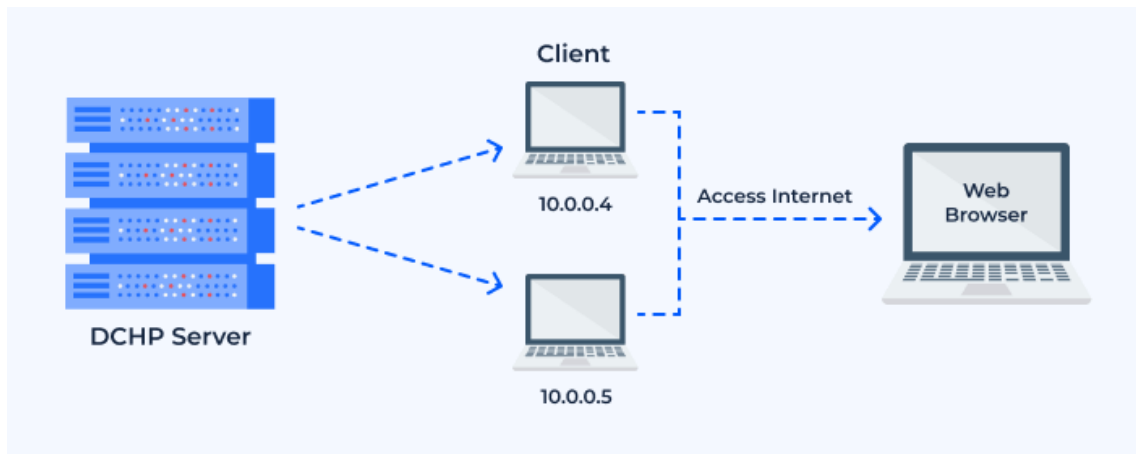


Configuration du Serveur DHCP sous Linux



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Encadré par : AHMED AMAMOU

I. Introduction

Le présent rapport explore la configuration d'un serveur DHCP sous Linux, mettant en œuvre le protocole DHCP (Dynamic Host Configuration Protocol) pour automatiser la distribution d'adresses IP au sein d'un réseau. Cette approche vise à simplifier la gestion des adresses IP, à réduire les erreurs humaines et à améliorer l'efficacité du réseau.

II. Fondements Théoriques

1. Dynamic Host Configuration Protocol (DHCP)

Le DHCP est un protocole de réseau qui permet aux appareils de recevoir automatiquement une configuration IP lors de leur connexion au réseau. Il fonctionne en attribuant de manière dynamique des adresses IP et d'autres paramètres de configuration réseau tels que la passerelle par défaut et les serveurs DNS.

2. Avantages du DHCP

Avantages

Automatisation : Élimine la nécessité de configurer manuellement chaque appareil avec une adresse IP.

Gestion Centralisée : Permet une gestion centralisée des adresses IP au sein du réseau.

Réduction des Conflits : Minimise les risques de conflits d'adresses IP.

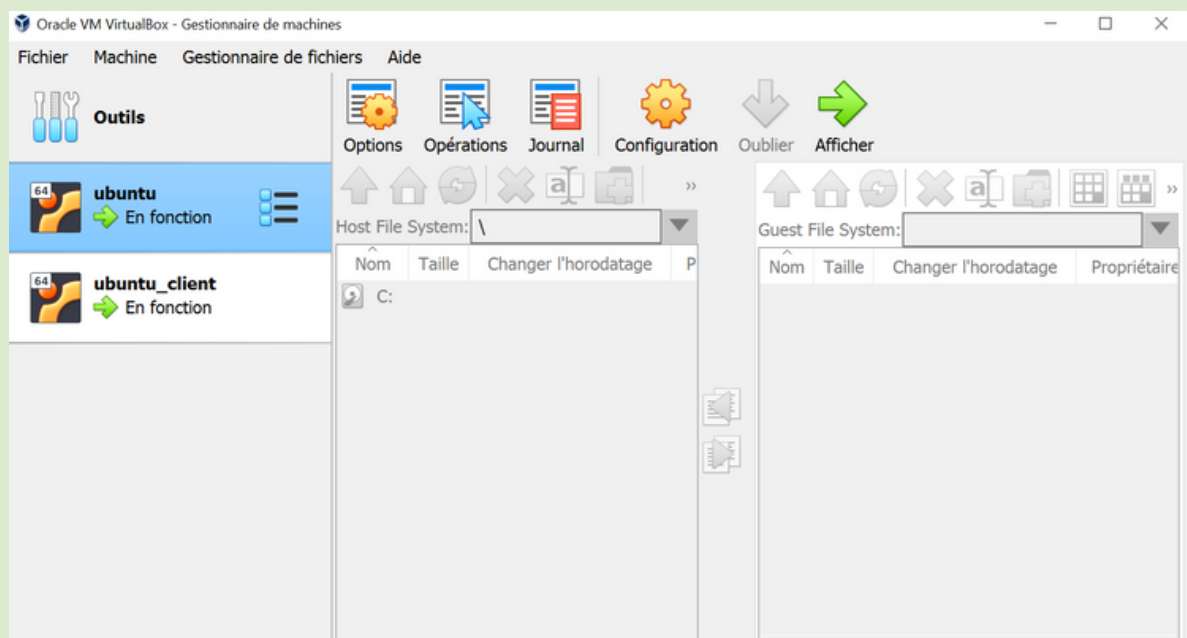
III. Objectifs de Configuration

Objectifs

L'objectif de cette configuration est de mettre en place un serveur DHCP pour attribuer dynamiquement des adresses IP aux clients du réseau. Les objectifs spécifiques comprennent la définition d'une plage d'adresses IP, la spécification des paramètres réseau, et l'assurance d'une gestion efficace des adresses attribuées.

IV. Logiciels Utilisés

Le logiciel ISC DHCP Server a été choisi en raison de sa fiabilité et de sa flexibilité. Il est largement utilisé dans les environnements Linux et offre une configuration robuste du serveur DHCP.



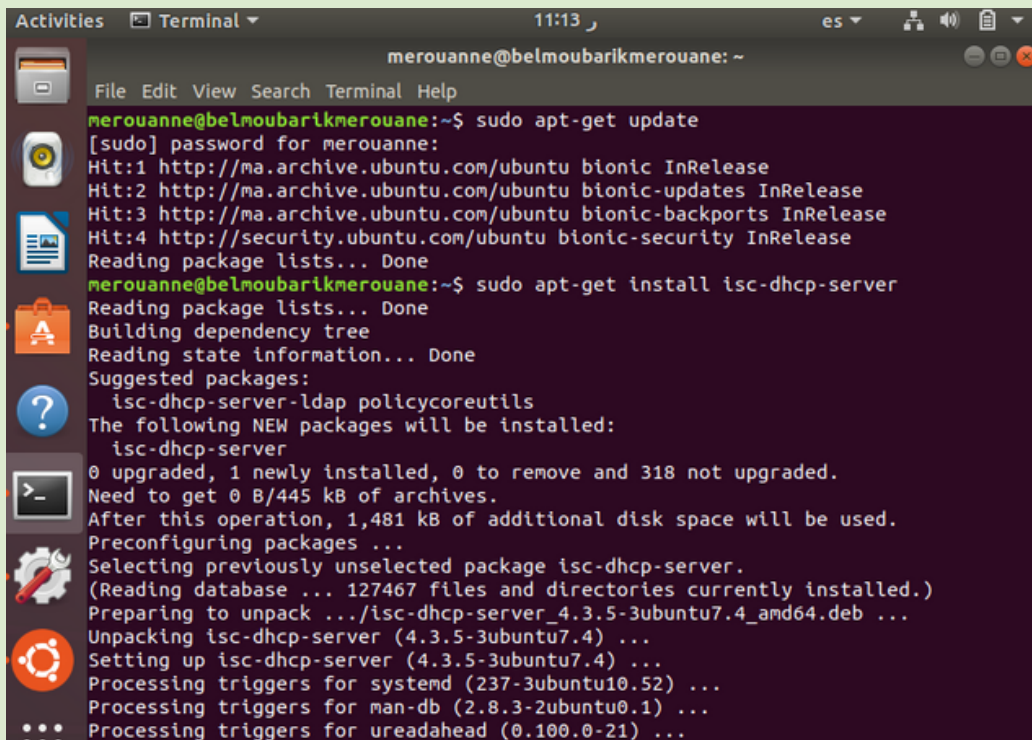
V. Configuration du Serveur DHCP

1. Installation du Serveur DHCP

Le processus d'installation du serveur DHCP sous Linux a été effectué en utilisant les commandes standards du gestionnaire de paquets.

```
sudo apt-get update
```

```
sudo apt-get install isc-dhcp-server
```

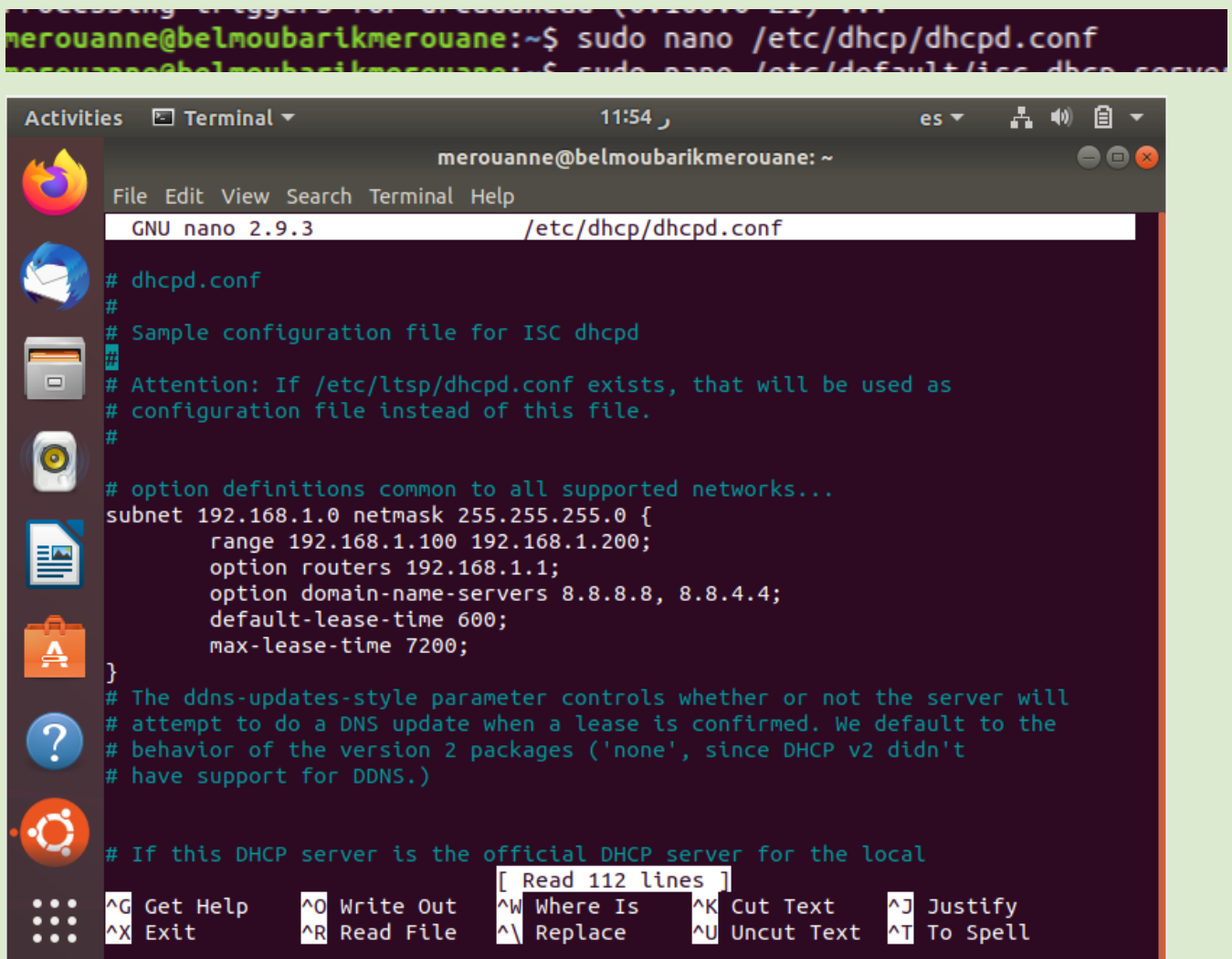
A screenshot of a terminal window titled "Terminal" with a dark purple background. The window shows the execution of two commands: "sudo apt-get update" and "sudo apt-get install isc-dhcp-server". The output of the first command shows updates for bionic, bionic-updates, bionic-backports, and bionic-security. The output of the second command shows the installation of isc-dhcp-server, including dependency resolution, disk space requirements, and the unpacking of the package. The terminal window has a menu bar with "File", "Edit", "View", "Search", "Terminal", and "Help". The status bar at the bottom shows the user "merouanne@belmoubarikmerouane" and the time "11:13".

```
merouanne@belmoubarikmerouane: ~  
File Edit View Search Terminal Help  
merouanne@belmoubarikmerouane:~$ sudo apt-get update  
[sudo] password for merouanne:  
Hit:1 http://ma.archive.ubuntu.com/ubuntu bionic InRelease  
Hit:2 http://ma.archive.ubuntu.com/ubuntu bionic-updates InRelease  
Hit:3 http://ma.archive.ubuntu.com/ubuntu bionic-backports InRelease  
Hit:4 http://security.ubuntu.com/ubuntu bionic-security InRelease  
Reading package lists... Done  
merouanne@belmoubarikmerouane:~$ sudo apt-get install isc-dhcp-server  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Suggested packages:  
  isc-dhcp-server-ldap polycoreutils  
The following NEW packages will be installed:  
  isc-dhcp-server  
0 upgraded, 1 newly installed, 0 to remove and 318 not upgraded.  
Need to get 0 B/445 kB of archives.  
After this operation, 1,481 kB of additional disk space will be used.  
Preconfiguring packages ...  
Selecting previously unselected package isc-dhcp-server.  
(Reading database ... 127467 files and directories currently installed.)  
Preparing to unpack .../isc-dhcp-server_4.3.5-3ubuntu7.4_amd64.deb ...  
Unpacking isc-dhcp-server (4.3.5-3ubuntu7.4) ...  
Setting up isc-dhcp-server (4.3.5-3ubuntu7.4) ...  
Processing triggers for systemd (237-3ubuntu10.52) ...  
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...  
... Processing triggers for ureadahead (0.100.0-21) ...
```

V. Configuration du Serveur DHCP

2. Configuration du Fichier dhcpd.conf

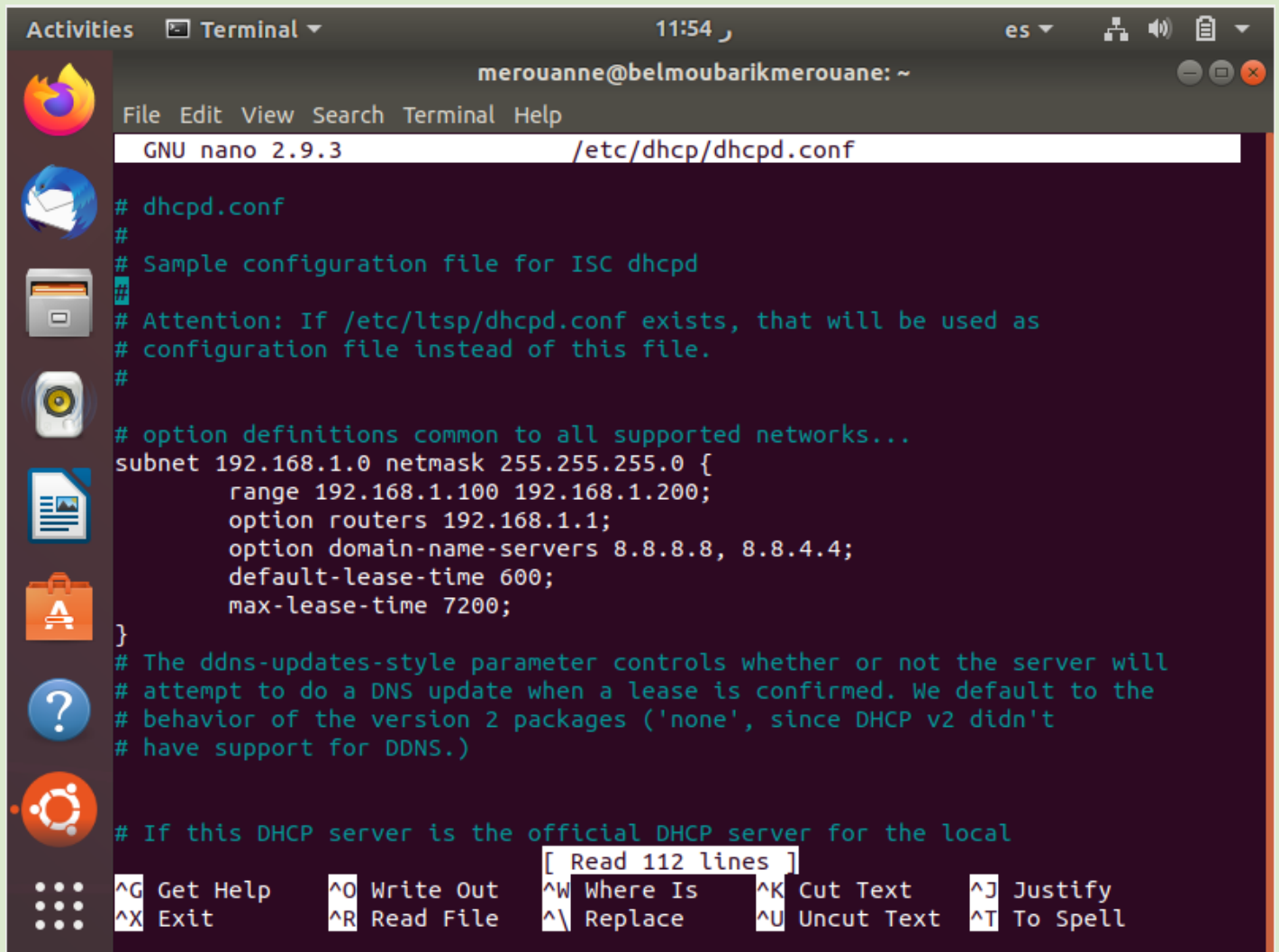
Le fichier de configuration principal, /etc/dhcp/dhcpd.conf, a été modifié pour définir le sous-réseau, la plage d'adresses, et d'autres paramètres. Cela garantit une attribution cohérente des adresses IP aux clients.



```
merouanne@belmoubarikmerouane:~$ sudo nano /etc/dhcp/dhcpd.conf
merouanne@belmoubarikmerouane:~$ nano /etc/default/isc-dhcp-server

Activities  Terminal  11:54  es  [Icons]
merouanne@belmoubarikmerouane: ~
File Edit View Search Terminal Help
GNU nano 2.9.3 /etc/dhcp/dhcpd.conf

# dhcpd.conf
#
# Sample configuration file for ISC dhcpd
#
# Attention: If /etc/ltsp/dhcpd.conf exists, that will be used as
# configuration file instead of this file.
#
# option definitions common to all supported networks...
subnet 192.168.1.0 netmask 255.255.255.0 {
    range 192.168.1.100 192.168.1.200;
    option routers 192.168.1.1;
    option domain-name-servers 8.8.8.8, 8.8.4.4;
    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.)
#
# If this DHCP server is the official DHCP server for the local
[ Read 112 lines ]
^G Get Help      ^O Write Out    ^W Where Is     ^K Cut Text     ^J Justify
^X Exit          ^R Read File    ^\ Replace      ^U Uncut Text   ^T To Spell
```



```
merouanne@belmoubarikmerouane: ~
GNU nano 2.9.3 /etc/dhcp/dhcpd.conf

# dhcpd.conf
#
# Sample configuration file for ISC dhcpd
# Attention: If /etc/ltsp/dhcpd.conf exists, that will be used as
# configuration file instead of this file.
#
# option definitions common to all supported networks...
subnet 192.168.1.0 netmask 255.255.255.0 {
    range 192.168.1.100 192.168.1.200;
    option routers 192.168.1.1;
    option domain-name-servers 8.8.8.8, 8.8.4.4;
    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.)
# If this DHCP server is the official DHCP server for the local
```

[Read 112 lines]

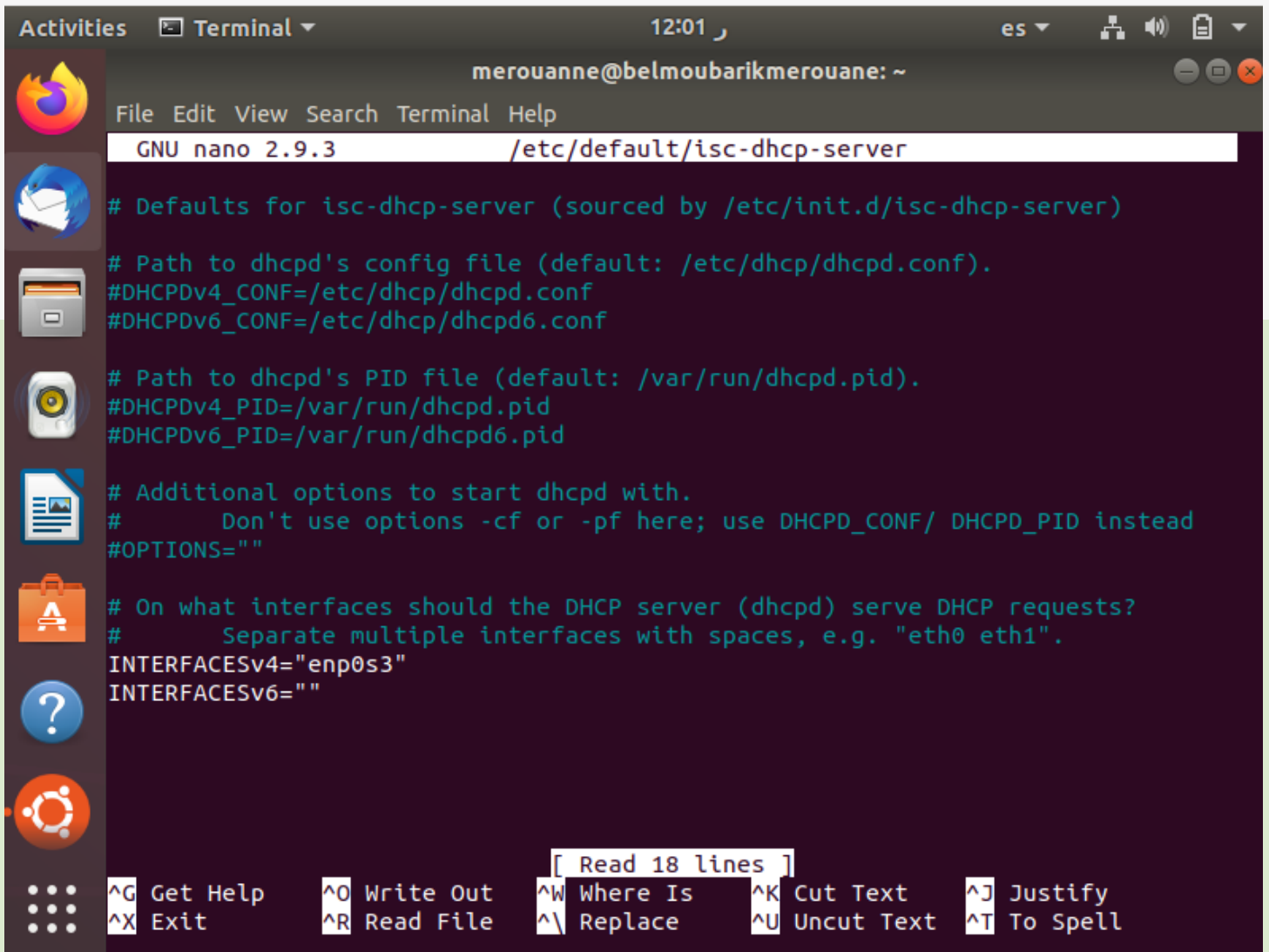
^G Get Help	^O Write Out	^W Where Is	^K Cut Text	^J Justify
^X Exit	^R Read File	^_ Replace	^U Uncut Text	^T To Spell

- subnet: Spécifie le sous-réseau et le masque de sous-réseau.
- range: Définit la plage d'adresses IP à attribuer aux clients DHCP.
- option routers: Indique la passerelle par défaut.
- option domain-name-servers: Spécifie les serveurs DNS à utiliser.
- default-lease-time et max-lease-time: Définissent la durée de bail par défaut et maximale.

Indiquer à DHCP sur quelle interface réseau il doit écouter. Ajoutez la ligne suivante dans le fichier `/etc/default/isc-dhcp-server` :

INTERFACESv4="enp0s3"

```
merouanne@belmoubarikmerouane:~$ sudo nano /etc/default/isc-dhcp-server
```



The screenshot shows a terminal window with the nano text editor open. The editor is editing the file `/etc/default/isc-dhcp-server`. The content of the file is as follows:

```
# Defaults for isc-dhcp-server (sourced by /etc/init.d/isc-dhcp-server)

# Path to dhcpd's config file (default: /etc/dhcp/dhcpd.conf).
#DHCPDv4_CONF=/etc/dhcp/dhcpd.conf
#DHCPDv6_CONF=/etc/dhcp/dhcpd6.conf

# Path to dhcpd's PID file (default: /var/run/dhcpd.pid).
#DHCPDv4_PID=/var/run/dhcpd.pid
#DHCPDv6_PID=/var/run/dhcpd6.pid

# Additional options to start dhcpd with.
# Don't use options -cf or -pf here; use DHCPD_CONF/ DHCPD_PID instead
#OPTIONS=""

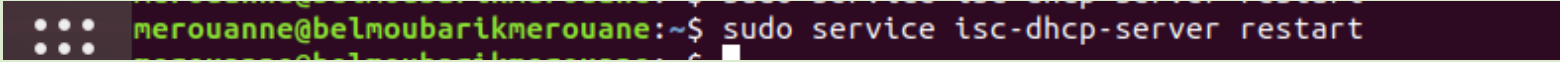
# On what interfaces should the DHCP server (dhcpd) serve DHCP requests?
# Separate multiple interfaces with spaces, e.g. "eth0 eth1".
INTERFACESv4="enp0s3"
INTERFACESv6=""
```

The terminal window also shows a sidebar with various application icons and a bottom status bar with keyboard shortcuts.

Redémarrer le serveur DHCP :

Après avoir effectué les modifications, redémarrez le service DHCP pour appliquer les changements.

`sudo service isc-dhcp-server restart`

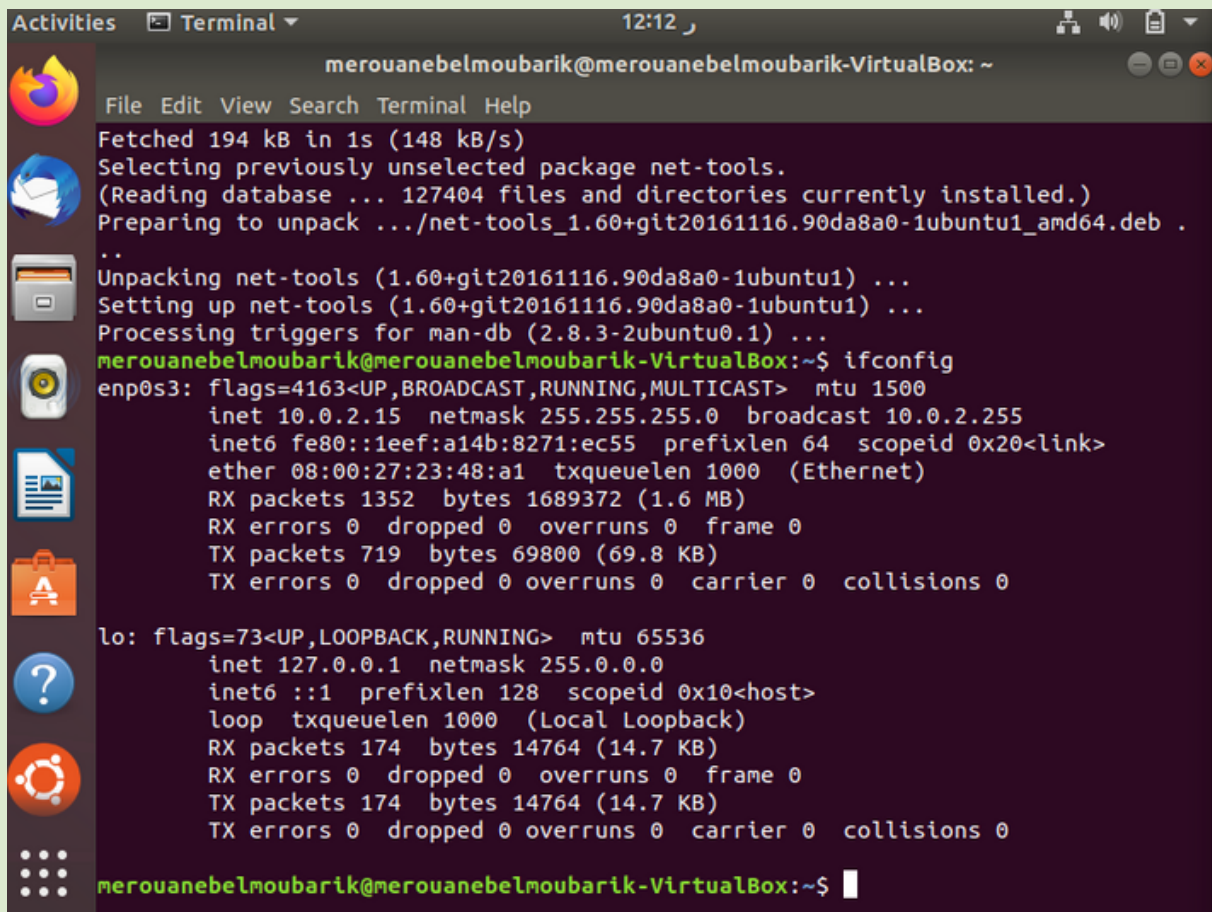


```
merouanne@belmoubarikmerouane:~$ sudo service isc-dhcp-server restart
```

A terminal window with a dark background. The prompt is 'merouanne@belmoubarikmerouane:~\$'. The command 'sudo service isc-dhcp-server restart' is entered and followed by a cursor. There are some faint, illegible lines of text above the command.

VI. Tests de Validation

DES TESTS APPROFONDIS ONT ÉTÉ RÉALISÉS POUR VALIDER LA CONFIGURATION, NOTAMMENT DES SIMULATIONS DE CONNEXION DE CLIENTS, DES VÉRIFICATIONS D'ATTRIBUTION D'ADRESSES IP, ET DES ANALYSES DE LA STABILITÉ DU SERVICE.

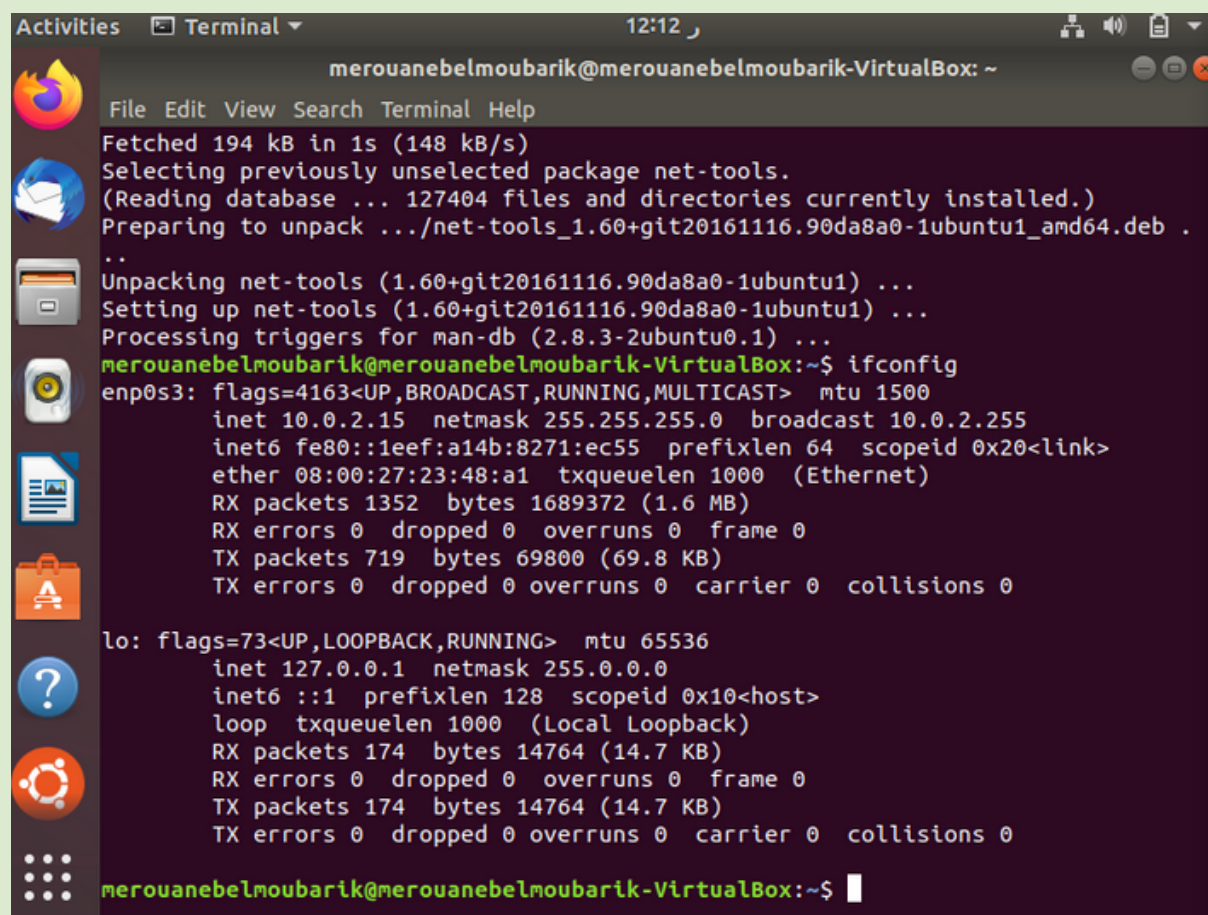


```
merouanebelmoubarik@merouanebelmoubarik-VirtualBox: ~  
File Edit View Search Terminal Help  
Fetched 194 kB in 1s (148 kB/s)  
Selecting previously unselected package net-tools.  
(Reading database ... 127404 files and directories currently installed.)  
Preparing to unpack .../net-tools_1.60+git20161116.90da8a0-1ubuntu1_amd64.deb .  
..  
Unpacking net-tools (1.60+git20161116.90da8a0-1ubuntu1) ...  
Setting up net-tools (1.60+git20161116.90da8a0-1ubuntu1) ...  
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...  
merouanebelmoubarik@merouanebelmoubarik-VirtualBox:~$ ifconfig  
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
    inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255  
    inet6 fe80::1eef:a14b:8271:ec55 prefixlen 64 scopeid 0x20<link>  
    ether 08:00:27:23:48:a1 txqueuelen 1000 (Ethernet)  
    RX packets 1352 bytes 1689372 (1.6 MB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 719 bytes 69800 (69.8 KB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536  
    inet 127.0.0.1 netmask 255.0.0.0  
    inet6 ::1 prefixlen 128 scopeid 0x10<host>  
    loop txqueuelen 1000 (Local Loopback)  
    RX packets 174 bytes 14764 (14.7 KB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 174 bytes 14764 (14.7 KB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
merouanebelmoubarik@merouanebelmoubarik-VirtualBox:~$
```

VII. Problèmes Rencontrés et Solutions

L'ADRESSE IP QUE LE CLIENT A PRIS N'APPARTIENT PAS A LA PLAGE D'ADRESSE QUE NOUS AVONS CONFIGURÉ POUR NOTRE DHCP SERVER

SOLUTION:



```
merouanebelmoubarik@merouanebelmoubarik-VirtualBox: ~  
File Edit View Search Terminal Help  
Fetched 194 kB in 1s (148 kB/s)  
Selecting previously unselected package net-tools.  
(Reading database ... 127404 files and directories currently installed.)  
Preparing to unpack .../net-tools_1.60+git20161116.90da8a0-1ubuntu1_amd64.deb .  
..  
Unpacking net-tools (1.60+git20161116.90da8a0-1ubuntu1) ...  
Setting up net-tools (1.60+git20161116.90da8a0-1ubuntu1) ...  
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...  
merouanebelmoubarik@merouanebelmoubarik-VirtualBox:~$ ifconfig  
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
    inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255  
    inet6 fe80::1eef:a14b:8271:ec55 prefixlen 64 scopeid 0x20<link>  
    ether 08:00:27:23:48:a1 txqueuelen 1000 (Ethernet)  
    RX packets 1352 bytes 1689372 (1.6 MB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 719 bytes 69800 (69.8 KB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536  
    inet 127.0.0.1 netmask 255.0.0.0  
    inet6 ::1 prefixlen 128 scopeid 0x10<host>  
    loop txqueuelen 1000 (Local Loopback)  
    RX packets 174 bytes 14764 (14.7 KB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 174 bytes 14764 (14.7 KB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
merouanebelmoubarik@merouanebelmoubarik-VirtualBox:~$
```

VII. Problèmes Rencontrés et Solutions

```
merouanne@belmoubarikmerouane:~$ systemctl status isc-dhcp-server
● isc-dhcp-server.service - ISC DHCP IPv4 server
   Loaded: loaded (/lib/systemd/system/isc-dhcp-server.service; enabled; vendor
   Active: failed (Result: exit-code) since Wed 2024-03-06 09:29:09 +01; 32min
   Docs: man:dhcpd(8)
   Process: 915 ExecStart=/bin/sh -ec CONFIG_FILE=/etc/dhcp/dhcpd.conf;
   Main PID: 915 (code=exited, status=1/FAILURE)

mar06 09:29:09 belmoubarikmerouane dhcpd[915]:
mar06 09:29:09 belmoubarikmerouane dhcpd[915]: Not configured to listen on an
mar06 09:29:09 belmoubarikmerouane dhcpd[915]:
mar06 09:29:09 belmoubarikmerouane dhcpd[915]: If you think you have received
mar06 09:29:09 belmoubarikmerouane dhcpd[915]: than a configuration issue ple
mar06 09:29:09 belmoubarikmerouane dhcpd[915]: bugs on either our web page at
mar06 09:29:09 belmoubarikmerouane dhcpd[915]: before submitting a bug. Thes
mar06 09:29:09 belmoubarikmerouane dhcpd[915]: process and the information we
mar06 09:29:09 belmoubarikmerouane dhcpd[915]:
mar06 09:29:09 belmoubarikmerouane dhcpd[915]: exiting.
```

SOLUTION:

- SERVEUR UNIQUE 8.8.8.8
- RECONFIGURER LES DES DEUX MACHINES(SERVEUR DHCP ET CLIENT) EN RÉSEAUX INTERNES

```
GNU nano 2.9.3 /etc/dhcp/dhcpd.conf

# dhcpd.conf
#
# Sample configuration file for ISC dhcpd
#
# Attention: If /etc/ltsp/dhcpd.conf exists, that will be used as
# configuration file instead of this file.
#
# option definitions common to all supported networks...
subnet 192.168.1.0 netmask 255.255.255.0 {
    range 192.168.1.100 192.168.1.200;
    option routers 192.168.1.1;
    option domain-name-servers 8.8.8.8;
    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.)

# If this DHCP server is the official DHCP server for the local
[ Read 112 lines ]
```

VII. Problèmes Rencontrés et Solutions

SOLUTION:

- DONNER UNE ADRESSE A L'INTERFACE ENPOS3 DE LA MACHINE

```
merouanne@belmoubarikmerouane:~$ sudo ifconfig enp0s3 192.168.1.1
```

SOLUTION:

- TESTE DU STATUS DHCP DE LA MACHINE HOST

```
merouanne@belmoubarikmerouane:~$ systemctl restart isc-dhcp-server
merouanne@belmoubarikmerouane:~$ systemctl status isc-dhcp-server
● isc-dhcp-server.service - ISC DHCP IPv4 server
   Loaded: loaded (/lib/systemd/system/isc-dhcp-server.service; enabled; vendor
   Active: active (running) since Wed 2024-03-06 10:03:03 +01; 4s ago
     Docs: man:dhcpcd(8)
   Main PID: 2519 (dhcpcd)
    Tasks: 1 (limit: 4113)
   CGroup: /system.slice/isc-dhcp-server.service
           └─2519 dhcpcd -user dhcpcd -group dhcpcd -f -4 -pf /run/dhcp-server/dhc

مر06 10:03:03 belmoubarikmerouane dhcpcd[2519]: Database file: /var/lib/dhcp/
مر06 10:03:03 belmoubarikmerouane dhcpcd[2519]: PID file: /run/dhcp-server/dh
مر06 10:03:03 belmoubarikmerouane dhcpcd[2519]: Wrote 0 leases to leases file
مر06 10:03:03 belmoubarikmerouane dhcpcd[2519]: Listening on LPF/enp0s3/08:00
مر06 10:03:03 belmoubarikmerouane sh[2519]: Listening on LPF/enp0s3/08:00:27
مر06 10:03:03 belmoubarikmerouane sh[2519]: Sending on LPF/enp0s3/08:00:27
مر06 10:03:03 belmoubarikmerouane sh[2519]: Sending on Socket/fallback/fal
مر06 10:03:03 belmoubarikmerouane dhcpcd[2519]: Sending on LPF/enp0s3/08:00
مر06 10:03:03 belmoubarikmerouane dhcpcd[2519]: Sending on Socket/fallback/
مر06 10:03:03 belmoubarikmerouane dhcpcd[2519]: Server starting service.
...skipping...
● isc-dhcp-server.service - ISC DHCP IPv4 server
   Loaded: loaded (/lib/systemd/system/isc-dhcp-server.service; enabled; vendor
   Active: active (running) since Wed 2024-03-06 10:03:03 +01; 4s ago
     Docs: man:dhcpcd(8)
   Main PID: 2519 (dhcpcd)
    Tasks: 1 (limit: 4113)
   CGroup: /system.slice/isc-dhcp-server.service
```

PROBLEME RESOLU

VII. Problèmes Rencontrés et Solutions

SOLUTION:

- TEST EN MACHINE CLIENT

```
merouanebelmoubarik@merouanebelmoubarik-VirtualBox:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
    inet 192.168.1.100  netmask 255.255.255.0  broadcast 192.168.1.255
    inet6 fe80::1eef:a14b:8271:ec55  prefixlen 64  scopeid 0x20<link>
    ether 08:00:27:23:48:a1  txqueuelen 1000  (Ethernet)
    RX packets 2   bytes 684 (684.0 B)
    RX errors 0    dropped 0  overruns 0  frame 0
    TX packets 353  bytes 25673 (25.6 KB)
    TX errors 0    dropped 0  overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
    inet 127.0.0.1  netmask 255.0.0.0
    inet6 ::1  prefixlen 128  scopeid 0x10<host>
    loop txqueuelen 1000  (Local Loopback)
    RX packets 473  bytes 39396 (39.3 KB)
    RX errors 0    dropped 0  overruns 0  frame 0
    TX packets 473  bytes 39396 (39.3 KB)
    TX errors 0    dropped 0  overruns 0  carrier 0  collisions 0

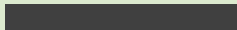
merouanebelmoubarik@merouanebelmoubarik-VirtualBox:~$
```

Show Applications

merouanebelmoubarik@merouanebelmoubarik-VirtualBox:~\$

La machine cliente a pris une adresse ip dans la plage que nous avons configuré en serveur dhcp (Entre 192.168.1.100 et 192.168.1.200)

Conclusion



La configuration du serveur DHCP a été menée avec succès, démontrant l'efficacité du protocole DHCP dans la gestion des adresses IP. Cette approche offre une solution automatisée et scalable pour les réseaux, améliorant la flexibilité et la facilité de gestion.