TASK 1

Creation d'un reseau

```
PS C:\Users\shadr> docker network create reseau_ynov
004160e0bb4aa67f7da13293fa92ef258c8ec940f9bf4cb247336c08845e3120
PS C:\Users\shadr> docker network ls
NETWORK ID      NAME            DRIVER      SCOPE
5413952e4864    bridge          bridge      local
a1ead3ff5eb7    host            host        local
bf06d0c3b14e    none            null        local
004160e0bb4a    reseau_ynov     bridge      local
a19ad081833e    ynov_network    bridge      local
PS C:\Users\shadr>
```

Creation de notre db container avec mariadb

docker run -d --name ynovdb --network reseau_ynov -e MYSQL_ROOT_PASSWORD=test1234 -e
MYSQL_DATABASE=ynov_db -e MYSQL_USER=ynov_user -e MYSQL_PASSWORD=test1234 -v
data:/var/lib/mysql mariadb

```
PS C:\Users\shadr> docker run -d --name ynovdb --network reseau_ynov -e MYSQL_ROOT_PASSWORD=test1234 -e MYSQL_DATABASE=y
nov_db -e MYSQL_USER=ynov_user -e MYSQL_PASSWORD=test1234 -v data:/var/lib/mysql mariadb
b38d6dfd3356782e06a6a311a1e223da465f47a0cca3f4798d6937fe5c3f5b27
PS C:\Users\shadr>
```

Creation de notre front container prestashop

docker run -d --name frontend --network reseau_ynov -e DB_SERVER=mariadb_ynov -e
DB_NAME=ynov_db -e DB_USER=ynov_user -e DB_PASSWD=test1234 -p 8080:80 -v
frontend_data:/var/data/html prestashop/prestashop

```
PS C:\Users\shadr> docker run -d --name frontend --network reseau_ynov -e DB_SERVER=mariadb_ynov -e DB_NAME=ynov_db -e D
B_USER=ynov_user -e DB_PASSWD=test1234 -p 8080:80 -v frontend_data:/var/data/html prestashop/prestashop
198d64de2e5ae9e3fccbb98dce94febdfd2791427c19fe66ea7b0d4579690389
PS C:\Users\shadr>
```

Installation de la commande ping dans ynovdb

```
PS C:\Users\shadr> docker exec -it ynovdb bash
root@b38d6dfd3356:/# apt-get update
Get:1 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:3 http://archive.ubuntu.com/ubuntu jammy InRelease [270 kB]
Get:4 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [44.0 kB]
Get:5 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [1282 kB]
Get:2 https://archive.mariadb.org/mariadb-11.2.2/repo/ubuntu jammy InRelease [7764 B]
Get:6 https://archive.mariadb.org/mariadb-11.2.2/repo/ubuntu jammy/main amd64 Packages [16.1 kB]
Get:7 https://archive.mariadb.org/mariadb-11.2.2/repo/ubuntu jammy/main/debug amd64 Packages [17.2 kB]
Get:8 http://archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:9 http://archive.ubuntu.com/ubuntu jammy-backports InRelease [109 kB]
Get:10 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [1036 kB]
Get:11 http://archive.ubuntu.com/ubuntu jammy/main amd64 Packages [1792 kB]
Get:12 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [1512 kB]
Get:13 http://archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [17.5 MB]
Get:14 http://archive.ubuntu.com/ubuntu jammy/restricted amd64 Packages [164 kB]
Get:15 http://archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [266 kB]
Get:16 http://archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [49.8 kB]
Get:17 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1304 kB]
Get:18 http://archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [1538 kB]
Get:19 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [1552 kB]
Get:20 http://archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [32.6 kB]
Get:21 http://archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [78.3 kB]
Fetched 28.8 MB in 9s (3373 kB/s)
Reading package lists... Done
```

```
root@b38d6dfd3356:/# apt-get install iputils-ping
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  iputils-ping
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 42.9 kB of archives.
After this operation, 116 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu jammy/main amd64 iputils-ping amd64 3:20211215-1 [42.9 kB]
Fetched 42.9 kB in 0s (129 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package iputils-ping.
(Reading database ... 9948 files and directories currently installed.)
Preparing to unpack .../iputils-ping_3%3a20211215-1_amd64.deb ...
Unpacking iputils-ping (3:20211215-1) ...
Setting up iputils-ping (3:20211215-1) ...
root@b38d6dfd3356:/#
```

Installation de la commande ping dans frontend

```
root@b38d6dfd3356:/# exit
exit
PS C:\Users\shadr> docker exec -it frontend bash
root@198d64de2e5a:/var/www/html# apt-get update
Get:1 http://deb.debian.org/debian bookworm InRelease [151 kB]
Get:2 http://deb.debian.org/debian bookworm-updates InRelease [52.1 kB]
Get:3 http://deb.debian.org/debian-security bookworm-security InRelease [48.0 kB]
Get:4 http://deb.debian.org/debian bookworm/main amd64 Packages [8780 kB]
Get:5 http://deb.debian.org/debian bookworm-updates/main amd64 Packages [6668 B]
Get:6 http://deb.debian.org/debian-security bookworm-security/main amd64 Packages [106 kB]
Fetched 9144 kB in 26s (350 kB/s)
Reading package lists... Done
```

```
root@198d64de2e5a:/var/www/html# apt-get install iputils-ping
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libcap2-bin libpam-cap
The following NEW packages will be installed:
  iputils-ping libcap2-bin libpam-cap
0 upgraded, 3 newly installed, 0 to remove and 27 not upgraded.
Need to get 96.2 kB of archives.
After this operation, 311 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://deb.debian.org/debian bookworm/main amd64 libcap2-bin amd64 1:2.66-4 [34.7 kB]
Get:2 http://deb.debian.org/debian bookworm/main amd64 iputils-ping amd64 3:20221126-1 [47.1 kB]
Get:3 http://deb.debian.org/debian bookworm/main amd64 libpam-cap amd64 1:2.66-4 [14.5 kB]
Fetched 96.2 kB in 0s (332 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package libcap2-bin.
(Reading database ... 15591 files and directories currently installed.)
Preparing to unpack .../libcap2-bin_1%3a2.66-4_amd64.deb ...
Unpacking libcap2-bin (1:2.66-4) ...
Selecting previously unselected package iputils-ping.
Preparing to unpack .../iputils-ping_3%3a20221126-1_amd64.deb ...
Unpacking iputils-ping (3:20221126-1) ...
Selecting previously unselected package libpam-cap:amd64.
Preparing to unpack .../libpam-cap_1%3a2.66-4_amd64.deb ...
Unpacking libpam-cap:amd64 (1:2.66-4) ...
Setting up libcap2-bin (1:2.66-4) ...
Setting up libpam-cap:amd64 (1:2.66-4) ...
debconf: unable to initialize frontend: Dialog
debconf: (No usable dialog-like program is installed, so the dialog based frontend cannot be used. at /usr/share/perl5/Debconf/FrontEnd/Dialog.p
m line 78.)
debconf: falling back to frontend: Readline
Setting up iputils-ping (3:20221126-1) ...
root@198d64de2e5a:/var/www/html#
```

Ping de frontend vers backend

```
root@198d64de2e5a:/var/www/html# ping ynovdb
PING ynovdb (172.23.0.2) 56(84) bytes of data.
64 bytes from ynovdb.reseau_ynov (172.23.0.2): icmp_seq=1 ttl=64 time=0.109 ms
64 bytes from ynovdb.reseau_ynov (172.23.0.2): icmp_seq=2 ttl=64 time=0.087 ms
64 bytes from ynovdb.reseau_ynov (172.23.0.2): icmp_seq=3 ttl=64 time=0.083 ms
64 bytes from ynovdb.reseau_ynov (172.23.0.2): icmp_seq=4 ttl=64 time=0.063 ms
64 bytes from ynovdb.reseau_ynov (172.23.0.2): icmp_seq=5 ttl=64 time=0.070 ms
64 bytes from ynovdb.reseau_ynov (172.23.0.2): icmp_seq=6 ttl=64 time=0.072 ms
64 bytes from ynovdb.reseau_ynov (172.23.0.2): icmp_seq=7 ttl=64 time=0.068 ms
```

Ping de ynovdb vers frontend

```
root@198d64de2e5a:/var/www/html# exit
exit
PS C:\Users\shadr> docker exec -it ynovdb bash
root@b38d6dfd3356:/# ping frontend
PING frontend (172.23.0.3) 56(84) bytes of data.
64 bytes from frontend.reseau_ynov (172.23.0.3): icmp_seq=1 ttl=64 time=0.055 ms
64 bytes from frontend.reseau_ynov (172.23.0.3): icmp_seq=2 ttl=64 time=0.090 ms
64 bytes from frontend.reseau_ynov (172.23.0.3): icmp_seq=3 ttl=64 time=0.066 ms
64 bytes from frontend.reseau_ynov (172.23.0.3): icmp_seq=4 ttl=64 time=0.059 ms
64 bytes from frontend.reseau_ynov (172.23.0.3): icmp_seq=5 ttl=64 time=0.063 ms
64 bytes from frontend.reseau_ynov (172.23.0.3): icmp_seq=6 ttl=64 time=0.086 ms
64 bytes from frontend.reseau_ynov (172.23.0.3): icmp_seq=7 ttl=64 time=0.085 ms
64 bytes from frontend.reseau_ynov (172.23.0.3): icmp_seq=8 ttl=64 time=0.085 ms
64 bytes from frontend.reseau_ynov (172.23.0.3): icmp_seq=9 ttl=64 time=0.084 ms
64 bytes from frontend.reseau_ynov (172.23.0.3): icmp_seq=10 ttl=64 time=0.084 ms
64 bytes from frontend.reseau_ynov (172.23.0.3): icmp_seq=11 ttl=64 time=0.086 ms
64 bytes from frontend.reseau_ynov (172.23.0.3): icmp_seq=12 ttl=64 time=0.085 ms
64 bytes from frontend.reseau_ynov (172.23.0.3): icmp_seq=13 ttl=64 time=0.094 ms
64 bytes from frontend.reseau_ynov (172.23.0.3): icmp_seq=14 ttl=64 time=0.088 ms
64 bytes from frontend.reseau_ynov (172.23.0.3): icmp_seq=15 ttl=64 time=0.084 ms
^C
--- frontend ping statistics ---
15 packets transmitted, 15 received, 0% packet loss, time 14393ms
rtt min/avg/max/mdev = 0.055/0.079/0.094/0.011 ms
root@b38d6dfd3356:/#
```

Page Html
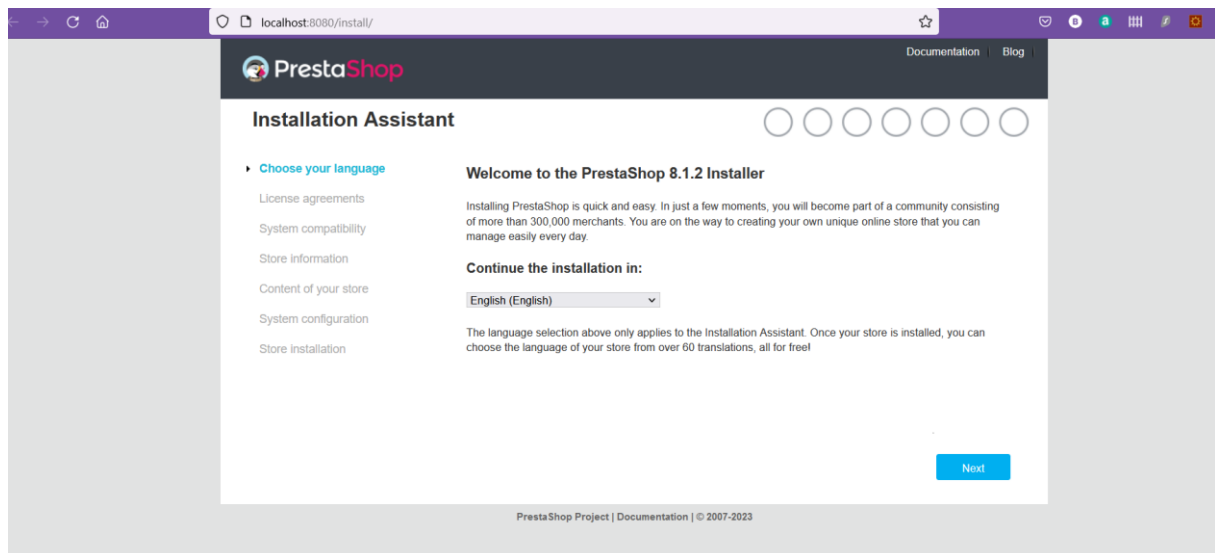
TASK 2

Creation des subnets

Subnet 1

docker network create --subnet=10.0.0.0/24 frontend_network

```
PS C:\MASTER\Master2\Semestre1\Docker\task1> docker network create --subnet=10.0.0.0/24 frontend_network
9ef68fabe511fc4a82273d15f7d8023979e4989b1cb9779f7a8fda390156bd74
```

Subnet 2

docker network create --subnet=10.0.1.0/24 backend_network

```
PS C:\MASTER\Master2\Semestre1\Docker\task1> docker network create --subnet=10.0.1.0/24 backend_network
d2885143350632ee024d11401f37edf63f3abc70e7a4b0e38da6af588bf214d2
```

Connect frontend to frontend_network

docker network connect frontend_network frontend

```
PS C:\MASTER\Master2\Semestre1\Docker\task1> docker network connect frontend_network frontend
```

Connect ynovdb to backend_network

docker network connect backend_network ynovdb

```
docker network connect backend_network ynovdb
```

Creation dockerfile pour le routeur

```
network >  dockerfile > ...
    1    FROM httpd
    2    RUN apt update -y
    3    RUN apt install -y iputils-ping
    4    RUN apt install -y inetutils-traceroute
    5    RUN apt install -y iproute2
    6    RUN apt install -y curl telnet dnsutils vim
```

Build Docker file dans le dossier où est le dockerfile

docker build -t nhttpd .

```
PS C:\MASTER\Master2\Semestre1\Docker\task1> docker build -t nhttpd .
[+] Building 2.8s (11/11) FINISHED
 => [internal] load build definition from Dockerfile                                      0.0s
 => => transferring dockerfile: 32B                                                       0.0s
 => [internal] load .dockerignore                                                         0.0s
 => => transferring context: 2B                                                           0.0s
 => [internal] load metadata for docker.io/library/httpd:latest                          2.7s
 => [auth] library/httpd:pull token for registry-1.docker.io                             0.0s
 => [1/6] FROM docker.io/library/httpd@sha256:04551bc91cc03314eaab20d23609339aebe2ae694fc2e337d0afad429ec22c5a   0.0s
 => CACHED [2/6] RUN apt update -y                                                        0.0s
 => CACHED [3/6] RUN apt install -y iputils-ping                                          0.0s
 => CACHED [4/6] RUN apt install -y inetutils-traceroute                                  0.0s
 => CACHED [5/6] RUN apt install -y iproute2                                              0.0s
 => CACHED [6/6] RUN apt install -y curl telnet dnsutils vim                              0.0s
 => exporting to image                                                                    0.0s
 => => exporting layers                                                                   0.0s
 => => writing image sha256:4932faba1ac99ae6d64fa0e1e116041aa2269abb3a4d65a94dc85902de293d0f   0.0s
 => => naming to docker.io/library/nhttpd                                                 0.0s
```

Creation du Routeur et l'affecter au premier reseau

docker run -d --privileged --name router --network frontend_network nginx

```
PS C:\MASTER\Master2\Semestre1\Docker\task1> docker run -d --privileged --name router --network frontend_network nginx
5b16946ccbf22b7fdf86d8de24e499e1416ddff06babd503050bbd966b9444ee
PS C:\MASTER\Master2\Semestre1\Docker\task1> docker ps -a
CONTAINER ID   IMAGE                      COMMAND                  CREATED          STATUS
    PORTS                                 NAMES
5b16946ccbf2   nginx                      "/docker-entrypoint..."  8 seconds ago    Up 6 seconds
    80/tcp                                router
198d64de2e5a   prestashop/prestashop      "docker-php-entrypoi…"   2 hours ago      Up 2 hours
```

Connecter le routeur au deuxième reseau

docker network connect backend_network router

```
                                        docker-tutorial
PS C:\MASTER\Master2\Semestre1\Docker\task1> docker network connect backend_network router
PS C:\MASTER\Master2\Semestre1\Docker\task1>
```

Verification

docker inspect router

```
PS C:\MASTER\Master2\Semestre1\Docker\task1> docker inspect router
[
```

```
        "Networks": {
            "backend_network": {
                "IPAMConfig": {},
                "Links": null,
                "Aliases": [
                    "5b16946ccbf2"
                ],
                "NetworkID": "d2885143350632ee024d11401f37edf63f3abc70e7a4b0e38da6af588bf214d2",
                "EndpointID": "bc45e872e5d6908b457a72990d88b4e367c10bb2848b7132d29dcb728c257949",
                "Gateway": "10.0.1.1",
                "IPAddress": "10.0.1.3",
                "IPPrefixLen": 24,
                "IPv6Gateway": "",
                "GlobalIPv6Address": "",
                "GlobalIPv6PrefixLen": 0,
                "MacAddress": "02:42:0a:00:01:03",
                "DriverOpts": {}
            },
            "frontend_network": {
                "IPAMConfig": null,
                "Links": null,
                "Aliases": [
                    "5b16946ccbf2"
                ],
                "NetworkID": "9ef68fabe511fc4a82273d15f7d8023979e4989b1cb9779f7a8fda390156bd74",
                "EndpointID": "14be7a80e0c35b9e321c0c255099b9167cd625cffd3322f8d11c453cfda16e97",
                "Gateway": "10.0.0.1",
                "IPAddress": "10.0.0.3",
```

Installation des commandes dans le routeur

```
docker exec -it router bash
apt-get update
apt-get install iputils-ping
apt install -y inetutils-traceroute
apt install -y iproute2
apt install -y curl telnet dnsutils vim
```

A l'interieur du routeur faire ip route

Ip route add 10.0.0.0/24 via 10.0.0.3

Ip route add 10.0.1.0/24 via 10.0.1.0

```
PS C:\MASTER\Master2\Semestre1\Docker\task1> docker exec -it router bash
root@5b16946ccbf2:/# ip route add 10.0.0.0/24 via 10.0.0.3
RTNETLINK answers: File exists
root@5b16946ccbf2:/# ip route add 10.0.1.0/24 via 10.0.1.0
Error: Nexthop has invalid gateway.
root@5b16946ccbf2:/#
```

```
root@5b16946ccbf2:/# ip route add 10.0.1.0/24 via 10.0.1.0
Error: Nexthop has invalid gateway.
root@5b16946ccbf2:/# ip route add 10.0.1.0/24 via 10.0.1.3
RTNETLINK answers: File exists
root@5b16946ccbf2:/# ip route
default via 10.0.1.1 dev eth1
10.0.0.0/24 dev eth0 proto kernel scope link src 10.0.0.3
10.0.1.0/24 dev eth1 proto kernel scope link src 10.0.1.3
root@5b16946ccbf2:/# ip route add 10.0.0.3 via 10.0.0.1
root@5b16946ccbf2:/# ip route add 10.0.1.3 via 10.0.1.1
root@5b16946ccbf2:/# ping ynovdb
PING ynovdb (10.0.1.2) 56(84) bytes of data.
64 bytes from ynovdb.backend_network (10.0.1.2): icmp_seq=1 ttl=64 time=1.36 ms
64 bytes from ynovdb.backend_network (10.0.1.2): icmp_seq=2 ttl=64 time=0.080 ms
64 bytes from ynovdb.backend_network (10.0.1.2): icmp_seq=3 ttl=64 time=0.082 ms
^C
--- ynovdb ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2004ms
rtt min/avg/max/mdev = 0.080/0.505/1.355/0.600 ms
root@5b16946ccbf2:/# ping frontend
PING frontend (10.0.0.2) 56(84) bytes of data.
64 bytes from frontend.frontend_network (10.0.0.2): icmp_seq=1 ttl=64 time=0.628 ms
64 bytes from frontend.frontend_network (10.0.0.2): icmp_seq=2 ttl=64 time=0.305 ms
64 bytes from frontend.frontend_network (10.0.0.2): icmp_seq=3 ttl=64 time=0.083 ms
64 bytes from frontend.frontend_network (10.0.0.2): icmp_seq=4 ttl=64 time=0.079 ms
^C
--- frontend ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3067ms
rtt min/avg/max/mdev = 0.079/0.273/0.628/0.224 ms
root@5b16946ccbf2:/# exit
```

```
rtt min/avg/max/mdev = 0.080/0.505/1.355/0.600 ms
root@5b16946ccbf2:/# ping frontend
PING frontend (10.0.0.2) 56(84) bytes of data.
64 bytes from frontend.frontend_network (10.0.0.2): icmp_seq=1 ttl=64 time=0.628 ms
64 bytes from frontend.frontend_network (10.0.0.2): icmp_seq=2 ttl=64 time=0.305 ms
64 bytes from frontend.frontend_network (10.0.0.2): icmp_seq=3 ttl=64 time=0.083 ms
64 bytes from frontend.frontend_network (10.0.0.2): icmp_seq=4 ttl=64 time=0.079 ms
^C
--- frontend ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3067ms
rtt min/avg/max/mdev = 0.079/0.273/0.628/0.224 ms
root@5b16946ccbf2:/# exit
exit
PS C:\MASTER\Master2\Semestre1\Docker\task1> docker exec -it frontend ping ynovdb
PING ynovdb (172.23.0.2) 56(84) bytes of data.
64 bytes from ynovdb.reseau_ynov (172.23.0.2): icmp_seq=1 ttl=64 time=0.387 ms
64 bytes from ynovdb.reseau_ynov (172.23.0.2): icmp_seq=2 ttl=64 time=0.086 ms
64 bytes from ynovdb.reseau_ynov (172.23.0.2): icmp_seq=3 ttl=64 time=0.085 ms
64 bytes from ynovdb.reseau_ynov (172.23.0.2): icmp_seq=4 ttl=64 time=0.083 ms
64 bytes from ynovdb.reseau_ynov (172.23.0.2): icmp_seq=5 ttl=64 time=0.080 ms
64 bytes from ynovdb.reseau_ynov (172.23.0.2): icmp_seq=6 ttl=64 time=0.085 ms
64 bytes from ynovdb.reseau_ynov (172.23.0.2): icmp_seq=7 ttl=64 time=0.084 ms
64 bytes from ynovdb.reseau_ynov (172.23.0.2): icmp_seq=8 ttl=64 time=0.083 ms
^C
--- ynovdb ping statistics ---
8 packets transmitted, 8 received, 0% packet loss, time 7010ms
rtt min/avg/max/mdev = 0.080/0.121/0.387/0.100 ms
PS C:\MASTER\Master2\Semestre1\Docker\task1> docker exec -it frontend ping 10.0.1.3
PING 10.0.1.3 (10.0.1.3) 56(84) bytes of data.
^C
```