

МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РФ

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«Национальный исследовательский университет ИТМО»

**Факультет программной инженерии и компьютерной техники**

## **Лабораторная работа №3.1**

по дисциплине

“Технологии виртуализации”

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# Задача

Ознакомиться с функционалом создания контейнеров в Docker

## Ход работы

## Docker

```
glados@GLaDOS:~/Desktop/University/University/ITM0_4/autmn/VirtualizationTechnologies/lab4$ ./scripts/docker-init.sh
Проверяю, установлен ли докер
docker --version
Docker version 28.4.0, build d8eb465
Docker установлен. Ну или ты меня хорошо обманываешь T_T
Запускаю hello-контейнер
docker run --name hello_delete_me hello-world

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
1. The Docker client contacted the Docker daemon.
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
   (amd64)
3. The Docker daemon created a new container from that image which runs the
   executable that produces the output you are currently reading.
4. The Docker daemon streamed that output to the Docker client, which sent it
   to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

For more examples and ideas, visit:
https://docs.docker.com/get-started/

Список контейнеров
docker container ls --all

```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
1fa113b28691	hello-world	"/hello"	Less than a second ago	Exited (0) Less than a second ago		hello_delete_me
edd09b2fc6e9	bsord/tetris	"/docker-entrypoint..."	9 hours ago	Exited (0) 9 hours ago		tetris
6341c8355af9	nginx:alpine	"/docker-entrypoint..."	9 hours ago	Exited (0) 9 hours ago		nextcloud_web
cb3a6354c68e	nextcloud:latest	"/entrypoint.sh апас..."	9 hours ago	Exited (0) 9 hours ago		nextcloud_app
7807a6ee637a	mysql:latest	"/docker-entrypoint.s..."	9 hours ago	Exited (0) 9 hours ago		nextcloud_db
69c49f9fc22f	bamboo/phpvirtualbox:latest	"/bin/sh -c 'php82 /..."	10 hours ago	Exited (0) 10 hours ago		phpvirtualbox

```

Не знаю какой смысл запускать что бы то ни было из второго пункта лр - но вот
docker run Hello_Rumskiy
docker: invalid reference format: repository name (library/Hello_Rumskiy) must be lowercase

Run 'docker run --help' for more information
Перейти к запуску Apache(y/n)?
$
```

# Nginx

```
glados@GLaDOS:~/Desktop/University/University/ITMO_4/autmn/VirtualizationTechnologies/Lab4$ ./scripts/init-nginx.sh
Подготавливаем к запуску контейнер с nginx
    Создаю html файл
    file:///home/glados/Desktop/University/University/ITMO_4/autmn/VirtualizationTechnologies/Lab4/dockerfiles/nginx/index.html
    Собираю docker image для nginx2
Содержимое докер-файла:
FROM nginx:alpine

RUN mkdir -p /home/www/html

COPY index.html /home/www/html/

RUN echo 'server { \
    listen 80; \
    root /home/www/html; \
    index index.html; \
}' > /etc/nginx/conf.d/default.conf

EXPOSE 80
docker build --no-cache -t xoeqvdp/lab3-nginx
[+] Building 0.5s (9/9) FINISHED
=> [internal] load build definition from Dockerfile
=> == transferring dockerfile: 256B
=> [internal] load metadata for docker.io/library/nginx:alpine
=> [internal] load .dockerignore
=> == transferring context: 2B
=> CACHED [1/4] FROM docker.io/library/nginx:alpine
=> [internal] load build context
=> == transferring context: 116B
=> [2/4] RUN mkdir -p /home/www/html
=> [3/4] COPY index.html /home/www/html/
=> [4/4] RUN echo 'server { \
=> == exporting layers
=> == writing image sha256:d747a22dc18d668db7781b035c2f44a2a69e5398663fedd48f0c1e3d1523dc96
=> == naming to docker.io/xoeqvdp/lab3-nginx
Запускаю контейнер в фоне
docker run -d -p 8080:80 --name nginx-app xoeqvdp/lab3-nginx
318caad4d0acf09210b5df0a187283470b9346f2ab470ce504b3ead607394974
Проверить доступность
Тыкай на меня, давай. ДАВАЙ ЖЕ.
Перейти к запуску MariaDB(y/n)?
n
Ну и не надо Т.Т
glados@GLaDOS:~/Desktop/University/University/ITMO_4/autmn/VirtualizationTechnologies/Lab4$
```

← → ↺ http://localhost:8080

# Hello from nginx!

## Second name: Rumskiy

# MariaDB

```
glados@GLAD05:~/Desktop/University/University/ITMO_4/autnn/VirtualizationTechnologies/lab4$ ./scripts/init-mariadb.sh
Запуск контейнера с MariaDB
Содержимое докер-файла:
FROM mariadb:latest

ENV MYSQL_ROOT_PASSWORD=rootpass
ENV MYSQL_USER=labuser
ENV MYSQL_PASSWORD=userpass

WORKDIR /home/DB

COPY init.sql /docker-entrypoint-initdb.d/

EXPOSE 3306

Создаём изображение
docker build -t xoeqvdp/lab3-mariadb .
[+] Building 0.1s (8/8) FINISHED                                docker:default
=> [internal] load build definition from Dockerfile              0.0s
=> == transferring dockerfile: 228B                               0.0s
=> WARN: SecretsUsedInArgOrEnv: Do not use ARG or ENV instructions for sensitive data (ENV "MYSQL_ROOT_PASSWORD") (line 3)  0.0s
=> WARN: SecretsUsedInArgOrEnv: Do not use ARG or ENV instructions for sensitive data (ENV "MYSQL_PASSWORD") (line 5)    0.0s
=> [internal] load metadata for docker.io/library/mariadb:latest  0.0s
=> [internal] load .dockerignore                                  0.0s
=> == transferring context: 2B                                     0.0s
=> [1/3] FROM docker.io/library/mariadb:latest                  0.0s
=> [internal] load build context                                  0.0s
=> == transferring context: 30B                                    0.0s
=> CACHED [2/3] WORKDIR /home/DB                                0.0s
=> CACHED [3/3] COPY init.sql /docker-entrypoint-initdb.d/      0.0s
=> exporting to image                                           0.0s
=> == exporting layers                                           0.0s
=> == writing image sha256:7060f5bea4833c3675d634b2d7c8c6f49c6e8908bd6b1ab87c88444d957baa36 0.0s
=> == naming to docker.io/xoeqvdp/lab3-mariadb                  0.0s

2 warnings found (use docker --debug to expand):
- SecretsUsedInArgOrEnv: Do not use ARG or ENV instructions for sensitive data (ENV "MYSQL_ROOT_PASSWORD") (line 3)
- SecretsUsedInArgOrEnv: Do not use ARG or ENV instructions for sensitive data (ENV "MYSQL_PASSWORD") (line 5)
Создаём контейнер
docker run -d -p 3306:3306 --name mariadb-app xoeqvdp/lab3-mariadb
0e9f019978886e9eb3904f9846e37b84a8450f88fb2b2031a01e89a272c7ebf2
Для подключения к БД(пароль - rootpass):
docker exec -it mariadb-app mariadb -u root -p
glados@GLAD05:~/Desktop/University/University/ITMO_4/autnn/VirtualizationTechnologies/lab4$
```

```
glados@GLAD05:~/Desktop/University/University/ITMO_4/autnn/VirtualizationTechnologies/lab4$ docker exec -it mariadb-app mariadb -u root -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 3
Server version: 12.1.2-MariaDB-ubu2404 mariadb.org binary distribution

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

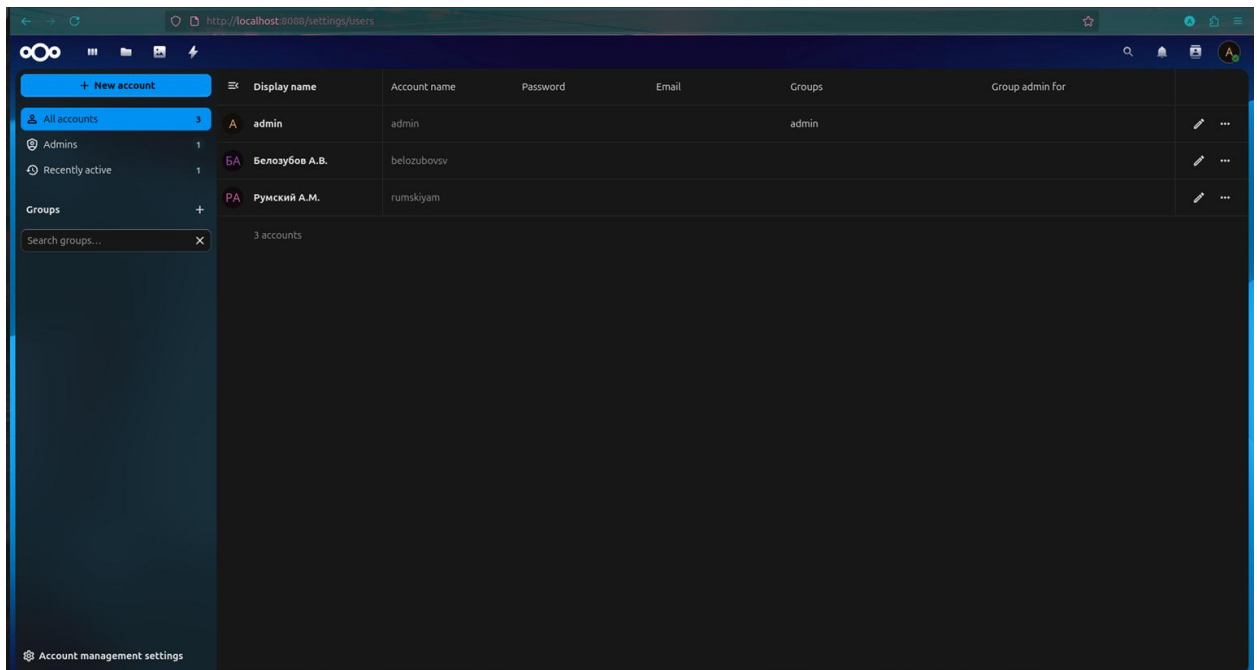
MariaDB [(none)]> use rumskiy;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [rumskiy]> select * from messages;
+-----+
| id | text |
+-----+
| 1 | hello |
| 2 | darkness |
| 3 | my |
| 4 | old |
| 5 | friend |
+-----+
5 rows in set (0.002 sec)
```

# NextCloud

```
glados@GLaDOS: ~/Desktop/University/University/ITMO_4/autmn/VirtualizationTechnologies/lab4$ ./scripts/init-nextCloud.sh
Запуск контейнера с NextCloud
Содержимое докер-файла:
version: '3.8'

services:
  nextcloud:
    image: nextcloud:latest
    ports:
      - "8088:80"
    volumes:
      - /home/www/NextCloud:/var/www/html
    environment:
      - NEXTCLOUD_ADMIN_USER=admin
      - NEXTCLOUD_ADMIN_PASSWORD=adminpass
    restart: unless-stopped
Запускаю через docker-compose
docker compose up -d
WARN[0000] /home/glados/Desktop/University/University/ITMO_4/autmn/VirtualizationTechnologies/lab4/dockerfiles/nextcloud/docker-compose.yml: the attribute 'version' is obsolete, it will be ignored, please remove it to avoid potential confusion
[+] Running 2/2
 ✓ Network nextcloud_default      Created
 ✓ Container nextcloud-nextcloud-1 Started
Проверить доступность
Тыкай на меня, давай. ДАВАЙ ЖЕ.
glados@GLaDOS: ~/Desktop/University/University/ITMO_4/autmn/VirtualizationTechnologies/lab4$
```





# Compose

Файл:

version: '3.8'

services:

db:

image: mariadb:latest

container\_name: nextcloud\_db

restart: unless-stopped

environment:

MYSQL\_ROOT\_PASSWORD: rootpass

MYSQL\_USER: labuser

MYSQL\_PASSWORD: userpass

volumes:

- /home/DB:/docker-entrypoint-initdb.d/

- db\_data:/var/lib/mysql

networks:

- nextcloud\_net

web:

image: nginx:alpine

container\_name: nextcloud\_web

restart: unless-stopped

volumes:

- /home/www/html:/usr/share/nginx/html

- ./nginx.conf:/etc/nginx/conf.d/default.conf

ports:

- "80:80"

depends\_on:

- nextcloud

networks:

- nextcloud\_net

nextcloud:

image: nextcloud:latest

container\_name: nextcloud\_app

restart: unless-stopped

ports:

- "2022:80"

volumes:

- /home/www/NextCloud:/var/www/html

environment:

- NEXTCLOUD\_ADMIN\_USER=admin

- NEXTCLOUD\_ADMIN\_PASSWORD=adminpass

- MYSQL\_HOST=db

- MYSQL\_USER=root

- MYSQL\_PASSWORD=rootpass

- MYSQL\_DATABASE=nextcloud

depends\_on:

- db

networks:

- nextcloud\_net

volumes:

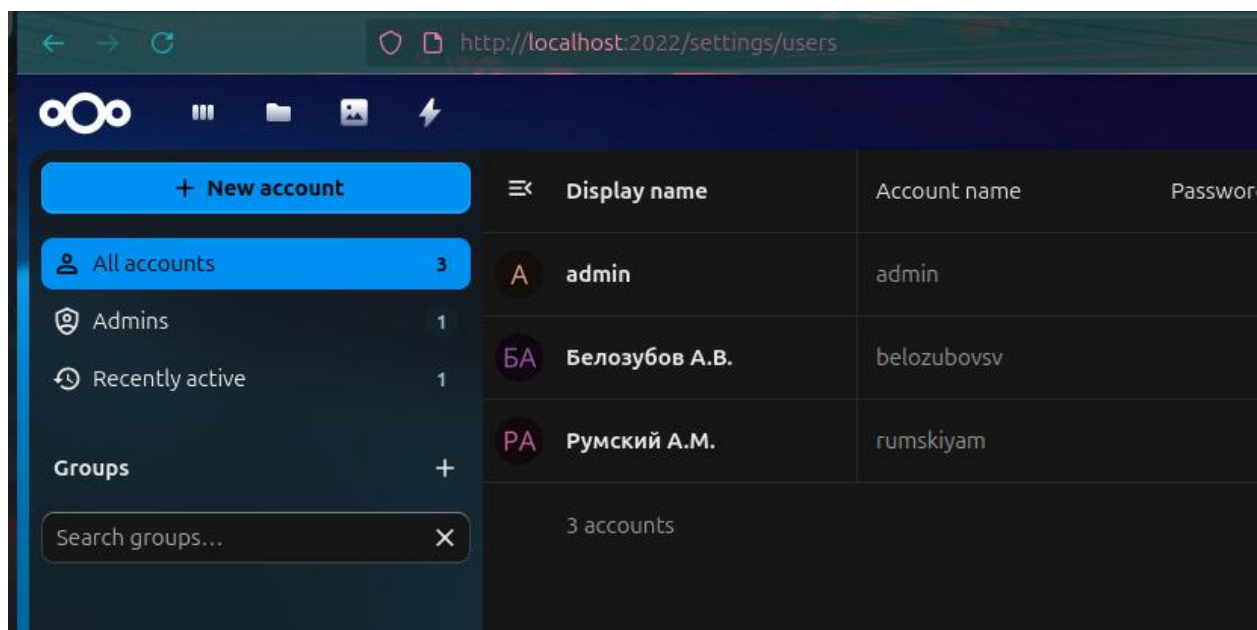
db\_data:

networks:

nextcloud\_net:



driver: bridge



# Game

Команда: `docker run -d -p 80:80 --name tetris bsord/tetris`

Или, если запуск повторный: `docker start tetris`

