

## 0.- DISEÑO DEL ENTORNO

Crea las siguientes máquinas y configura interfaces de red que vas a activar cada una para poder hacer la práctica.

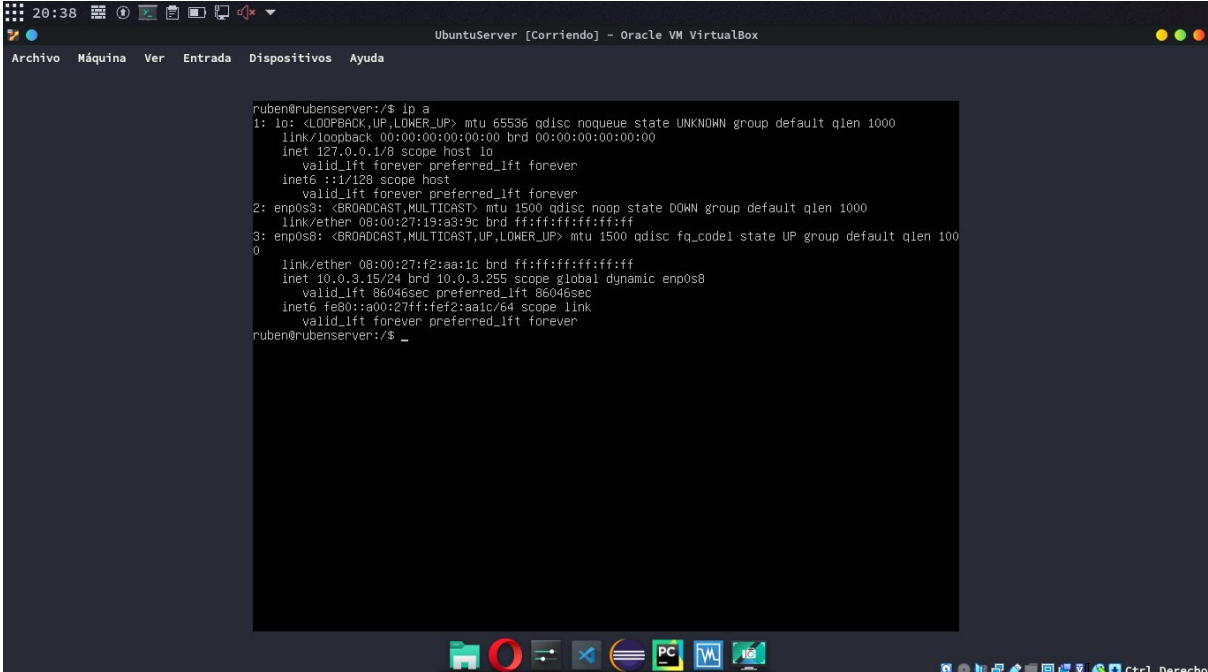
Rellena la siguiente tabla. Para ver el nombre que le da Vbox a las tarjetas puedes verlo con ifconfig

S.O.	Maquina(hostname)	Nombre y tipo de la/s Interface/s (tarjeta red) de la VM.	IPs asociada a cada tarjeta e indica si es asignada por DHCP o manualmente (estática)
Ubuntu Server	rubenserver	Nat: enp0s8 Red Interna: enp0s3	10.0.3.15 192.168.115.5
Lubuntu	ruben	Red Interna: enp0s3	DHCP
Windows 7	ruben	Red Interna: enp0s3	DHCP

## 1.- CONFIGURACIÓN DE LAS TARJETAS DE RED DE LAS VM

a) Echa un vistazo a la configuración de red inicial de tus máquinas : ejecuta ifconfig o ipconfig y mira también fichero /etc/network/interfaces en cada máquina.

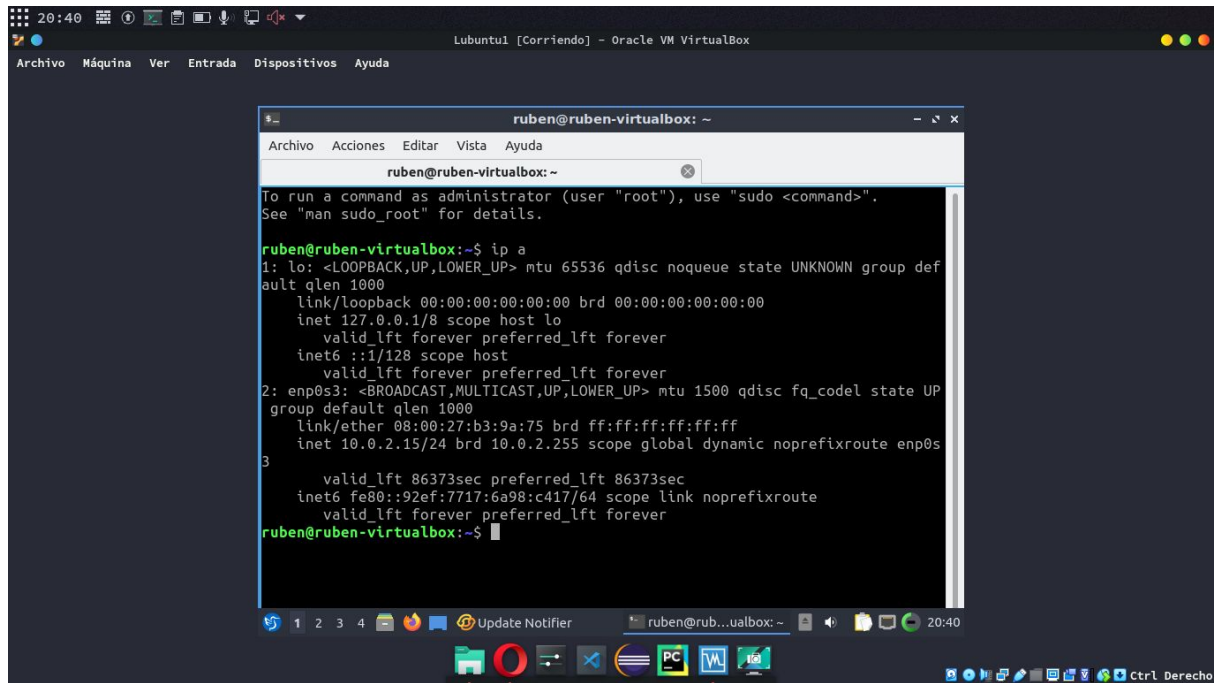
### Ubuntu Server



```

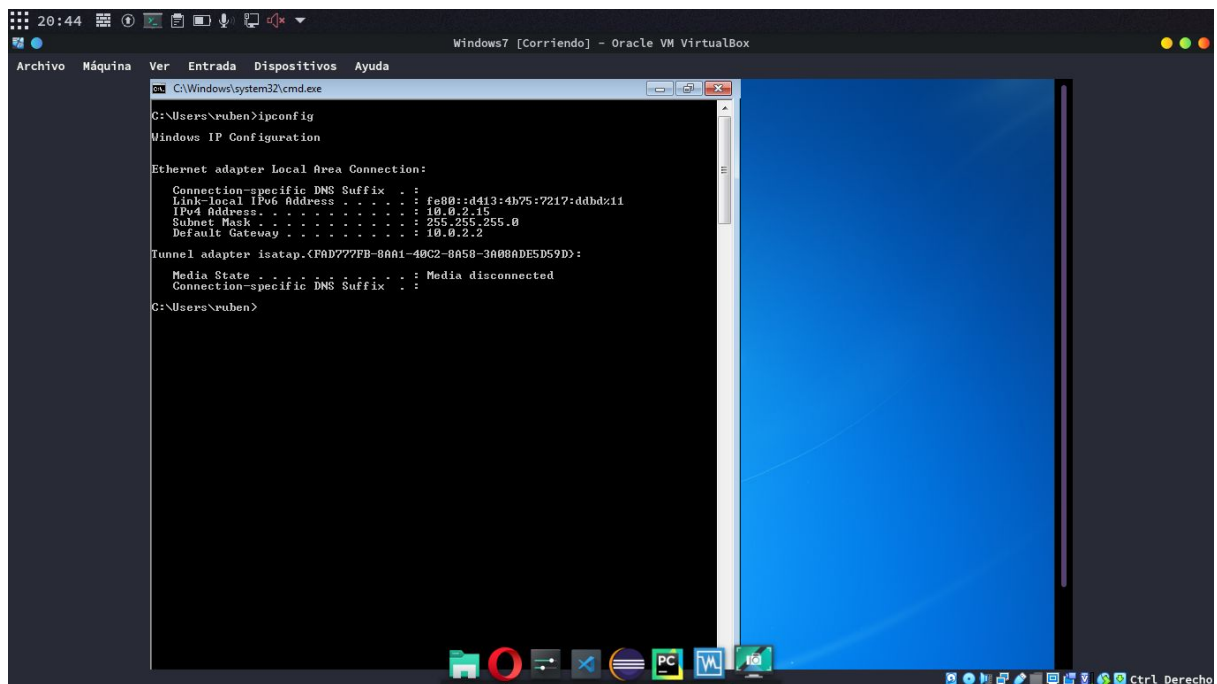
ruben@rubenserver:/$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 08:00:27:19:a3:9c brd ff:ff:ff:ff:ff:ff
3: enp0s8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:f2:aa:1c brd ff:ff:ff:ff:ff:ff
    inet 10.0.3.15/24 brd 10.0.3.255 scope global dynamic enp0s8
        valid_lft 86046sec preferred_lft 86046sec
    inet6 fe80::a00:27ff:fef2:aa1c/64 scope link
        valid_lft forever preferred_lft forever
ruben@rubenserver:/$ _
  
```

## Lubuntu



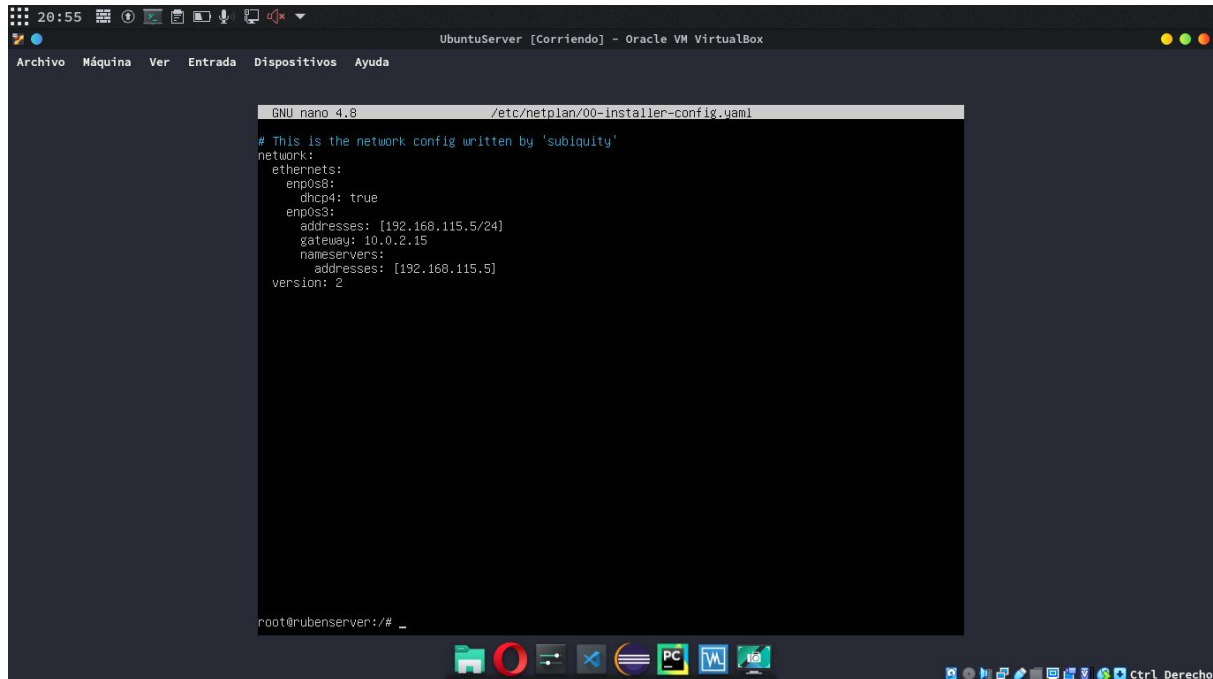
```
ruben@ruben-virtualbox: ~  
Archivo Acciones Editar Vista Ayuda  
ruben@ruben-virtualbox: ~  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo_root" for details.  
ruben@ruben-virtualbox:~$ ip a  
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group def  
ault 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  
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP  
group default qlen 1000  
    link/ether 08:00:27:b3:9a:75 brd ff:ff:ff:ff:ff:ff  
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s  
3  
        valid_lft 86373sec preferred_lft 86373sec  
    inet6 fe80::92ef:7717:6a98:c417/64 scope link noprefixroute  
        valid_lft forever preferred_lft forever  
ruben@ruben-virtualbox:~$
```

## Windows 7



```
C:\Windows\system32\cmd.exe  
C:\Users\ruben>ipconfig  
Windows IP Configuration  
  
Ethernet adapter Local Area Connection:  
  
    Connection-specific DNS Suffix  . :  
    Link-local IPv6 Address . . . . . : fe80::d413:4b75:7217:ddb2%11  
    IPv4 Address. . . . . : 10.0.2.15  
    Subnet Mask . . . . . : 255.255.255.0  
    Default Gateway . . . . . : 10.0.2.2  
  
Tunnel adapter isatap.{FAD777FB-8AA1-40C2-8A58-3A08ADE5D59D}:  
  
    Media State . . . . . : Media disconnected  
    Connection-specific DNS Suffix  . :  
  
C:\Users\ruben>
```

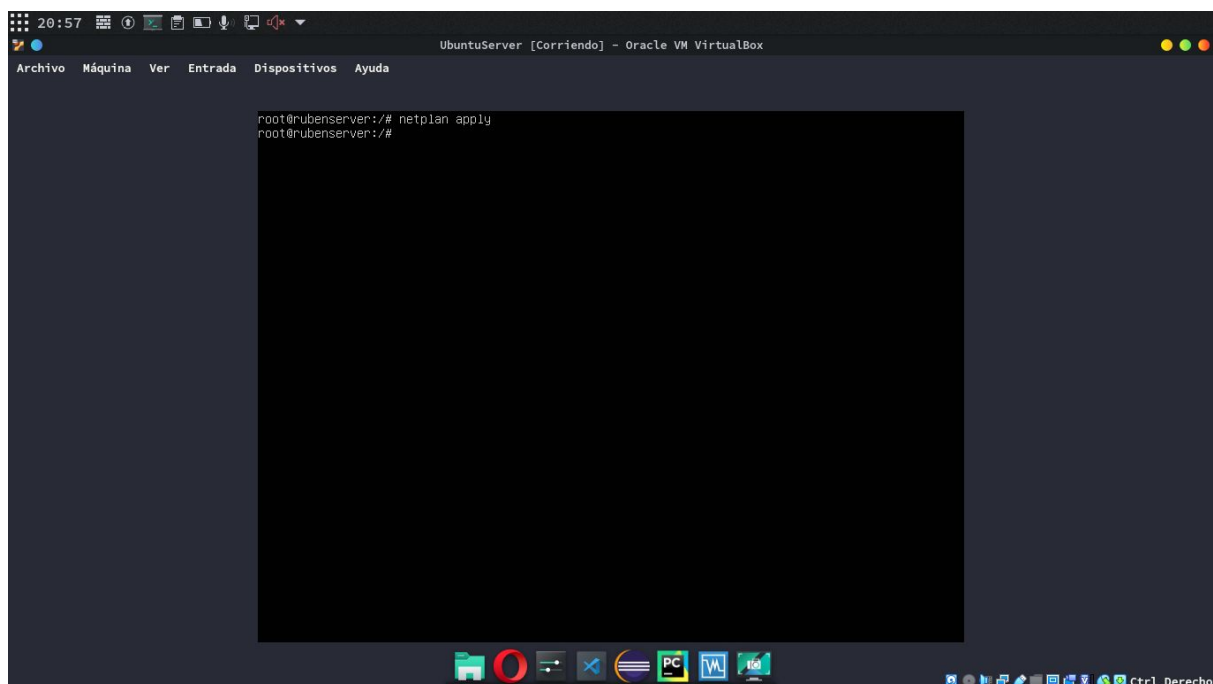
b) Asigna una dirección fija a la máquina servidora Ubuntu.  
Comprueba si por defecto la asignación de la IP es dinámica (por DHCP) en el archivo `/etc/netplan/interfaces`. Modifícalo y asigna la primera IP libre de la red.



The screenshot shows a terminal window titled "UbuntuServer [Corriendo] - Oracle VM VirtualBox". The terminal is running the nano text editor on the file `/etc/netplan/00-installer-config.yaml`. The configuration file content is as follows:

```
GNU nano 4.8 /etc/netplan/00-installer-config.yaml
# This is the network config written by 'subiquity'
network:
  ethernet:
    enp0s8:
      dhcp4: true
    enp0s3:
      addresses: [192.168.115.5/24]
      gateway: 10.0.2.15
      nameservers:
        addresses: [192.168.115.5]
  version: 2
```

The terminal prompt is `root@rubenserver:/#`. The bottom of the window shows the VirtualBox interface with various icons and a system tray on the right.



The screenshot shows the same terminal window after the `netplan apply` command has been executed. The output is as follows:

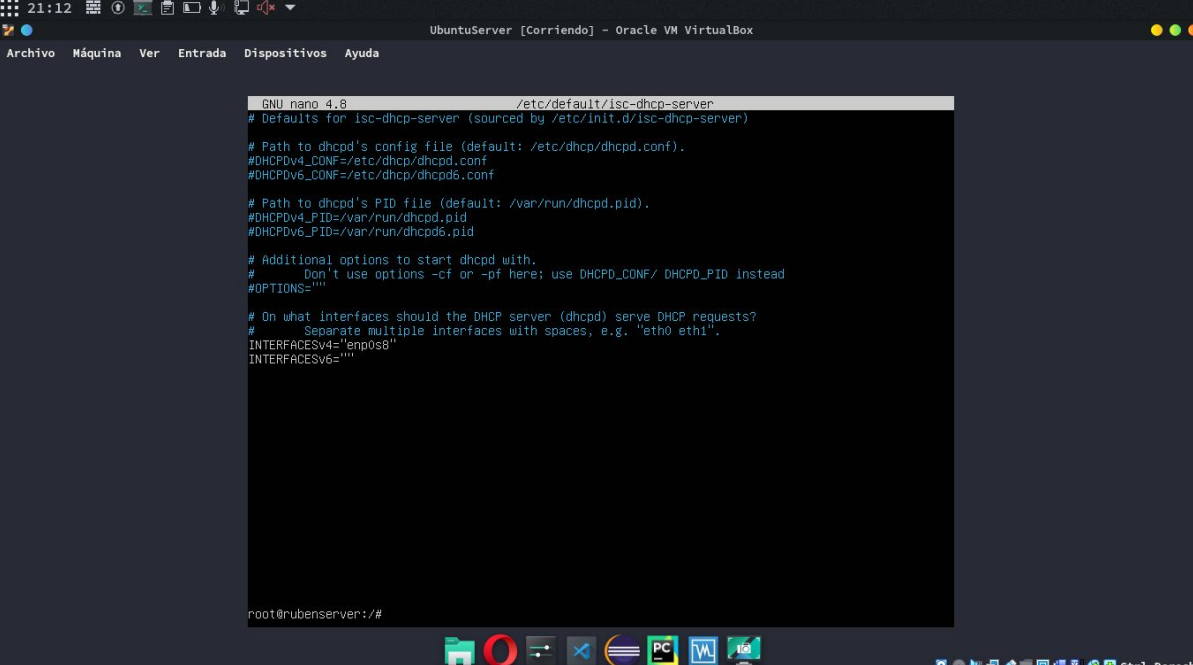
```
root@rubenserver:/# netplan apply
root@rubenserver:/#
```

The terminal prompt remains `root@rubenserver:/#`. The bottom of the window shows the VirtualBox interface with various icons and a system tray on the right.

## 2.- INSTALAR Y CONFIGURAR EL SERVICIO DHCP EN EL SERVIDOR UBUNTU Y CLIENTES

### 2.1. Configurar el Servidor.

a) Lo primero es indicar por cuál de las interfaces de red del servidor (si tenemos más de una) se va a dar servicio DHCP. Nuestro servidor dará servicio por la tarjeta de la red local interna con los clientes.



```
GNU nano 4.8 /etc/default/isc-dhcp-server
# 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="enp0s8"
INTERFACESv6=""

root@rubenserver:/#
```

**b) HACIENDO COPIA DE SEGURIDAD ANTES, configurar el fichero de configuración /etc/dhcp/dhcpd.conf**

- **Crea un rango de IPs (del 200 al 224) para el resto de máquinas que pidan servicio**
- **El tiempo máximo de cesión de IP (max-lease-time) debe ser 4 horas (14400 segundos).**

**Nota: El servicio DHCP debería enviar al cliente también la IP del servidor DNS y de la puerta de enlace pero en nuestro caso no lo tenemos montado por lo que no lo haremos por ahora.**

```

GNU nano 4.8 /etc/dhcp/dhcpd.conf
# In a certain class get addresses on the 10.17.224/24 subnet, and all
# other clients get addresses on the 10.0.29/24 subnet.

#class "foo" {
# match if substring (option vendor-class-identifier, 0, 4) = "SUNW";
#}

#shared-network 224-29 {
# subnet 10.17.224.0 netmask 255.255.255.0 {
# option routers rtr-224.example.org;
# }
# subnet 10.0.29.0 netmask 255.255.255.0 {
# option routers rtr-29.example.org;
# }
# pool {
# allow members of "foo";
# range 10.17.224.10 10.17.224.250;
# }
# pool {
# deny members of "foo";
# range 10.0.29.10 10.0.29.230;
# }
#}
subnet 192.168.115.0 netmask 255.255.255.0 {
range 192.168.115.200 192.168.115.224;
option broadcast-address 192.168.115.255;
option subnet-mask 255.255.255.0;
option domain-name "ruben.local";
max-lease-time 14400;
}

```

**c) Reiniciar el servicio para coger los cambios.**

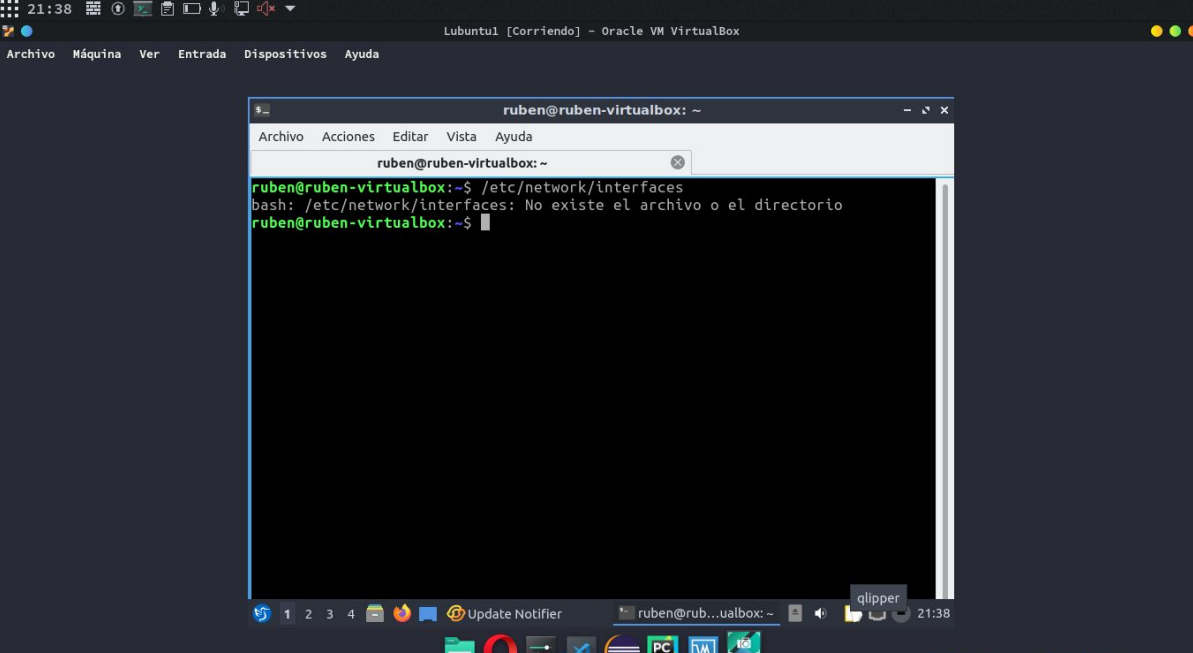
```

root@rubenserver:~# /etc/init.d/isc-dhcp-server restart
Restarting isc-dhcp-server (via systemctl): isc-dhcp-server.service.
root@rubenserver:~# systemctl restart isc-dhcp-server
root@rubenserver:~# systemctl status isc-dhcp-server
● isc-dhcp-server.service - ISC DHCP IPv4 server
   Loaded: loaded (/lib/systemd/system/isc-dhcp-server.service; enabled; vendor preset: enabled)
   Active: active (running) since Thu 2020-10-08 19:32:46 UTC; 9s ago
     Docs: man:dhcpd(8)
    Main PID: 4141 (dhcpd)
      Tasks: 4 (limit: 1075)
     Memory: 4.5M
    CGroup: /system.slice/isc-dhcp-server.service
            └─4141 dhcpd -user dhcpd -group dhcpd -f -4 -pf /run/dhcp-server/dhcpd.pid -cf /etc/dh

```

## 2.2. Configuración de los Clientes:

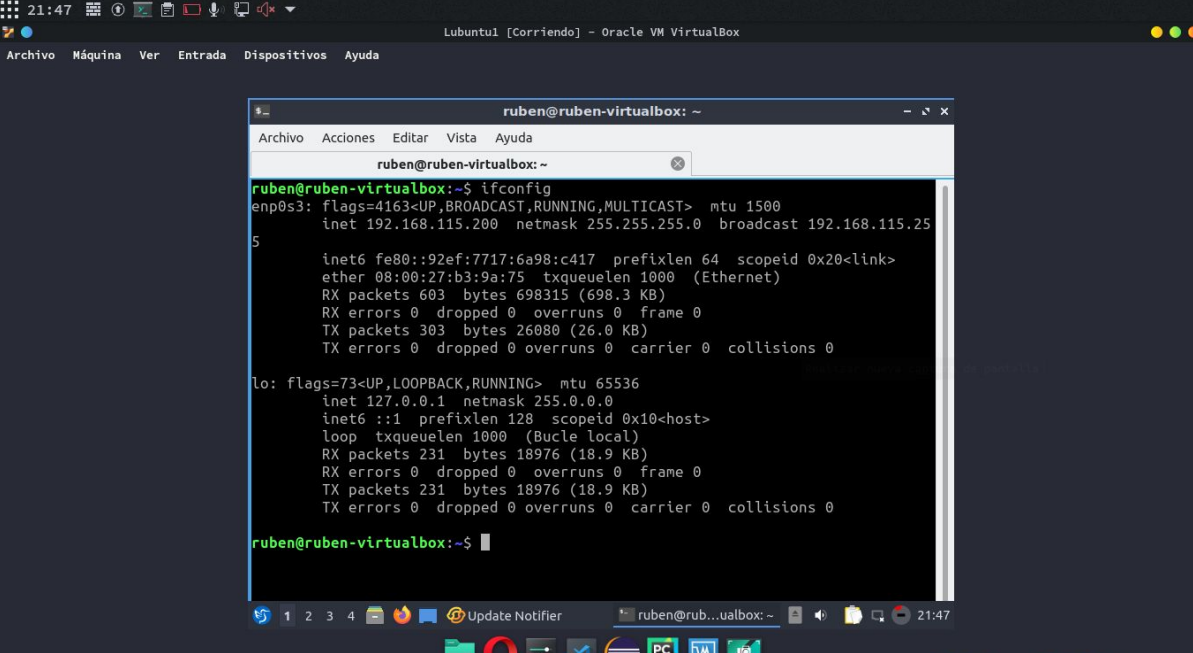
a) Indica el contenido de tu fichero `/etc/network/interfaces`.



The screenshot shows a terminal window titled 'ruben@ruben-virtualbox: ~' within a virtual machine environment. The user has entered the command `/etc/network/interfaces` at the prompt. The terminal output shows the command being executed, followed by an error message: `bash: /etc/network/interfaces: No existe el archivo o el directorio`. The terminal window has a menu bar with 'Archivo', 'Acciones', 'Editar', 'Vista', and 'Ayuda'. The desktop background is dark, and the taskbar at the bottom shows various application icons and the system clock at 21:38.

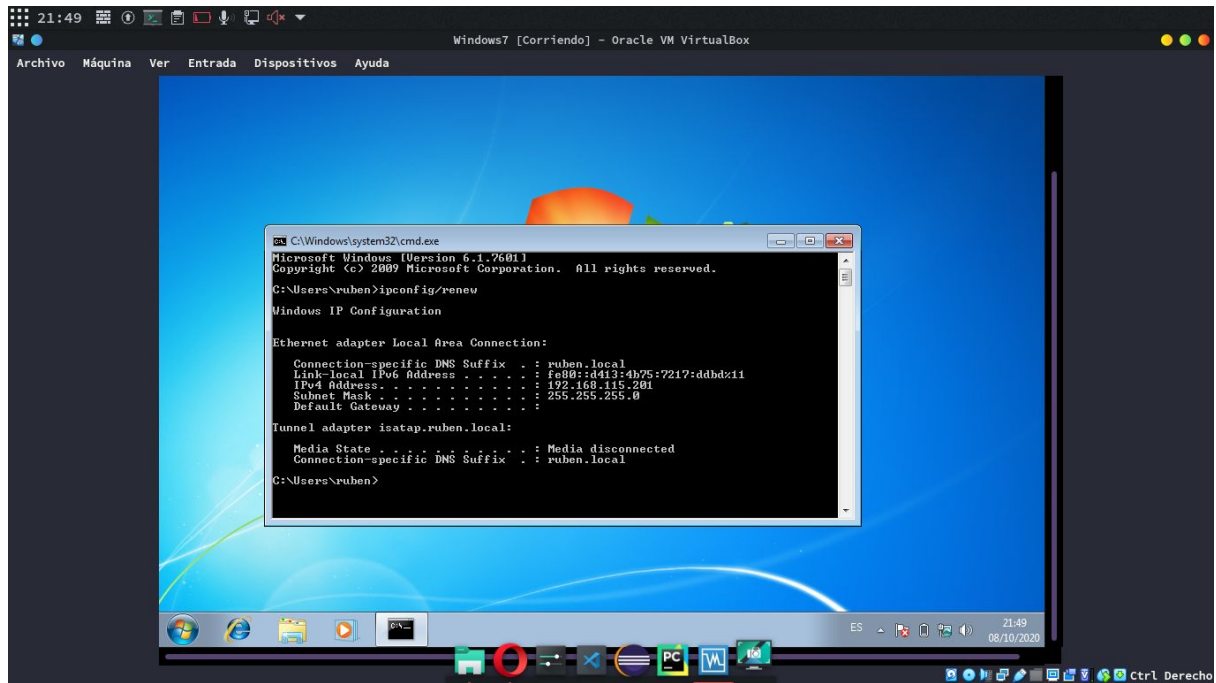
```
ruben@ruben-virtualbox: ~  
Archivo Acciones Editar Vista Ayuda  
ruben@ruben-virtualbox: ~  
ruben@ruben-virtualbox:~$ /etc/network/interfaces  
bash: /etc/network/interfaces: No existe el archivo o el directorio  
ruben@ruben-virtualbox:~$
```

b) Renueva la IP para que la tome del servidor DHCP:



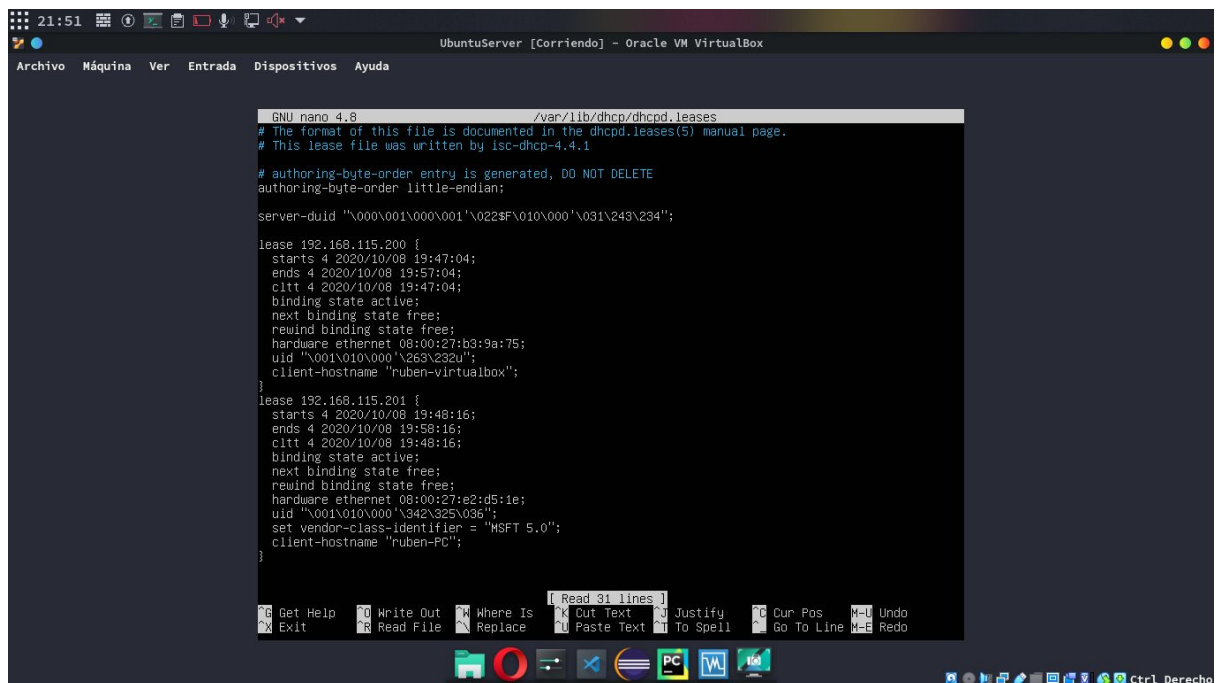
The screenshot shows a terminal window titled 'ruben@ruben-virtualbox: ~' within a virtual machine environment. The user has entered the command `ifconfig` at the prompt. The terminal output shows the configuration for the `enp0s3` interface, including its flags, MTU, IP address, netmask, broadcast address, and MAC address. It also shows statistics for RX and TX packets, bytes, errors, and collisions. The terminal window has a menu bar with 'Archivo', 'Acciones', 'Editar', 'Vista', and 'Ayuda'. The desktop background is dark, and the taskbar at the bottom shows various application icons and the system clock at 21:47.

```
ruben@ruben-virtualbox:~$ ifconfig  
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
        inet 192.168.115.200 netmask 255.255.255.0 broadcast 192.168.115.255  
        ether 08:00:27:b3:9a:75 txqueuelen 1000 (Ethernet)  
        RX packets 603 bytes 698315 (698.3 KB)  
        RX errors 0 dropped 0 overruns 0 frame 0  
        TX packets 303 bytes 26080 (26.0 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 (Bucle local)  
        RX packets 231 bytes 18976 (18.9 KB)  
        RX errors 0 dropped 0 overruns 0 frame 0  
        TX packets 231 bytes 18976 (18.9 KB)  
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
ruben@ruben-virtualbox:~$
```



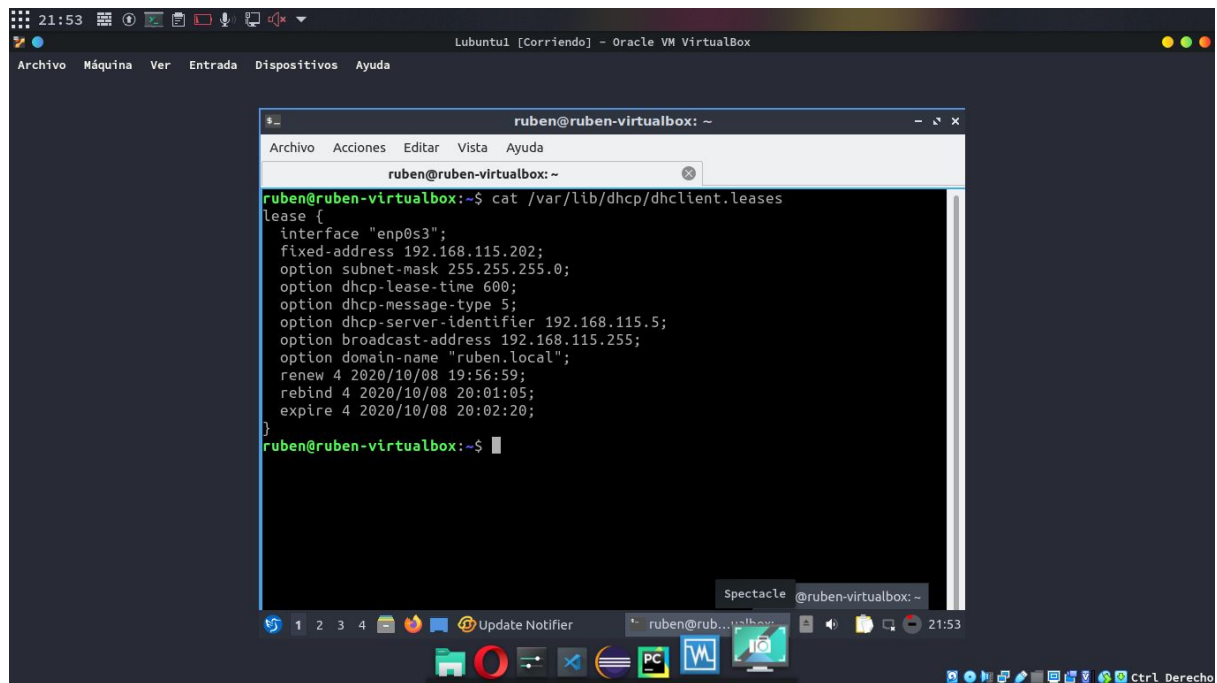
### 2.3. Comprueba en el servidor las concesiones (leases) asignadas a las maquinas clientes:

#### Ubuntu Server



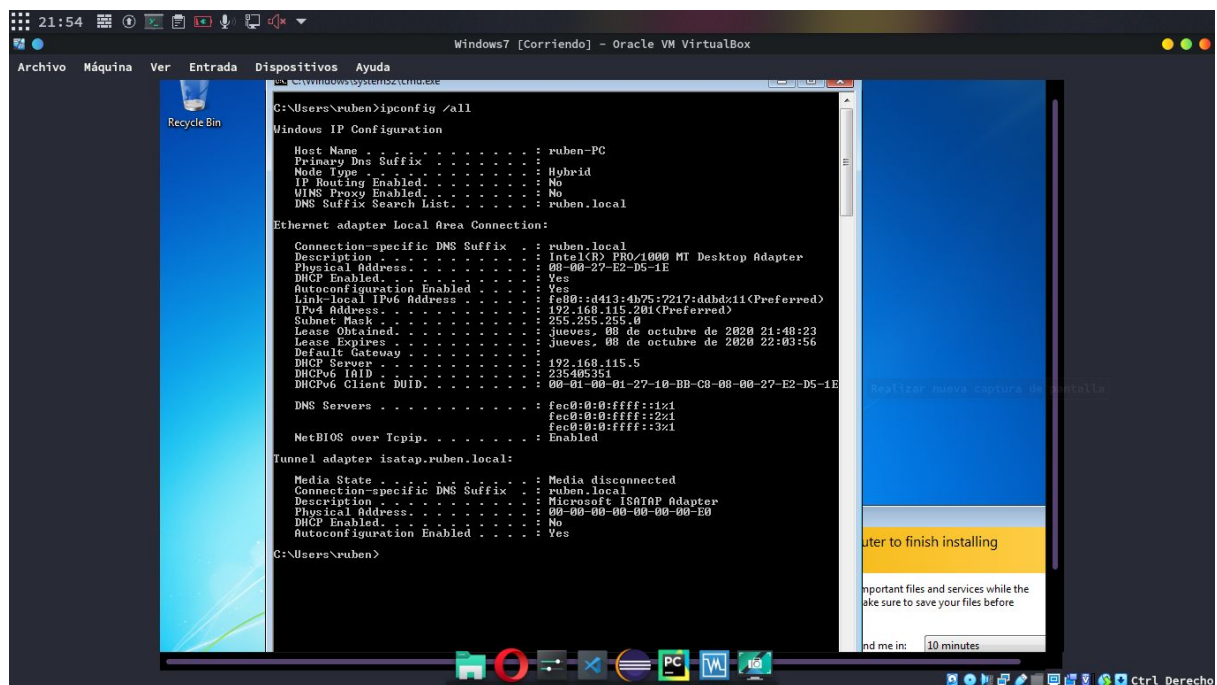


## Lubuntu



```
ruben@ruben-virtualbox: ~  
Archivo Acciones Editar Vista Ayuda  
ruben@ruben-virtualbox:~  
ruben@ruben-virtualbox:~$ cat /var/lib/dhcp/dhclient.leases  
lease {  
  interface "enp0s3";  
  fixed-address 192.168.115.202;  
  option subnet-mask 255.255.255.0;  
  option dhcp-lease-time 600;  
  option dhcp-message-type 5;  
  option dhcp-server-identifier 192.168.115.5;  
  option broadcast-address 192.168.115.255;  
  option domain-name "ruben.local";  
  renew 4 2020/10/08 19:56:59;  
  rebind 4 2020/10/08 20:01:05;  
  expire 4 2020/10/08 20:02:20;  
}
```

## Windows 7



```
C:\Users\ruben>ipconfig /all  
Windows IP Configuration  
  
Host Name . . . . . : ruben-PC  
Primary Dns Suffix . . . . . :  
Node Type . . . . . : Hybrid  
IP Routing Enabled. . . . . : No  
WINS Proxy Enabled. . . . . : No  
DNS Suffix Search List. . . . . : ruben.local  
  
Ethernet adapter Local Area Connection:  
  
Connection-specific DNS Suffix . : ruben.local  
Description . . . . . : Intel(R) PRO/1000 MT Desktop Adapter  
Physical Address. . . . . : 08-00-27-E2-D5-1E  
DHCP Enabled. . . . . : Yes  
Autoconfiguration Enabled . . . . : Yes  
Link-local IPv6 Address . . . . . : fe80::d413:4b75:7217:ddbd%11(Preferred)  
IPv4 Address. . . . . : 192.168.115.201(Preferred)  
Subnet Mask . . . . . : 255.255.255.0  
Lease Obtained. . . . . : jueves, 08 de octubre de 2020 21:48:23  
Lease Expires . . . . . : jueves, 08 de octubre de 2020 22:03:56  
Default Gateway . . . . . : 192.168.115.5  
DHCP Server . . . . . : 192.168.115.5  
DHCPv6 IAID . . . . . : 235405352  
DHCPv6 Client DUID. . . . . : 08-01-00-01-27-10-BB-C8-00-00-27-E2-D5-1E  
  
DNS Servers . . . . . : fec0:0:0:ffff::1%1  
                          fec0:0:0:ffff::2%1  
                          fec0:0:0:ffff::3%1  
NetBIOS over Tcpip. . . . . : Enabled  
  
Tunnel adapter isatap.ruben.local:  
  
Media State . . . . . : Media disconnected  
Connection-specific DNS Suffix . : ruben.local  
Description . . . . . : Microsoft ISATAP Adapter  
Physical Address. . . . . : 00-00-00-00-00-00-E0  
DHCP Enabled. . . . . : No  
Autoconfiguration Enabled . . . . : Yes  
  
C:\Users\ruben>
```