

Docker

Task 1 Lecture 1

Install docker and check

```
[root@localhost ~]# docker -v
Docker version 20.10.21, build baedalf
[root@localhost ~]# systemctl status docker
● docker.service - Docker Application Container Engine
   Loaded: loaded (/usr/lib/systemd/system/docker.service; enabled; vendor preset: disabled)
   Active: active (running) since Fri 2022-12-09 14:37:40 MSK; 39s ago
     Docs: https://docs.docker.com
  Main PID: 31847 (dockerd)
    Tasks: 10
   Memory: 26.4M
    CGroup: /system.slice/docker.service
            └─31847 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock

Dec 09 14:37:37 localhost.localdomain dockerd[31847]: time="2022-12-09T14:37:37.525883233+03:00" level=info msg=...
Dec 09 14:37:37 localhost.localdomain dockerd[31847]: time="2022-12-09T14:37:37.525899588+03:00" level=info msg=...
Dec 09 14:37:39 localhost.localdomain dockerd[31847]: time="2022-12-09T14:37:39.747403562+03:00" level=info msg=...
Dec 09 14:37:40 localhost.localdomain dockerd[31847]: time="2022-12-09T14:37:40.573873110+03:00" level=info msg=...
Dec 09 14:37:40 localhost.localdomain dockerd[31847]: time="2022-12-09T14:37:40.745822267+03:00" level=info msg=...
Dec 09 14:37:40 localhost.localdomain dockerd[31847]: time="2022-12-09T14:37:40.866257339+03:00" level=info msg=...
Dec 09 14:37:40 localhost.localdomain dockerd[31847]: time="2022-12-09T14:37:40.886152184+03:00" level=info msg=...
Dec 09 14:37:40 localhost.localdomain dockerd[31847]: time="2022-12-09T14:37:40.886426116+03:00" level=info msg=...
Dec 09 14:37:40 localhost.localdomain systemd[1]: Started Docker Application Container Engine.
Dec 09 14:37:40 localhost.localdomain dockerd[31847]: time="2022-12-09T14:37:40.916172457+03:00" level=info msg=...
Hint: Some lines were ellipsized, use -l to show in full.
[root@localhost ~]#
```

dockerfile

FROM ubuntu:20.04

ENV TZ=Europe/Kiev

RUN apt-get update -y

RUN DEBIAN_FRONTEND="noninteractive" apt-get install -y apache2

RUN echo 'Hi there, what is it?' > /var/www/html/index.html

RUN echo 'It is a sone' >> /var/www/html/index.html

CMD ["/usr/sbin/apache2ctl", "-DFOREGROUND"]

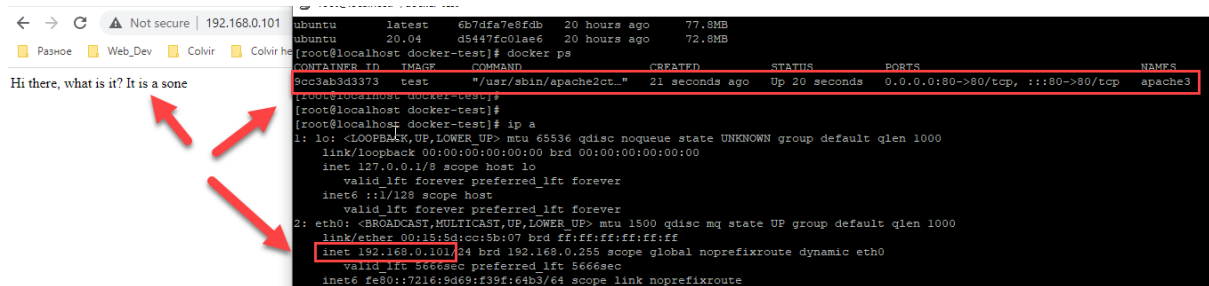
EXPOSE 80

create image

docker build -t test /root/docker-test/

```
REPOSITORY    TAG          IMAGE ID      CREATED      SIZE
<none>        <none>       a36866f89015 About an hour ago 72.8MB
ubuntu        20.04        d5447fc01ae6 13 hours ago 72.8MB
[root@localhost docker-test]#
[root@localhost docker-test]#
[root@localhost docker-test]#
```

docker run --name apache3 -p 80:80 -d test



docker exec -it apache3 /bin/bash

date

Fri Dec 9 23:49:56 EET 2022

```
[root@localhost docker-test]#
[root@localhost docker-test]# docker exec -it apache3 /bin/bash
root@9cc3ab3d3373:/# ip a
bash: ip: command not found
root@9cc3ab3d3373:/# pwd
bash: pwd: command not found
root@9cc3ab3d3373:/# pwd
/
root@9cc3ab3d3373:/# ls
bin  boot  dev  etc  home  lib  lib32  lib64  libx32  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr  var
root@9cc3ab3d3373:/# date
Fri Dec 9 23:49:56 EET 2022
root@9cc3ab3d3373:/#
```

Task 2 Lecture 2

help link:

<https://www.digitalocean.com/community/tutorials/how-to-build-and-deploy-a-flask-application-using-docker-on-ubuntu-18-04>

<https://www.digitalocean.com/community/tutorials/how-to-use-templates-in-a-flask-application>

nano Dockerfile

FROM tiangolo/uwsgi-nginx-flask:python3.6-alpine3.7

RUN apk --update add bash nano

ENV STATIC_URL /static

ENV STATIC_PATH /var/www/app/static

COPY ./requirements.txt /var/www/requirements.txt

RUN pip install -r /var/www/requirements.txt

nano main.py

from app import app

nano requirements.txt

Flask==1.0.2

#####

nano start.sh

#!/bin/bash

app="docker.test"

docker build -t \${app} .

docker run -d -p 56733:80 \

--name=\${app} \

-v \$PWD:/app \${app}

#####

nano uwsgi.ini

[uwsgi]

module = main

callable = app

master = true

#####

mkdir app

cd app

#####

nano __init__.py

from flask import Flask

app = Flask(__name__)

from app import views

#####

nano views.py

from app import app

from flask import render_template

import random

list of cat images

```
images = [  
  
"https://www.deviantart.com/favorisxp/art/Neon-Rider-x-SteelSeries-Live-Wallpaper-884137969",  
  
"https://wallpaper.mob.org/image/nature-doroga-derevya-sneg-gora-vers-hina-150657.html",  
  
"https://wallpaper.mob.org/image/nature-gora-vershina-zasnezhennii-oblaka-dolina_kkhumbu-namche-nepal-109549.html"  
]
```

```
@app.route('/')  
def home():  
    return "Hello world!"
```

```
@app.route('/template')  
def template():  
    url = random.choice(images)  
    return render_template('home.html', url=url)
```

```
#####
```

```
cd templates
```

```
nano home.html
```

```
<html>  
<head>  
<style type="text/css">  
body {  
background: black;  
color: green;  
}  
div.container {  
max-width: 500px;  
margin: 100px auto;  
border: 20px solid white;  
padding: 10px;
```

```

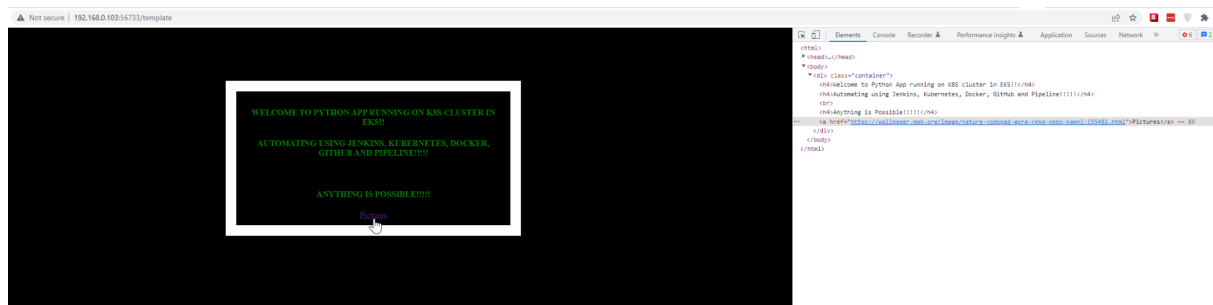
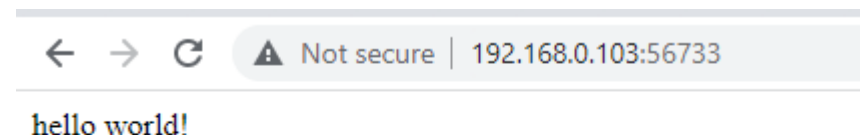
text-align: center;
}
h4 {
text-transform: uppercase;
}
</style>
</head>
<body>
<div class="container">
<h4>Welcome to Python App running on K8S cluster in EKS!!</h4>
<h4>Automating using Jenkins, Kubernetes, Docker, GitHub and
Pipeline!!!!</h4>
<br>
<h4>Anything is Possible!!!!</h4>
<a href={{ url }}>Pictures</a>
</div>
</body>

```

```

#####
docker start docker.test
docker stop docker.test
sudo docker stop docker.test && sudo docker start docker.test

```



docker login

```
[root@agent-2 TestApp]# docker login
Authenticating with existing credentials...
WARNING! Your password will be stored unencrypted in /root/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
[root@agent-2 TestApp]#
```

https://hub.docker.com/

Repositories Create

Using 0 of 1 private repositories. [Get more](#)

Create repository

test-app

for tests

Visibility

Using 0 of 1 private repositories. [Get more](#)

☒ Public Appears in Docker Hub search results

☐ Private Only visible to you

[Cancel](#) [Create](#)

Pro tip

You can push a new image to this repository using the CLI

```
docker tag local-image:tagname new-repo:tagname
docker push new-repo:tagname
```

Make sure to change tagname with your desired image repository tag.

docker tag docker.test nominonik/test

docker.test - existing image

nominonik - docker username

test - name image in docker hub

docker tag docker.test nominonik/test:latest

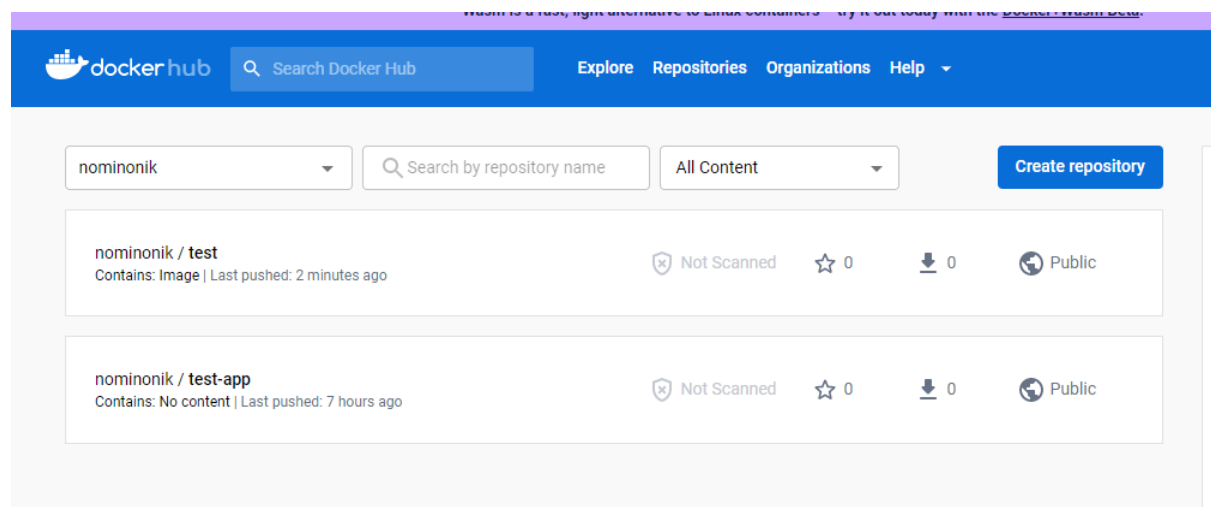
latest - default

```
[root@agent-2 TestApp]# docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
docker.test	latest	d9746cc7e2bc	23 hours ago	198MB
test-app	docker.test	d9746cc7e2bc	23 hours ago	198MB
nominonik/test	latest	d9746cc7e2bc	23 hours ago	198MB
tiangolo/uwsgi-nginx-flask	python3.6-alpine3.7	cdec3b0d8f20	2 years ago	189MB

docker push nominonik/test:latest

```
[root@agent-2 TestApp]# docker tag docker.test nominonik/test
[root@agent-2 TestApp]# docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
docker.test          latest              d9746cc7e2bc       23 hours ago       198MB
test-app             docker.test        d9746cc7e2bc       23 hours ago       198MB
nominonik/test       latest             d9746cc7e2bc       23 hours ago       198MB
tiangolo/uwsgi-nginx-flask  python3.6-alpine3.7 cdec3b0d8f20       2 years ago        189MB
[root@agent-2 TestApp]# docker push nominonik/test:latest
The push refers to repository [docker.io/nominonik/test]
bb95a4768086: Pushed
4ff201075a38: Pushed
8cbc58bfd226: Pushed
43af064e75cf: Mounted from tiangolo/uwsgi-nginx-flask
d8fbb3fcf0c3: Mounted from tiangolo/uwsgi-nginx-flask
fa8d13c8857c: Mounted from tiangolo/uwsgi-nginx-flask
7eb1bd306f96: Mounted from tiangolo/uwsgi-nginx-flask
c590d120099d: Mounted from tiangolo/uwsgi-nginx-flask
0f012e3a82af: Mounted from tiangolo/uwsgi-nginx-flask
931d5d66ea02: Mounted from tiangolo/uwsgi-nginx-flask
18f5239c5171: Mounted from tiangolo/uwsgi-nginx-flask
162b81cbe949: Mounted from tiangolo/uwsgi-nginx-flask
b3940a09f534: Mounted from tiangolo/uwsgi-nginx-flask
e56f89dab92c: Mounted from tiangolo/uwsgi-nginx-flask
da8f3a173da: Mounted from tiangolo/uwsgi-nginx-flask
83ee2076ff77: Mounted from tiangolo/uwsgi-nginx-flask
bec3ecd7622d: Mounted from tiangolo/uwsgi-nginx-flask
7d83efed6188: Mounted from tiangolo/uwsgi-nginx-flask
f001031d5ef8: Mounted from tiangolo/uwsgi-nginx-flask
b15402eeb9fb: Mounted from tiangolo/uwsgi-nginx-flask
9c2123bd22f4: Mounted from tiangolo/uwsgi-nginx-flask
alle869e648d: Mounted from tiangolo/uwsgi-nginx-flask
50f8b07e9421: Mounted from tiangolo/uwsgi-nginx-flask
629164d914fc: Mounted from tiangolo/uwsgi-nginx-flask
```



The screenshot shows the Docker Hub web interface. At the top is a navigation bar with the Docker Hub logo, a search bar, and links for Explore, Repositories, Organizations, and Help. Below the navigation bar is a search filter section with a dropdown menu set to 'nominonik', a search bar with the text 'Search by repository name', a dropdown menu set to 'All Content', and a 'Create repository' button. The main content area displays a list of repositories. The first repository is 'nominonik / test', which contains an image and was last pushed 2 minutes ago. It has a 'Not Scanned' status, 0 stars, 0 downloads, and is public. The second repository is 'nominonik / test-app', which contains no content and was last pushed 7 hours ago. It also has a 'Not Scanned' status, 0 stars, 0 downloads, and is public.

```
docker rm -f $(docker ps -a -q)
docker rmi -f $(docker images -q)
```

Pull image from docker Hub

```
docker run -d -p 5000:5000 nominonik/test:latest
```

```

[root@agent-2 TestApp]#
[root@agent-2 TestApp]# docker run -d -p 5000:5000 nominonik/test:latest
Unable to find image 'nominonik/test:latest' locally
latest: Pulling from nominonik/test
48ecbb6b270e: Pull complete
692f29ee68fa: Pull complete
f75fc7ac1098: Pull complete
c30e40bb471c: Pull complete
61a8cc25b36b: Pull complete
074ffb62a7a7: Pull complete
4adfla1570c9: Pull complete
b85c5544f47f: Pull complete
4b692052c830: Pull complete
6c397707523a: Pull complete
8f024010f4fc: Pull complete
71a2c0a6f4c0: Pull complete
84153fe0f140: Pull complete
2f415e7b7d03: Pull complete
861b676195c0: Pull complete
7a0bf11a12e0: Pull complete
89035b694307: Pull complete
b99491632f33: Pull complete
662bd63da354: Pull complete
270a925c68d3: Pull complete
e2a1178babal: Pull complete
a6c76d783525: Pull complete
acf53c994bd1: Pull complete
8798f540edfd: Pull complete
Digest: sha256:d51d4453675cfee61fa336c0e2d3f5697014d9333907f4a021f59427cceded3c
Status: Downloaded newer image for nominonik/test:latest
b5ad384f72f7a9146d8d00b2ba0ff890ce389d7df24283eeac3093df79c2a074
[root@agent-2 TestApp]#

```

Task 3 Lecture 3

```

curl -SL
https://github.com/docker/compose/releases/download/v2.6.1
/docker-compose-linux-x86_64 -o
/usr/local/bin/docker-compose
ln -s /usr/local/bin/docker-compose
/usr/bin/docker-compose
chmod +x /usr/local/bin/docker-compose
docker-compose -v

```

Docker Compose version v2.6.1

nano docker-compose.yml:

version: '3'

services:

Database

db:

image: mysql:5.7

volumes:

- db_data:/var/lib/mysql

restart: always

environment:

MYSQL_ROOT_PASSWORD: password

MYSQL_DATABASE: wordpress

MYSQL_USER: wordpress

MYSQL_PASSWORD: wordpress

Wordpress

wordpress:

depends_on:

- db

image: wordpress:latest

ports:

- '8000:80'

restart: always

volumes: ['./var/www/html']

environment:

WORDPRESS_DB_HOST: db:3306

WORDPRESS_DB_USER: wordpress

WORDPRESS_DB_PASSWORD: wordpress

volumes:

db_data:

docker-compose up -d

ports:

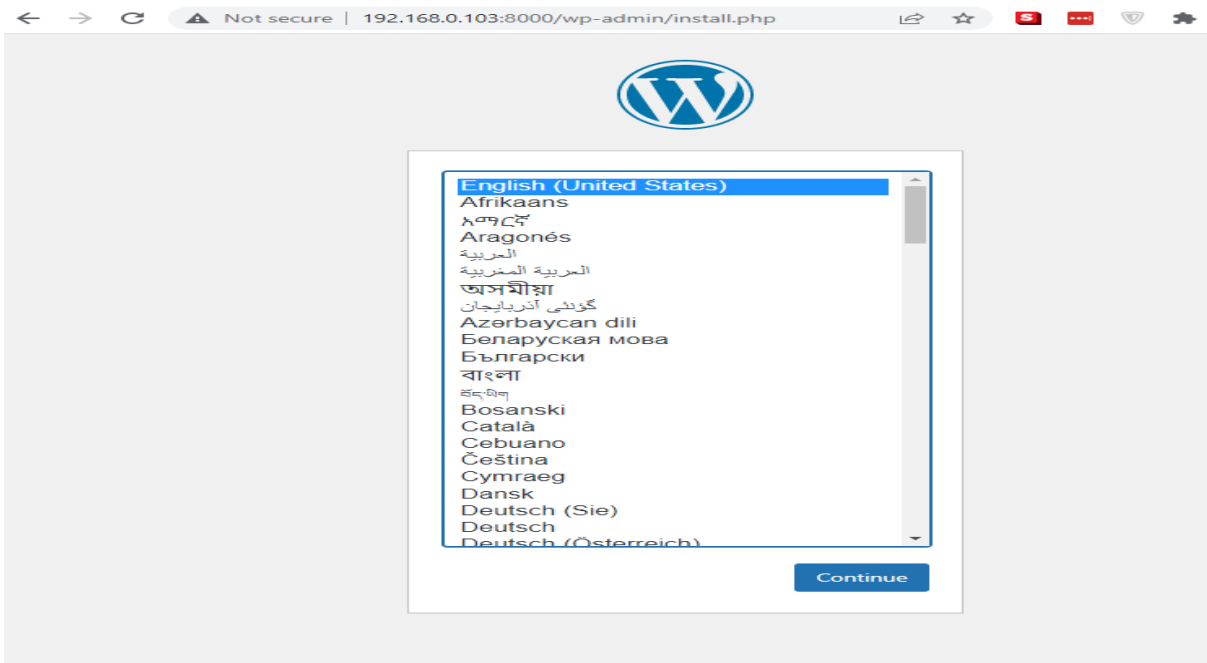
- '8000:80'

8000 - port VM

80 - port in docker

```
root@agent-2:~/mysql
services.mysql Additional property wordpress is not allowed
[root@agent-2 mysql]# nano docker-compose.yml
[root@agent-2 mysql]# docker-compose up -d
services.db Additional property wordpress is not allowed
[root@agent-2 mysql]# docker-compose up -d
[root@agent-2 mysql]# nano docker-compose.yml
[root@agent-2 mysql]# docker-compose up -d
services.db Additional property wordpress is not allowed
[root@agent-2 mysql]# nano docker-compose.yml
[root@agent-2 mysql]# docker-compose up -d
[*] Running 0/34
┌ wordpress Pulling
└─ d 025c56f98b67 Waiting 5.9s
└─ d db4ab4019a6f Waiting 3.4s
└─ d 19c3d46c565a Waiting 3.4s
└─ d 7d52c3b9728a Waiting 3.4s
└─ d 075f56345c53 Waiting 3.4s
└─ d 84f1e4bf9884 Waiting 3.4s
└─ d 33c195cea794 Waiting 3.4s
└─ d 23c53708753b Waiting 3.4s
└─ d 3bba2691b9ce Waiting 3.4s
└─ d
└─ f 28e5d9f2c72e Waiting 3.3s
└─ f afd79f595c00 Waiting 3.3s
└─ f c7699d0147ec Waiting 3.3s
└─ f 1ca504b60cdf8 Waiting 3.3s
└─ f 0fe9ebf0f00e Waiting 3.3s
└─ f 1a97859a7b0e Waiting 3.3s
└─ f adf5a5a72aa6 Waiting 3.3s
└─ f e79a82e9f5f1 Waiting 3.3s
└─ f 5d47d3a005c5 Waiting 3.3s
└─ f 42c3f370ad79 Waiting 3.3s
└─ f ceb026853b0c Waiting 3.3s
└─ f
└─ i db Pulling
└─ i d26998a7c52d Downloading [=====] 23.78MB/49.82MB 3.4s
└─ i 4a8d8a3567e3 Download complete 3.4s
└─ i bfe1f0f345e Download complete 3.4s
└─ i 71ff8dfb9b12 Download complete 3.4s
└─ i bf56cbebc916 Download complete 3.4s
└─ i 2e74fe5e37d7 Download complete 3.4s
└─ i 711a06e512da Downloading [=====] 1.829MB/25.53MB 3.4s
└─ i 3288d6e4e9e Download complete 3.4s
└─ i 49271f2d6d15 Waiting 3.4s
└─ i f782f6ca69c Waiting 3.4s
└─ i 701dea355e91 Waiting 3.4s
```

```
[root@agent-2 mysql]# docker ps
CONTAINER ID    IMAGE                COMMAND              CREATED
STATUS         PORTS              NAMES
2a42150d4284   wordpress:latest    "docker-entrypoint.s..." 3 minutes
ago           Up 2 minutes      0.0.0.0:8000->80/tcp, :::8000->80/tcp
mysql-wordpress-1
2da220dd38ff   mysql:5.7           "docker-entrypoint.s..." 3 minutes
ago           Up 2 minutes      3306/tcp, 33060/tcp      mysql-db-1
[root@agent-2 mysql]#
```




/var/lib/mysql - inside docker vm

```
[root@agent-2 mysql]# docker exec -it mysql-db-1 /bin/bash
bash-4.2# pwd
/
bash-4.2# ls
adm  cache  db  empty  games  gopher  kerberos  lib  local  lock  log  mail  nis  opt  preserve  run  spool  tmp  yp
bash-4.2# ls var/lib/
alternatives  games  misc  mysql  mysql-files  mysql-keyring  rpm  rpm-state  supportinfo  yum
bash-4.2# ls var/lib/mysql
auto.cnf  ca.pem  client-key.pem  ib_logfile0  ibdata1  mysql  performance_schema  public_key.pem  server-key.pem  wordpress
ca-key.pem  client-cert.pem  ib_buffer_pool  ib_logfile1  ibtmp1  mysql.sock  private_key.pem  server-cert.pem  sys
bash-4.2#
```

volume on host VM

/var/lib/docker/volumes/mysql_db_data/_data

/var/lib/docker/volumes/mysql_db_data/_data/*.*		
Имя	Размер	Изменено
		18.12.2022 16:35:24
mysql		18.12.2022 16:35:26
performance_schema		18.12.2022 16:35:26
sys		18.12.2022 16:35:26
wordpress		18.12.2022 16:35:31
auto.cnf	1 KB	18.12.2022 16:35:26
ca.pem	2 KB	18.12.2022 16:35:26
ca-key.pem	2 KB	18.12.2022 16:35:26
client-cert.pem	2 KB	18.12.2022 16:35:26
client-key.pem	2 KB	18.12.2022 16:35:26
ib_buffer_pool	2 KB	18.12.2022 16:35:31
ib_logfile0	49 152 KB	18.12.2022 16:35:35
ib_logfile1	49 152 KB	18.12.2022 16:35:25
ibdata1	77 824 KB	18.12.2022 16:35:35
ibtmp1	12 288 KB	18.12.2022 16:41:15
mysql.sock	1 KB	18.12.2022 16:35:30
private_key.pem	2 KB	18.12.2022 16:35:26
public_key.pem	1 KB	18.12.2022 16:35:26
server-cert.pem	2 KB	18.12.2022 16:35:26
server-key.pem	2 KB	18.12.2022 16:35:26

install pgAdmin

nano docker-compose-pg.yml:

version: "3.7"

services:

pgadmin:

image: dpage/pgadmin4

container_name: pgadmin

environment:

PGADMIN_DEFAULT_EMAIL: sys@colvir.ru

PGADMIN_DEFAULT_PASSWORD: sys

PGADMIN_LISTEN_PORT: 8080

restart: always

ports:

- "8080:8080"

volumes:

- pgadmin:/var/lib/pgadmin

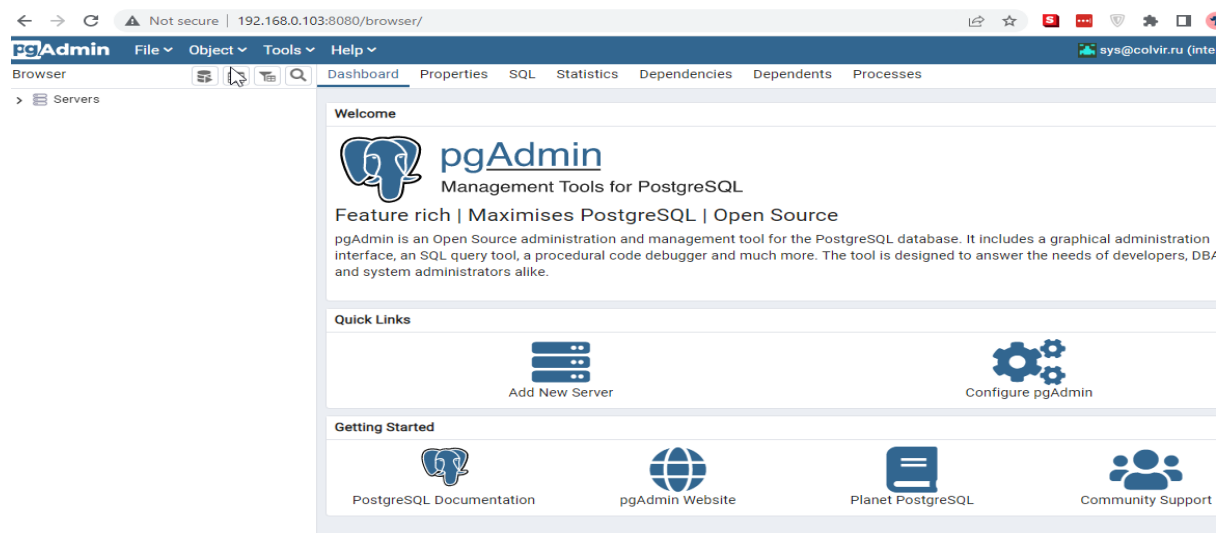
volumes:

pgdata:


pgadmin:

```
root@agent-2 pgadmin]# docker-compose -f docker-compose-pg.yml up -d
+J Running 1/15
: pgadmin Pulling
: ca78dd9ec2235 Pull complete
: 239c7c08c598 Downloading [=====>] 35.49MB/53.18MB
: 96528202a796 Download complete
: 352eac98d4d0 Download complete
: 496dff0917f8 Download complete
: 1669cc6c32bc Download complete
: 37eb4951c967 Downloading [=====>] 8.096MB/8.586MB
: 2ec496e62b97 Downloading [=====>] 4.34MB/21.85MB
: 3376692967d7 Waiting
: 86881266b9c2 Waiting
: 3b35cc859e08 Waiting
: b613bbab0161 Waiting
: ad91e12622a9 Waiting
: 8e80feca838b Waiting
```

docker-compose -f docker-compose-pg.yml up -d



`/var/lib/docker/volumes/pgadmin_pgadmin/_data`

/var/lib/docker/volumes/pgadmin_pgadmin/_data/		
Имя	Размер	Изменено
		18.12.2022 16:55:44
azurecredentialcache		18.12.2022 16:55:48
sessions		18.12.2022 16:58:38
storage		18.12.2022 16:55:48
pgadmin4.db	164 KB	18.12.2022 16:58:44