



## Proxecto de configuración de redes

*Introdución: Neste prototipo de configuración dunha rede empresarial empregaremos catro máquinas virtuais, como se detalla a continuación:*

|   |  |
|---|--|
| <p><b>Cliente1:</b></p> <ul style="list-style-type: none"> <li>○ Máquina virtual</li> <li>○ Sistema operativo: Windows 10</li> <li>○ Hostname: cliente1</li> <li>○ Rede VirtualBox: <ul style="list-style-type: none"> <li>▪ Adapter 1: <ul style="list-style-type: none"> <li>• Attached to: Internal Network</li> <li>• Name: intnet</li> <li>• IP: 192.168.250.101</li> </ul> </li> </ul> </li> </ul>      | <p><b>Cliente2:</b></p> <ul style="list-style-type: none"> <li>○ Máquina virtual</li> <li>○ Sistema operativo: Windows 10</li> <li>○ Hostname: cliente2</li> <li>○ Rede VirtualBox: <ul style="list-style-type: none"> <li>▪ Adapter 1: <ul style="list-style-type: none"> <li>• Attached to: Internal Network</li> <li>• Name: intnet</li> <li>• IP: 192.168.250.102</li> </ul> </li> </ul> </li> </ul>   |
| <p><b>Cliente3:</b></p> <ul style="list-style-type: none"> <li>○ Máquina virtual</li> <li>○ Sistema operativo: Ubuntu 22 (GUI)</li> <li>○ Hostname: cliente3</li> <li>○ Rede VirtualBox: <ul style="list-style-type: none"> <li>▪ Adapter 1: <ul style="list-style-type: none"> <li>• Attached to: Internal Network</li> <li>• Name: intnet</li> <li>• IP: 192.168.250.103</li> </ul> </li> </ul> </li> </ul> | <p><b>Server:</b></p> <ul style="list-style-type: none"> <li>○ Máquina virtual</li> <li>○ Sistema operativo: Debian 11 (CLI)</li> <li>○ Hostname: server</li> <li>○ Rede VirtualBox: <ul style="list-style-type: none"> <li>▪ Adapter 1: <ul style="list-style-type: none"> <li>• Attached to: NAT</li> <li>• IP: 10.0.2.15/24</li> <li>• Broadcast: 10.0.2.255</li> <li>• Gateway: 10.0.2.2</li> <li>• DNS: 10.0.2.3</li> </ul> </li> <li>▪ Adapter 2: <ul style="list-style-type: none"> <li>• Attached to: Internal Network</li> <li>• Name: intnet</li> <li>• IP: 192.168.250.1</li> </ul> </li> </ul> </li> </ul> |

*A máquina Server, aparte de proporcionar un servidor Web, actuará como porta de enlace para as máquinas clientes.*

#### CA5.7 Utilizáronse dispositivos de interconexión de redes (10%)



1. Dada as seguintes especificacións (cliente1, cliente2 e cliente 3):

**Cliente1:**

- *Máquina virtual*
- *Sistema operativo: Windows 10*
- *Hostname: cliente1*
- *Rede VirtualBox:*
  - *Adapter 1:*
    - *Attached to: Internal Network*
    - *Name: intnet*
    - *IP: 192.168.250.101/24*

**Cliente2:**

- *Máquina virtual*
- *Sistema operativo: Windows 10*
- *Hostname: cliente1*
- *Rede VirtualBox:*
  - *Adapter 1:*
    - *Attached to: Internal Network*
    - *Name: intnet*
    - *IP: 192.168.250.102/24*

**Cliente3:**

- *Máquina virtual*
- *Sistema operativo: Ubuntu 22 (GUI)*
- *Hostname: cliente3*
- *Rede VirtualBox:*
  - *Adapter 1:*
    - *Attached to: Internal Network*
    - *Name: intnet*
    - *IP: 192.168.250.103/24*

a) Configura a rede de cliente1 segundo as especificacións subministradas. Comproba que cliente1 non ten acceso a Internet [Captura de pantalla da configuración de rede][Captura de pantalla de ping 8.8.8.8]

b) Configura a rede de cliente2 segundo as especificacións subministradas. Comproba que cliente2 non ten acceso a Internet [Captura de pantalla da configuración de rede][Captura de pantalla de ping 8.8.8.8]

c) Configura a rede de cliente3 segundo as especificacións subministradas. Comproba que cliente3 non ten acceso a Internet. [Captura de pantalla da configuración de rede][Captura de pantalla de ping 8.8.8.8]

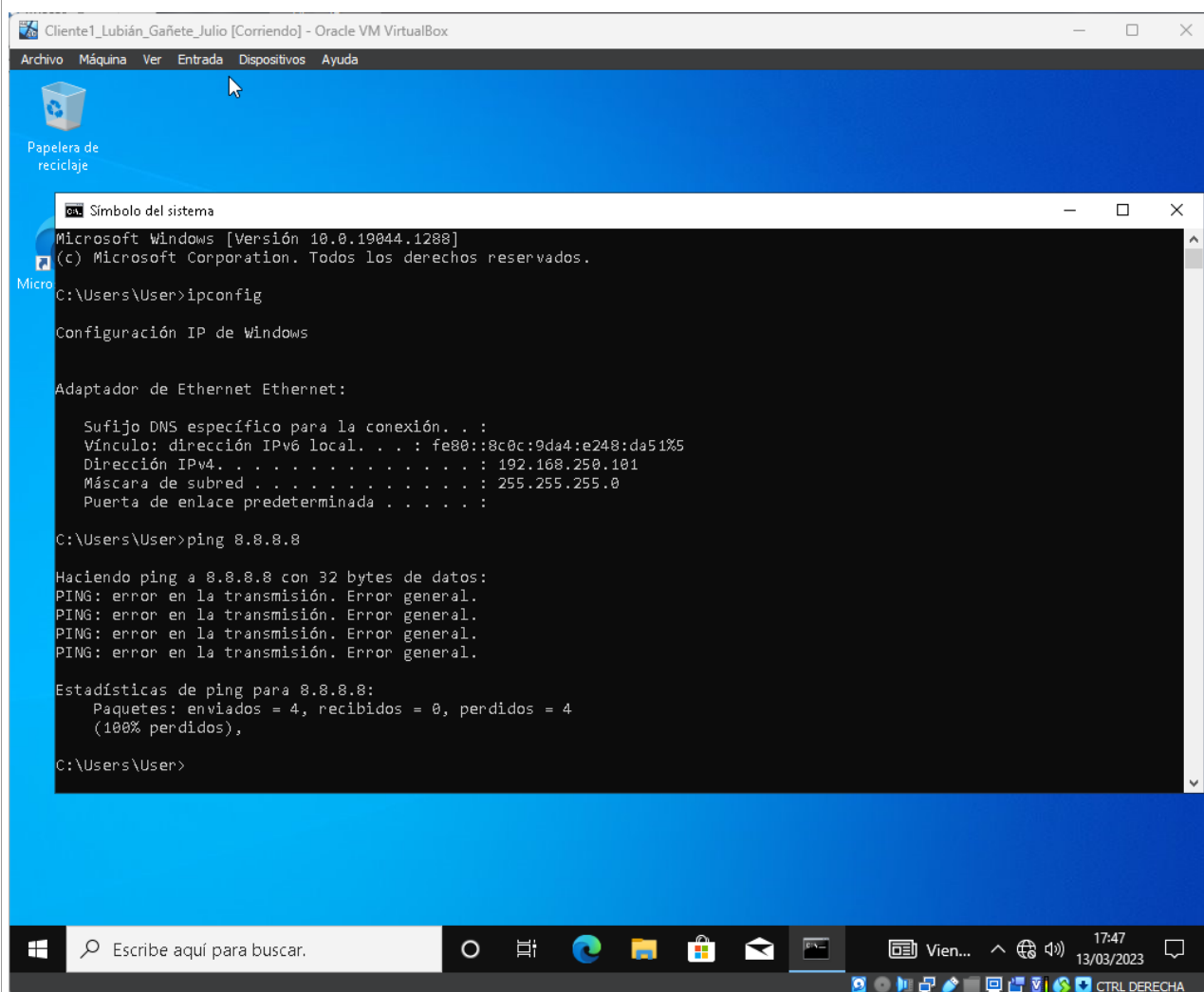
d) Crea o cartafol “Sistemas informáticos” no escritorio de cliente1 [Captura de pantalla da máquina virtual co cartafol]

e) Comparte este cartafol para o grupo de traballo “Workgroup” e proporciona “Control total” para o grupo Todos. [Captura de pantalla de compartir]

- f) Comprueba dende cliente2 que podes acceder ao cartafol “Sistemas informáticos” da máquina cliente1 [Captura de pantalla]
- g) Configura as máquinas para que respondan a ping [Captura de pantalla]
- h) Dende cliente1 fai ping á dirección IP de cliente2 [Captura de pantalla]
- i) Dende cliente2 fai ping á dirección IP de cliente1 [Captura de pantalla]
- j) Dende cliente1 fai ping á dirección IP de cliente3 [Captura de pantalla]
- k) Dende cliente3 fai ping á dirección IP de cliente1 [Captura de pantalla]

## Resposta

a) Configura a rede de cliente1 segundo as especificacións subministradas. Comprueba que cliente1 non ten acceso a Internet [Captura de pantalla da configuración de rede][Captura de pantalla de ping 8.8.8.8]



```
Cliente1_Lubián_Gañete_Julio [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda

Papelera de reciclaje

Símbolo del sistema
Microsoft Windows [Versión 10.0.19044.1288]
(c) Microsoft Corporation. Todos los derechos reservados.

C:\Users\User>ipconfig

Configuración IP de Windows

Adaptador de Ethernet Ethernet:

    Sufixo DNS específico para la conexión. . . :
    Vínculo: dirección IPv6 local. . . : fe80::8c0c:9da4:e248:da51%5
    Dirección IPv4. . . . . : 192.168.250.101
    Máscara de subred. . . . . : 255.255.255.0
    Puerta de enlace predeterminada. . . . . :

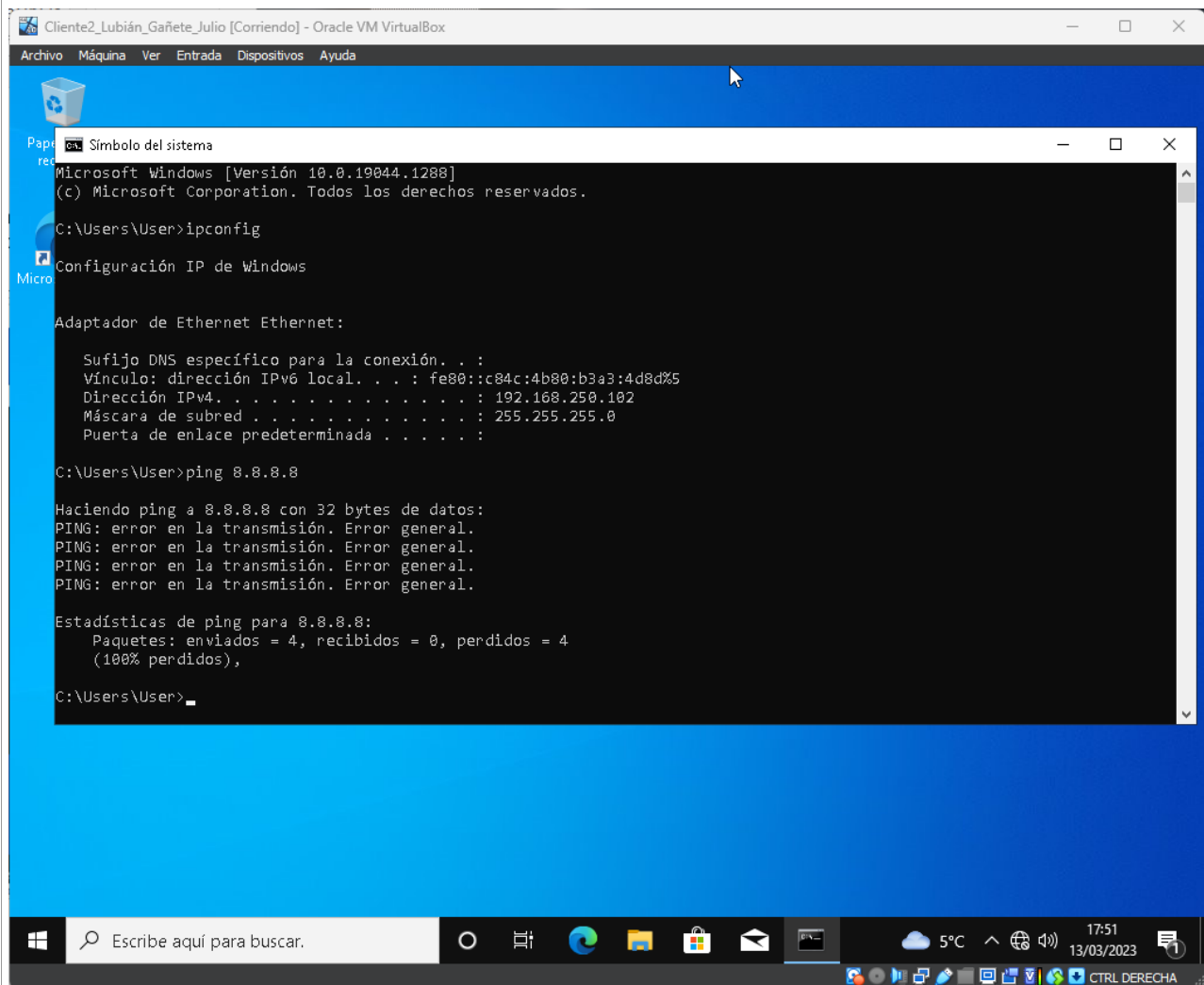
C:\Users\User>ping 8.8.8.8

Haciendo ping a 8.8.8.8 con 32 bytes de datos:
PING: error en la transmisión. Error general.
PING: error en la transmisión. Error general.
PING: error en la transmisión. Error general.
PING: error en la transmisión. Error general.

Estadísticas de ping para 8.8.8.8:
    Paquetes: enviados = 4, recibidos = 0, perdidos = 4
    (100% perdidos),

C:\Users\User>
```

b) Configura a rede de cliente2 segundo as especificacións subministradas. Comproba que cliente2 non ten acceso a Internet [Captura de pantalla da configuración de rede][Captura de pantalla de ping 8.8.8.8]



```
Cliente2_Lubián_Gañete_Julio [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda

Símbolo del sistema
Microsoft Windows [Versión 10.0.19044.1288]
(c) Microsoft Corporation. Todos los derechos reservados.

C:\Users\User>ipconfig

Configuración IP de Windows

Adaptador de Ethernet Ethernet:

    Sufixo DNS específico para la conexión. . . :
    Vínculo: dirección IPv6 local. . . : fe80::c84c:4b80:b3a3:4d8d%5
    Dirección IPv4. . . . . : 192.168.250.102
    Máscara de subred . . . . . : 255.255.255.0
    Puerta de enlace predeterminada . . . . . :

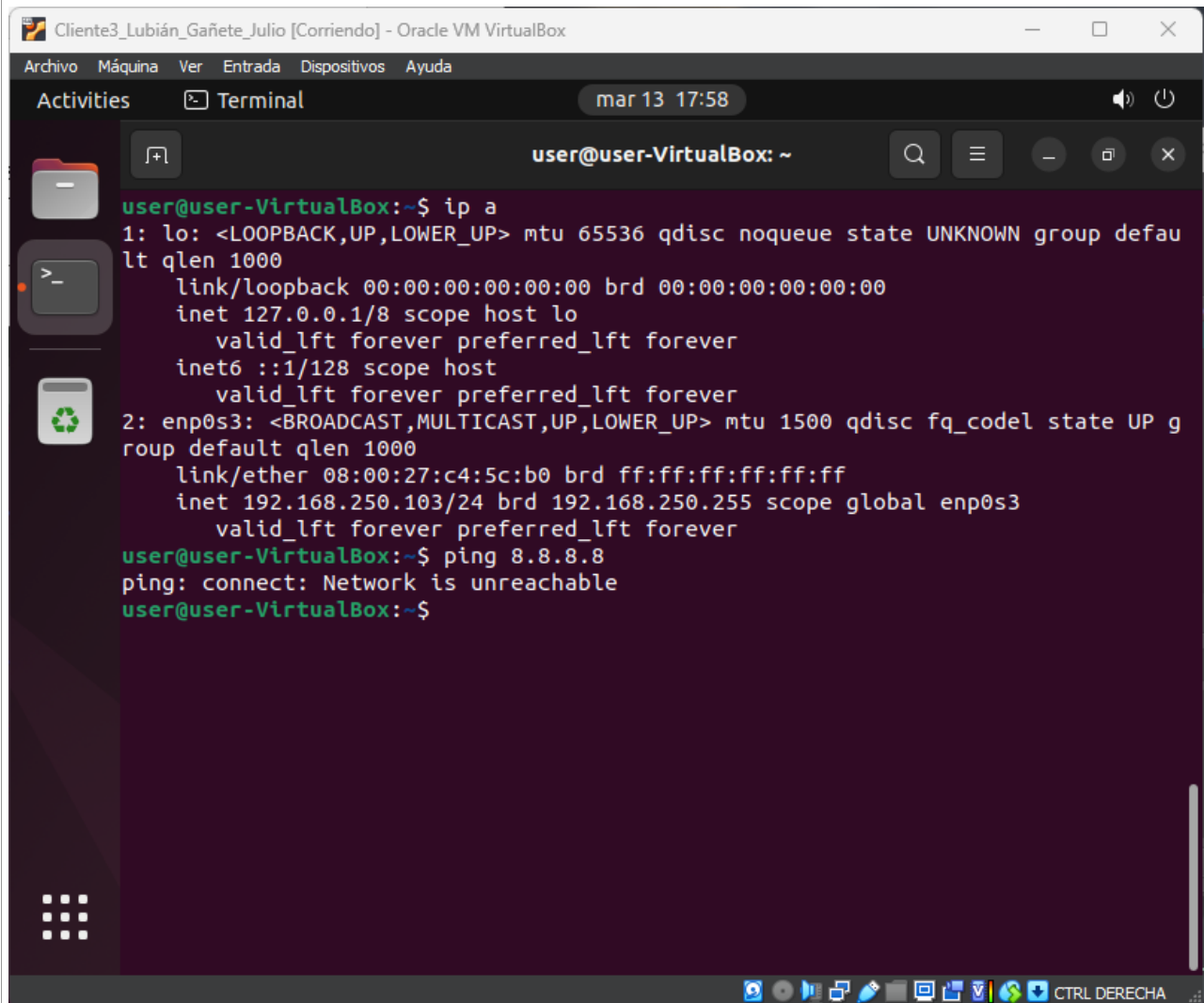
C:\Users\User>ping 8.8.8.8

Haciendo ping a 8.8.8.8 con 32 bytes de datos:
PING: error en la transmisión. Error general.
PING: error en la transmisión. Error general.
PING: error en la transmisión. Error general.
PING: error en la transmisión. Error general.

Estadísticas de ping para 8.8.8.8:
    Paquetes: enviados = 4, recibidos = 0, perdidos = 4
    (100% perdidos),

C:\Users\User>
```

c) Configura a rede de cliente3 segundo as especificacións subministradas. Comproba que cliente3 non ten acceso a Internet. [Captura de pantalla da configuración de rede][Captura de pantalla de ping 8.8.8.8]

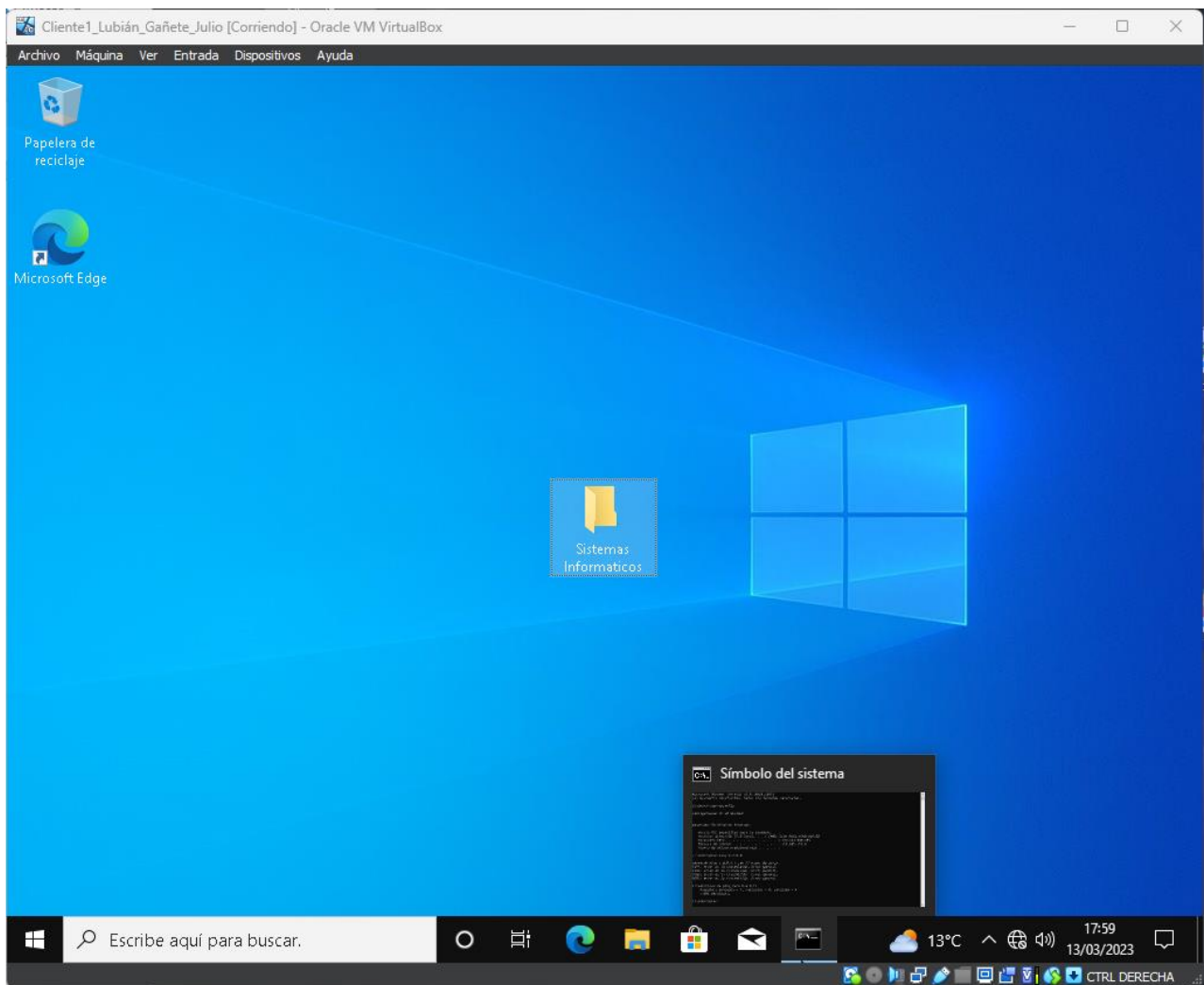


The screenshot shows a terminal window titled "Cliente3\_Lubián\_Gañete\_Julio [Corriendo] - Oracle VM VirtualBox". The terminal output is as follows:

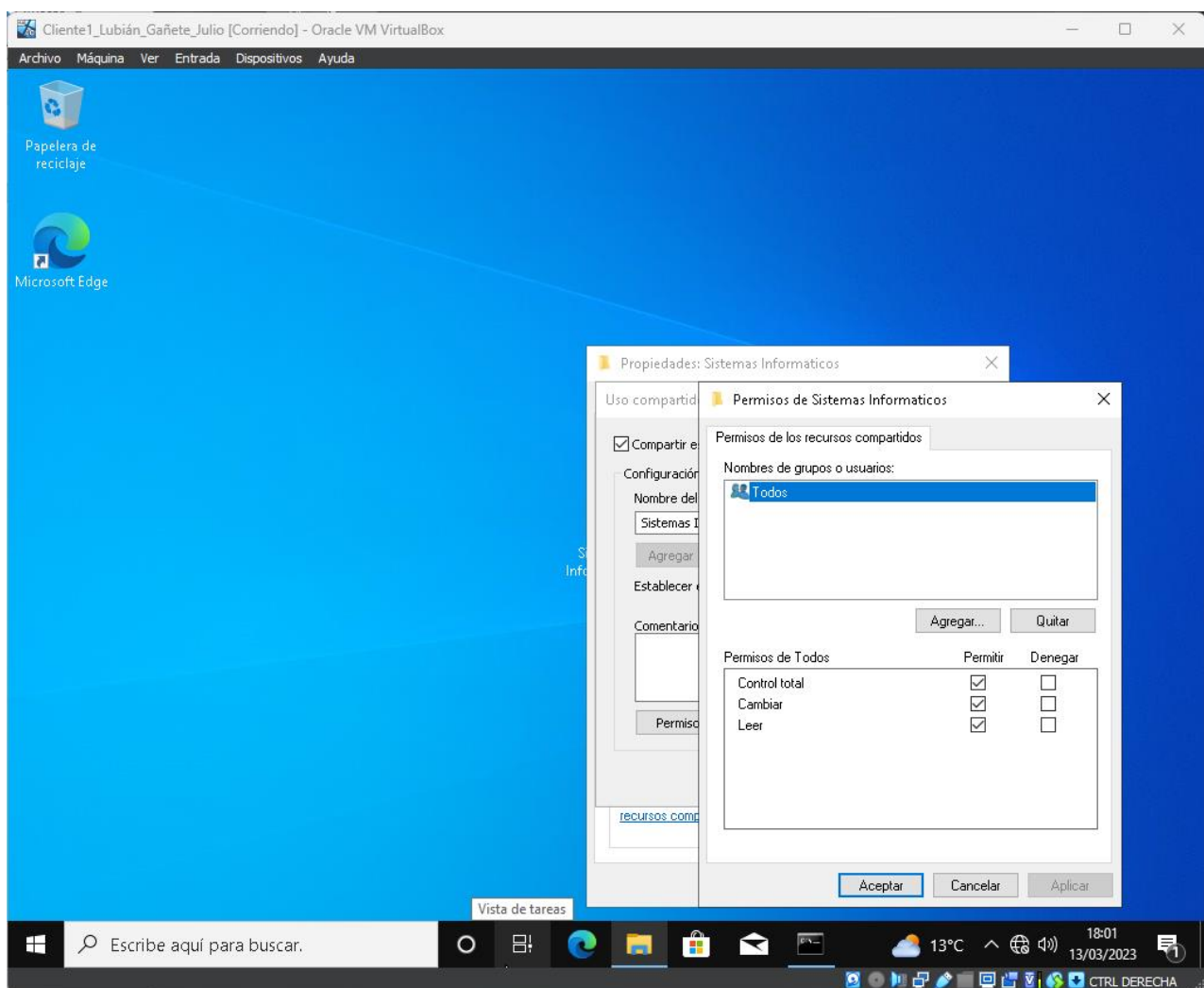
```
user@user-VirtualBox:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:c4:5c:b0 brd ff:ff:ff:ff:ff:ff
    inet 192.168.250.103/24 brd 192.168.250.255 scope global enp0s3
        valid_lft forever preferred_lft forever
user@user-VirtualBox:~$ ping 8.8.8.8
ping: connect: Network is unreachable
user@user-VirtualBox:~$
```

The terminal window includes a menu bar with "Archivo", "Máquina", "Ver", "Entrada", "Dispositivos", and "Ayuda". The title bar shows the window name and standard OS controls. The bottom status bar displays system icons and the text "CTRL DERECHA".

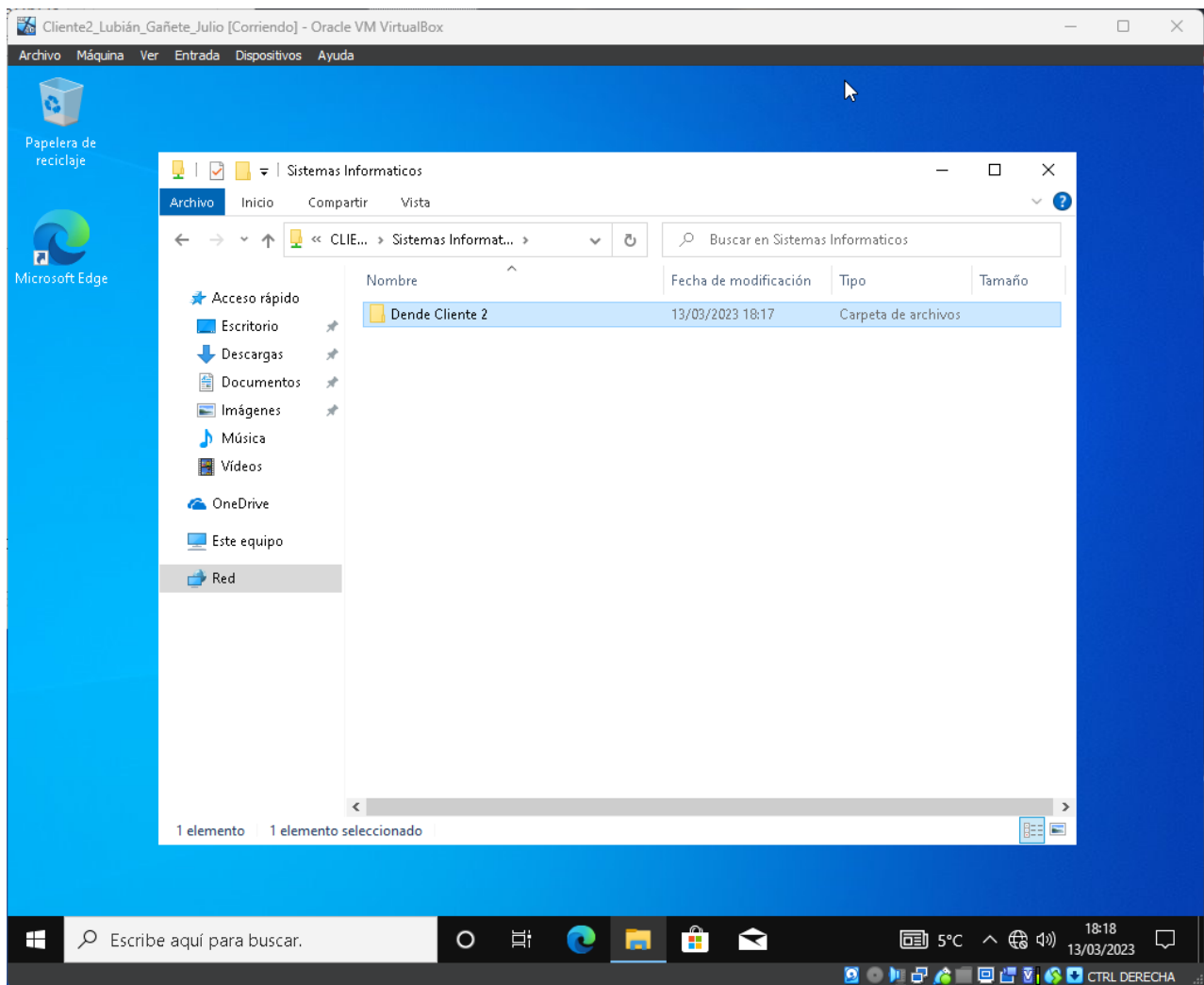
d) Crea o cartafol “Sistemas informáticos” no escritorio de cliente1 [Captura de pantalla da máquina virtual co cartafol]



e) Comparte este cartafol para o grupo de traballo “Workgroup” e proporciona “Control total” para o grupo Todos. [Captura de pantalla de compartir]

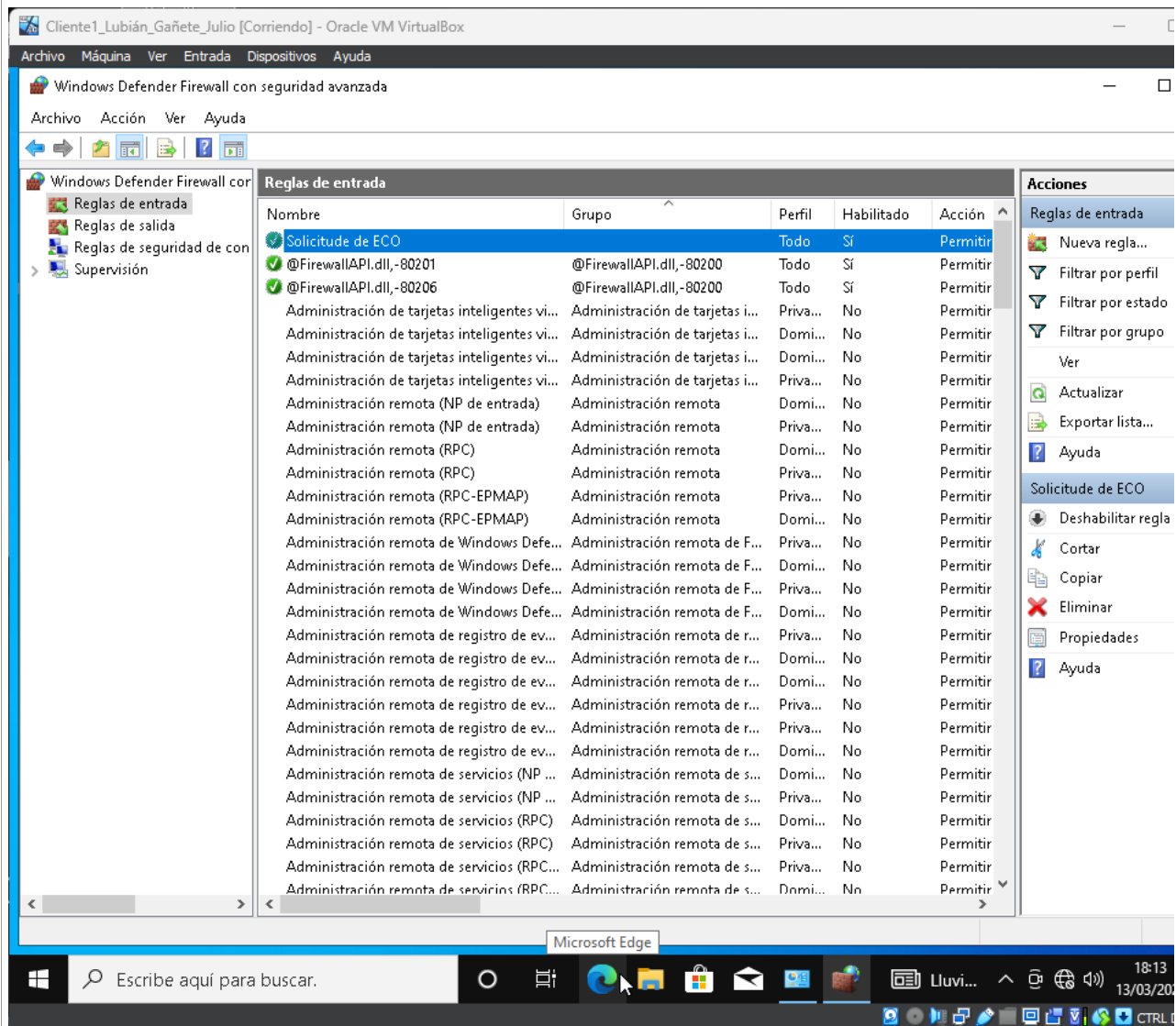


f) Comproba dende cliente2 que podes acceder ao cartafol “Sistemas informáticos” da máquina cliente1 [Captura de pantalla]

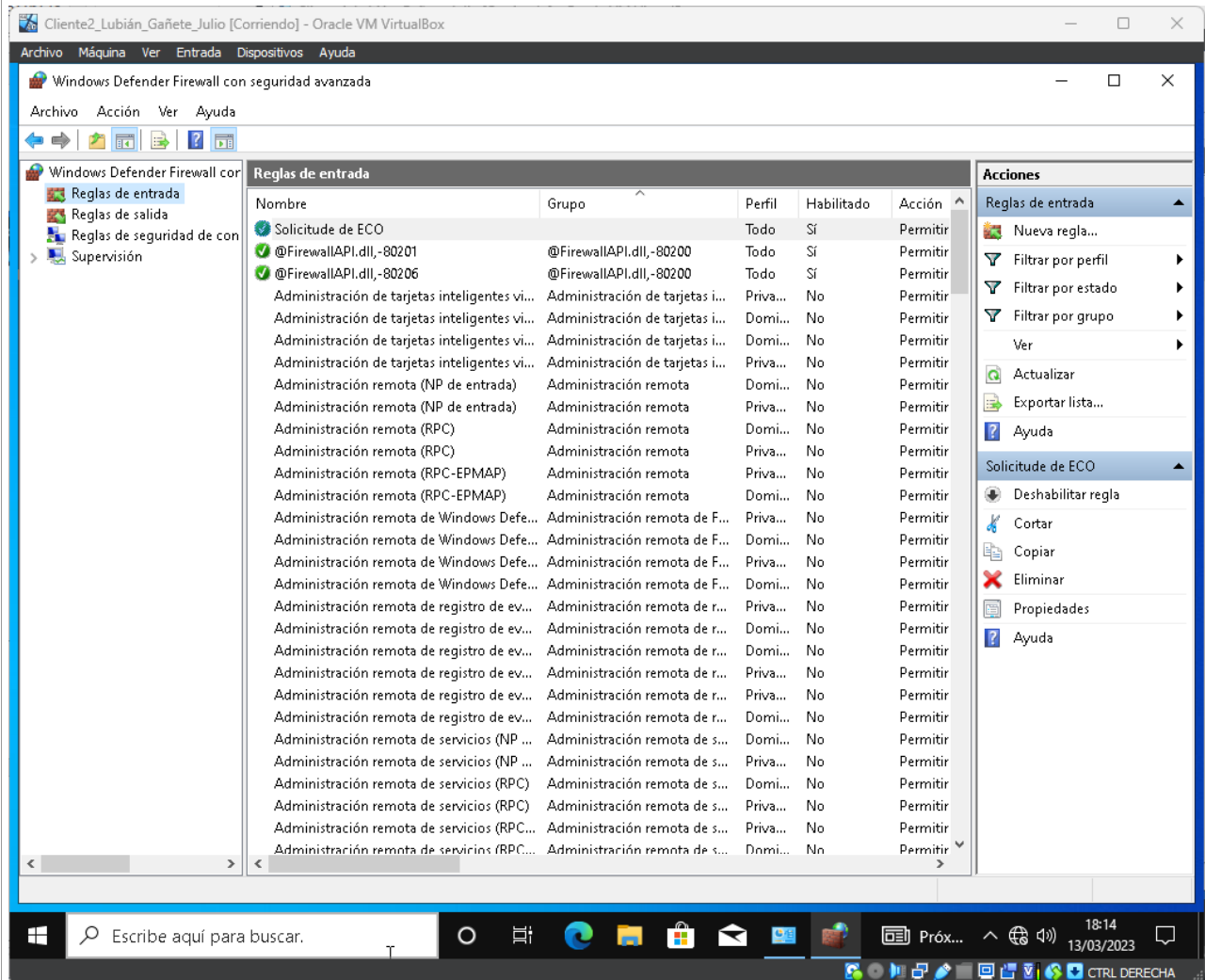




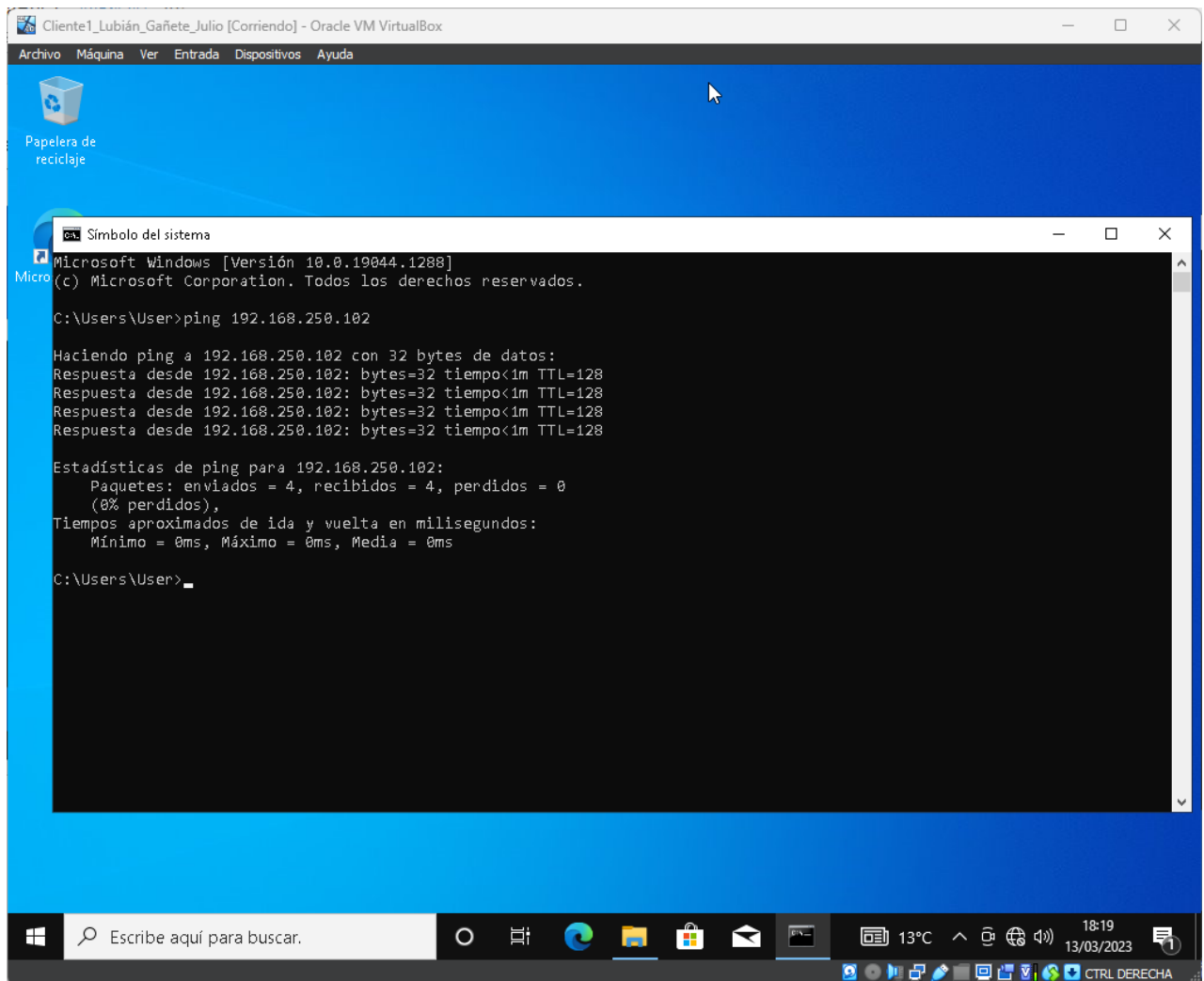
g) Configura as máquinas para que respondan a ping [Captura de pantalla]  
cliente1



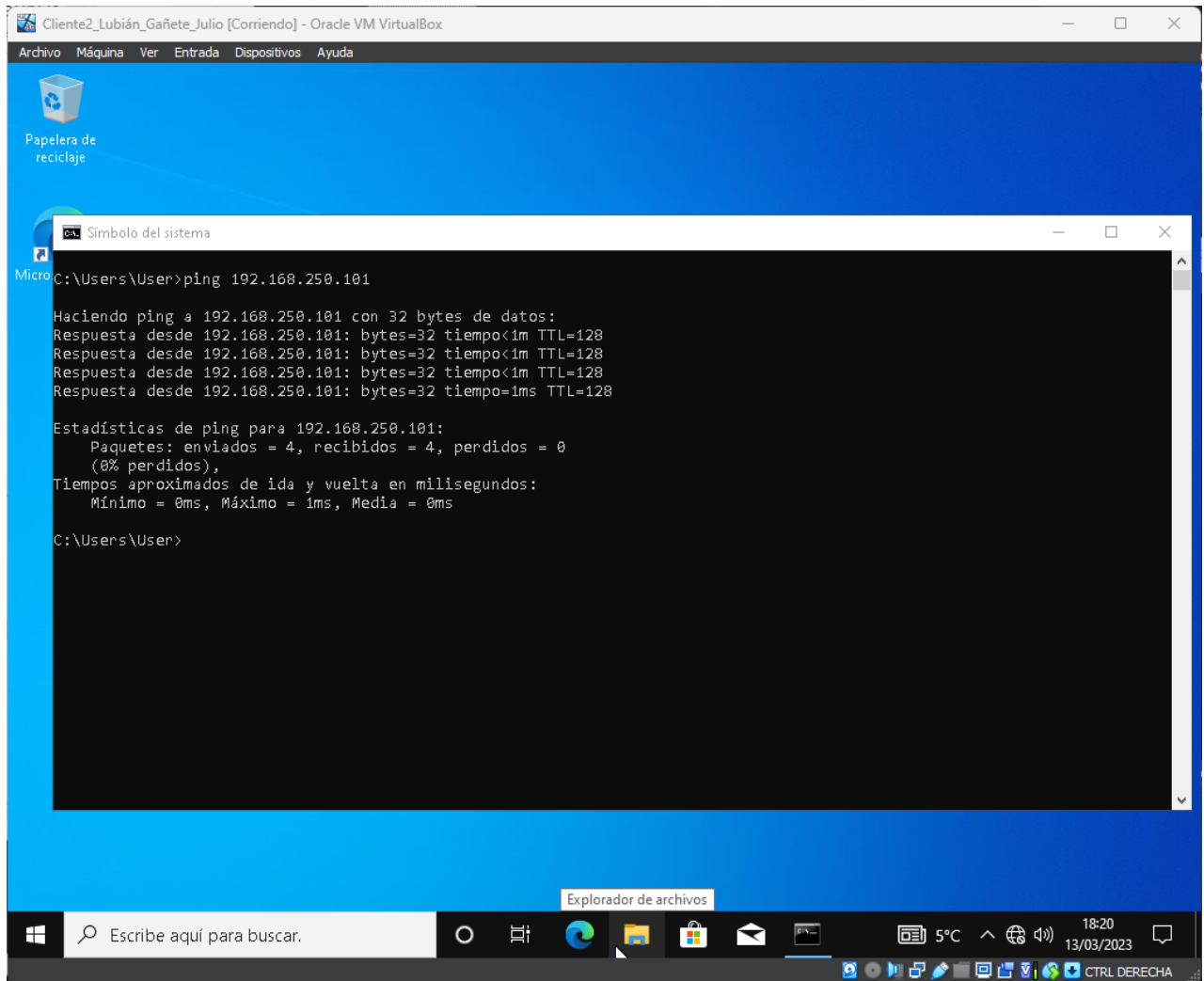
cliente2



h) Dende cliente1 fai ping á dirección IP de cliente2 [Captura de pantalla]



i) Dende cliente2 fai ping á dirección IP de cliente1 [Captura de pantalla]



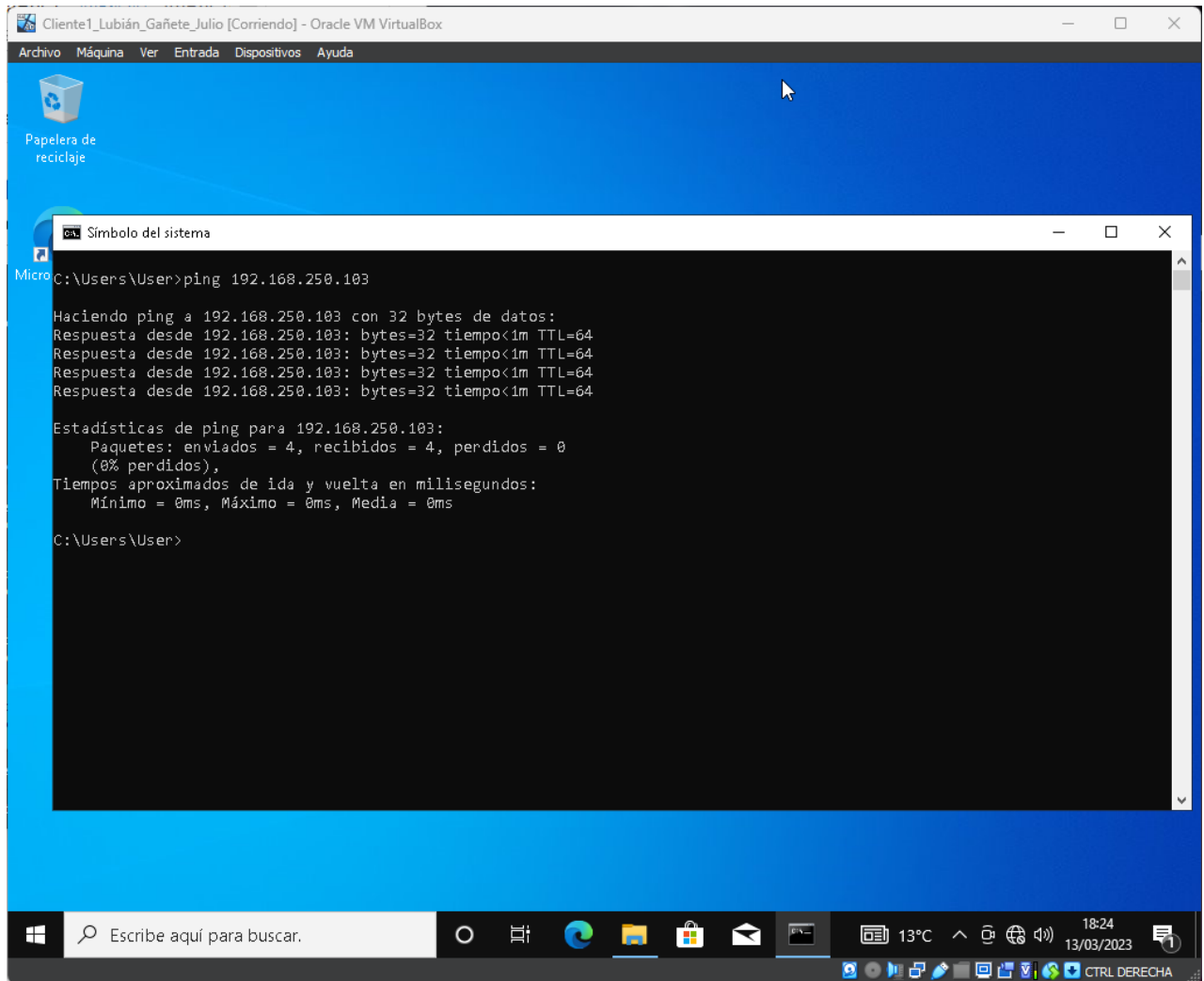
```
C:\Users\User>ping 192.168.250.101

Haciendo ping a 192.168.250.101 con 32 bytes de datos:
Respuesta desde 192.168.250.101: bytes=32 tiempo<1m TTL=128
Respuesta desde 192.168.250.101: bytes=32 tiempo<1m TTL=128
Respuesta desde 192.168.250.101: bytes=32 tiempo<1m TTL=128
Respuesta desde 192.168.250.101: bytes=32 tiempo=1ms TTL=128

Estadísticas de ping para 192.168.250.101:
    Paquetes: enviados = 4, recibidos = 4, perdidos = 0
            (0% perdidos),
    Tiempos aproximados de ida y vuelta en milisegundos:
        Mínimo = 0ms, Máximo = 1ms, Media = 0ms

C:\Users\User>
```

j) Dende cliente1 fai ping á dirección IP de cliente3 [Captura de pantalla]



```
Cliente1_Lubián_Gañete_Julio [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

Papelera de reciclaje

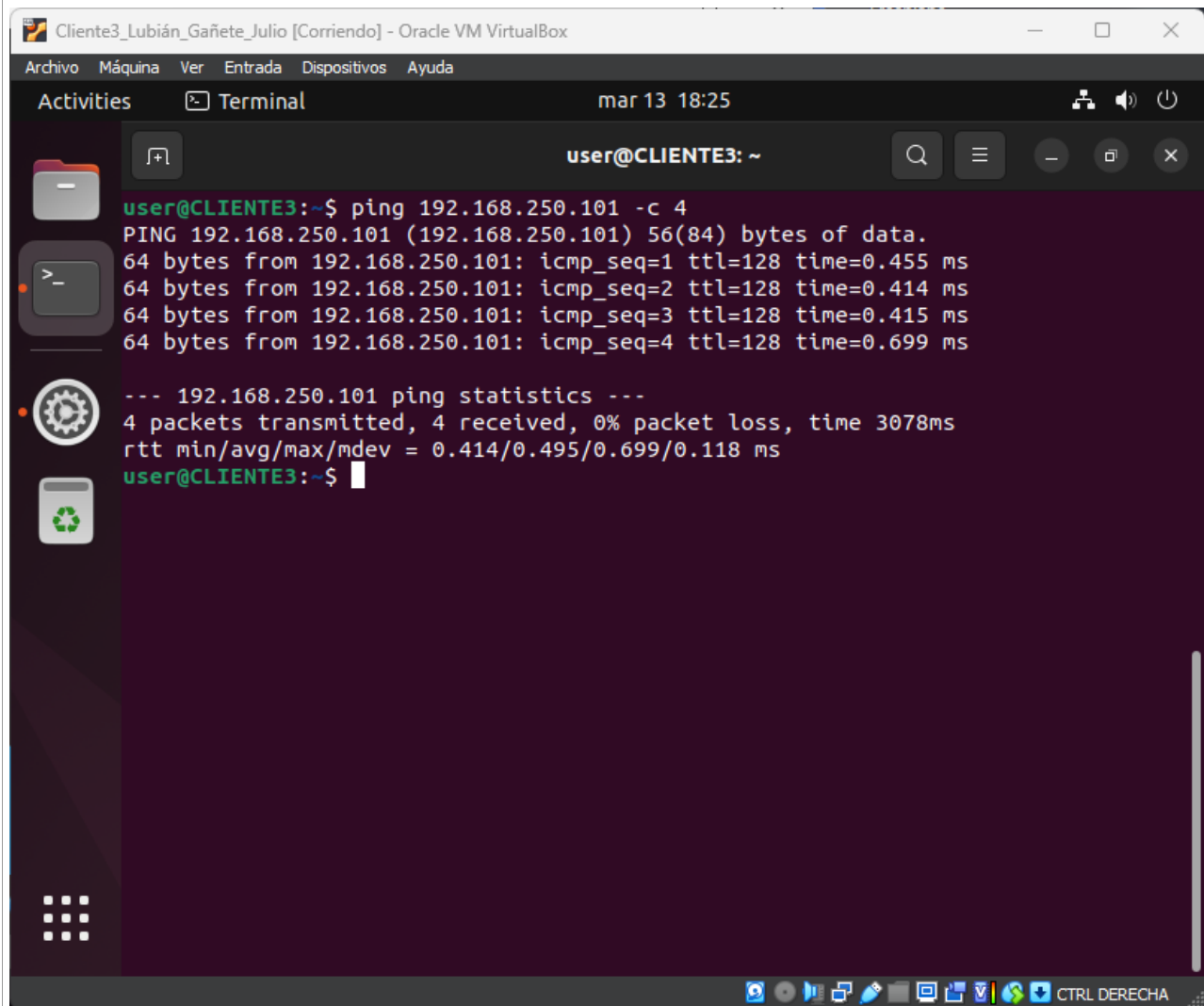
Símbolo del sistema
C:\Users\User>ping 192.168.250.103

Haciendo ping a 192.168.250.103 con 32 bytes de datos:
Respuesta desde 192.168.250.103: bytes=32 tiempo<1m TTL=64
Respuesta desde 192.168.250.103: bytes=32 tiempo<1m TTL=64
Respuesta desde 192.168.250.103: bytes=32 tiempo<1m TTL=64
Respuesta desde 192.168.250.103: bytes=32 tiempo<1m TTL=64

Estadísticas de ping para 192.168.250.103:
    Paquetes: enviados = 4, recibidos = 4, perdidos = 0
    (0% perdidos),
    Tiempos aproximados de ida y vuelta en milisegundos:
        Mínimo = 0ms, Máximo = 0ms, Media = 0ms

C:\Users\User>
```

k) Dende cliente3 fai ping á dirección IP de cliente1 [Captura de pantalla]



The screenshot shows a terminal window titled "Cliente3\_Lubián\_Gañete\_Julio [Corriendo] - Oracle VM VirtualBox". The window has a menu bar with "Archivo", "Máquina", "Ver", "Entrada", "Dispositivos", and "Ayuda". Below the menu bar is a toolbar with "Activities" and "Terminal" buttons. The terminal itself has a title bar "user@CLIENTE3: ~" and a search icon. The terminal output shows a ping command being executed: `user@CLIENTE3:~$ ping 192.168.250.101 -c 4`. The output of the ping command is: `PING 192.168.250.101 (192.168.250.101) 56(84) bytes of data.  
64 bytes from 192.168.250.101: icmp_seq=1 ttl=128 time=0.455 ms  
64 bytes from 192.168.250.101: icmp_seq=2 ttl=128 time=0.414 ms  
64 bytes from 192.168.250.101: icmp_seq=3 ttl=128 time=0.415 ms  
64 bytes from 192.168.250.101: icmp_seq=4 ttl=128 time=0.699 ms  
--- 192.168.250.101 ping statistics ---  
4 packets transmitted, 4 received, 0% packet loss, time 3078ms  
rtt min/avg/max/mdev = 0.414/0.495/0.699/0.118 ms  
user@CLIENTE3:~$`. The terminal window is part of a desktop environment with a sidebar on the left containing icons for a file manager, terminal, settings, and a trash can. The bottom of the window shows a taskbar with various application icons and the text "CTRL DERECHA".

```
user@CLIENTE3:~$ ping 192.168.250.101 -c 4
PING 192.168.250.101 (192.168.250.101) 56(84) bytes of data.
64 bytes from 192.168.250.101: icmp_seq=1 ttl=128 time=0.455 ms
64 bytes from 192.168.250.101: icmp_seq=2 ttl=128 time=0.414 ms
64 bytes from 192.168.250.101: icmp_seq=3 ttl=128 time=0.415 ms
64 bytes from 192.168.250.101: icmp_seq=4 ttl=128 time=0.699 ms
--- 192.168.250.101 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3078ms
rtt min/avg/max/mdev = 0.414/0.495/0.699/0.118 ms
user@CLIENTE3:~$
```

#### CA5.8 Configúrese o acceso a redes de área extensa (10%)



2. Configura a máquina server como se sinala a continuación:

**Server:**

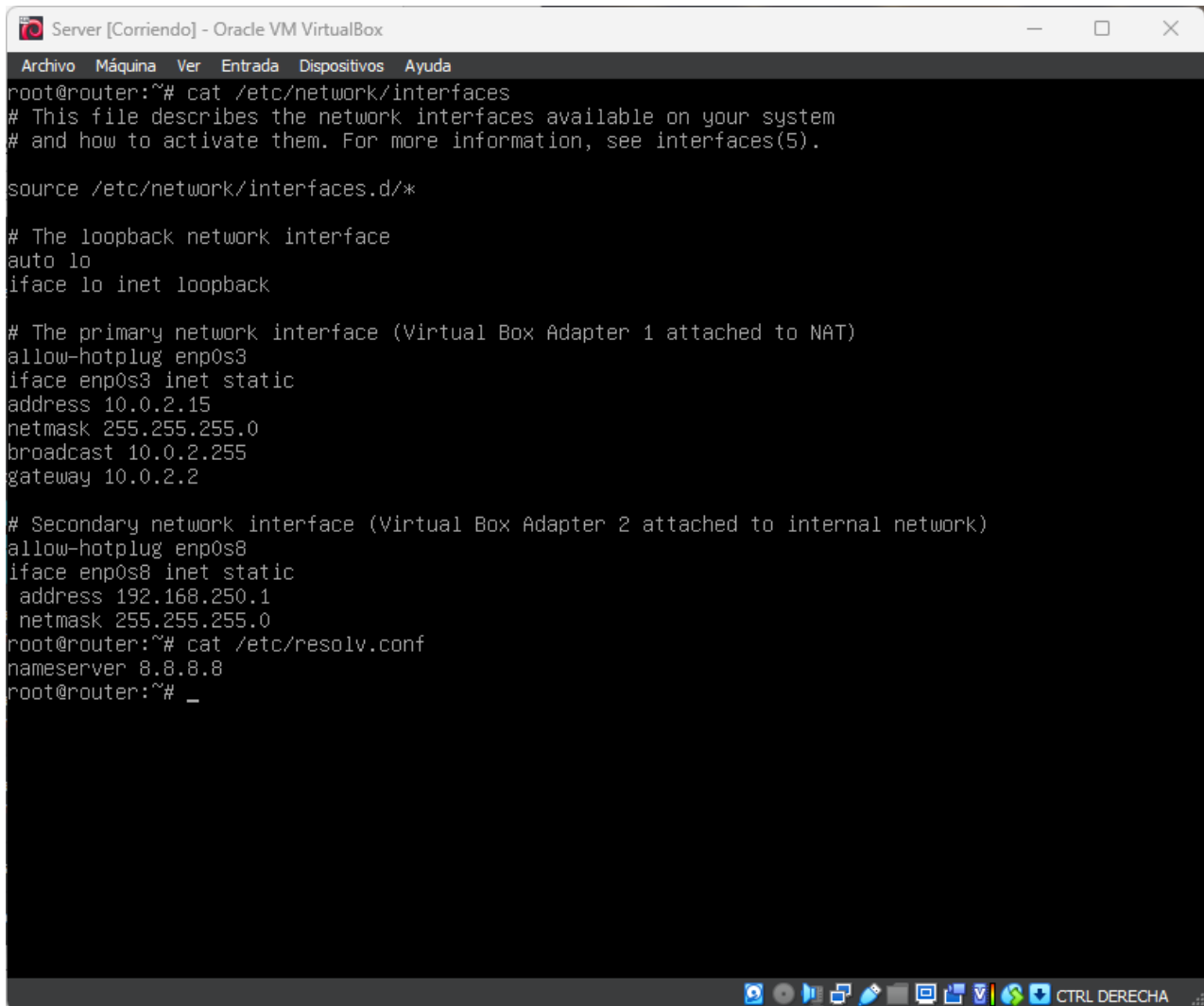
- *Máquina virtual*
- *Sistema operativo: Debian 11 (CLI)*
- *Hostname: server*
- *Rede VirtualBox:*
  - *Adapter 1:*
    - *Attached to: NAT*
    - *IP: 10.0.2.15/24*
    - *Brocadcast: 10.0.2.255*
    - *Gateway: 10.0.2.2*
    - *DNS: 10.0.2.3*
  - *Adapter 2:*
    - *Attached to: Internal Network*
    - *Name: intnet*
    - *IP: 192.168.250.1/24*

*Para proceder con esta parte é necesario ter as máquinas cliente1 e cliente2 acendidas.*

- a) Configura os interfaces de rede segundo as especificacións subministradas [Captura de pantalla]
- b) Comproba que o servidor pode acceder a Internet [Captura de pantalla]
- c) Dende o servidor efectúa ping á máquina cliente1 [Captura de pantalla]
- d) Dende o servidor efectúa ping á máquina cliente2 [Captura de pantalla]

Resposta

a) Configura os interfaces de rede segundo as especificacións subministradas [Captura de pantalla]



The screenshot shows a terminal window titled "Server [Corriendo] - Oracle VM VirtualBox". The terminal displays the following commands and output:

```
root@router:~# cat /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

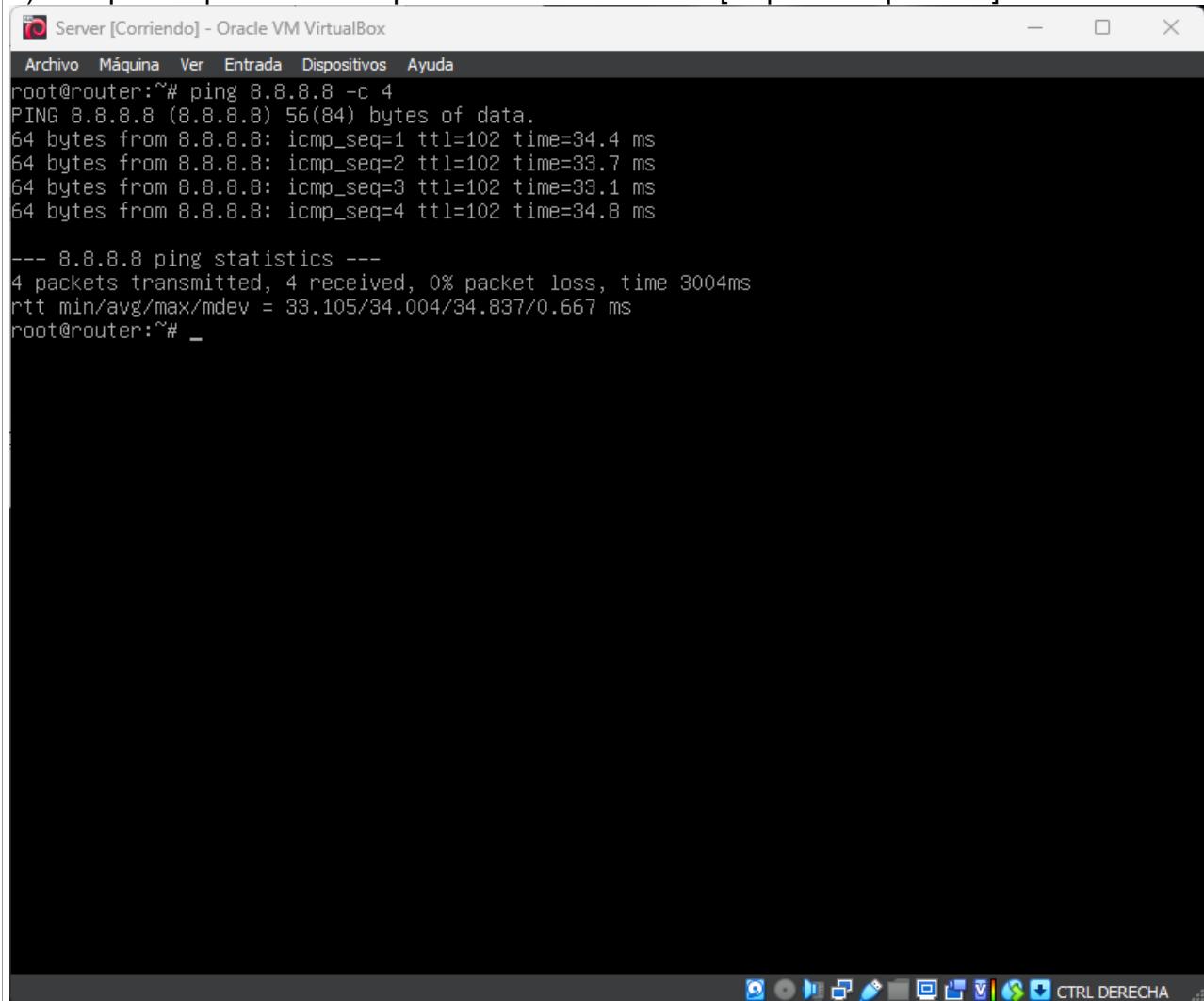
# The primary network interface (Virtual Box Adapter 1 attached to NAT)
allow-hotplug enp0s3
iface enp0s3 inet static
address 10.0.2.15
netmask 255.255.255.0
broadcast 10.0.2.255
gateway 10.0.2.2

# Secondary network interface (Virtual Box Adapter 2 attached to internal network)
allow-hotplug enp0s8
iface enp0s8 inet static
address 192.168.250.1
netmask 255.255.255.0
root@router:~# cat /etc/resolv.conf
nameserver 8.8.8.8
root@router:~# _
```

The terminal window has a menu bar with "Archivo", "Máquina", "Ver", "Entrada", "Dispositivos", and "Ayuda". The bottom status bar shows various icons and the text "CTRL DERECHA".



b) Comprueba que o servidor pode acceder a Internet [Captura de pantalla]



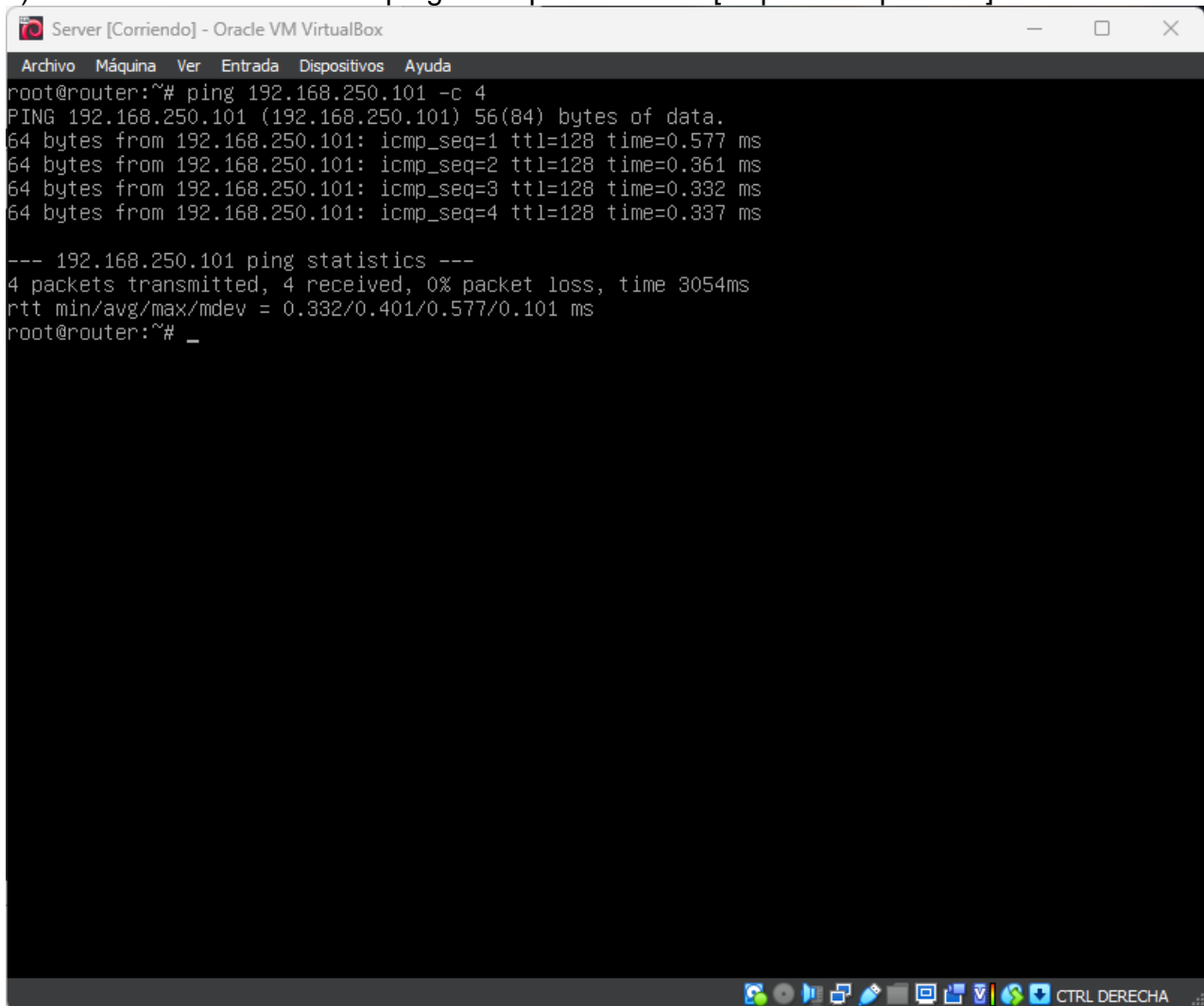
The screenshot shows a terminal window titled "Server [Corriendo] - Oracle VM VirtualBox". The terminal output is as follows:

```
root@router:~# ping 8.8.8.8 -c 4
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=102 time=34.4 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=102 time=33.7 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=102 time=33.1 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=102 time=34.8 ms

--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3004ms
rtt min/avg/max/mdev = 33.105/34.004/34.837/0.667 ms
root@router:~# _
```

The terminal window has a menu bar with "Archivo", "Máquina", "Ver", "Entrada", "Dispositivos", and "Ayuda". The bottom status bar shows various icons and the text "CTRL DERECHA".

c) Dende o servidor efectúa ping á máquina cliente1 [Captura de pantalla]



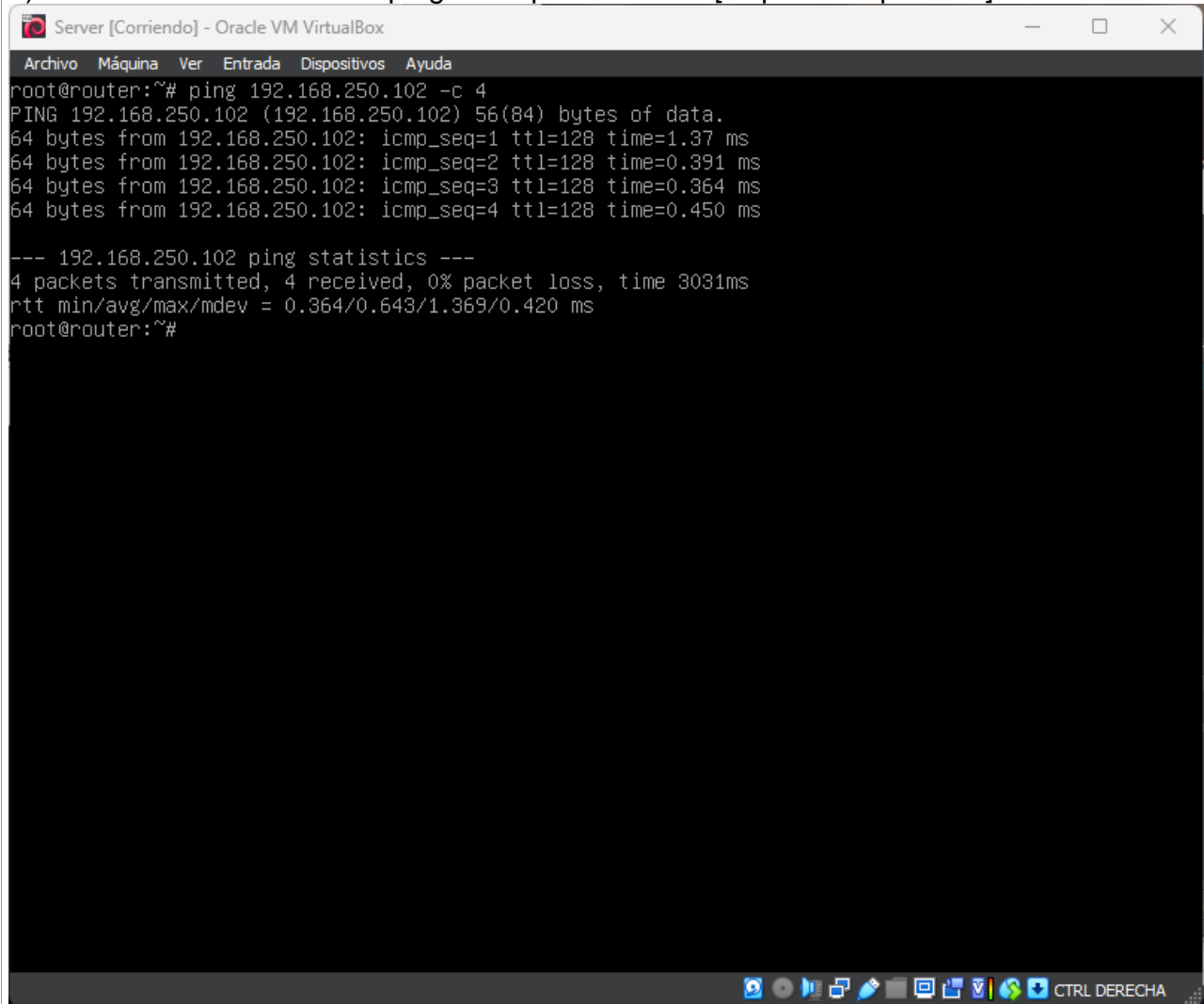
The screenshot shows a terminal window titled "Server [Corriendo] - Oracle VM VirtualBox". The terminal output is as follows:

```
root@router:~# ping 192.168.250.101 -c 4
PING 192.168.250.101 (192.168.250.101) 56(84) bytes of data.
64 bytes from 192.168.250.101: icmp_seq=1 ttl=128 time=0.577 ms
64 bytes from 192.168.250.101: icmp_seq=2 ttl=128 time=0.361 ms
64 bytes from 192.168.250.101: icmp_seq=3 ttl=128 time=0.332 ms
64 bytes from 192.168.250.101: icmp_seq=4 ttl=128 time=0.337 ms

--- 192.168.250.101 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3054ms
rtt min/avg/max/mdev = 0.332/0.401/0.577/0.101 ms
root@router:~# _
```

The terminal window has a menu bar with "Archivo", "Máquina", "Ver", "Entrada", "Dispositivos", and "Ayuda". The bottom status bar shows various icons and the text "CTRL DERECHA".

d) Dende o servidor efectúa ping á máquina cliente2 [Captura de pantalla]



```
Server [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda
root@router:~# ping 192.168.250.102 -c 4
PING 192.168.250.102 (192.168.250.102) 56(84) bytes of data.
64 bytes from 192.168.250.102: icmp_seq=1 ttl=128 time=1.37 ms
64 bytes from 192.168.250.102: icmp_seq=2 ttl=128 time=0.391 ms
64 bytes from 192.168.250.102: icmp_seq=3 ttl=128 time=0.364 ms
64 bytes from 192.168.250.102: icmp_seq=4 ttl=128 time=0.450 ms

--- 192.168.250.102 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3031ms
rtt min/avg/max/mdev = 0.364/0.643/1.369/0.420 ms
root@router:~#
```

### CA5.9 Xestionáronse portos de comunicacións (10%)



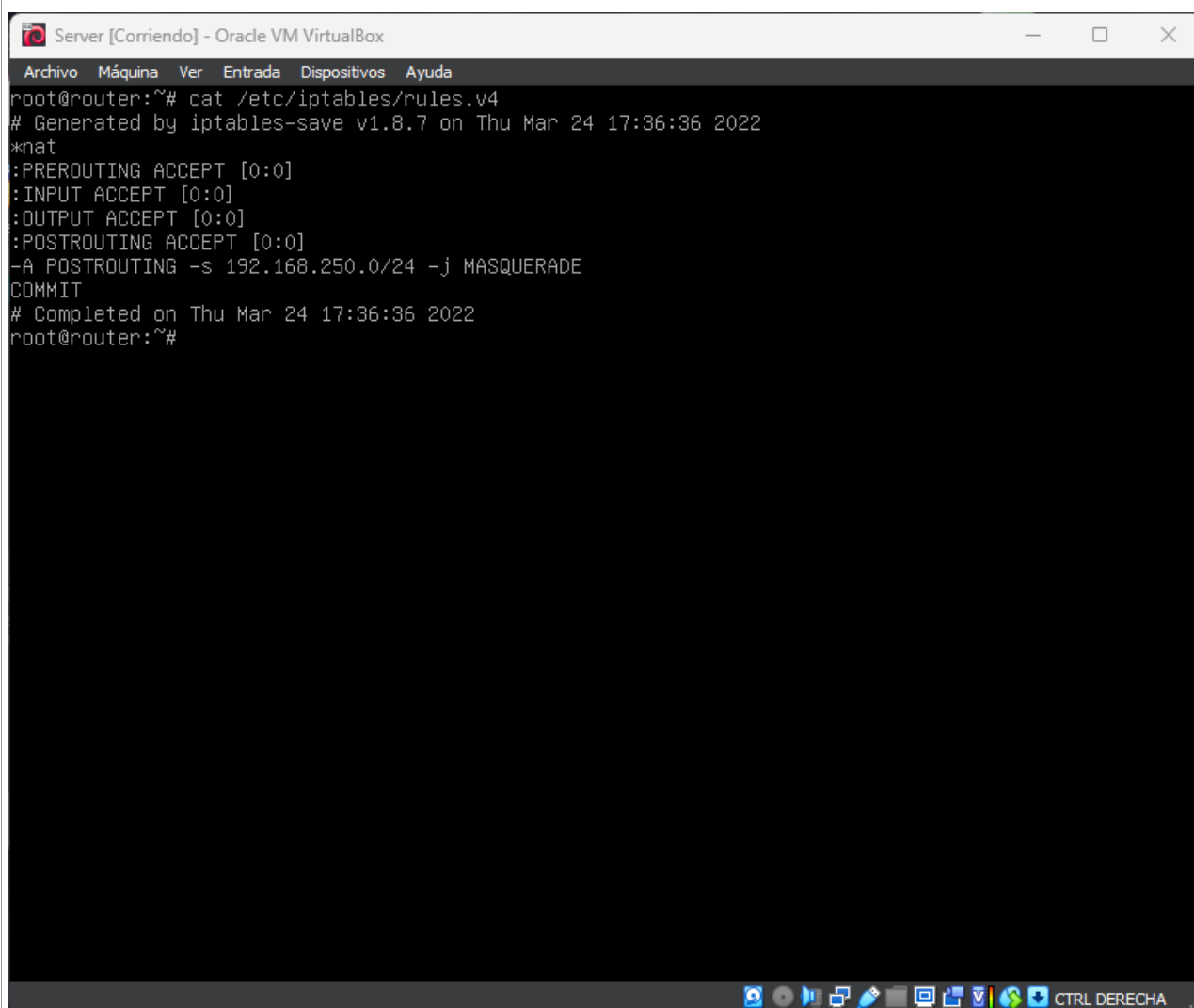
3. Configura a máquina server como router para que as máquinas cliente1 e cliente2 podan navegar por Internet.

a) Configura o server como router [Captura de pantalla]

- b) Configura a rede de cliente1 para que a porta de enlace sexa a IP 192.168.250.1 correspondente ao servidor [Captura de pantalla]
- c) Comproba que o cliente1 é capaz de navegar por Internet [Captura de pantalla]
- d) Configura a rede de cliente2 para que a porta de enlace sexa a IP 192.168.250.1 correspondente ao servidor [Captura de pantalla]
- e) Comproba que o cliente2 é capaz de navegar por Internet [Captura de pantalla]
- f) Configura a rede de cliente3 para que a porta de enlace sexa a IP 192.168.250.1 correspondente ao servidor [Captura de pantalla]
- g) Comproba que o cliente3 é capaz de navegar por Internet [Captura de pantalla]

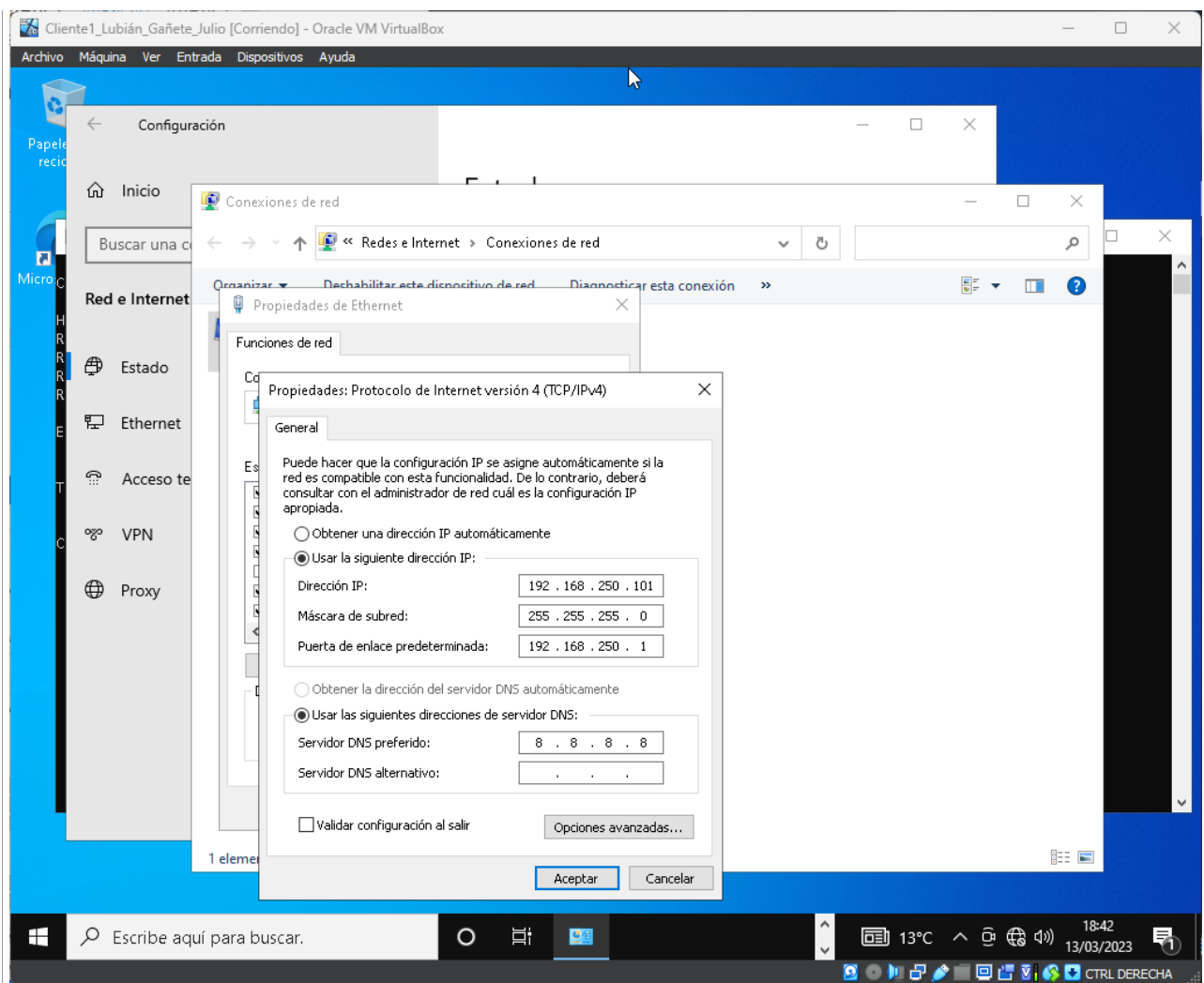
## Resposta

- a) Configura o server como router [Captura de pantalla]

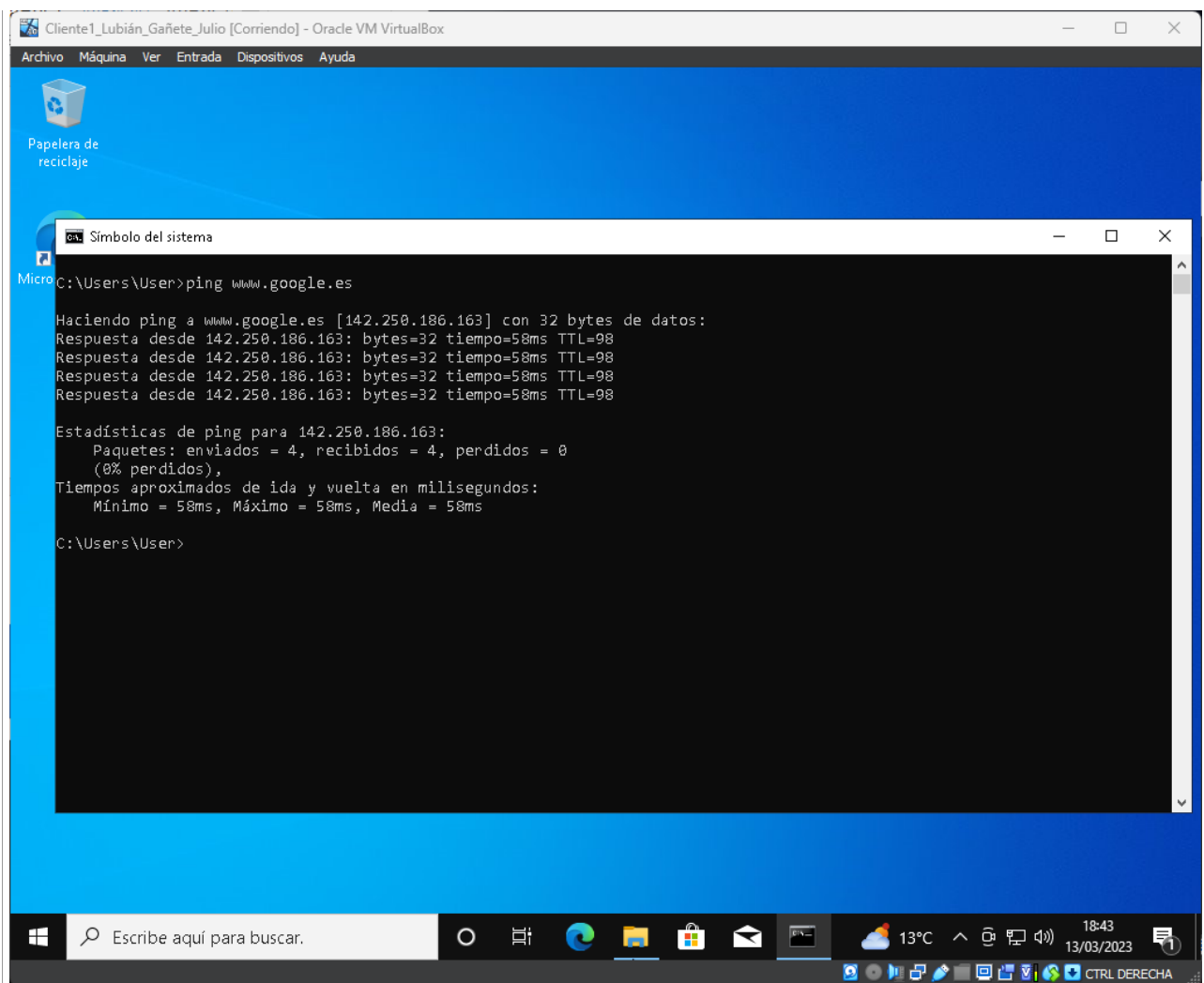


```
Server [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda
root@router:~# cat /etc/iptables/rules.v4
# Generated by iptables-save v1.8.7 on Thu Mar 24 17:36:36 2022
*nat
:PREROUTING ACCEPT [0:0]
:INPUT ACCEPT [0:0]
:OUTPUT ACCEPT [0:0]
:POSTROUTING ACCEPT [0:0]
-A POSTROUTING -s 192.168.250.0/24 -j MASQUERADE
COMMIT
# Completed on Thu Mar 24 17:36:36 2022
root@router:~#
```

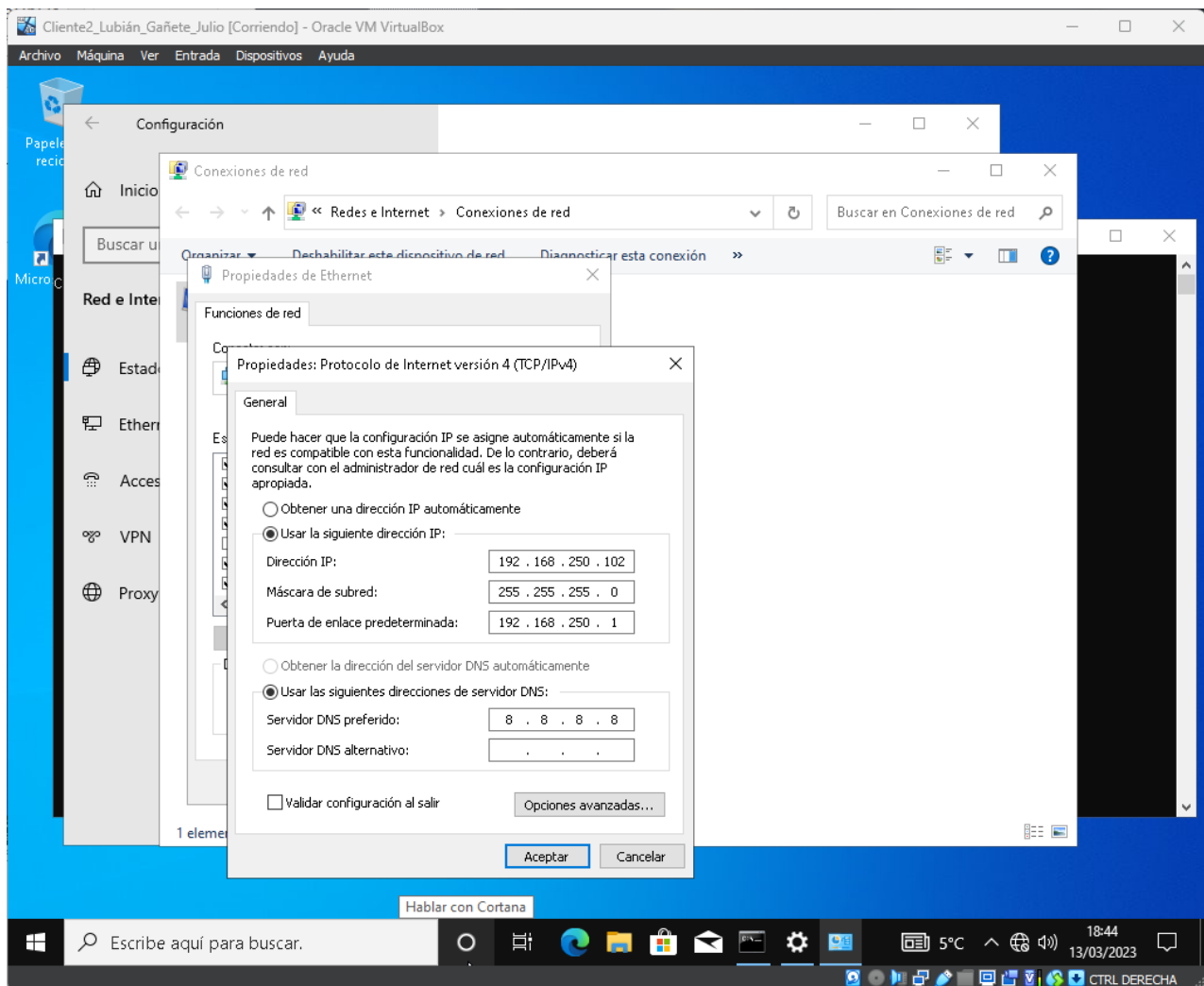
- b) Configura a rede de cliente1 para que a porta de enlace sexa a IP 192.168.250.1 correspondente ao servidor [Captura de pantalla]



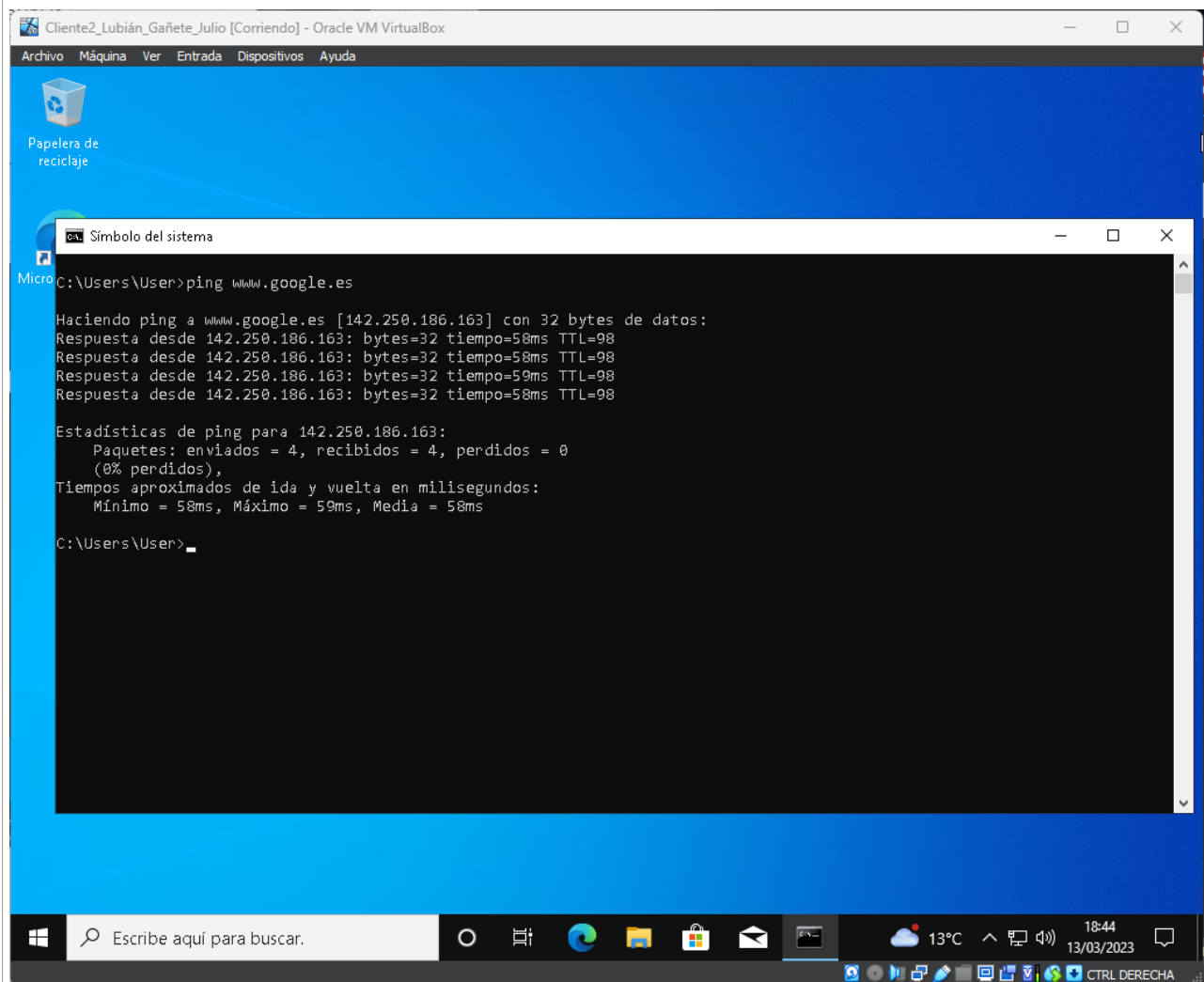
c) Comproba que o cliente1 é capaz de navegar por Internet [Captura de pantalla]



d) Configura a rede de cliente2 para que a porta de enlace sexa a IP 192.168.250.1 correspondente ao servidor [Captura de pantalla]

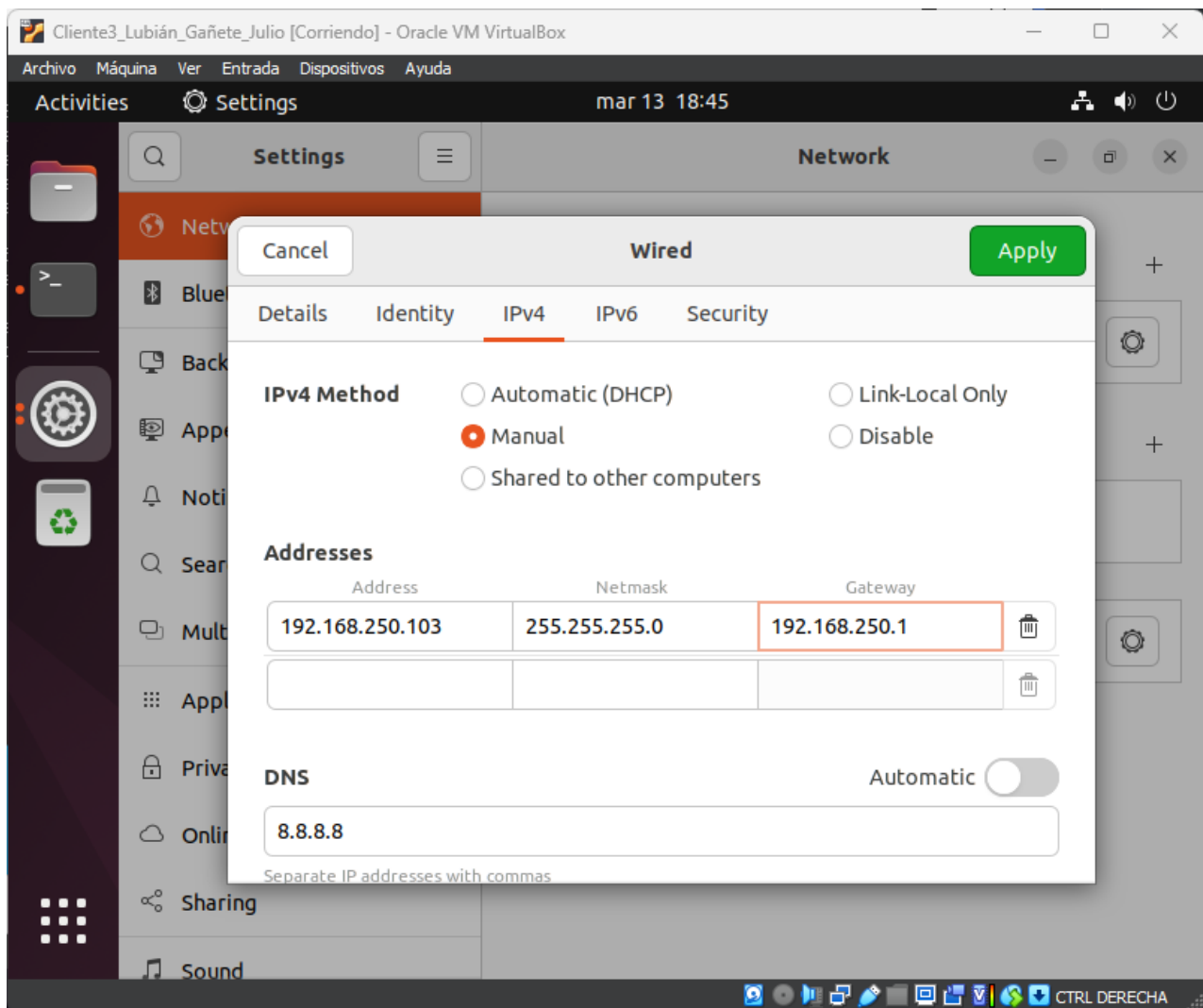


e) Comproba que o cliente2 é capaz de navegar por Internet [Captura de pantalla]

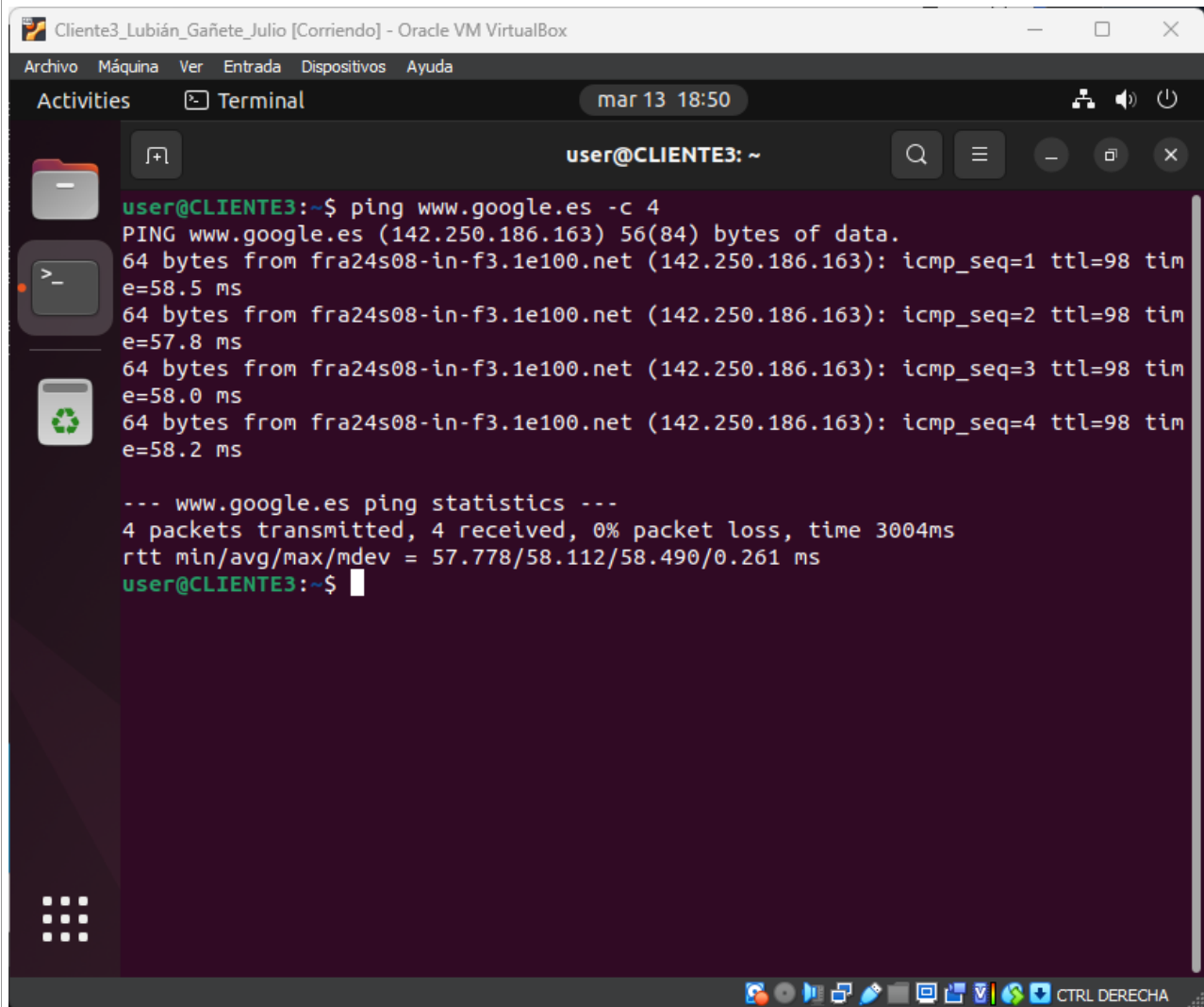




f) Configura a rede de cliente3 para que a porta de enlace sexa a IP 192.168.250.1 correspondente ao servidor [Captura de pantalla]



g) Comproba que o cliente3 é capaz de navegar por Internet [Captura de pantalla]



The screenshot shows a terminal window titled "Cliente3\_Lubián\_Gañete\_Julio [Corriendo] - Oracle VM VirtualBox". The terminal is running a ping command to www.google.es. The output shows four successful pings with varying response times (57.8 ms to 58.5 ms). The statistics at the bottom indicate 4 packets transmitted, 4 received, 0% packet loss, and a total time of 3004ms. The terminal prompt is user@CLIENTE3:~\$.

```
user@CLIENTE3:~$ ping www.google.es -c 4
PING www.google.es (142.250.186.163) 56(84) bytes of data.
64 bytes from fra24s08-in-f3.1e100.net (142.250.186.163): icmp_seq=1 ttl=98 time=58.5 ms
64 bytes from fra24s08-in-f3.1e100.net (142.250.186.163): icmp_seq=2 ttl=98 time=57.8 ms
64 bytes from fra24s08-in-f3.1e100.net (142.250.186.163): icmp_seq=3 ttl=98 time=58.0 ms
64 bytes from fra24s08-in-f3.1e100.net (142.250.186.163): icmp_seq=4 ttl=98 time=58.2 ms

--- www.google.es ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3004ms
rtt min/avg/max/mdev = 57.778/58.112/58.490/0.261 ms
user@CLIENTE3:~$
```

CA5.10 Verifícase o funcionamento da rede mediante o uso de comandos e ferramentas básicas. (10%)

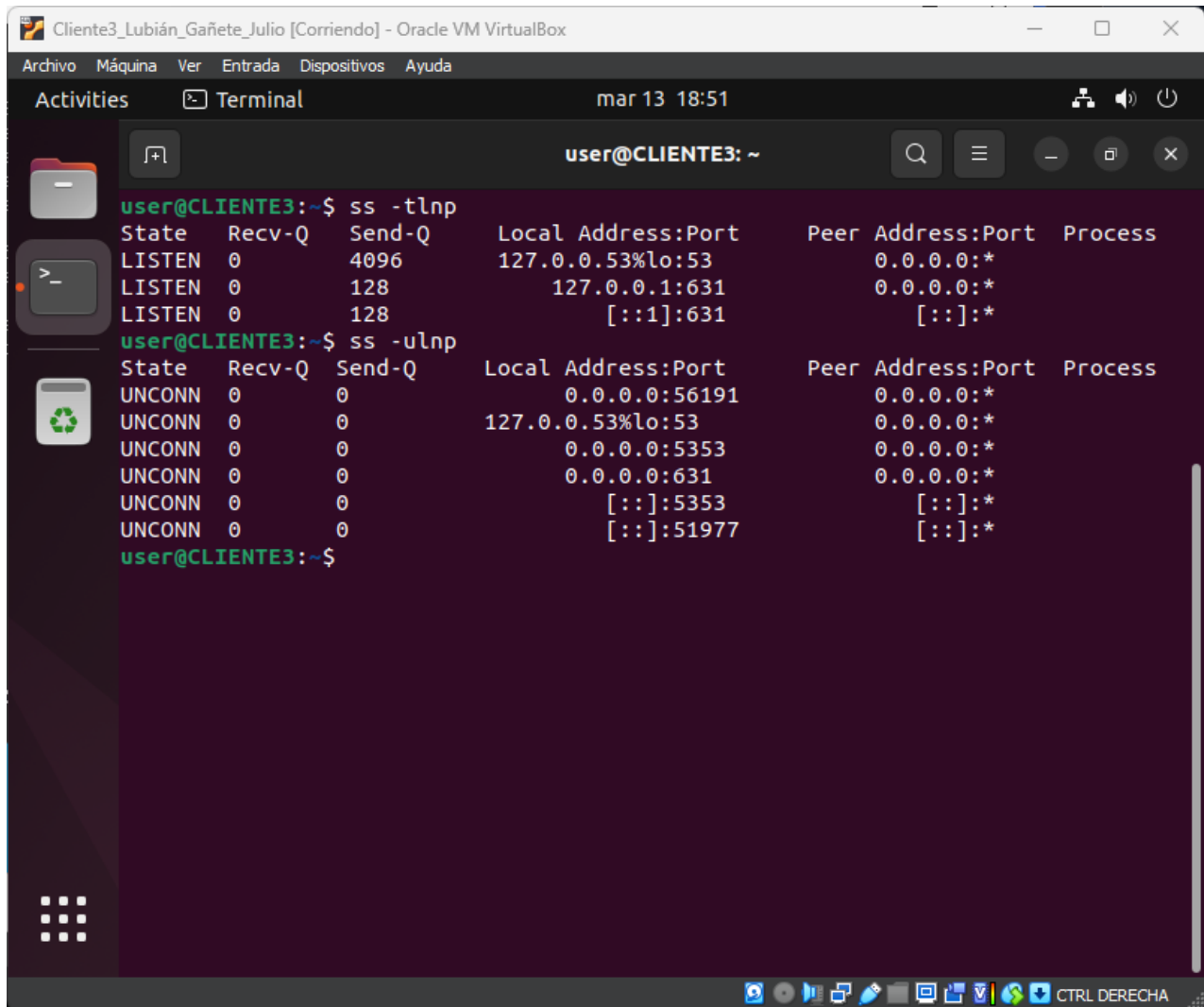


4. Realiza as seguintes tarefas de comprobación de funcionamento da rede.

- a) Dende cliente3 descobre os portos abertos na máquina cliente3 [Captura de pantalla]
- b) Dende cliente3 comproba se o servidor web proporcionado por server é accesible [Captura de pantalla]
- d) Detecta dende cliente3 todas as máquinas activas na rede interna local (192.168.250.0/24) mediante nmap [Captura de pantalla]
- e) Dende cliente3 trata de descubrir mediante nmap os portos abertos en Server [Captura de pantalla]
- f) Dende cliente3 e mediante nmap trata descubrir o sistema operativo que está instalado en server [Captura de pantalla]

Resposta

a) Dende cliente3 descubre os portos abertos na máquina cliente3 [Captura de pantalla]

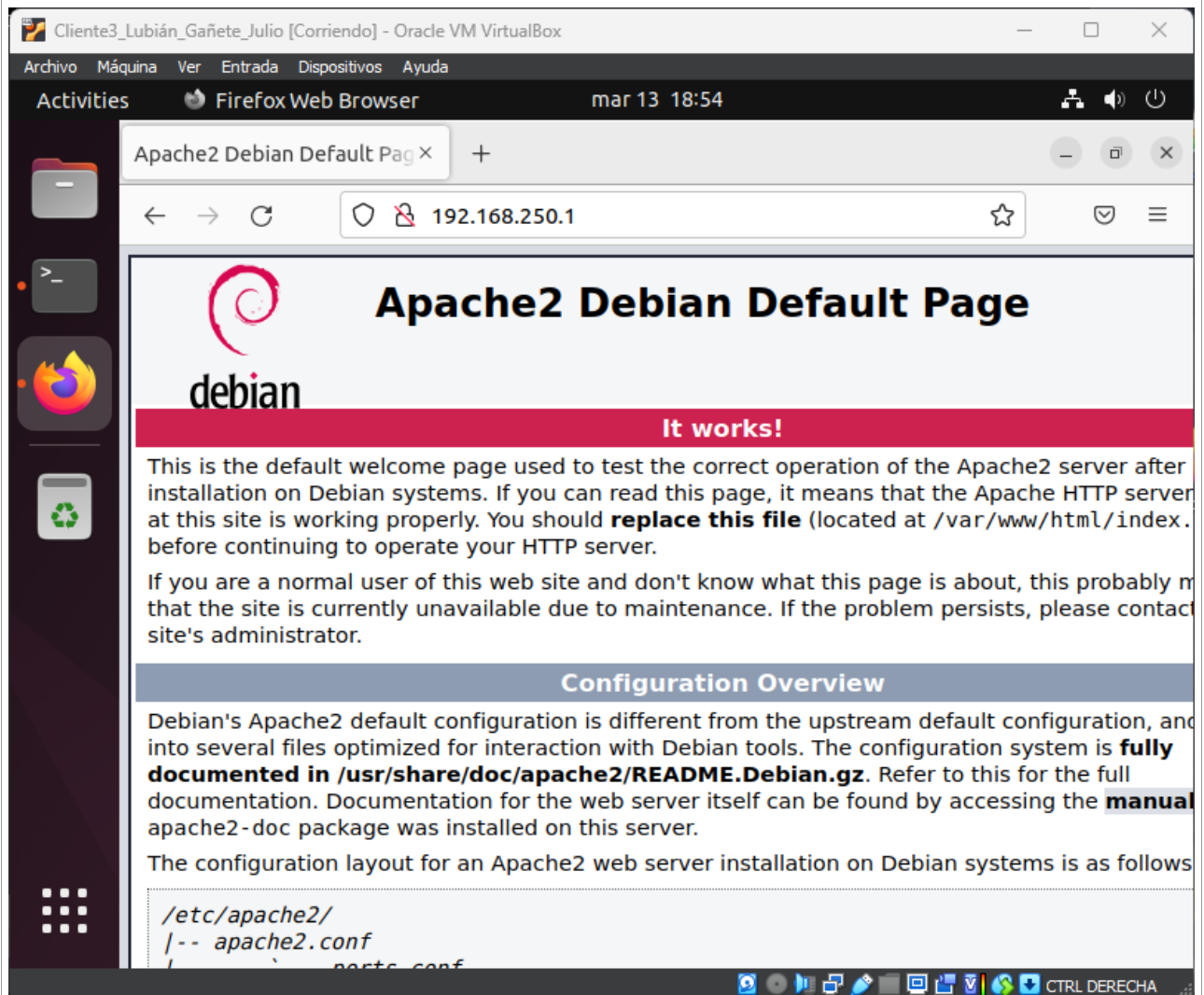


The screenshot shows a terminal window titled "Cliente3\_Lubián\_Gañete\_Julio [Corriendo] - Oracle VM VirtualBox". The terminal displays the output of two commands: `ss -tlnp` and `ss -ulnp`. The first command shows listening ports, and the second command shows unlistening ports. The output is as follows:

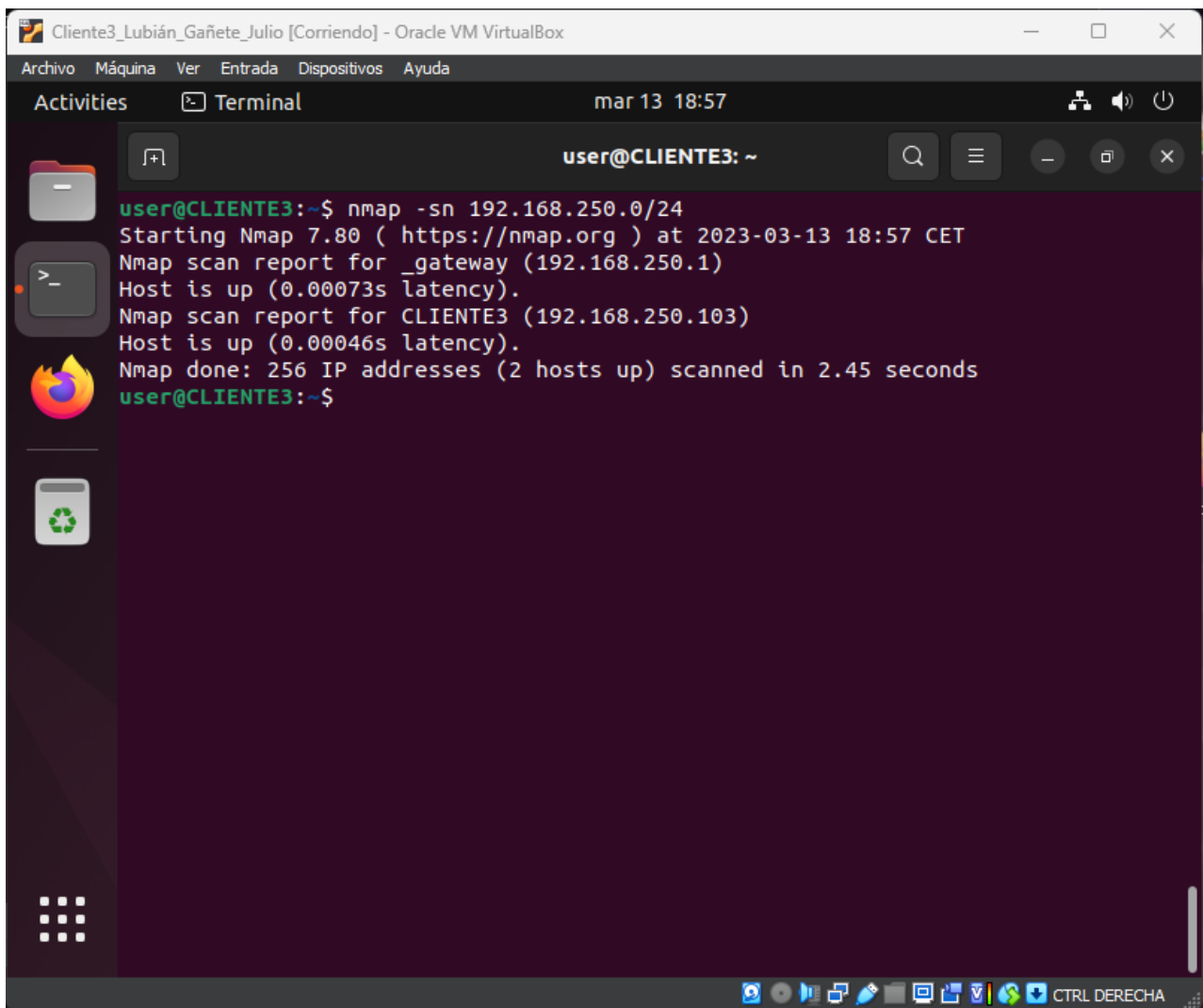
```
user@CLIENTE3:~$ ss -tlnp
State      Recv-Q    Send-Q    Local Address:Port    Peer Address:Port    Process
LISTEN     0         4096      127.0.0.53%lo:53      0.0.0.0:*
LISTEN     0         128      127.0.0.1:631        0.0.0.0:*
LISTEN     0         128      [::1]:631           [::]:*

user@CLIENTE3:~$ ss -ulnp
State      Recv-Q    Send-Q    Local Address:Port    Peer Address:Port    Process
UNCONN     0         0        0.0.0.0:56191        0.0.0.0:*
UNCONN     0         0      127.0.0.53%lo:53      0.0.0.0:*
UNCONN     0         0        0.0.0.0:5353        0.0.0.0:*
UNCONN     0         0        0.0.0.0:631        0.0.0.0:*
UNCONN     0         0          [::]:5353          [::]:*
UNCONN     0         0          [::]:51977         [::]:*
```

b) Dende cliente3 comproba se o servidor web proporcionado por server é accesible  
[Captura de pantalla]

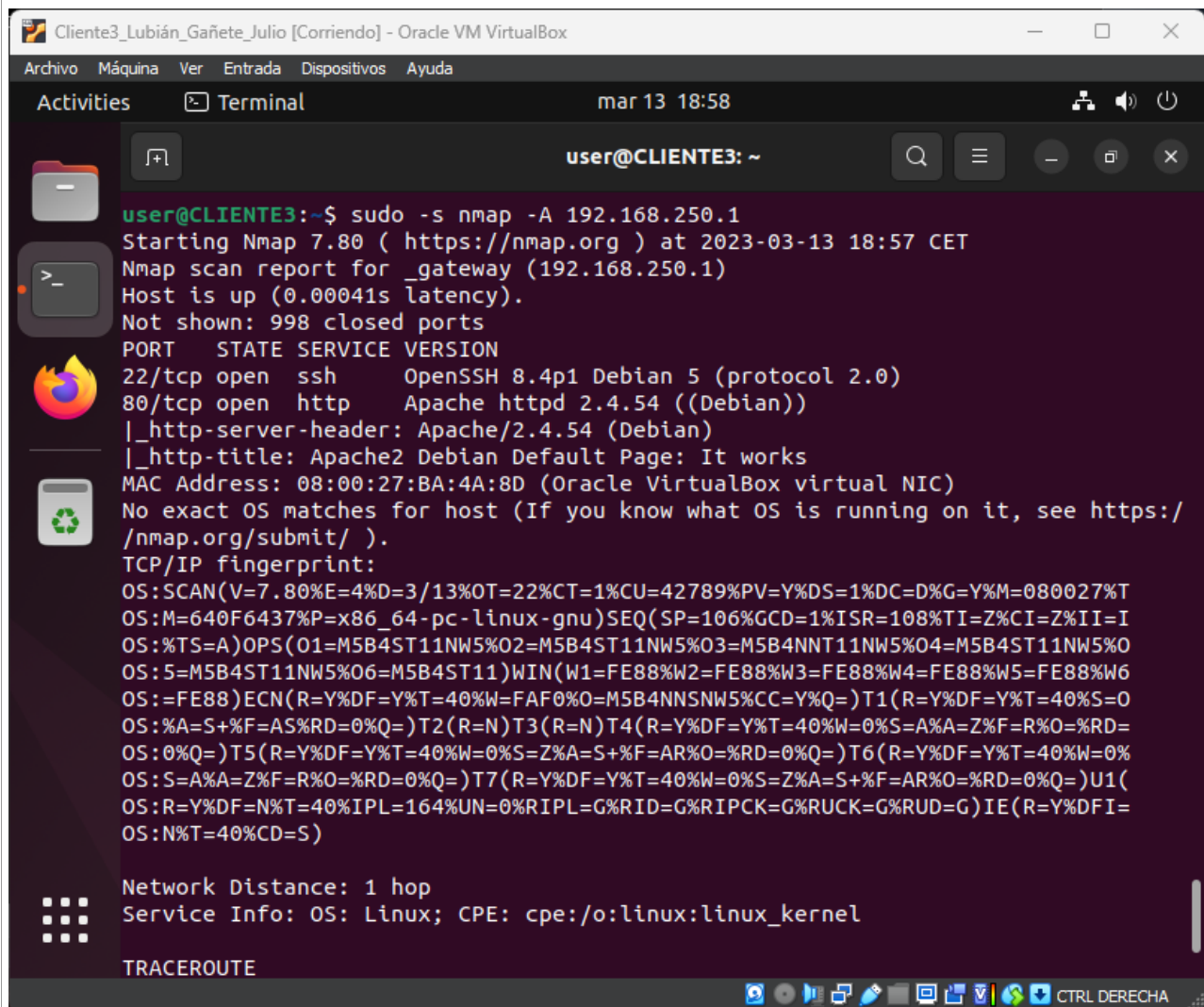


d) Detecta desde cliente3 todas as máquinas activas na rede interna local (192.168.250.0/24) mediante nmap [Captura de pantalla]



```
Cliente3_Lubián_Gañete_Julio [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
Activities Terminal mar 13 18:57
user@CLIENTE3: ~
user@CLIENTE3:~$ nmap -sn 192.168.250.0/24
Starting Nmap 7.80 ( https://nmap.org ) at 2023-03-13 18:57 CET
Nmap scan report for _gateway (192.168.250.1)
Host is up (0.00073s latency).
Nmap scan report for CLIENTE3 (192.168.250.103)
Host is up (0.00046s latency).
Nmap done: 256 IP addresses (2 hosts up) scanned in 2.45 seconds
user@CLIENTE3:~$
```

e) Dende cliente3 trata de descubrir mediante nmap os portos abertos en Server [Captura de pantalla]

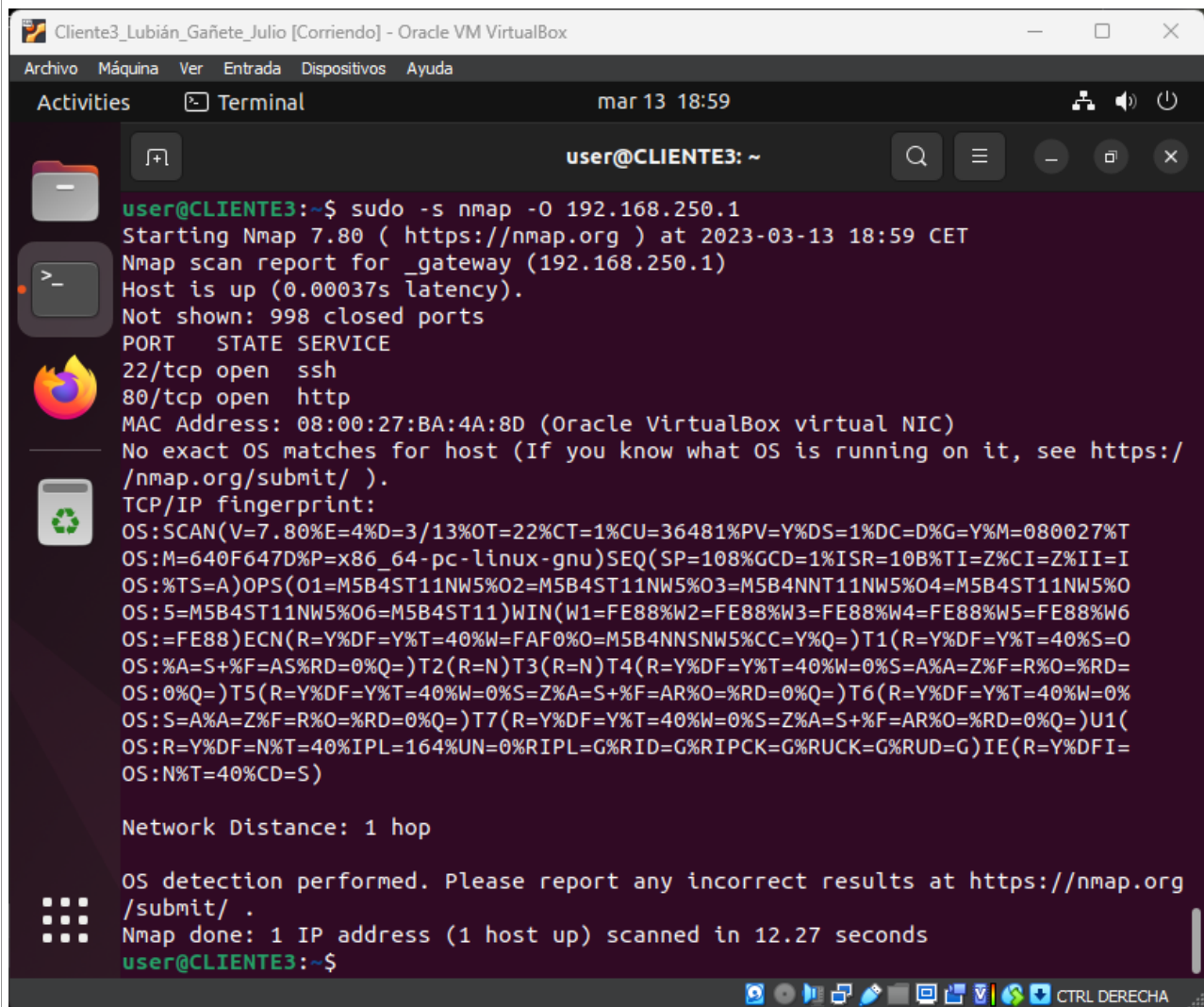


```
Cliente3_Lubián_Gañete_Julio [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
Activities Terminal mar 13 18:58
user@CLIENTE3: ~
user@CLIENTE3:~$ sudo -s nmap -A 192.168.250.1
Starting Nmap 7.80 ( https://nmap.org ) at 2023-03-13 18:57 CET
Nmap scan report for _gateway (192.168.250.1)
Host is up (0.00041s latency).
Not shown: 998 closed ports
PORT      STATE SERVICE VERSION
22/tcp    open  ssh      OpenSSH 8.4p1 Debian 5 (protocol 2.0)
80/tcp    open  http      Apache httpd 2.4.54 ((Debian))
|_http-server-header: Apache/2.4.54 (Debian)
|_http-title: Apache2 Debian Default Page: It works
MAC Address: 08:00:27:BA:4A:8D (Oracle VirtualBox virtual NIC)
No exact OS matches for host (If you know what OS is running on it, see https://nmap.org/submit/ ).
TCP/IP fingerprint:
OS:SCAN(V=7.80%E=4%D=3/13%OT=22%CT=1%CU=42789%PV=Y%DS=1%DC=D%G=Y%M=080027%T
OS:M=640F6437%P=x86_64-pc-linux-gnu)SEQ(SP=106%GCD=1%ISR=108%TI=Z%CI=Z%II=I
OS:%TS=A)OPS(O1=M5B4ST11NW5%O2=M5B4ST11NW5%O3=M5B4NNT11NW5%O4=M5B4ST11NW5%O
OS:5=M5B4ST11NW5%O6=M5B4ST11)WIN(W1=FE88%W2=FE88%W3=FE88%W4=FE88%W5=FE88%W6
OS:=FE88)ECN(R=Y%DF=Y%T=40%W=FAF0%O=M5B4NNSNW5%CC=Y%Q=)T1(R=Y%DF=Y%T=40%S=0
OS:%A=S+F=AS%RD=0%Q=)T2(R=N)T3(R=N)T4(R=Y%DF=Y%T=40%W=0%S=A%A=Z%F=R%O=%RD=
OS:0%Q=)T5(R=Y%DF=Y%T=40%W=0%S=Z%A=S+F=AR%O=%RD=0%Q=)T6(R=Y%DF=Y%T=40%W=0%
OS:S=A%A=Z%F=R%O=%RD=0%Q=)T7(R=Y%DF=Y%T=40%W=0%S=Z%A=S+F=AR%O=%RD=0%Q=)U1(
OS:R=Y%DF=N%T=40%IPL=164%UN=0%RIPL=G%RID=G%RIPCK=G%RUCK=G%RUD=G)IE(R=Y%DFI=
OS:N%T=40%CD=S)

Network Distance: 1 hop
Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel

TRACEROUTE
```

f) Dende cliente3 e mediante nmap trata descubrir o sistema operativo que está instalado en server [Captura de pantalla]



```
user@CLIENTE3: ~  
user@CLIENTE3:~$ sudo -s nmap -O 192.168.250.1  
Starting Nmap 7.80 ( https://nmap.org ) at 2023-03-13 18:59 CET  
Nmap scan report for _gateway (192.168.250.1)  
Host is up (0.00037s latency).  
Not shown: 998 closed ports  
PORT      STATE SERVICE  
22/tcp    open  ssh  
80/tcp    open  http  
MAC Address: 08:00:27:BA:4A:8D (Oracle VirtualBox virtual NIC)  
No exact OS matches for host (If you know what OS is running on it, see https://nmap.org/submit/ ).  
TCP/IP fingerprint:  
OS:SCAN(V=7.80%E=4%D=3/13%OT=22%CT=1%CU=36481%PV=Y%DS=1%DC=D%G=Y%M=080027%TOS:M=640F647D%P=x86_64-pc-linux-gnu)SEQ(SP=108%GCD=1%ISR=10B%TI=Z%CI=Z%II=IOS:%TS=A)OPS(O1=M5B4ST11NW5%O2=M5B4ST11NW5%O3=M5B4NNT11NW5%O4=M5B4ST11NW5%O5=M5B4ST11NW5%O6=M5B4ST11)WIN(W1=FE88%W2=FE88%W3=FE88%W4=FE88%W5=FE88%W6=FE88)ECN(R=Y%DF=Y%T=40%W=FAF0%O=M5B4NNSNW5%CC=Y%Q=)T1(R=Y%DF=Y%T=40%S=0%OS:0%Q=)T2(R=N)T3(R=N)T4(R=Y%DF=Y%T=40%W=0%S=A%A=Z%F=R%O=%RD=0%Q=)T5(R=Y%DF=Y%T=40%W=0%S=Z%A=S+%F=AR%O=%RD=0%Q=)T6(R=Y%DF=Y%T=40%W=0%OS:S=A%A=Z%F=R%O=%RD=0%Q=)T7(R=Y%DF=Y%T=40%W=0%S=Z%A=S+%F=AR%O=%RD=0%Q=)U1(R=Y%DF=N%T=40%IPL=164%UN=0%RIPL=G%RID=G%RIPCK=G%RUCK=G%RUD=G)IE(R=Y%DFIOS:N%T=40%CD=S)  
  
Network Distance: 1 hop  
  
OS detection performed. Please report any incorrect results at https://nmap.org/submit/ .  
Nmap done: 1 IP address (1 host up) scanned in 12.27 seconds  
user@CLIENTE3:~$
```

#### CA5.11 Aplicáronse protocolos seguros de comunicacións. (5%)



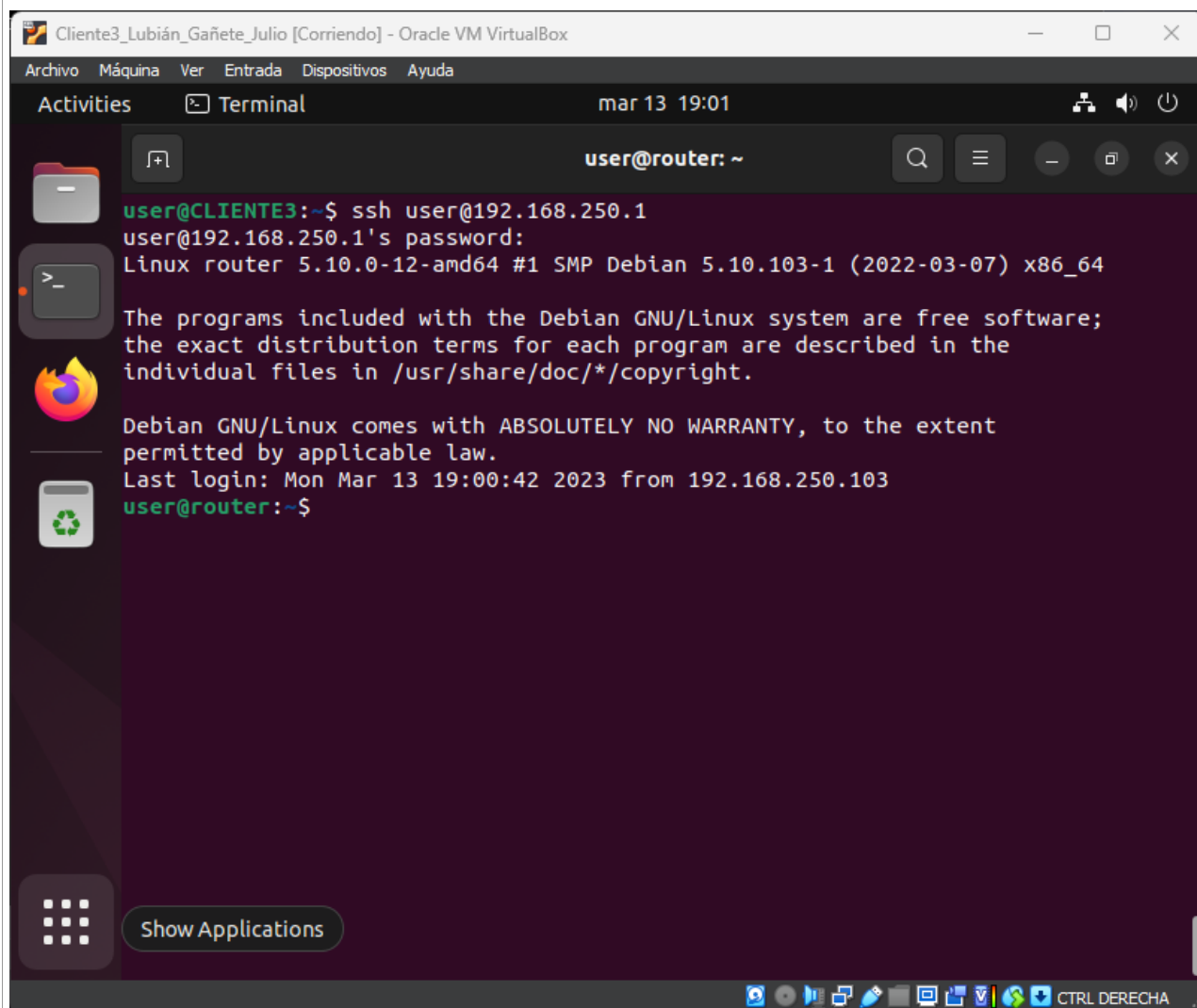
##### 5. Instalación remota.

- Realiza unha conexión ssh á máquina server [Captura de pantalla]
- Instala suricata na máquina server por medio de ssh [Captura de pantalla]
- Configura suricata para detectar tráfico de aplicacións peer-to-peer [Captura de pantalla]
- Instala un cliente de Bittorrent na máquina cliente3 [Captura de pantalla]
- Comproba en server que se detecta o tráfico de Bittorrent procedente de cliente3 [Captura de pantalla]

Resposta



a) Realiza unha conexión ssh á maquina server [Captura de pantalla]

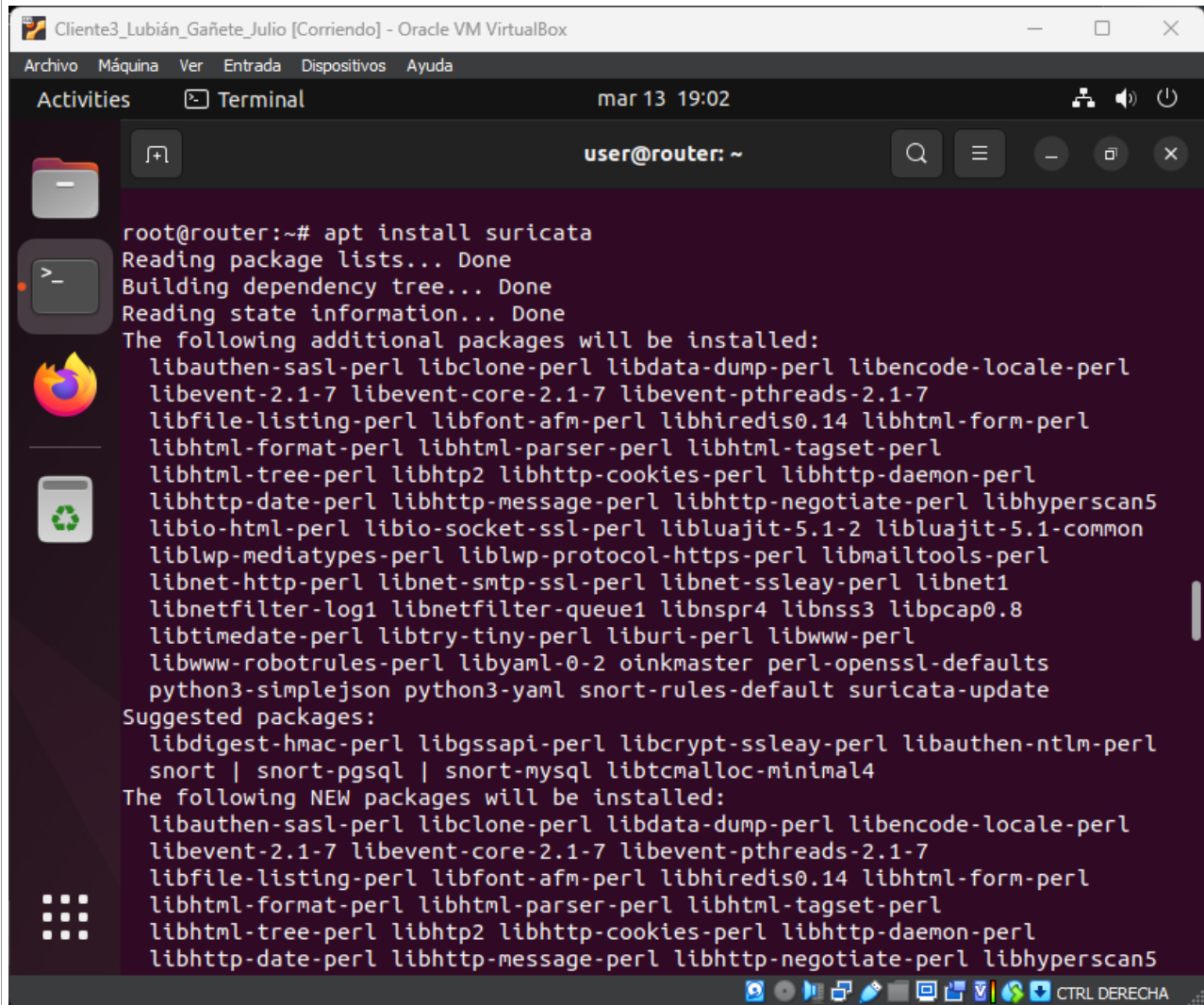


The screenshot shows a terminal window titled "Cliente3\_Lubián\_Gañete\_Julio [Corriendo] - Oracle VM VirtualBox". The terminal displays the following text:

```
user@router: ~  
user@CLIENTE3:~$ ssh user@192.168.250.1  
user@192.168.250.1's password:  
Linux router 5.10.0-12-amd64 #1 SMP Debian 5.10.103-1 (2022-03-07) x86_64  
  
The programs included with the Debian GNU/Linux system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/*/copyright.  
  
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent  
permitted by applicable law.  
Last login: Mon Mar 13 19:00:42 2023 from 192.168.250.103  
user@router:~$
```

The terminal window is part of a desktop environment with a sidebar on the left containing icons for a file manager, terminal, Firefox, and a trash can. At the bottom, there is a taskbar with various system icons and a "CTRL DERECHA" button.

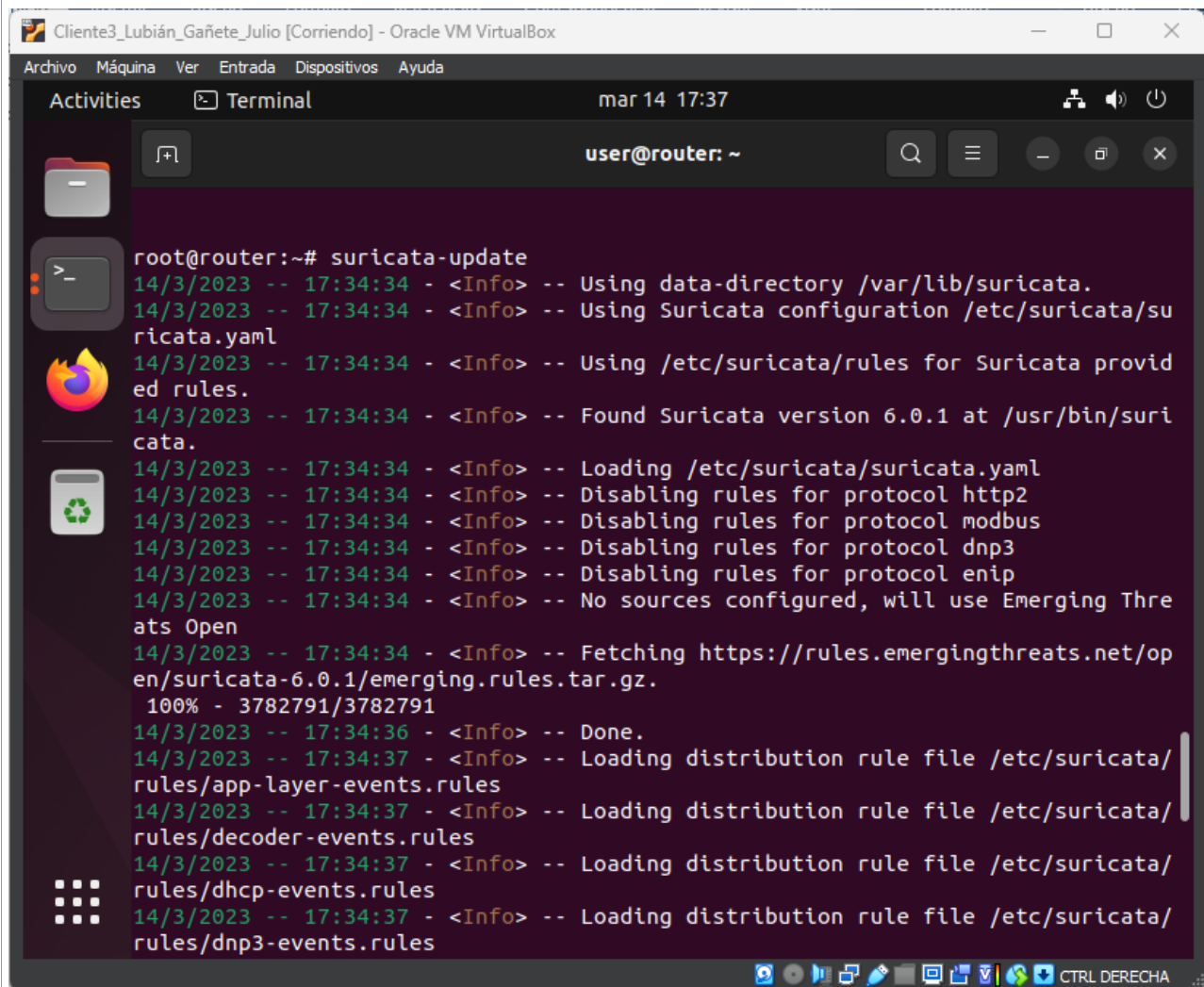
b) Instala Suricata na máquina server por medio de ssh [Captura de pantalla]



```
Cliente3_Lubián_Gañete_Julio [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda
Activities  Terminal  mar 13 19:02  user@router: ~

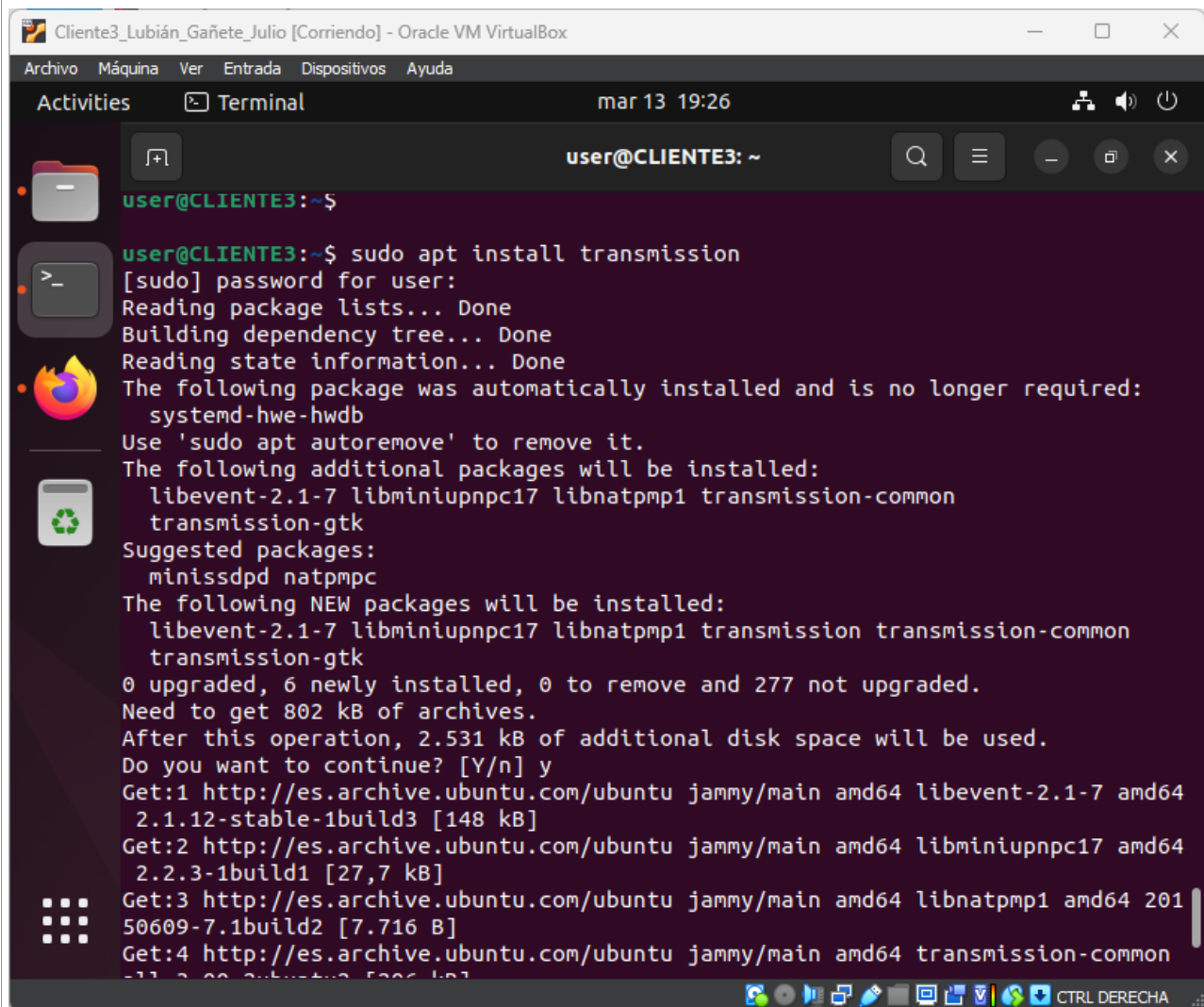
root@router:~# apt install suricata
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libauthen-sasl-perl libclone-perl libdata-dump-perl libencode-locale-perl
  libevent-2.1-7 libevent-core-2.1-7 libevent-pthreads-2.1-7
  libfile-listing-perl libfont-afm-perl libhiredis0.14 libhtml-form-perl
  libhtml-format-perl libhtml-parser-perl libhtml-tagset-perl
  libhtml-tree-perl libhttp2 libhttp-cookies-perl libhttp-daemon-perl
  libhttp-date-perl libhttp-message-perl libhttp-negotiate-perl libhyperscan5
  libio-html-perl libio-socket-ssl-perl liblua5.1-2 liblua5.1-common
  liblwp-mediatypes-perl liblwp-protocol-https-perl libmailtools-perl
  libnet-http-perl libnet-smtp-ssl-perl libnet-ssleay-perl libnet1
  libnetfilter-log1 libnetfilter-queue1 libnspr4 libnss3 libpcap0.8
  libtimedate-perl libtry-tiny-perl liburi-perl libwww-perl
  libwww-robotrules-perl libyaml-0-2 oinkmaster perl-openssl-defaults
  python3-simplejson python3-yaml snort-rules-default suricata-update
Suggested packages:
  libdigest-hmac-perl libgssapi-perl libcrypt-ssleay-perl libauthen-ntlm-perl
  snort | snort-pgsql | snort-mysql libtcalloc-minimal4
The following NEW packages will be installed:
  libauthen-sasl-perl libclone-perl libdata-dump-perl libencode-locale-perl
  libevent-2.1-7 libevent-core-2.1-7 libevent-pthreads-2.1-7
  libfile-listing-perl libfont-afm-perl libhiredis0.14 libhtml-form-perl
  libhtml-format-perl libhtml-parser-perl libhtml-tagset-perl
  libhtml-tree-perl libhttp2 libhttp-cookies-perl libhttp-daemon-perl
  libhttp-date-perl libhttp-message-perl libhttp-negotiate-perl libhyperscan5
```

c) Configura Suricata para detectar tráfico de aplicaciones peer-to-peer [Captura de pantalla]



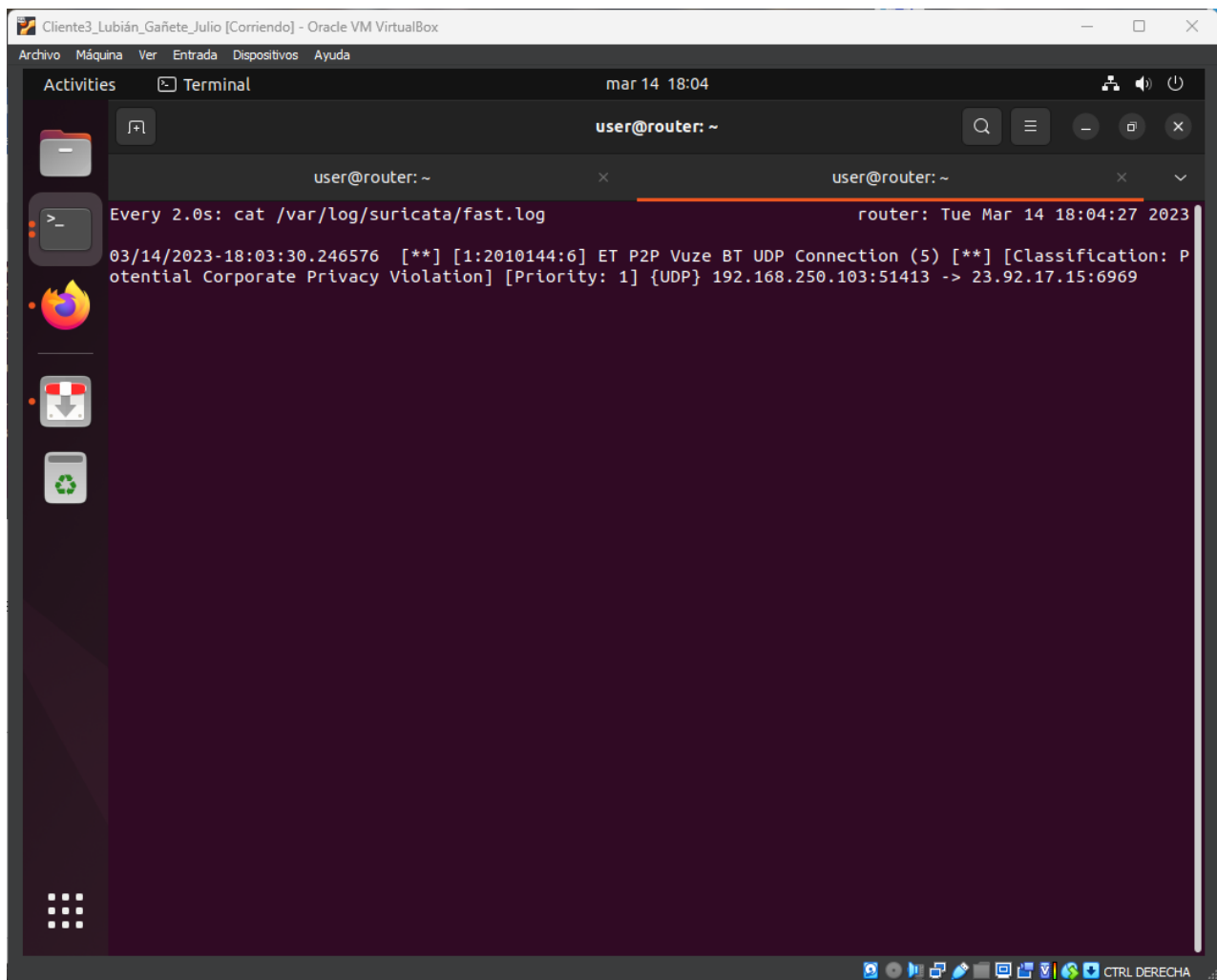
```
root@router:~# suricata-update
14/3/2023 -- 17:34:34 - <Info> -- Using data-directory /var/lib/suricata.
14/3/2023 -- 17:34:34 - <Info> -- Using Suricata configuration /etc/suricata/suricata.yaml
14/3/2023 -- 17:34:34 - <Info> -- Using /etc/suricata/rules for Suricata provided rules.
14/3/2023 -- 17:34:34 - <Info> -- Found Suricata version 6.0.1 at /usr/bin/suricata.
14/3/2023 -- 17:34:34 - <Info> -- Loading /etc/suricata/suricata.yaml
14/3/2023 -- 17:34:34 - <Info> -- Disabling rules for protocol http2
14/3/2023 -- 17:34:34 - <Info> -- Disabling rules for protocol modbus
14/3/2023 -- 17:34:34 - <Info> -- Disabling rules for protocol dnp3
14/3/2023 -- 17:34:34 - <Info> -- Disabling rules for protocol enip
14/3/2023 -- 17:34:34 - <Info> -- No sources configured, will use Emerging Threats Open
14/3/2023 -- 17:34:34 - <Info> -- Fetching https://rules.emergingthreats.net/open/suricata-6.0.1/emerging.rules.tar.gz.
100% - 3782791/3782791
14/3/2023 -- 17:34:36 - <Info> -- Done.
14/3/2023 -- 17:34:37 - <Info> -- Loading distribution rule file /etc/suricata/rules/app-layer-events.rules
14/3/2023 -- 17:34:37 - <Info> -- Loading distribution rule file /etc/suricata/rules/decoder-events.rules
14/3/2023 -- 17:34:37 - <Info> -- Loading distribution rule file /etc/suricata/rules/dhcp-events.rules
14/3/2023 -- 17:34:37 - <Info> -- Loading distribution rule file /etc/suricata/rules/dnp3-events.rules
```

d) Instala un cliente de Bittorrent (Transmission) na máquina cliente3 [Captura de pantalla]



```
Cliente3_Lubián_Gañete_Julio [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
Activities Terminal mar 13 19:26
user@CLIENTE3: ~
user@CLIENTE3:~$ sudo apt install transmission
[sudo] password for user:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following package was automatically installed and is no longer required:
  systemd-hwe-hwdb
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  libevent-2.1-7 libminiupnpc17 libnatpmp1 transmission-common
  transmission-gtk
Suggested packages:
  minissdpc natpmpc
The following NEW packages will be installed:
  libevent-2.1-7 libminiupnpc17 libnatpmp1 transmission transmission-common
  transmission-gtk
0 upgraded, 6 newly installed, 0 to remove and 277 not upgraded.
Need to get 802 kB of archives.
After this operation, 2.531 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://es.archive.ubuntu.com/ubuntu jammy/main amd64 libevent-2.1-7 amd64
  2.1.12-stable-1build3 [148 kB]
Get:2 http://es.archive.ubuntu.com/ubuntu jammy/main amd64 libminiupnpc17 amd64
  2.2.3-1build1 [27,7 kB]
Get:3 http://es.archive.ubuntu.com/ubuntu jammy/main amd64 libnatpmp1 amd64 201
  50609-7.1build2 [7.716 B]
Get:4 http://es.archive.ubuntu.com/ubuntu jammy/main amd64 transmission-common
  2.13.2-0ubuntu2 [500 kB]
```

e) Comprueba en server que se detecta o tráfico de Bittorrent procedente de cliente3  
[Captura de pantalla]



The screenshot shows a Linux desktop environment with a terminal window open. The terminal title bar reads "Cliente3\_Lubián\_Gañete\_Julio [Corriendo] - Oracle VM VirtualBox". The terminal content shows a command being executed every 2 seconds: `cat /var/log/suricata/fast.log`. The output of the command is a log entry: `03/14/2023-18:03:30.246576 [**] [1:2010144:6] ET P2P Vuze BT UDP Connection (5) [**] [Classification: P otential Corporate Privacy Violation] [Priority: 1] {UDP} 192.168.250.103:51413 -> 23.92.17.15:6969`. The terminal window has a dark theme and a sidebar with application icons on the left. The system clock at the top right shows "mar 14 18:04".

```
user@router: ~  
Every 2.0s: cat /var/log/suricata/fast.log router: Tue Mar 14 18:04:27 2023  
03/14/2023-18:03:30.246576 [**] [1:2010144:6] ET P2P Vuze BT UDP Connection (5) [**] [Classification: P  
otential Corporate Privacy Violation] [Priority: 1] {UDP} 192.168.250.103:51413 -> 23.92.17.15:6969
```