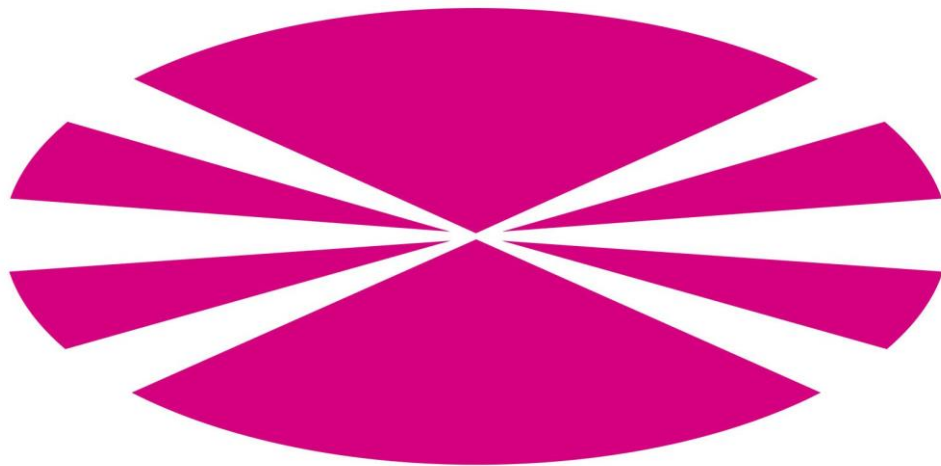


**MEMORIA PRÁCTICA 5**  
**ADMINISTRACIÓN DE SISTEMAS OPERATIVOS**

Maseda Dorado, Tomé



**UNIVERSIDADE DA CORUÑA**

Facultade de Informática

Universidade da Coruña

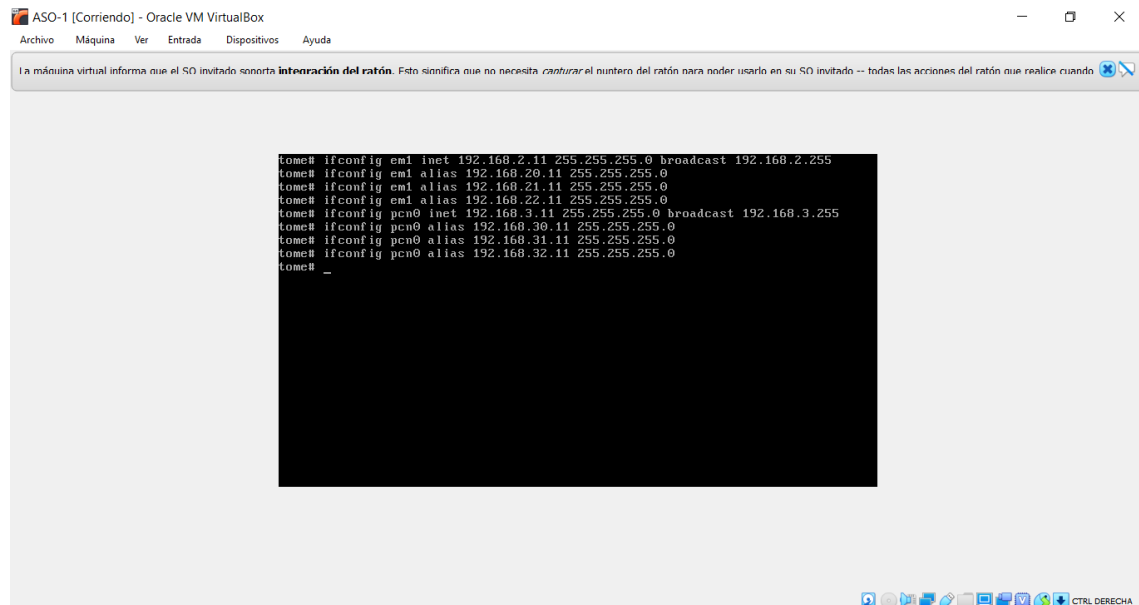
A Coruña, Spain

# CONFIGURACIÓN DE LAS TARJETAS DE RED

## 1. Configuración de interfaces por línea de comando.

### OpenBSD (ASO-1)

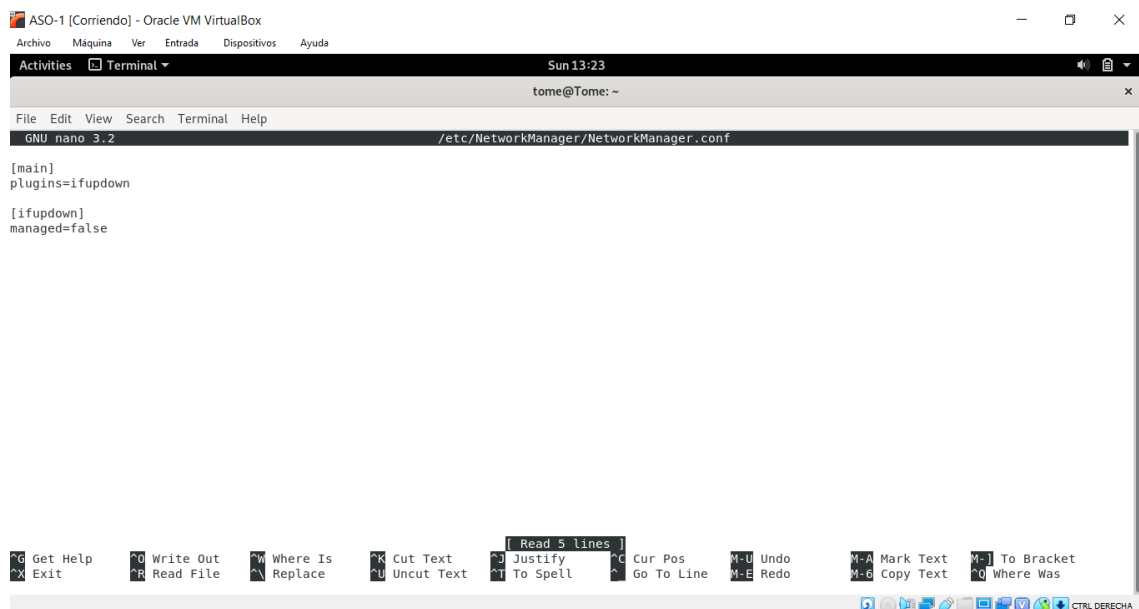
Configuré las interfaces a través del comando ifconfig (em0 ya estaba configurada con DHCP por defecto).



```
tome# ifconfig em1 inet 192.168.2.11 255.255.255.0 broadcast 192.168.2.255
tome# ifconfig em1 alias 192.168.20.11 255.255.255.0
tome# ifconfig em1 alias 192.168.21.11 255.255.255.0
tome# ifconfig em1 alias 192.168.22.11 255.255.255.0
tome# ifconfig pcn0 inet 192.168.3.11 255.255.255.0 broadcast 192.168.3.255
tome# ifconfig pcn0 alias 192.168.30.11 255.255.255.0
tome# ifconfig pcn0 alias 192.168.31.11 255.255.255.0
tome# ifconfig pcn0 alias 192.168.32.11 255.255.255.0
tome# _
```

### Debian Linux (ASO-1)

Para que el network manager no interfiera en la configuración de las tarjetas de red modifíco su fichero de configuración de la siguiente manera:

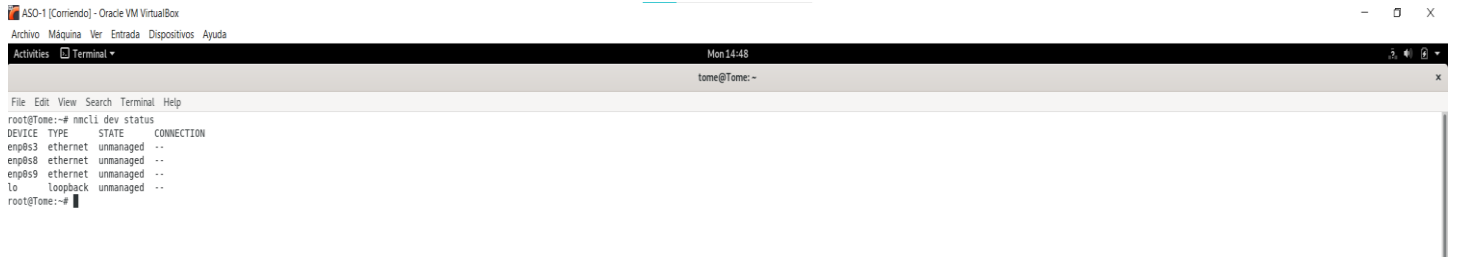


```
Sun 13:23
tome@Tome: ~
File Edit View Search Terminal Help
GNU nano 3.2 /etc/NetworkManager/NetworkManager.conf

[main]
plugins=ifupdown

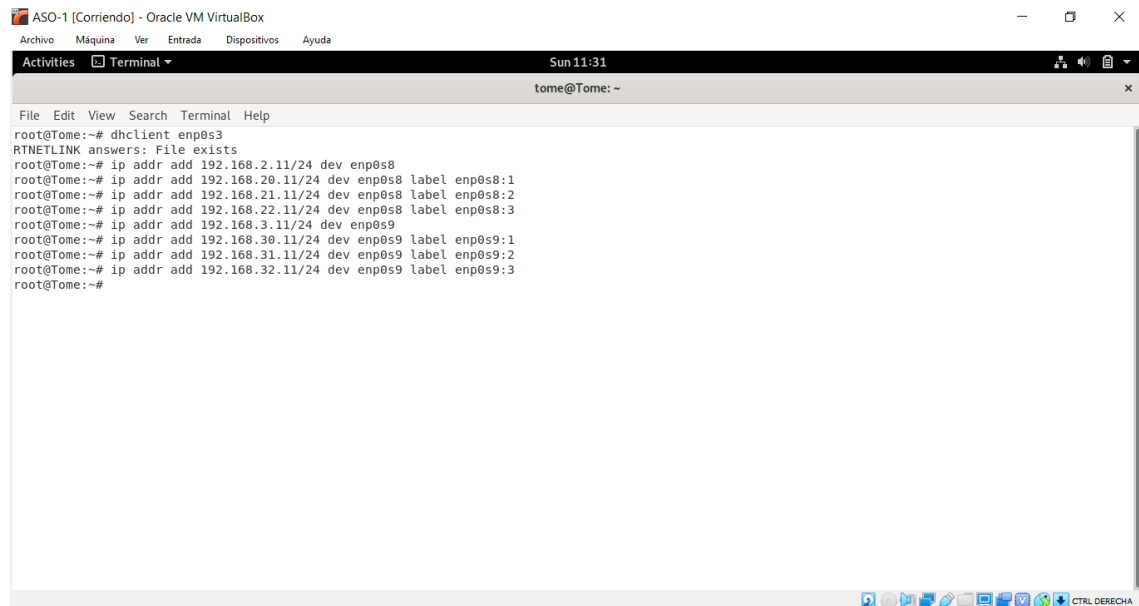
[ifupdown]
managed=false
```

## Compruebo que NetworkManager ya no está gestionando las tarjetas:



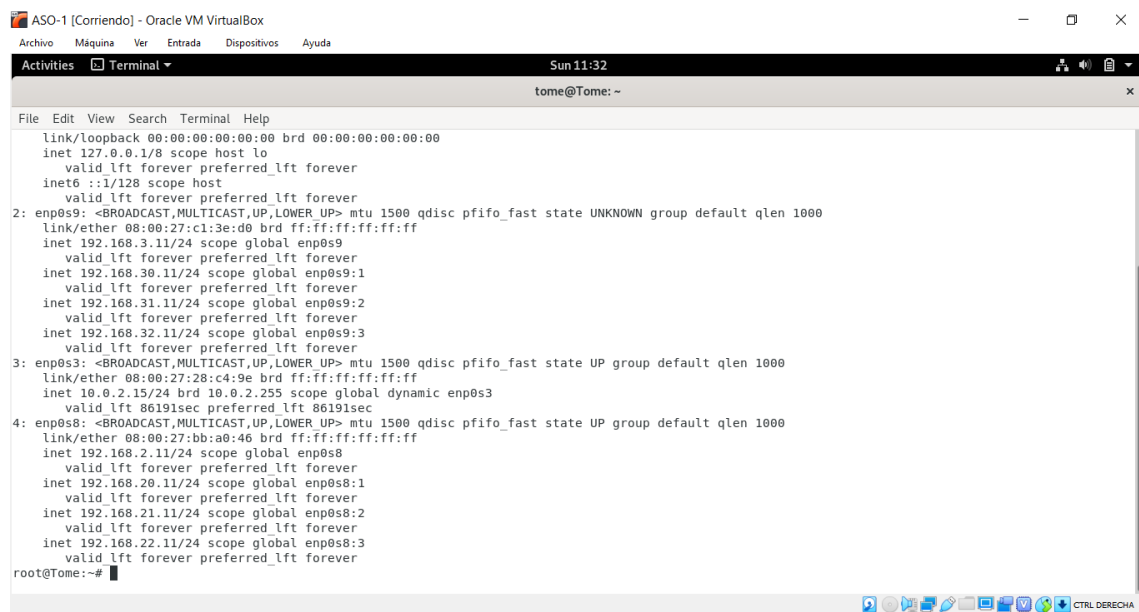
```
ASO-1 [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
Actividades Terminal
Mon 14:48
tome@Tome: ~
File Edit View Search Terminal Help
root@Tome:~# nmcli dev status
DEVICE  TYPE      STATE      CONNECTION
enp0s3  ethernet  unmanaged  --
enp0s8  ethernet  unmanaged  --
enp0s9  ethernet  unmanaged  --
lo       loopback  unmanaged  --
root@Tome:~#
```

## Configuro las interfaces con el comando ip y dhclient para DHCP:



```
ASO-1 [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
Actividades Terminal
Sun 11:31
tome@Tome: ~
File Edit View Search Terminal Help
root@Tome:~# dhclient enp0s3
RTNETLINK answers: File exists
root@Tome:~# ip addr add 192.168.2.11/24 dev enp0s8
root@Tome:~# ip addr add 192.168.20.11/24 dev enp0s8 label enp0s8:1
root@Tome:~# ip addr add 192.168.21.11/24 dev enp0s8 label enp0s8:2
root@Tome:~# ip addr add 192.168.22.11/24 dev enp0s8 label enp0s8:3
root@Tome:~# ip addr add 192.168.3.11/24 dev enp0s9
root@Tome:~# ip addr add 192.168.30.11/24 dev enp0s9 label enp0s9:1
root@Tome:~# ip addr add 192.168.31.11/24 dev enp0s9 label enp0s9:2
root@Tome:~# ip addr add 192.168.32.11/24 dev enp0s9 label enp0s9:3
root@Tome:~#
```

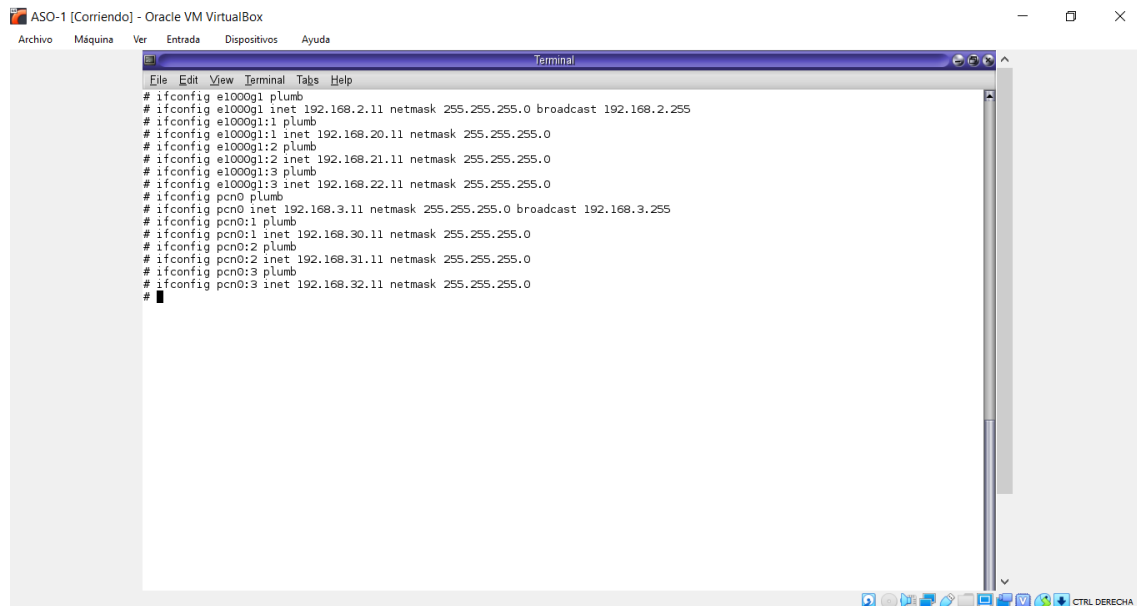
## Compruebo que la red está correctamente configurada:



```
ASO-1 [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
Actividades Terminal
Sun 11:32
tome@Tome: ~
File Edit View Search Terminal Help
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: enp0s9: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UNKNOWN group default qlen 1000
    link/ether 08:00:27:c1:3e:d0 brd ff:ff:ff:ff:ff:ff
    inet 192.168.3.11/24 scope global enp0s9
        valid_lft forever preferred_lft forever
    inet 192.168.30.11/24 scope global enp0s9:1
        valid_lft forever preferred_lft forever
    inet 192.168.31.11/24 scope global enp0s9:2
        valid_lft forever preferred_lft forever
    inet 192.168.32.11/24 scope global enp0s9:3
        valid_lft forever preferred_lft forever
3: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:28:c4:9e brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic enp0s3
        valid_lft 86191sec preferred_lft 86191sec
4: enp0s8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:bb:a0:46 brd ff:ff:ff:ff:ff:ff
    inet 192.168.2.11/24 scope global enp0s8
        valid_lft forever preferred_lft forever
    inet 192.168.20.11/24 scope global enp0s8:1
        valid_lft forever preferred_lft forever
    inet 192.168.21.11/24 scope global enp0s8:2
        valid_lft forever preferred_lft forever
    inet 192.168.22.11/24 scope global enp0s8:3
        valid_lft forever preferred_lft forever
root@Tome:~#
```

## Solaris 10 (ASO-1)

Configuro las interfaces con el comando ifconfig (en Solaris antes hay que levantar las interfaces con plumb).



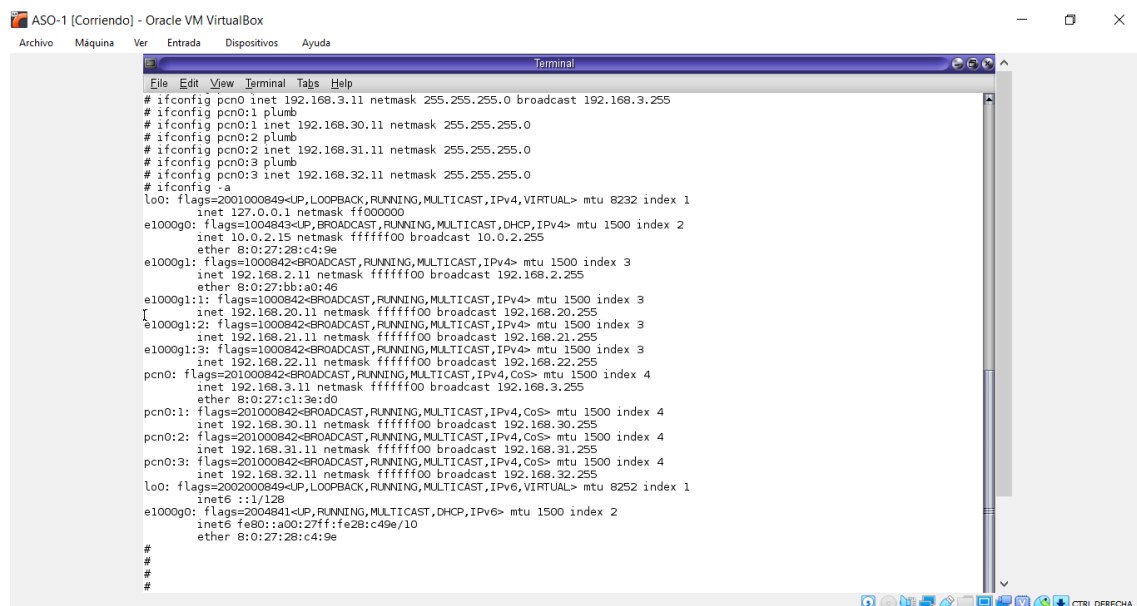
```
ASO-1 [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

Terminal

File Edit View Terminal Tabs Help

# ifconfig e1000g1 plumb
# ifconfig e1000g1 inet 192.168.2.11 netmask 255.255.255.0 broadcast 192.168.2.255
# ifconfig e1000g1:1 plumb
# ifconfig e1000g1:1 inet 192.168.20.11 netmask 255.255.255.0
# ifconfig e1000g1:2 plumb
# ifconfig e1000g1:2 inet 192.168.21.11 netmask 255.255.255.0
# ifconfig e1000g1:3 plumb
# ifconfig e1000g1:3 inet 192.168.22.11 netmask 255.255.255.0
# ifconfig pcn0 plumb
# ifconfig pcn0 inet 192.168.3.11 netmask 255.255.255.0 broadcast 192.168.3.255
# ifconfig pcn0:1 plumb
# ifconfig pcn0:1 inet 192.168.30.11 netmask 255.255.255.0
# ifconfig pcn0:2 plumb
# ifconfig pcn0:2 inet 192.168.31.11 netmask 255.255.255.0
# ifconfig pcn0:3 plumb
# ifconfig pcn0:3 inet 192.168.32.11 netmask 255.255.255.0
#
```

Compruebo que la red está correctamente configurada:



```
ASO-1 [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

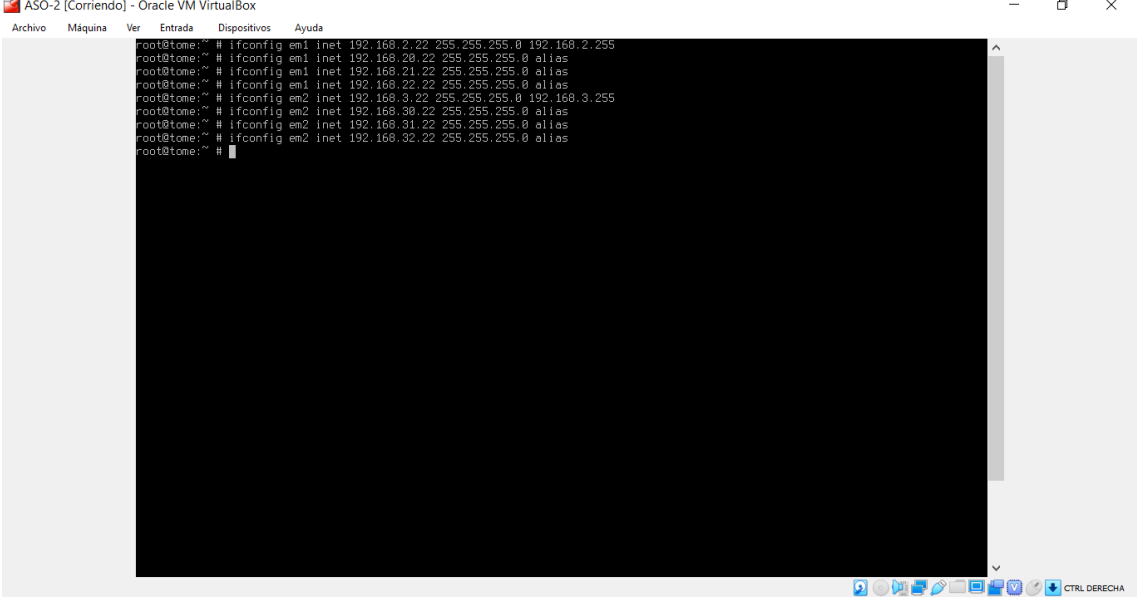
Terminal

File Edit View Terminal Tabs Help

# ifconfig pcn0 inet 192.168.3.11 netmask 255.255.255.0 broadcast 192.168.3.255
# ifconfig pcn0:1 plumb
# ifconfig pcn0:1 inet 192.168.30.11 netmask 255.255.255.0
# ifconfig pcn0:2 plumb
# ifconfig pcn0:2 inet 192.168.31.11 netmask 255.255.255.0
# ifconfig pcn0:3 plumb
# ifconfig pcn0:3 inet 192.168.32.11 netmask 255.255.255.0
# ifconfig -a
lo0: flags=2001000849<UP,LOOPBACK,RUNNING,MULTICAST,IPv4,VIRTUAL> mtu 8232 index 1
    inet 127.0.0.1 netmask ffffffff
e1000g0: flags=1004843<UP,BROADCAST,RUNNING,MULTICAST,DHCP,IPv4> mtu 1500 index 2
    inet 10.0.2.15 netmask ffffffff broadcast 10.0.2.255
    ether 8:0:27:26:c4:9e
e1000g1: flags=1000842<BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 3
    inet 192.168.2.11 netmask ffffffff broadcast 192.168.2.255
    ether 8:0:27:bb:a0:46
e1000g1:1: flags=1000842<BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 3
    inet 192.168.20.11 netmask ffffffff broadcast 192.168.20.255
e1000g1:2: flags=1000842<BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 3
    inet 192.168.21.11 netmask ffffffff broadcast 192.168.21.255
e1000g1:3: flags=1000842<BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 3
    inet 192.168.22.11 netmask ffffffff broadcast 192.168.22.255
pcn0: flags=201000842<BROADCAST,RUNNING,MULTICAST,IPv4,CoS> mtu 1500 index 4
    inet 192.168.3.11 netmask ffffffff broadcast 192.168.3.255
    ether 8:0:27:c1:3e:d0
pcn0:1: flags=201000842<BROADCAST,RUNNING,MULTICAST,IPv4,CoS> mtu 1500 index 4
    inet 192.168.30.11 netmask ffffffff broadcast 192.168.30.255
pcn0:2: flags=201000842<BROADCAST,RUNNING,MULTICAST,IPv4,CoS> mtu 1500 index 4
    inet 192.168.31.11 netmask ffffffff broadcast 192.168.31.255
pcn0:3: flags=201000842<BROADCAST,RUNNING,MULTICAST,IPv4,CoS> mtu 1500 index 4
    inet 192.168.32.11 netmask ffffffff broadcast 192.168.32.255
lo0: flags=2002000849<UP,LOOPBACK,RUNNING,MULTICAST,IPv6,VIRTUAL> mtu 8252 index 1
    inet6 ::1/128
e1000g0: flags=2004841<UP,RUNNING,MULTICAST,DHCP,IPv6> mtu 1500 index 2
    inet6 fe80::a00:27ff:fe28:c49e/10
    ether 8:0:27:26:c4:9e
#
#
#
#
```

## FreeBSD (ASO-2)

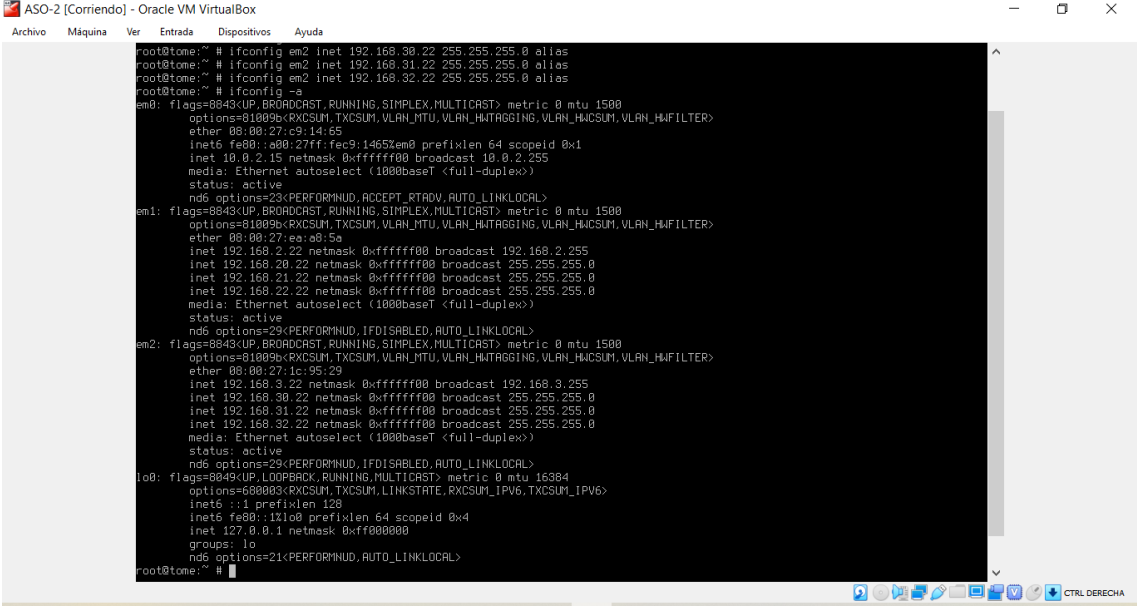
Configuro las interfaces con el comando ifconfig:



```
ASO-2 [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

root@tome:~ # ifconfig em1 inet 192.168.2.22 255.255.255.0 192.168.2.255
root@tome:~ # ifconfig em1 inet 192.168.20.22 255.255.255.0 alias
root@tome:~ # ifconfig em1 inet 192.168.21.22 255.255.255.0 alias
root@tome:~ # ifconfig em1 inet 192.168.22.22 255.255.255.0 alias
root@tome:~ # ifconfig em2 inet 192.168.3.22 255.255.255.0 192.168.3.255
root@tome:~ # ifconfig em2 inet 192.168.30.22 255.255.255.0 alias
root@tome:~ # ifconfig em2 inet 192.168.31.22 255.255.255.0 alias
root@tome:~ # ifconfig em2 inet 192.168.32.22 255.255.255.0 alias
root@tome:~ #
```

Compruebo que la red está correctamente configurada:

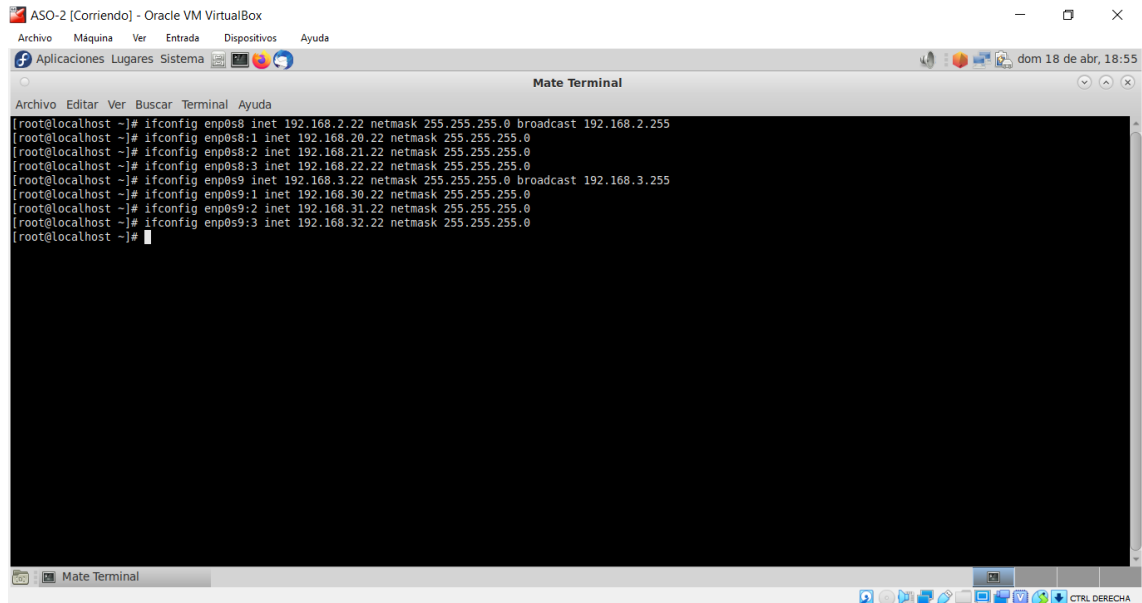


```
ASO-2 [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

root@tome:~ # ifconfig em2 inet 192.168.30.22 255.255.255.0 alias
root@tome:~ # ifconfig em2 inet 192.168.31.22 255.255.255.0 alias
root@tome:~ # ifconfig em2 inet 192.168.32.22 255.255.255.0 alias
root@tome:~ # ifconfig -a
em0: flags=8043<UP,BROADCAST,RUNNING,SIMPLEX,MULTICAST> metric 0 mtu 1500
    options=81009b<RXCSUM, TXCSUM, VLAN_MTU, VLAN_HWTAGGING, VLAN_HUCSUM, VLAN_HWFILTER>
    ether 08:00:27:c9:14:65
    inet6 fe80::a00:27ff:fec9:1465em0 prefixlen 64 scopeid 0x1
    inet 10.0.2.15 netmask 0xffffff00 broadcast 10.0.2.255
    media: Ethernet autoselect (1000baseT <full-duplex>)
    status: active
    nd6 options=23<PERFORMNUD, ACCEPT_RTADV, AUTO_LINKLOCAL>
em1: flags=8043<UP,BROADCAST,RUNNING,SIMPLEX,MULTICAST> metric 0 mtu 1500
    options=81009b<RXCSUM, TXCSUM, VLAN_MTU, VLAN_HWTAGGING, VLAN_HUCSUM, VLAN_HWFILTER>
    ether 08:00:27:ea:a8:5a
    inet 192.168.2.22 netmask 0xffffff00 broadcast 192.168.2.255
    inet 192.168.20.22 netmask 0xffffff00 broadcast 255.255.255.0
    inet 192.168.21.22 netmask 0xffffff00 broadcast 255.255.255.0
    inet 192.168.22.22 netmask 0xffffff00 broadcast 255.255.255.0
    media: Ethernet autoselect (1000baseT <full-duplex>)
    status: active
    nd6 options=29<PERFORMNUD, IFDISABLED, AUTO_LINKLOCAL>
em2: flags=8043<UP,BROADCAST,RUNNING,SIMPLEX,MULTICAST> metric 0 mtu 1500
    options=81009b<RXCSUM, TXCSUM, VLAN_MTU, VLAN_HWTAGGING, VLAN_HUCSUM, VLAN_HWFILTER>
    ether 08:00:27:1c:95:29
    inet 192.168.3.22 netmask 0xffffff00 broadcast 192.168.3.255
    inet 192.168.30.22 netmask 0xffffff00 broadcast 255.255.255.0
    inet 192.168.31.22 netmask 0xffffff00 broadcast 255.255.255.0
    inet 192.168.32.22 netmask 0xffffff00 broadcast 255.255.255.0
    media: Ethernet autoselect (1000baseT <full-duplex>)
    status: active
    nd6 options=29<PERFORMNUD, IFDISABLED, AUTO_LINKLOCAL>
lo0: flags=8049<UP,LOOPBACK,RUNNING,MULTICAST> metric 0 mtu 16384
    options=680003<RXCSUM, TXCSUM, LINKSTATE, RXCSUM_IPV6, TXCSUM_IPV6>
    inet6 ::1 prefixlen 128
    inet6 fe80::1110 prefixlen 64 scopeid 0x4
    inet 127.0.0.1 netmask 0xff000000
    groups: lo
    nd6 options=21<PERFORMNUD, AUTO_LINKLOCAL>
root@tome:~ #
```

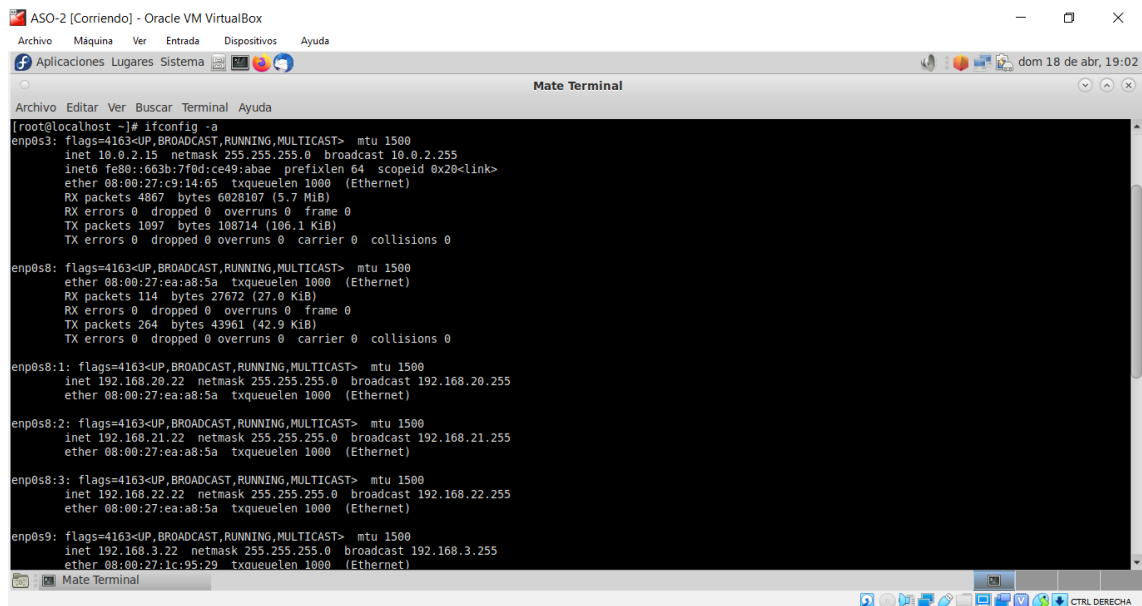
## Linux Fedora (ASO-2)

Configuro las interfaces con el comando ifconfig:



```
ASO-2 [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda
Aplicaciones Lugares Sistema
Mate Terminal
Archivo Editar Ver Buscar Terminal Ayuda
[root@localhost ~]# ifconfig enp0s8 inet 192.168.2.22 netmask 255.255.255.0 broadcast 192.168.2.255
[root@localhost ~]# ifconfig enp0s8:1 inet 192.168.20.22 netmask 255.255.255.0
[root@localhost ~]# ifconfig enp0s8:2 inet 192.168.21.22 netmask 255.255.255.0
[root@localhost ~]# ifconfig enp0s8:3 inet 192.168.22.22 netmask 255.255.255.0
[root@localhost ~]# ifconfig enp0s9 inet 192.168.3.22 netmask 255.255.255.0 broadcast 192.168.3.255
[root@localhost ~]# ifconfig enp0s9:1 inet 192.168.30.22 netmask 255.255.255.0
[root@localhost ~]# ifconfig enp0s9:2 inet 192.168.31.22 netmask 255.255.255.0
[root@localhost ~]# ifconfig enp0s9:3 inet 192.168.32.22 netmask 255.255.255.0
[root@localhost ~]#
```

Compruebo que la red está correctamente configurada:



```
ASO-2 [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda
Aplicaciones Lugares Sistema
Mate Terminal
Archivo Editar Ver Buscar Terminal Ayuda
[root@localhost ~]# ifconfig -a
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::663b:7f0d:ce49:abae prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:c9:14:65 txqueuelen 1000 (Ethernet)
    RX packets 4867 bytes 6028107 (5.7 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 1097 bytes 108714 (106.1 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

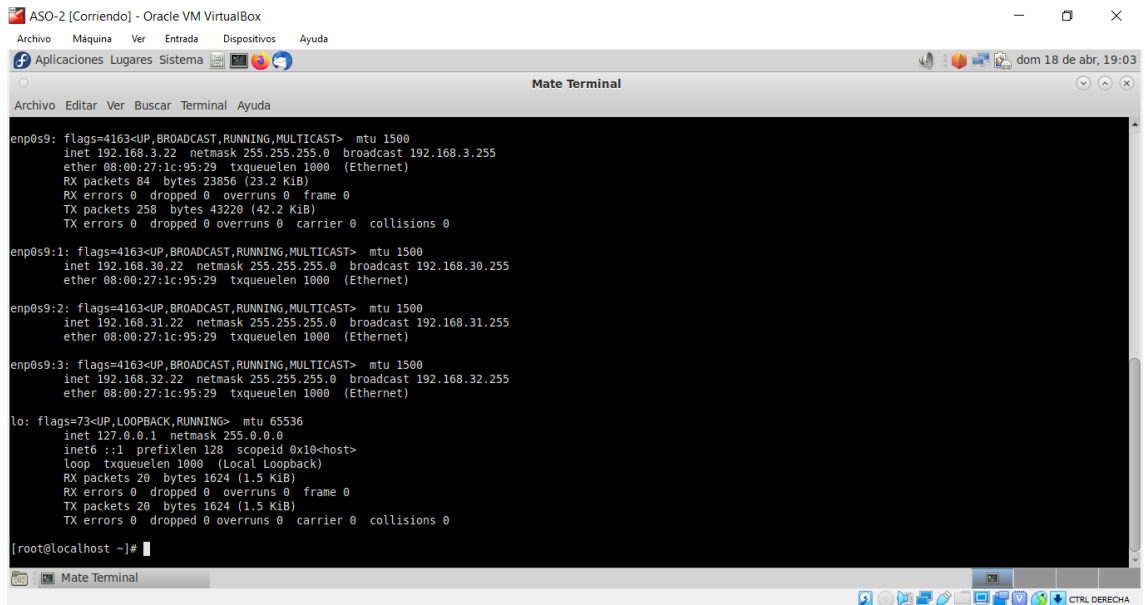
enp0s8: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    ether 08:00:27:ea:a8:5a txqueuelen 1000 (Ethernet)
    RX packets 114 bytes 27672 (27.0 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 264 bytes 43961 (42.9 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

enp0s8:1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.20.22 netmask 255.255.255.0 broadcast 192.168.20.255
    ether 08:00:27:ea:a8:5a txqueuelen 1000 (Ethernet)

enp0s8:2: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.21.22 netmask 255.255.255.0 broadcast 192.168.21.255
    ether 08:00:27:ea:a8:5a txqueuelen 1000 (Ethernet)

enp0s8:3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.22.22 netmask 255.255.255.0 broadcast 192.168.22.255
    ether 08:00:27:ea:a8:5a txqueuelen 1000 (Ethernet)

enp0s9: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.3.22 netmask 255.255.255.0 broadcast 192.168.3.255
    ether 08:00:27:1c:95:29 txqueuelen 1000 (Ethernet)
```



ASO-2 [Corriendo] - Oracle VM VirtualBox

Archivo Máquina Ver Entrada Dispositivos Ayuda

Aplicaciones Lugares Sistema dom 18 de abr, 19:03

Mate Terminal

Archivo Editar Ver Buscar Terminal Ayuda

```
enp0s9: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.3.22 netmask 255.255.255.0 broadcast 192.168.3.255
    ether 08:00:27:1c:95:29 txqueuelen 1000 (Ethernet)
    RX packets 84 bytes 23856 (23.2 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 258 bytes 43220 (42.2 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

enp0s9:1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.30.22 netmask 255.255.255.0 broadcast 192.168.30.255
    ether 08:00:27:1c:95:29 txqueuelen 1000 (Ethernet)

enp0s9:2: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.31.22 netmask 255.255.255.0 broadcast 192.168.31.255
    ether 08:00:27:1c:95:29 txqueuelen 1000 (Ethernet)

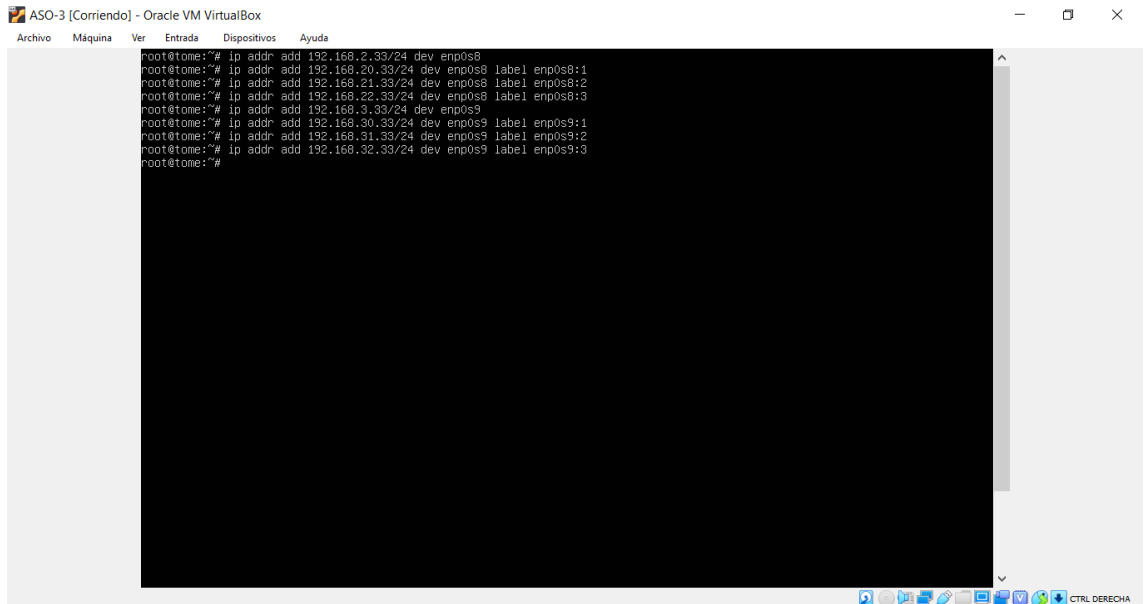
enp0s9:3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.32.22 netmask 255.255.255.0 broadcast 192.168.32.255
    ether 08:00:27:1c:95:29 txqueuelen 1000 (Ethernet)

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 20 bytes 1624 (1.5 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 20 bytes 1624 (1.5 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

[root@localhost ~]#
```

## Ubuntu Server (ASO-3)

Configuro las interfaces con el comando ip:



ASO-3 [Corriendo] - Oracle VM VirtualBox

Archivo Máquina Ver Entrada Dispositivos Ayuda

```
root@tome:~# ip addr add 192.168.2.33/24 dev enp0s8
root@tome:~# ip addr add 192.168.20.33/24 dev enp0s8 label enp0s8:1
root@tome:~# ip addr add 192.168.21.33/24 dev enp0s8 label enp0s8:2
root@tome:~# ip addr add 192.168.22.33/24 dev enp0s8 label enp0s8:3
root@tome:~# ip addr add 192.168.3.33/24 dev enp0s9
root@tome:~# ip addr add 192.168.30.33/24 dev enp0s9 label enp0s9:1
root@tome:~# ip addr add 192.168.31.33/24 dev enp0s9 label enp0s9:2
root@tome:~# ip addr add 192.168.32.33/24 dev enp0s9 label enp0s9:3
root@tome:~#
```

## Compruebo que la red está correctamente configurada:

```
ASO-3 [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

root@tome:~# ip addr add 192.168.21.33/24 dev enp0s8 label enp0s8:2
root@tome:~# ip addr add 192.168.22.33/24 dev enp0s8 label enp0s8:3
root@tome:~# ip addr add 192.168.3.33/24 dev enp0s9
root@tome:~# ip addr add 192.168.30.33/24 dev enp0s9 label enp0s9:1
root@tome:~# ip addr add 192.168.31.33/24 dev enp0s9 label enp0s9:2
root@tome:~# ip addr add 192.168.32.33/24 dev enp0s9 label enp0s9:3
root@tome:~# ip addr show
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:ab:a4:7c brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic enp0s3
        valid_lft 86063sec preferred_lft 86063sec
    inet6 fe80::a00:27ff:feab:a47c/64 scope link
        valid_lft forever preferred_lft forever
3: enp0s8: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 08:00:27:bc:46:af brd ff:ff:ff:ff:ff:ff
    inet 192.168.2.33/24 scope global enp0s8
        valid_lft forever preferred_lft forever
    inet 192.168.20.33/24 scope global enp0s8:1
        valid_lft forever preferred_lft forever
    inet 192.168.21.33/24 scope global enp0s8:2
        valid_lft forever preferred_lft forever
    inet 192.168.22.33/24 scope global enp0s8:3
        valid_lft forever preferred_lft forever
4: enp0s9: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 08:00:27:4e:53:6d brd ff:ff:ff:ff:ff:ff
    inet 192.168.3.33/24 scope global enp0s9
        valid_lft forever preferred_lft forever
    inet 192.168.30.33/24 scope global enp0s9:1
        valid_lft forever preferred_lft forever
    inet 192.168.31.33/24 scope global enp0s9:2
        valid_lft forever preferred_lft forever
    inet 192.168.32.33/24 scope global enp0s9:3
        valid_lft forever preferred_lft forever
root@tome:~#
```

## Solaris 11 (ASO-3)

Configura los interfaces con ipadm (Las creo con create-ip y les asigno direcciones IP con create-addr) y compruebo que la red está correctamente configurada:

```
ASO-3 [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

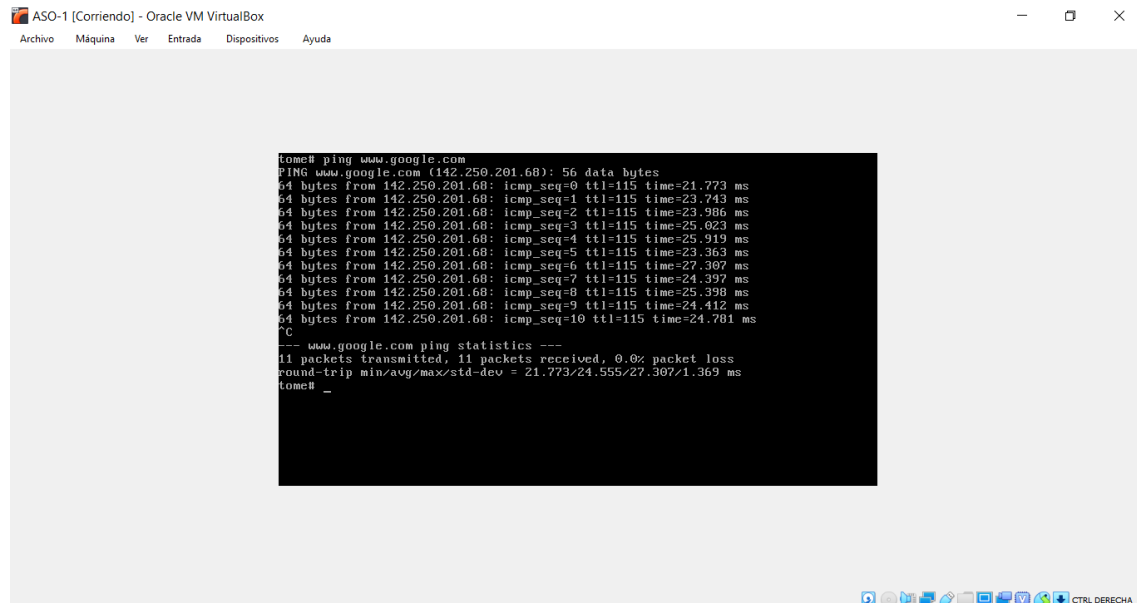
root@solaris:~# ipadm create-ip net1
root@solaris:~# ipadm create-addr -T static -a 192.168.2.33/24 net1/addr
root@solaris:~# ipadm create-addr -T static -a 192.168.20.33/24 net1/alias0
root@solaris:~# ipadm create-addr -T static -a 192.168.21.33/24 net1/alias1
root@solaris:~# ipadm create-addr -T static -a 192.168.22.33/24 net1/alias2
root@solaris:~# ipadm create-addr -T static -a 192.168.3.33/24 net2/addr
ipadm: cannot create address: No such interface
root@solaris:~# ipadm create-ip net2
root@solaris:~# ipadm create-addr -T static -a 192.168.3.33/24 net2/addr
root@solaris:~# ipadm create-addr -T static -a 192.168.30.33/24 net2/alias0
root@solaris:~# ipadm create-addr -T static -a 192.168.31.33/24 net2/alias1
root@solaris:~# ipadm create-addr -T static -a 192.168.32.33/24 net2/alias2
root@solaris:~# ipadm show-addr
ADDROBJ      TYPE      STATE      ADDR
lo0/v4        static    ok          127.0.0.1/8
net0/v4        dhcp      ok          10.0.2.15/24
net1/addr      static    ok          192.168.2.33/24
net1/alias0    static    ok          192.168.20.33/24
net1/alias1    static    ok          192.168.21.33/24
net1/alias2    static    ok          192.168.22.33/24
net2/addr      static    ok          192.168.3.33/24
net2/alias0    static    ok          192.168.30.33/24
net2/alias1    static    ok          192.168.31.33/24
net2/alias2    static    ok          192.168.32.33/24
lo0/v6        static    ok          ::1/128
net0/v6        addrconf  ok          fe80::a00:27ff:feab:a47c/10
root@solaris:~#
```



## 2. Comprobar que todas las máquinas virtuales (todos los S.O) tienen acceso a internet a través de la interfaz conectada al NAT del Virtualbox.

Para comprobar que todas las máquinas tienen acceso a internet hice un ping a Google de cada S.O.

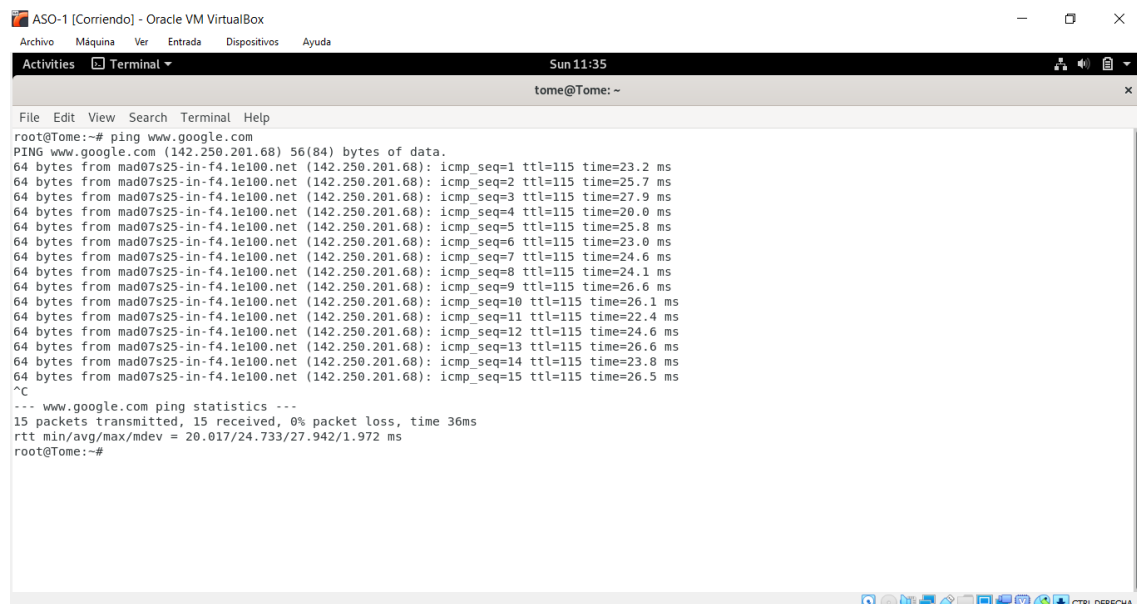
### OpenBSD (ASO-1)



```
ASO-1 [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

tome# ping www.google.com
PING www.google.com (142.250.201.68): 56 data bytes
64 bytes from 142.250.201.68: icmp_seq=0 ttl=115 time=21.773 ms
64 bytes from 142.250.201.68: icmp_seq=1 ttl=115 time=23.743 ms
64 bytes from 142.250.201.68: icmp_seq=2 ttl=115 time=23.986 ms
64 bytes from 142.250.201.68: icmp_seq=3 ttl=115 time=25.023 ms
64 bytes from 142.250.201.68: icmp_seq=4 ttl=115 time=25.919 ms
64 bytes from 142.250.201.68: icmp_seq=5 ttl=115 time=23.363 ms
64 bytes from 142.250.201.68: icmp_seq=6 ttl=115 time=27.307 ms
64 bytes from 142.250.201.68: icmp_seq=7 ttl=115 time=24.397 ms
64 bytes from 142.250.201.68: icmp_seq=8 ttl=115 time=25.398 ms
64 bytes from 142.250.201.68: icmp_seq=9 ttl=115 time=24.412 ms
64 bytes from 142.250.201.68: icmp_seq=10 ttl=115 time=24.781 ms
^C
--- www.google.com ping statistics ---
11 packets transmitted, 11 packets received, 0.0% packet loss
round-trip min/avg/max/std-dev = 21.773/24.555/27.307/1.369 ms
tome# _
```

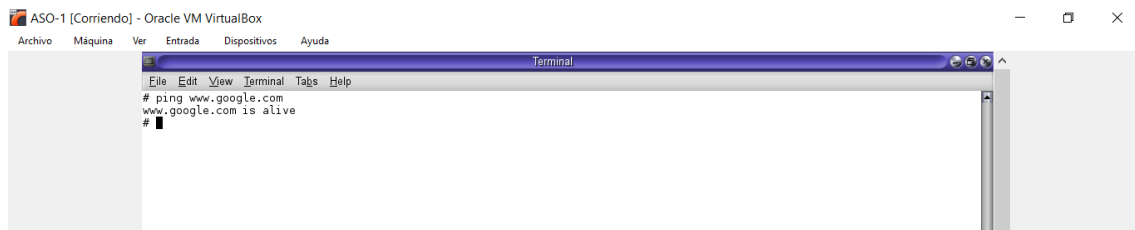
### Debian Linux (ASO-1)



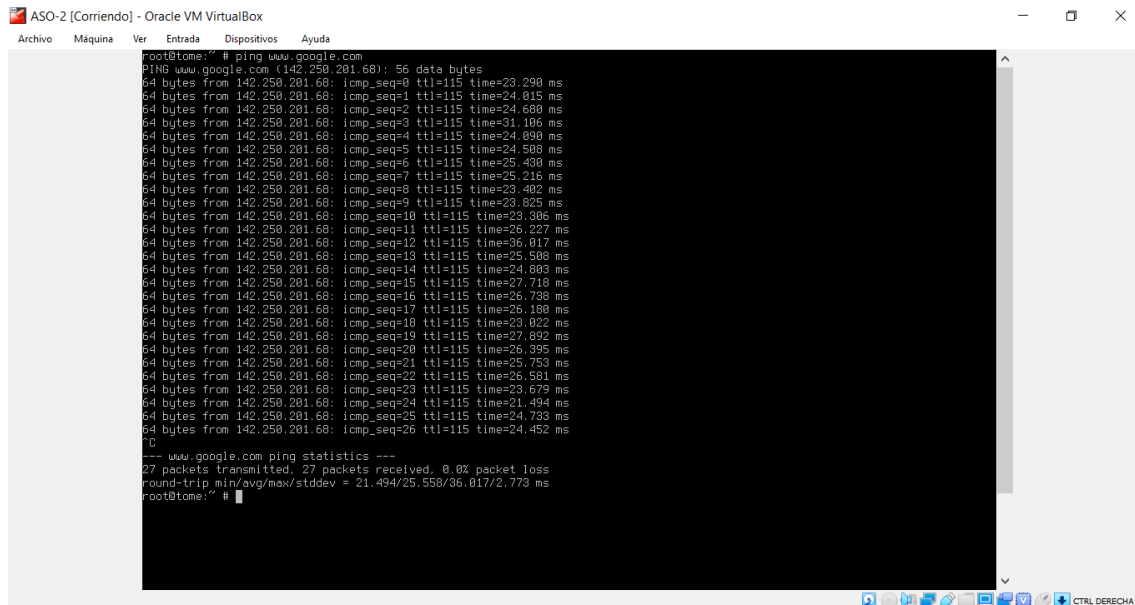
```
ASO-1 [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

Activities  Terminal
Sun 11:35
tome@Tome: ~
File Edit View Search Terminal Help
root@Tome:~# ping www.google.com
PING www.google.com (142.250.201.68) 56(84) bytes of data:
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=1 ttl=115 time=23.2 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=2 ttl=115 time=25.7 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=3 ttl=115 time=27.9 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=4 ttl=115 time=20.0 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=5 ttl=115 time=25.8 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=6 ttl=115 time=23.0 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=7 ttl=115 time=24.6 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=8 ttl=115 time=24.1 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=9 ttl=115 time=26.6 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=10 ttl=115 time=26.1 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=11 ttl=115 time=22.4 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=12 ttl=115 time=24.6 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=13 ttl=115 time=26.6 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=14 ttl=115 time=23.8 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=15 ttl=115 time=26.5 ms
^C
--- www.google.com ping statistics ---
15 packets transmitted, 15 received, 0% packet loss, time 36ms
rtt min/avg/max/mdev = 20.017/24.733/27.942/1.972 ms
root@Tome:~#
```

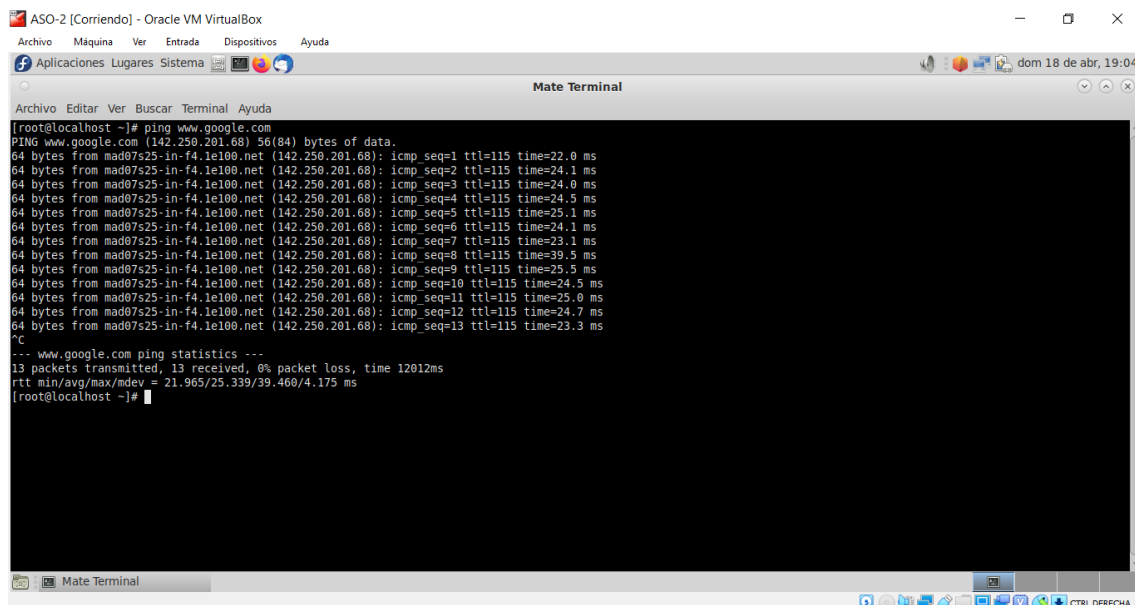
## Solaris 10 (ASO-1)



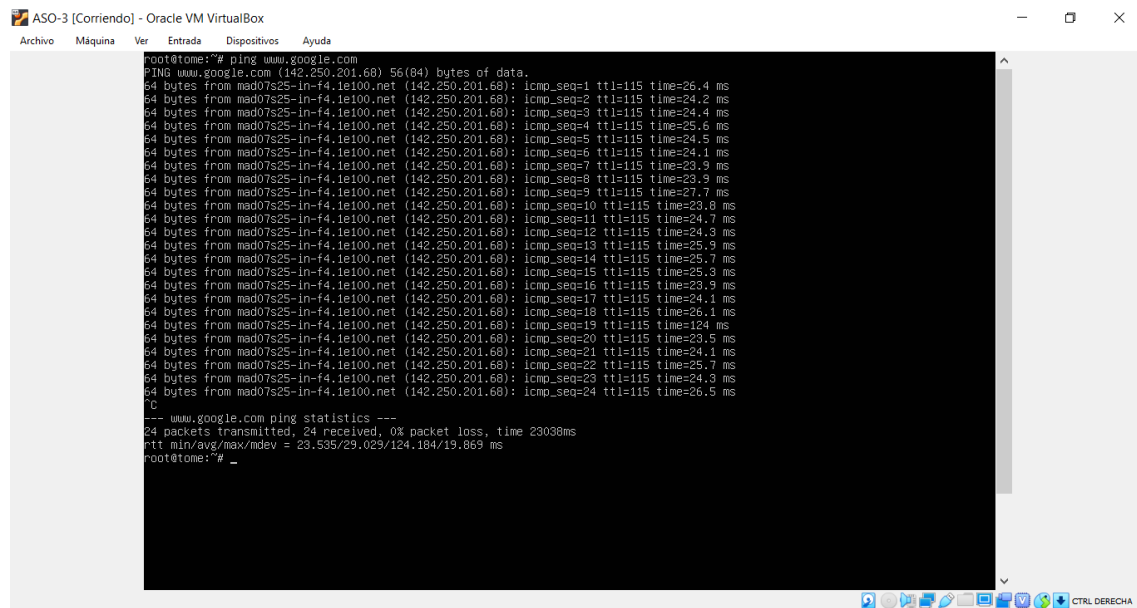
## FreeBSD (ASO-2)



## Linux Fedora (ASO-2)



## Ubuntu Server (ASO-3)



```
ASO-3 [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

root@tome:~# ping www.google.com
PING www.google.com (142.250.201.68) 56(84) bytes of data:
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=1 ttl=115 time=26.4 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=2 ttl=115 time=24.2 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=3 ttl=115 time=24.4 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=4 ttl=115 time=25.6 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=5 ttl=115 time=24.5 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=6 ttl=115 time=24.1 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=7 ttl=115 time=23.9 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=8 ttl=115 time=23.9 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=9 ttl=115 time=27.7 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=10 ttl=115 time=23.8 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=11 ttl=115 time=24.7 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=12 ttl=115 time=24.3 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=13 ttl=115 time=25.9 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=14 ttl=115 time=25.7 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=15 ttl=115 time=25.3 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=16 ttl=115 time=23.9 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=17 ttl=115 time=24.1 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=18 ttl=115 time=26.1 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=19 ttl=115 time=124 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=20 ttl=115 time=23.5 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=21 ttl=115 time=24.1 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=22 ttl=115 time=25.7 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=23 ttl=115 time=24.3 ms
64 bytes from mad07s25-in-f4.1e100.net (142.250.201.68): icmp_seq=24 ttl=115 time=26.5 ms
^C
--- www.google.com ping statistics ---
24 packets transmitted, 24 received, 0% packet loss, time 23038ms
rtt min/avg/max/mdev = 23.535/23.029/124.184/19.869 ms
root@tome:~#
```

## Solaris 11 (ASO-3)



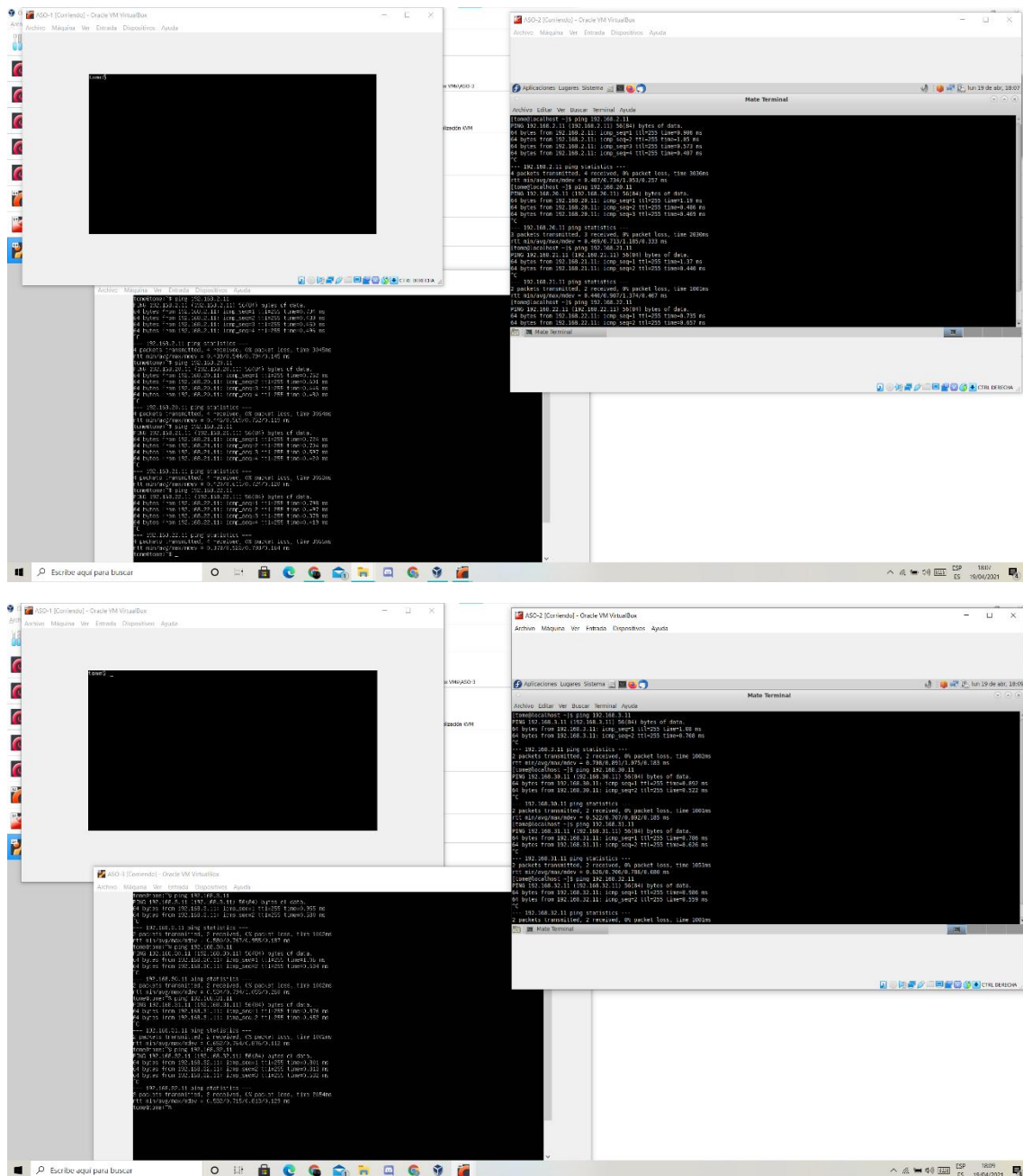
```
ASO-3 [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

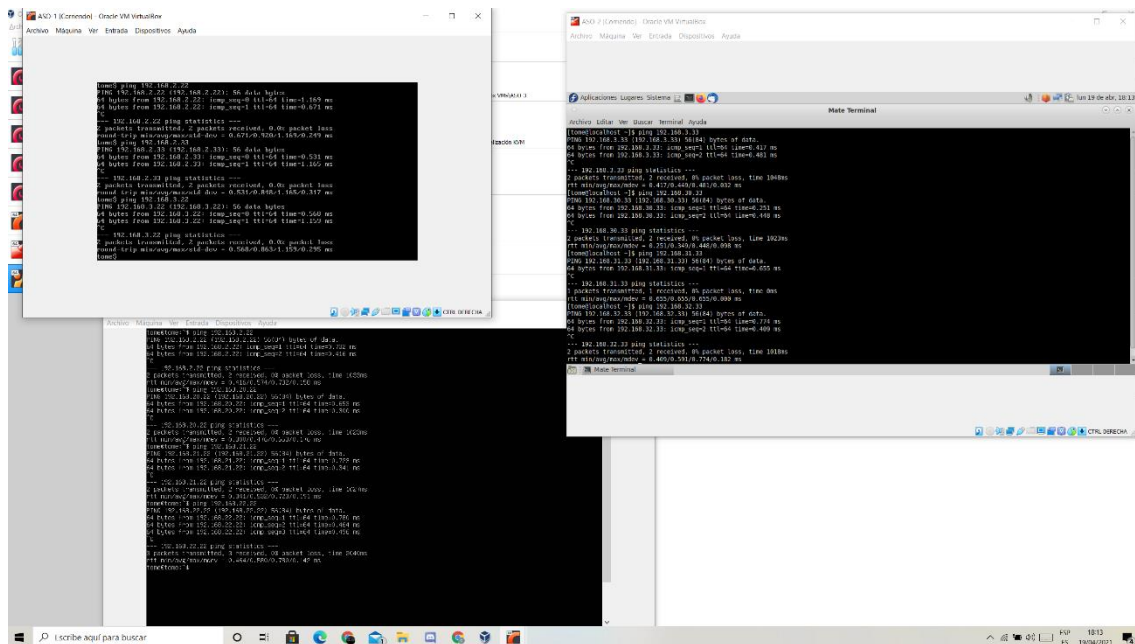
root@solaris:~# ping www.google.com
www.google.com is alive
root@solaris:~#
```

**3. Comprobar que (simultáneamente al apartado anterior) desde cada máquina se puede acceder a las otras dos utilizando distintas redes locales a las que están conectadas a la segunda y tercera tarjetas. (Comprobar que se accede puede hacerse viendo que responden al ping, o algún otro tipo de conexión).**

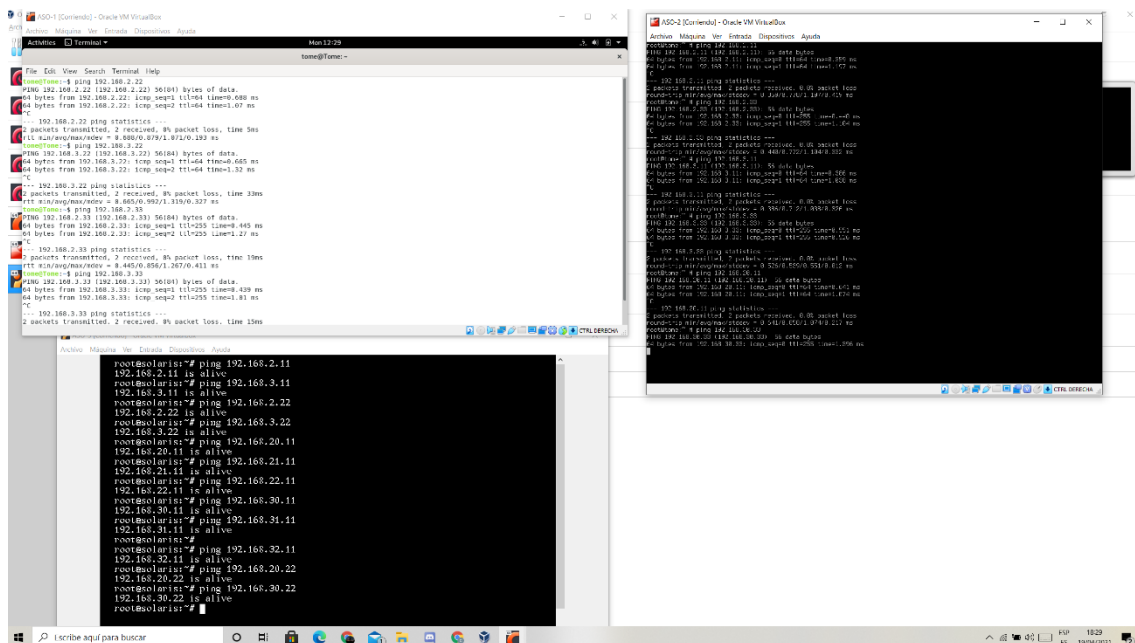
Para comprobar la conexión entre máquinas a través de la red interna fui haciendo pings entre máquinas a través de redes de distintas tarjetas de red. Además, fui cambiando de sistemas operativos para comprobar que funcionaba en todos.

### OpenBSD-Fedora-Ubuntu

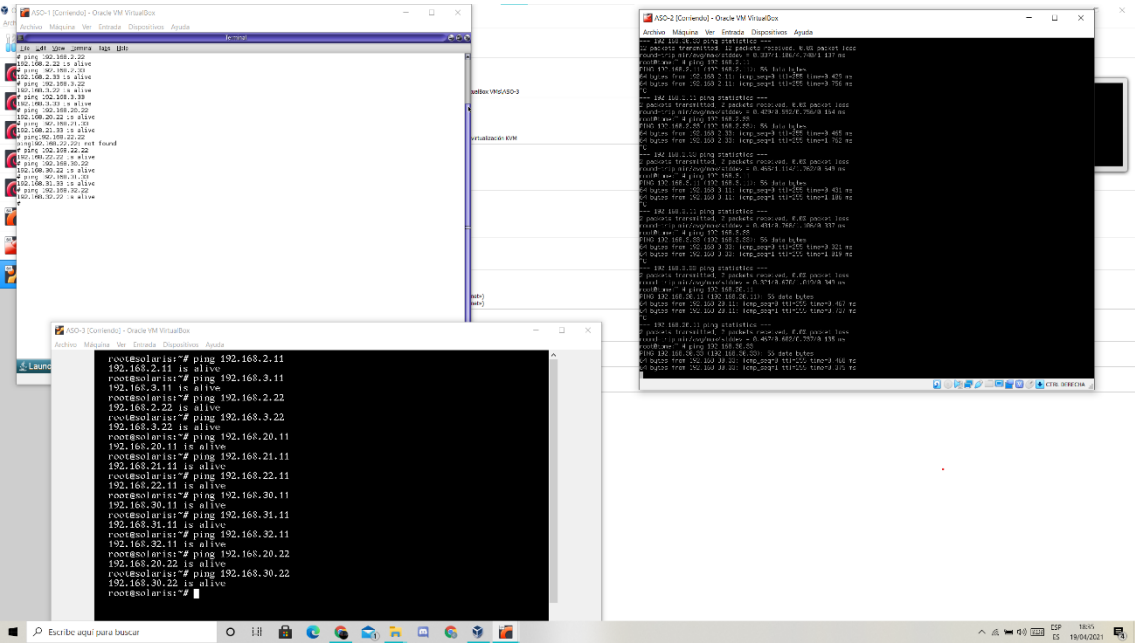




## Debian-Solaris-FreeBSD



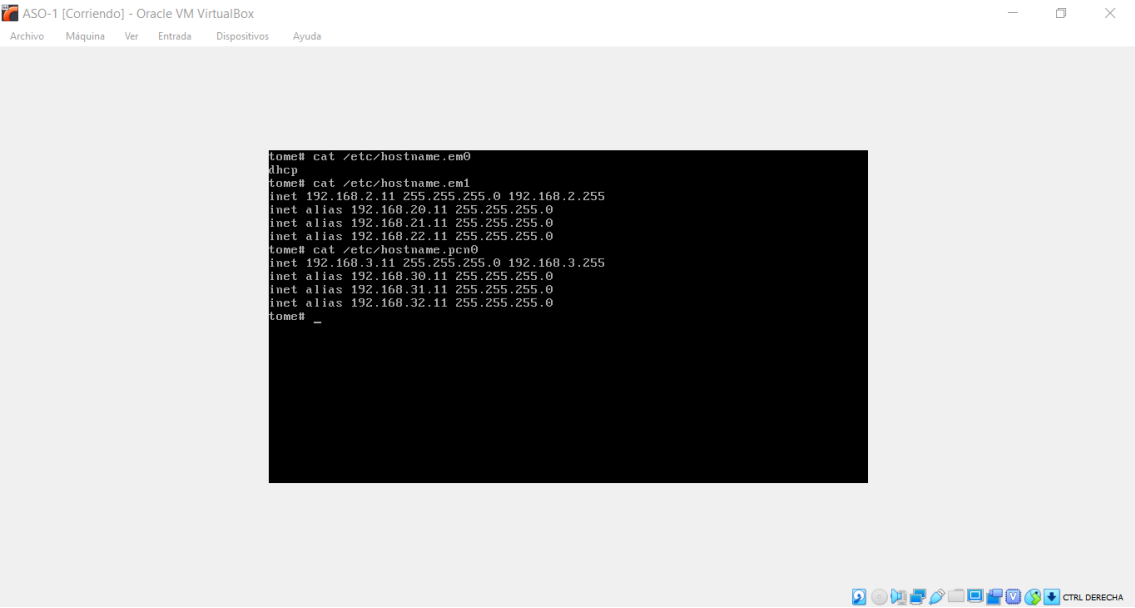
Cambio Debian por Solaris 10:



4. Realizar los cambios necesarios para que dicha configuración se mantenga al reiniciar (en todos los S.O.).

OpenBSD (ASO-1)

Edito los ficheros /etc/hostname.<interfaz> correspondientes:



## Debian Linux (ASO-1)

Configuro las interfaces en el fichero `/etc/network/interfaces`:



```
ASO-1 [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

Activities  Terminal  Sun 12:10
tome@Tome: ~

File Edit View Search Terminal Help
root@Tome:~# nano /etc/network/interfaces
root@Tome:~# 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/*

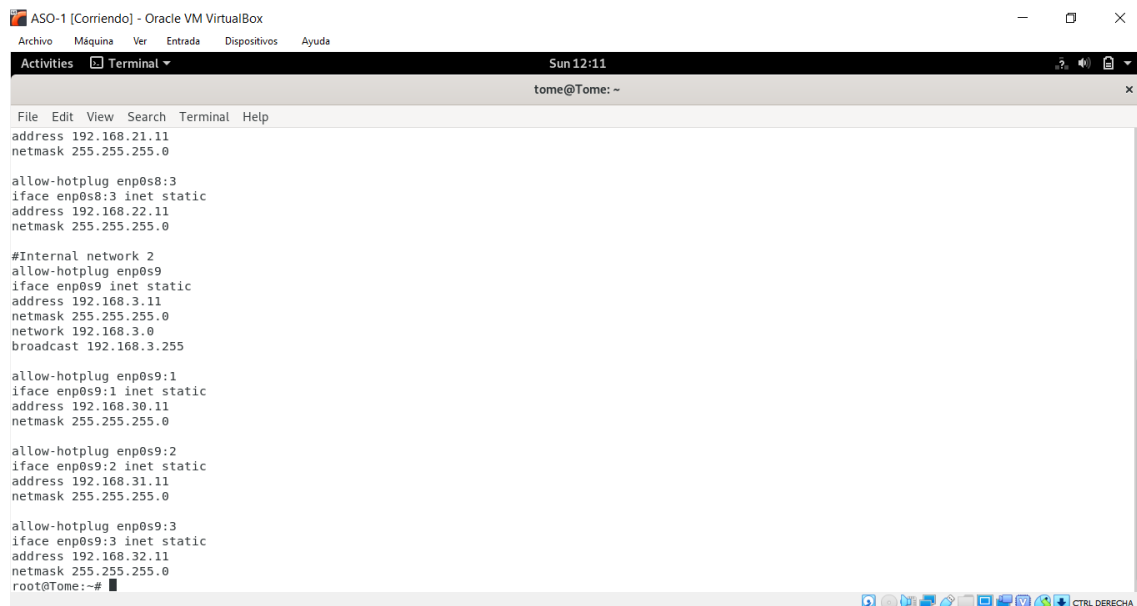
# The loopback network interface
auto lo enp0s3 enp0s8 enp0s8:1 enp0s8:2 enp0s8:3 enp0s9 enp0s9:1 enp0s9:2 enp0s9:3
iface lo inet loopback

# The primary network interface
allow-hotplug enp0s3
iface enp0s3 inet dhcp

#Internal network 1
allow-hotplug enp0s8
iface enp0s8 inet static
address 192.168.2.11
netmask 255.255.255.0
network 192.168.2.0
broadcast 192.168.2.255

allow-hotplug enp0s8:1
iface enp0s8:1 inet static
address 192.168.20.11
netmask 255.255.255.0

allow-hotplug enp0s8:2
iface enp0s8:2 inet static
address 192.168.21.11
```



```
ASO-1 [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

Activities  Terminal  Sun 12:11
tome@Tome: ~

File Edit View Search Terminal Help
address 192.168.21.11
netmask 255.255.255.0

allow-hotplug enp0s8:3
iface enp0s8:3 inet static
address 192.168.22.11
netmask 255.255.255.0

#Internal network 2
allow-hotplug enp0s9
iface enp0s9 inet static
address 192.168.3.11
netmask 255.255.255.0
network 192.168.3.0
broadcast 192.168.3.255

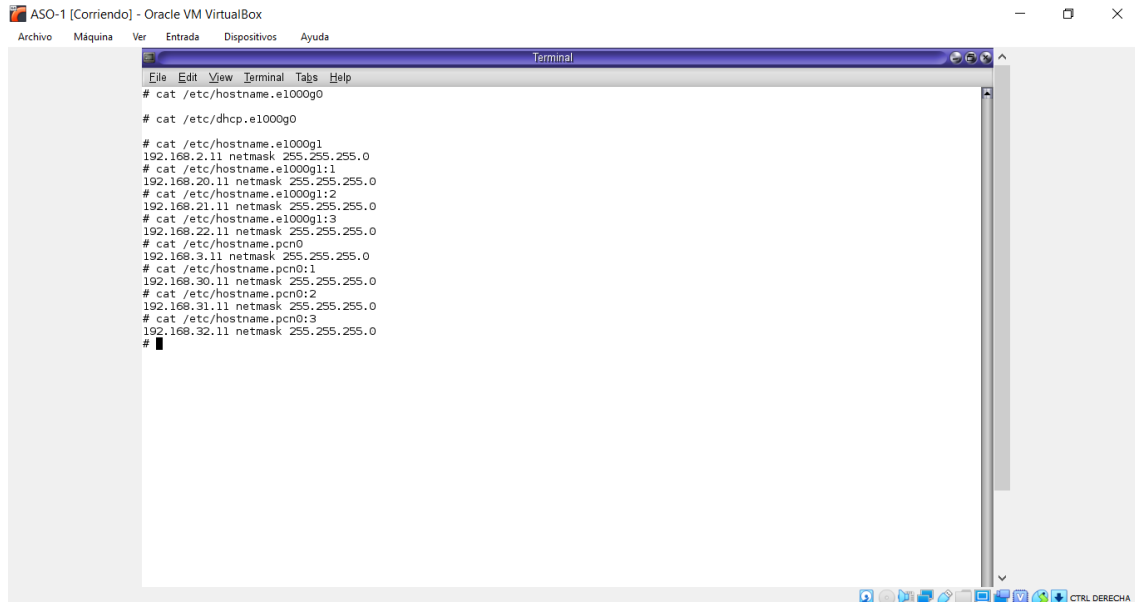
allow-hotplug enp0s9:1
iface enp0s9:1 inet static
address 192.168.30.11
netmask 255.255.255.0

allow-hotplug enp0s9:2
iface enp0s9:2 inet static
address 192.168.31.11
netmask 255.255.255.0

allow-hotplug enp0s9:3
iface enp0s9:3 inet static
address 192.168.32.11
netmask 255.255.255.0
root@Tome:~#
```

## Solaris 10 (ASO-1)

Edito los ficheros `/etc/hostname.<interfaz>` correspondientes para las IPs estáticas y los ficheros `/etc/dhcp.<interfaz>` para las asignaciones por DHCP:



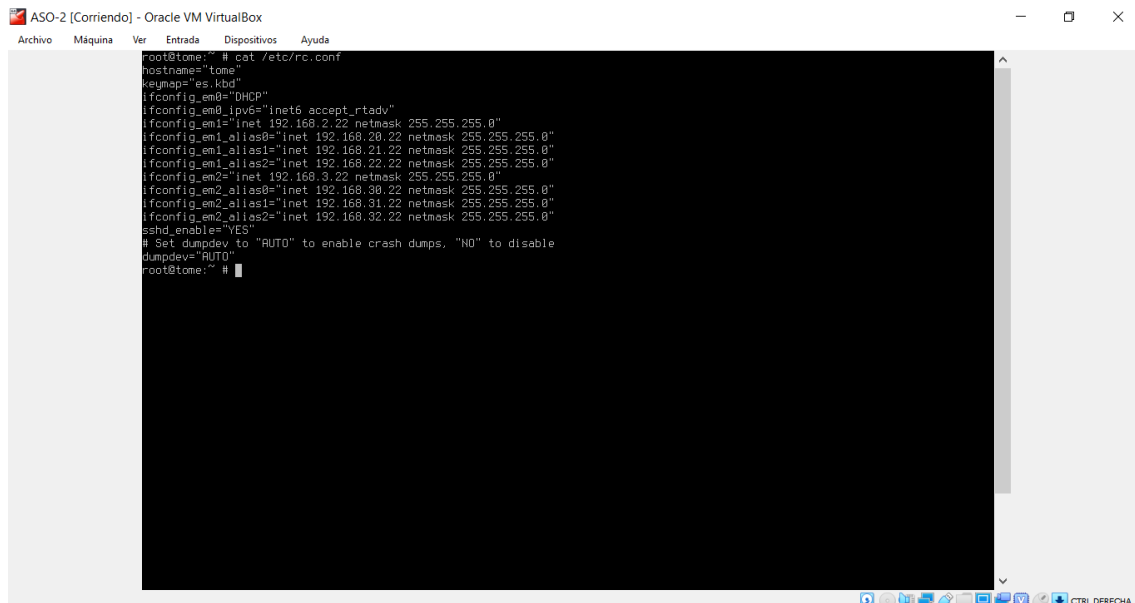
```
ASO-1 [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

Terminal

File Edit View Terminal Tabs Help
# cat /etc/hostname.e1000g0
# cat /etc/dhcp.e1000g0
# cat /etc/hostname.e1000g1
192.168.2.11 netmask 255.255.255.0
# cat /etc/hostname.e1000g1:1
192.168.20.11 netmask 255.255.255.0
# cat /etc/hostname.e1000g1:2
192.168.21.11 netmask 255.255.255.0
# cat /etc/hostname.e1000g1:3
192.168.22.11 netmask 255.255.255.0
# cat /etc/hostname.pcn0
192.168.3.11 netmask 255.255.255.0
# cat /etc/hostname.pcn0:1
192.168.30.11 netmask 255.255.255.0
# cat /etc/hostname.pcn0:2
192.168.31.11 netmask 255.255.255.0
# cat /etc/hostname.pcn0:3
192.168.32.11 netmask 255.255.255.0
#
```

## FreeBSD (ASO-2)

Edito el fichero `rc.conf` añadiendo una línea por cada interfaz (o alias):



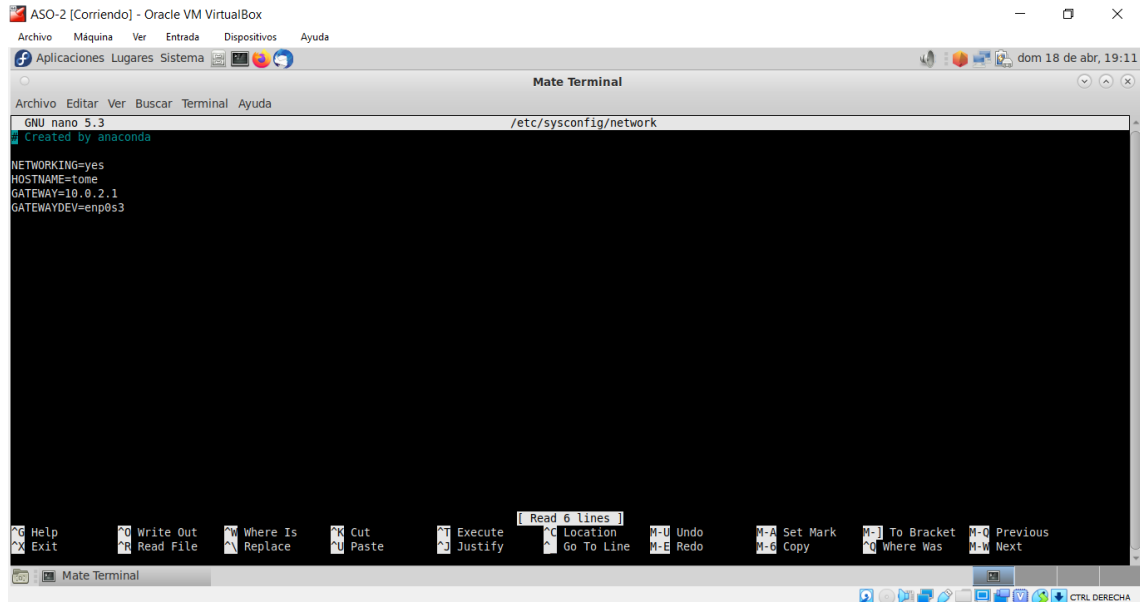
```
ASO-2 [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

root@tome:~ # cat /etc/rc.conf
hostname="tome"
keymap="es.kbd"
ifconfig_em0="DHCP"
ifconfig_em0_ipv6="inet6 accept_rtadv"
ifconfig_em1="inet 192.168.2.22 netmask 255.255.255.0"
ifconfig_em1_alias0="inet 192.168.20.22 netmask 255.255.255.0"
ifconfig_em1_alias1="inet 192.168.21.22 netmask 255.255.255.0"
ifconfig_em1_alias2="inet 192.168.22.22 netmask 255.255.255.0"
ifconfig_em2="inet 192.168.3.22 netmask 255.255.255.0"
ifconfig_em2_alias0="inet 192.168.30.22 netmask 255.255.255.0"
ifconfig_em2_alias1="inet 192.168.31.22 netmask 255.255.255.0"
ifconfig_em2_alias2="inet 192.168.32.22 netmask 255.255.255.0"
sshd_enable="YES"
# Set dumpdev to "AUTO" to enable crash dumps, "NO" to disable
dumpdev="AUTO"
root@tome:~ #
```



## Linux Fedora (ASO-2)

Habilito la configuración de red en `/etc/sysconfig/network`:



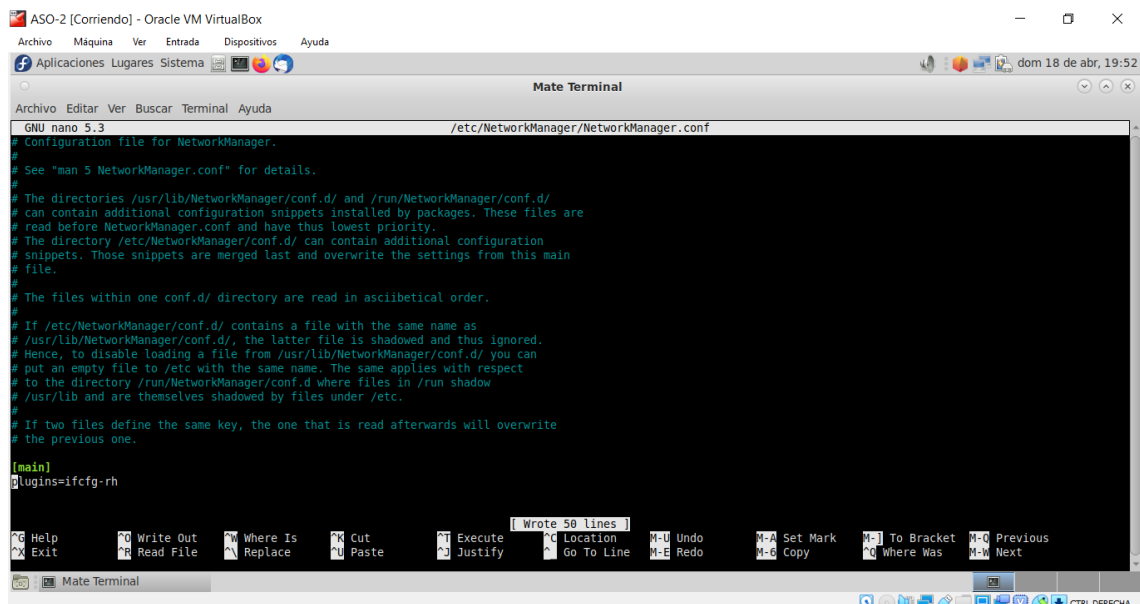
The screenshot shows a terminal window titled "ASO-2 [Corriendo] - Oracle VM VirtualBox". Inside the terminal, a "Mate Terminal" window is open, displaying the GNU nano 5.3 editor editing the file `/etc/sysconfig/network`. The file content is as follows:

```
Created by anaconda

NETWORKING=yes
HOSTNAME=tome
GATEWAY=10.0.2.1
GATEWAYDEV=ens3
```

The terminal window includes a menu bar with options like Archivo, Editar, Ver, Buscar, Terminal, and Ayuda. At the bottom, there is a status bar showing "Mate Terminal" and system icons.

Edito el fichero de configuración de NetworkManager para activar el plugin `ifcfg-rh` de forma que pille las configuraciones de los archivos `ifcfg-<interfaz>` del directorio `/etc/sysconfig/network-scripts`:



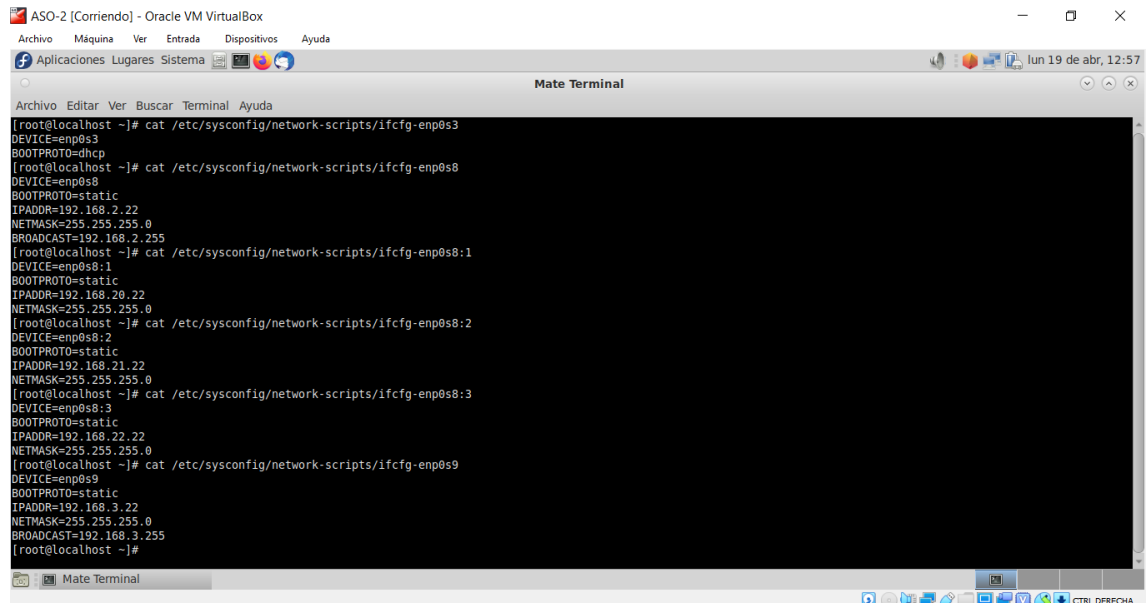
The screenshot shows a terminal window titled "ASO-2 [Corriendo] - Oracle VM VirtualBox". Inside the terminal, a "Mate Terminal" window is open, displaying the GNU nano 5.3 editor editing the file `/etc/NetworkManager/NetworkManager.conf`. The file content is as follows:

```
# Configuration file for NetworkManager.
#
# See "man 5 NetworkManager.conf" for details.
#
# The directories /usr/lib/NetworkManager/conf.d/ and /run/NetworkManager/conf.d/
# can contain additional configuration snippets installed by packages. These files are
# read before NetworkManager.conf and have thus lowest priority.
# The directory /etc/NetworkManager/conf.d/ can contain additional configuration
# snippets. Those snippets are merged last and overwrite the settings from this main
# file.
#
# The files within one conf.d/ directory are read in asciibetical order.
#
# If /etc/NetworkManager/conf.d/ contains a file with the same name as
# /usr/lib/NetworkManager/conf.d/, the latter file is shadowed and thus ignored.
# Hence, to disable loading a file from /usr/lib/NetworkManager/conf.d/ you can
# put an empty file to /etc with the same name. The same applies with respect
# to the directory /run/NetworkManager/conf.d where files in /run shadow
# /usr/lib and are themselves shadowed by files under /etc.
#
# If two files define the same key, the one that is read afterwards will overwrite
# the previous one.

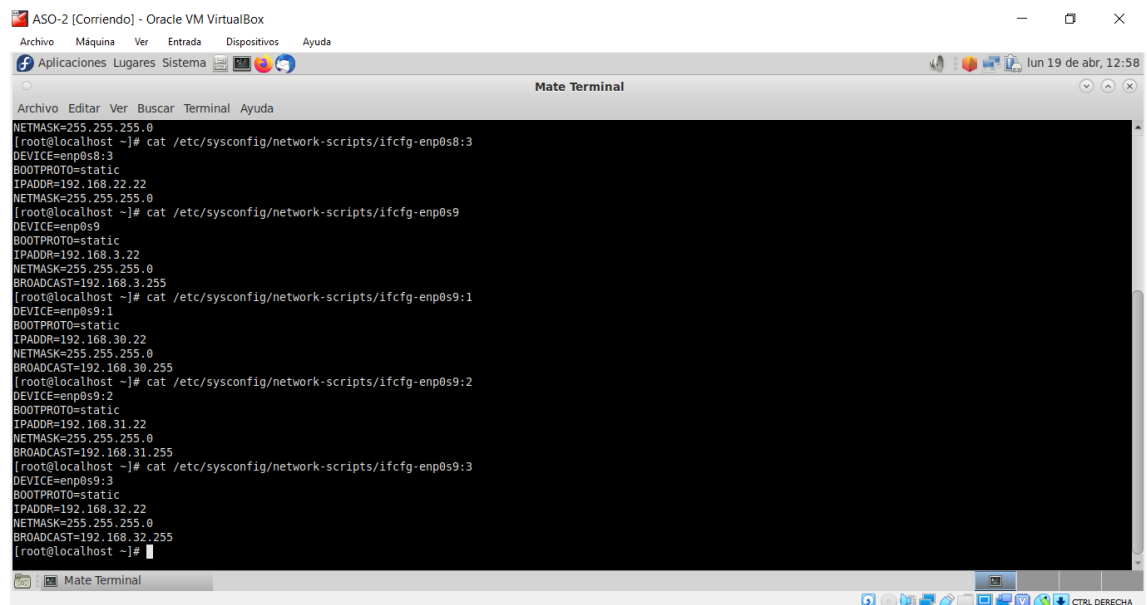
[main]
plugins=ifcfg-rh
```

The terminal window includes a menu bar with options like Archivo, Editar, Ver, Buscar, Terminal, and Ayuda. At the bottom, there is a status bar showing "Mate Terminal" and system icons.

Creo los archivos ifcfg-<interfaz> correspondientes:



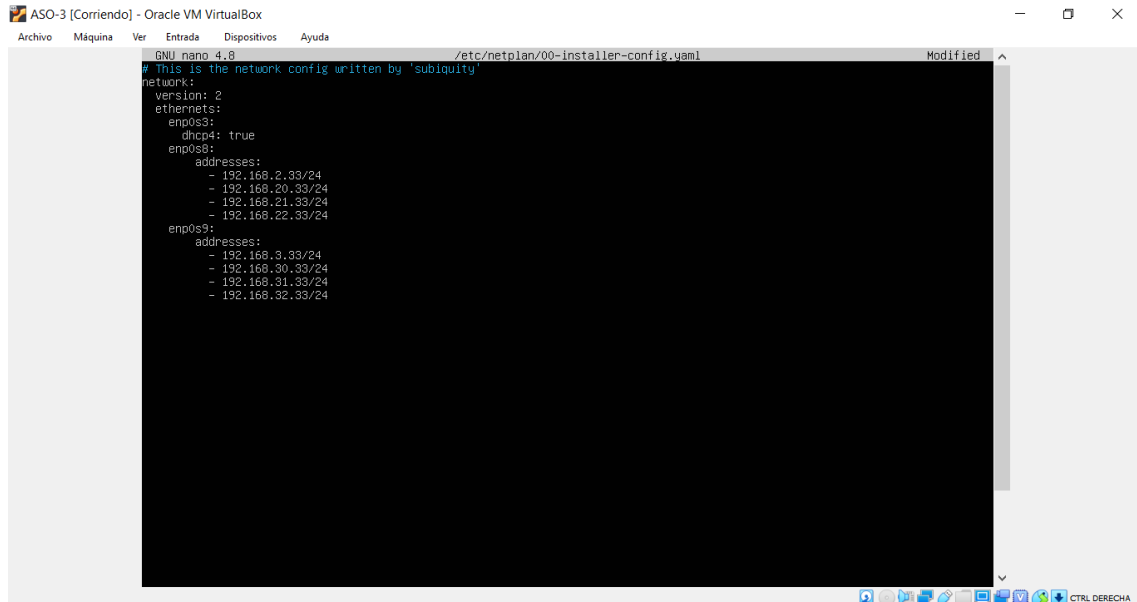
```
ASO-2 [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda
Aplicaciones Lugares Sistema
Mate Terminal
Archivo Editar Ver Buscar Terminal Ayuda
[root@localhost ~]# cat /etc/sysconfig/network-scripts/ifcfg-enp0s3
DEVICE=enp0s3
BOOTPROTO=dhcp
[root@localhost ~]# cat /etc/sysconfig/network-scripts/ifcfg-enp0s8
DEVICE=enp0s8
BOOTPROTO=static
IPADDR=192.168.2.22
NETMASK=255.255.255.0
BROADCAST=192.168.2.255
[root@localhost ~]# cat /etc/sysconfig/network-scripts/ifcfg-enp0s8:1
DEVICE=enp0s8:1
BOOTPROTO=static
IPADDR=192.168.20.22
NETMASK=255.255.255.0
[root@localhost ~]# cat /etc/sysconfig/network-scripts/ifcfg-enp0s8:2
DEVICE=enp0s8:2
BOOTPROTO=static
IPADDR=192.168.21.22
NETMASK=255.255.255.0
[root@localhost ~]# cat /etc/sysconfig/network-scripts/ifcfg-enp0s8:3
DEVICE=enp0s8:3
BOOTPROTO=static
IPADDR=192.168.22.22
NETMASK=255.255.255.0
[root@localhost ~]# cat /etc/sysconfig/network-scripts/ifcfg-enp0s9
DEVICE=enp0s9
BOOTPROTO=static
IPADDR=192.168.5.22
NETMASK=255.255.255.0
BROADCAST=192.168.3.255
[root@localhost ~]#
```



```
ASO-2 [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda
Aplicaciones Lugares Sistema
Mate Terminal
Archivo Editar Ver Buscar Terminal Ayuda
NETMASK=255.255.255.0
[root@localhost ~]# cat /etc/sysconfig/network-scripts/ifcfg-enp0s8:3
DEVICE=enp0s8:3
BOOTPROTO=static
IPADDR=192.168.22.22
NETMASK=255.255.255.0
[root@localhost ~]# cat /etc/sysconfig/network-scripts/ifcfg-enp0s9
DEVICE=enp0s9
BOOTPROTO=static
IPADDR=192.168.3.22
NETMASK=255.255.255.0
BROADCAST=192.168.3.255
[root@localhost ~]# cat /etc/sysconfig/network-scripts/ifcfg-enp0s9:1
DEVICE=enp0s9:1
BOOTPROTO=static
IPADDR=192.168.30.22
NETMASK=255.255.255.0
BROADCAST=192.168.30.255
[root@localhost ~]# cat /etc/sysconfig/network-scripts/ifcfg-enp0s9:2
DEVICE=enp0s9:2
BOOTPROTO=static
IPADDR=192.168.31.22
NETMASK=255.255.255.0
BROADCAST=192.168.31.255
[root@localhost ~]# cat /etc/sysconfig/network-scripts/ifcfg-enp0s9:3
DEVICE=enp0s9:3
BOOTPROTO=static
IPADDR=192.168.32.22
NETMASK=255.255.255.0
BROADCAST=192.168.32.255
[root@localhost ~]#
```

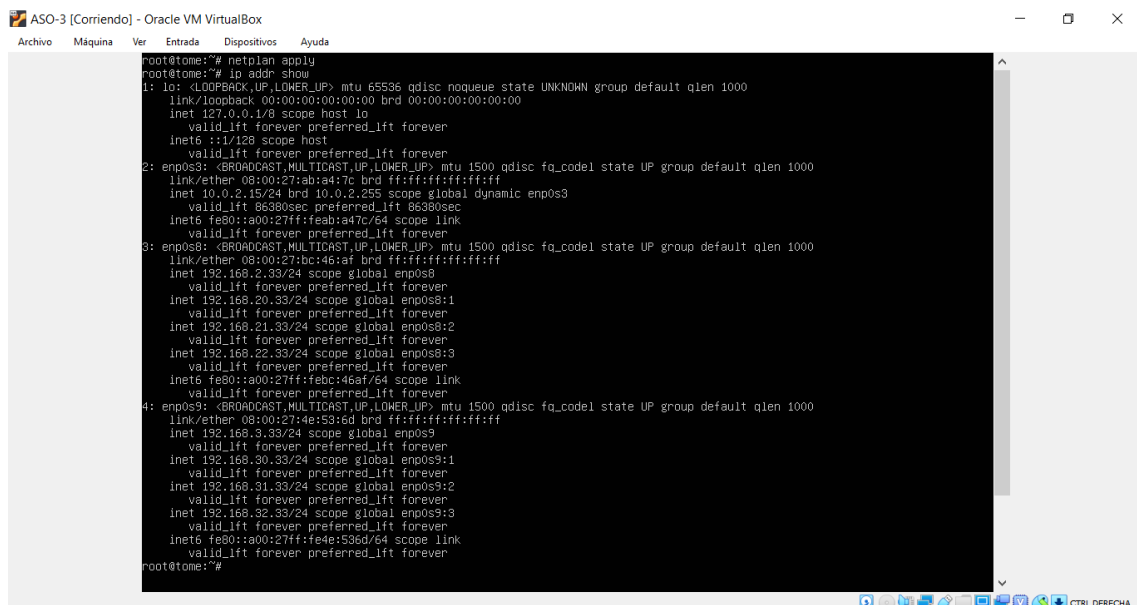
## Ubuntu Server (ASO-3)

En Ubuntu uso el metaconfigurador de red netplan, que funciona a través de archivos .yaml ubicados en /etc/netplan. Edito el fichero 00-installer-config.yaml añadiendo las interfaces correspondientes:



```
GNU nano 4.8 /etc/netplan/00-installer-config.yaml
# This is the network config written by 'subiquity'
network:
  version: 2
  ethernets:
    enp0s3:
      dhcp4: true
      enp0s8:
        addresses:
          - 192.168.2.33/24
          - 192.168.20.33/24
          - 192.168.21.33/24
          - 192.168.22.33/24
    enp0s9:
        addresses:
          - 192.168.3.33/24
          - 192.168.30.33/24
          - 192.168.31.33/24
          - 192.168.32.33/24
```

Ejecuto 'netplan apply' y compruebo que la configuración se ha aplicado correctamente:



```
root@tome:~# netplan apply
root@tome:~# ip addr show
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:ab:a4:7c brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global enp0s3
        valid_lft 86380sec preferred_lft 86380sec
    inet6 fe80::a00:27ff:feab:a47c/64 scope link
        valid_lft forever preferred_lft forever
3: enp0s8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:bc:46:af brd ff:ff:ff:ff:ff:ff
    inet 192.168.2.33/24 scope global enp0s8
        valid_lft forever preferred_lft forever
    inet 192.168.20.33/24 scope global enp0s8:1
        valid_lft forever preferred_lft forever
    inet 192.168.21.33/24 scope global enp0s8:2
        valid_lft forever preferred_lft forever
    inet 192.168.22.33/24 scope global enp0s8:3
        valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:febc:46af/64 scope link
        valid_lft forever preferred_lft forever
4: enp0s9: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:4e:53:6d brd ff:ff:ff:ff:ff:ff
    inet 192.168.3.33/24 scope global enp0s9
        valid_lft forever preferred_lft forever
    inet 192.168.30.33/24 scope global enp0s9:1
        valid_lft forever preferred_lft forever
    inet 192.168.31.33/24 scope global enp0s9:2
        valid_lft forever preferred_lft forever
    inet 192.168.32.33/24 scope global enp0s9:3
        valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fe4e:536d/64 scope link
        valid_lft forever preferred_lft forever
root@tome:~#
```

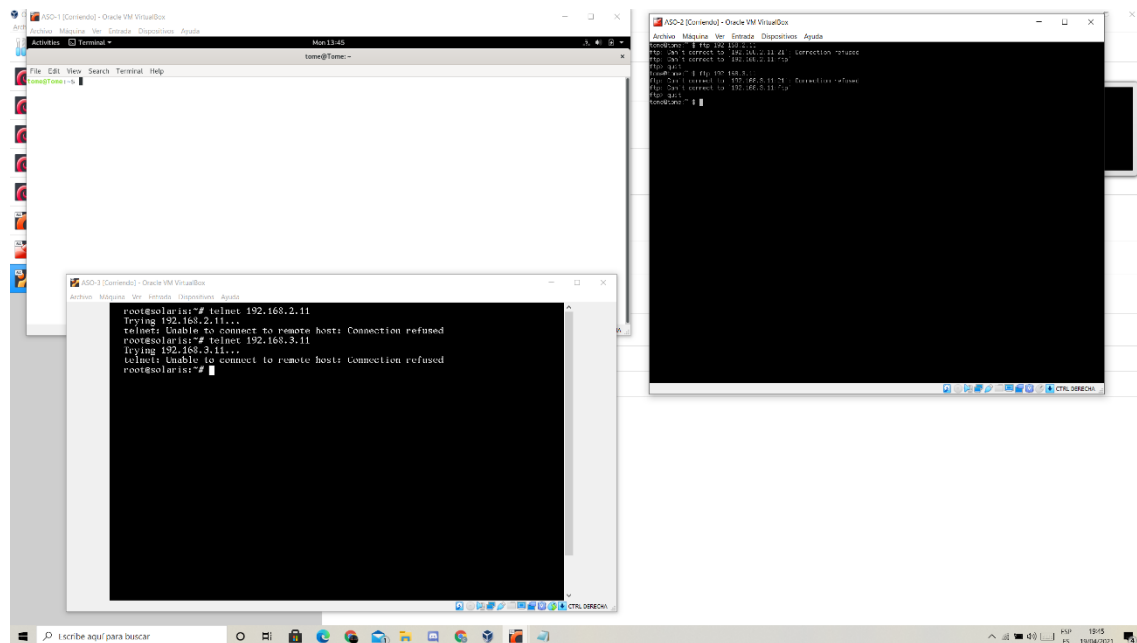
## Solaris 11 (ASO-3)

En Solaris las interfaces configuradas con ipadm ya son persistentes, por tanto no tuve que añadir ninguna configuración adicional.

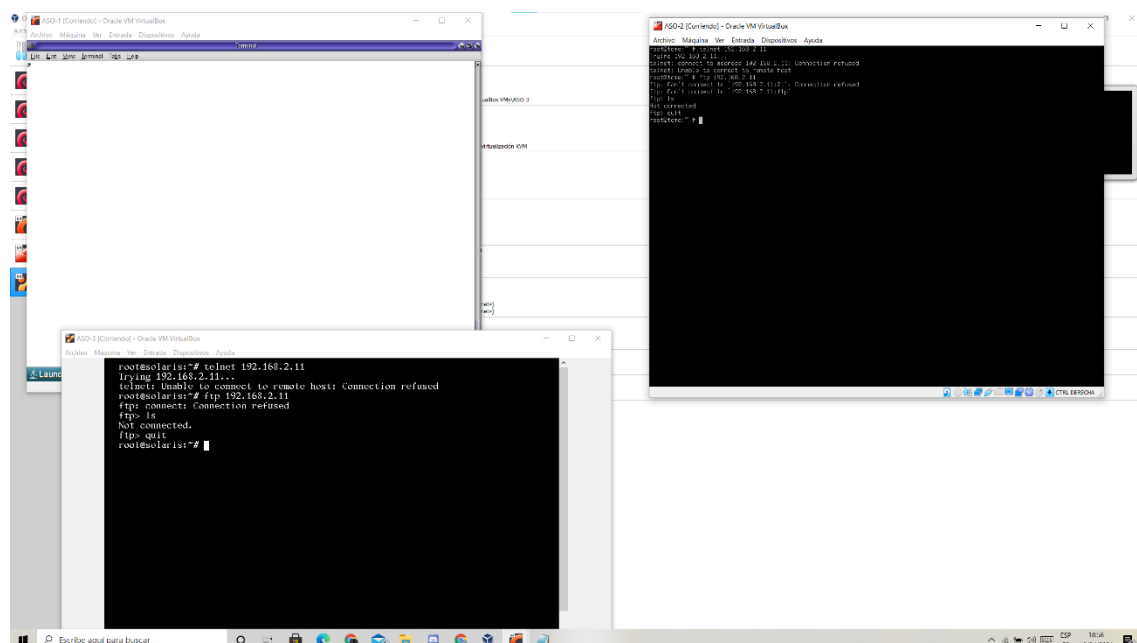
# CONFIGURACIÓN DE INETD Y LOS TCP WRAPPERS

1. Comprobar que tanto devuan como solaris 10 en la máquina 1 rechazan todas las conexiones ftp y telnet provenientes de las redes locales de las otras máquinas.

## Debian Linux



## Solaris 10

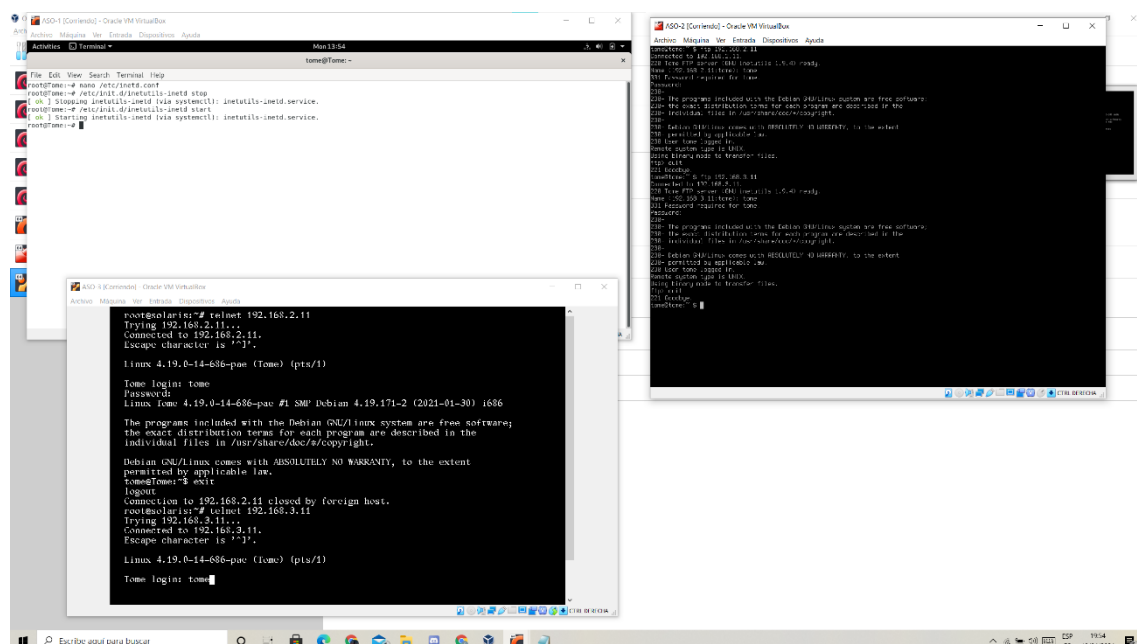
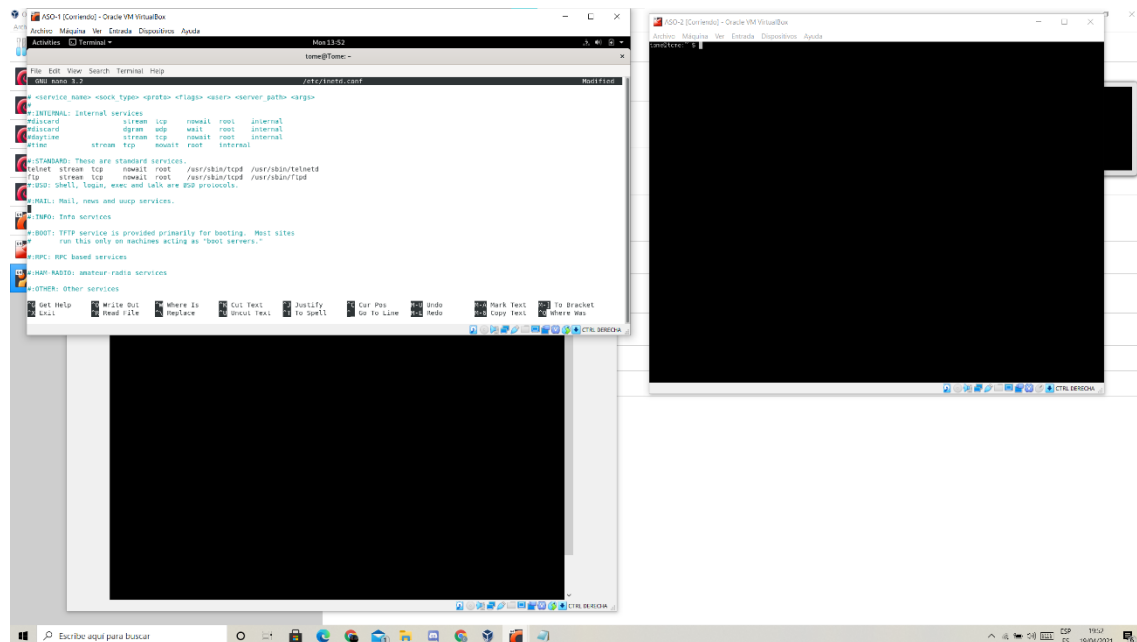


Podemos ver que las conexiones se rechazan a través de cualquiera de las dos tarjetas de red (en Solaris 10 se me olvidó probar la NIC 3, pero obviamente tampoco funcionaba)

## 2. Habilitar los servicios telnet y ftp en devuan (archivo /etc/inetd.conf) y en solaris (comando svcadm) y comprobar que se aceptan todas las conexiones ftp y telnet provenientes de las redes locales de las otras máquinas

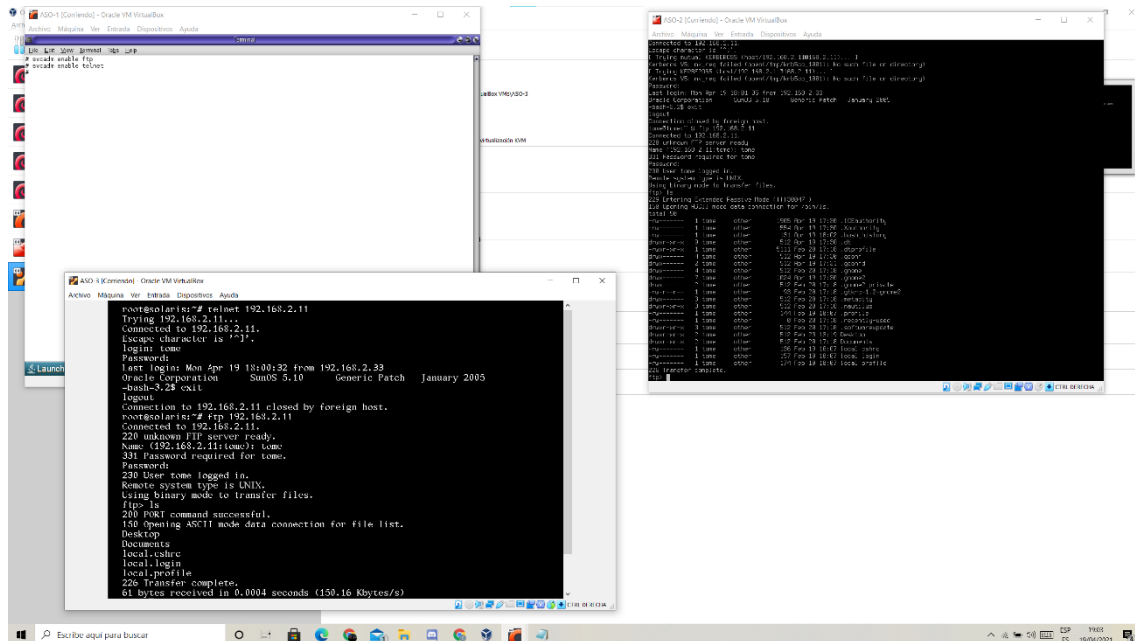
### Debian Linux

Edito el fichero de configuración de inetd, añado los servicios y reinicio inetd. A continuación, pruebo a conectarme a través de las dos tarjetas de red y ya funciona:



## Solaris 10

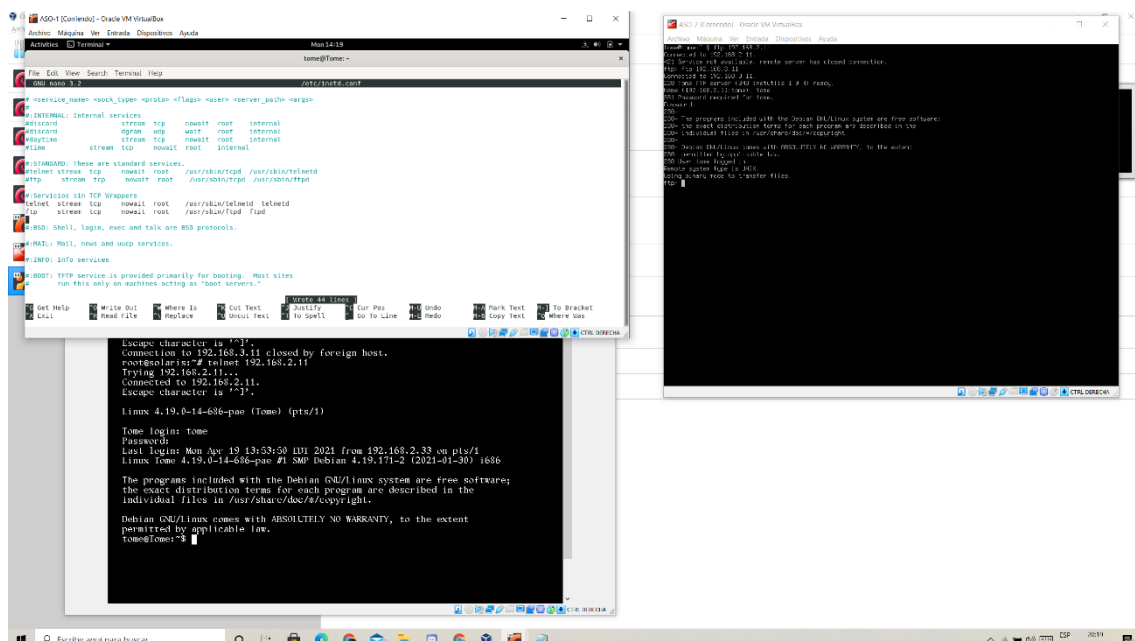
Habilito los servicios con el comando svcadm y ya compruebo que funciona:



3. Utilizando las tcpwrappers admitir las conexiones telnet en las ips de la NIC2 y rechazar las que entran por la NIC3. Para las conexiones ftp rechazar las de la NIC2 y admitir las de la NIC3 (en solaris 10, la página manual de hosts access se encuentra en /usr/sfw/share/man, concretamente en la sección 4)

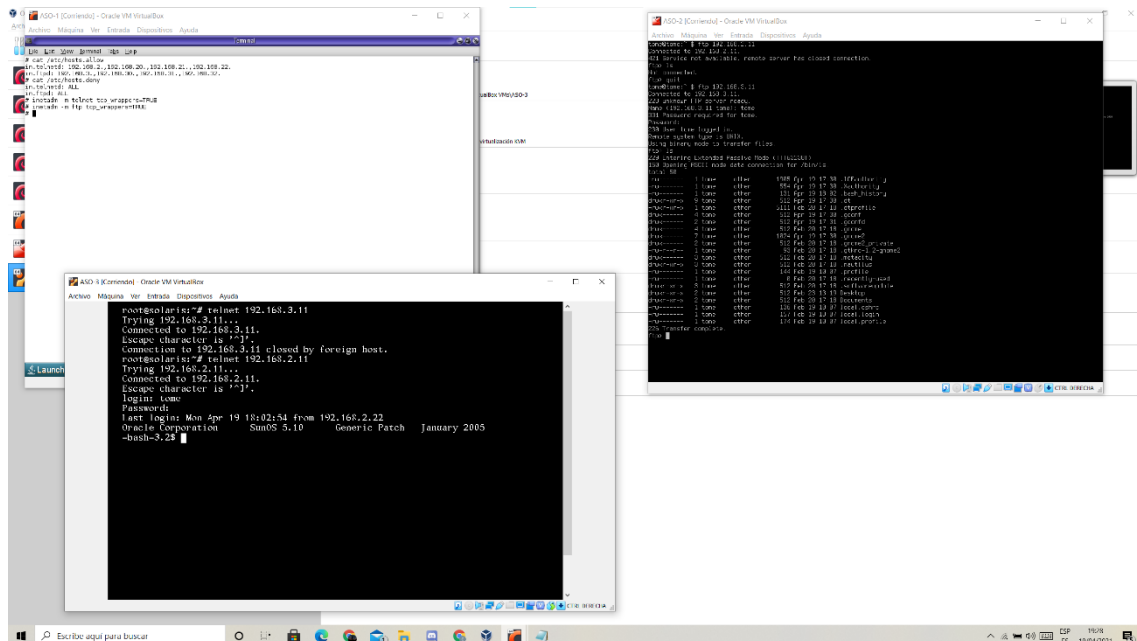
## Debian Linux

Edito los ficheros /etc/hosts.allow y /etc/hosts.deny como corresponde y compruebo que funciona:



## Solaris 10

Edito los ficheros `/etc/hosts.allow` y `/etc/hosts.deny` como corresponde y activo los TCP Wrappers con `inetadm`:

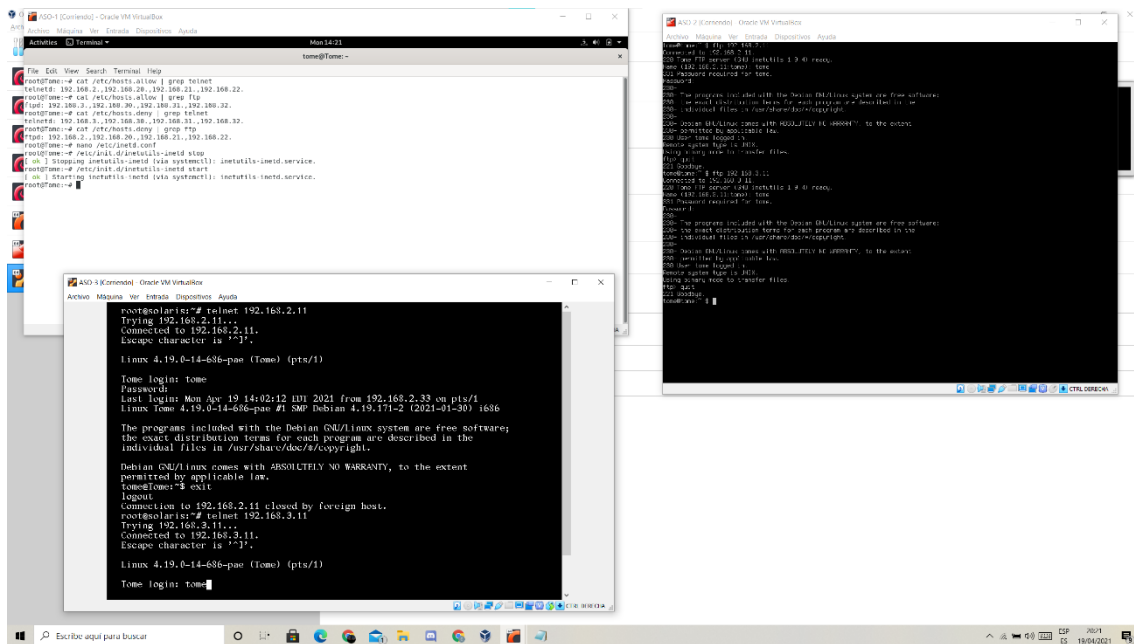


En Ubuntu los TCP Wrappers ya estaban activados porque cuando añadí los servicios en la configuración de `inetd`, configuré que `inetd` llamé a `tcpd` (que ejecutó el programa que le pases como argumento comprobando antes los TCP Wrappers para denegar o permitir el acceso).

**4. Sin modificar los ficheros `/etc/hosts.allow` y `/etc/hosts.deny`, deshabilitar las `tcpwrappers` y comprobar que se admiten todas las conexiones telnet y ftp en devuan y solaris 10.**

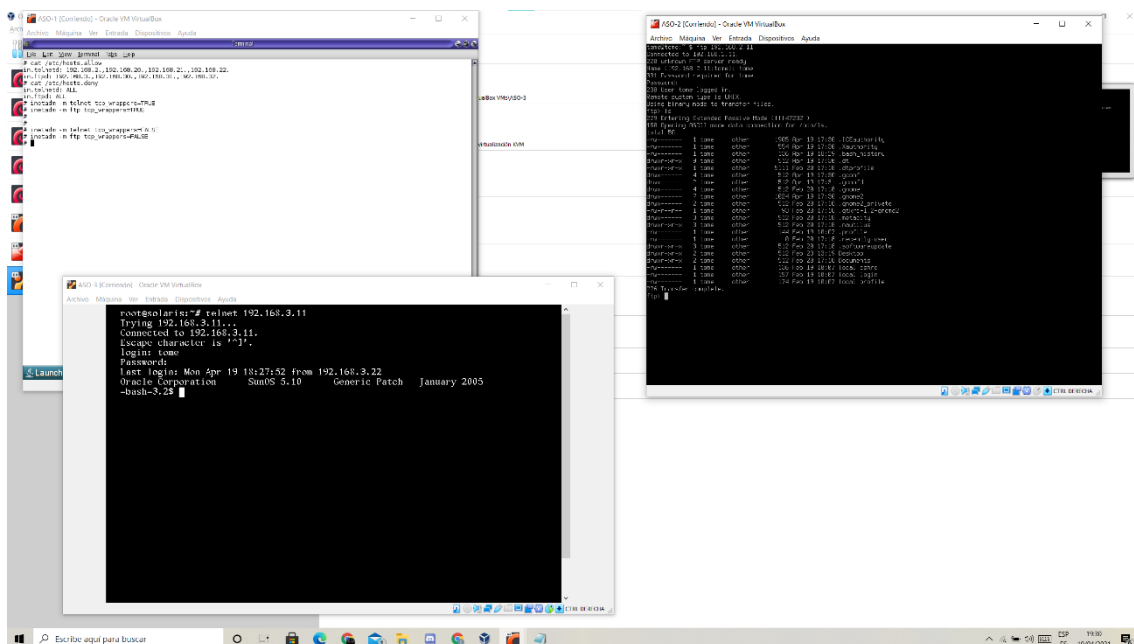
## Debian Linux

Para ello modifico la configuración de `inetd` para que llamé directamente a los programas correspondientes a los servicios telnet y ftp (sin llamarlos a través de `tcpd`):



## Solaris 10

Deshabilito los TCP Wrappers con inetadm:



**ACLARACIÓN:** Durante la explicación de la práctica me refiero a las interfaces de forma genérica, refiriéndome tanto a las interfaces como a los alias de esas interfaces.