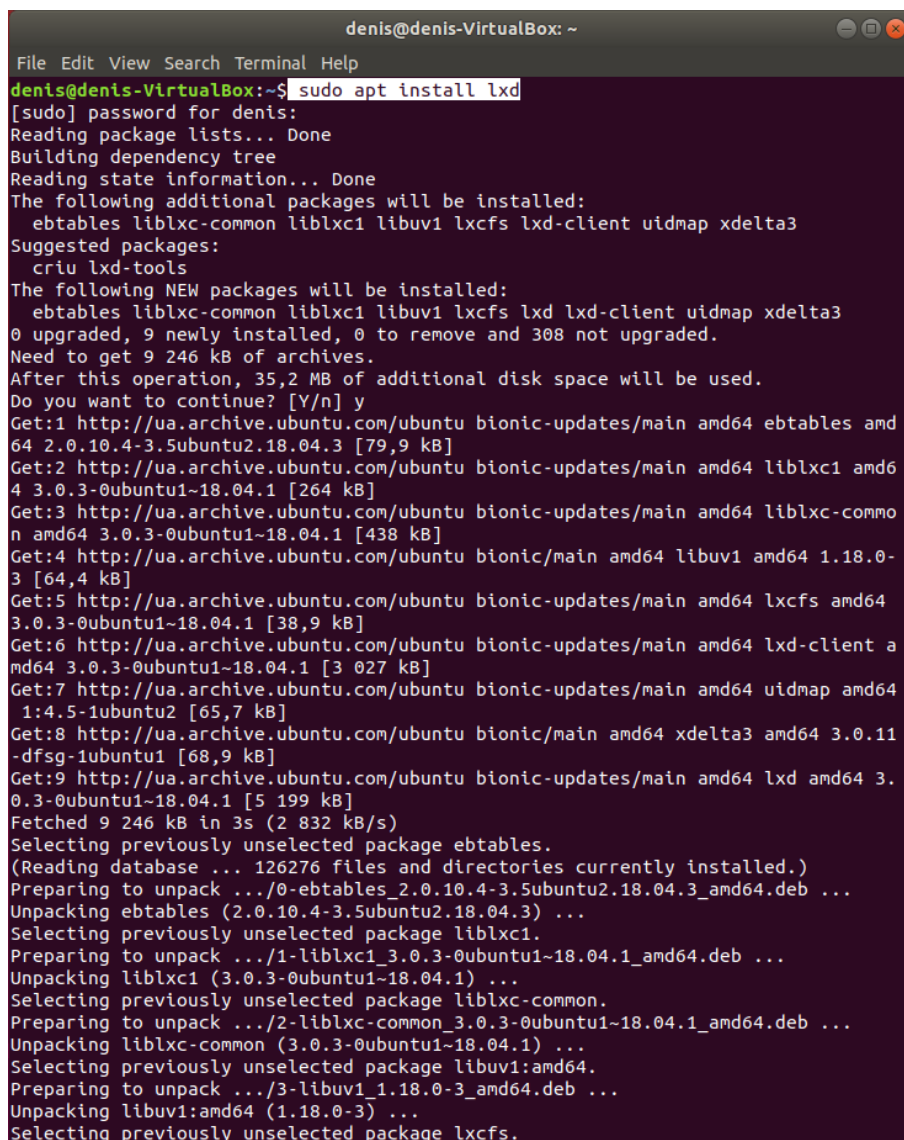
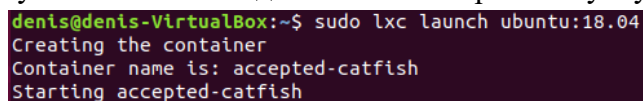


1. Установить lxc (screenshot)



```
denis@denis-VirtualBox: ~  
File Edit View Search Terminal Help  
denis@denis-VirtualBox:~$ sudo apt install lxd  
[sudo] password for denis:  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following additional packages will be installed:  
  ebttables liblxc-common liblxc1 libuv1 lxcfs lxd-client uidmap xdelta3  
Suggested packages:  
  criu lxd-tools  
The following NEW packages will be installed:  
  ebttables liblxc-common liblxc1 libuv1 lxcfs lxd-client uidmap xdelta3  
0 upgraded, 9 newly installed, 0 to remove and 308 not upgraded.  
Need to get 9 246 kB of archives.  
After this operation, 35,2 MB of additional disk space will be used.  
Do you want to continue? [Y/n] y  
Get:1 http://ua.archive.ubuntu.com/ubuntu bionic-updates/main amd64 ebttables amd64 2.0.10.4-3.5ubuntu2.18.04.3 [79,9 kB]  
Get:2 http://ua.archive.ubuntu.com/ubuntu bionic-updates/main amd64 liblxc1 amd64 3.0.3-0ubuntu1~18.04.1 [264 kB]  
Get:3 http://ua.archive.ubuntu.com/ubuntu bionic-updates/main amd64 liblxc-common amd64 3.0.3-0ubuntu1~18.04.1 [438 kB]  
Get:4 http://ua.archive.ubuntu.com/ubuntu bionic/main amd64 libuv1 amd64 1.18.0-3 [64,4 kB]  
Get:5 http://ua.archive.ubuntu.com/ubuntu bionic-updates/main amd64 lxcfs amd64 3.0.3-0ubuntu1~18.04.1 [38,9 kB]  
Get:6 http://ua.archive.ubuntu.com/ubuntu bionic-updates/main amd64 lxd-client amd64 3.0.3-0ubuntu1~18.04.1 [3 027 kB]  
Get:7 http://ua.archive.ubuntu.com/ubuntu bionic-updates/main amd64 uidmap amd64 1:4.5-1ubuntu2 [65,7 kB]  
Get:8 http://ua.archive.ubuntu.com/ubuntu bionic/main amd64 xdelta3 amd64 3.0.11-1dfsg-1ubuntu1 [68,9 kB]  
Get:9 http://ua.archive.ubuntu.com/ubuntu bionic-updates/main amd64 lxd amd64 3.0.3-0ubuntu1~18.04.1 [5 199 kB]  
Fetched 9 246 kB in 3s (2 832 kB/s)  
Selecting previously unselected package ebttables.  
(Reading database ... 126276 files and directories currently installed.)  
Preparing to unpack .../0-ebttables_2.0.10.4-3.5ubuntu2.18.04.3_amd64.deb ...  
Unpacking ebttables (2.0.10.4-3.5ubuntu2.18.04.3) ...  
Selecting previously unselected package liblxc1.  
Preparing to unpack .../1-liblxc1_3.0.3-0ubuntu1~18.04.1_amd64.deb ...  
Unpacking liblxc1 (3.0.3-0ubuntu1~18.04.1) ...  
Selecting previously unselected package liblxc-common.  
Preparing to unpack .../2-liblxc-common_3.0.3-0ubuntu1~18.04.1_amd64.deb ...  
Unpacking liblxc-common (3.0.3-0ubuntu1~18.04.1) ...  
Selecting previously unselected package libuv1:amd64.  
Preparing to unpack .../3-libuv1_1.18.0-3_amd64.deb ...  
Unpacking libuv1:amd64 (1.18.0-3) ...  
Selecting previously unselected package lxcfs.  
Preparing to unpack .../4-lxcfs_3.0.3-0ubuntu1~18.04.1_amd64.deb ...  
Unpacking lxcfs (3.0.3-0ubuntu1~18.04.1) ...  
Selecting previously unselected package lxd-client.  
Preparing to unpack .../5-lxd-client_3.0.3-0ubuntu1~18.04.1_amd64.deb ...  
Unpacking lxd-client (3.0.3-0ubuntu1~18.04.1) ...  
Selecting previously unselected package uidmap.  
Preparing to unpack .../6-uidmap_1:4.5-1ubuntu2_amd64.deb ...  
Unpacking uidmap (1:4.5-1ubuntu2) ...  
Selecting previously unselected package xdelta3.  
Preparing to unpack .../7-xdelta3_3.0.11-1dfsg-1ubuntu1_amd64.deb ...  
Unpacking xdelta3 (3.0.11-1dfsg-1ubuntu1) ...  
Selecting previously unselected package lxd.  
Preparing to unpack .../8-lxd_3.0.3-0ubuntu1~18.04.1_amd64.deb ...  
Unpacking lxd (3.0.3-0ubuntu1~18.04.1) ...  
Setting up ebttables (2.0.10.4-3.5ubuntu2.18.04.3) ...  
Setting up liblxc1 (3.0.3-0ubuntu1~18.04.1) ...  
Setting up liblxc-common (3.0.3-0ubuntu1~18.04.1) ...  
Setting up libuv1:amd64 (1.18.0-3) ...  
Setting up lxcfs (3.0.3-0ubuntu1~18.04.1) ...  
Setting up lxd-client (3.0.3-0ubuntu1~18.04.1) ...  
Setting up uidmap (1:4.5-1ubuntu2) ...  
Setting up xdelta3 (3.0.11-1dfsg-1ubuntu1) ...  
Setting up lxd (3.0.3-0ubuntu1~18.04.1) ...
```

2. Запустить lxc launch для любой из версий Убунту (screenshot)



```
denis@denis-VirtualBox:~$ sudo lxc launch ubuntu:18.04  
Creating the container  
Container name is: accepted-catfish  
Starting accepted-catfish
```

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

```
denis@denis-VirtualBox:~$ sudo lxc list
[sudo] password for denis:
+-----+-----+-----+-----+-----+-----+
| NAME | STATE | IPV4 | IPV6 | TYPE | SNAPSHOTS |
+-----+-----+-----+-----+-----+-----+
| accepted-catfish | RUNNING | 10.135.201.17 (eth0) | fd42:806d:99cf:70bc:216:3eff:fe91:80ec (eth0) | PERSISTENT | 0 |
+-----+-----+-----+-----+-----+-----+
```

4. Зайдите в контейнер с командной строкой bash /bin/bash (screenshot)

```
root@accepted-catfish: ~
File Edit View Search Terminal Help
denis@denis-VirtualBox:~$ sudo lxc list
[sudo] password for denis:
+-----+-----+-----+-----+-----+-----+
| NAME | STATE | IPV4 | IPV6 | TYPE | SNAPSHOTS |
+-----+-----+-----+-----+-----+-----+
| accepted-catfish | RUNNING | 10.135.201.17 (eth0) | fd42:806d:99cf:70bc:216:3eff:fe91:80ec (eth0) | PERSISTENT | 0 |
+-----+-----+-----+-----+-----+-----+
denis@denis-VirtualBox:~$ sudo lxc exec accepted-catfish -- /bin/bash
root@accepted-catfish:~#
```

5. Запустите обновление apt-get update (screenshot)

```
root@accepted-catfish: ~
File Edit View Search Terminal Help
| accepted-catfish | RUNNING | 10.135.201.17 (eth0) | fd42:806d:99cf:70bc:216:3eff:fe91:80ec (eth0) | PERSISTENT | 0 |
+-----+-----+-----+-----+-----+-----+
denis@denis-VirtualBox:~$ sudo lxc exec accepted-catfish -- /bin/bash
root@accepted-catfish:~# 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://security.ubuntu.com/ubuntu bionic-security/restricted amd64 Packages [28.5 kB]
Get:9 http://security.ubuntu.com/ubuntu bionic-security/restricted Translation-en [7568 B]
Get:10 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 Packages [653 kB]
Get:11 http://security.ubuntu.com/ubuntu bionic-security/universe Translation-en [217 kB]
Get:12 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 Packages [6968 B]
Get:13 http://security.ubuntu.com/ubuntu bionic-security/multiverse Translation-en [2732 B]
Get:14 http://archive.ubuntu.com/ubuntu bionic/universe Translation-en [4941 kB]
Get:15 http://archive.ubuntu.com/ubuntu bionic/multiverse amd64 Packages [151 kB]
Get:16 http://archive.ubuntu.com/ubuntu bionic/multiverse Translation-en [108 kB]
Get:17 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages [897 kB]
Get:18 http://archive.ubuntu.com/ubuntu bionic-updates/main Translation-en [310 kB]
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 16s (1178 kB/s)
Reading package lists... Done
root@accepted-catfish:~#
```

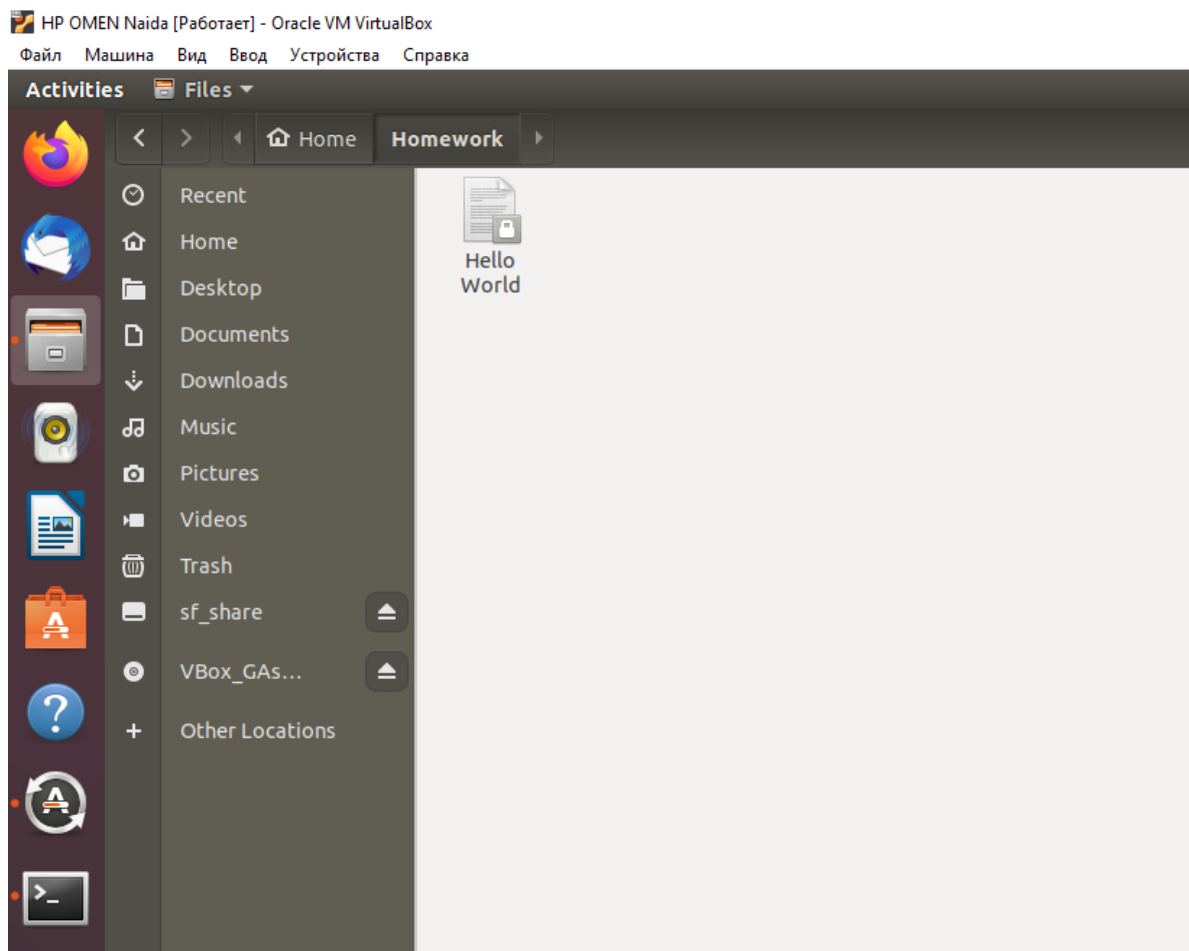
6. Установите (apt-get install) любую программу в контейнер. Например mc. Проверьте работоспособность. (screenshot)

```
root@accepted-catfish: ~  
File Edit View Search Terminal Help  
root@accepted-catfish:~# apt-get install vim  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following package was automatically installed and is no longer required:  
  libfreetype6  
Use 'apt autoremove' to remove it.  
The following additional packages will be installed:  
  vim-common vim-runtime vim-tiny  
Suggested packages:  
  ctags vim-doc vim-scripts indent  
The following packages will be upgraded:  
  vim vim-common vim-runtime vim-tiny  
4 upgraded, 0 newly installed, 0 to remove and 22 not upgraded.  
Need to get 7135 kB of archives.  
After this operation, 4096 B of additional disk space will be used.  
Do you want to continue? [Y/n] y  
Get:1 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 vim amd64 2:8.0.1453-1ubuntu1.3 [1153 kB]  
Get:2 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 vim-tiny amd64 2:8.0.1453-1ubuntu1.3 [476 kB]  
Get:3 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 vim-runtime all 2:8.0.1453-1ubuntu1.3 [5436 kB]  
Get:4 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 vim-common all 2:8.0.1453-1ubuntu1.3 [70.6 kB]  
Fetched 7135 kB in 7s (962 kB/s)  
(Reading database ... 28688 files and directories currently installed.)  
Preparing to unpack .../vim_2%3a8.0.1453-1ubuntu1.3_amd64.deb ...  
Unpacking vim (2:8.0.1453-1ubuntu1.3) over (2:8.0.1453-1ubuntu1.1) ...  
Preparing to unpack .../vim-tiny_2%3a8.0.1453-1ubuntu1.3_amd64.deb ...  
Unpacking vim-tiny (2:8.0.1453-1ubuntu1.3) over (2:8.0.1453-1ubuntu1.1) ...  
Preparing to unpack .../vim-runtime_2%3a8.0.1453-1ubuntu1.3_all.deb ...  
Unpacking vim-runtime (2:8.0.1453-1ubuntu1.3) over (2:8.0.1453-1ubuntu1.1) ...  
Preparing to unpack .../vim-common_2%3a8.0.1453-1ubuntu1.3_all.deb ...  
Unpacking vim-common (2:8.0.1453-1ubuntu1.3) over (2:8.0.1453-1ubuntu1.1) ...  
Setting up vim-common (2:8.0.1453-1ubuntu1.3) ...  
Setting up vim-runtime (2:8.0.1453-1ubuntu1.3) ...  
Setting up vim-tiny (2:8.0.1453-1ubuntu1.3) ...  
Setting up vim (2:8.0.1453-1ubuntu1.3) ...  
Processing triggers for mime-support (3.60ubuntu1) ...  
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...  
root@accepted-catfish:~#
```

```
root@accepted-catfish: ~  
File Edit View Search Terminal Help  
root@accepted-catfish:~# vim
```



```
denis@denis-VirtualBox: ~/Homework
File Edit View Search Terminal Help
denis@denis-VirtualBox:~$ cd Homework
denis@denis-VirtualBox:~/Homework$ sudo lxc file pull accepted-catfish/home/'Hello World' .
denis@denis-VirtualBox:~/Homework$
```

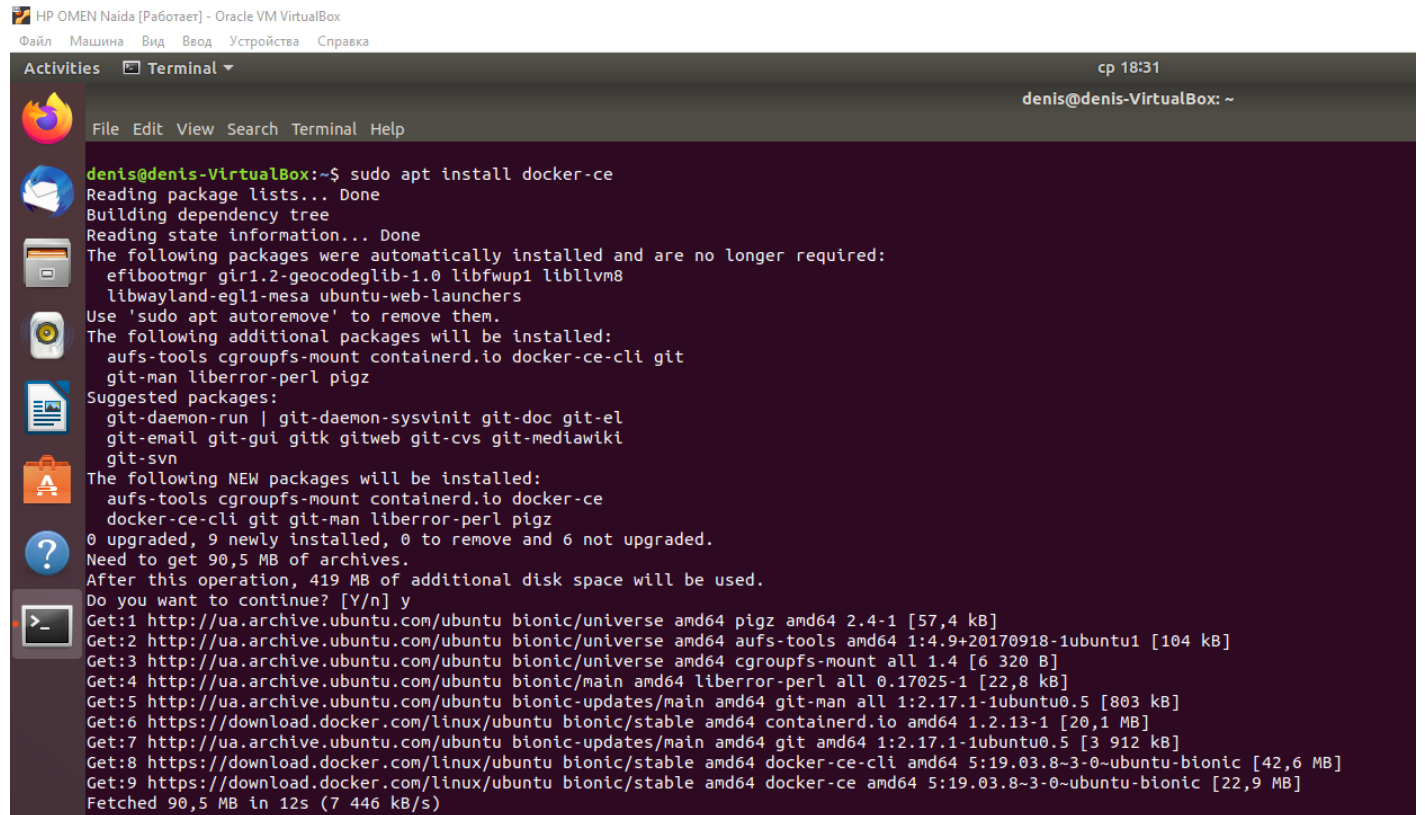


Работа с Docker в Ubuntu

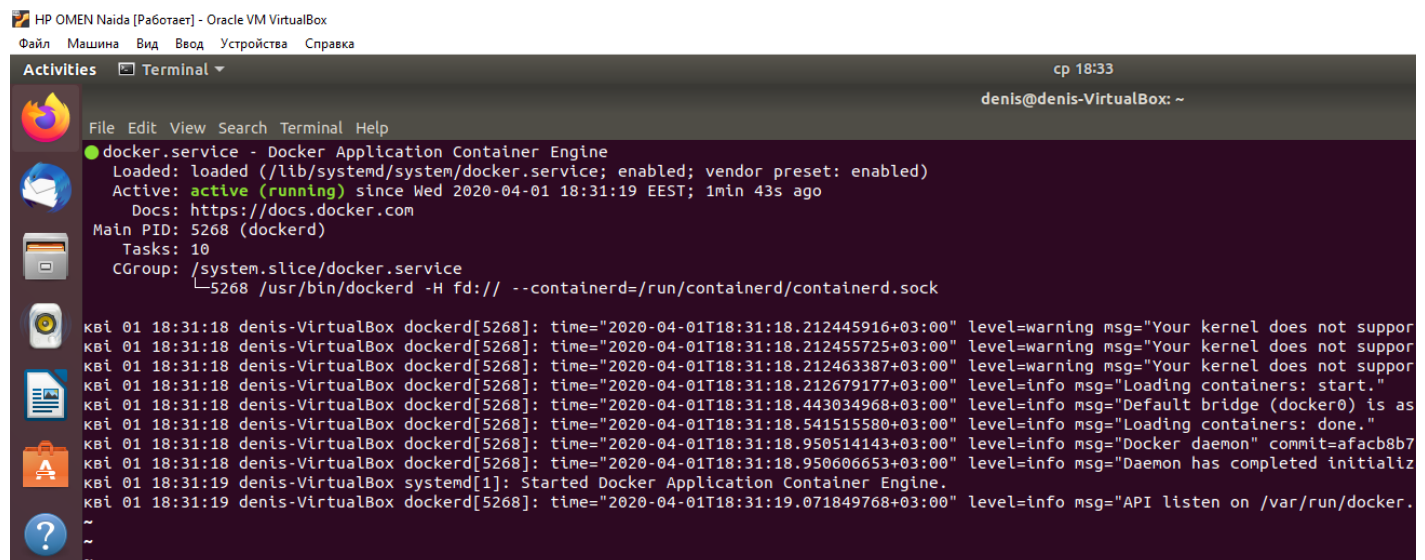
Documentation - <https://www.digitalocean.com/community/tutorials/how-to-install-and-use-docker-on-ubuntu-18-04>

<https://docs.docker.com>

1. Установить docker (screenshot)



```
HP OMEN Naida [Работает] - Oracle VM VirtualBox
Файл Машина Вид Ввод Устройства Справка
Activities Terminal
cp 18:31
denis@denis-VirtualBox: ~
File Edit View Search Terminal Help
denis@denis-VirtualBox:~$ sudo apt install docker-ce
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
efibootmgr gir1.2-geocodeglib-1.0 libfwupd1 liblvm2
libwayland-egl1-mesa ubuntu-web-launchers
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
aufs-tools cgroupfs-mount containerd.io docker-ce-cli git
git-man liberror-perl pigz
Suggested packages:
git-daemon-run | git-daemon-sysvinit git-doc git-el
git-email git-gui gitk gitweb git-cvs git-mediawiki
git-svn
The following NEW packages will be installed:
aufs-tools cgroupfs-mount containerd.io docker-ce
docker-ce-cli git git-man liberror-perl pigz
0 upgraded, 9 newly installed, 0 to remove and 6 not upgraded.
Need to get 90,5 MB of archives.
After this operation, 419 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://ua.archive.ubuntu.com/ubuntu bionic/universe amd64 pigz amd64 2.4-1 [57,4 kB]
Get:2 http://ua.archive.ubuntu.com/ubuntu bionic/universe amd64 aufs-tools amd64 1:4.9+20170918-1ubuntu1 [104 kB]
Get:3 http://ua.archive.ubuntu.com/ubuntu bionic/universe amd64 cgroupfs-mount all 1.4 [6 320 B]
Get:4 http://ua.archive.ubuntu.com/ubuntu bionic/main amd64 liberror-perl all 0.17025-1 [22,8 kB]
Get:5 http://ua.archive.ubuntu.com/ubuntu bionic-updates/main amd64 git-man all 1:2.17.1-1ubuntu0.5 [803 kB]
Get:6 https://download.docker.com/linux/ubuntu bionic/stable amd64 containerd.io amd64 1.2.13-1 [20,1 MB]
Get:7 http://ua.archive.ubuntu.com/ubuntu bionic-updates/main amd64 git amd64 1:2.17.1-1ubuntu0.5 [3 912 kB]
Get:8 https://download.docker.com/linux/ubuntu bionic/stable amd64 docker-ce-cli amd64 5:19.03.8-3-0-ubuntu-bionic [42,6 MB]
Get:9 https://download.docker.com/linux/ubuntu bionic/stable amd64 docker-ce amd64 5:19.03.8-3-0-ubuntu-bionic [22,9 MB]
Fetched 90,5 MB in 12s (7 446 kB/s)
```



```
HP OMEN Naida [Работает] - Oracle VM VirtualBox
Файл Машина Вид Ввод Устройства Справка
Activities Terminal
cp 18:33
denis@denis-VirtualBox: ~
File Edit View Search Terminal Help
● docker.service - Docker Application Container Engine
Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor preset: enabled)
Active: active (running) since Wed 2020-04-01 18:31:19 EEST; 1min 43s ago
Docs: https://docs.docker.com
Main PID: 5268 (dockerd)
Tasks: 10
CGroup: /system.slice/docker.service
└─5268 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock

кв1 01 18:31:18 denis-VirtualBox dockerd[5268]: time="2020-04-01T18:31:18.212445916+03:00" level=warning msg="Your kernel does not support
кв1 01 18:31:18 denis-VirtualBox dockerd[5268]: time="2020-04-01T18:31:18.212455725+03:00" level=warning msg="Your kernel does not support
кв1 01 18:31:18 denis-VirtualBox dockerd[5268]: time="2020-04-01T18:31:18.212463387+03:00" level=warning msg="Your kernel does not support
кв1 01 18:31:18 denis-VirtualBox dockerd[5268]: time="2020-04-01T18:31:18.212679177+03:00" level=info msg="Loading containers: start."
кв1 01 18:31:18 denis-VirtualBox dockerd[5268]: time="2020-04-01T18:31:18.443034968+03:00" level=info msg="Default bridge (docker0) is as
кв1 01 18:31:18 denis-VirtualBox dockerd[5268]: time="2020-04-01T18:31:18.541515580+03:00" level=info msg="Loading containers: done."
кв1 01 18:31:18 denis-VirtualBox dockerd[5268]: time="2020-04-01T18:31:18.950514143+03:00" level=info msg="Docker daemon" commit=afac8b7
кв1 01 18:31:18 denis-VirtualBox dockerd[5268]: time="2020-04-01T18:31:18.950606653+03:00" level=info msg="Daemon has completed initializ
кв1 01 18:31:19 denis-VirtualBox systemd[1]: Started Docker Application Container Engine.
кв1 01 18:31:19 denis-VirtualBox dockerd[5268]: time="2020-04-01T18:31:19.071849768+03:00" level=info msg="API listen on /var/run/docker.
```

2. Запустить поиск сконфигурированных решений для “ubuntu”(screenshot)


```
denis@denis-VirtualBox: ~  
File Edit View Search Terminal Help  
  
denis@denis-VirtualBox:~$ sudo docker search ubuntu  
NAME                                DESCRIPTION                                STARS                                OFFICIAL                                AUTOMATED  
ubuntu                              Ubuntu is a Debian-based Linux operating sys... 10699                                [OK]  
dorowu/ubuntu-desktop-lxde-vnc      Docker image to provide HTML5 VNC interface ... 410  
rastasheep/ubuntu-sshd              Dockerized SSH service, built on top of offi... 245  
consol/ubuntu-xfce-vnc              Ubuntu container with "headless" VNC session... 212  
ubuntu-upstart                      Upstart is an event-based replacement for th... 107  
neurodebian                         NeuroDebian provides neuroscience research s... 67  
1andiinternet/ubuntu-16-nginx-php-phpmyadmin-mysql-5  ubuntu-16-nginx-php-phpmyadmin-mysql-5  50  
ubuntu-debootstrap                  debbootstrap --variant=minbase --components=m... 43  
nuagebec/ubuntu                     Simple always updated Ubuntu docker images w... 24  
i386/ubuntu                         Ubuntu is a Debian-based Linux operating sys... 19  
1andiinternet/ubuntu-16-apache-php-5.6  ubuntu-16-apache-php-5.6  14  
1andiinternet/ubuntu-16-apache-php-7.0  ubuntu-16-apache-php-7.0  13  
ppc64le/ubuntu                      Ubuntu is a Debian-based Linux operating sys... 13  
1andiinternet/ubuntu-16-nginx-php-phpmyadmin-mariadb-10  ubuntu-16-nginx-php-phpmyadmin-mariadb-10  11  
1andiinternet/ubuntu-16-nginx-php-5.6  ubuntu-16-nginx-php-5.6  8  
1andiinternet/ubuntu-16-nginx-php-5.6-wordpress-4  ubuntu-16-nginx-php-5.6-wordpress-4  7  
1andiinternet/ubuntu-16-apache-php-7.1  ubuntu-16-apache-php-7.1  6  
darksheer/ubuntu                    Base Ubuntu Image -- Updated hourly 5  
pivotaldata/ubuntu                  A quick freshening-up of the base Ubuntu doc... 4  
1andiinternet/ubuntu-16-nginx-php-7.0  ubuntu-16-nginx-php-7.0  4  
pivotaldata/ubuntu16.04-build        Ubuntu 16.04 image for GPDB compilation 2  
pivotaldata/ubuntu-gpdb-dev          Ubuntu images for GPDB development 1  
smarterentry/ubuntu                 ubuntu with smarterentry 1  
1andiinternet/ubuntu-16-ssh          ubuntu-16-ssh 1  
1andiinternet/ubuntu-16-php-7.1      ubuntu-16-php-7.1 1
```

3. Скачать любой из образов на локальную машину. (screenshot)

```
denis@denis-VirtualBox: ~  
File Edit View Search Terminal Help  
  
denis@denis-VirtualBox:~$ 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
```

4. Запустить команду просмотра загруженных на компьютер образов. (screenshot)

```
denis@denis-VirtualBox: ~  
File Edit View Search Terminal Help  
  
denis@denis-VirtualBox:~$ docker images  
REPOSITORY          TAG             IMAGE ID         CREATED          SIZE  
ubuntu              latest          4e5021d210f6    12 days ago     64.2MB  
denis@denis-VirtualBox:~$
```

5. Запустите обновление apt-get update (screenshot)

```
root@0b9e6bc80698: /
File Edit View Search Terminal Help

denis@denis-VirtualBox:~$ sudo docker run -it ubuntu
root@0b9e6bc80698:/# 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://security.ubuntu.com/ubuntu bionic-security/restricted amd64 Packages [37.0 kB]
Get:4 http://archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:5 http://security.ubuntu.com/ubuntu bionic-security/main amd64 Packages [870 kB]
Get:6 http://archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Get:7 http://archive.ubuntu.com/ubuntu bionic/main amd64 Packages [1344 kB]
Get:8 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 Packages [7904 B]
Get:9 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 Packages [835 kB]
Get:10 http://archive.ubuntu.com/ubuntu bionic/restricted amd64 Packages [13.5 kB]
Get:11 http://archive.ubuntu.com/ubuntu bionic/multiverse amd64 Packages [186 kB]
Get:12 http://archive.ubuntu.com/ubuntu bionic/universe amd64 Packages [11.3 MB]
Get:13 http://archive.ubuntu.com/ubuntu bionic-updates/multiverse amd64 Packages [12.2 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/universe amd64 Packages [1367 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 37s (480 kB/s)
Reading package lists... Done
root@0b9e6bc80698:/#
```

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

```
root@0b9e6bc80698: /
File Edit View Search Terminal Help

root@0b9e6bc80698:/# apt-get install mc && apt-get install vim
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  file libgdbm-compat4 libgdbm5 libglib2.0-0 libglib2.0-data libgpm2 libicu60 libmagic-mgc
  libmagic1 libperl5.26 libslang2 libssh2-1 libxml2 mc-data mime-support netbase perl
  perl-modules-5.26 shared-mime-info unzip xdg-user-dirs xz-utils
Suggested packages:
  gdbm-l10n gpm arj catdvi | texlive-binaries dbview djvulibre-bin genisoimage gv imagemagick
  libaspell-dev links | w3m | lynx odt2txt poppler-utils python python-boto python-tz xpdf
  | pdf-viewer zip perl-doc libterm-readline-gnu-perl | libterm-readline-perl-perl make
The following NEW packages will be installed:
  file libgdbm-compat4 libgdbm5 libglib2.0-0 libglib2.0-data libgpm2 libicu60 libmagic-mgc
  libmagic1 libperl5.26 libslang2 libssh2-1 libxml2 mc mc-data mime-support netbase perl
  perl-modules-5.26 shared-mime-info unzip xdg-user-dirs xz-utils
0 upgraded, 23 newly installed, 0 to remove and 12 not upgraded.
Need to get 19.7 MB of archives.
After this operation, 98.1 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 perl-modules-5.26 all 5.26.1-6
ubuntu0.3 [2763 kB]
Get:2 http://archive.ubuntu.com/ubuntu bionic/main amd64 libgdbm5 amd64 1.14.1-6 [26.0 kB]
Get:3 http://archive.ubuntu.com/ubuntu bionic/main amd64 libgdbm-compat4 amd64 1.14.1-6 [6084 B]
```

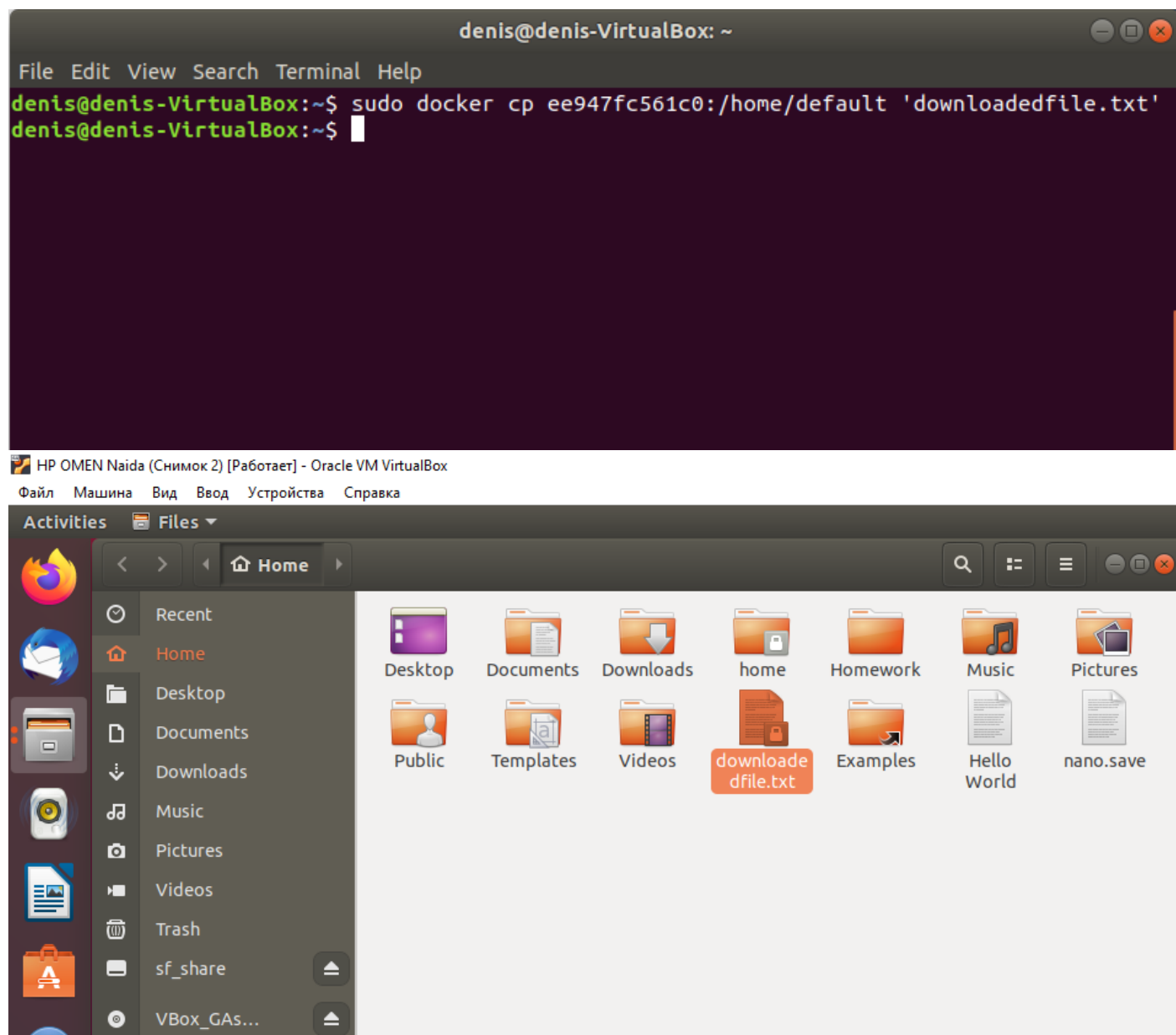

7. Загрузите в контейнер файл (screenshot) и скачайте с контейнера другой файл (screenshot).

Загрузка с хоста в контейнер

```
denis@denis-VirtualBox: ~  
File Edit View Search Terminal Help  
denis@denis-VirtualBox:~$ sudo docker ps  
[sudo] password for denis:  
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS              NAMES  
ee947fc561c0        ubuntu             "/bin/bash"        55 seconds ago     Up 41 seconds        
denis@denis-VirtualBox:~$ sudo docker cp 'Hello World' ee947fc561c0:/home/HELLO_WORLD.txt  
denis@denis-VirtualBox:~$
```

```
mc [root@ee947fc561c0]:/home  
File Edit View Search Terminal Help  
Left      File      Command      Options      Right  
<- /home .[^]> <- / .[^]>  
|.n| Name | Size | Modify | time | |.n| Name | Size | Modify | time |  
|/..| |UP--DIR| Apr 2 11:35 | |/bin| |4096| Mar 11 21:05 |  
|HELLO_WORLD.txt| |13| Apr 1 14:54 | |/boot| |4096| Apr 24 2018 |  
|default| |13| Apr 1 14:54 | |/dev| |360| Apr 2 11:30 |  
| | | | | |/etc| |4096| Apr 2 11:32 |  
| | | | | |/home| |4096| Apr 2 11:32 |  
| | | | | |/lib| |4096| May 23 2017 |  
| | | | | |/lib64| |4096| Mar 11 21:03 |  
| | | | | |/media| |4096| Mar 11 21:03 |  
| | | | | |/mnt| |4096| Mar 11 21:03 |  
| | | | | |/opt| |4096| Mar 11 21:03 |  
| | | | | |/proc| |0| Apr 2 11:30 |  
| | | | | |/root| |4096| Apr 2 11:32 |  
| | | | | |/run| |4096| Mar 20 19:20 |  
| | | | | |/sbin| |4096| Mar 20 19:20 |  
| | | | | |/srv| |4096| Mar 11 21:03 |  
| | | | | |/sys| |0| Apr 2 11:30 |  
| | | | | |/tmp| |4096| Apr 2 11:32 |  
| | | | | |/usr| |4096| Mar 11 21:03 |  
| | | | | |/var| |4096| Mar 11 21:05 |  
| | | | | |*.dockerenv| |0| Apr 2 11:30 |  
|HELLO_WORLD.txt| |1772M/10G (17%)| |/bin| |1772M/10G (17%)|  
Hint: M-! will allow you to execute programs and see the output in the viewer.  
root@ee947fc561c0:/home#  
1Help 2Menu 3View 4Edit 5Copy 6Re~ov 7Mkdir 8Delete 9PullDn 10Quit
```

Скачивание из контейнера на хост



8. Прочитать документацию и кратко описать основные 7 команд Dockerfile

kill – «Убивает» один или более запущенных контейнеров. Для использования необходимо ввести в командную строку: `docker kill [опции] <id контейнера>`

run – Запускает контейнер с выбранным образом. Для использования необходимо ввести в командную строку: `docker run [опции] <имя образа>`. При добавление параметра `-i` и `-t` (`-it`) после `run`, предоставляется интерактивный доступ к контейнеру с помощью командной строки.

commit – Позволяет создать новый образ на основе изменений, внесенных в контейнер. Для использования необходимо ввести: `docker commit [опции] <id контейнера> <название репозитория>/<имя нового образа>`

push – Позволяет выгрузить образ в репозиторий. Для использования необходимо залогиниться в Docker Hub и после этого ввести в командную строку: `docker push [опции] <имя вашего репозитория>/<имя образа>`

pull – Позволяет скачать образ из репозитория. Для использования необходимо ввести в командную строку: *docker pull <имя образа>*

create – Позволяет создать новый контейнер. Для использования необходимо ввести в командную строку: *docker create [OPTIONS] IMAGE [COMMAND] [ARG...]*

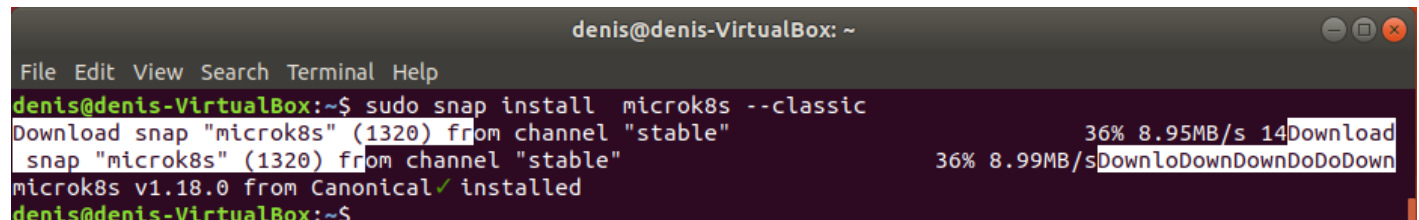
exec – Позволяет выполнить команду в уже запущенном контейнере. Для использования необходимо ввести в командную строку: *docker exec [опции] <команда> [опции]*

Работа с Kubernetes в Ubuntu

<https://ubuntu.com/kubernetes/install> ;

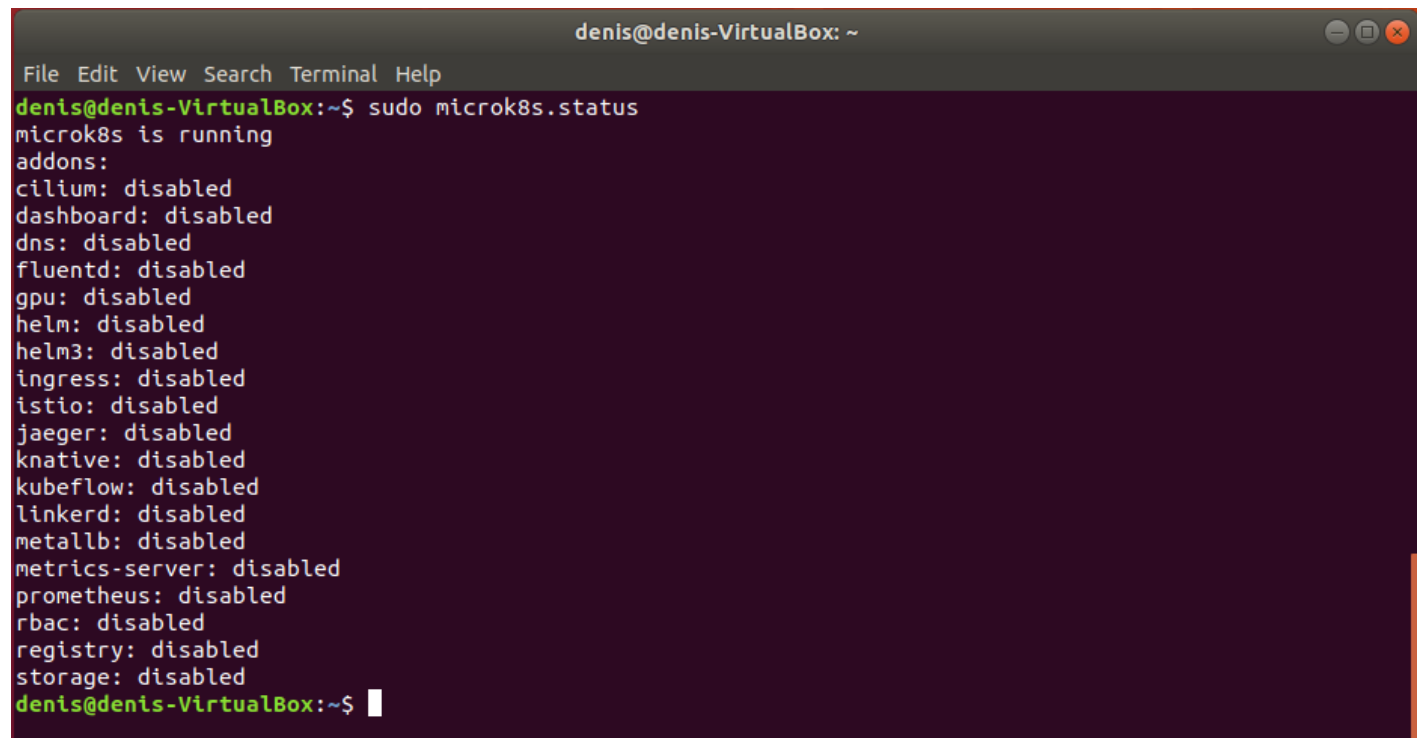
<https://microk8s.io/docs/>

1. Установить microk8s (screenshot)



```
denis@denis-VirtualBox: ~  
File Edit View Search Terminal Help  
denis@denis-VirtualBox:~$ sudo snap install microk8s --classic  
Download snap "microk8s" (1320) from channel "stable" 36% 8.95MB/s 14Download  
snap "microk8s" (1320) from channel "stable" 36% 8.99MB/sDownloadDownDownDoDoDown  
microk8s v1.18.0 from Canonical✓ installed  
denis@denis-VirtualBox:~$
```

2. Проверьте статус (screenshot) и команды менеджера кластера (screenshot).



```
denis@denis-VirtualBox: ~  
File Edit View Search Terminal Help  
denis@denis-VirtualBox:~$ sudo microk8s.status  
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  
denis@denis-VirtualBox:~$
```

```
denis@denis-VirtualBox: ~  
File Edit View Search Terminal Help  
denis@denis-VirtualBox:~$ sudo microk8s.kubectl get services  
[sudo] password for denis:  
NAME          TYPE          CLUSTER-IP    EXTERNAL-IP    PORT(S)    AGE  
kubernetes    ClusterIP     10.152.183.1  <none>         443/TCP    27m  
denis@denis-VirtualBox:~$
```

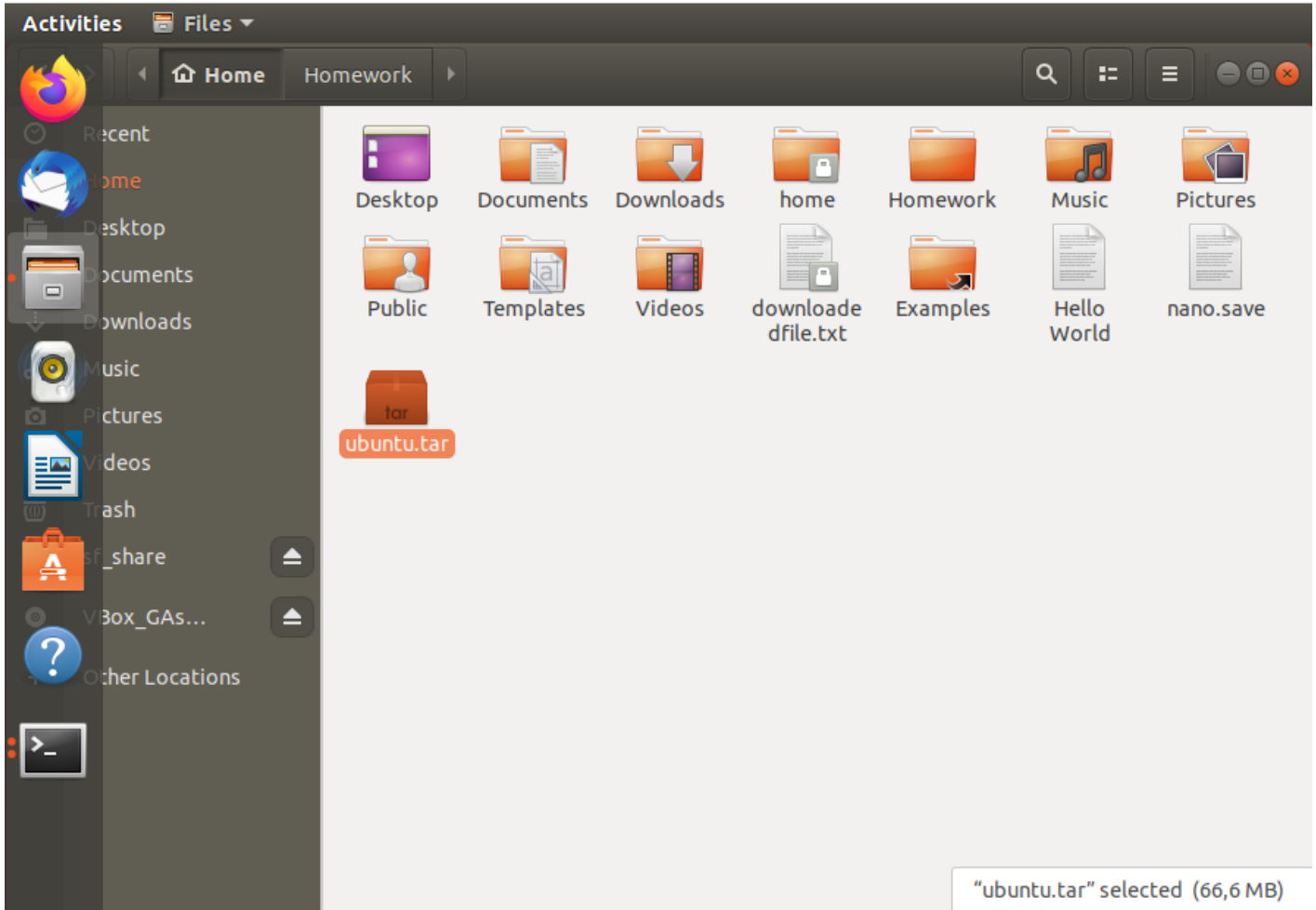
3. Просмотрите установленные в докере образы; заверните один из них в образ *.tar

HP OMEN Naida (Снимок 2) [Работает] - Oracle VM VirtualBox

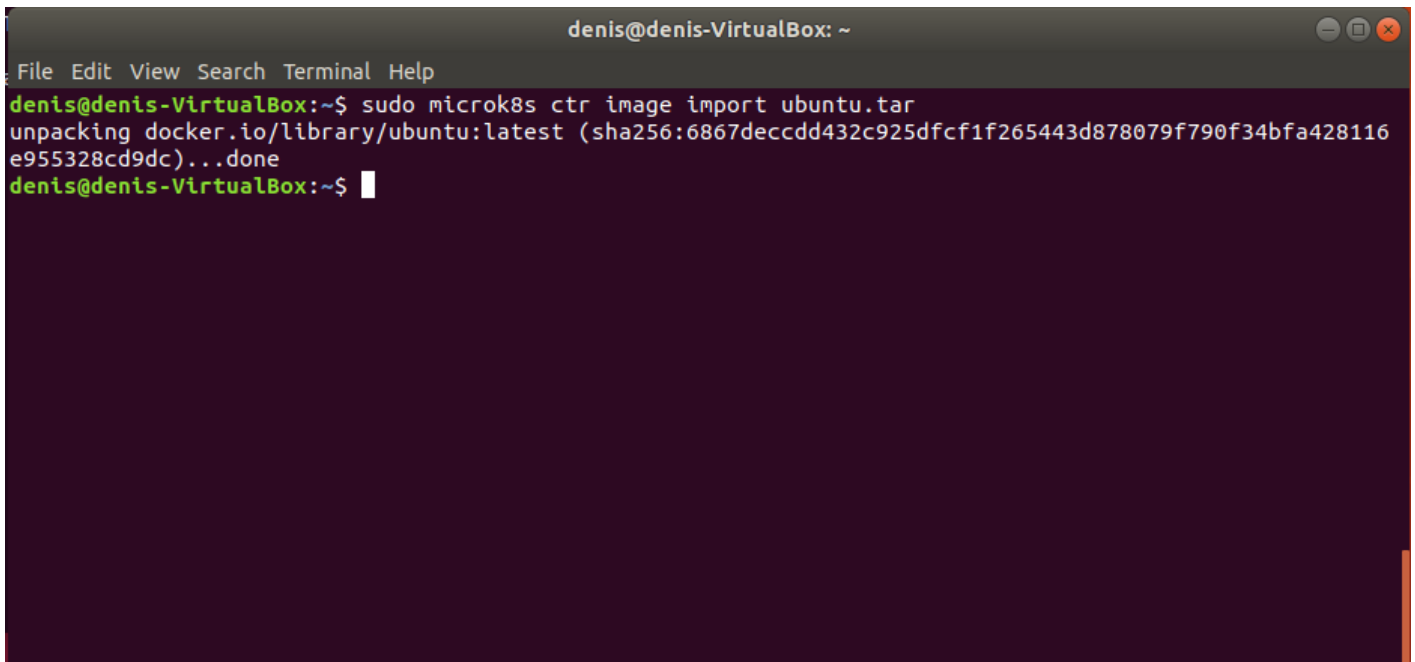
Файл Машина Вид Ввод Устройства Справка

Activities Terminal ▾

```
denis@denis-VirtualBox: ~  
File Edit View Search Terminal Help  
denis@denis-VirtualBox:~$ sudo docker images  
REPOSITORY          TAG          IMAGE ID          CREATED  
SIZE  
ubuntu              latest       4e5021d210f6     12 days ago  
64.2MB  
denis@denis-VirtualBox:~$
```

4. Импортируйте образ в Kubernetes (screenshot)



```
denis@denis-VirtualBox: ~  
File Edit View Search Terminal Help  
denis@denis-VirtualBox:~$ sudo microk8s ctr images ls  
REF                                     TYPE  
SIZE    DIGEST    PLATFORMS    LABELS  
docker.io/library/ubuntu:latest      application/vnd.oci.image.manifest.v1+json sha256:6867deccdd432c925dfcf1f265443d878079f790f34bfa428116e955328cd9dc 63.5 MiB linux/amd64 io.cri-containerd.image=managed  
sha256:4e5021d210f65ebe915670c7089120120bc0a303b90208592851708c1b8c04bd application/vnd.oci.image.manifest.v1+json sha256:6867deccdd432c925dfcf1f265443d878079f790f34bfa428116e955328cd9dc 63.5 MiB linux/amd64 io.cri-containerd.image=managed  
denis@denis-VirtualBox:~$
```

5. Запустите образ и убедитесь, что он работает. (screenshot)

```
Knob HP OMEN Naida [Running] - Oracle VM VirtualBox  
File Machine View Input Devices Help  
Activities Terminal  
nt 13:55  
denis@denis-VirtualBox: ~  
File Edit View Search Terminal Help  
denis@denis-VirtualBox:~$ sudo microk8s ctr images ls  
REF                                     TYPE  
SIZE    DIGEST    PLATFORMS    LABELS  
docker.io/coredns/coredns:1.6.6      application/vnd.docker.distribution.manifest.list.v2+json sha256:e89c79f6acb63ca5474d5a12.3 MiB linux/amd64,linux/arm,linux/arm64,linux/ppc64le,linux/s390x io.cri-containerd.image=managed  
docker.io/library/ubuntu:latest      application/vnd.oci.image.manifest.v1+json sha256:4e5021d210f65ebe915670c7089120120bc0a303b90208592851708c1b8c04bd application/vnd.oci.image.manifest.v1+json sha256:6867deccdd432c925dfcf1f265443d878079f790f34bfa428116e955328cd9dc 63.5 MiB linux/amd64 io.cri-containerd.image=managed  
92b7546b43a051853a341d 25.5 MiB linux/386,linux/amd64,linux/arm/v7,linux/arm64/v8,linux/ppc64le,linux/s390x io.cri-containerd.image=managed  
docker.io/library/ubuntu@sha256:bec5a2727be7fff3d308193cfe3491f8fba1a2ba392b7546b43a051853a341d application/vnd.docker.distribution.manifest.list.v2+json sha256:bec5a2727be7fff3d308193cfe3491f8fba1a2ba392b7546b43a051853a341d application/vnd.docker.distribution.manifest.list.v2+json sha256:6867deccdd432c925dfcf1f265443d878079f790f34bfa428116e955328cd9dc 63.5 MiB linux/amd64 io.cri-containerd.image=managed  
92b7546b43a051853a341d 25.5 MiB linux/386,linux/amd64,linux/arm/v7,linux/arm64/v8,linux/ppc64le,linux/s390x io.cri-containerd.image=managed  
k8s.gcr.io/pause:3.1                 application/vnd.docker.distribution.manifest.list.v2+json sha256:c2eed83929b888179acea309.7 KiB linux/amd64,linux/arm,linux/arm64,linux/ppc64le,linux/s390x io.cri-containerd.image=managed  
c2eed83929b888179acea 309.7 KiB linux/amd64,linux/arm,linux/arm64,linux/ppc64le,linux/s390x io.cri-containerd.image=managed  
k8s.gcr.io/pause@sha256:f78411e19d84a252e53bfff71a4407a5686c46983a2c2eed83929b888179acea application/vnd.docker.distribution.manifest.list.v2+json sha256:f78411e19d84a252e53bfff71a4407a5686c46983a2c2eed83929b888179acea application/vnd.docker.distribution.manifest.list.v2+json sha256:6867deccdd432c925dfcf1f265443d878079f790f34bfa428116e955328cd9dc 63.5 MiB linux/amd64 io.cri-containerd.image=managed  
c2eed83929b888179acea 309.7 KiB linux/amd64,linux/arm,linux/arm64,linux/ppc64le,linux/s390x io.cri-containerd.image=managed  
sha256:4e5021d210f65ebe915670c7089120120bc0a303b90208592851708c1b8c04bd application/vnd.oci.image.manifest.v1+json sha256:4e5021d210f65ebe915670c7089120120bc0a303b90208592851708c1b8c04bd application/vnd.oci.image.manifest.v1+json sha256:6867deccdd432c925dfcf1f265443d878079f790f34bfa428116e955328cd9dc 63.5 MiB linux/amd64 io.cri-containerd.image=managed  
92b7546b43a051853a341d 25.5 MiB linux/386,linux/amd64,linux/arm/v7,linux/arm64/v8,linux/ppc64le,linux/s390x io.cri-containerd.image=managed  
sha256:cc4d8e8c6169c7ff13f4178ff2915cbd41e6a42cf300d2ef5c9dcdefae59f45e application/vnd.docker.distribution.manifest.list.v2+json sha256:cc4d8e8c6169c7ff13f4178ff2915cbd41e6a42cf300d2ef5c9dcdefae59f45e application/vnd.docker.distribution.manifest.list.v2+json sha256:6867deccdd432c925dfcf1f265443d878079f790f34bfa428116e955328cd9dc 63.5 MiB linux/amd64 io.cri-containerd.image=managed  
e89c79f6acb63ca5474d5a 12.3 MiB linux/amd64,linux/arm,linux/arm64,linux/ppc64le,linux/s390x io.cri-containerd.image=managed  
sha256:da86e6ba6ca197bf6bc5e9d900febd906b133eaa4750e6bed647b0f5e50ed43e application/vnd.docker.distribution.manifest.list.v2+json sha256:da86e6ba6ca197bf6bc5e9d900febd906b133eaa4750e6bed647b0f5e50ed43e application/vnd.docker.distribution.manifest.list.v2+json sha256:6867deccdd432c925dfcf1f265443d878079f790f34bfa428116e955328cd9dc 63.5 MiB linux/amd64 io.cri-containerd.image=managed  
c2eed83929b888179acea 309.7 KiB linux/amd64,linux/arm,linux/arm64,linux/ppc64le,linux/s390x io.cri-containerd.image=managed  
denis@denis-VirtualBox:~$  
c2eed83929b888179acea 309.7 KiB linux/amd64,linux/arm,linux/arm64,linux/ppc64le,linux/s390x  
denis@denis-VirtualBox:~$ sudo microk8s.kubectl run myubuntu2 --image=docker.io/coredns/coredns:1.6.6  
pod/myubuntu2 created  
denis@denis-VirtualBox:~$  
denis@denis-VirtualBox:~$ sudo microk8s.kubectl get pods  
NAME      READY   STATUS    RESTARTS   AGE  
myubuntu2 1/1     Running   0           22s  
denis@denis-VirtualBox:~$
```