

Multi-Container Application Deployment with Docker

Containers:

MySQL database

Backend in Node.js

Nginx web server

Part 1: Setting Up the Environment

Docker version:

```
PS C:\Users\marko> docker --version
Docker version 27.4.0, build bde2b89
```

Part 2: Creating the Application

Creating a Docker Network:

```
PS C:\Users\marko> docker network create marcos-network
f874ed20ced99cf134c5807f18a6683320ab83126d449abb1cbcf7c446b6a670
```

Launching the Database (MySQL):

```
PS C:\Users\marko\Curso 2 DAM\PSyP\EjercicioDocker> docker run -d --name db --network marcos-network -e MYSQL_ROOT_PASSWORD=rootpassword -e MYSQL_DATABASE=testdb -p 3306:3306 mysql:5.7
Unable to find image 'mysql:5.7' locally
5.7: Pulling from library/mysql
20e4dcae4c69: Pull complete
1c56c3d4ce74: Pull complete
e9f83a1c24ce: Pull complete
68c3898c2015: Pull complete
6b95a940e7b6: Pull complete
90986bb8de6e: Pull complete
ae71319cb779: Pull complete
ffc89e9dfdb8: Pull complete
43d05e031908: Pull complete
064b2d298fba: Pull complete
df9a4d85569b: Pull complete
Digest: sha256:4bc6bc96e0d8443453676cae56536f4b8156d78bae03c0145cbe47c2aad73bb
Status: Downloaded newer image for mysql:5.7
6a9eb9ee0bfad2fb3dc94fb65eb72d2f453781e9a1154cfa24365f2e7eb614ad
```

Building the backend image:

```
PS C:\Users\marko\Curso 2 DAM\PSyP\EjercicioDocker> docker build -t marcos-backend .\backend\
[+] Building 2.1s (10/10) FINISHED
=> [internal] load build definition from Dockerfile                                docker:desktop-linux 0.1s
=> => transferring dockerfile: 132B                                              0.0s
=> [internal] load metadata for docker.io/library/node:18                       1.4s
=> [auth] library/node:pull token for registry-1.docker.io                     0.0s
=> [internal] load .dockerignore                                                 0.0s
=> => transferring context: 2B                                                    0.0s
=> [1/4] FROM docker.io/library/node:18@sha256:f12d34408955b2081f82078e8f96c3299ca0f38d11e76086cb9b9b1b669977e4 0.1s
=> => resolve docker.io/library/node:18@sha256:f12d34408955b2081f82078e8f96c3299ca0f38d11e76086cb9b9b1b669977e4 0.1s
=> [internal] load build context                                                0.1s
=> => transferring context: 60B                                                  0.0s
=> CACHED [2/4] WORKDIR /app                                                    0.0s
=> CACHED [3/4] COPY . .                                                        0.0s
=> CACHED [4/4] RUN npm install express mysql2                                0.0s
=> => exporting to image                                                         0.1s
=> => exporting layers                                                            0.0s
=> => writing image sha256:06705bb0976aa6d14a5a62f2c5abda8588355ce90934e5c9ff430be36b2d2b36 0.1s
=> => naming to docker.io/library/marcos-backend                             0.0s

View build details: docker-desktop://dashboard/build/desktop-linux/desktop-linux/v0tthbfhwd6yccg8lrfd07
```

Running the container:

```
PS C:\Users\marko\Curso 2 DAM\PSyP\EjercicioDocker> docker run -d --name marcosbackend --network marcos-network -p 3000:3000 marcos-backend b93fa9b3d0c447ea13831c898c7b5dcf96a68046c2d8e70bcad023700
```

```
PS C:\Users\marko\Curso 2 DAM\PSyP\EjercicioDocker> docker ps
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
b93fa9b3d0c4	marcos-backend	"docker-entrypoint.s..."	29 minutes ago	Up 33 seconds	0.0.0.0:3000->3000/tcp	marcosbackend
6a9eb9ee0bfa	mysql:5.7	"docker-entrypoint.s..."	33 minutes ago	Up 34 seconds	0.0.0.0:3306->3306/tcp, 33060/tcp	db

Building the Nginx image:

```
PS C:\Users\marko\Curso 2 DAM\PSyP\EjercicioDocker> docker build -t marcos-nginx .\nginx\
```

[*] Building 1.8s (8/8) FINISHED

docker:desktop-linux

=> [internal] load build definition from Dockerfile 0.1s

=> => transferring dockerfile: 106B 0.0s

=> [internal] load metadata for docker.io/library/nginx:latest 1.2s

=> [auth] library/nginx:pull token for registry-1.docker.io 0.0s

=> [internal] load .dockerignore 0.0s

=> => transferring context: 2B 0.0s

=> [internal] load build context 0.1s

=> => transferring context: 138B 0.0s

=> CACHED [1/2] FROM docker.io/library/nginx:latest@sha256:91734281c0ebfc6f1aea979cffe5d079cfe786228a71cc6f1f46a228cde0e34 0.0s

=> [2/2] COPY default.conf /etc/nginx/conf.d/default.conf 0.1s

=> exporting to image 0.1s

=> => exporting layers 0.2s

=> writing image sha256:c66e681786e065cd90b381a4ec06d63a1309d0906b0824a6f075cf631d50c40b 0.1s

=> => naming to docker.io/library/marcos-nginx 0.0s

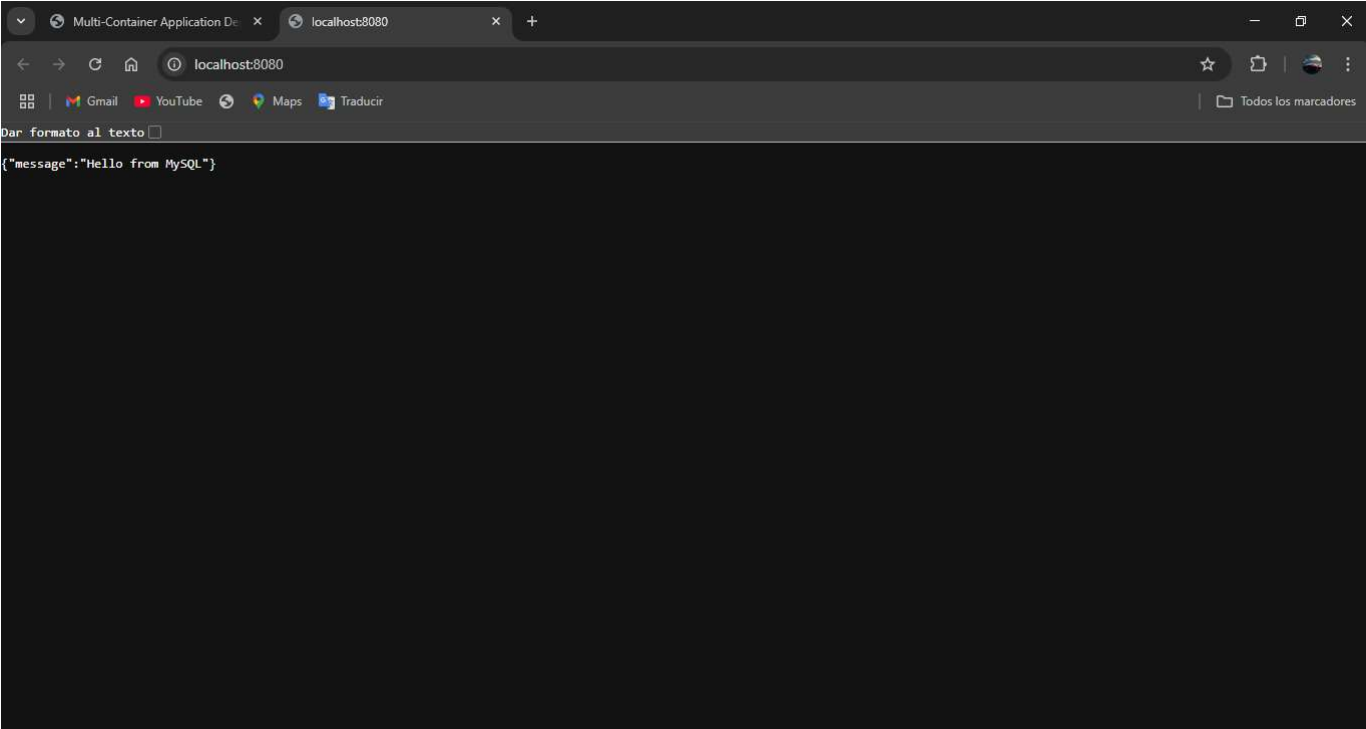
View build details: docker-desktop://dashboard/build/desktop-linux/desktop-linux/azn2a3uuntyu2yo3x3ns0fk8h

Running the container:

```
PS C:\Users\marko\Curso 2 DAM\PSyP\EjercicioDocker> docker run -d --name marcosweb --network marcos-network -p 8080:80 marcos-nginx 46717b320b89fafd2456aab3e9941fdaf94079557ea5778c424f0ad652b2067c
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
46717b320b89	marcos-nginx	"/docker-entrypoint..."	27 minutes ago	Up 5 seconds	0.0.0.0:8080->80/tcp	marcosweb
b93fa9b3d0c4	marcos-backend	"docker-entrypoint.s..."	31 minutes ago	Up 2 minutes	0.0.0.0:3000->3000/tcp	marcosbackend
6a9eb9ee0bfa	mysql:5.7	"docker-entrypoint.s..."	34 minutes ago	Up 2 minutes	0.0.0.0:3306->3306/tcp, 33060/tcp	db

Browser accessing http://localhost:8080:



Part 3: Management and Verification

Checking that all containers are running:

Containers

Give feedback

View all your running containers and applications. [Learn more](#)

Q Search

Only show running containers

	Name	Container ID	Image	Port(s)	CPU (%)	Last started	Actions
<input type="checkbox"/>	db	6a9eb9ee0bfa	mysql:5.7	3306:3306	0.08%	9 minutes ago	<div><div></div><div></div><div></div></div>
<input type="checkbox"/>	marcosbackend	b93fa9b3d0c4	marcos-backend	3000:3000	0%	6 minutes ago	<div><div></div><div></div><div></div></div>
<input type="checkbox"/>	marcosweb	46717b320b89	marcos-nginx	8080:80	0%	1 minute ago	<div><div></div><div></div><div></div></div>

PS C:\Users\marko\Curso 2 DAM\PSyP\EjercicioDocker> docker ps

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
46717b320b89	marcos-nginx	"/docker-entrypoint..."	3 minutes ago	Up 3 minutes	0.0.0.0:8080->80/tcp	marcosweb
b93fa9b3d0c4	marcos-backend	"docker-entrypoint.s..."	8 minutes ago	Up 8 minutes	0.0.0.0:3000->3000/tcp	marcosbackend
6a9eb9ee0bfa	mysql:5.7	"docker-entrypoint.s..."	11 minutes ago	Up 11 minutes	0.0.0.0:3306->3306/tcp, 33060/tcp	db

Inspecting the network and verify the connections:

```
"Containers": {
  "46717b320b89f9fd2456aab3e9941fda94079557ea5778c424f0ad652b2067c": {
    "Name": "marcosweb",
    "EndpointID": "d4b31cd3dde8261a93890833a94bbacd5f4458436fb1bbe214e06e34fd65458",
    "MacAddress": "02:42:ac:12:00:04",
    "IPv4Address": "172.18.0.4/16",
    "IPv6Address": ""
  },
  "6a0eb0eebfad2fb3dc94fb65eb72d2f453781e9a1154cfa24365f2e7eb614ad": {
    "Name": "db",
    "EndpointID": "d492bfe500d62c501e81d818f716e2e6cafa4b482b6d42beabc50b3f43368444",
    "MacAddress": "02:42:ac:12:00:02",
    "IPv4Address": "172.18.0.2/16",
    "IPv6Address": ""
  },
  "b93fa9b3db40322bc447ea13031c898c7b5dcf96a60046c2d8e70bcad823700": {
    "Name": "marcosbackend",
    "EndpointID": "7784a81e701f32483d110b3514ba3b328845f18f6858900a735f32a07a7e0a92",
    "MacAddress": "02:42:ac:12:00:03",
    "IPv4Address": "172.18.0.3/16",
    "IPv6Address": ""
  }
},
"Options": {},
"Labels": {}
```

Part 4: Demonstration

-Architecture diagram of this deployment:

