EPAM University Programs

DevOps external course

Module 2 Virtualization and Cloud Basic

TASK 2.4
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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)

2. Запустить lxc launch для любой из версий Убунту (screenshot)
   CentOS в данном кейсе запустил + убунту

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

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

```
[afofanov@a24-dockersrv ~]$ lxc exec ubuntu18 -- /bin/bash
root@ubuntu18:~#
```

5. Запустите обновление apt-get update (screenshot)

```
root@ubuntu18:~# apt-get update
Hit:1 http://archive.ubuntu.com/ubuntu bionic InRelease
Get:2 http://archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:3 http://archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Get:4 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Get:5 http://security.ubuntu.com/ubuntu bionic-security/main amd64 Packages [677 kB]
Get:6 http://security.ubuntu.com/ubuntu bionic-security/main Translation-en [218 kB]
Get:7 http://security.ubuntu.com/ubuntu bionic-security/restricted amd64 Packages [28
Get:8 http://security.ubuntu.com/ubuntu bionic-security/restricted Translation-en [75
Get:9 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 Packages [653
Get:10 http://security.ubuntu.com/ubuntu bionic-security/universe Translation-en [21
Get:11 http://archive.ubuntu.com/ubuntu bionic/universe amd64 Packages [8570 kB]
Get:12 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 Packages [
Get:13 http://security.ubuntu.com/ubuntu bionic-security/multiverse Translation-en [
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 [902 kB]
Get:18 http://archive.ubuntu.com/ubuntu bionic-updates/main Translation-en [311 kB]
Get:19 http://archive.ubuntu.com/ubuntu bionic-updates/restricted amd64 Packages [39
Get:20 http://archive.ubuntu.com/ubuntu bionic-updates/restricted Translation-en [10
Get:21 http://archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packages [1061
Get:22 http://archive.ubuntu.com/ubuntu bionic-updates/universe Translation-en [329
Get:23 http://archive.ubuntu.com/ubuntu bionic-updates/multiverse amd64 Packages [10
Get:24 http://archive.ubuntu.com/ubuntu bionic-updates/multiverse Translation-en [469
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 [402
Get:28 http://archive.ubuntu.com/ubuntu bionic-backports/universe Translation-en [190
Fetched 18.5 MB in 9s (2113 kB/s)
Reading package lists... Done
root@ubuntu18:~#
```

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

```
root@ubuntu18:~# apt install mc
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:
  libssh2-1 mc-data unzip
Suggested packages:
  arj catdvi | texlive-binaries dbview djvulibre-bin genisoimage gv imagemagick libaspell-dev links | w3m | lynx odt2txt p
The following NEW packages will be installed:
  libssh2-1 mc mc-data unzip
0 upgraded, 4 newly installed, 0 to remove and 26 not upgraded.
Need to get 1952 kB of archives.
After this operation, 8099 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu bionic/universe amd64 libssh2-1 amd64 1.8.0-1 [73.2 kB]
Get:2 http://archive.ubuntu.com/ubuntu bionic/universe amd64 mc-data all 3:4.8.19-1 [1238 kB]
Get:3 http://archive.ubuntu.com/ubuntu bionic/universe amd64 mc amd64 3:4.8.19-1 [474 kB]
Get:4 http://archive.ubuntu.com/ubuntu bionic/main amd64 unzip amd64 6.0-21ubuntu1 [167 kB]
Fetched 1952 kB in 1s (1449 kB/s)
Selecting previously unselected package libssh2-1:amd64.
(Reading database ... 28688 files and directories currently installed.)
Preparing to unpack .../libssh2-1_1.8.0-1_amd64.deb ...
Unpacking libssh2-1:amd64 (1.8.0-1) ...
Selecting previously unselected package mc-data.
Preparing to unpack .../mc-data_3%3a4.8.19-1_all.deb ...
Unpacking mc-data (3:4.8.19-1) ...
Selecting previously unselected package mc.
Preparing to unpack .../mc_3%3a4.8.19-1_amd64.deb ...
Unpacking mc (3:4.8.19-1) ...
Selecting previously unselected package unzip.
Preparing to unpack .../unzip_6.0-21ubuntu1_amd64.deb ...
Unpacking unzip (6.0-21ubuntu1) ...
Setting up mc-data (3:4.8.19-1) ...
Setting up unzip (6.0-21ubuntu1) ...
Setting up libssh2-1:amd64 (1.8.0-1) ...
Setting up mc (3:4.8.19-1) ...
Processing triggers for mime-support (3.60ubuntu1) ...
Processing triggers for libc-bin (2.27-3ubuntu1) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
root@ubuntu18:~#
```

7. Загрузите в контейнер файл (screenshot) и скачайте с контейнера другой файл (screenshot).
7.1

```
[root@a24-dockersrv home]# lxc file push /home/afofanov.txt ubuntu18/home/
[root@a24-dockersrv home]#
```

```
drwxr-xr-x 1 root    root     12 Apr  6 14:39 ./
drwxr-xr-x 1 root    root    140 Mar 17 15:53 ../
drwxr-xr-x 1 ubuntu  ubuntu   62 Apr  6 14:39 ubuntu/
root@ubuntu18:/home# ll
total 4
drwxr-xr-x 1 root    root     36 Apr  6 14:59 ./
drwxr-xr-x 1 root    root    140 Mar 17 15:53 ../
-rw-r--r-- 1 root    root      6 Apr  6 14:59 afofanov.txt
drwxr-xr-x 1 ubuntu  ubuntu   62 Apr  6 14:39 ubuntu/
root@ubuntu18:/home#
```
7.2

```
drwxr-xr-x 1 root    root     64 Apr  6 15:01 ./
drwxr-xr-x 1 root    root    140 Mar 17 15:53 ../
-rw-r--r-- 1 root    root      6 Apr  6 14:59 afofanov.txt
-rw-r--r-- 1 root    root      0 Apr  6 15:01 filetohost.txt
drwxr-xr-x 1 ubuntu  ubuntu   62 Apr  6 14:39 ubuntu/
root@ubuntu18:/home#
```

7.3

7.4

```
[root@a24-dockersrv afofanov]# lxc file pull ubuntu18/home/filetohost.txt home/
```
/

7.5

```
drwx------. 9 afofanov   afofanov   4096 Apr  6 18:03 afofanov
-rw-r--r--  1 root       root          6 Apr  6 17:56 afofanov.txt
drwxr-xr-x  8 root       root       4096 Mar 13 17:03 bitrix
drwxr-xr-x  4 root       root       4096 Mar 12 16:26 docker
-rw-r--r--  1 root       root          0 Apr  6 18:06 filetohost.txt
drwx------. 2 sbogomolov sbogomolov 4096 Feb  6 15:39 sbogomolov
drwx------  5 sol        sol        4096 Feb 13 16:54 sol
[root@a24-dockersrv home]#
```

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)
```
[root@a24-dockersrv home]# docker -v
Docker version 19.03.5, build 633a0ea
```

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

```
[root@a24-dockersrv home]# docker search ubuntu
NAME                         DESCRIPTION                              STARS
ubuntu                       Ubuntu is a Debian-based Linux operating sys…  10718
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
ansible/ubuntu14.04-ansible  Ubuntu 14.04 LTS with ansible            98
neurodebian                  NeuroDebian provides neuroscience research s…  68
```

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

```
[root@a24-dockersrv home]# 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)

```
[root@a24-dockersrv home]# docker images
REPOSITORY            TAG         IMAGE ID        CREATED         SIZ
ubuntu                latest      4e5021d210f6    2 weeks  ago    64.
a24                   1           3e20ce767658    3 weeks  ago    960
grafana/grafana       latest      0909c1dd3202    3 weeks  ago    233
percona/pmm-server    latest      ada7dbc5a8bc    2 months ago    1.1
memcached             1.5-alpine  319607c5f2b0    4 months ago    9.0
centos                7           5e35e350aded    4 months ago    203
```

5. Запустите обновление apt-get update (screenshot)

```
[root@a24-dockersrv home]# docker run -ti ubuntu
root@ebb9f96334e6:/# apt update
Get:1 http://archive.ubuntu.com/ubuntu bionic InRelease [242 kB]
Get:2 http://archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:3 http://archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Get:4 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Get:5 http://archive.ubuntu.com/ubuntu bionic/universe amd64 Packages [11.3 MB]
Get:6 http://security.ubuntu.com/ubuntu bionic-security/main amd64 Packages [870 kB]
Get:7 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 Packages [7
Get:8 http://security.ubuntu.com/ubuntu bionic-security/restricted amd64 Packages [3
Get:9 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 Packages [835
Get:10 http://archive.ubuntu.com/ubuntu bionic/main amd64 Packages [1344 kB]
Get:11 http://archive.ubuntu.com/ubuntu bionic/multiverse amd64 Packages [186 kB]
Get:12 http://archive.ubuntu.com/ubuntu bionic/restricted amd64 Packages [13.5 kB]
Get:13 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages [1167 kB]
Get:14 http://archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packages [1367
Get:15 http://archive.ubuntu.com/ubuntu bionic-updates/multiverse amd64 Packages [12
Get:16 http://archive.ubuntu.com/ubuntu bionic-updates/restricted amd64 Packages [53
Get:17 http://archive.ubuntu.com/ubuntu bionic-backports/universe amd64 Packages [42
Get:18 http://archive.ubuntu.com/ubuntu bionic-backports/main amd64 Packages [2496 B
Fetched 17.7 MB in 6s (2935 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@ebb9f96334e6:/#
```

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

```
root@ebb9f96334e6:/# apt install mc
Reading package lists... Done
Building dependency tree
Reading state information... Done
mc is already the newest version (3:4.8.19-1).
0 upgraded, 0 newly installed, 0 to remove and 12 not upgraded.
```

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

```
[root@a24-dockersrv home]# docker cp /home/afofanov/home/filetodockercontainet.txt e
```

```
root@ebb9f96334e6:/home# ll
total 8
drwxr-xr-x 1 root root 4096 Apr  6 15:39 ./
drwxr-xr-x 1 root root 4096 Apr  6 15:21 ../
-rw-r--r-- 1 root root    0 Apr  6 15:39 afofanovtohost.txt
```

```
root@ebb9f96334e6:/home# ll
total 8
drwxr-xr-x 1 root root 4096 Apr  6 15:43 ./
drwxr-xr-x 1 root root 4096 Apr  6 15:43 ../
-rw-r--r-- 1 root root    0 Apr  6 15:39 afofanovtohost.txt
-rw-r--r-- 1 root root    0 Apr  6 15:03 filetodockercontainet.txt
root@ebb9f96334e6:/home#
```

8. Прочитать документацию и кратко описать основные 7 команд Dockerfile
   FROM, RUN, ENV, COPY, EXPOSE, CMD, WORKDIR

Работа с Kubernetes в Ubuntu

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

1. Установить microk8s (screenshot)

```
[root@a24-dockersrv afofanov]# microk8s status --wait-ready
microk8s is running
```

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

```
[root@a24-dockersrv afofanov]#
[root@a24-dockersrv afofanov]# microk8s kubectl get nodes
NAME                         STATUS   ROLES    AGE     VERSION
a24-dockersrv.office.badm.com   Ready    <none>   2m30s   v1.16.8
```

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

```
[root@a24-dockersrv a24]# docker images
REPOSITORY          TAG         IMAGE ID        CREATED
grafana/grafana     latest      0909c1dd3202    3 weeks ago
percona/pmm-server  latest      ada7dbc5a8bc    2 months ago
centos              7           5e35e350aded    4 months ago
     response from daemon: No such container: 5e35e350aded
[root@a24-dockersrv a24]# docker save -o centos.tar centos
[root@a24-dockersrv a24]# ll
total 206244
-rw------- 1 root root 211182080 Apr  6 19:51 centos.tar
```

4. Импортируйте образ в Kubernetes (screenshot)

```
[root@a24-dockersrv a24]# microk8s.ctr image import centos.tar
unpacking docker.io/library/centos:7 (sha256:3860b4960219fd74536346908a7e8b5f9208
[root@a24-dockersrv a24]# microk8s ctr images ls
REF                                                                TYPE                                          DIGES
TFORMS  LABELS
docker.io/library/centos:7                                         application/vnd.oci.image.manifest.v1+json sha256
ux/amd64 io.cri-containerd.image=managed
sha256:5e35e350aded98340bc8fcb0ba392d809c807bc3eb5c618d4a0674d98d88bccd application/vnd.oci.image.manifest.v1+json sha256
ux/amd64 io.cri-containerd.image=managed
[root@a24-dockersrv a24]#
```

||

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

```
[root@a24-dockersrv a24]# kubectl create deployment centos --image=centos
deployment.apps/centos created
[root@a24-dockersrv a24]# kubectl get deployments
NAME      READY   UP-TO-DATE   AVAILABLE   AGE
centos    0/1     1            0           7s
nginx     0/1     1            0           97s
[root@a24-dockersrv a24]# kubectl get pods
NAME                      READY   STATUS         RESTARTS   AGE
centos-7866db48c-rstl7    0/1     Completed      2          36s
nginx-797956fc89-xmv22    0/1     ErrImagePull   0          2m6s
[root@a24-dockersrv a24]# kubectl get all --all-namespaces
NAMESPACE   NAME                          READY   STATUS         RESTARTS   AGE
default     pod/centos-7866db48c-rstl7    0/1     Completed      2          42s
default     pod/nginx-797956fc89-xmv22    0/1     ErrImagePull   0          2m12s

NAMESPACE   NAME                 TYPE        CLUSTER-IP     EXTERNAL-IP   PORT(S
default     service/kubernetes   ClusterIP   10.152.183.1   <none>        443/TC

NAMESPACE   NAME                        READY   UP-TO-DATE   AVAILABLE   AGE
default     deployment.apps/centos      0/1     1            0           42s
default     deployment.apps/nginx       0/1     1            0           2m12s

NAMESPACE   NAME                               DESIRED   CURRENT   READY   AGE
default     replicaset.apps/centos-7866db48c   1         1         0       42s
default     replicaset.apps/nginx-797956fc89   1         1         0       2m12s
[root@a24-dockersrv a24]#
```