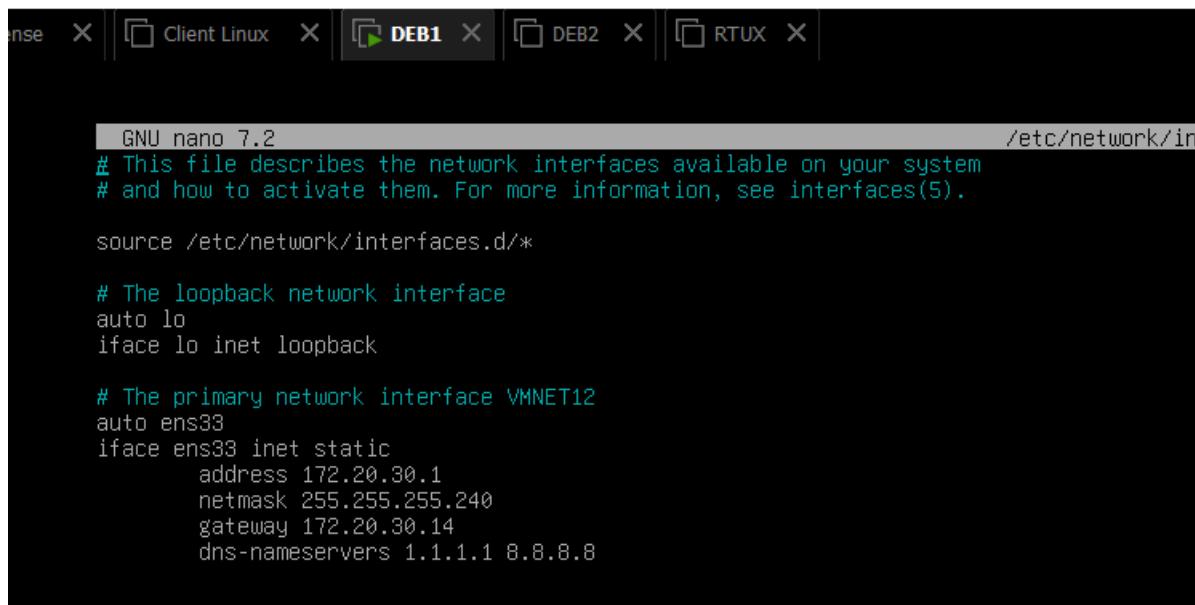


Mise en place d'un serveur DHCP sous Linux avec des clients sur des réseaux différents.

Configuration de SRV-DEB1 :

1. Configuration de l'IP Statique



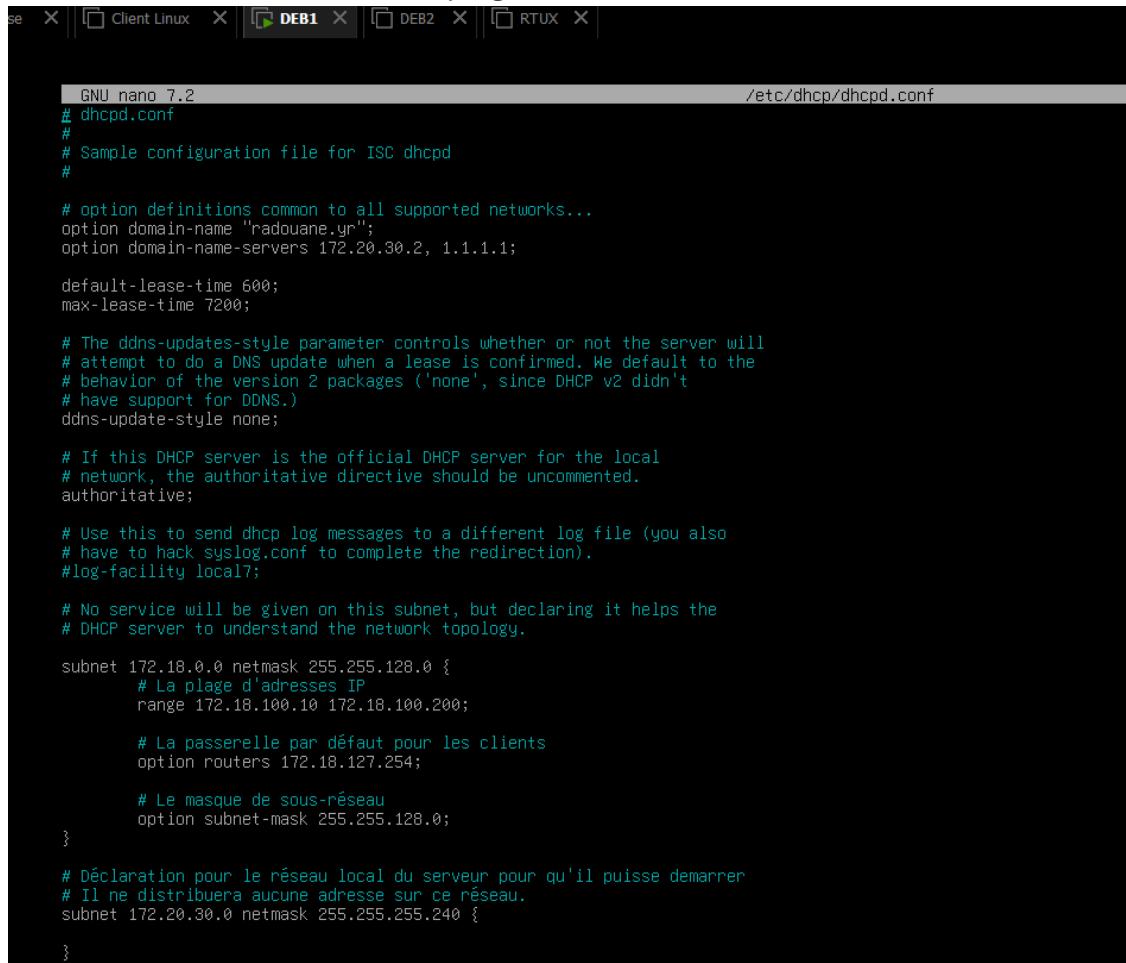
```
GNU nano 7.2 /etc/network/interfaces
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface VMNET12
auto ens33
iface ens33 inet static
    address 172.20.30.1
    netmask 255.255.255.240
    gateway 172.20.30.14
    dns-nameservers 1.1.1.1 8.8.8.8
```

2. Installation du serveur DHCP et plages d'adresses des clients



```
GNU nano 7.2 /etc/dhcp/dhcpd.conf
# dhcpd.conf
#
# Sample configuration file for ISC dhcpcd
#
# option definitions common to all supported networks...
option domain-name "radouane.yr";
option domain-name-servers 172.20.30.2, 1.1.1.1;

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

# The ddns-updates-style parameter controls whether or not the server will
# attempt to do a DNS update when a lease is confirmed. We default to the
# behavior of the version 2 packages ('none', since DHCP v2 didn't
# have support for DDNS.)
ddns-update-style none;

# If this DHCP server is the official DHCP server for the local
# network, the authoritative directive should be uncommented.
authoritative;

# Use this to send dhcp log messages to a different log file (you also
# have to hack syslog.conf to complete the redirection).
#log-facility local7;

# No service will be given on this subnet, but declaring it helps the
# DHCP server to understand the network topology.

subnet 172.18.0.0 netmask 255.255.128.0 {
    # La plage d'adresses IP
    range 172.18.100.10 172.18.100.200;

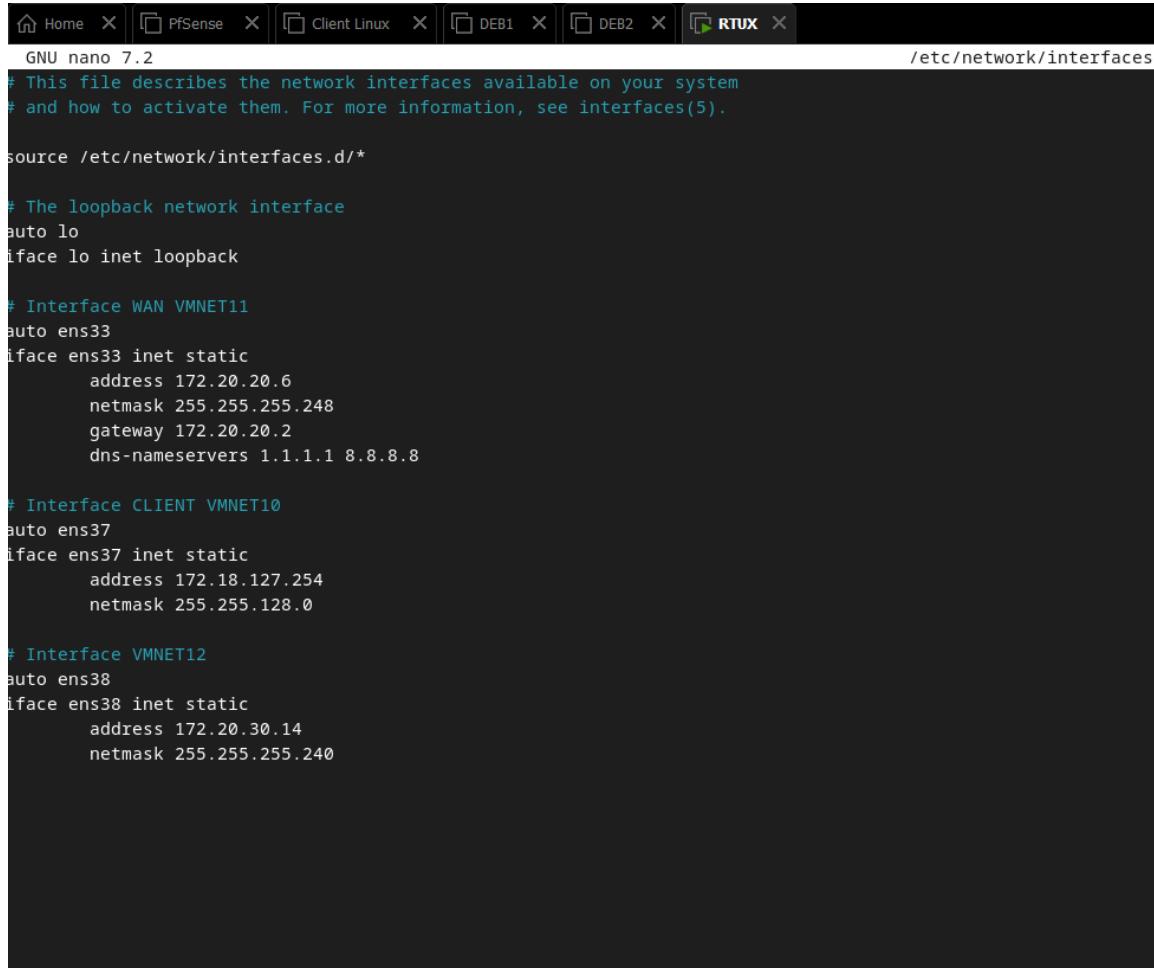
    # La passerelle par défaut pour les clients
    option routers 172.18.127.254;

    # Le masque de sous-réseau
    option subnet-mask 255.255.128.0;
}

# Déclaration pour le réseau local du serveur pour qu'il puisse démarrer
# Il ne distribuera aucune adresse sur ce réseau.
subnet 172.20.30.0 netmask 255.255.255.240 {
```

Configuration de RTUX

1. Configuration des interfaces + gateway



```
GNU nano 7.2 /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/*

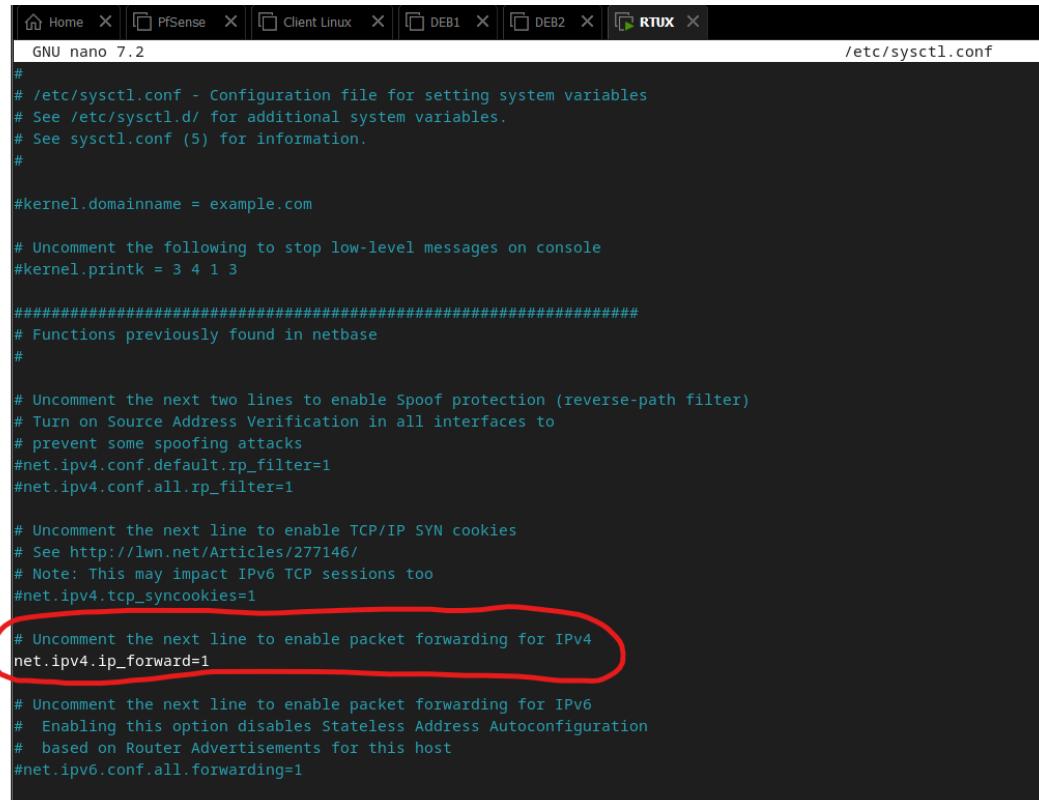
# The loopback network interface
auto lo
iface lo inet loopback

# Interface WAN VMNET11
auto ens33
iface ens33 inet static
    address 172.20.20.6
    netmask 255.255.255.248
    gateway 172.20.20.2
    dns-nameservers 1.1.1.1 8.8.8.8

# Interface CLIENT VMNET10
auto ens37
iface ens37 inet static
    address 172.18.127.254
    netmask 255.255.128.0

# Interface VMNET12
auto ens38
iface ens38 inet static
    address 172.20.30.14
    netmask 255.255.255.240
```

2. Activation du routage



```
GNU nano 7.2 /etc/sysctl.conf
#
# /etc/sysctl.conf - Configuration file for setting system variables
# See /etc/sysctl.d/ for additional system variables.
# See sysctl.conf (5) for information.
#
#kernel.domainname = example.com

# Uncomment the following to stop low-level messages on console
#kernel.printk = 3 4 1 3

#####
# Functions previously found in netbase
#

# Uncomment the next two lines to enable Spoof protection (reverse-path filter)
# Turn on Source Address Verification in all interfaces to
# prevent some spoofing attacks
#net.ipv4.conf.default.rp_filter=1
#net.ipv4.conf.all.rp_filter=1

# Uncomment the next line to enable TCP/IP SYN cookies
# See http://lwn.net/Articles/277146/
# Note: This may impact IPv6 TCP sessions too
#net.ipv4.tcp_syncookies=1

# Uncomment the next line to enable packet forwarding for IPv4
net.ipv4.ip_forward=1

# Uncomment the next line to enable packet forwarding for IPv6
# Enabling this option disables Stateless Address Autoconfiguration
# based on Router Advertisements for this host
#net.ipv6.conf.all.forwarding=1
```

```
root@debian:/home/youss# systemctl restart networking
root@debian:/home/youss# sudo sysctl -p
net.ipv4.ip_forward = 1
```

3. Installation du relais avec dhcp-helper (J'ai eu un problème avec dhcp-relay donc je l'ai supprimé)

The screenshot shows a terminal window with several tabs at the top: Home, PfSense, Client Linux, DEB1, DEB2, and RTUX. The main pane displays a file named /etc/default/dhcp-helper. The content of the file is as follows:

```
GNU nano 7.2
# Option flags used to start dhcp-helper.
#
# You will need at least "-s <DHCP server>" or
# "-b <interface>" so that dhcp-helper knows where
# to relay DHCP requests.
#
# See "man 8 dhcp-helper" for more details.

DHCPHELPER_OPTS="-s 172.20.30.1 -i ens37"
```

Below the file content, the terminal shows the output of the command `sudo nano /etc/default/dhcp-helper`. It includes the configuration above and a log of the dhcp-helper service's state changes:

```
11,6 ko réceptionnés en 0s (142 ko/s)
Sélection du paquet dhcp-helper précédemment désélectionné.
(Lecture de la base de données... 155540 fichiers et répertoires déjà installés.)
Préparation du dépaquetage de .../dhcp-helper_1.2-3.1_amd64.deb ...
Dépaquetage de dhcp-helper (1.2-3.1) ...
Paramétrage de dhcp-helper (1.2-3.1) ...
Job for dhcp-helper.service failed because the control process exited with error code.
See "systemctl status dhcp-helper.service" and "journalctl -xeu dhcp-helper.service" for details.
invoke-rc.d: initscript dhcp-helper, action "start" failed.
* dhcp-helper.service - DHCP/BOOTP relay agent
  Loaded: loaded (/lib/systemd/system/dhcp-helper.service; disabled; preset: enabled)
  Active: failed (Result: exit-code) since Mon 2025-10-13 10:46:11 CEST; 23ms ago
    Process: 3937 ExecStart=/usr/sbin/dhcp-helper -r /run/dhcp-helper.pid $DHCPHELPER_OPTS (code=exited, status=1/FAILURE)
      CPU: 2ms

oct. 13 10:46:11 debian systemd[1]: Starting dhcp-helper.service - DHCP/BOOTP relay agent...
oct. 13 10:46:11 debian dhcp-helper[3937]: dhcp-helper: bad interface eth0: No such device
oct. 13 10:46:11 debian systemd[1]: dhcp-helper.service: Control process exited, code=exited, status=1/FAILURE
oct. 13 10:46:11 debian systemd[1]: dhcp-helper.service: Failed with result 'exit-code'.
oct. 13 10:46:11 debian systemd[1]: Failed to start dhcp-helper.service - DHCP/BOOTP relay agent.
Traitement des actions différées (« triggers ») pour man-db (2.11.2-2) ...
root@debian:/home/youss# sudo nano /etc/default/dhcp-helper
root@debian:/home/youss# sudo systemctl enable --now dhcp-helper
Synchronizing state of dhcp-helper.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable dhcp-helper
Created symlink /etc/systemd/system/multi-user.target.wants/dhcp-helper.service → /lib/systemd/system/dhcp-helper.service.
root@debian:/home/youss# systemctl status dhcp-helper
● dhcp-helper.service - DHCP/BOOTP relay agent
  Loaded: loaded (/lib/systemd/system/dhcp-helper.service; enabled; preset: enabled)
  Active: active (running) since Mon 2025-10-13 10:47:05 CEST; 25s ago
    Process: 4036 ExecStart=/usr/sbin/dhcp-helper -r /run/dhcp-helper.pid $DHCPHELPER_OPTS (code=exited, status=0/SUCCESS)
  Main PID: 4038 (dhcp-helper)
     Tasks: 1 (limit: 2248)
   Memory: 212.0K
      CPU: 4ms
     CGroup: /system.slice/dhcp-helper.service
             └─4038 /usr/sbin/dhcp-helper -r /run/dhcp-helper.pid -s 172.20.30.1 -i ens37

oct. 13 10:47:05 debian systemd[1]: Starting dhcp-helper.service - DHCP/BOOTP relay agent...
oct. 13 10:47:05 debian systemd[1]: Started dhcp-helper.service - DHCP/BOOTP relay agent.
root@debian:/home/youss# S
```

Configuration du PfSense

1. Interfaces réseaux

The screenshot shows the PfSense web interface with the following details:

Header: pfSense COMMUNITY EDITION, System, Interfaces, Firewall, Services, VPN, Status, Diagnostics, Help.

Message Bar: WARNING: The 'admin' account password is set to the default value. Change the password in the User Manager.

Breadcrumbs: System / Routing / Gateways

Buttons: C, O, L, G, ?

Links: Gateways, Static Routes, Gateway Groups

Table Headers: Gateways, Name, Default Interface, Gateway, Monitor IP, Description, Actions

Table Data:

Name	Default	Interface	Gateway	Monitor IP	Description	Actions
WAN_DHCP6	WAN	fe80::20c:29ff:fe3d:2240%em0	fe80::20c:29ff:fe3d:2240%em0	Interface WAN_DHCP6 Gateway		
WAN_DHCP	WAN	192.168.29.2	192.168.29.2	Interface WAN_DHCP Gateway		
RTUX_GW	LAN	172.20.20.6	172.20.20.6	Passerelle vers les réseaux internes		

Buttons: Save, Add

Section: Default gateway

2. Autoriser tout le trafic sur la carte LAN via le pare-feu

The screenshot shows the PfSense web interface with the following details:

Header: pfSense.home.arpa - Fire: x, Non sécurisé, http://172.20.20.2/firewall_rules.php?if=lan

Message Bar: WARNING: The 'admin' account password is set to the default value. Change the password in the User Manager.

Breadcrumbs: Firewall / Rules / LAN

Buttons: L, G, ?

Links: Floating, WAN, LAN

Table Headers: Rules (Drag to Change Order), States, Protocol, Source, Port, Destination, Port, Gateway, Queue, Schedule, Description, Actions

Table Data:

States	Protocol	Source	Port	Destination	Port	Gateway	Queue	Schedule	Description	Actions
✓ 3/75 KIB	*	*	*	LAN Address	80	*	*		Anti-Lockout Rule	
✓ 0/0 B	IPv4	*	LAN address	*	*	*	*	none	Autoriser tout le trafic LAN	

3. Routes statiques pour atteindre les réseaux clients et serveurs

The screenshot shows the PfSense web interface with the following details:

Header: pfSense COMMUNITY EDITION

Message Bar: WARNING: The 'admin' account password is set to the default value. Change the password in the User Manager.

Breadcrumbs: System / Routing / Static Routes

Buttons: L, G, ?

Message: The changes have been applied successfully.

Links: Gateways, Static Routes, Gateway Groups

Table Headers: Static Routes, Network, Gateway, Interface, Description, Actions

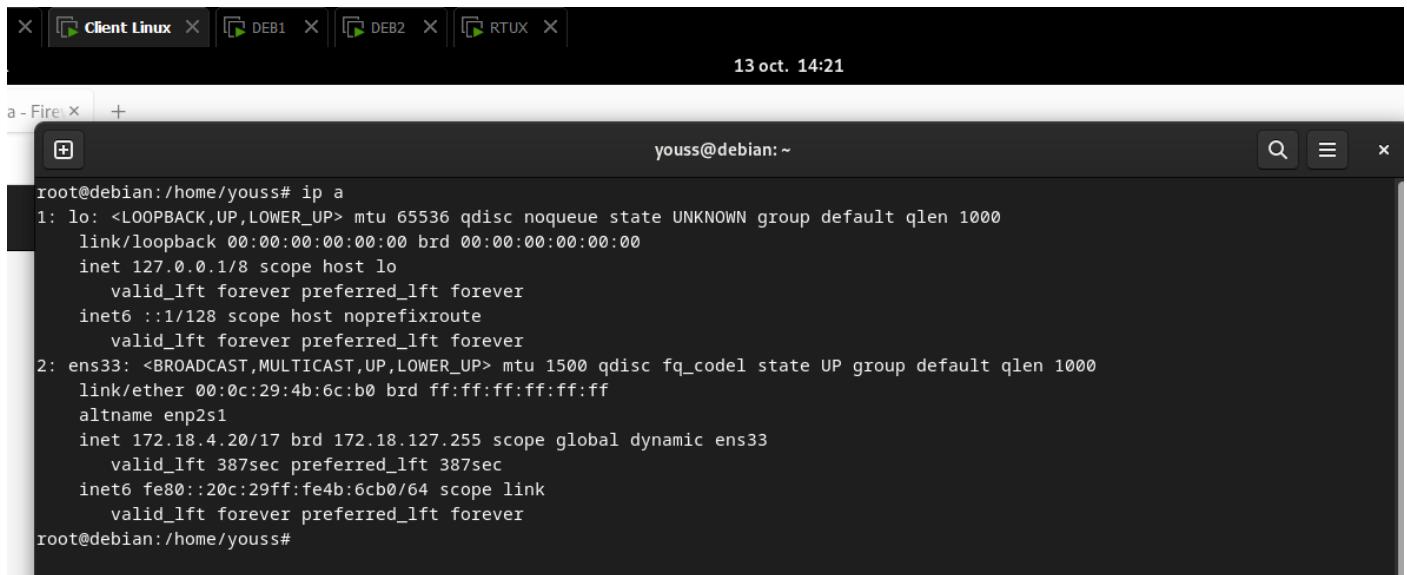
Table Data:

Network	Gateway	Interface	Description	Actions
172.18.0.0/17	RTUX_GW - 172.20.20.6	LAN	Route vers réseau Client	
172.20.30.0/28	RTUX_GW - 172.20.20.6	LAN	Route vers réseau Serveurs	

Buttons: + Add

Configuration du client

1. Configuration des interfaces réseaux pour obtenir une IP automatiquement



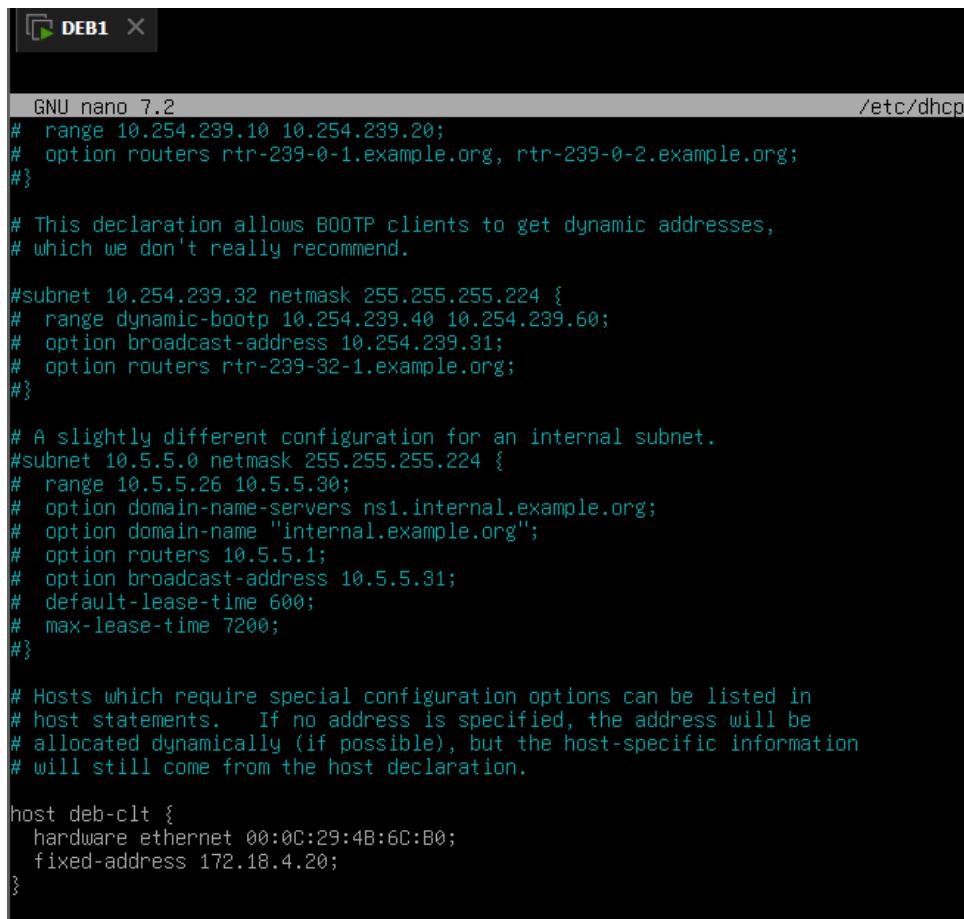
The screenshot shows a terminal window titled "Client Linux" with several tabs open. The current tab displays the output of the "ip a" command. The output shows two interfaces: "lo" (loopback) and "ens33" (ethernet). The "lo" interface has an IP of 127.0.0.1/8. The "ens33" interface has an IP of 172.18.4.20/17 and is connected to the network via an MAC address of 00:0c:29:4b:6c:b0.

```
root@debian:/home/youss# 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
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 00:0c:29:4b:6c:b0 brd ff:ff:ff:ff:ff:ff
    altname enp2s1
    inet 172.18.4.20/17 brd 172.18.127.255 scope global dynamic ens33
        valid_lft 387sec preferred_lft 387sec
    inet6 fe80::20c:29ff:fe4b:6cb0/64 scope link
        valid_lft forever preferred_lft forever
root@debian:/home/youss#
```

La configuration du DHCP fonctionne sur le client

Configuration de SRV-DEB1

1. Réservation pour le client DEB-CLT avec l'adresse 172.18.4.20



The screenshot shows a terminal window titled "DEB1" displaying the contents of the "/etc/dhcp/dhcpd.conf" file. The file contains configuration for a DHCP server. It includes sections for ranges, subnet declarations, and a specific host declaration for "deb-clt" with a fixed address of 172.18.4.20.

```
GNU nano 7.2 /etc/dhcp/
#
# range 10.254.239.10 10.254.239.20;
# option routers rtr-239-0-1.example.org, rtr-239-0-2.example.org;
#}

# This declaration allows BOOTP clients to get dynamic addresses,
# which we don't really recommend.

#subnet 10.254.239.32 netmask 255.255.255.224 {
#  range dynamic-bootp 10.254.239.40 10.254.239.60;
#  option broadcast-address 10.254.239.31;
#  option routers rtr-239-32-1.example.org;
#}

# A slightly different configuration for an internal subnet.
#subnet 10.5.5.0 netmask 255.255.255.224 {
#  range 10.5.5.26 10.5.5.30;
#  option domain-name-servers ns1.internal.example.org;
#  option domain-name "internal.example.org";
#  option routers 10.5.5.1;
#  option broadcast-address 10.5.5.31;
#  default-lease-time 600;
#  max-lease-time 7200;
#}

# Hosts which require special configuration options can be listed in
# host statements. If no address is specified, the address will be
# allocated dynamically (if possible), but the host-specific information
# will still come from the host declaration.

host deb-clt {
    hardware ethernet 00:0C:29:4B:6C:B0;
    fixed-address 172.18.4.20;
}
```

2. Release/renew à la linux

Le premier sudo dhclient -r && sudo dhclient n'a pas récupérer l'adresse réservée et a repris la même adresse qu'avant. Il fallait donc supprimer le fichier présent dans /var/lib/dhcp/dhclient.leases pour supprimer les anciens baux pour forcer le client DHCP à chercher une nouvelle adresse et donc trouver l'adresse 172.18.4.20.

```
root@debian:/home/youss# systemctl restart networking
root@debian:/home/youss# 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
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 00:0c:29:4b:6c:b0 brd ff:ff:ff:ff:ff:ff
    altname enp2s1
    inet 172.18.4.20/17 brd 172.18.127.255 scope global dynamic ens33
        valid_lft 598sec preferred_lft 598sec
    inet6 fe80::20c:29ff:fe4b:6cb0/64 scope link
        valid_lft forever preferred_lft forever
root@debian:/home/youss#
```