# Universidade do Minho - Dep.<sup>to</sup> Informática

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# Trabalho Prático Nº1

# Virtualização de Redes

MERSTEL

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**VR**

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1. How to create a container from a Linux alpine that has the container 9999 port mapped in the host 8668. It should also have a bind mount, mounting the container /home/internal_dir in the hosts /home/user/docker_dir/.

$docker run -it --name alpine -p 8668:9999 ubuntu:latest /bin/bash -v /home/et007/docker_dir/:/home/internal_dir ubuntu:latest/bin/bash

```
et007@et007:~$ docker run -it --name alpine -p 8668:9999 ubuntu:latest /bin/bash -v /home/et007/docker_dir/:/home/internal_dir ubuntu
:latest/bin/bash
/bin/bash: /home/et007/docker_dir/:/home/internal_dir: No such file or directory
```

2. How to create the volume "my-volume-1"? (a) What is the volume mountpoint? (b) Which driver is being used?

$docker volume create my-volume-1

```
et007@et007:~$ docker volume create my-volume-1
my-volume-1
```

$docker volume inspect my-volume-1

a) O Mountpoint é o directorio da imagem.
b) "local"

```
et007@et007:~$ docker volume inspect my-volume-1
[
    {
        "CreatedAt": "2021-03-13T05:57:14+03:00",
        "Driver": "local",
        "Labels": {},
        "Mountpoint": "/var/lib/docker/volumes/my-volume-1/_data",
        "Name": "my-volume-1",
        "Options": {},
        "Scope": "local"
    }
]
```

3. Create two basic containers (They should not be attached to any manually created network).
(a) Is it possible to inspect the bridge network and find their IP addresses?
(b) Is it possible for the containers to communicate among themselves using their names?
(c) And with their IPs?

**$docker run -it --name net01 ubuntu:latest /bin/bash**
**$docker run -it --name  net02 ubuntu:latest /bin/bash**

```
et007@et007:~$ docker run -it --name net01 ubuntu:latest /bin/bash
root@b65377917e39:/# exit
exit
et007@et007:~$ docker run -it --name net02 ubuntu:latest /bin/bash
root@ec497edf4d56:/#
```

a) Sim, na figura abaixo podemos verificar os IPs

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```
{
    "Name": "bridge",
    "Id": "2243a63924970c0fa8f888a62dcc1c60ea8895487ddc03c42872f35c539bc31b",
    "Created": "2021-03-12T14:41:50.716275762+03:00",
    "Scope": "local",
    "Driver": "bridge",
    "EnableIPv6": false,
    "IPAM": {
        "Driver": "default",
        "Options": null,
        "Config": [
            {
                "Subnet": "172.17.0.0/16",
                "Gateway": "172.17.0.1"
            }
        ]
    },
    "Internal": false,
    "Attachable": false,
    "Ingress": false,
    "ConfigFrom": {
        "Network": ""
    },
    "ConfigOnly": false,
    "Containers": {
        "d457d970998ea096de5193b36a8eebf2faa31549795d9afb2da23591762f220e": {
            "Name": "alpine-net-2",
            "EndpointID": "89ebe78daca8d7f523b34b9c45da09c3887706c5c5bc957cdbb64c0962093fdb",
            "MacAddress": "02:42:ac:11:00:03",
            "IPv4Address": "172.17.0.3/16",
            "IPv6Address": ""
        }
    },
    "Options": {
        "com.docker.network.bridge.default_bridge": "true",
        "com.docker.network.bridge.enable_icc": "true",
        "com.docker.network.bridge.enable_ip_masquerade": "true",
        "com.docker.network.bridge.host_binding_ipv4": "0.0.0.0",
```

b) Não, não é possível comunicar atraves dos nome

```
et007@et007:~$ ping alpine-net-2
ping: alpine-net-2: Nome ou serviço desconhecido
et007@et007:~$ ping alpine-net-1
ping: alpine-net-1: Nome ou serviço desconhecido
```

c) Sim, os container consegeum comunicar através dos IPs

```
et007@et007:~$ ping 172.17.0.3
PING 172.17.0.3 (172.17.0.3) 56(84) bytes of data.
64 bytes de 172.17.0.3: icmp_seq=1 ttl=64 tempo=0.116 ms
64 bytes de 172.17.0.3: icmp_seq=2 ttl=64 tempo=0.155 ms
64 bytes de 172.17.0.3: icmp_seq=3 ttl=64 tempo=0.119 ms
64 bytes de 172.17.0.3: icmp_seq=4 ttl=64 tempo=0.170 ms
^C
--- 172.17.0.3 estatísticas de ping ---
4 pacotes transmitidos, 4 recebidos, 0% perda de pacote, tempo 3071ms
rtt min/avg/max/mdev = 0.116/0.140/0.170/0.023 ms
```

4. What is the command to create the network "my-network-1"?

```
$docker network create my-network-1
```

```
et007@et007:~$ docker network create my-network-1
d1e8a811460ebbc0091b5bff2a061ada00a90b9897595509d59cc92a0a3e3aaf
```

(a) How to attach two containers to that network?

```
et007@et007:~$ docker run -dit --name netone --network my-network-1 ubuntu:latest /bin/bash docker run -dit-name nettwo --network my-network-1 ubuntu:
latest /bin/bash
5f954dc8a9154c9e5dc417346878ff6ffbb33130fcf2b87862b18cdcc6a2dc5f
et007@et007:~$ docker run -dit --name nettwo --network my-network-1 ubuntu:latest /bin/bash docker run -dit-name nettwo --network my-network-1 ubuntu:
latest /bin/bash
4c79c86c73b4759f63cae7bda5e28cb8bf54d44a7987ef3500e8f266d286935e
et007@et007:~$
```

(b) Which relevant parameter is possible to found about that network?

Através do inspect à network podemos observar vários dados: Id, Nome, Subnet, Driver, Gateway,containners …

$docker network inspect my-network-1

```
et007@et007:~$ docker network inspect my-network-1
[
    {
        "Name": "my-network-1",
        "Id": "00685b9abeac45543c6442aa72decf6faf1a34d5df990fa173b41b6c6a7f2b4a",
        "Created": "2021-03-14T22:26:27.790992411+03:00",
        "Scope": "local",
        "Driver": "bridge",
        "EnableIPv6": false,
        "IPAM": {
            "Driver": "default",
            "Options": {},
            "Config": [
                {
                    "Subnet": "172.18.0.0/16",
                    "Gateway": "172.18.0.1"
                }
            ]
        },
        "Internal": false,
        "Attachable": false,
        "Ingress": false,
        "ConfigFrom": {
            "Network": ""
        },
        "ConfigOnly": false,
        "Containers": {
            "11e7b7a270b1dd181c13c78d53d66c47ca1707c7fb2c23b071a2a798545d82ff": {
                "Name": "net_1",
                "EndpointID": "aba7334478b2193c7f91c013bb905d3864a03ad3cf290c02d66d1516084f4533",
                "MacAddress": "02:42:ac:12:00:02",
                "IPv4Address": "172.18.0.2/16",
                "IPv6Address": ""
            },
            "2614ff3567acbc9ab5f4b98ddcdad044226248389a3cb8b4aca2f30c36d05701": {
                "Name": "net_2",
                "EndpointID": "385f44fcac1aaa75fa185f9a503723ef175e5ccb909dbfb1b718f9c49434ee63",
                "MacAddress": "02:42:ac:12:00:03",
                "IPv4Address": "172.18.0.3/16",
                "IPv6Address": ""
            }
        },
        "Options": {},
        "Labels": {}
    }
]
```

(c) Can the containers ping one another using their name?

Sim, é possível fazer a comunicação

5) Which were the results obtained from the commands docker network ls, docker network inspect and docker volume ls in section 1 of this document? What conclusions is possible to take from the result of these commands?

Que todas tarefas foram concluidas de acordo as instruções aprendidas para criação de conteineres, volumes e network. Podemos concluir que, as tarefas foram executadas com exito e que esta tudo funcionando.

6)

Docker compose: IMAGEM
Para correr o ficheiro corremos o comando:
docker-compose up -d

```
 1 version: '3'
 2 services:
 3   alpine:
 4     image: alpine:latest
 5     ports:
 6       - "8888:9999"
 7     container_name: alpine_ctn
 8     hostname: alpine
 9     networks:
10       - some-net
11     volumes:
12       - type: volume
13         source: mydata
14         target: /data
15         volume:
16           nocopy: true
17       - type: bind
18         source: ./static
19         target: /home/et007/Documentos/Docker
20   ubuntu:
21     image: ubuntu:latest
22     ports:
23       - "8088:80"
24     container_name: ubuntu_ctn
25     networks:
26       - some-net
27     volumes:
28       - type: volume
29         source: mydata
30         target: /data
31 networks:
32   some-net:
33     driver: bridge
34 volumes:
35   mydata:
```

```
root@et007:/home/et007/Desktop/virt_redes# docker-compose up
Starting ubuntu_ctn ... done
Creating alpine_ctn ... done
Attaching to ubuntu_ctn, alpine_ctn
ubuntu_ctn exited with code 0
alpine_ctn exited with code 0
```

7)

```
1 FROM ubuntu:latest
2 EXPOSE 8668
3 RUN apt-get update && apt-get -y install netcat
4 VOLUME /home/output
5 ENTRYPOINT ["/bin/nc", "-k", "-l", "-p", "8668", "-vv"]
```

8)

```
Successfully tagged erikson_image:0.1
root@et007:/home/et007/Desktop/virt_redes# docker images
REPOSITORY        TAG        IMAGE ID        CREATED           SIZE
erikson_image     0.1        33f7e571d805    33 seconds ago    101MB
httpd             latest     ae15ff2bdcb4    2 days ago        138MB
mongo             latest     bbfd3e575f12    10 days ago       449MB
ubuntu            latest     4dd97cefde62    10 days ago       72.9MB
node              latest     135b0832eaab    11 days ago       937MB
alpine            latest     e50c909a8df2    6 weeks ago       5.61MB
gns3/xeyes        latest     3b554d93ae25    6 weeks ago       155MB
ubuntu            <none>     f63181f19b2f    7 weeks ago       72.9MB
hello-world       latest     bf756fb1ae65    14 months ago     13.3kB
gns3/ipterm       latest     39d9f0350e12    2 years ago       148MB
root@et007:/home/et007/Desktop/virt_redes#
```

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