

ACTIVIDAD 3 - REDES

Cristóbal Suárez Abad
OPTATIVA - 2º ASIR

Contenido

Parte 1 - Proyecto base (NAT por defecto)	2
Parte 2 - Red privada (Host-only)	4
Parte 3 - Reenvío de puertos	7
Parte 4 - Red pública (bridged)	11

Parte 1 - Proyecto base (NAT por defecto)

1. Crea una máquina virtual a partir del box ubuntu/jammy64

En el vagrantfile ponemos:

config.vm.box = "ubuntu/jammy64"

```
# boxes at https://vagrantcloud.com/sea
config.vm.box = "ubuntu/jammy64"
```

No nos habíamos bajado el box. Se lo baja automáticamente cuando hacemos “**vagrant up**”.

```
D:\Vagrant\actividad_3>vagrant up
Bringing machine 'default' up with 'virtualbox' provider...
==> default: Box 'ubuntu/jammy64' could not be found. Attempting to find and install...
default: Box Provider: virtualbox
default: Box Version: >= 0
==> default: Loading metadata for box 'ubuntu/jammy64'
default: URL: https://vagrantcloud.com/api/v2/vagrant/ubuntu/jammy64
==> default: Adding box 'ubuntu/jammy64' (v20241002.0.0) for provider: virtualbox
default: Downloading: https://vagrantcloud.com/ubuntu/boxes/jammy64/versions/20241002.0.0/providers/virtualbox/unknown/vagrant.box
default:
==> default: Successfully added box 'ubuntu/jammy64' (v20241002.0.0) for 'virtualbox'!
==> default: Importing base box 'ubuntu/jammy64'...
==> default: Matching MAC address for NAT networking...
```

2. Visualiza las interfaces de red y las ips usadas.

```
vagrant@ubuntu-jammy:~$ 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 02:72:47:2f:ff:80 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 metric 100 brd 10.0.2.255 scope global dynamic enp0s3
        valid_lft 86182sec preferred_lft 86182sec
    inet6 fd00::72:47ff:fe2f:ff80/64 scope global dynamic mngtmpaddr noprefixroute
        valid_lft 86184sec preferred_lft 14184sec
    inet6 fe80::72:47ff:fe2f:ff80/64 scope link
        valid_lft forever preferred_lft forever
vagrant@ubuntu-jammy:~$
```

3. ¿Tienes acceso a internet?

Si.

```
vagrant@ubuntu-jammy:~$ ping x.uk
PING x.uk (185.249.71.213) 56(84) bytes of data.
64 bytes from 185.249.71.213 (185.249.71.213): icmp_seq=1 ttl=255 time=34.5 ms
64 bytes from 185.249.71.213 (185.249.71.213): icmp_seq=2 ttl=255 time=35.0 ms
64 bytes from 185.249.71.213 (185.249.71.213): icmp_seq=3 ttl=255 time=34.7 ms
^C
--- x.uk ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2696ms
rtt min/avg/max/mdev = 34.521/34.731/35.010/0.205 ms
```

Parte 2 - Red privada (Host-only)

1. Configura red privada con ip fija

modificamos el vagrantfile:

config.vm.network "private_network", ip: "192.168.50.65"

```
# config.vm.network "private_network", ip: "192.168.33.10"
config.vm.network "private_network", ip: "192.168.50.65"
```

2. Recarga la máquina virtual.

```
D:\Vagrant\actividad_3>vagrant reload
==> default: Checking if box 'ubuntu/jammy64' version '20241002.0.0' is up to date...
==> default: Clearing any previously set network interfaces...
==> default: Preparing network interfaces based on configuration...
    default: Adapter 1: nat
    default: Adapter 2: hostonly
==> default: Forwarding ports...
    default: 22 (guest) => 2222 (host) (adapter 1)
==> default: Running 'pre-boot' VM customizations...
==> default: Booting VM...
==> default: Waiting for machine to boot. This may take a few minutes...
    default: SSH address: 127.0.0.1:2222
    default: SSH username: vagrant
    default: SSH auth method: private key
    default: Warning: Connection reset. Retrying...
==> default: Machine booted and ready!
==> default: Checking for guest additions in VM...
    default: The guest additions on this VM do not match the installed version of
    default: VirtualBox! In most cases this is fine, but in rare cases it can
    default: prevent things such as shared folders from working properly. If you see
    default: shared folder errors, please make sure the guest additions within the
    default: virtual machine match the version of VirtualBox you have installed on
    default: your host and reload your VM.
    default:
    default: Guest Additions Version: 6.0.0 r127566
    default: VirtualBox Version: 7.1
==> default: Configuring and enabling network interfaces...
==> default: Mounting shared folders...
    default: D:/Vagrant/actividad_3 => /vagrant
==> default: Machine already provisioned. Run `vagrant provision` or use the `--provision`
==> default: flag to force provisioning. Provisioners marked to run always will still run.
```

3. Visualiza las interfaces de red y las ips usadas.

```

❏ Selecccionar vagrant@ubuntu-jammy: ~
vagrant@ubuntu-jammy:~$ 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 02:72:47:2f:ff:80 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 metric 100 brd 10.0.2.255 scope global dynamic enp0s3
        valid_lft 86367sec preferred_lft 86367sec
    inet6 fd00::72:47ff:fe2f:ff80/64 scope global dynamic mngtmpaddr noprefixroute
        valid_lft 86368sec preferred_lft 14368sec
    inet6 fe80::72:47ff:fe2f:ff80/64 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 08:00:27:01:4c:d5 brd ff:ff:ff:ff:ff:ff
    inet 192.168.50.65/24 brd 192.168.50.255 scope global enp0s8
        valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fe01:4cd5/64 scope link
        valid_lft forever preferred_lft forever
vagrant@ubuntu-jammy:~$

```

4. ¿Tienes acceso a internet?

Si. No de manera directa, pero lo tiene. Hay que tener en cuenta que la interfaz de la red NAT sigue activa.

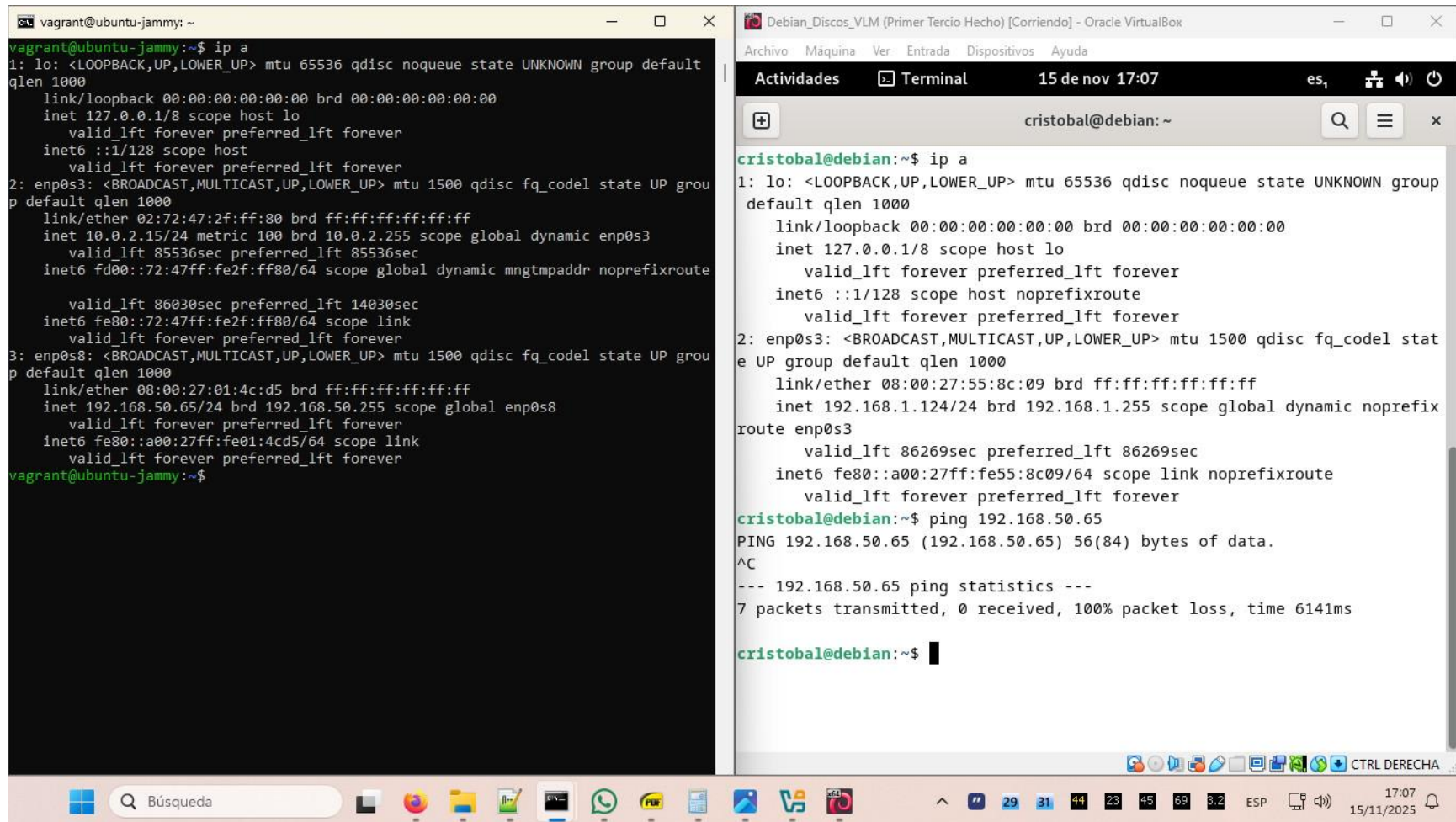
```

vagrant@ubuntu-jammy:~$ ping x.uk
PING x.uk (185.249.71.213) 56(84) bytes of data.
64 bytes from 185.249.71.213 (185.249.71.213): icmp_seq=1 ttl=255
64 bytes from 185.249.71.213 (185.249.71.213): icmp_seq=2 ttl=255
64 bytes from 185.249.71.213 (185.249.71.213): icmp_seq=3 ttl=255
64 bytes from 185.249.71.213 (185.249.71.213): icmp_seq=4 ttl=255
^C
--- x.uk ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3004ms
rtt min/avg/max/mdev = 34.091/34.984/36.632/1.010 ms
vagrant@ubuntu-jammy:~$

```


5. ¿Puedes acceder a esta máquina virtual desde otro equipo?

No, probado con otra VM en modo bridge en la misma red que el equipo host.



The image shows two terminal windows side-by-side. The left window is a host terminal (Ubuntu) showing the output of the 'ip a' command, displaying details for the loopback interface 'lo' and two ethernet interfaces 'enp0s3' and 'enp0s8'. The right window is a virtual machine terminal (Debian) showing the output of 'ip a' and a 'ping' command to the IP 192.168.50.65. The ping command results in a 100% packet loss, indicating that the VM is not connected to the same network as the host.

```
vagrant@ubuntu-jammy: ~  
vagrant@ubuntu-jammy:~$ 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 grou  
p default qlen 1000  
    link/ether 02:72:47:2f:ff:80 brd ff:ff:ff:ff:ff:ff  
    inet 10.0.2.15/24 metric 100 brd 10.0.2.255 scope global dynamic enp0s3  
        valid_lft 85536sec preferred_lft 85536sec  
    inet6 fd00::72:47ff:fe2f:ff80/64 scope global dynamic mngtmpaddr noprefixroute  
        valid_lft 86030sec preferred_lft 14030sec  
    inet6 fe80::72:47ff:fe2f:ff80/64 scope link  
        valid_lft forever preferred_lft forever  
3: enp0s8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP grou  
p default qlen 1000  
    link/ether 08:00:27:01:4c:d5 brd ff:ff:ff:ff:ff:ff  
    inet 192.168.50.65/24 brd 192.168.50.255 scope global enp0s8  
        valid_lft forever preferred_lft forever  
    inet6 fe80::a00:27ff:fe01:4cd5/64 scope link  
        valid_lft forever preferred_lft forever  
vagrant@ubuntu-jammy:~$  
  
Debian_Discos_VLM (Primer Tercio Hecho) [Corriendo] - Oracle VirtualBox  
Archivo Máquina Ver Entrada Dispositivos Ayuda  
Actividades Terminal 15 de nov 17:07 es, [iconos]  
cristobal@debian: ~ [iconos]  
cristobal@debian:~$ ip a  
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group  
default qlen 1000  
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00  
    inet 127.0.0.1/8 scope host lo  
        valid_lft forever preferred_lft forever  
    inet6 ::1/128 scope host noprefixroute  
        valid_lft forever preferred_lft forever  
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel stat  
e UP group default qlen 1000  
    link/ether 08:00:27:55:8c:09 brd ff:ff:ff:ff:ff:ff  
    inet 192.168.1.124/24 brd 192.168.1.255 scope global dynamic noprefix  
route enp0s3  
        valid_lft 86269sec preferred_lft 86269sec  
    inet6 fe80::a00:27ff:fe55:8c09/64 scope link noprefixroute  
        valid_lft forever preferred_lft forever  
cristobal@debian:~$ ping 192.168.50.65  
PING 192.168.50.65 (192.168.50.65) 56(84) bytes of data.  
^C  
--- 192.168.50.65 ping statistics ---  
7 packets transmitted, 0 received, 100% packet loss, time 6141ms  
  
cristobal@debian:~$
```

Parte 3 - Reenvío de puertos

1. Crea un aprovisionamiento instalando nginx

Vamos a hacerlo por el método del archivo, parece mas limpio:

Creemos archivo "install_nginx.sh" y metemos:

```
#!/bin/bash
echo "Instalando Nginx..."
sudo apt update
sudo apt install -y nginx
sudo systemctl start nginx
sudo systemctl enable nginx
echo "He instalado nginx, como mola."
```

```
#!/bin/bash
echo "Instalando Nginx..."
sudo apt update
sudo apt install -y nginx
sudo systemctl start nginx
sudo systemctl enable nginx
echo "He instalado nginx, como mola."
```

Modificamos el vagrantfile

```
config.vm.provision "shell", path: "install_nginx.sh"
```

```
end
```

Hacemos un "vagrant provision".

```
D:\Vagrant\actividad_3>vagrant provision
==> default: Running provisioner: shell...
default: Running: C:/Users/CRISTO~1/AppData/Local/Temp/vagrant-shell20251115-10996-bpu4nk.sh
default: Instalando Nginx...
default:
default: WARNING: apt does not have a stable CLI interface. Use with caution in scripts.
default:
default: Get:1 http://security.ubuntu.com/ubuntu jammy-security InRelease [129 kB]
default: Hit:2 http://archive.ubuntu.com/ubuntu jammy InRelease
default: Get:3 http://archive.ubuntu.com/ubuntu jammy-updates InRelease [128 kB]
default:
default: No VM guests are running outdated hypervisor (qemu) binaries on
default: Synchronizing state of nginx.service with SysV service script wi
default: Executing: /lib/systemd/systemd-sysv-install enable nginx
default: He instalado nginx, como mola.
```


2. Mapea el puerto host y guest

config.vm.network "forwarded_port", guest: 80, host: 8080

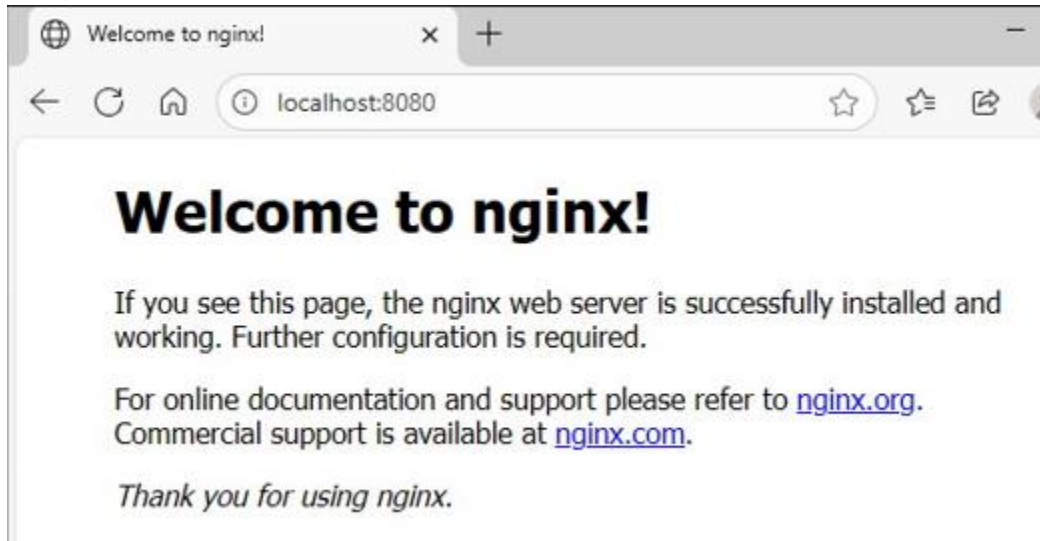
```
# NOTE: This will enable public access to the opened port
config.vm.network "forwarded_port", guest: 80, host: 8080
```

Hacemos un “**vagrant reload**”.

```
D:\Vagrant\actividad_3>vagrant reload
==> default: Attempting graceful shutdown of VM...
==> default: Checking if box 'ubuntu/jammy64' version '20241002.0.0' is up to date...
==> default: Clearing any previously set forwarded ports...
==> default: Clearing any previously set network interfaces...
==> default: Preparing network interfaces based on configuration...
    default: Adapter 1: nat
    default: Adapter 2: hostonly
==> default: Forwarding ports...
    default: 80 (guest) => 8080 (host) (adapter 1)
    default: 22 (guest) => 2222 (host) (adapter 1)
==> default: Running 'pre-boot' VM customizations...
==> default: Booting VM...
==> default: Waiting for machine to boot. This may take a few minutes...
    default: SSH address: 127.0.0.1:2222
    default: SSH username: vagrant
    default: SSH auth method: private key
    default: Warning: Connection reset. Retrying...
    default: Warning: Connection aborted. Retrying...
    default: Warning: Connection reset. Retrying...
==> default: Machine booted and ready!
==> default: Checking for guest additions in VM...
    default: The guest additions on this VM do not match the installed version of
    default: VirtualBox! In most cases this is fine, but in rare cases it can
    default: prevent things such as shared folders from working properly. If you see
    default: shared folder errors, please make sure the guest additions within the
    default: virtual machine match the version of VirtualBox you have installed on
    default: your host and reload your VM.
    default:
    default: Guest Additions Version: 6.0.0 r127566
    default: VirtualBox Version: 7.1
==> default: Configuring and enabling network interfaces...
==> default: Mounting shared folders...
    default: D:/Vagrant/actividad_3 => /vagrant
==> default: Machine already provisioned. Run `vagrant provision` or use the `--provision`
==> default: flag to force provisioning. Provisioners marked to run always will still run.
```

3. Desde el host accede a la web

Funciona.



4. Provocad una colisión cambiando host: 8080 a host: 80.

```
# NOTE: THIS WILL enable public access to the opened port
config.vm.network "forwarded_port", guest: 80, host: 80
```

Hacemos “vagrant reload”.

¿Qué avisa Vagrant?

Nos dice que estamos intentado usar un puerto por debajo del 1024, y esos están reservados para procesos privilegiados (del administrador).

**==> default: You are trying to forward to privileged ports (ports <= 1024). Most
 ==> default: operating systems restrict this to only privileged process (typically
 ==> default: processes running as an administrative user). This is a warning in case
 ==> default: the port forwarding doesn't work. If any problems occur, please try a
 ==> default: port higher than 1024.**

```
==> default: Clearing any previously set network interfaces...
==> default: Preparing network interfaces based on configuration...
default: Adapter 1: nat
default: Adapter 2: hostonly
==> default: You are trying to forward to privileged ports (ports <= 1024). Most
==> default: operating systems restrict this to only privileged process (typically
==> default: processes running as an administrative user). This is a warning in case
==> default: the port forwarding doesn't work. If any problems occur, please try a
==> default: port higher than 1024.
==> default: Forwarding ports...
default: 80 (guest) => 80 (host) (adapter 1)
default: 22 (guest) => 2222 (host) (adapter 1)
==> default: Running 'pre-boot' VM customizations...
```

Activad `auto_correct` y anotad el nuevo puerto.

config.vm.network "forwarded_port", guest: 80, host: 80, auto_correct: true

```
# NOTE: THIS WILL ENABLE PUBLIC ACCESS TO THE OPENED PORT
config.vm.network "forwarded_port", guest: 80, host: 80, auto_correct: true
```

Me redirige el puerto al 2201

NOTA: He tenido que poner un servicio en el puerto 80, porque automáticamente no me lo redirige si está libre.

```
=> default: Checking if box 'ubuntu/jammy64' version '20241002.0.0' is up to date...
=> default: Clearing any previously set forwarded ports...
=> default: Fixed port collision for 80 => 80. Now on port 2201.
=> default: Clearing any previously set network interfaces...
=> default: Preparing network interfaces based on configuration...
    default: Adapter 1: nat
    default: Adapter 2: hostonly
=> default: Forwarding ports...
    default: 80 (guest) => 2201 (host) (adapter 1)
    default: 22 (guest) => 2222 (host) (adapter 1)
=> default: Running 'pre-boot' VM customizations...
=> default: Booting VM...
=> default: Waiting for machine to boot. This may take a few minutes...
    default: SSH address: 127.0.0.1:2222
    default: SSH username: vagrant
    default: SSH auth method: private key
```


Parte 4 - Red pública (bridged)

1. Añadir adaptador puente para que la VM sea un “equipo más” en la LAN del aula

Modificamos vagrantfile

config.vm.network "public_network"

```
# your network.
config.vm.network "public_network"
```

2. Recarga la máquina virtual.

No nos deja porque tenemos una configuración de interfaces de red muy loca.

```
D:\Vagrant\actividad_3>vagrant reload
==> default: Checking if box 'ubuntu/jammy64' version '20241002.0.0' is up to date...
==> default: Fixed port collision for 80 => 80. Now on port 2202.
==> default: Fixed port collision for 22 => 2222. Now on port 2203.
==> default: Clearing any previously set network interfaces...
==> default: Available bridged network interfaces:
1) Intel(R) 82579LM Gigabit Network Connection
2) TAP-Windows Adapter V9 for OpenVPN Connect
==> default: When choosing an interface, it is usually the one that is
==> default: being used to connect to the internet.
==> default:
==> default: Which interface should the network bridge to? 1
==> default: Preparing network interfaces based on configuration...
==> default: Adapter 1: nat
==> default: Adapter 2: hostonly
==> default: Adapter 3: bridged
==> default: Forwarding ports...
==> default: 80 (guest) => 2202 (host) (adapter 1)
==> default: 22 (guest) => 2203 (host) (adapter 1)
==> default: Running 'pre-boot' VM customizations...
==> default: Booting VM...
==> default: Waiting for machine to boot. This may take a few minutes...
==> default: SSH address: 127.0.0.1:2203
==> default: SSH username: vagrant
==> default: SSH auth method: private key
Timed out while waiting for the machine to boot. This means that
Vagrant was unable to communicate with the guest machine within
the configured ("config.vm.boot_timeout" value) time period.

If you look above, you should be able to see the error(s) that
Vagrant had when attempting to connect to the machine. These errors
are usually good hints as to what may be wrong.

If you're using a custom box, make sure that networking is properly
working and you're able to connect to the machine. It is a common
problem that networking isn't setup properly in these boxes.
Verify that authentication configurations are also setup properly,
as well.

If the box appears to be booting properly, you may want to increase
the timeout ("config.vm.boot_timeout") value.

D:\Vagrant\actividad_3>
```

Hacemos una limpieza y dejamos solo la configuración necesaria para esta parte de la actividad. Es decir, solo: **config.vm.network "public_network"**

Si en nuestro host tenemos más de una interfaz de red nos pedirá que elijamos una:

```
==> default: Clearing any previously set network interfaces...
==> default: Available bridged network interfaces:
1) Intel(R) 82579LM Gigabit Network Connection
2) TAP-Windows Adapter V9 for OpenVPN Connect
==> default: When choosing an interface, it is usually the one that is
==> default: being used to connect to the internet.
==> default:
default: Which interface should the network bridge to? 1
default: Preparing network interfaces based on configuration
```

3. Visualiza las interfaces de red y las ips usadas.

```
Last login: Sat Nov 15 16:21:09 2025 from 10.0.2.2
vagrant@ubuntu-jammy:~$ 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 02:72:47:2f:ff:80 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 metric 100 brd 10.0.2.255 scope global dynamic enp0s3
        valid_lft 86358sec preferred_lft 86358sec
    inet6 fd00::72:47ff:fe2f:ff80/64 scope global dynamic mngtmpaddr noprefixroute
        valid_lft 86358sec preferred_lft 14358sec
    inet6 fe80::72:47ff:fe2f:ff80/64 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 08:00:27:01:4c:d5 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.33/24 metric 100 brd 192.168.1.255 scope global dynamic enp0s8
        valid_lft 86362sec preferred_lft 86362sec
    inet6 fe80::a00:27ff:fe01:4cd5/64 scope link
        valid_lft forever preferred_lft forever
vagrant@ubuntu-jammy:~$
```

4. ¿Tienes acceso a internet?

Tengo acceso a Internet.

```
valid_lft forever preferred_lft forever
vagrant@ubuntu-jammy:~$ ping x.uk
PING x.uk (185.249.71.213) 56(84) bytes of data.
64 bytes from 185.249.71.213 (185.249.71.213): icmp_seq=1 ttl=55 time=33.9 ms
64 bytes from 185.249.71.213 (185.249.71.213): icmp_seq=2 ttl=255 time=34.3 ms
64 bytes from 185.249.71.213 (185.249.71.213): icmp_seq=3 ttl=55 time=33.3 ms
64 bytes from 185.249.71.213 (185.249.71.213): icmp_seq=4 ttl=255 time=34.6 ms
```


5. ¿Puedes acceder a esta máquina virtual desde otro equipo?

Si, tengo acceso. Soy capaz de hacer ping, pero hay algún problema en la configuración de SSH que no me permite iniciar sesión.

