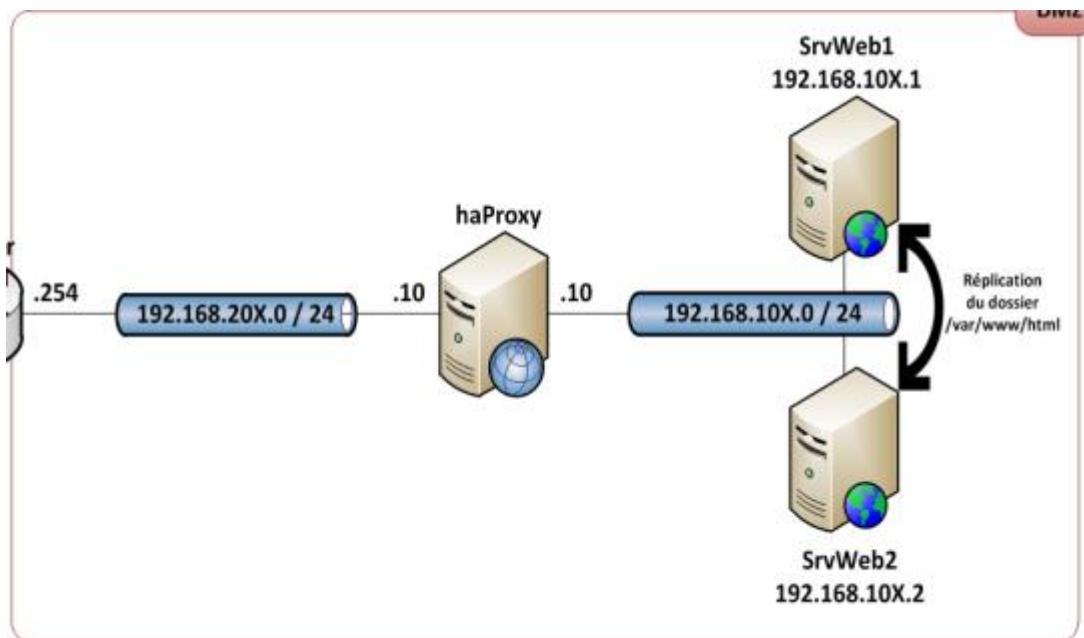


Voici le réseau qui doit être créé :



- Configuration des cartes réseau du serveur haproxy

```
GNU nano 5.4                               /etc/network/interfaces
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
auto ens33
iface ens33 inet static
    address 192.168.219.10/24
    gateway 192.168.219.254

auto ens36
iface ens36 inet static
    address 192.168.119.10/24
```

- Installation de Haproxy

Commande :

- Apt update
- Apt install haproxy

- Configuration

Nano /etc/haproxy/haproxy.cfg

```
GNU nano 5.4                               /etc/haproxy/haproxy.cfg

global
    log /dev/log    local0
    log /dev/log    local1 notice
    chroot /var/lib/haproxy
    stats socket /run/haproxy/admin.sock mode 660 level admin expose-fd listeners
    stats timeout 30s
    user haproxy
    group haproxy
    daemon

    # Default SSL material locations
    ca-base /etc/ssl/certs
    crt-base /etc/ssl/private

    # See: https://ssl-config.mozilla.org/#server=haproxy&server-version=2.0.3&config=intermediary
    ssl-default-bind-ciphers ECDHE-ECDSA-AES128-GCM-SHA256:ECDHE-RSA-AES128-GCM-SHA256:ECDHE-ECDSA-CHACHA20-POLY1305
    ssl-default-bind-ciphersuites TLS_AES_128_GCM_SHA256:TLS_AES_256_GCM_SHA384:TLS_CHACHA20_POLY1305
    ssl-default-bind-options ssl-min-ver TLSv1.2 no-tls-tickets

defaults
    log     global
    mode    http
    option  httplog
    option  dontlognull
    timeout connect 5000
    timeout client  50000
    timeout server  50000
    errorfile 400 /etc/haproxy/errors/400.http
    errorfile 403 /etc/haproxy/errors/403.http
    errorfile 408 /etc/haproxy/errors/408.http
    errorfile 500 /etc/haproxy/errors/500.http
    errorfile 502 /etc/haproxy/errors/502.http
    errorfile 503 /etc/haproxy/errors/503.http
    errorfile 504 /etc/haproxy/errors/504.http

frontend myfrontend
    bind *:80
    mode http
    default_backend mybackend

backend mybackend
    balance roundrobin
    mode http
    cookie SRV_ID insert indirect nocache
    server SrvWeb1 192.168.119.1:80 cookie srv1 check
    server SrvWeb2 192.168.119.2:80 cookie srv1 check
```

Redémarrer haproxy

Service haproxy restart

Ces deux parties permettent de mettre en place les cookies

- Création d'un serveur web
 - Commande d'installation

Apt install apache2

Apt install php7.4

- Configuration de la carte réseau

```
GNU nano 5.4                               /etc/network/interfaces
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface

auto ens33
iface ens33 inet static
    address 192.168.119.1/24
    gateway 192.168.119.10
```

- Commande de création de la page web
 - Nano /var/www/html/index.php

Créer votre page web

- Cloner votre premier serveur web pour créer le deuxième
 - Changer son adresse IP

```
GNU nano 5.4                               /var/www/html/ConnectBDD.php
<?php
try {    $bdd = new PDO('mysql:host=10.20.0.30;dbname=haproxy;', 'root', 'root')    array(PDO::MYSQL_A
catch (Exception $e) {        die('Erreur : ' . $e->getMessage());    }
?>
```

Attention mettre à jour les connexions au serveurBDD

- Mise en place du lsyncd sur les deux serveurs web
 - Commande

Apt install lsyncd

Configuration du lsyncd

Nano /etc/lsyncd/lsyncd.conf.lua

```
GNU nano 5.4                               /etc/lsyncd/lsyncd.conf.lua
settings {
    logfile = /var/log/lsyncd/lsyncd.log,
    statusFile = /var/log/lsyncd/lsyncd-status.log,
    statusInterval = 1,
    insist = 1
}

sync {
    default.rsyncssh,
    source = /var/www/html,
    host = 192.168.119.2,
    targetdir = /var/www/html,
    delay = 1,
    rsync = {
        archive = true,
        compress = true,
        whole_file = false
    },
    ssh = {
        port = 22
    }
}
```

Sur le routeur PfSense

Voici les 3 adresses IP de nos routeurs après les avoir configuré :

```
WAN (wan)      -> em1      -> v4: 172.31.251.20/16
LAN (lan)      -> em0      -> v4: 10.20.255.254/16
DMZ (opt1)     -> em2      -> v4: 192.168.219.254/24

0) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults 13) Update from console
5) Reboot system              14) Enable Secure Shell (sshd)
6) Halt system                15) Restore recent configuration
7) Ping host                  16) Restart PHP-FPM
8) Shell

Enter an option: ■
To direct input to this VM, click inside or press Ctrl+G.
```

Et les 3 @MAC de nos routeurs après avoir configuré l'@IP

Adresse mac WAN 00:0C:29:CB:C7:67 ---> em1

Adresse Mac de ma 1^{ère} carte réseau (en lan) : 00:0C:29:CB:C7:5D ---->em0

Adresse mac DMZ 00:0C:29:CB:C7:71---->em2

Configuration BDD

Après avoir fait un « apt update » & « apt install mariadb-server »

On configure la carte réseau en LAN static

```
# The primary network interface
auto ens33
iface ens33 inet static
address 10.20.0.30/16

auto ens34
iface ens34 inet dhcp

MariaDB [haproxy]> INSERT INTO MEMBRE(login, mdp, nom, prenom) VALUES
-> ('alves', '123', 'Alves', 'Manuel'),
-> ('thevenin', '123', 'Thevenin', 'Olivier');
ERROR 1146 (42S02): Table 'haproxy.MEMBRE' doesn't exist
MariaDB [haproxy]> INSERT INTO membre(login, mdp, nom, prenom) VALUES ('alves', '123', 'Alves', 'Manuel'),
('thevenin', '123', 'Thevenin', 'Olivier');
Query OK, 2 rows affected (0,001 sec)
Records: 2  Duplicates: 0  Warnings: 0
MariaDB [haproxy]> _
```

Documentation HAProxy + server web + BDD +PFSENSE

Comme demander sur le TP ont créé la base mariadb « HaProxy » dans laquelle on ajoute nos utilisateurs avec leurs login et leurs mdp

```
MariaDB [(none)]> show databases;
+-----+
| Database           |
+-----+
| haproxy           |
| information_schema |
| mysql              |
| performance_schema |
+-----+
4 rows in set (0,029 sec)

MariaDB [(none)]> use haproxy
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [haproxy]> show tables;
+-----+
| Tables_in_haproxy |
+-----+
| membre            |
+-----+
1 row in set (0,000 sec)

MariaDB [haproxy]> use membre
ERROR 1049 (42000): Unknown database 'membre'
MariaDB [haproxy]> select * from membre
    -> ;
+----+----+----+----+
| id | login    | mdp | nom      | prenom  |
+----+----+----+----+
| 1  | alves    | 123 | Alves    | Manuel  |
| 2  | thevenin | 123 | Thevenin | Olivier |
+----+----+----+----+
2 rows in set (0,001 sec)
```

Règles PfSense

States	Protocol	Source	Port	Destination	Port	Gateway	Queue	Schedule	Description	Actions
0/12 KiB	*	Reserved Not assigned by IANA	*	*	*	*	*	*	Block bogon networks	
0/0 B	IPv4 ICMP any	*	*	*	*	*	none			
0/5 KiB	IPv4 TCP	*	*	192.168.219.10 (HTTP)	80	*	none		NAT Wan vers HaProxy	

Buttons at the bottom: Add, Delete, Toggle, Copy, Save, Separator.

On paramètre nos règles afin d'autoriser les connexions à l'interface Web

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Floating WAN LAN DMZ

Rules (Drag to Change Order)

	States	Protocol	Source	Port	Destination	Port	Gateway	Queue	Schedule	Description	Actions
<input checked="" type="checkbox"/>	2/6.77 MiB	*	*	*	LAN Address	443	*	*		Anti-Lockout Rule	
<input type="checkbox"/>	✓ 0/7 KiB	IPv4 ICMP	any	*	*	*	*	*	none		 
<input type="checkbox"/>	✓ 12/51.83 MiB	IPv4	LAN net	*	*	*	*	*	none	Default allow LAN to any rule	 
<input type="checkbox"/>	✓ 0/0 B	IPv6	LAN net	*	*	*	*	*	none	Default allow LAN IPv6 to any rule	 

 Add  Add  Delete  Toggle  Copy  Save  Separator



*on a fait des aliases sur les ports 443 et 80 (HTTPS / http), puis on a effectué des règles afin de filtrer le trafic entrant / sortant

Floating WAN LAN DMZ

Rules (Drag to Change Order)

	States	Protocol	Source	Port	Destination	Port	Gateway	Queue	Schedule	Description	Actions
<input type="checkbox"/>	✓ 0/3 KiB	IPv4 ICMP	any	*	*	*	*	*	none		 
<input type="checkbox"/>	✓ 0/0 B	IPv4 TCP	DMZ net	*	10.20.0.30	*	*	*	none	règle dmz-->BDD	 

 Add  Add  Delete  Toggle  Copy  Save 



Et là on a configuré la DMZ de sorte à ce que la machine du réseau soit accessible depuis l'extérieur

Firewall / NAT / Port Forward ?

Port Forward 1:1 Outbound NPt

Rules										
<input type="checkbox"/>	Interface	Protocol	Source Address	Source Ports	Dest. Address	Dest. Ports	NAT IP	NAT Ports	Description	Actions
<input checked="" type="checkbox"/>	WAN	TCP	*	*	WAN address	80 (HTTP)	192.168.219.10	80 (HTTP)	Wan vers HaProxy	

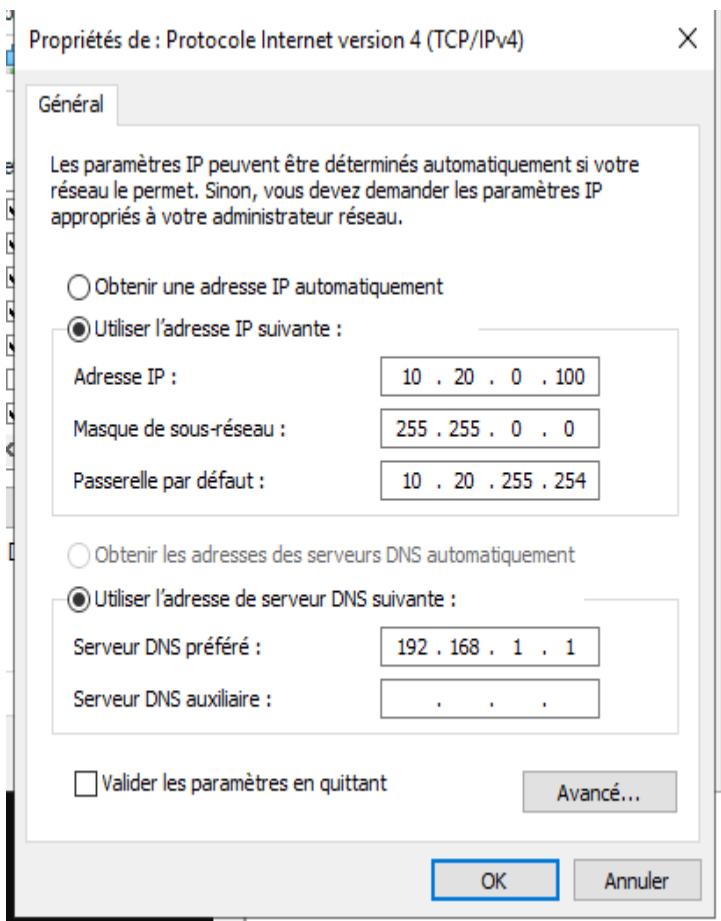
Add Add Delete Toggle Save Separator

Legend

- Pass
- Linked rule

Et pour finir on effectue, une règle NAT qui effectue une redirection de ports

Documentation Haproxy + server web + BDD +PFSENSE



```
C:\Users\Administrateur>nslookup srvsquid.sio.lan
Serveur : SrvDC.sio.lan
Address: 192.168.1.1

Nom : srvsquid.sio.lan
Address: 192.168.1.21
```

La machine est bien sur le réseau

Documentation HAProxy + server web + BDD +PFSENSE



Network	Gateway	Interface	Description	Actions
192.168.119.0/24	DMZGW - 192.168.219.10	DMZ		

Ajout d'une route statique [car le Pfsense connaît que les 3 réseaux]

```
MariaDB [(none)]> use mysql
ERROR 1049 (42000): Unknown database 'mysql'
MariaDB [(none)]> use mysql;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [mysql]> USE
USE          USE_FRM      USER          USER_RESOURCES
MariaDB [mysql]> USE haproxy
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [haproxy]> GRANT ALL PRIVILEGES ON haproxy.* TO 'root'@'%' IDENTIFIED BY 'root' WITH GRANT OPTION;
Query OK, 0 rows affected (0,002 sec)

MariaDB [haproxy]> flush privileges;
Query OK, 0 rows affected (0,001 sec)

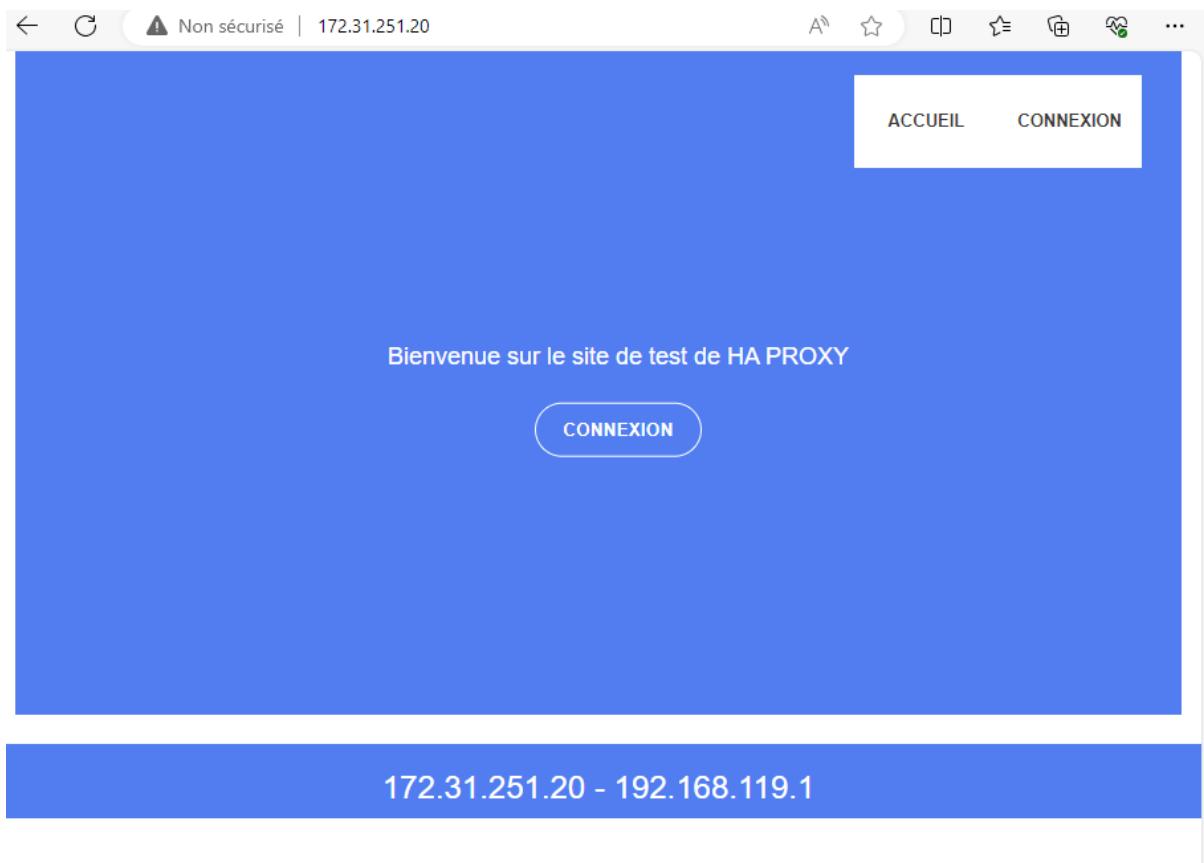
MariaDB [haproxy]>
```

*attribution des droits à route pour accéder à l'HAProxy

```
# localhost which is more compatible and is not less secure.
bind-address      = 0.0.0.0
```

*Ouverture du port d'écoute pour tout le monde

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On a bien accès à notre HaProxy !