03 - Exercício - 04 Lab Docker e Desafio 1 – NOTA DE ENTREGA

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1° - Acessei o shell da EC2* via protocolo SSH.

```
mathe@Meunote MINGW64 ~/OneDrive/Documentos/Aulas SO/2° sem/DesafioMYSQL-contain
er
$ ssh -i "Desafio-EC2.pem" ubuntu@ec2-54-242-188-102.compute-1.amazonaws.com
The authenticity of host 'ec2-54-242-188-102.compute-1.amazonaws.com (54.242.188.102)' can't be established.
ED25519 key fingerprint is SHA256:Tg8jnw1WeEVf3i8LFQrUyl+RW2MFui4f3dCARjluOig.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-54-242-188-102.compute-1.amazonaws.com' (ED25519) to the list of known hosts.
Welcome to Ubuntu 24.04 LTS (GNU/Linux 6.8.0-1012-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

 System information as of Thu Sep 19 14:06:03 UTC 2024

  System load:  0.22              Processes:             118
  Usage of /:   6.6% of 23.17GB   Users logged in:       0
  Memory usage: 5%                IPv4 address for enX0: 172.31.18.224
  Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


The list of available updates is more than a week old.
To check for new updates run: sudo apt update


The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-18-224:~$ sudo apt update && sudo apt upgrade -y
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:4 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Packages [15.0 MB]
Get:6 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [377 kB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [81.4 kB]
Get:8 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Metadata [4516 B]
Get:9 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [269 kB]
Get:10 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en [113 kB]
Get:11 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [8632 B]
Get:12 http://security.ubuntu.com/ubuntu noble-security/universe amd64 c-n-f Metadata [10.1 kB]
Get:13 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [353 kB]
Get:14 http://security.ubuntu.com/ubuntu noble-security/restricted Translation-en [68.1 kB]
```

2° - Atualizando os pacotes do sistema:

```
ubuntu@ip-172-31-18-224:~$ sudo apt update && sudo apt upgrade -y
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:4 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Packages [15.0 MB]
Get:6 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [377 kB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [81.4 kB]
Get:8 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Metadata [4516 B]
Get:9 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [269 kB]
Get:10 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en [113 kB]
Get:11 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [8632 B]
Get:12 http://security.ubuntu.com/ubuntu noble-security/universe amd64 c-n-f Metadata [10.1 kB]
Get:13 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [353 kB]
Get:14 http://security.ubuntu.com/ubuntu noble-security/restricted Translation-en [68.1 kB]
Get:15 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 c-n-f Metadata [428 B]
Get:16 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Packages [10.9 kB]
Get:17 http://security.ubuntu.com/ubuntu noble-security/multiverse Translation-en [2808 B]
Get:18 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [208 B]
Get:19 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 c-n-f Metadata [344 B]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe Translation-en [5982 kB]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Components [3871 kB]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 c-n-f Metadata [301 kB]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 Packages [269 kB]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse Translation-en [118 kB]
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 Components [35.0 kB]
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 c-n-f Metadata [8328 B]
Get:27 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [530 kB]
Get:28 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main Translation-en [128 kB]
Get:29 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 c-n-f Metadata [8352 B]
Get:30 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [372 kB]
Get:31 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe Translation-en [153 kB]
Get:32 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [45.0 kB]
Get:33 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 c-n-f Metadata [14.3 kB]
Get:34 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Packages [353 kB]
Get:35 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/restricted Translation-en [68.1 kB]
Get:36 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 c-n-f Metadata [424 B]
Get:37 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Packages [14.4 kB]
Get:38 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse Translation-en [3608 B]
Get:39 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [212 B]
Get:40 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 c-n-f Metadata [532 B]
Get:41 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/main amd64 Components [208 B]
Get:42 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/main amd64 c-n-f Metadata [112 B]
Get:43 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/universe amd64 Packages [10.6 kB]
Get:44 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/universe Translation-en [10.8 kB]
Get:45 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/universe amd64 Components [17.6 kB]
Get:46 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/universe amd64 c-n-f Metadata [1104 B]
Get:47 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/restricted amd64 Components [216 B]
Get:48 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/restricted amd64 c-n-f Metadata [116 B]
Get:49 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 Components [212 B]
Get:50 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 c-n-f Metadata [116 B]
Fetched 29.0 MB in 5s (6429 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
139 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
```

3° - Instalando o Docker na EC2:

```
ubuntu@ip-172-31-18-224:~$ sudo apt install docker.io -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  bridge-utils containerd dns-root-data dnsmasq-base pigz runc ubuntu-fan
Suggested packages:
  ifupdown aufs-tools cgroupfs-mount | cgroup-lite debootstrap docker-buildx docker-compose-v2 docker-doc rinse zfs-fuse | zfsutils
The following NEW packages will be installed:
  bridge-utils containerd dns-root-data dnsmasq-base docker.io pigz runc ubuntu-fan
0 upgraded, 8 newly installed, 0 to remove and 10 not upgraded.
Need to get 76.8 MB of archives.
After this operation, 289 MB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 pigz amd64 2.8-1 [65.6 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 bridge-utils amd64 1.7.1-1ubuntu2 [33.9 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 runc amd64 1.1.12-0ubuntu3.1 [8599 kB]
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 containerd amd64 1.7.12-0ubuntu4.1 [38.6 MB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 dns-root-data all 2023112702~willsync1 [4450 B]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 dnsmasq-base amd64 2.90-2build2 [375 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 docker.io amd64 24.0.7-0ubuntu4.1 [29.1 MB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 ubuntu-fan all 0.12.16 [35.2 kB]
Fetched 76.8 MB in 1s (65.0 MB/s)
Preconfiguring packages ...
Selecting previously unselected package pigz.
(Reading database ... 98401 files and directories currently installed.)
Preparing to unpack .../0-pigz_2.8-1_amd64.deb ...
Unpacking pigz (2.8-1) ...
Selecting previously unselected package bridge-utils.
Preparing to unpack .../1-bridge-utils_1.7.1-1ubuntu2_amd64.deb ...
Unpacking bridge-utils (1.7.1-1ubuntu2) ...
Selecting previously unselected package runc.
Preparing to unpack .../2-runc_1.1.12-0ubuntu3.1_amd64.deb ...
Unpacking runc (1.1.12-0ubuntu3.1) ...
Selecting previously unselected package containerd.
Preparing to unpack .../3-containerd_1.7.12-0ubuntu4.1_amd64.deb ...
Unpacking containerd (1.7.12-0ubuntu4.1) ...
Selecting previously unselected package dns-root-data.
Preparing to unpack .../4-dns-root-data_2023112702~willsync1_all.deb ...
Unpacking dns-root-data (2023112702~willsync1) ...
Selecting previously unselected package dnsmasq-base.
Preparing to unpack .../5-dnsmasq-base_2.90-2build2_amd64.deb ...
Unpacking dnsmasq-base (2.90-2build2) ...
Selecting previously unselected package docker.io.
Preparing to unpack .../6-docker.io_24.0.7-0ubuntu4.1_amd64.deb ...
Unpacking docker.io (24.0.7-0ubuntu4.1) ...
Selecting previously unselected package ubuntu-fan.
Preparing to unpack .../7-ubuntu-fan_0.12.16_all.deb ...
Unpacking ubuntu-fan (0.12.16) ...
Setting up dnsmasq-base (2.90-2build2) ...
Setting up runc (1.1.12-0ubuntu3.1) ...
Setting up dns-root-data (2023112702~willsync1) ...
Setting up bridge-utils (1.7.1-1ubuntu2) ...
Setting up pigz (2.8-1) ...
Setting up containerd (1.7.12-0ubuntu4.1) ...
Created symlink /etc/systemd/system/multi-user.target.wants/containerd.service → /usr/lib/systemd/system/containerd.service.
Setting up ubuntu-fan (0.12.16) ...
Created symlink /etc/systemd/system/multi-user.target.wants/ubuntu-fan.service → /usr/lib/systemd/system/ubuntu-fan.service.
Setting up docker.io (24.0.7-0ubuntu4.1) ...
```

4° - “Puxando” a imagem do mysql do DockerHub:

```
ubuntu@ip-172-31-18-224:~$ sudo docker pull mysql:5.7
5.7: Pulling from library/mysql
20e4dcae4c69: Pull complete
1c56c3d4ce74: Pull complete
e9f03a1c24ce: Pull complete
68c3898c2015: Pull complete
6b95a940e7b6: Pull complete
90986bb8de6e: Pull complete
ae71319cb779: Pull complete
ffc89e9dfd88: Pull complete
43d05e938198: Pull complete
064b2d298fba: Pull complete
df9a4d85569b: Pull complete
Digest: sha256:4bc6bc963e6d8443453676cae56536f4b8156d78bae03c0145cbe47c2aad73bb
Status: Downloaded newer image for mysql:5.7
docker.io/library/mysql:5.7
ubuntu@ip-172-31-18-224:~$
```

5° - Instalando e configurando o container:

```
ubuntu@ip-172-31-18-224:~$ sudo docker run -d -p 3306:3306 --name DesafioDocker -e MYSQL_ROOT_PASSWORD=urubu100 -e MYSQL_DATABASE=Banco1 mysql:5.7
6987ae6edd184d99061abf8decb2de5bb299f374f710f40bec0726fd61841c33
ubuntu@ip-172-31-18-224:~$
```

6° - Verificando se o container foi instalado:

```
ubuntu@ip-172-31-18-224:~$ sudo docker ps -a
CONTAINER ID   IMAGE      COMMAND                  CREATED          STATUS          PORTS                                                  NAMES
6987ae6edd18   mysql:5.7  "docker-entrypoint.s…"   32 seconds ago   Up 31 seconds   0.0.0.0:3306->3306/tcp, :::3306->3306/tcp, 33060/tcp   DesafioDocker
ubuntu@ip-172-31-18-224:~$
```

7°- Executando o container e entrando no mysql:

```
ubuntu@ip-172-31-18-224:~$ sudo docker exec -it DesafioDocker bash
bash-4.2# mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 2
Server version: 5.7.44 MySQL Community Server (GPL)

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affiliates. Other names may be trademarks of their respective
owners.

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

mysql>
```

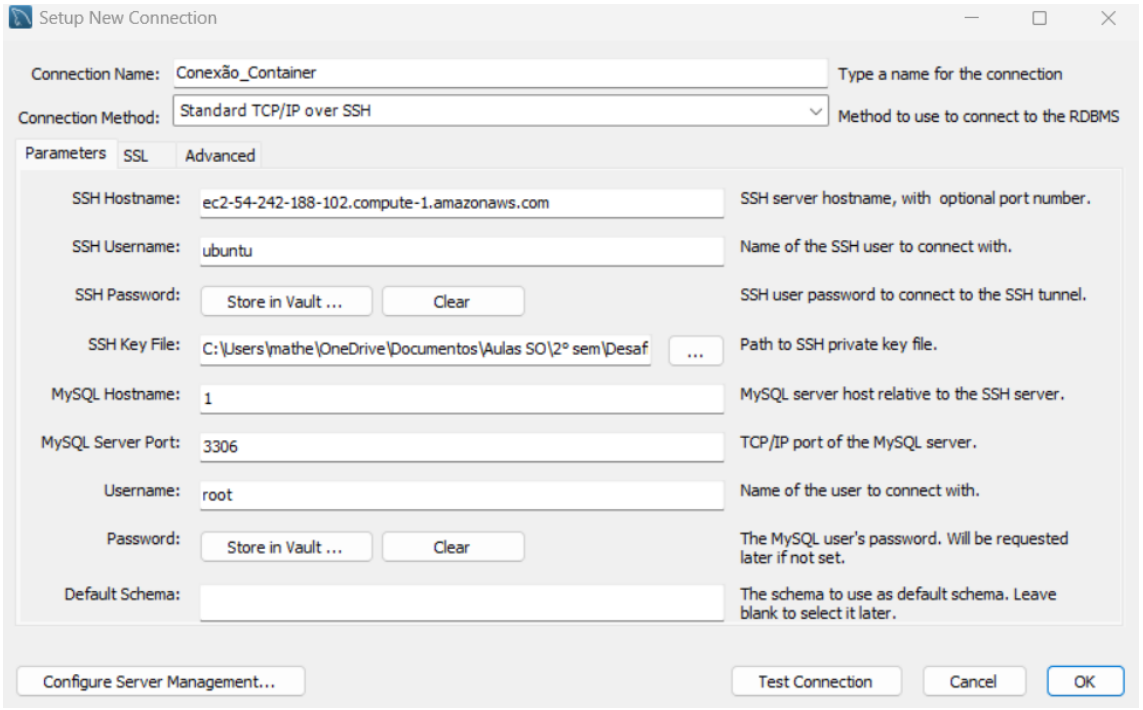
8° - Conferindo a presença do database criado:

```
mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| Banco1             |
| mysql              |
| performance_schema |
| sys                |
+--------------------+
5 rows in set (0.00 sec)

mysql>
```

9° - Copiando o DNS IPv4 público:

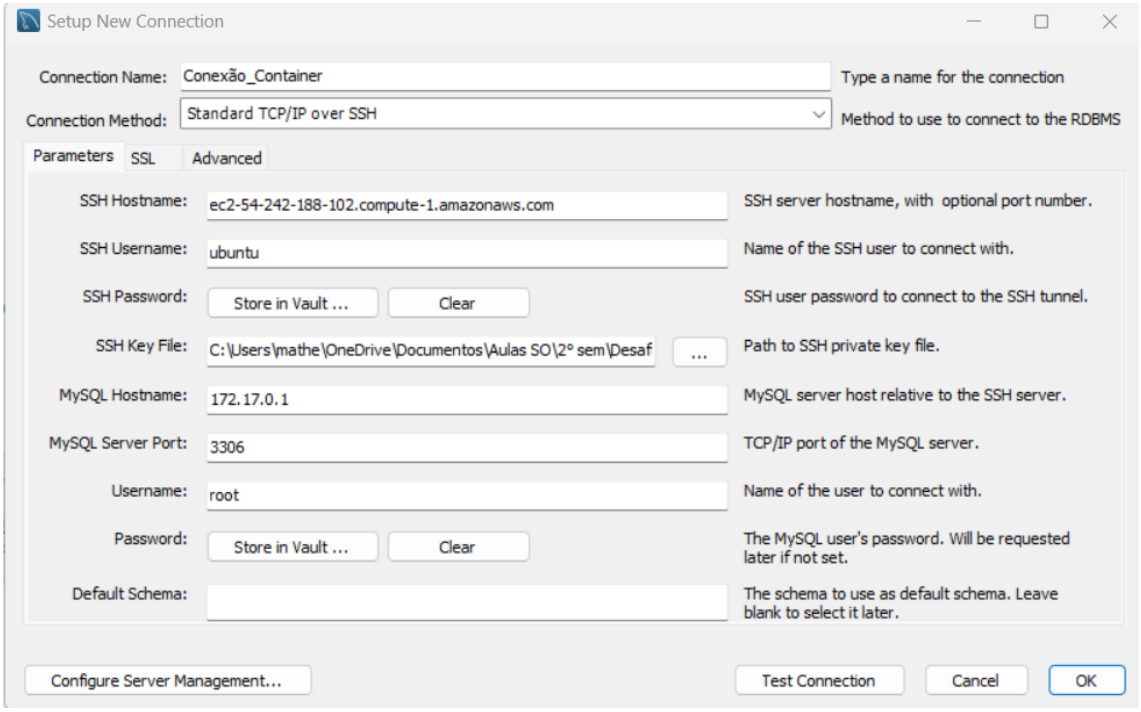
10° - Colando o DNS IPv4 público na nova extensão do banco de dados:



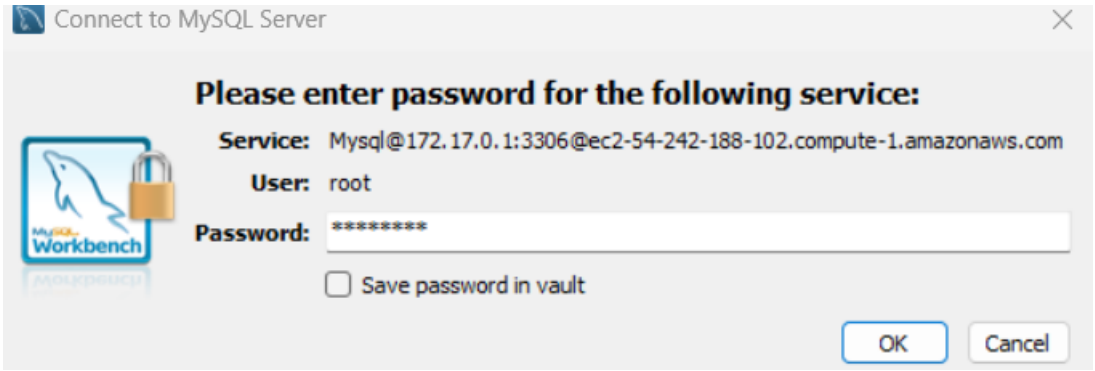
11° - Acessando as configurações privadas do contêiner:

12° - Copiando o IP privado do conteiner criado:

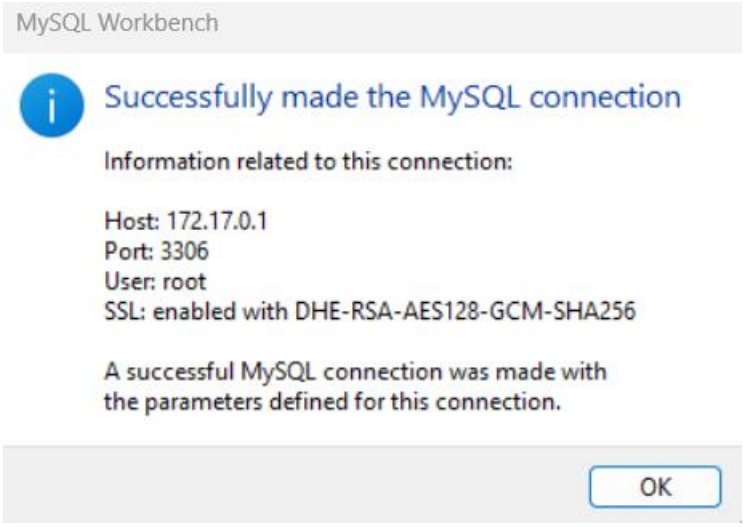
13° - Colando o IP privado do conteiner na nova extensão do banco de dados:



14° - Colocando a senha selecionada no momento de criação do contêiner:



15° - Conexão realizada com sucesso



Exercício 3 :

3.1 Imagens Docker para criação de container

As imagens Docker essenciais para a criação dos containers, elas contêm tudo o que é necessário para rodar um aplicativo. Quando uma imagem é criada, ela pode ser usada para criar diversos containers, que são instâncias isoladas dessa imagem, funcionando de forma independente.

3.2 Como o Dockerfile ajuda na criação das imagens Docker

O Dockerfile é composto por textos que estão dentro de um arquivo, os quais contém as instruções para construir uma imagem que poderá ser utilizada para criar containers. Ele define o ambiente necessário para rodar uma aplicação e a sequência de comandos que o Docker executa para criar a imagem.

3.3 Gerenciamento dos containers via Docker Compose

O Docker Compose é uma ferramenta utilizada na definição e gerenciamento de múltiplos containers Docker. Além de configurar containers, ela também disponibiliza a configuração de redes e volumes usando um arquivo YAML (docker-compose.yml), facilitando o monitoramento de ambientes mais complexos, como aplicações que dependem de servidores web., por exemplo.

3.4 Como é feita a comunicação entre containers criados pelo Docker?

A comunicação entre containers no Docker é facilitada pela criação de redes internas. Quando os diversos containers são executados em uma rede Docker, eles podem se comunicar entre si usando os nomes dos serviços definidos no docker-compose.yml ou através de endereços IP internos gerados automaticamente.