

# Задание 3

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## Разметка директорий

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```
\-- apps
  \-- client
  \-- server
\-- db
  \-- data
  \-- initdb.d
  \-- pgadmin
\-- environments
  \-- dev
  \-- prod
\-- reports
  +-- report1.md
  +-- report2.md
  +-- report3.md
  +-- report4.md
+-- .env
+-- .gitignore
+-- docker-compose.api.yaml
+-- README.md
```

## Конфиг контейнеров

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- **api**  
доступ к базе данных через api (веб клиент для всех пользователей)
- **db**  
контейнер базы данных (сервер бд)
- **db-ui (pgAdmin4)**  
веб панель администратора (клиент администратора бд)

```
Preview 1.md  docker-compose.api.yaml M X  .gitignore M  rsa.py U
docker-compose.api.yaml
1  version: '3'
2  services:
3    api:
4      image: postgres/postgres
5      ports:
6        - "3000:3000"
7      environment:
8        PGRST_DB_URI: ${PGRST_DB_URI}
9    db:
10     image: postgres
11     ports:
12       - "5433:5432"
13     environment:
14       POSTGRES_PASSWORD: ${POSTGRES_PASSWORD}
15       POSTGRES_USER: ${POSTGRES_USER}
16       POSTGRES_DB: ${POSTGRES_DB}
17       PGDATA: ${POSTGRES_PGDATA}
18     volumes:
19       - ./db/data:/var/lib/postgresql/data
20       - ./db/initdb.d:/docker-entrypoint-initdb.d
21    db-ui:
22     image: dpage/pgadmin4
23     ports:
24       - "5050:80"
25     environment:
26       PGADMIN_DEFAULT_EMAIL: ${PGADMIN_EMAIL}
27       PGADMIN_DEFAULT_PASSWORD: ${PGADMIN_PWD}
28       PGADMIN_CONFIG_SERVER_MODE: 'False'
29       PGADMIN_LISTEN_ADDRESS: '0.0.0.0'
30     volumes:
31       - ./db/pgadmin:/var/lib/pgadmin
32     restart: unless-stopped
33     deploy:
34       resources:
35         limits:
36           cpus: '0.5'
37           memory: 1G
38
39
```

## Настройка сети с помощью Docker

Для настройки сети мы используем драйвер локальной сети с режимом работы "bridge".

```
В качестве моста выбран ip_address = 14.7.0.1 \
В качестве маски сети ip_address = 14.7.0.0/24 \
local_ip_address API = 14.7.0.3 \
local_ip_address DB = 14.7.0.2 \
local_ip_address pgAdmin = 14.7.0.4
```

docker-compose.api.yaml

```

2  services:
3    api:
12   db:
13     image: postgres
14     ports:
15     - "5433:5432"
16     environment:
17       POSTGRES_PASSWORD: ${POSTGRES_PASSWORD}
18       POSTGRES_USER: ${POSTGRES_USER}
19       POSTGRES_DB: ${POSTGRES_DB}
20       PGDATA: ${POSTGRES_PGDATA}
21     volumes:
22     - ./db/data:/var/lib/postgresql/data
23     - ./db/initdb.d:/docker-entrypoint-initdb.d
24     networks:
25       localnet:
26       ipv4_address: ${DB_ADDRESS}
27   db-ui:
28     image: dpage/pgadmin4
29     ports:
30     - "5050:80"
31     environment:
32       PGADMIN_DEFAULT_EMAIL: ${PGADMIN_EMAIL}
33       PGADMIN_DEFAULT_PASSWORD: ${PGADMIN_PWD}
34       PGADMIN_CONFIG_SERVER_MODE: 'False'
35       PGADMIN_LISTEN_ADDRESS: '0.0.0.0'
36     volumes:
37     - ./db/pgadmin:/var/lib/pgadmin
38     restart: unless-stopped
39     deploy:
40       resources:
41         limits:
42         cpus: '0.5'
43         memory: 1G
44       networks:
45       localnet:
46       ipv4_address: ${ADMIN_ADDRESS}
47   networks:
48     localnet:
49     driver: bridge
50     ipam:
51     config:
52     - subnet: ${SUBNET_NETWORK}
53     gateway: ${GATEWAY_NETWORK}
54
55
56

```

```
# NETWORKING
SUBNET_NETWORK=14.7.0.1/24
GATEWAY_NETWORK=14.7.0.1
DB_ADDRESS=14.7.0.2
API_ADDRESS=14.7.0.3
ADMIN_ADDRESS=14.7.0.4
```

## Проверка работоспособности кластера

### запуск контейнеров

```
db-1 2024-10-23 16:52:53.211 UTC [1] LOG: starting PostgreSQL 16.2 (Debian 16.2-1-pgdg120+2) on x86_64-pc-linux-gnu, compiled by gcc (Debian 12.2.0-14) 12.2.0, 64-bit
db-1 2024-10-23 16:52:53.212 UTC [1] LOG: listening on IPv4 address "0.0.0.0", port 5432
db-1 2024-10-23 16:52:53.212 UTC [1] LOG: listening on IPv6 address ":::", port 5432
db-1 2024-10-23 16:52:53.255 UTC [1] LOG: listening on Unix socket "/var/run/postgresql/.s.PGSQL.5432"
db-1 2024-10-23 16:52:53.293 UTC [29] LOG: database system shutdown was interrupted; last known up at 2024-10-23 13:01:01 UTC
db-1 2024-10-23 16:52:54.688 UTC [30] FATAL: the database system is starting up
api-1 23/Oct/2024:16:52:54 +0000: {"code":"PGST000","details":"connection to server at \"host.docker.internal\" (192.168.65.254), port 5433 failed: FATAL: the database system is starting up\\n\", \"hint\":null", "message":"Database connection error. Retrying the connection."}
api-1 23/Oct/2024:16:52:54 +0000: {"code":"PGST000","details":"connection to server at \"host.docker.internal\" (192.168.65.254), port 5433 failed: FATAL: the database system is starting up\\n\", \"hint\":null", "message":"Database connection error. Retrying the connection."}
api-1 23/Oct/2024:16:52:54 +0000: attempting to reconnect to the database in 2 seconds...
db-1 2024-10-23 16:52:56.054 UTC [29] LOG: database system was not properly shut down; automatic recovery in progress
db-1 2024-10-23 16:52:56.080 UTC [29] LOG: redo starts at 0/19344E8
db-1 2024-10-23 16:52:56.087 UTC [29] LOG: invalid record length at 0/1934520: expected at least 24, got 0
db-1 2024-10-23 16:52:56.087 UTC [29] LOG: redo done at 0/19344E8 system usage: CPU: user=0.00 s, system=0.00 s, elapsed=0.00 s
db-1 2024-10-23 16:52:56.126 UTC [27] LOG: checkpoint starting: end-of-recovery immediate wait
db-1 2024-10-23 16:52:56.211 UTC [27] LOG: checkpoint complete: wrote 3 buffers (0.0%); 0 WAL file(s) added, 0 removed, 0 recycled; write=0.014 s, sync=0.008 s, total=0.087 s; sync files=2, longest=0.005 s, average=0.004 s; distance=0 kB, estimate=0 kB; lun=0/1934520, redo lun=0/1934520
db-1 2024-10-23 16:52:56.223 UTC [1] LOG: database system is ready to accept connections
api-1 23/Oct/2024:16:52:58 +0000: Connection successful
api-1 23/Oct/2024:16:52:58 +0000: Listening on port 3000
api-1 23/Oct/2024:16:52:58 +0000: Listening for notifications on the pgst channel
api-1 23/Oct/2024:16:52:58 +0000: Config reloaded
api-1 23/Oct/2024:16:52:58 +0000: Schema cache loaded
db-ui-1 [2024-10-23 16:53:05 +0000] [1] [INFO] Starting gunicorn 22.0.0
db-ui-1 [2024-10-23 16:53:05 +0000] [1] [INFO] Listening at: http://0.0.0.0:80 (1)
db-ui-1 [2024-10-23 16:53:05 +0000] [1] [INFO] Using worker: gthread
db-ui-1 [2024-10-23 16:53:05 +0000] [89] [INFO] Booting worker with pid: 89
```

### ping с сервера на api

```
# ping 14.7.0.2
PING 14.7.0.2 (14.7.0.2) 56(84) bytes of data.
64 bytes from 14.7.0.2: icmp_seq=1 ttl=64 time=0.068 ms
64 bytes from 14.7.0.2: icmp_seq=2 ttl=64 time=0.031 ms
64 bytes from 14.7.0.2: icmp_seq=3 ttl=64 time=0.051 ms
64 bytes from 14.7.0.2: icmp_seq=4 ttl=64 time=0.050 ms
64 bytes from 14.7.0.2: icmp_seq=5 ttl=64 time=0.035 ms
64 bytes from 14.7.0.2: icmp_seq=6 ttl=64 time=0.064 ms
64 bytes from 14.7.0.2: icmp_seq=7 ttl=64 time=0.045 ms
64 bytes from 14.7.0.2: icmp_seq=8 ttl=64 time=0.044 ms
64 bytes from 14.7.0.2: icmp_seq=9 ttl=64 time=0.029 ms
64 bytes from 14.7.0.2: icmp_seq=10 ttl=64 time=0.042 ms
64 bytes from 14.7.0.2: icmp_seq=11 ttl=64 time=0.039 ms
^C
--- 14.7.0.2 ping statistics ---
11 packets transmitted, 11 received, 0% packet loss, time 10364ms
rtt min/avg/max/mdev = 0.029/0.045/0.068/0.011 ms
# ping from db to api
```

### ping с api на сервер

```
$ docker exec -it ba4 ping 14.7.0.2
PING 14.7.0.2 (14.7.0.2) 56(84) bytes of data.
64 bytes from 14.7.0.2: icmp_seq=1 ttl=64 time=0.059 ms
64 bytes from 14.7.0.2: icmp_seq=2 ttl=64 time=0.039 ms
64 bytes from 14.7.0.2: icmp_seq=3 ttl=64 time=0.039 ms
64 bytes from 14.7.0.2: icmp_seq=4 ttl=64 time=0.038 ms
64 bytes from 14.7.0.2: icmp_seq=5 ttl=64 time=0.041 ms
64 bytes from 14.7.0.2: icmp_seq=6 ttl=64 time=0.047 ms
64 bytes from 14.7.0.2: icmp_seq=7 ttl=64 time=0.030 ms
64 bytes from 14.7.0.2: icmp_seq=8 ttl=64 time=0.021 ms
64 bytes from 14.7.0.2: icmp_seq=9 ttl=64 time=0.041 ms
^C
--- 14.7.0.2 ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 8320ms
rtt min/avg/max/mdev = 0.021/0.039/0.059/0.009 ms
```

# Подключение pgAdmin к серверу

localhost:5050pgAdmin 4

pgAdminFileObjectToolsHelp

Object ExplorerServers (1)wirehouse\_db

DashboardActivityStateConfigurationLogsSystem

Sessions

☐ Active sessions only

Search

		PID	Database	User	Application	Client	Backend start	Transaction start	State	Wait event	Blocking PIDs
✖	■	> 27					2024-10-23 16:52:53...			Activity: Checkpoint...	
✖	■	> 28					2024-10-23 16:52:53...			Activity: BgWriterHib...	
✖	■	> 31					2024-10-23 16:52:56...			Activity: WalWriterM...	
✖	■	> 32					2024-10-23 16:52:56...			Activity: AutoVacuu...	
✖	■	> 33		app_u...			2024-10-23 16:52:56...			Activity: LogicalLaun...	
✖	■	> 35	wirehous...	app_u...	PostgREST 12.0.2	14.7.0.1	2024-10-23 16:52:58...		idle	Client: ClientRead	
✖	■	> 312	wirehous...	app_u...	pgAdmin 4 - DB:wire...	14.7.0.4	2024-10-23 17:19:04...	2024-10-23 17:19:28...	active		

Locks

Search

PID	Database	Lock type	Target relation	Page	Tuple	vXID (t...	XID (target)	Class	Object ID	vXID (...)	Mode	Granted?
312	wirehouse_db	relation	pg_locks							5/19	Acces...	true
312		relation	pg_database_datname_in...							5/19	Acces...	true
312		relation	pg_database							5/19	Acces...	true
312		relation	pg_database_oid_index							5/19	Acces...	true
312		virtualxid					5/19			5/19	Exclus...	true