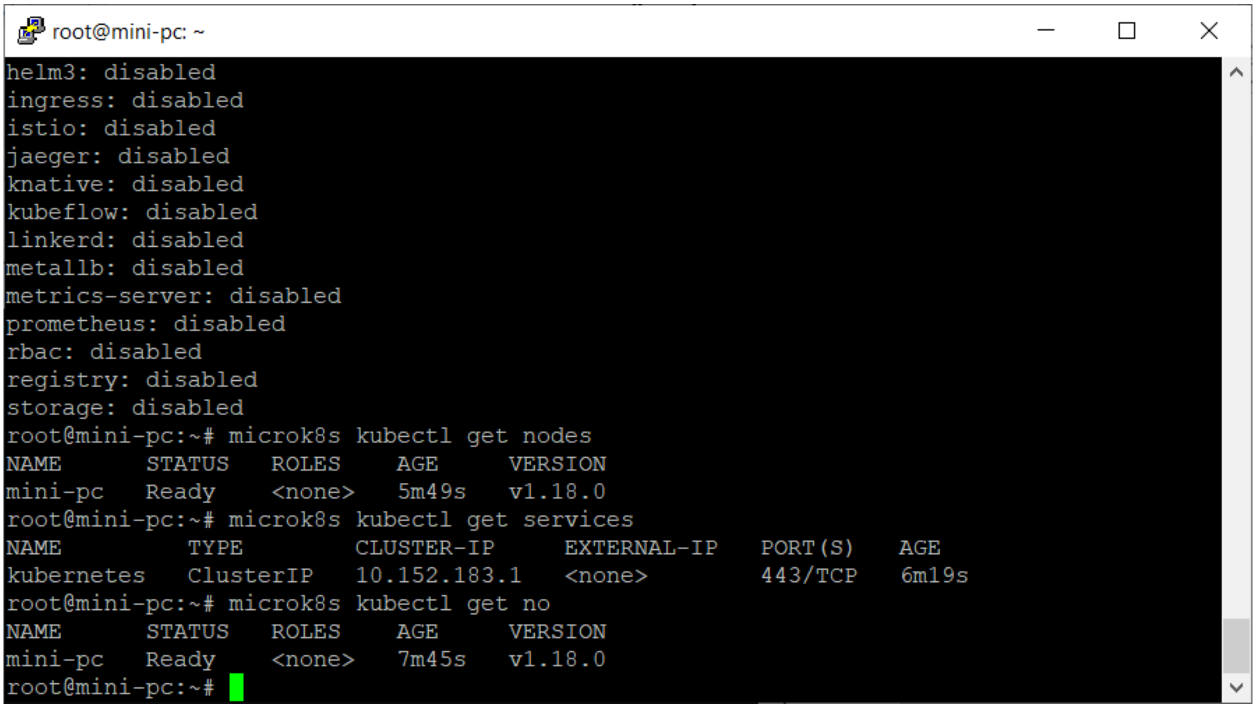
```
        TX packets 4244556  bytes 568632536 (568.6 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

flannel.1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1450
        inet 10.1.41.0  netmask 255.255.255.255  broadcast 0.0.0.0
        inet6 fe80::5490:58ff:fe8b:5201  prefixlen 64  scopeid 0x20<link>
        ether 56:90:58:8b:52:01  txqueuelen 0  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 10 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 25453  bytes 6420451 (6.4 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 25453  bytes 6420451 (6.4 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lxdbr0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.25.70.1  netmask 255.255.255.0  broadcast 0.0.0.0
        inet6 fe80::ac77:59ff:fedc:1997  prefixlen 64  scopeid 0x20<link>
        ether ae:77:59:dc:19:97  txqueuelen 1000  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 29  bytes 2126 (2.1 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

root@mini-pc:~# sudo snap install microk8s --classic
snap "microk8s" is already installed, see 'snap help refresh'
root@mini-pc:~#
```

2. Проверьте статус



```
root@mini-pc:~# microk8s.status --wait-ready
microk8s is running
addons:
cilium: disabled
dashboard: disabled
dns: disabled
fluentd: disabled
gpu: disabled
helm: disabled
helm3: disabled
ingress: disabled
istio: disabled
jaeger: disabled
knative: disabled
kubeflow: disabled
linkerd: disabled
metallb: disabled
metrics-server: disabled
prometheus: disabled
rbac: disabled
registry: disabled
storage: disabled
root@mini-pc:~#
```

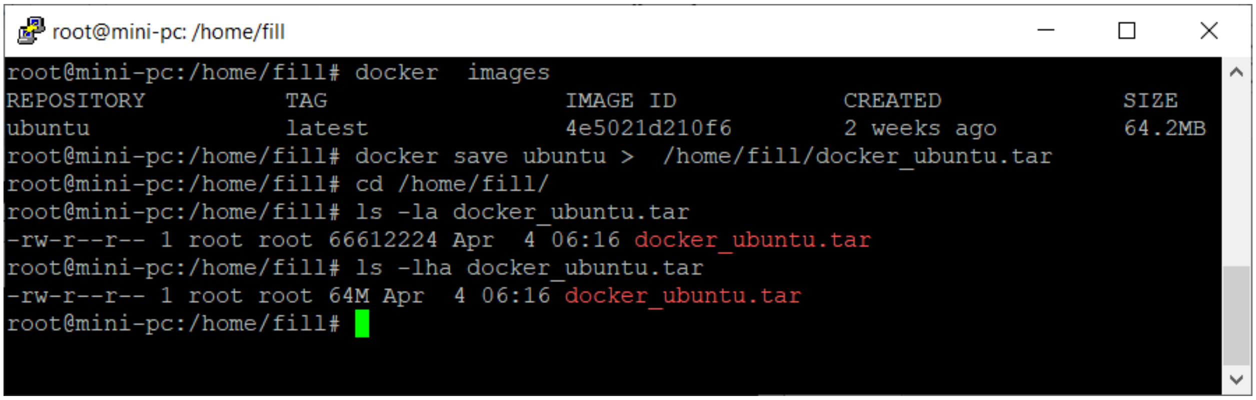
и команды менеджера кластера



```
helm3: disabled
ingress: disabled
istio: disabled
jaeger: disabled
knative: disabled
kubeflow: disabled
linkerd: disabled
metallb: disabled
metrics-server: disabled
prometheus: disabled
rbac: disabled
registry: disabled
storage: disabled
root@mini-pc:~# microk8s kubectl get nodes
NAME      STATUS   ROLES    AGE     VERSION
mini-pc   Ready    <none>   5m49s   v1.18.0
root@mini-pc:~# microk8s kubectl get services
NAME         TYPE        CLUSTER-IP     EXTERNAL-IP   PORT(S)   AGE
kubernetes   ClusterIP   10.152.183.1   <none>        443/TCP   6m19s
root@mini-pc:~# microk8s kubectl get no
NAME      STATUS   ROLES    AGE     VERSION
mini-pc   Ready    <none>   7m45s   v1.18.0
root@mini-pc:~# 
```

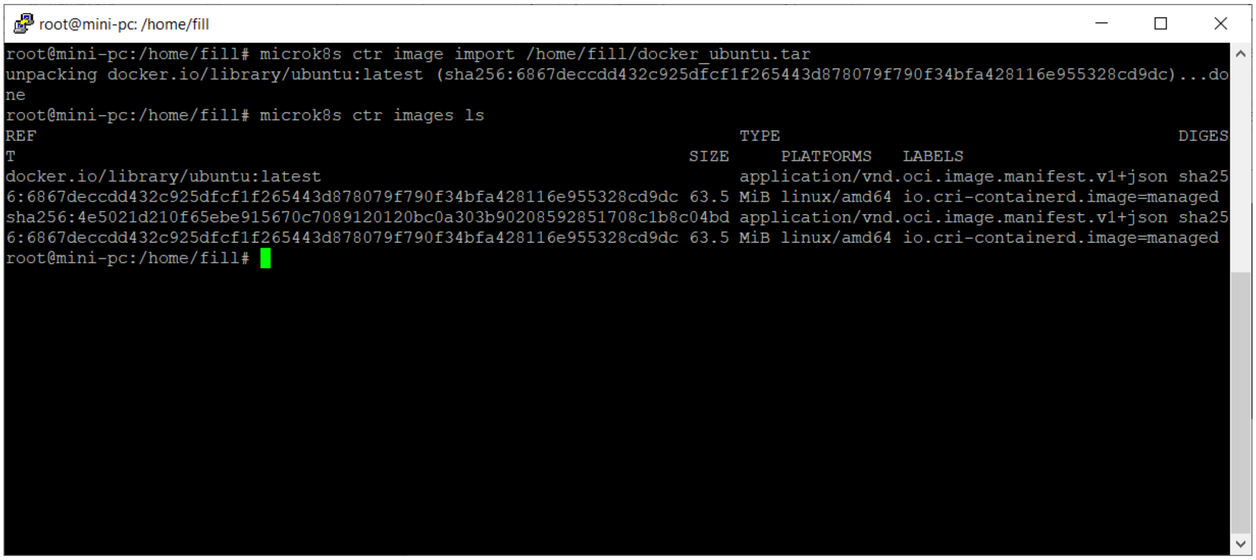
.

3. Просмотрите установленные в докере образы; заверните один из них в образ *.tar (https://docs.docker.com/engine/reference/commandline/save/)



```
root@mini-pc:/home/fill# docker  images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
ubuntu              latest              4e5021d210f6        2 weeks ago         64.2MB
root@mini-pc:/home/fill# docker save ubuntu >  /home/fill/docker_ubuntu.tar
root@mini-pc:/home/fill# cd /home/fill/
root@mini-pc:/home/fill# ls -la docker_ubuntu.tar
-rw-r--r-- 1 root root 66612224 Apr  4 06:16 docker_ubuntu.tar
root@mini-pc:/home/fill# ls -lha docker_ubuntu.tar
-rw-r--r-- 1 root root 64M Apr  4 06:16 docker_ubuntu.tar
root@mini-pc:/home/fill# 
```

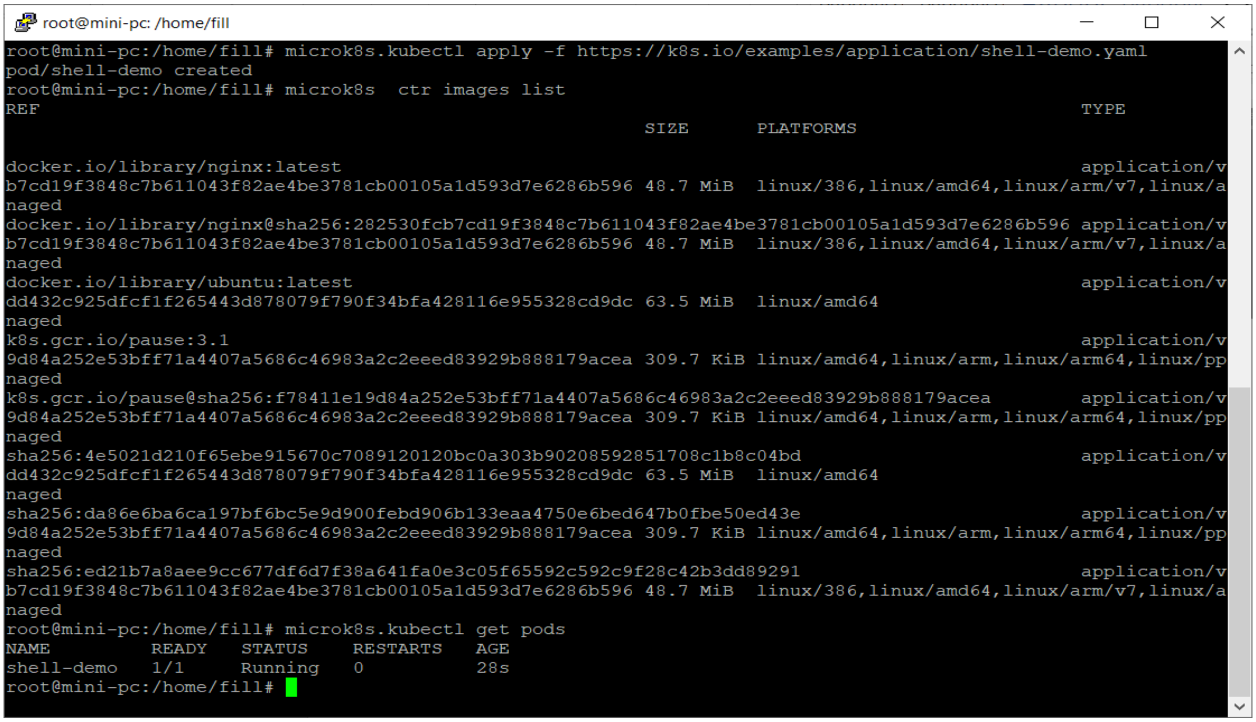
4. Импортируйте образ в Kubernetes



```
root@mini-pc:/home/fill# microk8s ctr image import /home/fill/docker_ubuntu.tar
unpacking docker.io/library/ubuntu:latest (sha256:6867deccdd432c925dfcf1f265443d878079f790f34bfa428116e955328cd9dc)...do
ne
root@mini-pc:/home/fill# microk8s ctr images ls
REF                                                                     TYPE                                       DIGES
T                                                                  SIZE      PLATFORMS   LABELS
docker.io/library/ubuntu:latest                                         application/vnd.oci.image.manifest.v1+json sha25
6:6867deccdd432c925dfcf1f265443d878079f790f34bfa428116e955328cd9dc 63.5 MiB linux/amd64 io.cri-containerd.image=managed
sha256:4e5021d210f65ebe915670c7089120120bc0a303b90208592851708c1b8c04bd application/vnd.oci.image.manifest.v1+json sha25
6:6867deccdd432c925dfcf1f265443d878079f790f34bfa428116e955328cd9dc 63.5 MiB linux/amd64 io.cri-containerd.image=managed
root@mini-pc:/home/fill#
```

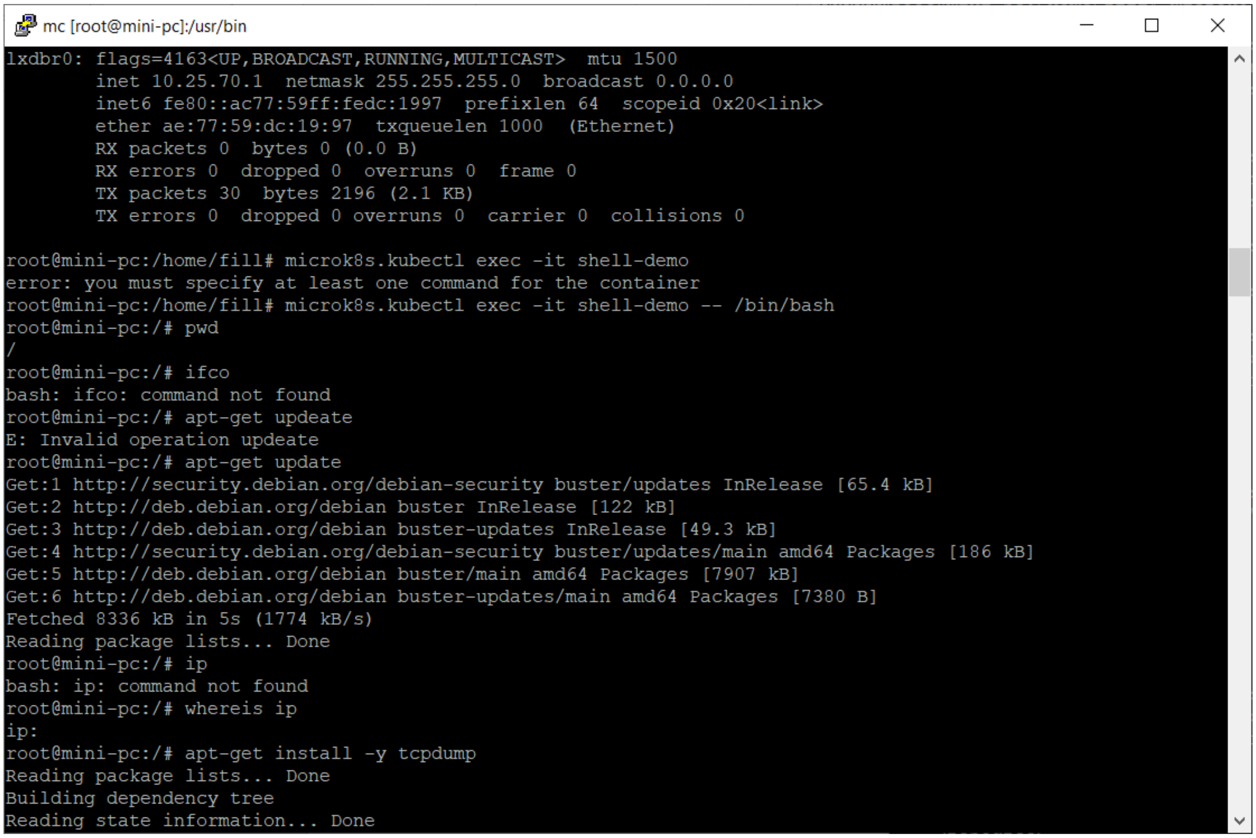
5. Запустите образ и убедитесь, что он работает.

First of all check how it works with basic pods following that manual:
https://kubernetes.io/docs/tasks/debug-application-cluster/get-shell-running-container/



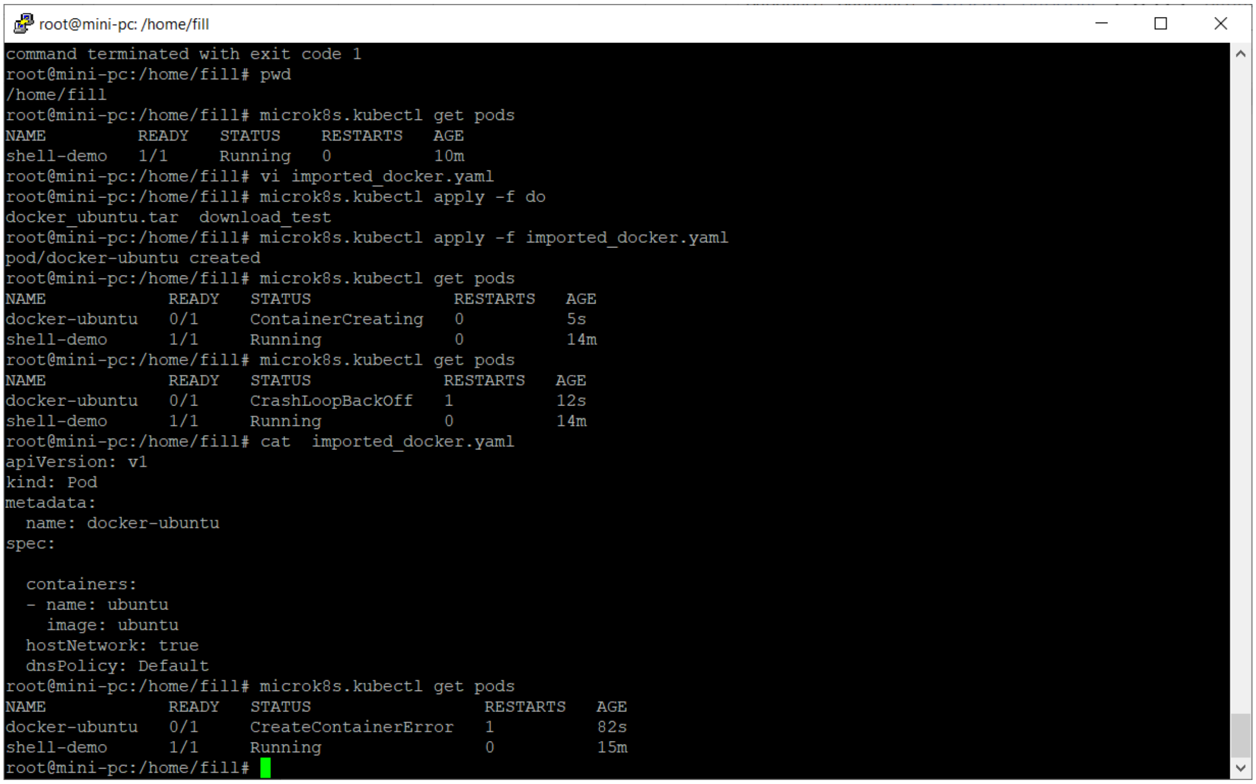
```
root@mini-pc:/home/fill# microk8s.kubectl apply -f https://k8s.io/examples/application/shell-demo.yaml
pod/shell-demo created
root@mini-pc:/home/fill# microk8s  ctr images list
REF                                                                                             TYPE
                                                         SIZE      PLATFORMS

docker.io/library/nginx:latest                                                                  application/v
b7cd19f3848c7b611043f82ae4be3781cb00105a1d593d7e6286b596 48.7 MiB  linux/386,linux/amd64,linux/arm/v7,linux/a
naged
docker.io/library/nginx@sha256:282530fcb7cd19f3848c7b611043f82ae4be3781cb00105a1d593d7e6286b596 application/v
b7cd19f3848c7b611043f82ae4be3781cb00105a1d593d7e6286b596 48.7 MiB  linux/386,linux/amd64,linux/arm/v7,linux/a
naged
docker.io/library/ubuntu:latest                                                                 application/v
dd432c925dfcf1f265443d878079f790f34bfa428116e955328cd9dc 63.5 MiB  linux/amd64
naged
k8s.gcr.io/pause:3.1                                                                            application/v
9d84a252e53bff71a4407a5686c46983a2c2eeed83929b888179acea 309.7 KiB linux/amd64,linux/arm,linux/arm64,linux/pp
naged
k8s.gcr.io/pause@sha256:f78411e19d84a252e53bff71a4407a5686c46983a2c2eeed83929b888179acea        application/v
9d84a252e53bff71a4407a5686c46983a2c2eeed83929b888179acea 309.7 KiB linux/amd64,linux/arm,linux/arm64,linux/pp
naged
sha256:4e5021d210f65ebe915670c7089120120bc0a303b90208592851708c1b8c04bd                         application/v
dd432c925dfcf1f265443d878079f790f34bfa428116e955328cd9dc 63.5 MiB  linux/amd64
naged
sha256:da86e6ba6ca197bf6bc5e9d900febd906b133eaa4750e6bed647b0fbe50ed43e                         application/v
9d84a252e53bff71a4407a5686c46983a2c2eeed83929b888179acea 309.7 KiB linux/amd64,linux/arm,linux/arm64,linux/pp
naged
sha256:ed21b7a8aee9cc677df6d7f38a641fa0e3c05f65592c592c9f28c42b3dd89291                         application/v
b7cd19f3848c7b611043f82ae4be3781cb00105a1d593d7e6286b596 48.7 MiB  linux/386,linux/amd64,linux/arm/v7,linux/a
naged
root@mini-pc:/home/fill# microk8s.kubectl get pods
NAME         READY   STATUS    RESTARTS   AGE
shell-demo   1/1     Running   0          28s
root@mini-pc:/home/fill#
```

Connect to pod shell-demo



```
lxdbr0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.25.70.1  netmask 255.255.255.0  broadcast 0.0.0.0
        inet6 fe80::ac77:59ff:fedc:1997  prefixlen 64  scopeid 0x20<link>
        ether ae:77:59:dc:19:97  txqueuelen 1000  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 30  bytes 2196 (2.1 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

root@mini-pc:/home/fill# microk8s.kubectl exec -it shell-demo
error: you must specify at least one command for the container
root@mini-pc:/home/fill# microk8s.kubectl exec -it shell-demo -- /bin/bash
root@mini-pc:/# pwd
/
root@mini-pc:/# ifco
bash: ifco: command not found
root@mini-pc:/# apt-get updeate
E: Invalid operation updeate
root@mini-pc:/# apt-get update
Get:1 http://security.debian.org/debian-security buster/updates InRelease [65.4 kB]
Get:2 http://deb.debian.org/debian buster InRelease [122 kB]
Get:3 http://deb.debian.org/debian buster-updates InRelease [49.3 kB]
Get:4 http://security.debian.org/debian-security buster/updates/main amd64 Packages [186 kB]
Get:5 http://deb.debian.org/debian buster/main amd64 Packages [7907 kB]
Get:6 http://deb.debian.org/debian buster-updates/main amd64 Packages [7380 B]
Fetched 8336 kB in 5s (1774 kB/s)
Reading package lists... Done
root@mini-pc:/# ip
bash: ip: command not found
root@mini-pc:/# whereis ip
ip:
root@mini-pc:/# apt-get install -y tcpdump
Reading package lists... Done
Building dependency tree
Reading state information... Done
```

Try to run pod from imported docker image and received an error during startup of pod docker-ubuntu:



```
command terminated with exit code 1
root@mini-pc:/home/fill# pwd
/home/fill
root@mini-pc:/home/fill# microk8s.kubectl get pods
NAME         READY   STATUS    RESTARTS   AGE
shell-demo   1/1     Running   0          10m
root@mini-pc:/home/fill# vi imported_docker.yaml
root@mini-pc:/home/fill# microk8s.kubectl apply -f do
docker_ubuntu.tar  download_test
root@mini-pc:/home/fill# microk8s.kubectl apply -f imported_docker.yaml
pod/docker-ubuntu created
root@mini-pc:/home/fill# microk8s.kubectl get pods
NAME            READY   STATUS              RESTARTS   AGE
docker-ubuntu   0/1     ContainerCreating   0          5s
shell-demo      1/1     Running             0          14m
root@mini-pc:/home/fill# microk8s.kubectl get pods
NAME            READY   STATUS             RESTARTS   AGE
docker-ubuntu   0/1     CrashLoopBackOff   1          12s
shell-demo      1/1     Running            0          14m
root@mini-pc:/home/fill# cat  imported_docker.yaml
apiVersion: v1
kind: Pod
metadata:
  name: docker-ubuntu
spec:

  containers:
  - name: ubuntu
    image: ubuntu
  hostNetwork: true
  dnsPolicy: Default
root@mini-pc:/home/fill# microk8s.kubectl get pods
NAME            READY   STATUS                 RESTARTS   AGE
docker-ubuntu   0/1     CreateContainerError   1          82s
shell-demo      1/1     Running                0          15m
root@mini-pc:/home/fill#
```