18-11-2025

Primer Trimestre DAW - Examen Trabajo Práctico

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ÍNDICE

Arquitectura

Carpetas - Estructura

```
C:\docker-lab>tree /f
Listado de rutas de carpetas para el volumen Acer
El número de serie del volumen es 365F-C2F1
C:.
    docker-compose.yml

├───bind
│   ├───config
│   │       named.conf
│   │       named.conf.options
│   │
│   │   └───zones
│   └───zones
│           db.172.20
│           db.milab.local
│
├───cliente-ubuntu
│       Dockerfile
│
└───nginx
        nginx.conf

    └───html
            estilos.css
            index.html


C:\docker-lab>
```

Estructura del Docker-compose.yml

Servidor dns

```yaml
version: '3.8'

services:
  # Servidor DNS con BIND9
  dns-server:
    image: ubuntu/bind9:latest
    container_name: dns-server
    hostname: dns
    ports:
      - "53:53/udp"
      - "53:53/tcp"
    volumes:
      - ./bind/config:/etc/bind
      - ./bind/zones:/etc/bind/zones
    networks:
      lab-network:
        ipv4_address: 172.20.0.10
    restart: unless-stopped
    command: |
      bash -c "
      named -g "
```

Servidor web nginx

```yaml
  # Servidor Web Nginx
  nginx-server:
    image: nginx:latest
    container_name: nginx-server
    hostname: nginx
    ports:
      - "80:80"
      - "443:443"
    volumes:
      - ./nginx/html:/usr/share/nginx/html
      - ./nginx/nginx.conf:/etc/nginx/conf.d/default.conf:ro
    networks:
      lab-network:
        ipv4_address: 172.20.0.20
    dns:
      - 172.20.0.10
    restart: unless-stopped
    depends_on:
      - dns-server
```
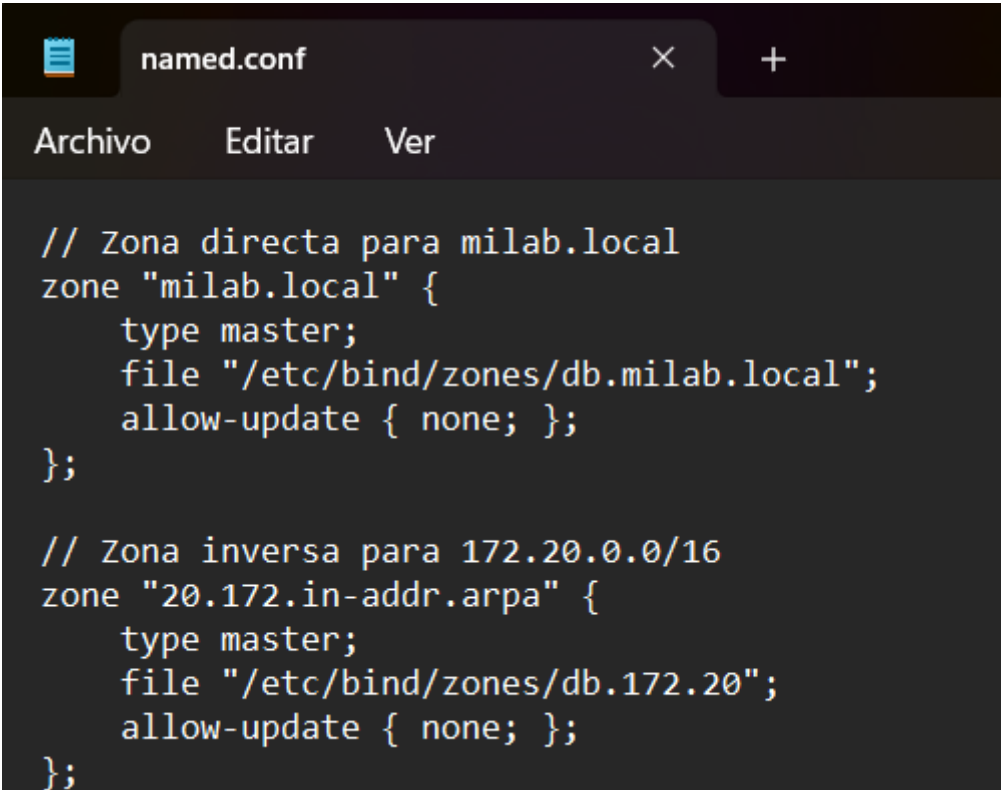
Cliente Ubuntu

```yaml
# Cliente Ubuntu
cliente-ubuntu:
  build:
    context: ./cliente-ubuntu
  container_name: cliente-ubuntu
  hostname: cliente
  stdin_open: true
  tty: true
  networks:
    lab-network:
      ipv4_address: 172.20.0.30
  dns:
    - 172.20.0.10
  dns_search:
    - milab.local
  restart: unless-stopped
  depends_on:
    - dns-server
    - nginx-server

networks:
  lab-network:
    driver: bridge
    ipam:
      config:
        - subnet: 172.20.0.0/16
          gateway: 172.20.0.1
```
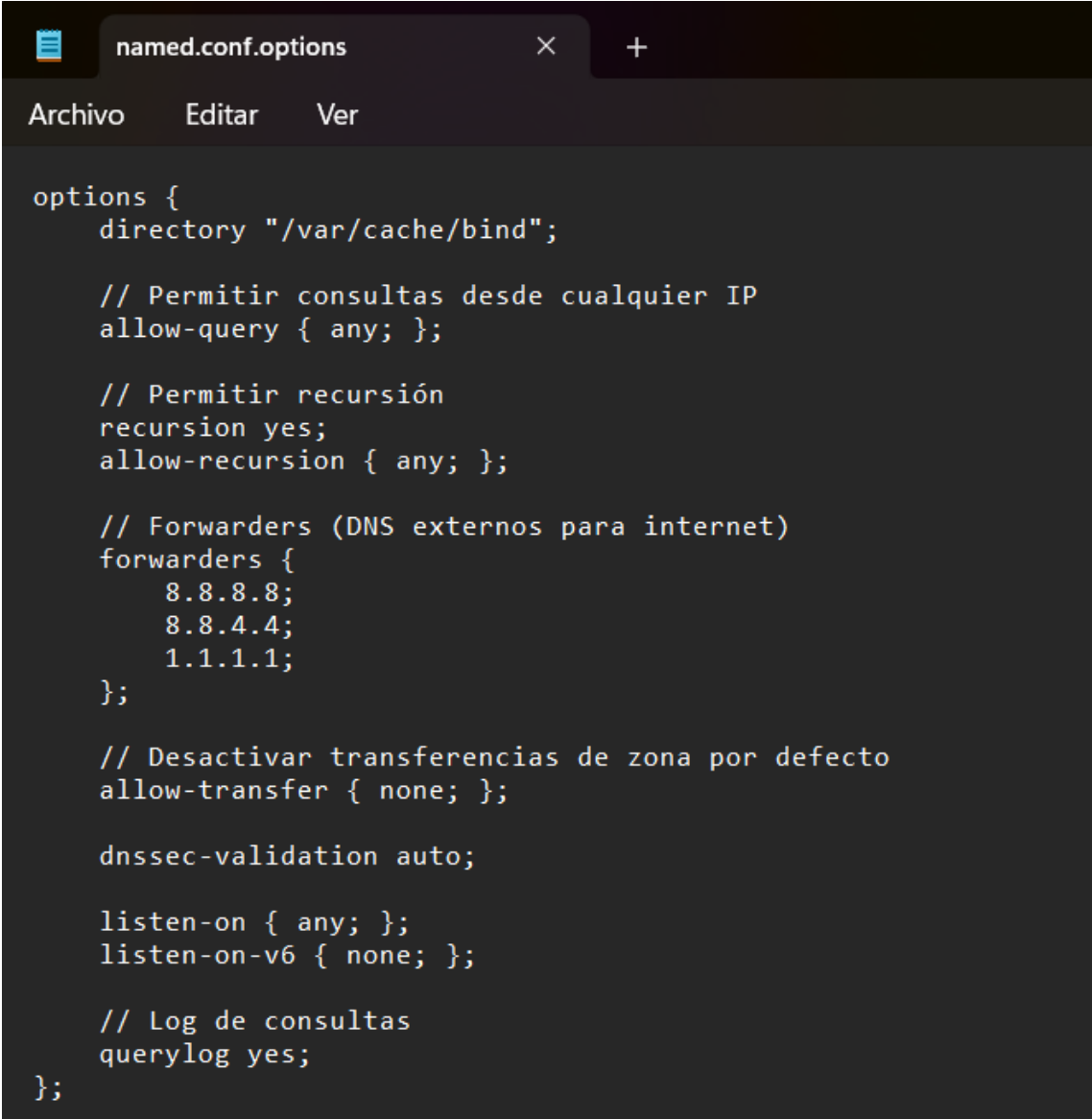
Archivos de configuración
DNS

```
named.conf                    ×    +

Archivo    Editar    Ver

// Zona directa para milab.local
zone "milab.local" {
    type master;
    file "/etc/bind/zones/db.milab.local";
    allow-update { none; };
};

// Zona inversa para 172.20.0.0/16
zone "20.172.in-addr.arpa" {
    type master;
    file "/etc/bind/zones/db.172.20";
    allow-update { none; };
};
```

```
options {
    directory "/var/cache/bind";

    // Permitir consultas desde cualquier IP
    allow-query { any; };

    // Permitir recursión
    recursion yes;
    allow-recursion { any; };

    // Forwarders (DNS externos para internet)
    forwarders {
        8.8.8.8;
        8.8.4.4;
        1.1.1.1;
    };

    // Desactivar transferencias de zona por defecto
    allow-transfer { none; };

    dnssec-validation auto;

    listen-on { any; };
    listen-on-v6 { none; };

    // Log de consultas
    querylog yes;
};
```

```
db.172.20                                    ×        +

Archivo      Editar      Ver

$TTL      604800
@         IN        SOA      dns.milab.local. admin.milab.local. (
                                  3             ; Serial
                               604800          ; Refresh
                                86400          ; Retry
                              2419200          ; Expire
                               604800 )        ; Negative Cache TTL
;
; Servidores de nombres
@         IN        NS       dns.milab.local.

; Registros PTR - Resolución inversa IP -> Nombre
10.0      IN        PTR      dns.milab.local.
20.0      IN        PTR      nginx.milab.local.
30.0      IN        PTR      cliente.milab.local.
```

```
db.milab.local                               ×        +

Archivo      Editar      Ver

$TTL      604800
@         IN        SOA      dns.milab.local. admin.milab.local. (
                                  3             ; Serial
                               604800          ; Refresh
                                86400          ; Retry
                              2419200          ; Expire
                               604800 )        ; Negative Cache TTL
;
; Servidores de nombres
@         IN        NS       dns.milab.local.

; Registros A - Dirección IP de cada host
dns             IN        A        172.20.0.10
nginx           IN        A        172.20.0.20
web             IN        A        172.20.0.20
cliente         IN        A        172.20.0.30

; Alias (CNAME)
www             IN        CNAME    nginx
servidor        IN        CNAME    nginx
webserver       IN        CNAME    nginx
```

CLIENTE UBUNTU

```
# Dockerfile correcto
FROM ubuntu:latest

ENV DEBIAN_FRONTEND=noninteractive

RUN apt-get update && \
    apt-get install -y curl wget dnsutils iputils-ping lynx net-tools && \
    rm -rf /var/lib/apt/lists/*

CMD ["bash"]
```

NGINX

```
server {
    listen 80;
    server_name localhost nginx.milab.local www.milab.local;

    root /usr/share/nginx/html;
    index index.html index.htm;

    location / {
        try_files $uri $uri/ =404;
    }

    location /status {
        return 200 "Nginx está funcionando correctamente\n";
        add_header Content-Type text/plain;
    }

    # Logs
    access_log /var/log/nginx/access.log;
    error_log /var/log/nginx/error.log;
}
```

C: > docker-lab > nginx > html > ⬜ index.html > ❖ html > ❖ body > ❖ div.container

```html
<!DOCTYPE html>
<html lang="es">
  <head>
    <meta charset="UTF-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <title>Servidor Nginx con Docker</title>
    <link rel="stylesheet" href="estilos.css" />
  </head>
  <body>
    <div class="container">
      <h1>Servidor Nginx</h1>
      <h2>BIND9 DNS</h2>

      <div class="info">
        <h3>Información del Sistema</h3>
        <p><strong>Servidor Web:</strong> Nginx</p>
        <p><strong>DNS:</strong> BIND9 (172.20.0.10)</p>
        <p><strong>Dominio:</strong> milab.local</p>
        <p><strong>IP Nginx:</strong> 172.20.0.20</p>
        <p><strong>IP Cliente:</strong> 172.20.0.30</p>
      </div>
    </div>
  </body>
</html>
```

index.html   estilos.css ✕

C: > docker-lab > nginx > html > estilos.css > ...

```css
body {
        font-family: Arial, sans-serif;
        max-width: 800px;
        margin: 50px auto;
        padding: 20px;
        background: #5A6FD6;
        color: white;
}
.container {
        background: rgba(255, 255, 255, 0.12);
        padding: 40px;
        border-radius: 15px;
        box-shadow: 0 8px 20px rgba(0, 0, 0, 0.2);
}
h1 {
        text-align: center;
        font-size: 2.5em;
        margin-bottom: 10px;
}
h2 {
        text-align: center;
        font-size: 1.2em;
        font-weight: normal;
        margin-bottom: 30px;
        opacity: 0.9;
}
.info {
        background: rgba(255, 255, 255, 0.15);
        padding: 20px;
        border-radius: 10px;
        margin: 20px 0;
}
.info p {
        margin: 10px 0;
        line-height: 1.6;
}
.status {
        text-align: center;
        font-size: 1.5em;
        color: #4ade80;
        font-weight: bold;
        margin: 30px 0;
}
```

COMANDOS Y COMPROBACIÓN DEL FUNCIONAMIENTO

Docker-compose up -d


```
C:\docker-lab>docker-compose up -d
time="2025-11-17T17:57:27+01:00" level=warning msg="C:\\docker-lab\\docker-c
ompose.yml: the attribute `version` is obsolete, it will be ignored, please
remove it to avoid potential confusion"
[+] Running 4/4
 ✔ Network docker-lab_lab-network   Created                              0.1s
 ✔ Container dns-server             Started                              1.7s
 ✔ Container nginx-server           Started                              2.2s
 ✔ Container cliente-ubuntu         Start...                             2.3s

C:\docker-lab>
```
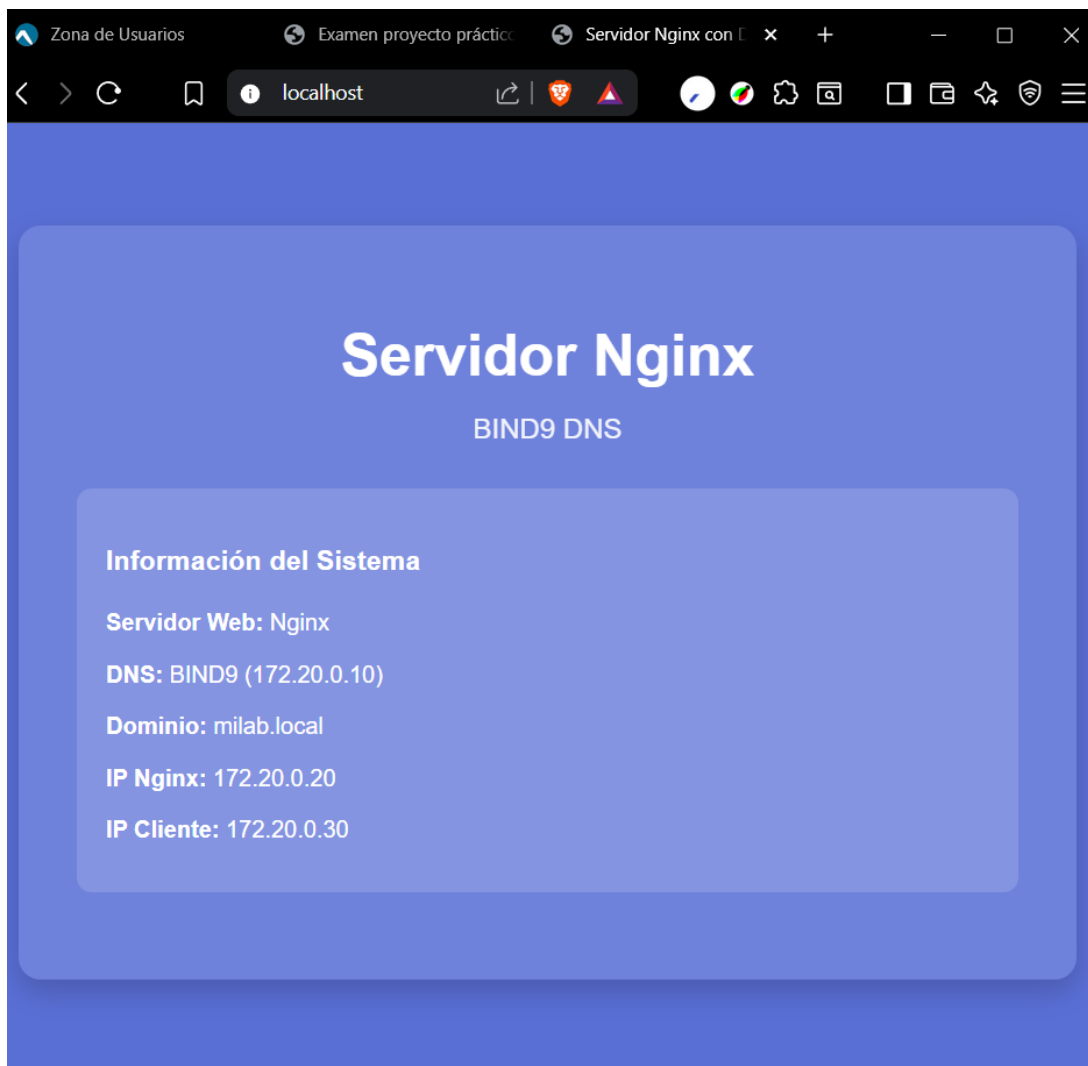
Docker-compose ps


```
C:\docker-lab>docker-compose ps
time="2025-11-17T21:06:16+01:00" level=warning msg="C:\\docker-lab\\docker-compose.yml: the attribute `version` is obsol
ete, it will be ignored, please remove it to avoid potential confusion"
NAME            IMAGE                      COMMAND               SERVICE        CREATED         STATUS
PORTS
cliente-ubuntu  docker-lab-cliente-ubuntu  "bash"                cliente-ubuntu  57 minutes ago  Up 55 minutes
dns-server      ubuntu/bind9:latest        "docker-entrypoint.s…"  dns-server    57 minutes ago  Up 56 minutes
0.0.0.0:53->53/tcp, 0.0.0.0:53->53/udp, [::]:53->53/tcp, [::]:53->53/udp
nginx-server    nginx:latest               "/docker-entrypoint.…"  nginx-server  57 minutes ago  Up 56 minutes
0.0.0.0:80->80/tcp, [::]:80->80/tcp, 0.0.0.0:443->443/tcp, [::]:443->443/tcp

C:\docker-lab>
```
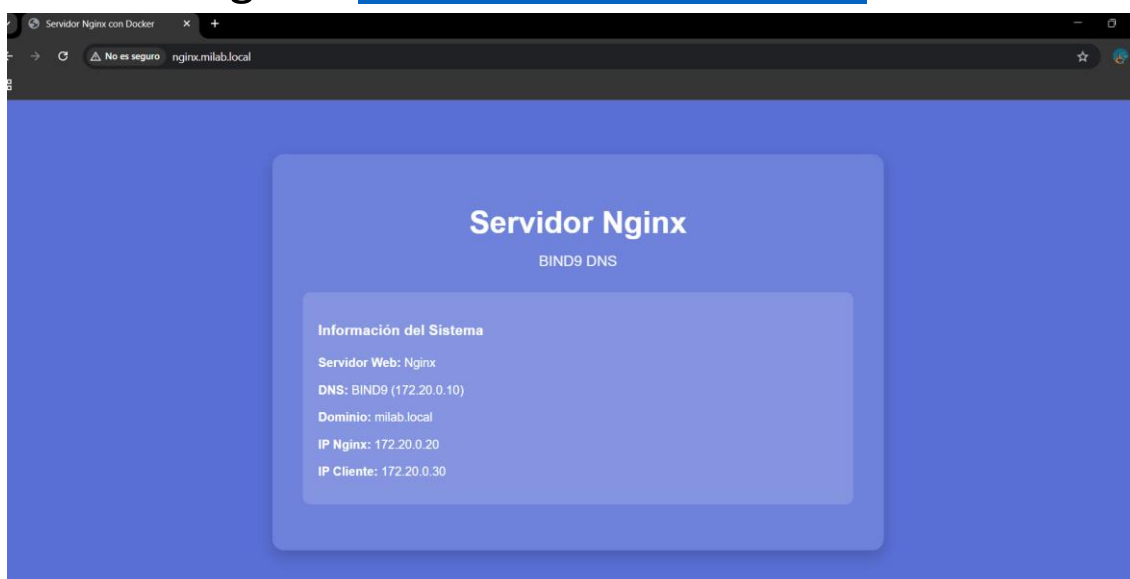
Vista desde el docker desktop

Servidor nginx - localhost

Servidor nginx - http://nginx.milab.local

Pruebas de funcionamiento

Cliente:

Hostname -I

```
root@cliente:/# hostname —I
172.20.0.30
```

Nslookup nginx.milab.local

```
root@cliente:/# nslookup nginx.milab.local
Server:         127.0.0.11
Address:        127.0.0.11#53

Name:    nginx.milab.local
Address: 172.20.0.20

root@cliente:/#
```

Ping 172.20.0.20

```
root@cliente:/# ping 172.20.0.20
PING 172.20.0.20 (172.20.0.20) 56(84) bytes of data.
64 bytes from 172.20.0.20: icmp_seq=1 ttl=64 time=0.158 ms
64 bytes from 172.20.0.20: icmp_seq=2 ttl=64 time=0.102 ms
64 bytes from 172.20.0.20: icmp_seq=3 ttl=64 time=0.166 ms
64 bytes from 172.20.0.20: icmp_seq=4 ttl=64 time=0.132 ms
^C
--- 172.20.0.20 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 2998ms
rtt min/avg/max/mdev = 0.102/0.139/0.166/0.025 ms
root@cliente:/# ping 172.20.0.30
PING 172.20.0.30 (172.20.0.30) 56(84) bytes of data.
64 bytes from 172.20.0.30: icmp_seq=1 ttl=64 time=0.152 ms
64 bytes from 172.20.0.30: icmp_seq=2 ttl=64 time=0.063 ms
64 bytes from 172.20.0.30: icmp_seq=3 ttl=64 time=0.091 ms
^C
--- 172.20.0.30 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2008ms
rtt min/avg/max/mdev = 0.063/0.102/0.152/0.037 ms
root@cliente:/#
```

Ping dns.milab.local

```
root@cliente:/# ping dns.milab.local
PING dns.milab.local (172.20.0.10) 56(84) bytes of data.
64 bytes from dns-server.docker-lab_lab-network (172.20.0.10): icmp_seq=1 ttl=64 time=0.106 ms
64 bytes from dns-server.docker-lab_lab-network (172.20.0.10): icmp_seq=2 ttl=64 time=0.165 ms
64 bytes from dns-server.docker-lab_lab-network (172.20.0.10): icmp_seq=3 ttl=64 time=0.168 ms
^C
--- dns.milab.local ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2000ms
rtt min/avg/max/mdev = 0.106/0.146/0.168/0.028 ms
root@cliente:/#
```

Servidor nginx

Hostname -I

```
root@nginx:/# hostname -I
172.20.0.20
root@nginx:/#
```

Servidor dns

Hostname -I

```
C:\docker-lab>docker exec -it dns-server bash
root@dns:/# hostname -I
172.20.0.10
root@dns:/#
```

Windows

```
C:\docker-lab>nslookup nginx.milab.local 127.0.0.1
Servidor:   UnKnown
Address:   127.0.0.1

Nombre:   nginx.milab.local
Address:   172.20.0.20


C:\docker-lab>
```

Enlace a github

https://github.com/HsJm03/Docker_DAW_1EVA.git