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TP : Docker networking

Dans le cadre de la Task 1, notre objectif est de mettre en place une architecture réseau spécialement conçue pour faciliter la communication entre PrestaShop et MariaDB.

Voici les étapes qu'on a suivi :

Téléchargement de l'Image PrestaShop : Récupérez l'image PrestaShop depuis Docker Hub

```
HELL INSPIROON@KENZA MINGW64 ~/desktop/docker/nhttpd (master)
$ docker run -ti --name frontend-ynov-prestashop --network=prestashop-network-ynov -e PS_DEV_MODE=false -e PS_INSTALL_AUTO=0 -p 8001:80 -d prestashop/prestashop:1.7-7.0
b31b5c88226e238d72dc2e9ce7646dcb3e4d0611b52ef99fe8616c5f3ac05c26

HELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker network inspect prestashop-network-ynov
{
  "Name": "prestashop-network-ynov",
  "Id": "258567e646304f7f4405dbf2c0af00f85b0262672445c7fd2bee3128a1bb2e64",
  "Created": "2023-12-07T09:43:27.9217445Z",
  "Scope": "local",
  "Driver": "bridge",
  "EnableIPv6": false,
  "IPAM": {
    "Driver": "default",
    "Options": {},
    "Config": [
      {
        "Subnet": "172.21.0.0/16",
        "Gateway": "172.21.0.1"
      }
    ]
  },
  "Internal": false,
  "Attachable": false,
  "Ingress": false,
  "ConfigFrom": {
    "Network": ""
  },
  "ConfigOnly": false,
  "Containers": {
    "0737ce3bfaf15b0bbd583171332c93d3c25e8faa1628205073f24f27fc2dc027": {
      "Name": "backend-ynov-prestashop",
      "EndpointID": "8cfbb6bb48c63c2dbd46152ef91933039c857f4e4d48a9c5d077cc52a1f42869",
      "MacAddress": "02:42:ac:15:00:02",
      "IPv4Address": "172.21.0.2/16",
      "IPv6Address": ""
    }
  },
  "Labels": {}
}
```

Création du Réseau Docker : Créez un réseau Docker nommé **prestashop-network-ynov** pour permettre la communication entre les conteneurs de PrestaShop et MariaDB.

```
DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker network create prestashop-network-ynov
258567e646304f7f4405dbf2c0af00f85b0262672445c7fd2bee3128a1bb2e64

DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker network inspect prestashop-network-ynov
[
  {
    "Name": "prestashop-network-ynov",
    "Id": "258567e646304f7f4405dbf2c0af00f85b0262672445c7fd2bee3128a1bb2e64",
    "Created": "2023-12-07T09:43:27.9217445Z",
    "Scope": "local",
    "Driver": "bridge",
    "EnableIPv6": false,
    "IPAM": {
      "Driver": "default",
      "Options": {},
      "Config": [
        {
          "Subnet": "172.21.0.0/16",
          "Gateway": "172.21.0.1"
        }
      ]
    },
    "Internal": false,
    "Attachable": false,
    "Ingress": false,
    "ConfigFrom": {
      "Network": ""
    },
    "ConfigOnly": false,
    "Containers": {},
    "Options": {},
    "Labels": {}
  }
]
```

Création du Volume pour MariaDB : Créez un volume Docker **mariadb_data** pour assurer la persistance des données de la base de données MariaDB, garantissant que les données ne sont pas perdues lorsque le conteneur est arrêté ou supprimé.

```
DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker volume create --name mariadb_data
mariadb_data

DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker volume inspect mariadb_data
[
  {
    "CreatedAt": "2023-12-07T09:46:28Z",
    "Driver": "local",
    "Labels": {},
    "Mountpoint": "/var/lib/docker/volumes/mariadb_data/_data",
    "Name": "mariadb_data",
    "Options": {},
    "Scope": "local"
  }
]
```

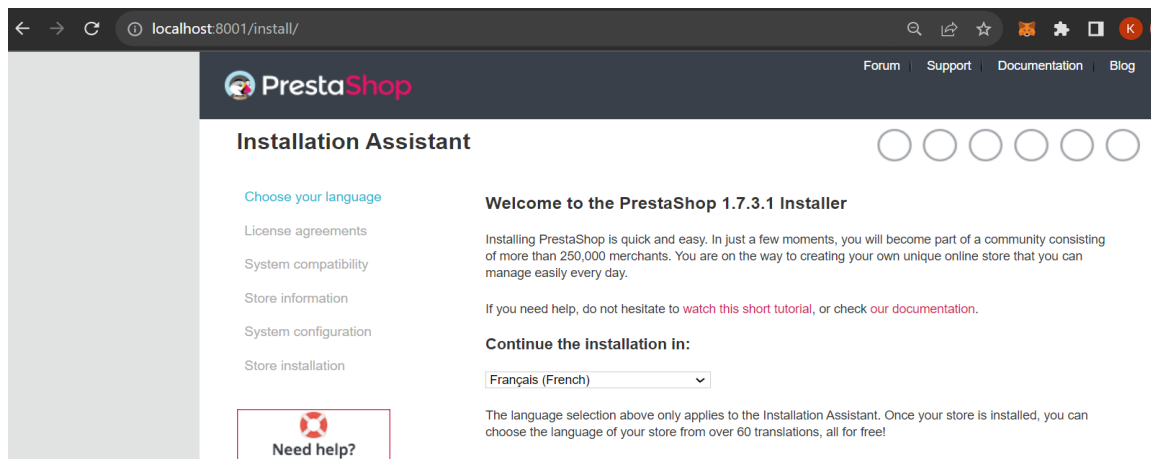
Déploiement de MariaDB : Lancez un conteneur MariaDB avec les variables d'environnement nécessaires et connectez-le au réseau Docker **prestashop-network-ynov**. Attachez également le volume **mariadb_data** pour la persistance des données.

```
DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker run -d --name mariadb \
  --env ALLOW_EMPTY_PASSWORD=yes \
  --env MARIADB_USER=oulmou_kana \
  --env MARIADB_PASSWORD=kenza_ronaldo \
  --env MARIADB_DATABASE=prestashop_db \
  --network prestashop-network-ynov \
  --volume mariadb_data:/bitnami/mariadb \
  bitnami/mariadb:latest
Unable to find image 'bitnami/mariadb:latest' locally
latest: Pulling from bitnami/mariadb
03cb1da8d495: Pull complete
Digest: sha256:c6f525d8012035463347cd942602c05cc9b4bc631fb605f75179329e3dccd13d
Status: Downloaded newer image for bitnami/mariadb:latest
afe3b018f60bb3c6d6266917fa9d5ccff40e39b83731d876d62304644d00f44a

DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker network inspect prestashop-network-ynov
[
  {
    "Name": "prestashop-network-ynov",
    "Id": "258567e646304f7f4405dbf2c0af00f85b0262672445c7fd2bee3128a1bb2e64",
    "Created": "2023-12-07T09:43:27.9217445Z",
    "Scope": "local",
    "Driver": "bridge",
    "EnableIPv6": false,
    "IPAM": {
      "Driver": "default",
      "Options": {},
      "Config": [
        {
          "Subnet": "172.21.0.0/16",
          "Gateway": "172.21.0.1"
        }
      ]
    },
    "Internal": false,
    "Attachable": false,
    "Ingress": false,
    "ConfigFrom": {
      "Network": ""
    },
    "ConfigOnly": false,
    "Containers": {
      "afe3b018f60bb3c6d6266917fa9d5ccff40e39b83731d876d62304644d00f44a": {
        "Name": "mariadb",
        "EndpointID": "c3120fdb7ecc77c01f16f1e831198980ffc9b0e32abf50a9fb28e9e599225363",
        "MacAddress": "02:42:ac:15:00:02",
        "IPv4Address": "172.21.0.2/16",

```

Déploiement de PrestaShop : Lancez un conteneur PrestaShop et configurez-le pour qu'il se connecte à la base de données MariaDB en utilisant les variables d'environnement correspondantes. Connectez ce conteneur au même réseau Docker et exposez-le sur le port 8001 pour permettre l'accès via un navigateur web.



TASK 2 :

Création des réseaux : Nous avons initié la mise en place de notre environnement en créant deux réseaux Docker distincts, nommés ynov-frontend-network et ynov-backend-network.

```
DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker network create --subnet=10.0.1.0/24 ynov-backend-network
d171598c0d20f67f0fd77eb382097eb497a565ad5f244c82c18f44249f8c2219

DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker network ls
NETWORK ID          NAME                DRIVER              SCOPE
5af47f45c185        bridge              bridge              local
a7be866a1b30        frontend            bridge              local
6b05f6c9217d        host                host                local
fcb695b8364d        none                null                local
258567e64630        prestashop-network-ynov bridge              local
79b827896282        spark-cluster_default bridge              local
0b89a5a0c5f1        spark-cluster_kafka_net bridge              local
d171598c0d20        ynov-backend-network bridge              local
835d145ec677        ynov-frontend-network bridge              local

DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$
```

Création du conteneur de passerelle : Un conteneur gateway, a été déployé pour fonctionner comme une passerelle inter-réseaux. Ce conteneur est configuré pour établir un pont entre les réseaux frontend et backend, facilitant ainsi la communication inter-services

```
DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
(reverse-i-search)`pr': docker run --privileged -d --name gateway nginx
```

Connexion des réseaux au conteneur gateway: L'étape suivante a consisté à connecter les réseaux ynov-frontend-network et ynov-backend-network au conteneur gateway. Cette opération a été conçue pour permettre au conteneur situé dans le réseau frontend de communiquer efficacement avec le conteneur dans le réseau backend

```

HELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker network connect ynov-frontend-network gateway

HELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker network connect ynov-backend-network gateway

HELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker network inspect ynov-backend-network

{
  "Name": "ynov-backend-network",
  "Id": "d171598c0d20f67f0fd77eb382097eb497a565ad5f244c82c18f44249f8c2219",
  "Created": "2023-12-07T11:28:48.7516507Z",
  "Scope": "local",
  "Driver": "bridge",
  "EnableIPv6": false,
  "IPAM": {
    "Driver": "default",
    "Options": {},
    "Config": [
      {
        "Subnet": "10.0.1.0/24"
      }
    ]
  },
  "Internal": false,
  "Attachable": false,
  "Ingress": false,
  "ConfigFrom": {
    "Network": ""
  },
  "ConfigOnly": false,
  "Containers": {
    "1d2e56b9d9463ff98dadb30b02908d0b54dc82f12da6b72d59c135b57f550815": {
      "Name": "gateway",
      "EndpointID": "f8fe99c435d6adae8ca1548c6be738455b7781548e2feed1147dbbf89ea13adf",
      "MacAddress": "02:42:0a:00:01:02",
      "IPv4Address": "10.0.1.2/24",
      "IPv6Address": ""
    }
  },
  "Options": {}
}

```

Configuration de routage : La table de routage a été configurée pour diriger le trafic de manière optimale entre les réseaux, assurant ainsi une communication fluide et sécurisée

```

root@27565f54e862:/# ip route show
default via 172.17.0.1 dev eth0
172.17.0.0/16 dev eth0 proto kernel scope link src 172.17.0.2
root@27565f54e862:/# ip route add 10.0.1.0/24 via 10.0.1.2
root@27565f54e862:/# ip route show
default via 172.17.0.1 dev eth0
10.0.1.0/24 via 10.0.1.2 dev eth2
172.17.0.0/16 dev eth0 proto kernel scope link src 172.17.0.2
root@27565f54e862:/# exit
exit

```

```

DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker exec -ti -u 0 backend-ynov-prestashop apt-get update
Get:1 http://security.debian.org/debian-security bullseye-security InRelease [48.4 kB]
Get:2 http://deb.debian.org/debian bullseye InRelease [116 kB]
Get:3 http://deb.debian.org/debian bullseye-updates InRelease [44.1 kB]
Get:4 http://security.debian.org/debian-security bullseye-security/main amd64 Packages [334 kB]
Get:5 http://deb.debian.org/debian bullseye/main amd64 Packages [11.1 MB]
Get:6 http://deb.debian.org/debian bullseye-updates/main amd64 Packages [17.7 kB]
Fetched 11.6 MB in 1min 25s (138 kB/s)
Reading package lists... Done

DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ ^[[200~http://deb.debian.org/debian bullseye/main amd64 Packages [11.1 MB]

DELL INSPIROON@KENZA MINGW64bash: http://deb.debian.org/debian: No such file or directory

DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker exec -ti -u 0 backend-ynov-prestashop apt-get install -y iputils-ping
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libcap2 libcap2-bin libpam-cap
The following NEW packages will be installed:
  iputils-ping libcap2 libcap2-bin libpam-cap
0 upgraded, 4 newly installed, 0 to remove and 0 not upgraded.
Need to get 121 kB of archives.
After this operation, 348 kB of additional disk space will be used.
Get:1 http://deb.debian.org/debian bullseye/main amd64 libcap2 amd64 1:2.44-1 [23.6 kB]
Get:2 http://deb.debian.org/debian bullseye/main amd64 libcap2-bin amd64 1:2.44-1 [32.6 kB]
Get:3 http://deb.debian.org/debian bullseye/main amd64 iputils-ping amd64 3:20210202-1 [49.8 kB]
Get:4 http://deb.debian.org/debian bullseye/main amd64 libpam-cap amd64 1:2.44-1 [15.4 kB]
Fetched 121 kB in 2s (48.6 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package libcap2:amd64.
(Reading database ... 7166 files and directories currently installed.)
Preparing to unpack .../libcap2_1%3a2.44-1_amd64.deb ...
Unpacking libcap2:amd64 (1:2.44-1) ...
Selecting previously unselected package libcap2-bin.
Preparing to unpack .../libcap2-bin_1%3a2.44-1_amd64.deb ...
Unpacking libcap2-bin (1:2.44-1) ...
Selecting previously unselected package iputils-ping.
Preparing to unpack .../iputils-ping_3%3a20210202-1_amd64.deb ...
Unpacking iputils-ping (3:20210202-1) ...

```

```

DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker exec -it backend-ynov-prestashop bash
I have no name!@0737ce3bfa17:/$ ping 172.21.0.3
PING 172.21.0.3 (172.21.0.3) 56(84) bytes of data.
64 bytes from 172.21.0.3: icmp_seq=1 ttl=64 time=0.569 ms
64 bytes from 172.21.0.3: icmp_seq=2 ttl=64 time=0.159 ms
64 bytes from 172.21.0.3: icmp_seq=3 ttl=64 time=0.157 ms
64 bytes from 172.21.0.3: icmp_seq=4 ttl=64 time=0.180 ms
64 bytes from 172.21.0.3: icmp_seq=5 ttl=64 time=0.151 ms
64 bytes from 172.21.0.3: icmp_seq=6 ttl=64 time=0.228 ms
64 bytes from 172.21.0.3: icmp_seq=7 ttl=64 time=0.193 ms
64 bytes from 172.21.0.3: icmp_seq=8 ttl=64 time=0.180 ms
64 bytes from 172.21.0.3: icmp_seq=9 ttl=64 time=0.420 ms
^C
--- 172.21.0.3 ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 8290ms
rtt min/avg/max/mdev = 0.151/0.248/0.569/0.137 ms
I have no name!@0737ce3bfa17:/$ |

```

```

HELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS               NAMES
0954aa4257e9       bitnami/prestashop:"/opt/bitnami/script-" 6 seconds ago      Up 4 seconds       8080/tcp, 0.0.0.0:8443->8443/tcp    frontend-ynov-prestashop
0737ce3bfa17       bitnami/mariadb:late" /opt/bitnami/script-" 27 minutes ago     Up 27 minutes      0.0.0.0:3333->3306/tcp             backend-ynov-prestashop
1e91db/ae3a2       nhttpd             "httpd-foreground" 6 days ago         Up 6 days          80/tcp              server2
00620fe319f4       nhttpd             "httpd-foreground" 6 days ago         Up 6 days          80/tcp              server1

HELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker exec -ti -u 0 frontend-ynov-prestashop apt-get update
Get:1 http://security.debian.org/debian-security bullseye-security InRelease [48.4 kB]
Get:2 http://deb.debian.org/debian bullseye InRelease [116 kB]
Get:3 http://security.debian.org/debian-security bullseye-security/main amd64 Packages [334 kB]
Get:4 http://deb.debian.org/debian bullseye-updates InRelease [44.1 kB]
Get:5 http://deb.debian.org/debian bullseye/main amd64 Packages [111.1 MB]
Get:6 http://deb.debian.org/debian bullseye-updates/main amd64 Packages [17.7 kB]
Fetched 11.6 MB in 13s (872 kB/s)
Reading package lists... Done

HELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker exec -ti -u 0 frontend-ynov-prestashop apt-get install -y iputils-ping
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libcap2 libcap2-bin libpam-cap
The following NEW packages will be installed:
  iputils-ping libcap2 libcap2-bin libpam-cap
0 upgraded, 4 newly installed, 0 to remove and 3 not upgraded.
Need to get 121 kB of archives.
After this operation, 348 kB of additional disk space will be used.
Get:1 http://deb.debian.org/debian bullseye/main amd64 libcap2 amd64 1:2.44-1 [23.6 kB]
Get:2 http://deb.debian.org/debian bullseye/main amd64 libcap2-bin amd64 1:2.44-1 [32.6 kB]
Get:3 http://deb.debian.org/debian bullseye/main amd64 iputils-ping amd64 3:20210202-1 [49.8 kB]
Get:4 http://deb.debian.org/debian bullseye/main amd64 libpam-cap amd64 1:2.44-1 [15.4 kB]
Fetched 121 kB in 2s (77.5 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package libcap2:amd64.
(Reading database ... 8250 files and directories currently installed.)
Preparing to unpack .../libcap2_1:3a2.44-1_amd64.deb ...
Unpacking libcap2:amd64 (1:2.44-1) ...
Selecting previously unselected package libcap2-bin.
Preparing to unpack .../libcap2-bin_1:3a2.44-1_amd64.deb ...
Unpacking libcap2-bin (1:2.44-1) ...
Selecting previously unselected package iputils-ping.
Preparing to unpack .../iputils-ping_3:3a20210202-1_amd64.deb ...
Unpacking iputils-ping (3:20210202-1) ...
Selecting previously unselected package libpam-cap:amd64.
Preparing to unpack .../libpam-cap_1:3a2.44-1_amd64.deb ...
Unpacking libpam-cap:amd64 (1:2.44-1) ...
Setting up libcap2:amd64 (1:2.44-1) ...
Setting up libcap2-bin (1:2.44-1) ...
Setting up libpam-cap:amd64 (1:2.44-1) ...

HELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker network inspect prestashop-network-ynov
{
  "Name": "prestashop-network-ynov",
  "Id": "258567e646304f7f4405dbf2c0af00f85b0262672445c7fd2bee3128a1bb2e64",
  "Created": "2023-12-07T09:43:27.9217445Z",
  "Scope": "local",
  "Driver": "bridge",
  "EnableIPv6": false,
  "IPAM": {
    "Driver": "default",
    "Options": {},
    "Config": [
      {
        "Subnet": "172.21.0.0/16",
        "Gateway": "172.21.0.1"
      }
    ]
  },
  "Internal": false,
  "Attachable": false,
  "Ingress": false,
  "ConfigFrom": {
    "Network": ""
  },
  "ConfigOnly": false,
  "Containers": {
    "0737ce3bfa175b0bbd583171332c93d3c25e8faa1628205073f24f27fc2dc027": {
      "Name": "backend-ynov-prestashop",
      "EndpointID": "8cfbb6bb48c63c2dbd46152ef91933039c857f4e4d48a9c5d077cc52a1f42869",
      "MacAddress": "02:42:ac:15:00:02",
      "IPv4Address": "172.21.0.2/16",
      "IPv6Address": ""
    },
    "d954aa4257e94d7d42cee9433958f03afc9b1c2144dd730316f69841294142": {
      "Name": "frontend-ynov-prestashop",
      "EndpointID": "0c8c7ac6e4ead91d7396aa1867c19f2f6f1cfa57b2e3bb634ecba3040a4c9836",
      "MacAddress": "02:42:ac:15:00:03",
      "IPv4Address": "172.21.0.3/16",
      "IPv6Address": ""
    }
  },
  "Options": {},
  "Labels": {}
}

HELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker exec -it frontend-ynov-prestashop bash
I have no name!@d954aa4257e9:/$ ping 172.21.0.2/16
ping: 172.21.0.2/16: Name or service not known
I have no name!@d954aa4257e9:/$ ping 172.21.0.2
PING 172.21.0.2 (172.21.0.2) 56(84) bytes of data.
64 bytes from 172.21.0.2: icmp_seq=1 ttl=64 time=1.16 ms
64 bytes from 172.21.0.2: icmp_seq=2 ttl=64 time=0.224 ms
64 bytes from 172.21.0.2: icmp_seq=3 ttl=64 time=0.175 ms
64 bytes from 172.21.0.2: icmp_seq=4 ttl=64 time=0.155 ms
64 bytes from 172.21.0.2: icmp_seq=5 ttl=64 time=0.174 ms
64 bytes from 172.21.0.2: icmp_seq=6 ttl=64 time=0.153 ms

```


Résultat Finale :

```
DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker exec -it gateway bash
root@27565f54e862:/# ip route show
default via 172.17.0.1 dev eth0
10.0.0.0/24 via 10.0.0.2 dev eth1
10.0.1.0/24 via 10.0.1.2 dev eth2
172.17.0.0/16 dev eth0 proto kernel scope link src 172.17.0.2
root@27565f54e862:/# exit
exit

DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker network inspect ynov-frontend-network
[
  {
    "Name": "ynov-frontend-network",
    "Id": "335d145ec67732318113d78555b29b78e793a05eb1cf15fe7a3d258e380f8ac2",
    "Created": "2023-12-07T11:26:23.7616953Z",
    "Scope": "local",
    "Driver": "bridge",
    "EnableIPv6": false,
    "IPAM": {
      "Driver": "default",
      "Options": {},
      "Config": [
        {
          "Subnet": "10.0.0.0/24"
        }
      ]
    },
    "Internal": false,
    "Attachable": false,
    "Ingress": false,
    "ConfigFrom": {
      "Network": ""
    },
    "ConfigOnly": false,
    "Containers": {
      "27565f54e8628003a4542d7c17fd7d473e6749e9c6722146e4cdb8b93e81286d": {
        "Name": "gateway",
        "EndpointID": "f32eee11b846d4900978b5797799c0f9987bdb586bdfa6f5502847c007bd9c88",
        "MacAddress": "02:42:0a:00:00:02",
        "IPv4Address": "10.0.0.2/24",
        "IPv6Address": ""
      },
      "d97d5945326bb41b0478402f4b9d473302ae11c18bdd96d9b13231b9a3af9913": {
        "Name": "prestashop-ynov",
        "EndpointID": "25137716a08a34219f92d6c32a7e9a8a43f0e945175323ac02e86f6e2b361036",
        "MacAddress": "02:42:0a:00:00:03",
        "IPv4Address": "10.0.0.3/24",
        "IPv6Address": ""
      }
    },
    "Options": {},
    "Labels": {}
  }
]
```



```
DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
$ docker network inspect ynov-backend-network
```

```
[
  {
    "Name": "ynov-backend-network",
    "Id": "d171598c0d20f67f0fd77eb382097eb497a565ad5f244c82c18f44249f8c2219",
    "Created": "2023-12-07T11:28:48.7516507Z",
    "Scope": "local",
    "Driver": "bridge",
    "EnableIPv6": false,
    "IPAM": {
      "Driver": "default",
      "Options": {},
      "Config": [
        {
          "Subnet": "10.0.1.0/24"
        }
      ]
    },
    "Internal": false,
    "Attachable": false,
    "Ingress": false,
    "ConfigFrom": {
      "Network": ""
    },
    "ConfigOnly": false,
    "Containers": {
      "27565f54e8628003a4542d7c17fd7d473e6749e9c6722146e4cdb8b93e81286d": {
        "Name": "gateway",
        "EndpointID": "dabcfaf7aabc12ec995e7a4f1311bca3b90c0e6cf2fd5ecc5046b2475d352f4",
        "MacAddress": "02:42:0a:00:01:02",
        "IPv4Address": "10.0.1.2/24",
        "IPv6Address": ""
      },
      "3651a05070c440e37e6376740b8ec5446ef0a06921c6995316c5146ff3f217a7": {
        "Name": "mariadb",
        "EndpointID": "a5a9cad2f503ecdab201e01b21023679c7a50f986a413d90ecafd019d776c8e5",
        "MacAddress": "02:42:0a:00:01:03",
        "IPv4Address": "10.0.1.3/24",
        "IPv6Address": ""
      }
    },
    "Options": {},
    "Labels": {}
  }
]
```

```
DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
```

```
$ docker ps
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS        PORTS                               NAMES
d31b5c88226e   prestashop/prestashop:1.7-7.0     "docker-php-entrypoi..." 8 minutes ago   Up 8 minutes   0.0.0.0:8001->80/tcp               frontend-ynov-prestashop
3651a05070c4   mariadb:latest                      "docker-entrypoint.s..." 53 minutes ago   Up 53 minutes   3306/tcp                           mariadb
d97d5945326b   prestashop/prestashop:1.7-7.0     "docker-php-entrypoi..." 2 hours ago     Up 2 hours     0.0.0.0:8000->80/tcp               prestashop-ynov
27565f54e862   nginx                                "/docker-entrypoint..." 3 hours ago     Up 3 hours     80/tcp                             gateway
0737ce3bfa17   bitnami/mariadb:latest              "/opt/bitnami/script..." 4 hours ago     Up 4 hours     0.0.0.0:3333->3306/tcp             backend-ynov-prestashop
3e91db7ae3a2   nhttpd                              "httpd -foreground"       7 days ago      Up 7 days      80/tcp                             server2
00620fes19f4   nhttpd                              "httpd -foreground"       7 days ago      Up 7 days      80/tcp                             server1
```

```
DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
```

```
$ docker exec -it d97 bash
root@d97d5945326b:/var/www/html# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
2: tunl0@NONE: <NOARP> mtu 1480 qdisc noop state DOWN group default qlen 1000
    link/ipip 0.0.0.0 brd 0.0.0.0
3: sit0@NONE: <NOARP> mtu 1480 qdisc noop state DOWN group default qlen 1000
    link/sit 0.0.0.0 brd 0.0.0.0
112: eth0@if113: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:0a:00:00:03 brd ff:ff:ff:ff:ff:ff
    inet 10.0.0.3/24 brd 10.0.0.255 scope global eth0
        valid_lft forever preferred_lft forever
root@d97d5945326b:/var/www/html# hostname -i
10.0.0.3
root@d97d5945326b:/var/www/html# exit
exit
```

```
DELL INSPIROON@KENZA MINGW64 ~/Desktop/docker/nhttpd (master)
```

```
$ docker exec -it mariadb bash
root@3651a05070c4:/# ping 10.0.0.3
PING 10.0.0.3 (10.0.0.3) 56(84) bytes of data.
^C
--- 10.0.0.3 ping statistics ---
23 packets transmitted, 0 received, 100% packet loss, time 22918ms

root@3651a05070c4:/# route 10.0.0.3
bash: route: command not found
root@3651a05070c4:/# tracerout 10.0.0.3
bash: tracerout: command not found
root@3651a05070c4:/# traceroute 10.0.0.3
bash: traceroute: command not found
root@3651a05070c4:/# exit
exit
```

Traceroute :

```
root@3651a05070c4: /
bash: traceroute: command not found
root@3651a05070c4:/# traceroute 10.0.0.3
bash: traceroute: command not found
root@3651a05070c4:/# exit
exit

$ docker exec -it mariadb bash
root@3651a05070c4:/# traceroute 10.0.0.3
bash: traceroute: command not found
root@3651a05070c4:/# apt-get install traceroute
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  traceroute
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 45.4 kB of archives.
After this operation, 152 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu jammy/universe amd64 traceroute amd64 1:2.1.0-2 [45.4 kB]
Fetched 45.4 kB in 1s (64.5 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package traceroute.
(Reading database ... 9918 files and directories currently installed.)
Preparing to unpack .../traceroute_1:2.1.0-2_...
Unpacking traceroute (1:2.1.0-2) ...
Setting up traceroute (1:2.1.0-2) ...
update-alternatives: using /usr/bin/traceroute.db to provide /usr/bin/traceroute (traceroute) in auto mode
update-alternatives: warning: skip creation of /usr/share/man/man1/traceroute.1.gz because associated file /usr/share/man/man1/traceroute.db.1.gz (of link group traceroute) doesn't exist
update-alternatives: using /usr/bin/traceroute6.db to provide /usr/bin/traceroute6 (traceroute6) in auto mode
update-alternatives: warning: skip creation of /usr/share/man/man1/traceroute6.1.gz because associated file /usr/share/man/man1/traceroute6.db.1.gz (of link group traceroute6) doesn't exist
update-alternatives: using /usr/bin/ift.db to provide /usr/bin/ift (ift) in auto mode
update-alternatives: warning: skip creation of /usr/share/man/man1/ift.1.gz because associated file /usr/share/man/man1/ift.db.1.gz (of link group ift) doesn't exist
update-alternatives: using /usr/bin/traceproto.db to provide /usr/bin/traceproto (traceproto) in auto mode
update-alternatives: warning: skip creation of /usr/share/man/man1/traceproto.1.gz because associated file /usr/share/man/man1/traceproto.db.1.gz (of link group traceproto) doesn't exist
update-alternatives: using /usr/sbin/tcptraceroute.db to provide /usr/sbin/tcptraceroute (tcptraceroute) in auto mode
update-alternatives: warning: skip creation of /usr/share/man/man8/tcptraceroute.8.gz because associated file /usr/share/man/man8/tcptraceroute.db.8.gz (of link group tcptraceroute) doesn't exist
root@3651a05070c4:/# traceroute 10.0.0.3
traceroute to 10.0.0.3 (10.0.0.3), 30 hops max, 60 byte packets
 1  10.0.1.1 (10.0.1.1)  1.663 ms  0.083 ms  0.111 ms
 2  * * *
 3  * * *
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  * * *
 9  * * *
10  * * *
11  * * *
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  |
```