

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 (screenshot)

```
maria@maria-VirtualBox:~$ sudo apt install lxd
[sudo] password for maria:
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 lxd-client uidmap xdelta3
0 upgraded, 9 newly installed, 0 to remove and 86 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
```

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

```
maria@maria-VirtualBox:/etc$ sudo lxc launch ubuntu:16.04
Creating the container

Container name is: loyal-akita
Starting loyal-akita
```

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

```
maria@maria-VirtualBox:/etc$ sudo lxc list
+-----+-----+-----+-----+-----+
| NAME   | STATE | IPV4   | IPV6   | |
|        |       |        |        |
|        |       | TYPE   | SNAPSHTS | LOCATION |
+-----+-----+-----+-----+-----+
| loyal-akita | RUNNING | 10.205.25.80 (eth0) | fd42:bcd3:5ef7:8d51:216:3eff:fe59:a206 (eth0) | PERSISTENT | 0 | maria-Virtualbox |
+-----+-----+-----+-----+-----+
maria@maria-VirtualBox:/etc$
```

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

```
maria@maria-VirtualBox:/etc$ lxc exec loyal-akita -- /bin/bash
root@loyal-akita:~#
```

5. Запустите обновление apt-get update (screenshot)

```

marlia@marlia-VirtualBox:/etc$ lxc exec loyal-akita -- /bin/bash
root@loyal-akita:~# apt-get update
Hit:1 http://archive.ubuntu.com/ubuntu xenial InRelease
Get:2 http://archive.ubuntu.com/ubuntu xenial-updates InRelease [109 kB]
Get:3 http://security.ubuntu.com/ubuntu xenial-security InRelease [109 kB]
Get:4 http://archive.ubuntu.com/ubuntu xenial-backports InRelease [107 kB]
Get:5 http://archive.ubuntu.com/ubuntu xenial/universe amd64 Packages [7532 kB]
Get:6 http://security.ubuntu.com/ubuntu xenial-security/main amd64 Packages [841 kB]
Get:7 http://security.ubuntu.com/ubuntu xenial-security/main Translation-en [319 kB]
Get:8 http://security.ubuntu.com/ubuntu xenial-security/universe amd64 Packages [487 kB]
Get:9 http://security.ubuntu.com/ubuntu xenial-security/universe Translation-en [199 kB]
Get:10 http://security.ubuntu.com/ubuntu xenial-security/multiverse amd64 Packages [5728 B]
Get:11 http://security.ubuntu.com/ubuntu xenial-security/multiverse Translation-en [2708 B]
Get:12 http://archive.ubuntu.com/ubuntu xenial/universe Translation-en [4354 kB]
Get:13 http://archive.ubuntu.com/ubuntu xenial/multiverse amd64 Packages [144 kB]
Get:14 http://archive.ubuntu.com/ubuntu xenial/multiverse Translation-en [106 kB]
Get:15 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 Packages [1121 kB]
Get:16 http://archive.ubuntu.com/ubuntu xenial-updates/main Translation-en [427 kB]
Get:17 http://archive.ubuntu.com/ubuntu xenial-updates/universe amd64 Packages [795 kB]
Get:18 http://archive.ubuntu.com/ubuntu xenial-updates/universe Translation-en [332 kB]
Get:19 http://archive.ubuntu.com/ubuntu xenial-updates/multiverse amd64 Packages [16.8 kB]
Get:20 http://archive.ubuntu.com/ubuntu xenial-updates/multiverse Translation-en [8468 B]
Get:21 http://archive.ubuntu.com/ubuntu xenial-backports/main amd64 Packages [7280 B]
Get:22 http://archive.ubuntu.com/ubuntu xenial-backports/main Translation-en [4456 B]
Get:23 http://archive.ubuntu.com/ubuntu xenial-backports/universe amd64 Packages [8064 B]
Get:24 http://archive.ubuntu.com/ubuntu xenial-backports/universe Translation-en [4328 B]
Fetched 17.0 MB in 60s (283 kB/s)
Reading package lists... Done
root@loyal-akita:~#

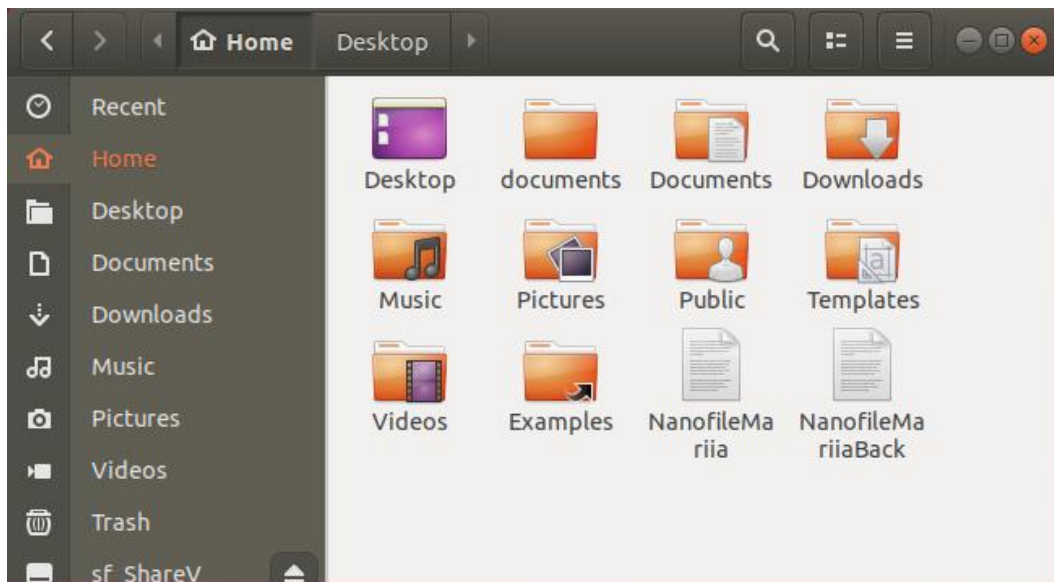
```

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

```

root@loyal-akita:~# 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 vim-gnome-py2 | vim-gtk-py2 | vim-gtk3-py2 | vim-athena-py2 | vim-nox-py2 indent
The following packages will be upgraded:
  vim vim-common vim-runtime vim-tiny
4 upgraded, 0 newly installed, 0 to remove and 6 not upgraded.
Need to get 6755 kB of archives.
After this operation, 0 B of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 vim amd64 2:7.4.1689-3ubuntu1.4 [1036 kB]
Get:2 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 vim-tiny amd64 2:7.4.1689-3ubuntu1.4 [446 kB]
Get:3 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 vim-runtime all 2:7.4.1689-3ubuntu1.4 [5169 kB]
Get:4 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 vim-common amd64 2:7.4.1689-3ubuntu1.4 [103 kB]
Fetched 6755 kB in 1min 2s (108 kB/s)
(Reading database ... 25753 files and directories currently installed.)
Preparing to unpack .../vim_2%3a7.4.1689-3ubuntu1.4_amd64.deb ...
Unpacking vim (2:7.4.1689-3ubuntu1.4) over (2:7.4.1689-3ubuntu1.3) ...
Preparing to unpack .../vim-tiny_2%3a7.4.1689-3ubuntu1.4_amd64.deb ...
Unpacking vim-tiny (2:7.4.1689-3ubuntu1.4) over (2:7.4.1689-3ubuntu1.3) ...
Preparing to unpack .../vim-runtime_2%3a7.4.1689-3ubuntu1.4_all.deb ...
Unpacking vim-runtime (2:7.4.1689-3ubuntu1.4) over (2:7.4.1689-3ubuntu1.3) ...
Preparing to unpack .../vim-common_2%3a7.4.1689-3ubuntu1.4_amd64.deb ...
Unpacking vim-common (2:7.4.1689-3ubuntu1.4) over (2:7.4.1689-3ubuntu1.3) ...
Processing triggers for man-db (2.7.5-1) ...
Processing triggers for mime-support (3.59ubuntu1) ...
Setting up vim-common (2:7.4.1689-3ubuntu1.4) ...
Setting up vim-runtime (2:7.4.1689-3ubuntu1.4) ...
Setting up vim (2:7.4.1689-3ubuntu1.4) ...
Setting up vim-tiny (2:7.4.1689-3ubuntu1.4) ...
root@loyal-akita:~#

```

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)

```

Mariia@mariia-VirtualBox:~$ sudo apt install docker-ce
Reading package lists... Done
Building dependency tree
Reading state information... Done
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 86 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 https://download.docker.com/linux/ubuntu bionic/stable amd64 containerd.io amd64 1.2.13-1 [20,1 MB]
Get:5 http://ua.archive.ubuntu.com/ubuntu bionic/main amd64 liberror-perl all 0.17025-1 [22,8 kB]
Get:6 http://ua.archive.ubuntu.com/ubuntu bionic-updates/main amd64 git-man all 1:2.17.1-1ubuntu0.5 [803 kB]
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 11min 24s (132 kB/s)
Selecting previously unselected package pigz.

```

```

● docker.service - Docker Application Container Engine
   Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor preset: enabled)
   Active: active (running) since Thu 2020-04-02 13:23:02 EEST; 26s ago
     Docs: https://docs.docker.com
    Main PID: 6676 (dockerd)
      Tasks: 8
     CGroup: /system.slice/docker.service
             └─6676 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock

kbi 02 13:23:02 mariia-VirtualBox dockerd[6676]: time="2020-04-02T13:23:02.087524163+03:00" level=warning msg="Your kernel does not support cgroup rt runtime"
kbi 02 13:23:02 mariia-VirtualBox dockerd[6676]: time="2020-04-02T13:23:02.087650408+03:00" level=warning msg="Your kernel does not support cgroup blkio weight"
kbi 02 13:23:02 mariia-VirtualBox dockerd[6676]: time="2020-04-02T13:23:02.087781523+03:00" level=warning msg="Your kernel does not support cgroup blkio weight device"
kbi 02 13:23:02 mariia-VirtualBox dockerd[6676]: time="2020-04-02T13:23:02.088120169+03:00" level=info msg="Loading containers: start."
kbi 02 13:23:02 mariia-VirtualBox dockerd[6676]: time="2020-04-02T13:23:02.202918718+03:00" level=info msg="Default bridge (docker0) is assigned with an IP address 172.17.0.0/16. Daemon option --bip can be"
kbi 02 13:23:02 mariia-VirtualBox dockerd[6676]: time="2020-04-02T13:23:02.359703065+03:00" level=info msg="Loading containers: done."
kbi 02 13:23:02 mariia-VirtualBox dockerd[6676]: time="2020-04-02T13:23:02.701846944+03:00" level=info msg="Docker daemon" commit=afacbb8b7f0 graphdriver(s)=overlay2 version=19.03.8
kbi 02 13:23:02 mariia-VirtualBox dockerd[6676]: time="2020-04-02T13:23:02.702243186+03:00" level=info msg="Daemon has completed initialization"
kbi 02 13:23:02 mariia-VirtualBox systemd[1]: Started Docker Application Container Engine.
kbi 02 13:23:02 mariia-VirtualBox dockerd[6676]: time="2020-04-02T13:23:02.751923776+03:00" level=info msg="API listen on /var/run/docker.sock"
~

```

2. Запустить поиск сконфигурированных решений для "ubuntu"(screenshot)

NAME	DESCRIPTION	STARS	OFFICIAL	AUTOMATED
ubuntu	Ubuntu is a Debian-based Linux operating sys...	10704	[OK]	
borowu/ubuntu-desktop-lxde-vnc	Docker image to provide HTML5 VNC interface ...	410		[OK]
trastashp/ubuntu-ssh	Dockerized SSH service, built on top of offl...	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]	
landinternet/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]
l386/ubuntu	Ubuntu is a Debian-based Linux operating sys...	19		
landinternet/ubuntu-16-apache-php-5.6	ubuntu-16-apache-php-5.6	14		[OK]
landinternet/ubuntu-16-apache-php-7.0	ubuntu-16-apache-php-7.0	13		[OK]
landinternet/ubuntu-16-nginx-php-phpmyadmin-mariadb-10	ubuntu-16-nginx-php-phpmyadmin-mariadb-10	11		[OK]
landinternet/ubuntu-16-nginx-php-5.6	ubuntu-16-nginx-php-5.6	8		[OK]
landinternet/ubuntu-16-nginx-php-5.6-wordpress-4	ubuntu-16-nginx-php-5.6-wordpress-4	7		[OK]
landinternet/ubuntu-16-apache-php-7.1	ubuntu-16-apache-php-7.1	6		[OK]
darksheer/ubuntu	Base Ubuntu Image -- Updated hourly	5		[OK]
landinternet/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		
landinternet/ubuntu-16-sshd	ubuntu-16-sshd	1		[OK]
smartentry/ubuntu	ubuntu with smartentry	1		[OK]
landinternet/ubuntu-16-php-7.1	ubuntu-16-php-7.1	1		[OK]
pivotaldata/ubuntu-gpdb-dev	Ubuntu images for GPDB development	1		

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

```

maria@mariia-VirtualBox:~$ sudo 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)

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
ubuntu	latest	4e5021d210f6	12 days ago	64.2MB

5. Запустите обновление apt-get update (screenshot)


```

marlia@marlia-VirtualBox:~$ sudo docker run -it ubuntu
root@edf9ff916031:/# apt update
Get:1 http://archive.ubuntu.com/ubuntu bionic InRelease [242 kB]
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://security.ubuntu.com/ubuntu bionic-security/main amd64 Packages [870 kB]
Get:6 http://archive.ubuntu.com/ubuntu bionic/restricted amd64 Packages [13.5 kB]
Get:7 http://archive.ubuntu.com/ubuntu bionic/multiverse amd64 Packages [186 kB]
Get:8 http://archive.ubuntu.com/ubuntu bionic/universe amd64 Packages [11.3 MB]
Get:9 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 Packages [7904 B]
Get:10 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 Packages [835 kB]
Get:11 http://security.ubuntu.com/ubuntu bionic-security/restricted amd64 Packages [37.0 kB]
Get:12 http://archive.ubuntu.com/ubuntu bionic/main amd64 Packages [1344 kB]
Get:13 http://archive.ubuntu.com/ubuntu bionic-updates/multiverse amd64 Packages [12.2 kB]
Get:14 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages [1161 kB]
Get:15 http://archive.ubuntu.com/ubuntu bionic-updates/restricted amd64 Packages [50.4 kB]
Get:16 http://archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packages [1367 kB]
Get:17 http://archive.ubuntu.com/ubuntu bionic-backports/universe amd64 Packages [4247 B]
Get:18 http://archive.ubuntu.com/ubuntu bionic-backports/main amd64 Packages [2496 B]
Fetched 17.7 MB in 1min 24s (212 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
12 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@edf9ff916031:/#

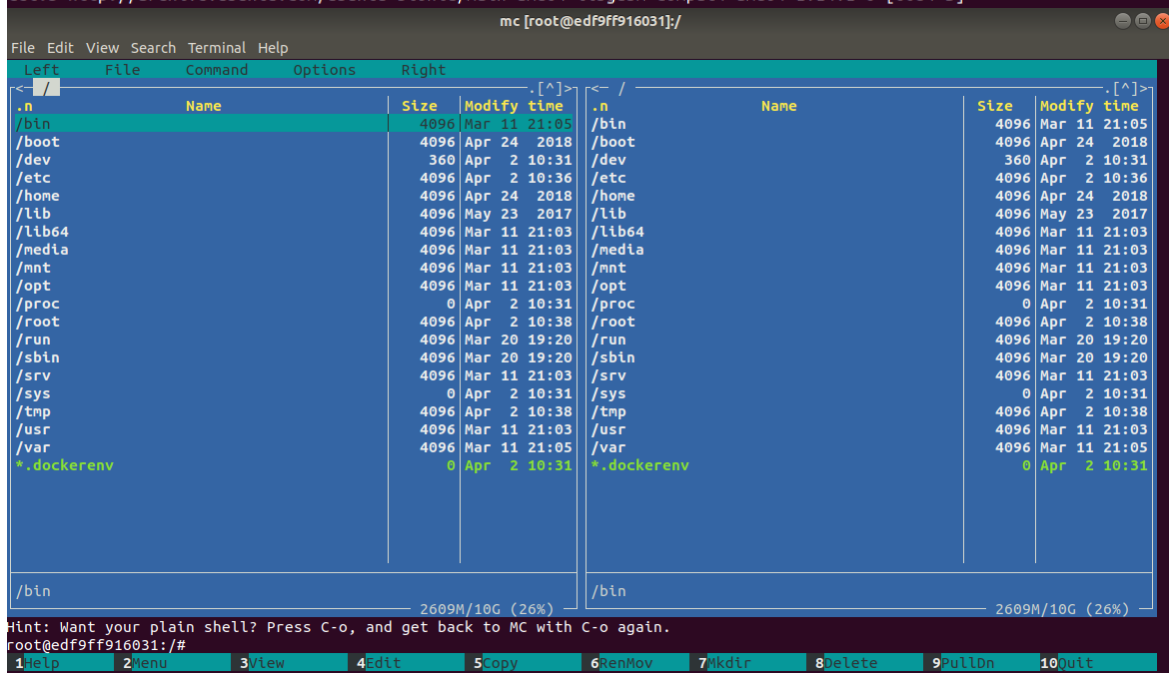
```

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

```

root@edf9ff916031:/# apt install mc
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 libss
h2-1 libxnl2 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 o
dt2txt 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 libss
h2-1 libxnl2 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 5.26.1-6ubuntu0.3 [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).

С хоста в контейнер:

```
maria@maria-VirtualBox:~$ sudo docker ps
CONTAINER ID   IMAGE      COMMAND                  CREATED
STATUS        PORTS     NAMES
8c138aa47772   ubuntu    "/bin/bash"             5 minutes ago
Up 5 minutes   brave_shamir
maria@maria-VirtualBox:~$ sudo docker cp 'NanofileMaria' 8c138aa47772:/Nano2
maria@maria-VirtualBox:~$
```

```
root@8c138aa47772:/# ls
Nano2  boot  etc  lib  media  opt  root  sbin  sys  usr
bin    dev  home  lib64  mnt  proc  run  srv  tmp  var
root@8c138aa47772:/# cat Nano2
Hello, its me.
root@8c138aa47772:/#
```

С контейнера на хост:

```
maria@maria-VirtualBox:~$ sudo docker cp 8c138aa47772:/Nano2 Nanoback.txt
maria@maria-VirtualBox:~$ ls
Desktop    Downloads    Nanoback.txt    Pictures    Videos
documents  examples.desktop  NanofileMaria    Public
Documents  Music        NanofileMariaBack  Templates
maria@maria-VirtualBox:~$ cat Nanoback.txt
Hello, its me.
maria@maria-VirtualBox:~$
```

8. Прочитать документацию и кратко описать основные 7 команд Dockerfile

- 1) rm – удаляет один или несколько контейнеров: `docker rm [имя контейнера или его id]`
 - 2) pull – позволяет загрузить образ из репозитория на компьютер: `docker pull [название образа]`
 - 3) push – позволяет выгрузить образ в репозиторий. `docker push [название образа]`. При этом предварительно надо зайти в Docker Hub.
 - 4) commit – создает новый образ из измененного контейнера. `docker commit -m "какие изменения были внесены" -a "имя автора" id_контейнера репозиторий/новое_имя_образа`
 - 5) build – создает образ из Dockerfile. `docker build [опции] путь | ссылка | -`
- Например: `$ docker build github.com/creack/docker-firefox`
- 6) exec – запускает команду в запущенном контейнере. `docker exec [опции] команда [аргументы...]`
 - 7) top – отображает запущенные в контейнере процессы. `docker top контейнер`

Работа с Kubernetes в Ubuntu

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

1. Установить microk8s (screenshot)

```
maria@maria-VirtualBox:~$ sudo snap install microk8s --classic
microk8s v1.18.0 from Canonical✓ installed
maria@maria-VirtualBox:~$
```

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

```
maria@maria-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
maria@maria-VirtualBox:~$
```

```
maria@maria-VirtualBox:~$ sudo microk8s.kubectl get services
[sudo] password for maria:
NAME          TYPE          CLUSTER-IP    EXTERNAL-IP    PORT(S)    AGE
kubernetes    ClusterIP     10.152.183.1  <none>         443/TCP    29m
maria@maria-VirtualBox:~$
```

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

```
maria@maria-VirtualBox:~$ sudo docker images
REPOSITORY    TAG          IMAGE ID          CREATED
SIZE
ubuntu        latest      4e5021d210f6      12 days ago
64.2MB
maria@maria-VirtualBox:~$ sudo docker save ubuntu > ubuntu.tar
maria@maria-VirtualBox:~$
```

4. Импортируйте образ в Kubernetes (screenshot)

```
maria@maria-VirtualBox:~$ sudo microk8s ctr image import ubuntu.tar
unpacking docker.io/library/ubuntu:latest (sha256:6867deccdd432c925dfcf1f265443d
878079f790f34bfa428116e955328cd9dc)...done
maria@maria-VirtualBox:~$
```

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

```
maria@maria-VirtualBox:~$ sudo microk8s kubectl get pods
NAME    READY    STATUS    RESTARTS    AGE
boxx    1/1      Running    0            14s
```



```

maria@maria-VirtualBox:~$ sudo microk8s kubectl describe pod boxx
Name:          boxx
Namespace:     default
Priority:       0
Node:          maria-virtualbox/10.0.2.15
Start Time:    Thu, 02 Apr 2020 20:14:07 +0300
Labels:        run=boxx
Annotations:    <none>
Status:        Running
IP:            10.1.21.7
IPs:
  IP: 10.1.21.7
Containers:
  boxx:
    Container ID:  containerd://671e0831e65ec2d1e3843cf088d7072573803a8626852442292e7526b2b4a91c
    Image:         docker.io/coredns/coredns:1.6.6
    Image ID:      docker.io/coredns/coredns@sha256:41bee6992c2ed0f4628fcef75751048927bcd6b1cee89c79f6acb63ca5474d5a
    Port:          <none>
    Host Port:     <none>
    State:         Running
      Started:     Thu, 02 Apr 2020 20:14:13 +0300
    Ready:         True
    Restart Count:  0
    Environment:   <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from default-token-p5rxs (ro)
Conditions:
  Type             Status
  Initialized       True
  Ready            True
  ContainersReady  True
  PodScheduled     True
Volumes:
  default-token-p5rxs:
    Type:          Secret (a volume populated by a Secret)
    SecretName:    default-token-p5rxs
    Optional:      false
QoS Class:        BestEffort
Node-Selectors:   <none>
Tolerations:      node.kubernetes.io/not-ready:NoExecute for 300s
                  node.kubernetes.io/unreachable:NoExecute for 300s
Events:
  Type     Reason      Age   From                      Message
  ----     -
  Normal   Scheduled   11m   default-scheduler         Successfully assigned default/boxx to maria-virtualbox
  Normal   Pulled      11m   kubelet, maria-virtualbox Container image "docker.io/coredns/coredns:1.6.6" already present on machine
  Normal   Created     11m   kubelet, maria-virtualbox Created container boxx
  Normal   Started     11m   kubelet, maria-virtualbox Started container boxx

```