DHCP

Riboulet Célian `S3B"`

2) Choosing addresses for both dhcp servers

dhcp1 :

```
ip addr add 192.168.1.1/24 dev eth0
```

dhcp2 :

```
ip addr add 192.168.2.1/24 dev eth0
```

3) Interfaces configuration on both DHCP servers

Added lines on `/etc/network/interfaces` **for dchp1 :**

```
auto eth0
iface eth0 inet static
 address 192.168.1.1
 netmask 255.255.255.0
```

Added lines on `/etc/network/interfaces` **for dchp2 :**

```
auto eth0
iface eth0 inet static
 address 192.168.1.1
 netmask 255.255.255.0
```

Et on fais ip link set eth0 up

4) Enabling interfaces on both dhcp servers

We can use the following command to take in consideration the changes in `/etc/network/interfaces` we have just made.

```
ip link set eth0 up
```

5) Activating the DHCP service on both servers

Adding the following line to `/etc/default/isc-dhcp-server` in order to enable the dhcp service on the eth0 interface.

```
INTERFACESv4="eth0"
```

6) Configuring Clients so they can get an IP address by requesting the DHCP service

Into both client's `/etc/network/interfaces` :

```
iface eth0 inet dhcp
```

7) Enabling client1 interface

We first use :

```
ifup eth0
```

After around one minute, the client does not have received any offer from the DHCP server, this is beacause the DHCP service is not yet completly configured.

8) Configuring dhcp1 subnet

We now have to edit the `/etc/dhcp/dhcpd.conf` file on dhcp1 in order to setup the DHCP service.

```
subnet 192.168.1.0 netmask 255.255.255.0 {
}
```
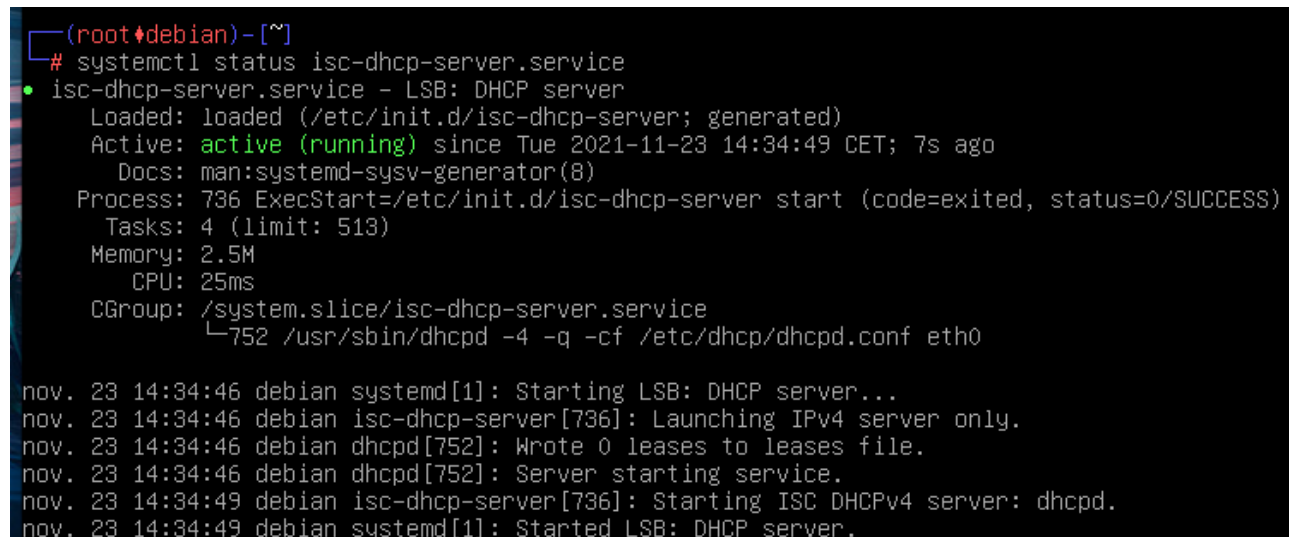
9) Restarting the DHCP service on dhcp1

```
systemctl restart isc-dhcp-server
```

> This has to be done after any modiciation in `/etc/dhcp/dhcpd.conf`

10) Checking DHCP service status

```
systemctl status isc-dhcp-server
```

```
┌──(root♦debian)-[~]
└─# systemctl status isc-dhcp-server.service
● isc-dhcp-server.service - LSB: DHCP server
     Loaded: loaded (/etc/init.d/isc-dhcp-server; generated)
     Active: active (running) since Tue 2021-11-23 14:34:49 CET; 7s ago
       Docs: man:systemd-sysv-generator(8)
    Process: 736 ExecStart=/etc/init.d/isc-dhcp-server start (code=exited, status=0/SUCCESS)
      Tasks: 4 (limit: 513)
     Memory: 2.5M
        CPU: 25ms
     CGroup: /system.slice/isc-dhcp-server.service
             └─752 /usr/sbin/dhcpd -4 -q -cf /etc/dhcp/dhcpd.conf eth0

nov. 23 14:34:46 debian systemd[1]: Starting LSB: DHCP server...
nov. 23 14:34:46 debian isc-dhcp-server[736]: Launching IPv4 server only.
nov. 23 14:34:46 debian dhcpd[752]: Wrote 0 leases to leases file.
nov. 23 14:34:46 debian dhcpd[752]: Server starting service.
nov. 23 14:34:49 debian isc-dhcp-server[736]: Starting ISC DHCPv4 server: dhcpd.
nov. 23 14:34:49 debian systemd[1]: Started LSB: DHCP server.
```

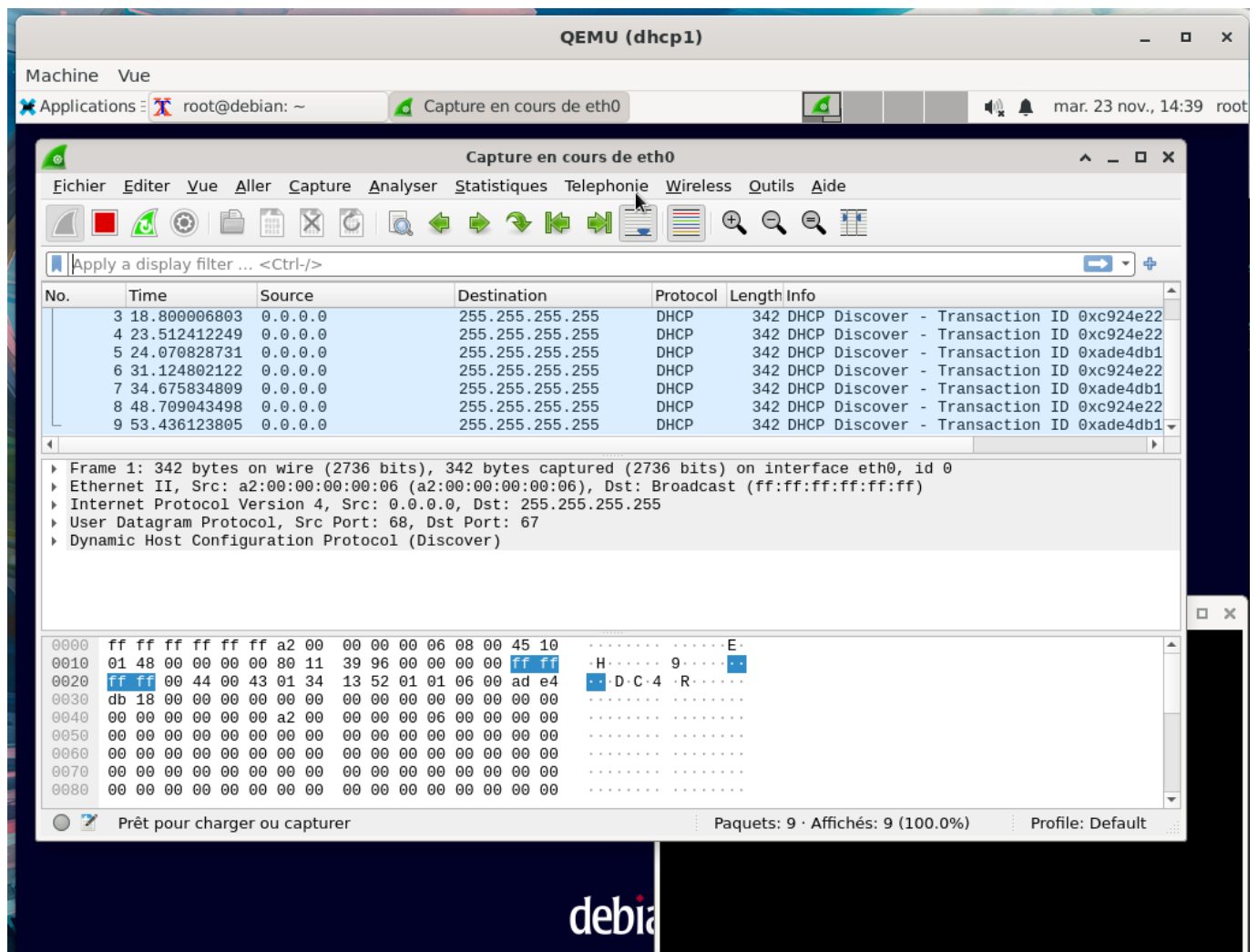## 11) Starting wireshark in graphic mode on dhcp1

In order to see incoming packets from the clients, we will use wireshark.

```
startx && wireshark -i eth0 -k
```

12-13) Start client1 network interface in debug mode

```
dhclient -d eth0
```

The dhcp1 server does see the DHCP Discover request from client 1 but is not giving back an offer.

> The DHCP is not responding a DHCP Offer, this is because we haven't setup the available addresses range into the server's `etc/dhcp/dhcpd.conf` file. The server is actually not able to give an available IP address to any client.

14) Addresses range setup on the DHCP server

Editing the `/etc/dhcp/dhcpd.conf` file on dhcpd1 :

```
subnet 192.168.1.0 netmask 255.255.255.255 {
 range 192.168.1.3 192.168.1.13
}
```

15) Testing wireshark with the new configuration

The client1 machine now have a respond of his offer and can now request to have an available IP addresse.

16) The network configuration on client1 given by the DHCP server

> The ip addresse is here `192.168.1.3` and is in the range we've set into the dhcp configuration on dhcp1

17) Checking if client1 and dhcp1 can communicate

19) Releasing the DHCP lease on client1

20) client1 mac address

```
a2:00:00:00:00:07
```

21) Giving client its own static IP

Editing the `/etc/dhcp/dhcpd.conf` file on dhcp1

We also change the client2 hostname by editing his file `/etc/hostname`

22) Starting both clients network interfaces

Client 2 :

```
┌──(root✦client2)-[~]
└─# dhclient -d eth0
Internet Systems Consortium DHCP Client 4.4.1
Copyright 2004-2018 Internet Systems Consortium.
All rights reserved.
For info, please visit https://www.isc.org/software/dhcp/

Listening on LPF/eth0/a2:00:00:00:00:07
Sending on   LPF/eth0/a2:00:00:00:00:07
Sending on   Socket/fallback
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 4
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 9
DHCPOFFER of 192.168.1.20 from 192.168.1.1
DHCPREQUEST for 192.168.1.20 on eth0 to 255.255.255.255 port 67
DHCPACK of 192.168.1.20 from 192.168.1.1
bound to 192.168.1.20 -- renewal in 289 seconds.
─
```

23) Checking both clients network configurations

Both configuration can be check by using :

```
ip addr
```

> Client2 does have the IP 192.168.1.20 as we wave configured it in the dhcp server's config
> file.

24) Checking if both clients can communicate

Here client2 can communicate with client1 and dhcp1 :

25) Releasing client's DHCP leases

```
dhclient -r eth0
```

26) Changing the default lease time

We have to edit the `/etc/dhcp/dhcpd.conf` file on dhcp1 in order to change de lease time :

28) Lease time

The lease is renewed every 15 secondes

29) Same addresses ?

All clients has the same addresses after a renewal, this is the main goal of asking the dhcp server for a renewal.

30-31) Shuting down the DHCP service

```
systemctl stop isc-dhcp-server
```

> Both clients are now not able to renew their lease (As expected)

```
Listening on LPF/eth0/a2:00:00:00:00:06
Sending on   LPF/eth0/a2:00:00:00:00:06
Sending on   Socket/fallback
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 4
DHCPOFFER of 192.168.1.5 from 192.168.1.1
DHCPREQUEST for 192.168.1.5 on eth0 to 255.255.255.255 port 67
DHCPACK of 192.168.1.5 from 192.168.1.1
bound to 192.168.1.5 -- renewal in 16 seconds.
DHCPREQUEST for 192.168.1.5 on eth0 to 192.168.1.1 port 67
DHCPREQUEST for 192.168.1.5 on eth0 to 192.168.1.1 port 67
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 6
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 7
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 16
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 13
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 19
No DHCPOFFERS received.
No working leases in persistent database - sleeping.
```

32) Restarting the DHCP service with clients running

Clients stay in "sleeping" mode and are not looking for a new lease, even if the dhcp service is up again

33) Releasing clients leases

```
dhclient -r eth0
```

34) Seting up client3 and dhcp2

mon client3 ne boot pas :/

```
#option domain-name  example.org ;
#option domain-name-servers ns1.example.org, ns2.example.org;

default-lease-time 600;
max-lease-time 7200;

subnet 192.168.2.0 netmask 255.255.255.0 {
        range 192.168.2.3 192.168.2.13;
}

host client3 {
        hardware ethernet ?????????????;_
        fixed-address 192.168.2.2;
}

# The ddns-updates-style parameter controls whether or not the
# attempt to do a DNS update when a lease is confirmed. We def
```

35) Linking eth1 interfaces for both servers

On both dhcp servers :

```
iface eth1 inet dhcp
```

We also have to run the following command in order to enable the ip forwading :

```
echo 1 > /proc/sys/net/ipv4/ip_forward
```

36) Starting eth1 interface on both servers

```
ifup eth1
```

37) Checking IP addresses for both servers

on dhcp2 :

```
┌──(root✦debian)-[~]
└─# ifup eth1
Internet Systems Consortium DHCP Client 4.4.1
Copyright 2004-2018 Internet Systems Consortium.
All rights reserved.
For info, please visit https://www.isc.org/software/dhcp/

Listening on LPF/eth1/a2:00:00:00:00:05
Sending on   LPF/eth1/a2:00:00:00:00:05
Sending on   Socket/fallback
Created duid "\000\001\000\001)D\303*\242\000\000\000\000\005".
DHCPDISCOVER on eth1 to 255.255.255.255 port 67 interval 4
DHCPOFFER of 192.168.254.2 from 192.168.254.254
DHCPREQUEST for 192.168.254.2 on eth1 to 255.255.255.255 port 67
DHCPACK of 192.168.254.2 from 192.168.254.254
bound to 192.168.254.2 -- renewal in 1609 seconds.

┌──(root✦debian)-[~]
└─# ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen
    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
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group def
    link/ether a2:00:00:00:00:04 brd ff:ff:ff:ff:ff:ff
    altname enp0s3
    altname ens3
    inet 192.168.2.1/24 brd 192.168.2.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::a000:ff:fe00:4/64 scope link
       valid_lft forever preferred_lft forever
3: eth1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group def
    link/ether a2:00:00:00:00:05 brd ff:ff:ff:ff:ff:ff
    altname enp0s4
    altname ens4
    inet 192.168.254.2/24 brd 192.168.254.255 scope global dynamic eth1
       valid_lft 3579sec preferred_lft 3579sec
    inet6 fe80::a000:ff:fe00:5/64 scope link
       valid_lft forever preferred_lft forever
```

38) Checking if both servers can communicate

On dhcp2 :

```
┌──(root✦debian)-[~]
└─# ping 192.168.254.1
PING 192.168.254.1 (192.168.254.1) 56(84) bytes of data.
64 bytes from 192.168.254.1: icmp_seq=1 ttl=64 time=0.770 ms
64 bytes from 192.168.254.1: icmp_seq=2 ttl=64 time=1.69 ms
64 bytes from 192.168.254.1: icmp_seq=3 ttl=64 time=1.80 ms
64 bytes from 192.168.254.1: icmp_seq=4 ttl=64 time=1.50 ms
64 bytes from 192.168.254.1: icmp_seq=5 ttl=64 time=1.58 ms
64 bytes from 192.168.254.1: icmp_seq=6 ttl=64 time=1.62 ms
^C
--- 192.168.254.1 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5005ms
rtt min/avg/max/mdev = 0.770/1.489/1.795/0.334 ms
```

39) Setting up the default gateway on dhcp1

We have to edit one more time the `/etc/dhcp/dhcpd.conf` file on dhcp1.

In the subnet block we add :

```
option routers 192.168.1.1;
```

40) Setting up the default gateway on dhcp2

```
option routers 192.168.2.1;
```

41)

```
systemctl restart isc-dhcp-server
```

44)

On client 1 (ping to dhcp2 -> client3 is down but its the same network)

```
┌──(root♦debian)-[~]
└─# ping 192.168.2.1
PING 192.168.2.1 (192.168.2.1) 56(84) bytes of data.
64 bytes from 192.168.2.1: icmp_seq=1 ttl=62 time=4.34 ms
64 bytes from 192.168.2.1: icmp_seq=2 ttl=62 time=4.24 ms
64 bytes from 192.168.2.1: icmp_seq=3 ttl=62 time=4.29 ms
64 bytes from 192.168.2.1: icmp_seq=4 ttl=62 time=4.59 ms
^C
--- 192.168.2.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3005ms
rtt min/avg/max/mdev = 4.235/4.364/4.593/0.136 ms
```