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ОСНОВЫ РАБОТЫ С DOCKER И POSTGRESQL

Отчет по лабораторной работе №1
по дисциплине «Разработка приложений»

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Екатеринбург
2025

ХОД РАБОТЫ

Часть 0

Для работы была выбрана машина на ОС Ubuntu, и установка docker была выполнена через скрипт для установки.

```
curl -fsSL https://get.docker.com -o get-docker.sh
```

```
sudo sh get-docker.sh
```

```
eugene@motiv:~$ docker version
Client: Docker Engine - Community
 Version:      28.4.0
 API version:  1.51
 Go version:   go1.24.7
 Git commit:   d8eb465
 Built:        Wed Sep  3 20:57:05 2025
 OS/Arch:     linux/amd64
 Context:      default

Server: Docker Engine - Community
 Engine:
  Version:      28.4.0
  API version:  1.51 (minimum version 1.24)
  Go version:   go1.24.7
  Git commit:   249d679
  Built:        Wed Sep  3 20:57:05 2025
  OS/Arch:     linux/amd64
  Experimental: false
 containerd:
  Version:      1.7.27
  GitCommit:    05044ec0a9a75232cad458027ca83437aae3f4da
 runc:
  Version:      1.2.5
  GitCommit:    v1.2.5-0-g59923ef
 docker-init:
  Version:      0.19.0
  GitCommit:    de40ad0
```

```
eugene@motiv:~$ docker run 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/
```

Часть 1

```
eugene@motiv:~$ docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
nginx         alpine   4a86014ec699   5 weeks ago   52.5MB
hello-world   latest   1b44b5a3e06a   6 weeks ago   10.1kB

eugene@motiv:~$ docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS          NAMES
eugene@motiv:~$ docker stop -a
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS          NAMES
9baaa7c4e80f   hello-world   "/hello"                About a minute ago   Exited (0)    About a minute ago   determined_allen
ee4641d0db1d   nginx:alpine   "/docker-entrypoint..." 16 hours ago       Exited (0)    16 hours ago       my_webserver
80d2f13841aa   hello-world   "/hello"                17 hours ago       Exited (0)    17 hours ago       jovial_golick
```

localhost:8080

Welcome to nginx!

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

Thank you for using nginx.

```
eugene@motiv:~$ docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS          NAMES
e26246c4e0c2   nginx:alpine   "/docker-entrypoint..." About a minute ago   Up About a minute   0.0.0.0:8080->80/tcp, [::]:8080->80/tcp   my_webserver

eugene@motiv:~$ docker stop my_webserver
my_webserver

eugene@motiv:~$ docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS          NAMES
e26246c4e0c2   nginx:alpine   "/docker-entrypoint..." About a minute ago   Exited (0)    3 seconds ago   my_webserver
9baaa7c4e80f   hello-world   "/hello"                4 minutes ago     Exited (0)    4 minutes ago   determined_allen
80d2f13841aa   hello-world   "/hello"                17 hours ago       Exited (0)    17 hours ago   jovial_golick

eugene@motiv:~$ docker rm my_webserver
my_webserver
```

ЧАСТЬ 2

```
eugene@motiv:~$ docker run -d --name my_postgres_db -e POSTGRES_USER=postgres -e POSTGRES_PASSWORD=postgres -e POSTGRES_DB=test_db -p 5432:5432 postgres:15
es:15
Unable to find image 'postgres:15' locally
15: Pulling from library/postgres
ce1261c6d567: Pull complete
80ed16669c95: Pull complete
4e5806601837: Pull complete
b18445125df5: Pull complete
874a3ca0fb79: Pull complete
38a0056e8c05: Pull complete
cb4494753109: Pull complete
9286f415f93a: Pull complete
60570350e677: Pull complete
0b33c9cf245: Pull complete
f082d788df98: Pull complete
b2ae65346945: Pull complete
3e69ab42557e: Pull complete
f35e17a433de: Pull complete
Digest: sha256:1cd9dd548427751dc0fab24a3bdf96a6dd08c0025a167ecbb5c14bec21ff94c
Status: Downloaded newer image for postgres:15
9c9313d182c865053b9d51aaee987124dec4d8283d1212ddfa0e2b03bd84c741

eugene@motiv:~$ docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS          NAMES
9c9313d182c8   postgres:15   "docker-entrypoint.s..." 13 seconds ago   Up 12 seconds   0.0.0.0:5432->5432/tcp, [::]:5432->5432/tcp   my_postgres_db
```

```
eugene@motiv:~$ docker exec -it my_postgres_db psql -U postgres -d test_db
psql (15.14 (Debian 15.14-1.pgdg13+1))
Type "help" for help.

test_db=# \l
               List of databases
  Name  | Owner  | Encoding | Collate  | Ctype  | ICU Locale | Locale Provider | Access privileges
-----+-----+-----+-----+-----+-----+-----+-----
 postgres | postgres | UTF8     | en_US.utf8 | en_US.utf8 |              | libc             | =c/postgres
 template0 | postgres | UTF8     | en_US.utf8 | en_US.utf8 |              | libc             | =c/postgres
 template1 | postgres | UTF8     | en_US.utf8 | en_US.utf8 |              | libc             | =c/postgres
 test_db  | postgres | UTF8     | en_US.utf8 | en_US.utf8 |              | libc             | =c/postgres
(4 rows)

test_db=# \dt
Did not find any relations.
test_db=# CREATE TABLE users (id SERIAL PRIMARY KEY, name VARCHAR(50));
CREATE TABLE
test_db=# INSERT INTO users (name) VALUES ('Alice'), ('Bob');
INSERT 0 2
test_db=# SELECT * FROM users;
 id | name
----+-----
  1 | Alice
  2 | Bob
(2 rows)

test_db=# \q
eugene@motiv:~$
```

ЧАСТЬ 3

```
eugene@motiv:~$ docker network create my_network
49eaa6eeec856627ad7de2c9a68f98cf3946148b9c5bb926fb9e213c1d47dda8
eugene@motiv:~$ docker network ps
docker: unknown command: docker network ps
```

Usage: docker network

Run 'docker network --help' for more information

```
eugene@motiv:~$ docker network ls
NETWORK ID        NAME                DRIVER              SCOPE
541ce5c0decf      bridge              bridge              local
c1045d5a7238      host                host                local
49eaa6eeec85      my_network          bridge              local
583e1919e912      none                null                local
```

```
eugene@motiv:~$ docker network connect my_network my_postgres_db
eugene@motiv:~$ docker run -d \
> --name my_pgadmin \
> -e PGADMIN_DEFAULT_EMAIL=admin@example.com \
> -e PGADMIN_DEFAULT_PASSWORD=admin \
> -p 8080:80 \
> --network my_network \
> dpage/pgadmin4
Unable to find image 'dpage/pgadmin4:latest' locally
latest: Pulling from dpage/pgadmin4
9824c27679d3: Already exists
28a8ddc2abd2: Pull complete
7dc5f1c3188a: Pull complete
4c4d3d6a532b: Pull complete
81cac31f42a7: Pull complete
2425492cad43: Pull complete
1519b7b7923d: Pull complete
ff0eff1c5d48: Pull complete
5dbfdc003cfd: Pull complete
9f2fe31f1f30: Pull complete
0eecab1d578f: Pull complete
4aa794a497e1: Pull complete
c2fc03c4d3e1: Pull complete
133a0b74b0e0: Pull complete
8f9b27100efb: Pull complete
Digest: sha256:d115bcd737940a6cfb61a54439d50de8b850e0782e2363102c9fa761f4022f49
Status: Downloaded newer image for dpage/pgadmin4:latest
46f9dc9f01af6a2e9785e5f92358d51f2277b12bafd2d3172385ea50928e27d3
eugene@motiv:~$
```


← ↻ 🌐 localhost:8080 pgAdmin 4

pgAdmin File ▾ Object ▾ Tools ▾ Help ▾

Welcome × test_db/postgres@Docker PostgreSQL* ×

test_db/postgres@Docker PostgreSQL ▾

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Query Query History

1 **SELECT * FROM users;**

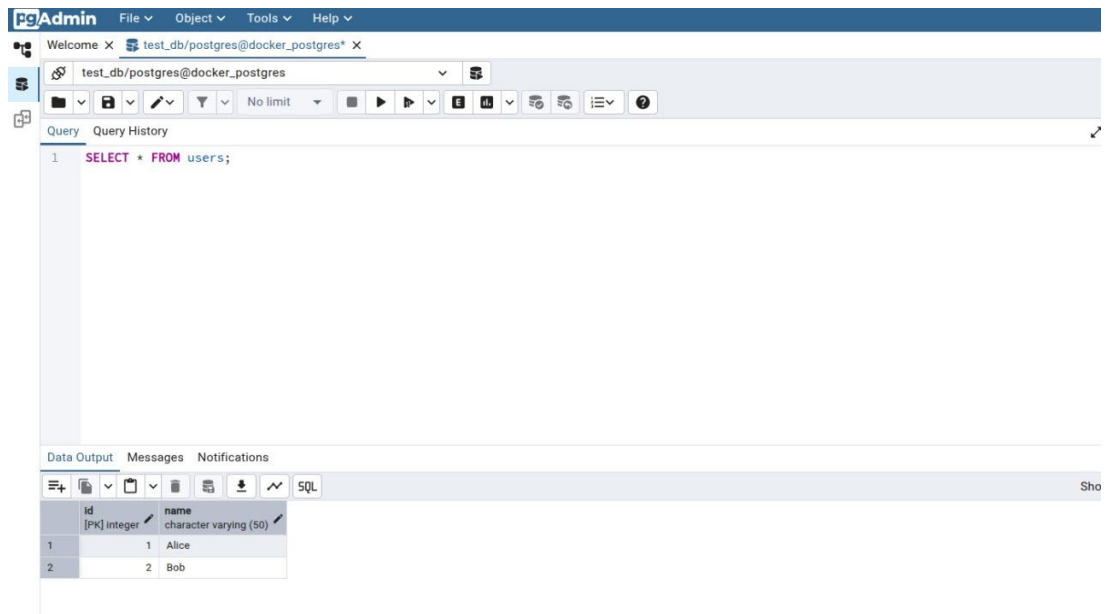
Data Output Messages Notifications

📄 ▾ 📄 ▾ 📄 ▾ 📄 ▾ 📄 ▾ 📄 ▾ SQL

	id [PK] integer	name character varying (50)
1	1	Alice
2	2	Bob

ЧАСТЬ 4

```
eugene@motiv:~$ docker volume create postgres_data
postgres_data
eugene@motiv:~$ docker volume ls
DRIVER      VOLUME NAME
local       680e8c2364296503506755758b9852f2a01ab1fe97e8b4eb2335095197735309
local       d72b6cdc5c62f669a48d2b1e7eb146c0b5ba0b8499f0843fe209452ff078c576
local       postgres_data
eugene@motiv:~$ docker run -d --name my_postgres_db_persistent -e POSTGRES_USER=postgres -e POSTGRES_PASSWORD=postgres -e POSTGRES_DB=test_db -p 5432:5432 -v postgres_data:/var/lib/postgresql/data --network my_network postgres:15
b9dfb5cf3283ac5df48f0b0fc56436495d8856d0857c46e5dcd1d273c83cdf0f
eugene@motiv:~$ docker ps -a
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS
NAMES
b9dfb5cf3283   postgres:15    "docker-entrypoint.s..." 25 seconds ago Up 25 seconds 0.0.0.0:5432->5432/tcp, [::]:5432->5432/tcp
my_postgres_db_persistent
46f9dc9f01af   dpag/pgadmin4  "/entrypoint.sh"         3 hours ago   Up 5 minutes  443/tcp, 0.0.0.0:8080->80/tcp, [::]:8080->80/tcp
my_pgadmin
9c9313d182c8   postgres:15    "docker-entrypoint.s..." 3 hours ago   Exited (0) 2 hours ago
my_postgres_db
9baaa7c4e80f   hello-world    "/hello"                 3 hours ago   Exited (0) 3 hours ago
determined_allen
80d2f13841aa   hello-world    "/hello"                 20 hours ago  Exited (0) 20 hours ago
jovial_golick
```



Ответы на вопросы

1. Что такое docker?
Docker – это продукт для создания и развертывания контейнеров, используемых для изоляции приложений.
2. Для чего нужны тома и сети docker?
Тома нужны для сохранения данных после удаления контейнера. Сети нужны для связи контейнеров между собой и внешним миром.
3. Как подключиться к контейнеру и выполнить в нём команды?
Через команду `docker exec`.
4. Для чего нужен pgAdmin?
pgAdmin – веб-интерфейс для работы с БД postgresql.

ЗАКЛЮЧЕНИЕ

В ходе лабораторной работы были получены навыки работы с Docker и Docker-Compose.