

Министерство образования Республики Беларусь
Учреждение образования
БЕЛОРУССКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ
ИНФОРМАТИКИ И РАДИОЭЛЕКТРОНИКИ

Факультет компьютерных систем и сетей
Кафедра информатики
Дисциплина: Избранные главы информатики

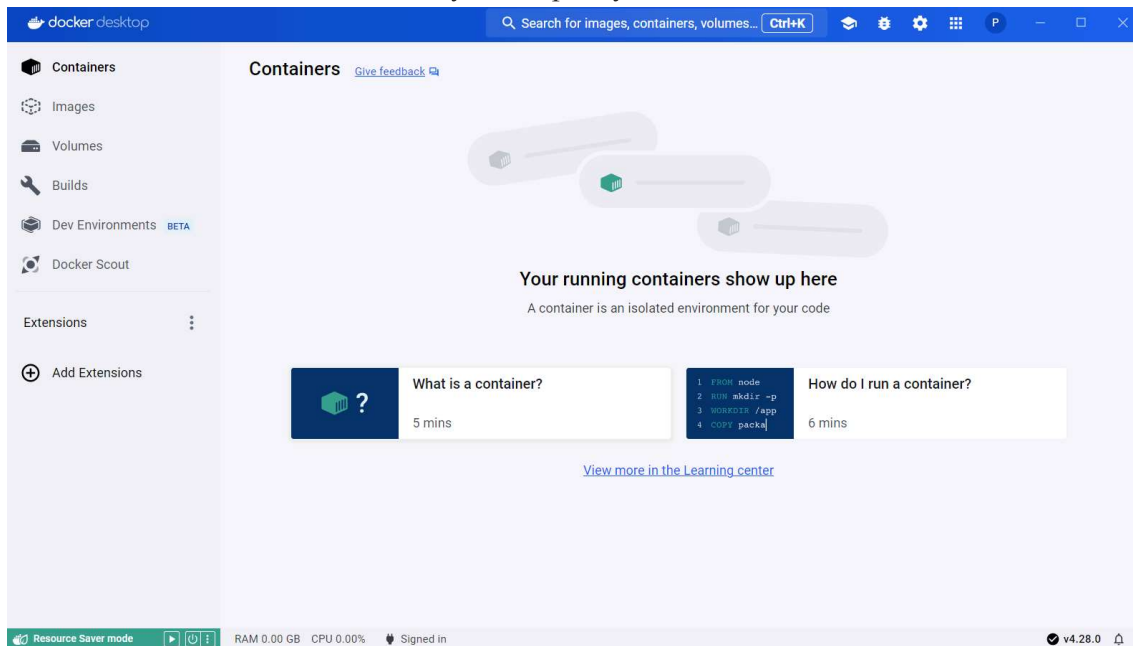
ОТЧЁТ
к лабораторной работе №2

Выполнил: студент группы 253505
Таргонский Дмитрий Андреевич

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1.Подготовьте рабочее окружение в соответствии с типом вашей операционной системы

- Установите Docker
- Выполните базовую настройку



```
C:\Users\dimat>docker --version
Docker version 25.0.3, build 4debf41
```

2.Изучите простейшие консольные команды и возможности Docker Desktop (см. лекцию), создать собственный контейнер docker/getting-started, открыть в браузере и изучить tutorial

```
C:\Users\dimat>docker

Usage:  docker [OPTIONS] COMMAND

A self-sufficient runtime for containers

Common Commands:
run      Create and run a new container from an image
exec     Execute a command in a running container
ps       List containers
build    Build an image from a Dockerfile
pull     Download an image from a registry
push     Upload an image to a registry
images   List images
login    Log in to a registry
logout   Log out from a registry
search   Search Docker Hub for images
version  Show the Docker version information
info     Display system-wide information
```

```
C:\Users\dimat>docker run -dp 80:80 docker/getting-started
Unable to find image 'docker/getting-started:latest' locally
latest: Pulling from docker/getting-started
c158987b0551: Pull complete
1e35f6679fab: Pull complete
cb9626c74200: Pull complete
b6334b6ace34: Pull complete
f1d1c9928c82: Pull complete
9b6f639ec6ea: Pull complete
ee68d3549ec8: Pull complete
33e0cbbb4673: Pull complete
4f7e34c2de10: Pull complete
Digest: sha256:d79336f4812b6547a53e735480dde67f8f7071b414fbd9297609ffb989abc1
Status: Downloaded newer image for docker/getting-started:latest
55591a47db0c45d16dcf81495efbf4836d1f8d566474fbc73c78f913a45540b0
```

```
C:\Users\dimat>docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS                    NAMES
55591a47db0c   docker/getting-started  "/docker-entrypoint...."  46 seconds ago  Up 44 seconds  0.0.0.0:80->80/tcp        objective_germain
```

Getting Started

The command you just ran

Congratulations! You have started the container for this tutorial! Let's first explain the command that you just ran. In case you forgot, here's the command:

```
docker run -d -p 80:80 docker/getting-started
```

You'll notice a few flags being used. Here's some more info on them:

- `-d` - run the container in detached mode (in the background)
- `-p 80:80` - map port 80 of the host to port 80 in the container
- `docker/getting-started` - the image to use

Pro tip

You can combine single character flags to shorten the full command. As an example, the command above could be written as:

```
docker run -dp 80:80 docker/getting-started
```

The Docker Dashboard

Containers

Container CPU usage: 0.00% / 400% (4 CPUs available)

Container memory usage: 4.1MB / 3.66GB

Name	Image	Status	CPU (%)	Port(s)	Last started	Actions
objective_germain	docker/getting-started	Running	0%	80:80	2 minutes ago	[Stop] [Refresh] [Delete]

Showing 1 item

Walkthroughs

- Multi-container applications (8 mins)
- Containerize your application (3 mins)

View more in the Learning center

Engine running | RAM 2.64 GB | CPU 1.01% | Signed in | v4.28.0

```
C:\Users\dimat>docker info
Client:
Version:      25.0.3
Context:      default
Debug Mode:   false
Plugins:
buildx: Docker Buildx (Docker Inc.)
  Version:    v0.12.1-desktop.4
  Path:       C:\Program Files\Docker\cli-plugins\docker-buildx.exe
compose: Docker Compose (Docker Inc.)
  Version:    v2.24.6-desktop.1
  Path:       C:\Program Files\Docker\cli-plugins\docker-compose.exe
debug: Get a shell into any image or container. (Docker Inc.)
  Version:    0.0.24
  Path:       C:\Program Files\Docker\cli-plugins\docker-debug.exe
dev: Docker Dev Environments (Docker Inc.)
  Version:    v0.1.0
  Path:       C:\Program Files\Docker\cli-plugins\docker-dev.exe
extension: Manages Docker extensions (Docker Inc.)
  Version:    v0.2.22
  Path:       C:\Program Files\Docker\cli-plugins\docker-extension.exe
feedback: Provide feedback, right in your terminal! (Docker Inc.)
  Version:    v1.0.4
  Path:       C:\Program Files\Docker\cli-plugins\docker-feedback.exe
init: Creates Docker-related starter files for your project (Docker Inc.)
  Version:    v1.0.1
  Path:       C:\Program Files\Docker\cli-plugins\docker-init.exe
sbom: View the packaged-based Software Bill Of Materials (SBOM) for an image (Anchore Inc.)
  Version:    0.6.0
  Path:       C:\Program Files\Docker\cli-plugins\docker-sbom.exe
scout: Docker Scout (Docker Inc.)
  Version:    v1.5.0
  Path:       C:\Program Files\Docker\cli-plugins\docker-scout.exe
```

```
C:\Users\dimat>docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS                    NAMES
55591a47db0c   docker/getting-started   "/docker-entrypoint..."  14 minutes ago   Up 14 minutes   0.0.0.0:80->80/tcp       objective_germain
```

```
C:\Users\dimat>docker images
REPOSITORY          TAG          IMAGE ID          CREATED          SIZE
docker/getting-started   latest       3e4394f6b72f     15 months ago   47MB
```

```
C:\Users\dimat>docker ps -a
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS                    NAMES
55591a47db0c   docker/getting-started   "/docker-entrypoint..."  15 minutes ago   Up 15 minutes   0.0.0.0:80->80/tcp       objective_germain
```

```

C:\Users\dimat>docker logs 55
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
/docker-entrypoint.sh: Configuration complete; ready for start up
2024/03/20 13:45:49 [notice] 1#1: using the "epoll" event method
2024/03/20 13:45:49 [notice] 1#1: nginx/1.23.3
2024/03/20 13:45:49 [notice] 1#1: built by gcc 12.2.1 20220924 (Alpine 12.2.1_git20220924-r4)
2024/03/20 13:45:49 [notice] 1#1: OS: Linux 5.15.146.1-microsoft-standard-WSL2
2024/03/20 13:45:49 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2024/03/20 13:45:49 [notice] 1#1: start worker processes
2024/03/20 13:45:49 [notice] 1#1: start worker process 30
2024/03/20 13:45:49 [notice] 1#1: start worker process 31
2024/03/20 13:45:49 [notice] 1#1: start worker process 32
2024/03/20 13:45:49 [notice] 1#1: start worker process 33

C:\Users\dimat>docker stop 55
55

C:\Users\dimat>docker start 55
55

C:\Users\dimat>docker pause 55
55

C:\Users\dimat>docker unpause 55
55

C:\Users\dimat>docker restart 55
55

C:\Users\dimat>.docker ps
".docker" не является внутренней или внешней
командой, исполняемой программой или пакетным файлом.

C:\Users\dimat>docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS                    NAMES
55591a47db0c   docker/getting-started  "/docker-entrypoint..." 23 minutes ago Up 24 seconds  0.0.0.0:80->80/tcp       objective_germain

C:\Users\dimat>docker stop 55
55

C:\Users\dimat>docker rm 55
55

C:\Users\dimat>docker ps -a
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS                    NAMES
C:\Users\dimat>

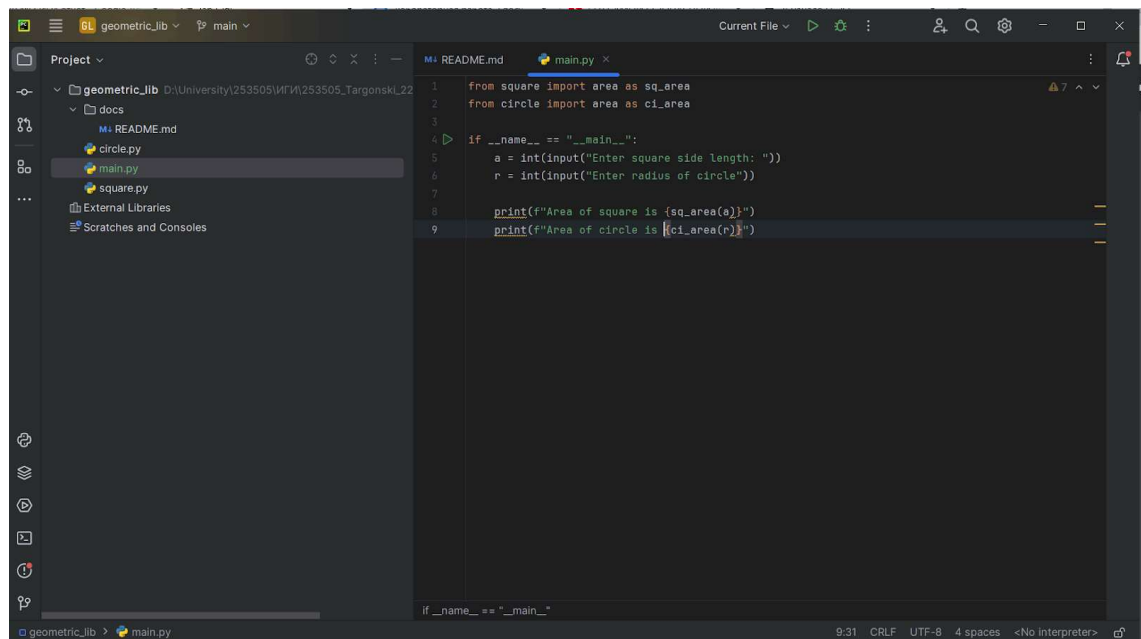
```

3 Создайте docker image, который запускает скрипт с использованием функций из https://github.com/smartigaorg/geometric_lib.

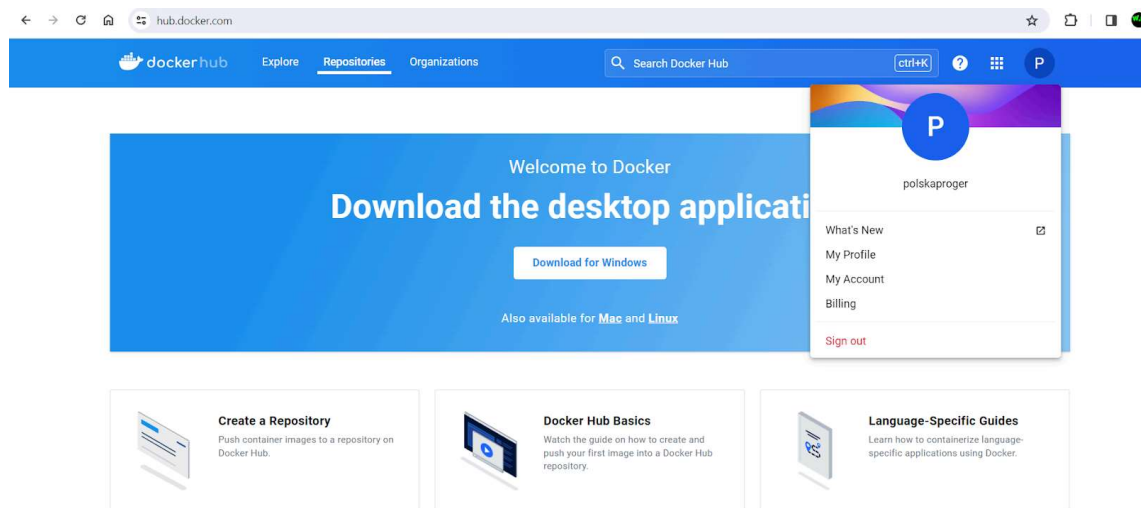
- Данные необходимые для работы скрипта передайте любым удобным способом (например: конфиг файл через docker volume, переменные окружения, перенаправление ввода). Изучите простейшие консольные команды для работы с docker(см. лекцию). Зарегистрируйтесь на DockerHub и выберите необходимые для проекта образы
- Создать Dockerfile для реализации сборки собственных Docker образов
- Использовать его для создания контейнера. Протестировать использование контейнера


```
dimat@LAPTOP-0PJ01U69 MINGW64 /d/University/253505/ИГМ/253505_Targonski_22/IGI/LR2 (IGI_LR2)
$ git clone https://github.com/smartigaorg/geometric_lib
Cloning into 'geometric_lib'...
remote: Enumerating objects: 35, done.
remote: Total 35 (delta 0), reused 0 (delta 0), pack-reused 35
Receiving objects: 100% (35/35), 4.60 KiB | 672.00 KiB/s, done.
Resolving deltas: 100% (6/6), done.

dimat@LAPTOP-0PJ01U69 MINGW64 /d/University/253505/ИГМ/253505_Targonski_22/IGI/LR2 (IGI_LR2)
$
```



```
1 from square import area as sq_area
2 from circle import area as ci_area
3
4 if __name__ == "__main__":
5     a = int(input("Enter square side length: "))
6     r = int(input("Enter radius of circle:"))
7
8     print(f"Area of square is {sq_area(a)}")
9     print(f"Area of circle is {ci_area(r)}")
```




Welcome to Docker

Download the desktop application


Download for Windows

Also available for Mac and Linux




Create a Repository

Push container images to a repository on Docker Hub.




Docker Hub Basics

Watch the guide on how to create and push your first image into a Docker Hub repository.



Language-Specific Guides

Learn how to containerize language-specific applications using Docker.



polskaproger

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- Billing
- Sign out

```

dimat@LAPTOP-0PJ01U69 MINGW64 /d/University/253505/ИГН/253505_Targonski_22/IGI/LR2/geometric_lib (main)
$ docker build -t geometric .
#0 building with "default" instance using docker driver

#1 [internal] load build definition from Dockerfile
#1 transferring dockerfile: 29B 0.0s
#1 transferring dockerfile: 115B 0.1s done
#1 DONE 0.2s

#2 [internal] load metadata for docker.io/library/python:latest
#2 DONE 0.0s

#3 [internal] load .dockerignore
#3 transferring context:
#3 transferring context: 2B 0.1s done
#3 DONE 0.2s

#4 [1/3] FROM docker.io/library/python:latest
#4 DONE 0.5s

#5 [2/3] WORKDIR /usr/src/app
#5 DONE 0.2s

#6 [internal] load build context
#6 transferring context: 42.28kB 0.3s done
#6 DONE 0.6s

#7 [3/3] COPY . .
#7 DONE 0.2s

#8 exporting to image
#8 exporting layers
#8 exporting layers 0.2s done
#8 writing image sha256:c16b2b9e8de4cbea4c96c6e1b3aeda986d07e8940a18684876f94a1ded84fa78 done
#8 naming to docker.io/library/geometric 0.0s done
#8 DONE 0.2s

View build details: docker-desktop://dashboard/build/default/default/giui4lp97o98dnwvvtstcunx8

What's Next?
  View a summary of image vulnerabilities and recommendations → docker scout quickview

```

```

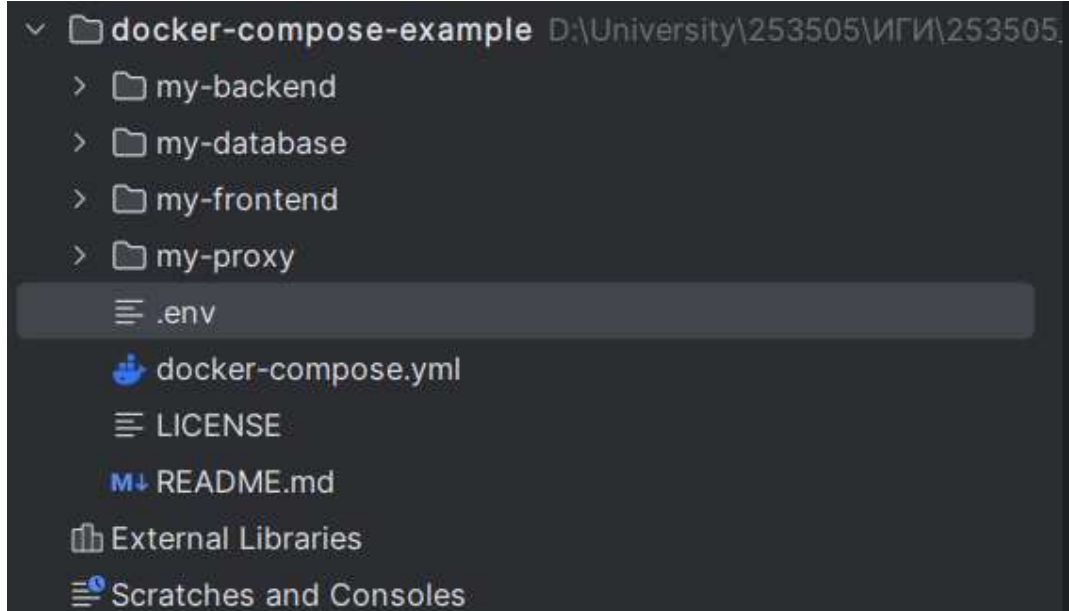
dimat@LAPTOP-0PJ01U69 MINGW64 /d/University/253505/ИГН/253505_Targonski_22/IGI/LR2/geometric_lib (main)
$ winpty docker run -it --name my_mf_app geometric
Enter square side length: 1
Enter radius of circle: 2
Area of square is 1
Area of circle is 12.566370614359172

dimat@LAPTOP-0PJ01U69 MINGW64 /d/University/253505/ИГН/253505_Targonski_22/IGI/LR2/geometric_lib (main)
$ docker ps -a

```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
56b6e0832bd3	geometric	"python main.py"	31 seconds ago	Exited (0) 22 seconds ago		my_mf_app

4. Скачать любой доступный проект с GitHub с произвольным стеком технологий или использовать свой, ранее разработанный. Создать для него необходимый контейнер, используя Docker Compose для управления многоконтейнерными приложениями. Запустить проект в контейнере. (Примеры Images: https://hub.docker.com/_/phpmyadmin, https://hub.docker.com/_/mysql, https://hub.docker.com/_/postgres)



```
FROM mcr.microsoft.com/dotnet/sdk:7.0 as build
WORKDIR /src
COPY *.csproj ./
RUN dotnet restore
COPY ./ ./
RUN dotnet publish -c Release -o out
```

```
FROM mcr.microsoft.com/dotnet/aspnet:7.0
WORKDIR /app
COPY --from=build /src/out/ ./
ENTRYPOINT [ "dotnet", "my-backend.dll" ]
```

```
FROM mysql
COPY *.sql /docker-entrypoint-initdb.d/
```



```
FROM node:14 as build
```

```
WORKDIR /src
```

```
COPY package*.json ./
```

```
RUN npm install
```

```
COPY ./ ./
```

```
RUN npm run build --prod
```

```
FROM nginx:alpine
```

```
WORKDIR /app
```

```
COPY --from=build /src/dist/my-frontend /usr/share/nginx/html
```

```
FROM nginx:alpine
```

```
COPY *.conf /etc/nginx/conf.d/
```

```
version: '3.9'

services:
  my-proxy:
    build: my-proxy
    ports:
      - "8080:80"
  my-frontend:
    build: my-frontend
  my-backend:
    build: my-backend
    environment:
      - ConnectionStrings__Default
  my-database:
    build: my-database
    environment:
      - MYSQL_ROOT_PASSWORD
```

```
dimat@LAPTOP-0PJ01U69 MINGW64 /d/University/253505/МГМ/253505_Targonski_22/IGI/L
R2/docker-compose-example (master)
$ docker compose build
2024/03/21 18:04:23 http2: server: error reading preface from client //./pipe/do
cker_engine: file has already been closed
2024/03/21 18:04:23 http2: server: error reading preface from client //./pipe/do
cker_engine: file has already been closed
#0 building with "default" instance using docker driver

#1 [my-proxy internal] load build definition from Dockerfile
#1 transferring dockerfile: 88B done
#1 DONE 0.0s

#2 [my-backend internal] load build definition from Dockerfile
#2 transferring dockerfile: 322B done
#2 DONE 0.0s

#3 [my-frontend internal] load build definition from Dockerfile
#3 transferring dockerfile: 252B done
#3 DONE 0.0s

#4 [my-database internal] load build definition from Dockerfile
#4 transferring dockerfile: 90B done
```

```

#27 112.3
#27 112.3 added 1515 packages from 1245 contributors and audited 1521 packages i
n 109.995s
#27 113.8
#27 113.8 121 packages are looking for funding
#27 113.8   run `npm fund` for details
#27 113.8
#27 113.8 found 126 vulnerabilities (5 low, 78 moderate, 35 high, 8 critical)
#27 113.8   run `npm audit fix` to fix them, or `npm audit` for details
#27 DONE 114.0s

















#39 [my-frontend build 5/6] COPY ./ ./
#39 DONE 0.1s





#40 [my-frontend build 6/6] RUN npm run build --prod
#40 0.864
#40 0.864 > my-frontend@0.0.0 build /src
#40 0.864 > ng build
#40 0.864
#40 18.46 Compiling @angular/core : es2015 as esm2015
#40 33.87 Compiling @angular/common : es2015 as esm2015
#40 36.79 Compiling @angular/platform-browser : es2015 as esm2015
#40 36.79 Compiling @angular/common/http : es2015 as esm2015
#40 38.51 Compiling @angular/platform-browser-dynamic : es2015 as esm2015
#40 40.75 Compiling @angular/forms : es2015 as esm2015
#40 50.57 - Generating browser application bundles...
#40 71.43 ✓ Browser application bundle generation complete.
#40 71.56 - Copying assets...
#40 71.57 ✓ Copying assets complete.
#40 71.58 - Generating index html...
#40 71.65 ✓ Index html generation complete.
#40 71.67
#40 71.67 Initial Chunk Files | Names          | Size
#40 71.67 vendor.js           | vendor         | 2.45 MB
#40 71.67 polyfills.js         | polyfills     | 141.26 kB
#40 71.67 main.js              | main          | 11.56 kB
#40 71.67 runtime.js           | runtime       | 6.15 kB
#40 71.67 styles.css           | styles        | 120 bytes
#40 71.67
#40 71.67 | Initial Total | 2.61 MB
#40 71.67
#40 71.67 Build at: 2024-03-21T15:07:31.105Z - Hash: 4ed74c931092007c54ec - Time: 21108ms
#40 DONE 72.6s

#41 [my-frontend stage-1 3/3] COPY --from=build /src/dist/my-frontend /usr/share/nginx/html
#41 DONE 0.3s

#42 [my-frontend] exporting to image
#42 exporting layers
#42 exporting layers 0.2s done
#42 writing image sha256:4b9970fcfd0d093eac7666f13646b7d6871b3e551c459c3ab30fd33c5c9ab06c 0.0s done
#42 naming to docker.io/library/docker-compose-example-my-frontend 0.0s done
#42 DONE 0.3s

dimat@LAPTOP-0PJ01U69 MINGW64 /d/University/253505/ИГМ/253505_Targonski_22/IGI/LR2/docker-compose-example (master)
$ |
```

<input type="checkbox"/>	Name	Tag	Status	Created	Size	Actions
<input type="checkbox"/>	docker-compose-example-my-4b9970fcfd0d 	latest	In use	4 minutes ago	48.13 MB	  
<input type="checkbox"/>	docker-compose-example-my-ba6852d63509 	latest	In use	5 minutes ago	217.42 MB	  
<input type="checkbox"/>	docker-compose-example-my-5123c1322ed0 	latest	In use	6 minutes ago	632.33 MB	  
<input type="checkbox"/>	docker-compose-example-my-5c8d04631542 	latest	In use	4 hours ago	42.57 MB	  
docker-compose-example-my-5c8d04631542						

<input type="checkbox"/>	>  docker.com	Running (4/4)	0%	1 minute ago	  
--------------------------	--	---------------	----	--------------	---



```

my-frontend-1 | 172.19.0.5 -- [21/Mar/2024:15:14:35 +0000] "GET / HTTP/1.0" 200 508 "-" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-proxy-1 | 172.19.0.1 -- [21/Mar/2024:15:14:35 +0000] "GET / HTTP/1.1" 200 508 "-" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-frontend-1 | 172.19.0.5 -- [21/Mar/2024:15:14:35 +0000] "GET /runtime.js HTTP/1.0" 200 6299 "http://localhost:8080/" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-proxy-1 | 172.19.0.1 -- [21/Mar/2024:15:14:35 +0000] "GET /styles.css HTTP/1.0" 200 120 "http://localhost:8080/" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-frontend-1 | 172.19.0.5 -- [21/Mar/2024:15:14:35 +0000] "GET /runtime.js HTTP/1.1" 200 6299 "http://localhost:8080/" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-proxy-1 | 172.19.0.1 -- [21/Mar/2024:15:14:35 +0000] "GET /polyfills.js HTTP/1.0" 200 144655 "http://localhost:8080/" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-frontend-1 | 172.19.0.5 -- [21/Mar/2024:15:14:35 +0000] "GET /polyfills.js HTTP/1.1" 200 144655 "http://localhost:8080/" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-proxy-1 | 172.19.0.1 -- [21/Mar/2024:15:14:35 +0000] "GET /main.js HTTP/1.0" 200 11842 "http://localhost:8080/" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-frontend-1 | 172.19.0.5 -- [21/Mar/2024:15:14:35 +0000] "GET /main.js HTTP/1.1" 200 11842 "http://localhost:8080/" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-proxy-1 | 172.19.0.1 -- [21/Mar/2024:15:14:35 +0000] "GET /vendor.js HTTP/1.0" 200 2573981 "http://localhost:8080/" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-frontend-1 | 172.19.0.5 -- [21/Mar/2024:15:14:35 +0000] "GET /vendor.js HTTP/1.1" 200 2573981 "http://localhost:8080/" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-proxy-1 | 172.19.0.1 -- [21/Mar/2024:15:14:35 +0000] "GET /favicon.ico HTTP/1.0" 200 948 "http://localhost:8080/" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-frontend-1 | 172.19.0.5 -- [21/Mar/2024:15:14:35 +0000] "GET /favicon.ico HTTP/1.1" 200 948 "http://localhost:8080/" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-proxy-1 | 172.19.0.1 -- [21/Mar/2024:15:14:35 +0000] "GET /api/number HTTP/1.1" 200 20 "http://localhost:8080/" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-backend-1 | warn: Microsoft.AspNetCore.HttpsPolicy.HttpsRedirectionMiddleware[3]
my-backend-1 | Failed to determine the https port for redirect.
my-proxy-1 | 172.19.0.1 -- [21/Mar/2024:15:14:36 +0000] "GET /api/number HTTP/1.1" 200 20 "http://localhost:8080/" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-frontend-1 | 172.19.0.5 -- [21/Mar/2024:15:14:45 +0000] "GET /runtime.js.map HTTP/1.0" 200 6282 "-" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-proxy-1 | 172.19.0.1 -- [21/Mar/2024:15:14:45 +0000] "GET /runtime.js.map HTTP/1.1" 200 6282 "-" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-frontend-1 | 172.19.0.5 -- [21/Mar/2024:15:14:45 +0000] "GET /styles.css.map HTTP/1.0" 200 230 "-" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-proxy-1 | 172.19.0.1 -- [21/Mar/2024:15:14:45 +0000] "GET /styles.css.map HTTP/1.1" 200 230 "-" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-frontend-1 | 172.19.0.5 -- [21/Mar/2024:15:14:45 +0000] "GET /polyfills.js.map HTTP/1.0" 200 162826 "-" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-proxy-1 | 172.19.0.1 -- [21/Mar/2024:15:14:45 +0000] "GET /polyfills.js.map HTTP/1.1" 200 162826 "-" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-frontend-1 | 172.19.0.5 -- [21/Mar/2024:15:14:45 +0000] "GET /main.js.map HTTP/1.0" 200 5156 "-" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-proxy-1 | 172.19.0.1 -- [21/Mar/2024:15:14:45 +0000] "GET /main.js.map HTTP/1.1" 200 5156 "-" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-frontend-1 | 172.19.0.5 -- [21/Mar/2024:15:14:45 +0000] "GET /vendor.js.map HTTP/1.0" 200 2648172 "-" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-proxy-1 | 172.19.0.1 -- [21/Mar/2024:15:14:45 +0000] "GET /vendor.js.map HTTP/1.1" 200 2648172 "-" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"
my-proxy-1 | 172.19.0.1 -- [21/Mar/2024:15:14:49 +0000] "POST /api/number HTTP/1.1" 200 0 "http://localhost:8080/" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 "-"

```

5

Настроить сети и тома для обеспечения связи между контейнерами и сохранения данных (исходные данные, логин, пароль и т.д.)

```

$ docker network ls
NETWORK ID          NAME                                DRIVER              SCOPE
3cf80dd718f8        bridge                            bridge              local
0621980444e8        docker-compose-example_default    bridge              local
72c48ae28733        host                              host                local
c52618405ba6        none                               null                local
7adf6b4b3fb4        project_default                    bridge              local

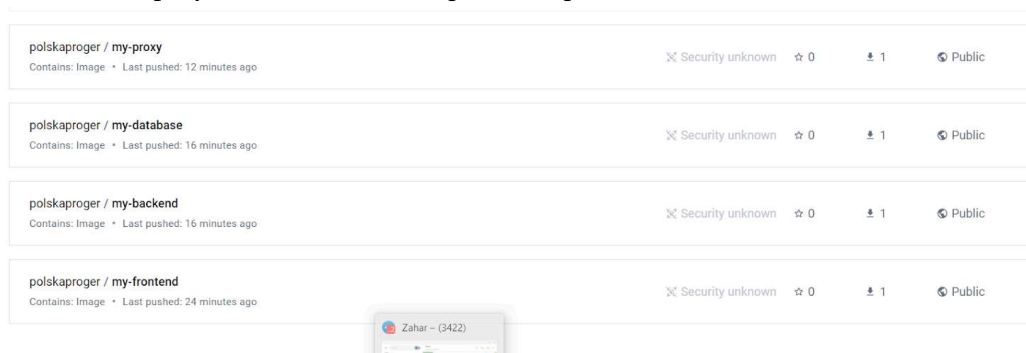
```

```

1  version: '3.9'
2  services:
3    my-proxy:
4      image: polskaproger/my-proxy
5      build: my-proxy
6      ports:
7        - "8080:80"
8      networks:
9        - mynetwork
10   my-frontend:
11     image: polskaproger/my-frontend
12     build: my-frontend
13     networks:
14       - mynetwork
15     depends_on:
16       - my-backend
17   my-backend:
18     image: polskaproger/my-backend
19     build: my-backend
20     environment:
21       - ConnectionStrings__Default
22     networks:
23       - mynetwork
24     depends_on:
25       - my-database
26   my-database:
27     image: polskaproger/my-database
28     build: my-database
29     environment:

```

6. Разместите результат в созданный репозиторий в DockerHub



7. Выполните следующие действия с целью изучить особенности сетевого взаимодействия:

- Получить информацию о всех сетях, работающих на текущем хосте и подробности о каждом типе сети


```

"Networks": {
  "my_new_network": {
    "IPAMConfig": null,
    "Links": null,
    "Aliases": [
      "24aaff17f338"
    ],
    "MacAddress": "02:42:ac:15:00:02",
    "NetworkID": "51045e131779c115f44f1a57e2ebabf5d8d26e03f99eef9934830e48c7c27d40",
    "EndpointID": "8499aa80a79e7a1a688c31fd8ea3cdd9a85df907c02a6136baf521ec3b7d878d",
    "Gateway": "172.21.0.1",
    "IPAddress": "172.21.0.2",
    "IPPrefixLen": 16,
    "IPv6Gateway": "",
    "GlobalIPv6Address": "",
    "GlobalIPv6PrefixLen": 0,
    "DriverOpts": null,
    "DNSNames": [
      "my_test_container",
      "24aaff17f338"
    ]
  }
}

```

```

dimat@LAPTOP-0PJ01U69 MINGW64 /d/University/253505/ИГМ/253505_Targonski_22/ИГИ/LR2/docker-compose-example (master)
$ docker network disconnect my_new_network my_test_container

dimat@LAPTOP-0PJ01U69 MINGW64 /d/University/253505/ИГМ/253505_Targonski_22/ИГИ/LR2/docker-compose-example (master)
$ docker inspect my_test_container

```

```

"Networks": {}

```

- Создать еще одну сеть bridge, вывести о ней всю информацию, запустить в ней три контейнера, подключиться к любому из контейнеров и пропинговать два других из оболочки контейнера, убедиться, что между контейнерами происходит общение по IP-адресу

```

dimat@LAPTOP-0PJ01U69 MINGW64 /d/University/253505/ИГМ/253505_Targonski_22/ИГИ/LR2/docker-compose-example (master)
$ docker network create -d bridge my_new_network_2
cc13e75c9e34010c6544764810bd2d348579a17e9facb7a32315f50ff564fbd6

dimat@LAPTOP-0PJ01U69 MINGW64 /d/University/253505/ИГМ/253505_Targonski_22/ИГИ/LR2/docker-compose-example (master)
$ docker network inspect my_new_network_2
[
  {
    "Name": "my_new_network_2",
    "Id": "cc13e75c9e34010c6544764810bd2d348579a17e9facb7a32315f50ff564fbd6",
    "Created": "2024-03-21T16:45:50.039558425Z",
    "Scope": "local",
    "Driver": "bridge",
    "EnableIPv6": false,
    "IPAM": {
      "Driver": "default",
      "Options": {},
      "Config": [
        {
          "Subnet": "172.22.0.0/16",
          "Gateway": "172.22.0.1"
        }
      ]
    },
    "Internal": false,
    "Attachable": false,
    "Ingress": false,
    "ConfigFrom": {
      "Network": ""
    },
    "ConfigOnly": false,
    "Containers": {},
    "Options": {},
    "Labels": {}
  }
]

```

```
$ docker network ls
NETWORK ID          NAME                DRIVER              SCOPE
3cf80dd718f8        bridge             bridge              local
0621980444e8        docker-compose-example_default    bridge              local
bc235e1a1a40        docker-compose-example_mynetwork  bridge              local
72c48ae28733        host               host                local
51045e131779        my_new_network     bridge              local
cc13e75c9e34        my_new_network_2   bridge              local
c52618405ba6        none               null                local
7adf6b4b3fb4        project_default    bridge              local
```

```
$ docker run --network my_new_network_2 --name container1 -d nginx
c92c3ee6d8936f1ca3645414ef8b82088c6a813d28b68f6a3f8d058eb2d9a6fd

$ docker run --network my_new_network_2 --name container2 -d nginx
aa000739637fecf52e83d2dbf82f90e69868a52b2ea38e48d0b60e7db8e6cb04

$ docker run --network my_new_network_2 --name container3 -d nginx
b29a1aa26eb9f0b325092fd8930d05bf5a2b145ec36a5a88fb549aa4e54fe9

$ docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED    STATUS    PORTS    NAMES
b29a1aa26eb9  nginx    "/docker-entrypoint..." 11 seconds ago Up 10 seconds 80/tcp   container3
aa000739637f  nginx    "/docker-entrypoint..." 16 seconds ago Up 15 seconds 80/tcp   container2
c92c3ee6d893  nginx    "/docker-entrypoint..." 22 seconds ago Up 21 seconds 80/tcp   container1
24aaaf17f338  nginx    "/docker-entrypoint..." 19 minutes ago Up 19 minutes 80/tcp   my_test_container
81b9269db564  polskaproger/my-frontend  "dotnet my-frontend-1" About an hour ago Up About an hour 80/tcp   docker-compose-example-my-frontend-1
282b4500e400  polskaproger/my-backend  "dotnet my-backend.d..." About an hour ago Up About an hour 80/tcp   docker-compose-example-my-backend-1
6317f03b1b9c  polskaproger/my-database "docker-entrypoint.s..." About an hour ago Up About an hour 3306/tcp, 33060/tcp docker-compose-example-my-database-1
ad70e873db26  polskaproger/my-proxy   "/docker-entrypoint..." About an hour ago Up About an hour 0.0.0.0:8080->80/tcp docker-compose-example-my-proxy-1
```

```
$ docker inspect container1
[
  {
    "Id": "c92c3ee6d8936f1ca3645414ef8b82088c6a813d28b68f6a3f8d058eb2d9a6fd",
    "Created": "2024-03-21T16:49:34.794220354Z",
    "Path": "/docker-entrypoint.sh",
    "Args": [
      "nginx",
      "-p",
      "daemon off;"
    ],
    "State": {
      "Status": "running",
      "Running": true,
      "Paused": false,
      "Restarting": false,
      "OOMKilled": false,
      "Dead": false,
      "Pid": 7845,
      "ExitCode": 0,
      "Error": "",
      "StartedAt": "2024-03-21T16:49:35.421579993Z",
      "FinishedAt": "0001-01-01T00:00:00Z"
    },
    "Image": "sha256:93b1f67642b62bb8e7e49169c346b30e20cd3c1c034d31087e46924b9312e",
    "ResolveConfPath": "/var/lib/docker/containers/c92c3ee6d8936f1ca3645414ef8b82088c6a813d28b68f6a3f8d058eb2d9a6fd/resolve_conf",
    "HostnamePath": "/var/lib/docker/containers/c92c3ee6d8936f1ca3645414ef8b82088c6a813d28b68f6a3f8d058eb2d9a6fd/hostname",
    "HostsPath": "/var/lib/docker/containers/c92c3ee6d8936f1ca3645414ef8b82088c6a813d28b68f6a3f8d058eb2d9a6fd/hosts",
    "LogPath": "/var/lib/docker/containers/c92c3ee6d8936f1ca3645414ef8b82088c6a813d28b68f6a3f8d058eb2d9a6fd/c92c3ee6d8936f1ca3645414ef8b82088c6a813d28b68f6a3f8d058eb2d9a6fd-json.log",
    "Name": "/container1",
    "RestartCount": 0,
    "Driver": "overlay2",
    "Platform": "linux"
  }
]
```

```
"Networks": {
  "my_new_network_2": {
    "IPAMConfig": null,
    "Links": null,
    "Aliases": [
      "c92c3ee6d893"
    ],
    "MacAddress": "02:42:ac:16:00:02",
    "NetworkID": "cc13e75c9e34010c6544764810bd2d348579a17e9facb7a32315f50ff564fbd6",
    "EndpointID": "311d2aecc531d415464ddbcc5864b797a4a5f943d6371aaa152f8b73448b7339",
    "Gateway": "172.22.0.1",
    "IPAddress": "172.22.0.2",
    "IPPrefixLen": 16,
    "IPv6Gateway": "",
    "GlobalIPv6Address": "",
    "GlobalIPv6PrefixLen": 0,
    "DNSOpts": null,
    "DNSNames": [
      "container1",
      "c92c3ee6d893"
    ]
  }
}
```

```
$ winpty docker exec -it container1 //bin//bash
root@c92c3ee6d893:/# ping 172.22.0.2
```



```

root@c92c3ee6d893:/# ping 172.22.0.3
PING 172.22.0.3 (172.22.0.3) 56(84) bytes of data.
64 bytes from 172.22.0.3: icmp_seq=1 ttl=64 time=0.193 ms
64 bytes from 172.22.0.3: icmp_seq=2 ttl=64 time=0.111 ms
64 bytes from 172.22.0.3: icmp_seq=3 ttl=64 time=0.112 ms
64 bytes from 172.22.0.3: icmp_seq=4 ttl=64 time=0.086 ms
^C
--- 172.22.0.3 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3116ms
rtt min/avg/max/mdev = 0.086/0.125/0.193/0.040 ms
root@c92c3ee6d893:/# |

```

```

root@c92c3ee6d893:/# ping 172.22.0.4
PING 172.22.0.4 (172.22.0.4) 56(84) bytes of data.
64 bytes from 172.22.0.4: icmp_seq=1 ttl=64 time=2.64 ms
64 bytes from 172.22.0.4: icmp_seq=2 ttl=64 time=0.265 ms
64 bytes from 172.22.0.4: icmp_seq=3 ttl=64 time=0.129 ms
64 bytes from 172.22.0.4: icmp_seq=4 ttl=64 time=1.15 ms
^C
--- 172.22.0.4 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3062ms
rtt min/avg/max/mdev = 0.129/1.046/2.644/1.001 ms

```

- Создать свою собственную сеть overlay, проверить, создана ли она, вывести о ней всю информацию

```

dimat@LAPTOP-0P301U69 MINGW64 /d/University/253505/ИГМ/253505_Targonski_22/IGI/LR2/docker-compose-example (master)
$ docker swarm init
Swarm initialized: current node (i3csvlr15htbkiq0u07d0pq69) is now a manager.

To add a worker to this swarm, run the following command:

    docker swarm join --token SWMTKN-1-3u32nwly09d49pvxdzneb46d6rssolaicko8jz17gicuk1zloj-b82w5zncq6quk7vb43zsjvp9f 192.168.65.3:2377

To add a manager to this swarm, run 'docker swarm join-token manager' and follow the instructions.

dimat@LAPTOP-0P301U69 MINGW64 /d/University/253505/ИГМ/253505_Targonski_22/IGI/LR2/docker-compose-example (master)
$ docker network create --driver=overlay my_overlay_network
jflpd894r4ks8479xuvtn63o

dimat@LAPTOP-0P301U69 MINGW64 /d/University/253505/ИГМ/253505_Targonski_22/IGI/LR2/docker-compose-example (master)
$ docker network ls

```

NETWORK ID	NAME	DRIVER	SCOPE
3cf80dd718f8	bridge	bridge	local
0621980444e8	docker-compose-example_default	bridge	local
bc235e1a1a40	docker-compose-example_mynetwork	bridge	local
e4b0eeba8bd2	docker_gwbridge	bridge	local
72c48ae28733	host	host	local
q5wtt13m0lcv	ingress	overlay	swarm
51045e131779	my_new_network	bridge	local
cc13e75c9e34	my_new_network_2	bridge	local
jflpd894r4ks	my_overlay_network	overlay	swarm
c52618405ba6	none	null	local
7adf6b4b3fb4	project_default	bridge	local

```
$ docker inspect my_overlay_network
[
  {
    "Name": "my_overlay_network",
    "Id": "jflpd894r4ks8479xuvtnw63o",
    "Created": "2024-03-21T17:32:57.297766332Z",
    "Scope": "swarm",
    "Driver": "overlay",
    "EnableIPv6": false,
    "IPAM": {
      "Driver": "default",
      "Options": null,
      "Config": [
        {
          "Subnet": "10.0.1.0/24",
          "Gateway": "10.0.1.1"
        }
      ]
    },
    "Internal": false,
    "Attachable": false,
    "Ingress": false,
    "ConfigFrom": {
      "Network": ""
    },
    "ConfigOnly": false,
    "Containers": null,
    "Options": {
      "com.docker.network.driver.overlay.vxlanid_list": "4097"
    },
    "Labels": null
  }
]
```

- Создать еще одну сеть overlay, проверить, создана ли она, вывести о ней всю информацию, удалить сеть

```
dimat@LAPTOP-0PJ0IU69 MINGW64 /d/University/253505/ИГМ/253505_Targonski_22/IGI/LR2/docker-compose-example (master)
$ docker network create --driver=overlay my_overlay_network_2
qf5np7v8flz0s6cgmcl742xck

dimat@LAPTOP-0PJ0IU69 MINGW64 /d/University/253505/ИГМ/253505_Targonski_22/IGI/LR2/docker-compose-example (master)
$ docker network ls

```

NETWORK ID	NAME	DRIVER	SCOPE
3cf80dd718f8	bridge	bridge	local
0621980444e8	docker-compose-example_default	bridge	local
bc235e1a1a40	docker-compose-example_mynetwork	bridge	local
e4b0eeba8bd2	docker_gwbridge	bridge	local
72c48ae28733	host	host	local
q5wt13m01cv	ingress	overlay	swarm
51045e131779	my_new_network	bridge	local
cc13e75c9e34	my_new_network_2	bridge	local
jflpd894r4ks	my_overlay_network	overlay	swarm
qf5np7v8flz0	my_overlay_network_2	overlay	swarm
c52618405ba6	none	null	local
7adf6b4b3fb4	project_default	bridge	local

```

dimat@LAPTOP-0PJ0IU69 MINGW64 /d/University/253505/ИГМ/253505_Targonski_22/IGI/LR2/docker-compose-example (master)
$ docker network rm my_overlay_network_2
my_overlay_network_2

dimat@LAPTOP-0PJ0IU69 MINGW64 /d/University/253505/ИГМ/253505_Targonski_22/IGI/LR2/docker-compose-example (master)
$ docker network ls

```

NETWORK ID	NAME	DRIVER	SCOPE
3cf80dd718f8	bridge	bridge	local
0621980444e8	docker-compose-example_default	bridge	local
bc235e1a1a40	docker-compose-example_mynetwork	bridge	local
e4b0eeba8bd2	docker_gwbridge	bridge	local
72c48ae28733	host	host	local
q5wt13m01cv	ingress	overlay	swarm
51045e131779	my_new_network	bridge	local
cc13e75c9e34	my_new_network_2	bridge	local
jflpd894r4ks	my_overlay_network	overlay	swarm
c52618405ba6	none	null	local
7adf6b4b3fb4	project_default	bridge	local

```

dimat@LAPTOP-0PJ0IU69 MINGW64 /d/University/253505/ИГМ/253505_Targonski_22/IGI/LR2/docker-compose-example (master)
$

```


- Попробовать создать сеть host, сохранить результат в отчет.

```
dimat@LAPTOP-0PJ0IU69 MINGW64 /d/University/253505/ИГР/253505_Targonski_22/IGI/LR2/docker-compose-example (master)
$ docker network create --driver=host my_host_network
Error response from daemon: only one instance of "host" network is allowed

dimat@LAPTOP-0PJ0IU69 MINGW64 /d/University/253505/ИГР/253505_Targonski_22/IGI/LR2/docker-compose-example (master)
$ docker network ls
NETWORK ID          NAME                DRIVER              SCOPE
3cf80dd718f8        bridge             bridge              local
0621980444e8        docker-compose-example_default    bridge              local
bc235e1a1a40        docker-compose-example_mynetwork  bridge              local
e4b0eeba8bd2        docker_gwbridge    bridge              local
72c48ae28733        host               host                local
q5wt113m01cv        ingress            overlay             swarm
51045e131779        my_new_network     bridge              local
cc13e75c9e34        my_new_network_2   bridge              local
jfpd894r4ks         my_overlay_network overlay             swarm
c52618405ba6        none               null                local
7adf6b4b3fb4        project_default    bridge              local
```