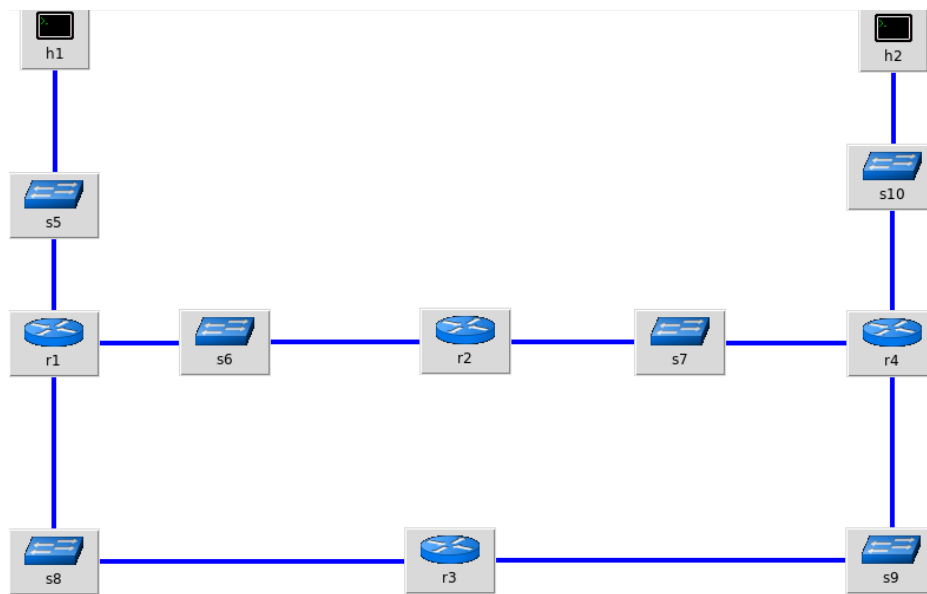


# 1. Esquema ESCENARIO 5



## 2. COMANDOS UTILIZADOS

### ASIGNACIÓN DE IP'S Y RUTAS DE ENCAMINAMIENTO A LOS ELEMENTOS DE LA RED

- H1 -

**#ip a** → Para comprobar las interfaces de red si tienen ip o en el caso de añadirla probar si se han añadido correctamente.

**#ip a add** → Para añadir ip a la interfaz.

```
"Node: h1" (on mininet-vm)
root@mininet-vm:~# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default
    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
2: h1-eth0@if23: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 62:26:ec:fb:59:2d brd ff:ff:ff:ff:ff:ff
    inet 10.0.0.1/8 brd 10.255.255.255 scope global h1-eth0
        valid_lft forever preferred_lft forever
    inet 192.168.1.2/24 scope global h1-eth0
        valid_lft forever preferred_lft forever
root@mininet-vm:~#
```

**#ip r** → Para comprobar la tabla de encaminamiento

**#ip r add** → Para añadir ruta de encaminamiento

```
"Node: h1" (on mininet-vm)
root@mininet-vm:~# ip r
10.0.0.0/8 dev h1-eth0 proto kernel scope link src 10.0.0.1
192.168.1.0/24 dev h1-eth0 proto kernel scope link src 192.168.1.2
192.168.6.2 via 192.168.1.1 dev h1-eth0
root@mininet-vm:~#
```

La ruta de encaminamiento que esta subrayada de verde es la que se pone por defecto al asignarle una ip a la interfaz de red. Y la subrayada de rojo es la que hemos añadido nosotros

- H2 -

```
"Node: h2" (on mininet-vm)
root@mininet-vm:~# ip r
10.0.0.0/8 dev h2-eth0 proto kernel scope link src 10.0.0.2
192.168.1.2 via 192.168.6.1 dev h2-eth0
192.168.6.0/24 dev h2-eth0 proto kernel scope link src 192.168.6.2
root@mininet-vm:~# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default
    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
2: h2-eth0@if34: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 3a:ca:29:20:62:99 brd ff:ff:ff:ff:ff:ff
    inet 10.0.0.2/8 brd 10.255.255.255 scope global h2-eth0
        valid_lft forever preferred_lft forever
    inet 192.168.6.2/24 scope global h2-eth0
        valid_lft forever preferred_lft forever
root@mininet-vm:~#
```

- R1 -

```
"Node: r1" (on mininet-vm)
root@mininet-vm:~# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default
    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
2: r1-eth0@if24: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether ee:eh:0f:8c:c4:36 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.1/24 scope global r1-eth0
        valid_lft forever preferred_lft forever
3: r1-eth1@if25: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 6a:c6:80:eb:55:c7 brd ff:ff:ff:ff:ff:ff
    inet 192.168.2.1/24 scope global r1-eth1
        valid_lft forever preferred_lft forever
4: r1-eth2@if26: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 76:24:dd:5c:aa:34 brd ff:ff:ff:ff:ff:ff
    inet 192.168.4.1/24 scope global r1-eth2
        valid_lft forever preferred_lft forever
root@mininet-vm:~#

"Node: r1" (on mininet-vm)
root@mininet-vm:~# ip r
192.168.1.0/24 dev r1-eth0 proto kernel scope link src 192.168.1.1
192.168.2.0/24 dev r1-eth1 proto kernel scope link src 192.168.2.1
192.168.4.0/24 dev r1-eth2 proto kernel scope link src 192.168.4.1
192.168.6.2 via 192.168.2.2 dev r1-eth1
root@mininet-vm:~#
```

- R2 -

```
"Node: r2" (on mininet-vm)

root@mininet-vm:~# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default
    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
2: r2-eth0@if27: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state
    UP group default qlen 1000
    link/ether 0e:7f:dd:15:78:93 brd ff:ff:ff:ff:ff:ff
    inet 192.168.2.2/24 scope global r2-eth0
        valid_lft forever preferred_lft forever
3: r2-eth1@if28: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state
    UP group default qlen 1000
    link/ether 8a:ch:b7:b8:ad:6b brd ff:ff:ff:ff:ff:ff
    inet 192.168.3.1/24 scope global r2-eth1
        valid_lft forever preferred_lft forever
root@mininet-vm:~#

"Node: r2" (on mininet-vm)

root@mininet-vm:~# ip r
192.168.1.2 via 192.168.2.1 dev r2-eth0
192.168.2.0/24 dev r2-eth0 proto kernel scope link src 192.168.2.2
192.168.3.0/24 dev r2-eth1 proto kernel scope link src 192.168.3.1
192.168.6.2 via 192.168.3.2 dev r2-eth1
root@mininet-vm:~#
```

- R3 -

```
"Node: r3" (on mininet-vm)

root@mininet-vm:~# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default
    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
2: r3-eth0@if29: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state
    UP group default qlen 1000
    link/ether 36:27:eb:7b:90:b6 brd ff:ff:ff:ff:ff:ff
    inet 192.168.4.2/24 scope global r3-eth0
        valid_lft forever preferred_lft forever
3: r3-eth1@if30: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state
    UP group default qlen 1000
    link/ether 92:e7:59:84:5a:f7 brd ff:ff:ff:ff:ff:ff
    inet 192.168.5.1/24 scope global r3-eth1
        valid_lft forever preferred_lft forever
root@mininet-vm:~#

"Node: r3" (on mininet-vm)

root@mininet-vm:~# ip r
192.168.1.2 via 192.168.4.1 dev r3-eth0
192.168.4.0/24 dev r3-eth0 proto kernel scope link src 192.168.4.2
192.168.5.0/24 dev r3-eth1 proto kernel scope link src 192.168.5.1
192.168.6.2 via 192.168.5.2 dev r3-eth1
root@mininet-vm:~#
```

```
"Node: r4" (on mininet-virtual-machine)

root@mininet-virtual-machine:~# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default
    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
2: r4-eth0@if31: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 26:5d:92:46:1c:70 brd ff:ff:ff:ff:ff:ff
    inet 192.168.3.2/24 scope global r4-eth0
        valid_lft forever preferred_lft forever
3: r4-eth1@if32: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether be:8d:50:84:56:87 brd ff:ff:ff:ff:ff:ff
    inet 192.168.5.2/24 scope global r4-eth1
        valid_lft forever preferred_lft forever
4: r4-eth2@if33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 46:36:3e:47:9e:66 brd ff:ff:ff:ff:ff:ff
    inet 192.168.6.1/24 scope global r4-eth2
        valid_lft forever preferred_lft forever
root@mininet-virtual-machine:~#

"Node: r4" (on mininet-virtual-machine)

root@mininet-virtual-machine:~# ip r
192.168.1.2 via 192.168.3.1 dev r4-eth0
192.168.3.0/24 dev r4-eth0 proto kernel scope link src 192.168.3.2
192.168.5.0/24 dev r4-eth1 proto kernel scope link src 192.168.5.2
192.168.6.0/24 dev r4-eth2 proto kernel scope link src 192.168.6.1
root@mininet-virtual-machine:~#
```

## CONECTIVIDAD ENTRE NODOS

Para comprobar conectividad e introducido el comando `#ping` y la ip donde quiero del host al que quiero hacer ping. Y para capturar el trafico he usado `#tcpdump -i nombre_del_host-nombre de la interfaz`.

```
"Node: h1" (on mininet-virtual-machine)

root@mininet-virtual-machine:~# ping 192.168.6.2 -c 6
PING 192.168.6.2 (192.168.6.2) 56(84) bytes of data:
64 bytes from 192.168.6.2: icmp_seq=1 ttl=61 time=1.64 ms
64 bytes from 192.168.6.2: icmp_seq=2 ttl=61 time=0.260 ms
64 bytes from 192.168.6.2: icmp_seq=3 ttl=61 time=0.175 ms

"Node: h2" (on mininet-virtual-machine)

root@mininet-virtual-machine:~# ping 192.168.1.2 -c 6
PING 192.168.1.2 (192.168.1.2) 56(84) bytes of data:
64 bytes from 192.168.1.2: icmp_seq=1 ttl=61 time=1.17 ms
64 bytes from 192.168.1.2: icmp_seq=2 ttl=61 time=0.182 ms
64 bytes from 192.168.1.2: icmp_seq=3 ttl=61 time=0.195 ms
```

## CAPTURA DE TRÁFICO

```
"Node: r3" (on mininet-vm)
root@mininet-vm:~# tcpdump -i r3-eth0 -c 6
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on r3-eth0, link-type EN10MB (Ethernet), capture size 262144 bytes
16:06:42.478047 IP 192.168.1.2 > 192.168.6.2: ICMP echo request, id 6211, seq 1,
length 64
16:06:42.478218 IP 192.168.6.2 > 192.168.1.2: ICMP echo reply, id 6211, seq 1, l
ength 64
16:06:43.479593 IP 192.168.1.2 > 192.168.6.2: ICMP echo request, id 6211, seq 2,
length 64
```

```
"Node: r2" (on mininet-vm)
length 64
16:42:21.145161 IP 192.168.6.2 > 192.168.1.2: ICMP echo reply, id 6747, seq 9, l
ength 64
16:42:22.147429 IP 192.168.1.2 > 192.168.6.2: ICMP echo request, id 6747, seq 10
, length 64
16:42:22.147503 IP 192.168.6.2 > 192.168.1.2: ICMP echo reply, id 6747, seq 10,
```