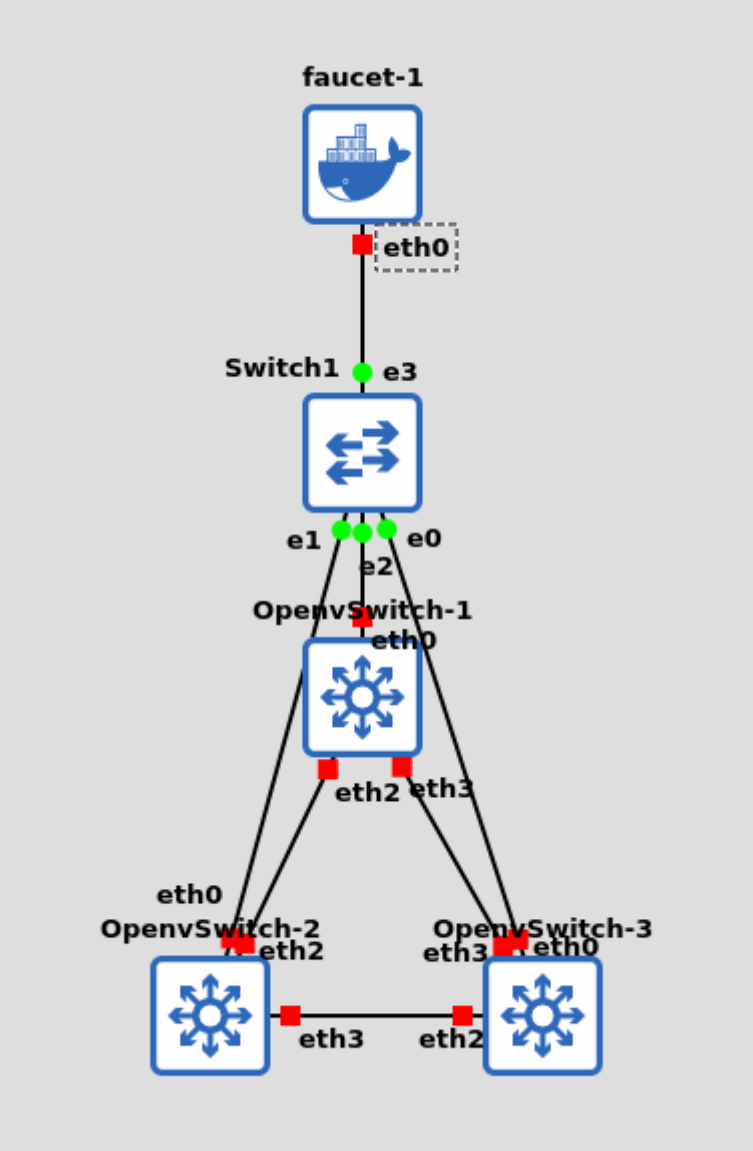
TP 2 SDN Guillaume Sanchez

Etape 1 :

Mise en place des machines avec leurs connections :



Configuration réseau de toutes les machines :

Configuration eth0 sur le Controlleur SDN Faucet :

```
faucet-1:~# ip addr show eth0
239: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 65521 qdisc fq_codel state UNKN
OWN qlen 1000
    link/ether 02:42:ae:46:0c:00 brd ff:ff:ff:ff:ff:ff
    inet 172.20.1.254/24 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:aeff:fe46:c00/64 scope link
       valid_lft forever preferred_lft forever
```

Configuration eth0 sur OpenvSwitch-1 :

```
OpenvSwitch-1:/# ip addr show eth0
193: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP100> mtu 65521 qdisc fq_codel state U
NKNOWN qlen 1000
    link/ether 02:42:1b:36:f3:00 brd ff:ff:ff:ff:ff:ff
    inet 172.20.1.1/24 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:1bff:fe36:f300/64 scope link
       valid_lft forever preferred_lft forever
```

Configuration eth0 sur OpenvSwitch-2 :

```
OpenvSwitch-2:/# ip addr show eth0
191: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP100> mtu 65521 qdisc fq_codel state U
NKNOWN qlen 1000
    link/ether 02:42:86:02:08:00 brd ff:ff:ff:ff:ff:ff
    inet 172.20.1.2/24 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:86ff:fe02:800/64 scope link
       valid_lft forever preferred_lft forever
```

Configuration eth0 sur OpenvSwitch-3 :

```
OpenvSwitch-3:/# ip addr show eth0
192: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP100> mtu 65521 qdisc fq_codel state U
NKNOWN qlen 1000
    link/ether 02:42:42:33:10:00 brd ff:ff:ff:ff:ff:ff
    inet 172.20.1.3/24 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:42ff:fe33:1000/64 scope link
       valid_lft forever preferred_lft forever
```

Test de connectivité entre le Controlleur SDN Faucet et les 3 machines OpenvSwitch :

```
faucet-1:~# ping -c 2 172.20.1.1
PING 172.20.1.1 (172.20.1.1): 56 data bytes
64 bytes from 172.20.1.1: seq=0 ttl=64 time=1004.995 ms
64 bytes from 172.20.1.1: seq=1 ttl=64 time=4.965 ms

--- 172.20.1.1 ping statistics ---
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max = 4.965/504.980/1004.995 ms
faucet-1:~# ping -c 2 172.20.1.2
PING 172.20.1.2 (172.20.1.2): 56 data bytes
64 bytes from 172.20.1.2: seq=0 ttl=64 time=1011.850 ms
64 bytes from 172.20.1.2: seq=1 ttl=64 time=11.690 ms

--- 172.20.1.2 ping statistics ---
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max = 11.690/511.770/1011.850 ms
faucet-1:~# ping -c 2 172.20.1.3
PING 172.20.1.3 (172.20.1.3): 56 data bytes
64 bytes from 172.20.1.3: seq=0 ttl=64 time=0.293 ms
64 bytes from 172.20.1.3: seq=1 ttl=64 time=0.128 ms

--- 172.20.1.3 ping statistics ---
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max = 0.128/0.210/0.293 ms
```

Mise en place de la configuration de chaques pont OVS vers l'ip du Controlleur SDN Faucet et vérification avec la commande ovs-vsctl get-controller br0 :

OpenvSwitch-1 :

```
OpenvSwitch-1:/# ovs-vsctl set bridge br0 other-config:datapath-id=0000000000000001 fail_mode=secure -- set-cont
roller br0 tcp:172.20.1.254:6653 -- set controller br0 connection-mode=out-of-band -- --if-exists del-port eth0
OpenvSwitch-1:/# ovs-vsctl get-controller br0
tcp:172.20.1.254:6653
```

OpenvSwitch-2 :

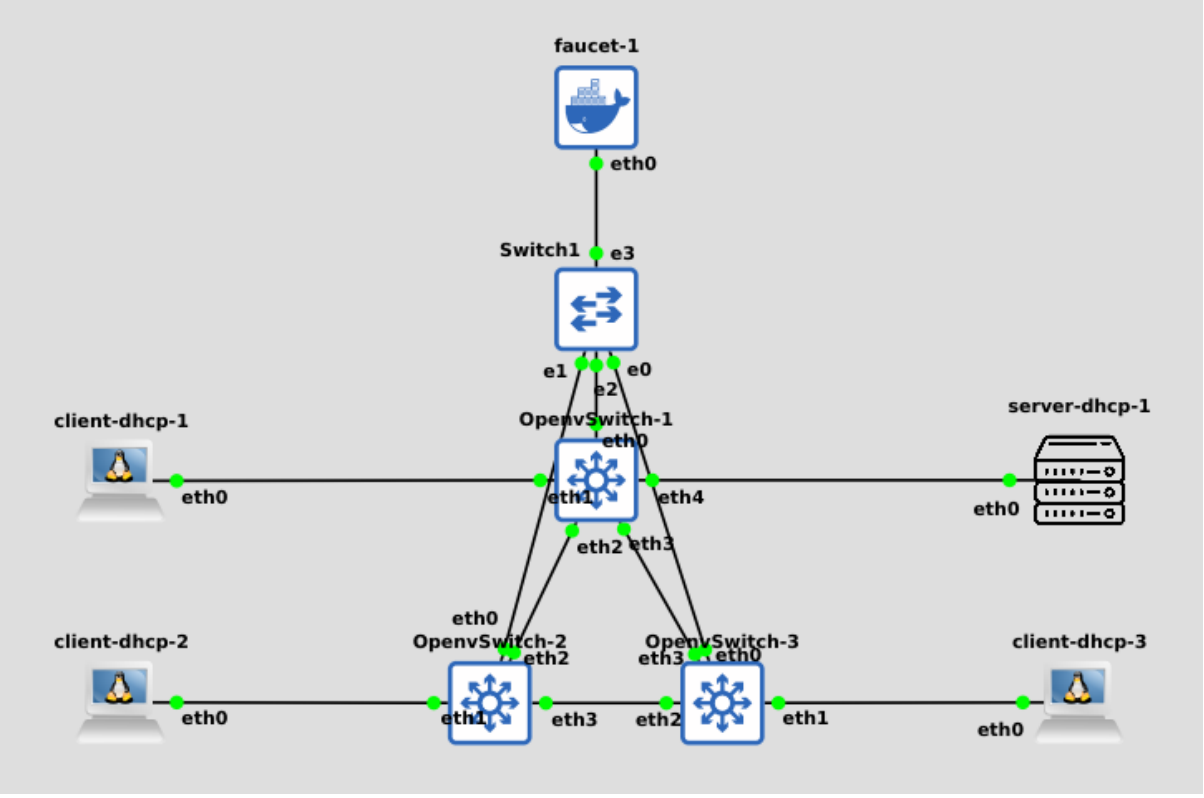
```
OpenvSwitch-2:/# ovs-vsctl set bridge br0 other-config:datapath-id=0000000000000002 fail_mode=secure -- set-contr
oller br0 tcp:172.20.1.254:6653 -- set controller br0 connection-mode=out-of-band -- --if-exists del-port eth0
OpenvSwitch-2:/# ovs-vsctl get-controller br0
tcp:172.20.1.254:6653
```

OpenvSwitch-3 :

```
OpenvSwitch-3:/# ovs-vsctl set bridge br0 other-config:datapath-id=0000000000000003 fail_mode=secure -- set-controll
er br0 tcp:172.20.1.254:6653 -- set controller br0 connection-mode=out-of-band -- --if-exists del-port eth0
OpenvSwitch-3:/# ovs-vsctl get-controller br0
tcp:172.20.1.254:6653
```

Etape 2 :

Mise en place des 4 nouvelles machines :



Configuration du serveur dhcp :

server-dhcp-1 interfaces

```
auto eth0
iface eth0 inet static
address 10.20.30.1
netmask 255.255.255.0
```

```
/ # ip addr show eth0
299: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 65521 qdisc fq_codel qlen 1000
    link/ether 02:42:71:d2:55:00 brd ff:ff:ff:ff:ff:ff
    inet 10.20.30.1/24 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:71ff:fed2:5500/64 scope link
       valid_lft forever preferred_lft forever
```

Sur la machine Controlleur SDN Faucet, sauvegarde de faucet.yaml et édition du fichier pour placer la configuration :

```
faucet-1:~# mv /etc/faucet/faucet.yaml /etc/faucet/faucet.yaml.ori
faucet-1:~# vi /etc/faucet/faucet.yaml
```

Test du nouveau fichier créé :

```
faucet-1:~# check_faucet_config /etc/faucet/faucet.yaml
['{\n'
 '    "advertise_interval": 30,\n'
 '    "arp_neighbor_timeout": 30,\n'
 '    "cache_update_guard_time": 150,\n'
 '    "combinatorial_port_flood": false,\n'
 '    "cookie": 1524372928,\n'
 '    "description": "openvswitch-1",\n'
 '    "dot1x": {},\n'
 '    "dp_id": 1,\n'
 '    "drop_broadcast_source_address": true,\n'
```

Application de la nouvelle configuration :

```
faucet-1:~# pkill -HUP ryu-manager
```

Sur le serveur dhcp, sauvegarde de dhcpd.conf et édition du fichier pour placer la configuration :

```
/ # cp /etc/dhcp/dhcpd.conf /etc/dhcp/dhcpd.conf.orig
/ # vi /etc/dhcp/dhcpd.conf
```

Affichage de la configuration :

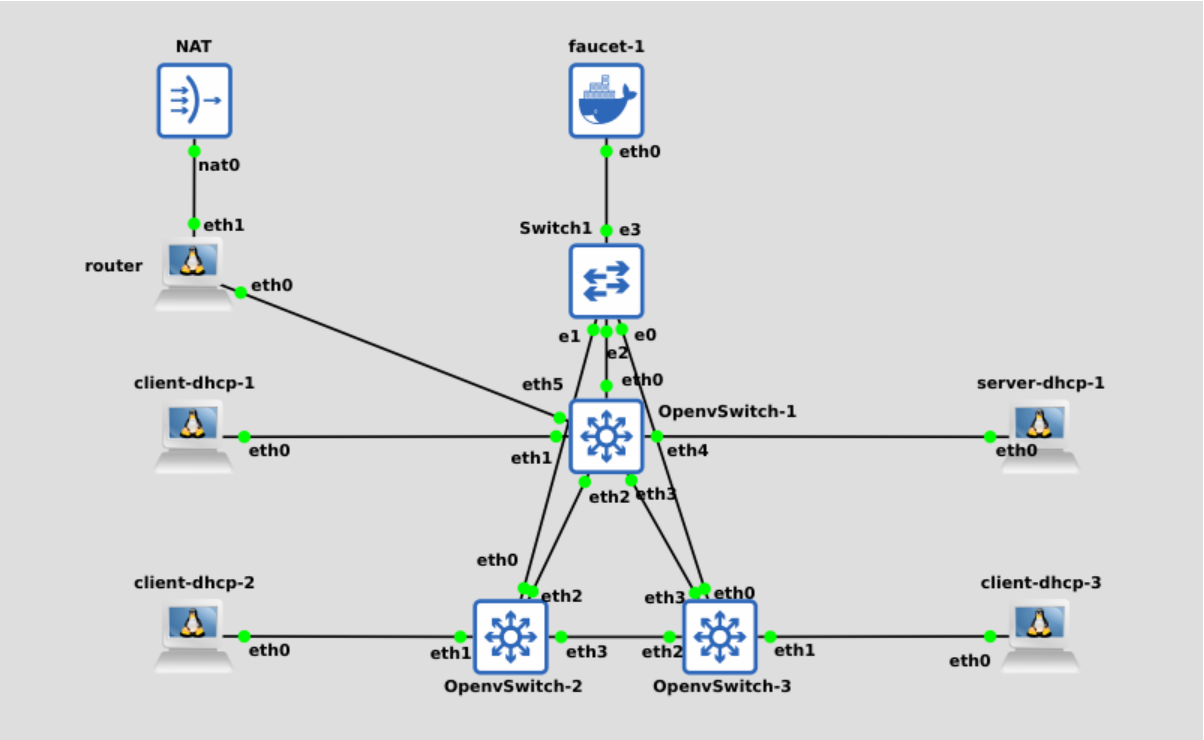
```
/ # cat /etc/dhcp/dhcpd.conf
subnet 10.20.30.0 netmask 255.255.255.0 {
# specifie un domaine specifique au sous-reseau
option domain-name "mondomaine.org";
option broadcast-address 10.20.30.255; # adresse de diffusion
range 10.20.30.2 10.20.30.253; # plage adresses IP dynamiques
option routers 10.20.30.254; # routeur par defaut
default-lease-time 3600;
max-lease-time 7200;
}
```

Lancement du serveur dhcp avec la nouvelle configuration :

```
/ # /etc/init.d/isc-dhcp-server start
Launching both IPv4 and IPv6 servers (please configure INTERFACES in /etc/default/isc-dhcp-server if you only want one or the other).
 * Starting ISC DHCPv4 server dhcpd
   ...done.
```

Etape 3 :

Mise en place de la machine router et du NAT :



Configuration de la machine router, mise en place de eth0 en IP fix vers le OpenVSwitch1 et de eth1 vers le NAT en DHCP pour avoir internet :

```
/ # ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue 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
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
419: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 65521 qdisc fq_codel qlen 1000
    link/ether 02:42:8c:64:7e:00 brd ff:ff:ff:ff:ff:ff
    inet 10.20.40.1/24 brd 10.20.40.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:8cff:fe64:7e00/64 scope link
       valid_lft forever preferred_lft forever
420: eth1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 65521 qdisc fq_codel qlen 1000
    link/ether 02:42:8c:64:7e:01 brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.239/24 brd 192.168.122.255 scope global eth1
       valid_lft forever preferred_lft forever
/ #
```

Une fois que les machine client ont récupéré une ip avec le serveur DHCP, si je ping google (8.8.8.8) je reçois bien une réponse de google depuis un serveur client :

