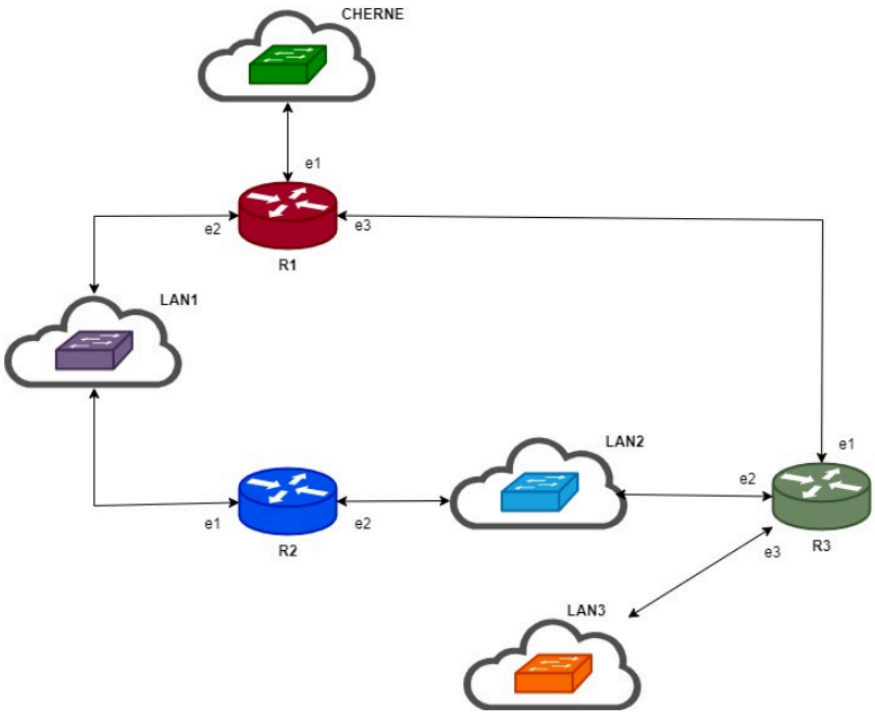
DHCP,DNS,NAT,RIPv2



Datos:

LAN1: 10.10.100.128/255.255.255.128

Red LAN1 = 10.10.100.128
Primera de la red = 10.10.100.129
Última de la red = 10.10.100.254
Broadcast = 10.10.100.255

LAN2: 172.16.2.0/255.255.254.0

Red LAN2 = 172.16.2.0/23
Primera de la red = 172.16.2.1
Última de la red = 172.16.3.254
Broadcast = 172.16.3.255

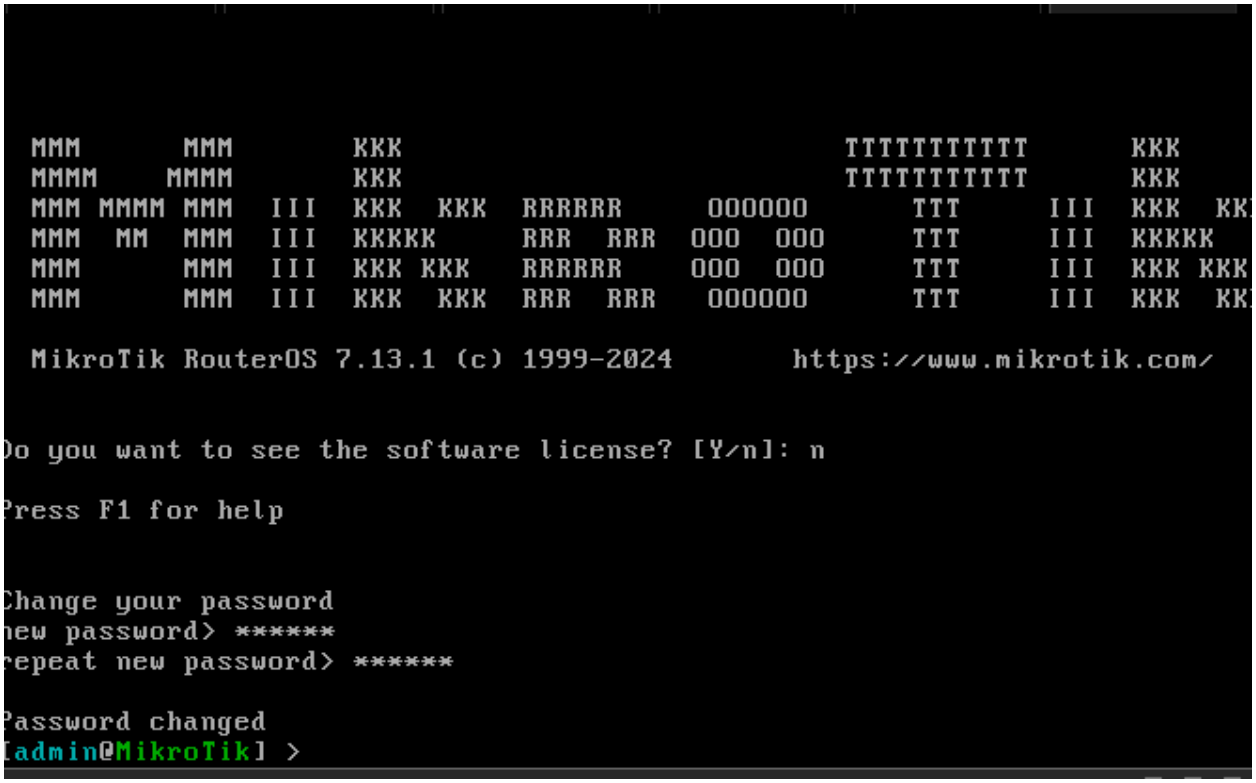
LAN3: 192.168.4.0/255.255.255.0

Red LAN3 = 192.168.4.0
Broadcast = 192.168.4.255
Primera de la red = 192.168.4.1
Última de la red = 192.168.4.254

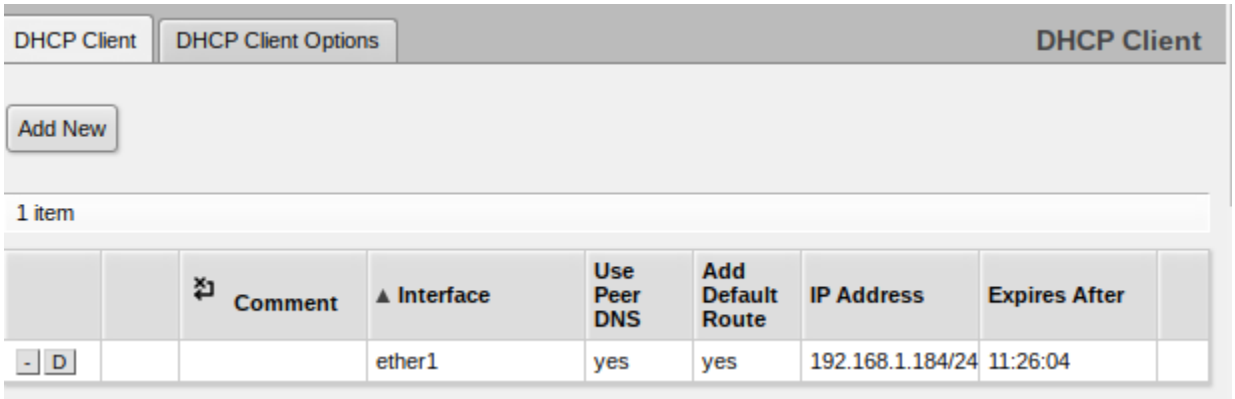
Enlace R1-R3: 192.168.100.0/30
Primera de la red = 192.168.100.1
Última de la red = 192.168.100.2

R1 IP en e1 dinámica sin utilizar NAT en VMware o Virtualbox
R1 IP en e2 la **primera** de la red
R1 IP en e3 la **última** de la red
R2 IP en e1 la **última** de la red
R2 IP en e2 la **primera** de la red
R3 IP en e1 la **primera** de la red
R3 IP en e2 la **última** de la red
R3 IP en e3 la **primera** de la red

1. Configura la passwd de admin: 123456 en los tres routers



2. Configura las direcciones IP en todas las interfaces de los tres routers. Configura solo las direcciones de Red de las interfaces, no las rutas. La interfaz e1 del R1 deberá configurarse como cliente DHCP y por tanto, se obtendrá una ruta por defecto en la red de CHERNE en este router.



Router 1:

Adaptador e1 está en bridged, con IP 192.168.1.184/24

```
#    ADDRESS            NETWORK         INTERFACE
0 D  192.168.1.184/24   192.168.1.0     ether1
1    10.10.100.129/25   10.10.100.128   ether2
2    192.168.100.2/30   192.168.100.0   ether3
```

Router 2:

```
# ADDRESS            NETWORK         INTERFACE
0 10.10.100.254/25   10.10.100.128   ether1
1 172.16.2.1/23      172.16.2.0      ether2
```

Router 3:

```
# ADDRESS            NETWORK         INTERFACE
0 172.16.3.254/23    172.16.2.0      ether2
1 192.168.4.1/24     192.168.4.0     ether3
2 192.168.100.1/30   192.168.100.0   ether1
```

3. Anota cuántas rutas existen en cada uno de los routers en este instante.

Router 1:

4 items

		Comment	▲ Dst. Address	Gateway	Distance	Pref. Source
-	DAd		0.0.0.0/0	192.168.1.1	1	
-	DAC		10.10.100.128/25	%ether2		
-	DAC		192.168.1.0/24	%ether1		
-	DAC		192.168.100.0/30	%ether3		

Router 2:

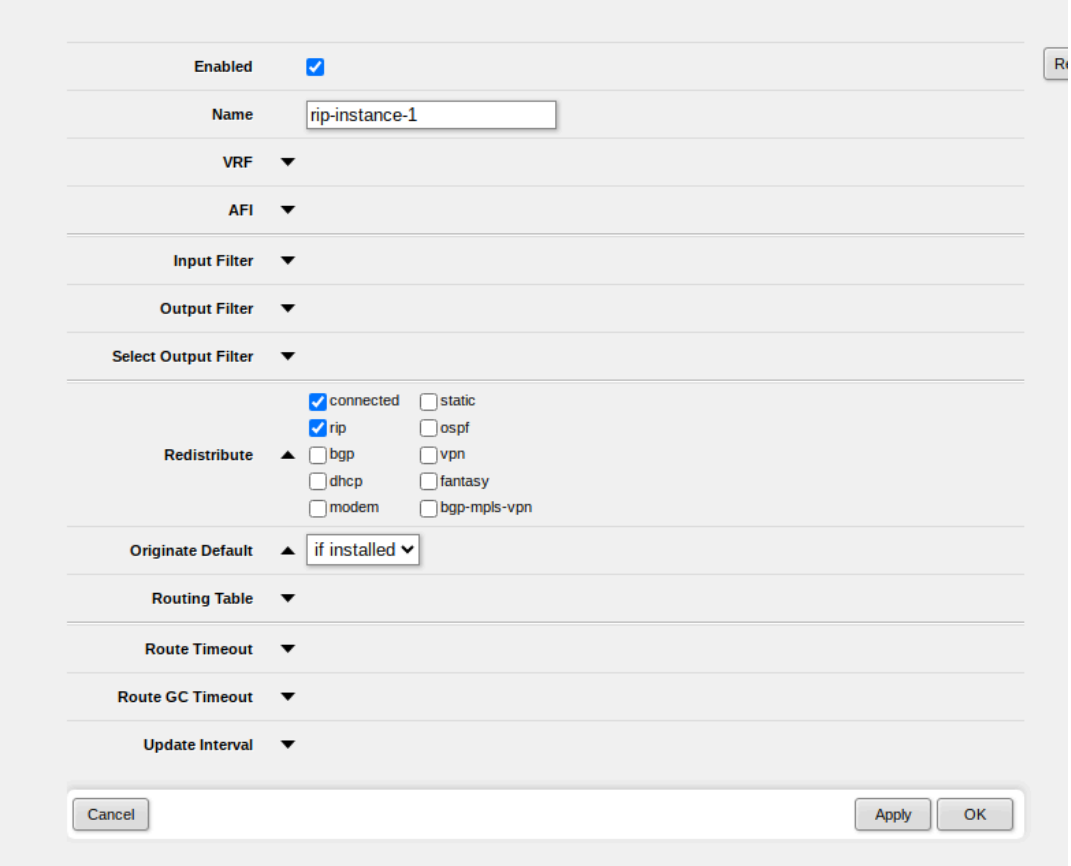
		Comment	▲ Dst. Address	Gateway
-	DAC		10.10.100.128/25	%ether1
-	DAC		172.16.2.0/23	%ether2

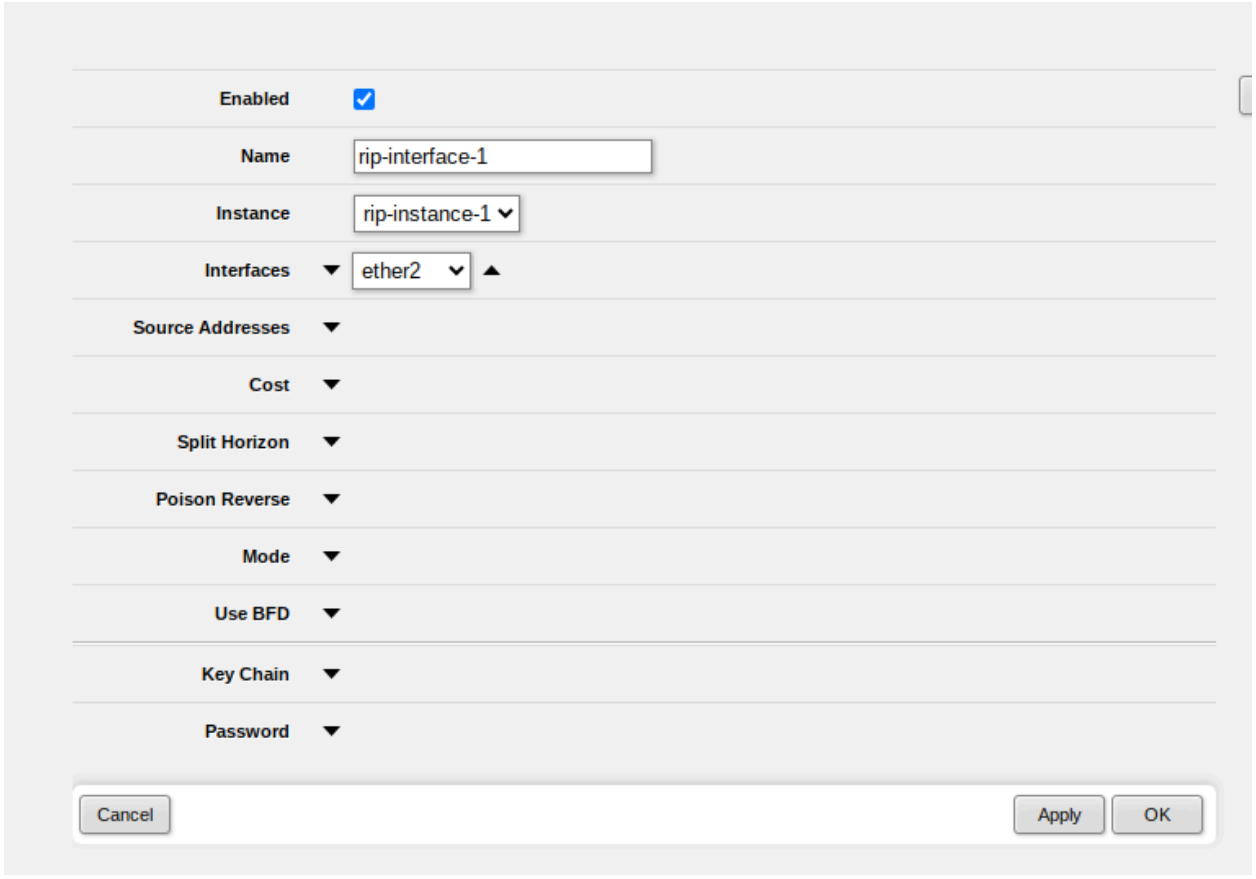
Router 3:

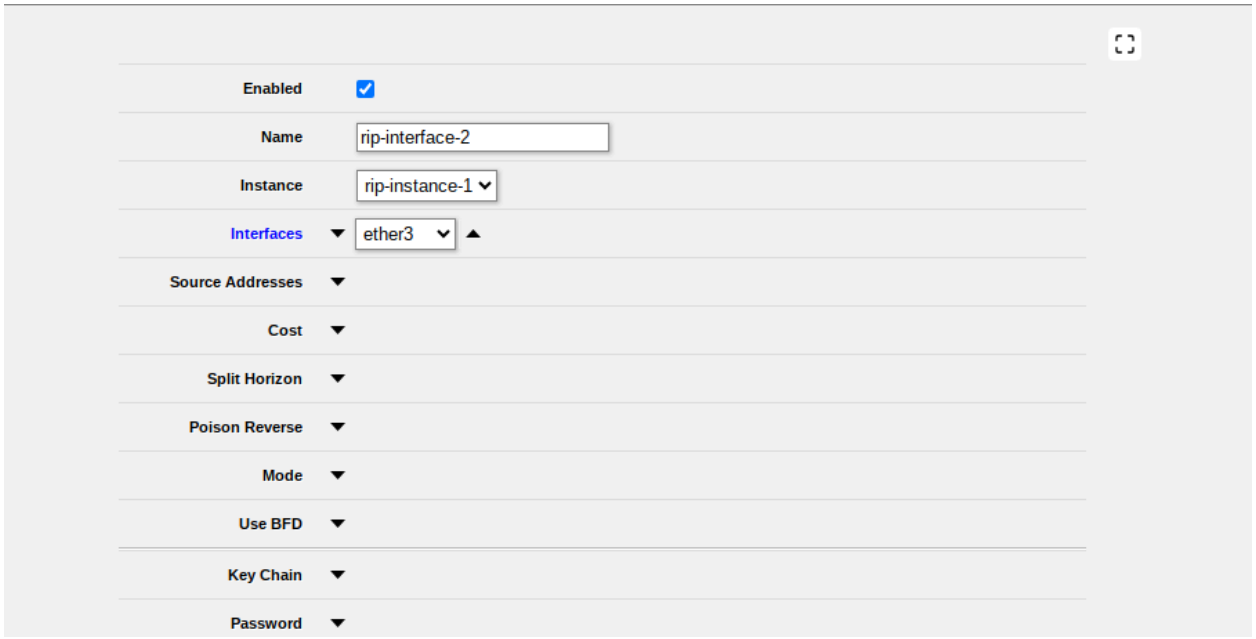
		Comment	▲ Dst. Address	Gateway
-	DAC		172.16.2.0/23	%ether2
-	DAC		192.168.4.0/24	%ether3
-	DAC		192.168.100.0/30	%ether1

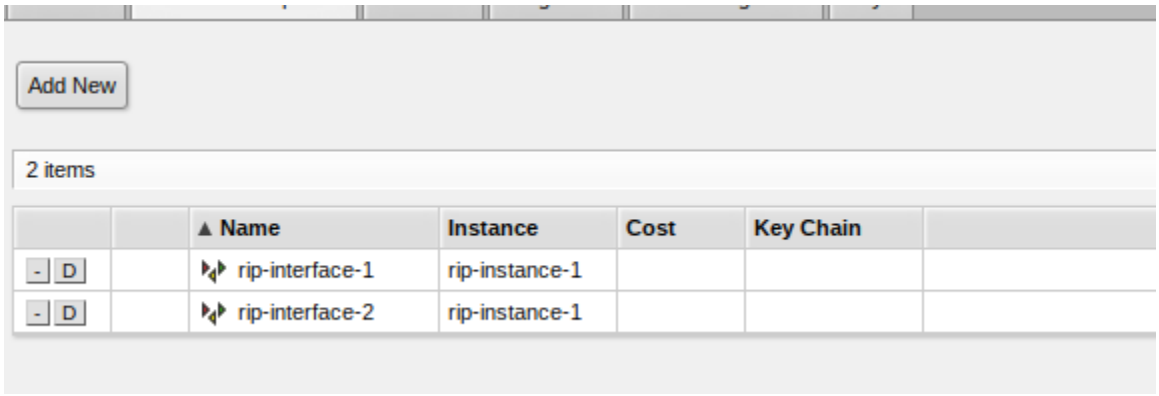
4. Activa RIP en R1 solo en las interfaces e2 y e3 y distribuye las rutas conectadas, las RIP y la ruta por defecto si está instalada. También activa RIP en R2 solo en la interfaz e1 para las rutas conectadas y las RIP. Anota las rutas existentes en los tres routers.

Router 1:




Enabled
Name
rip-interface-1
Instance
rip-instance-1
Interfaces
ether2
Source Addresses
Cost
Split Horizon
Poison Reverse
Mode
Use BFD
Key Chain
Password
Cancel
Apply
OK


Enabled
Name
rip-interface-2
Instance
rip-instance-1
Interfaces
ether3
Source Addresses
Cost
Split Horizon
Poison Reverse
Mode
Use BFD
Key Chain
Password



Router 2:

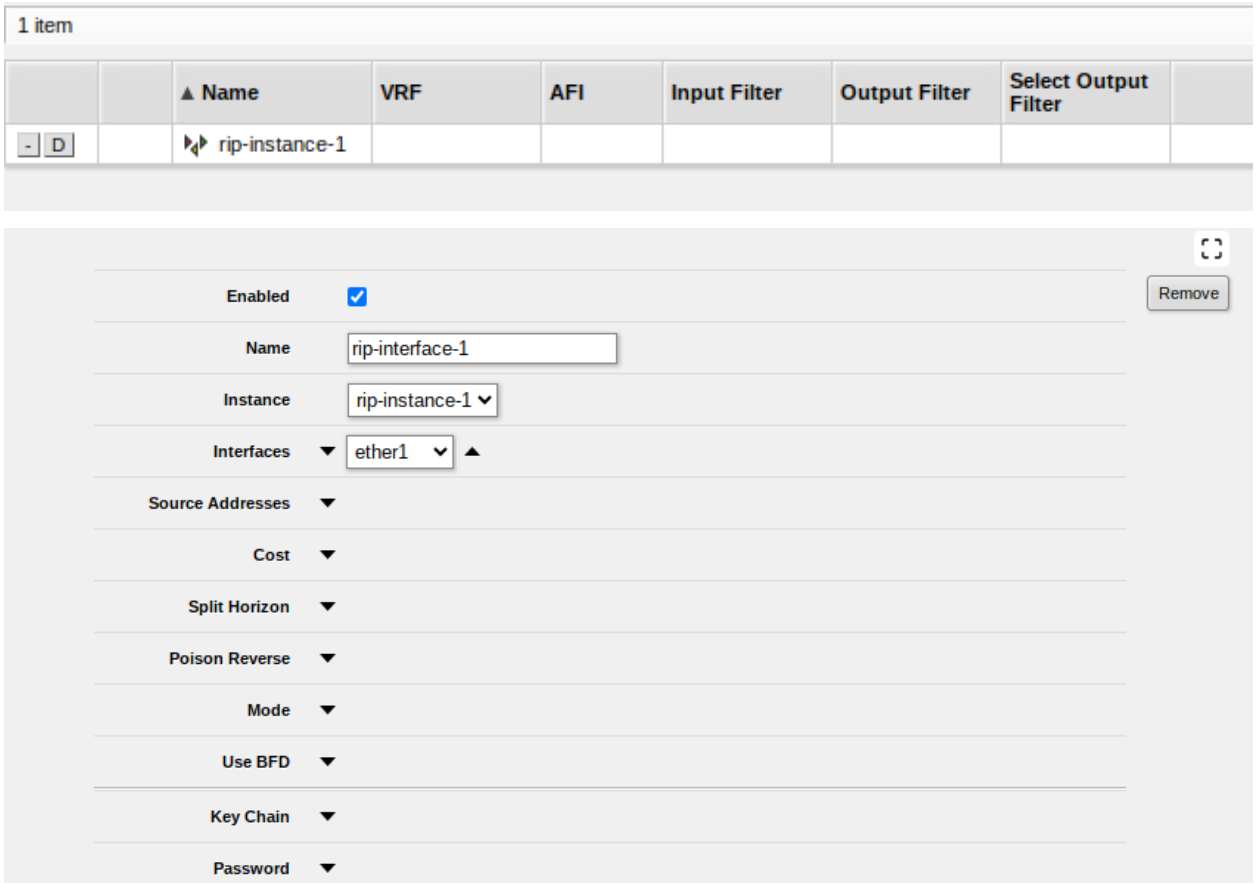


Tabla rutas nueva router 1:

		Comment	Dst. Address	Gateway	Distance	Pref. Source
-	DAd		0.0.0.0/0	192.168.1.1	1	
-	DAC		10.10.100.128/25	%ether2		
-	DAr		172.16.2.0/23	10.10.100.254%ether2	120	
-	DAC		192.168.1.0/24	%ether1		
-	DAC		192.168.100.0/30	%ether3		

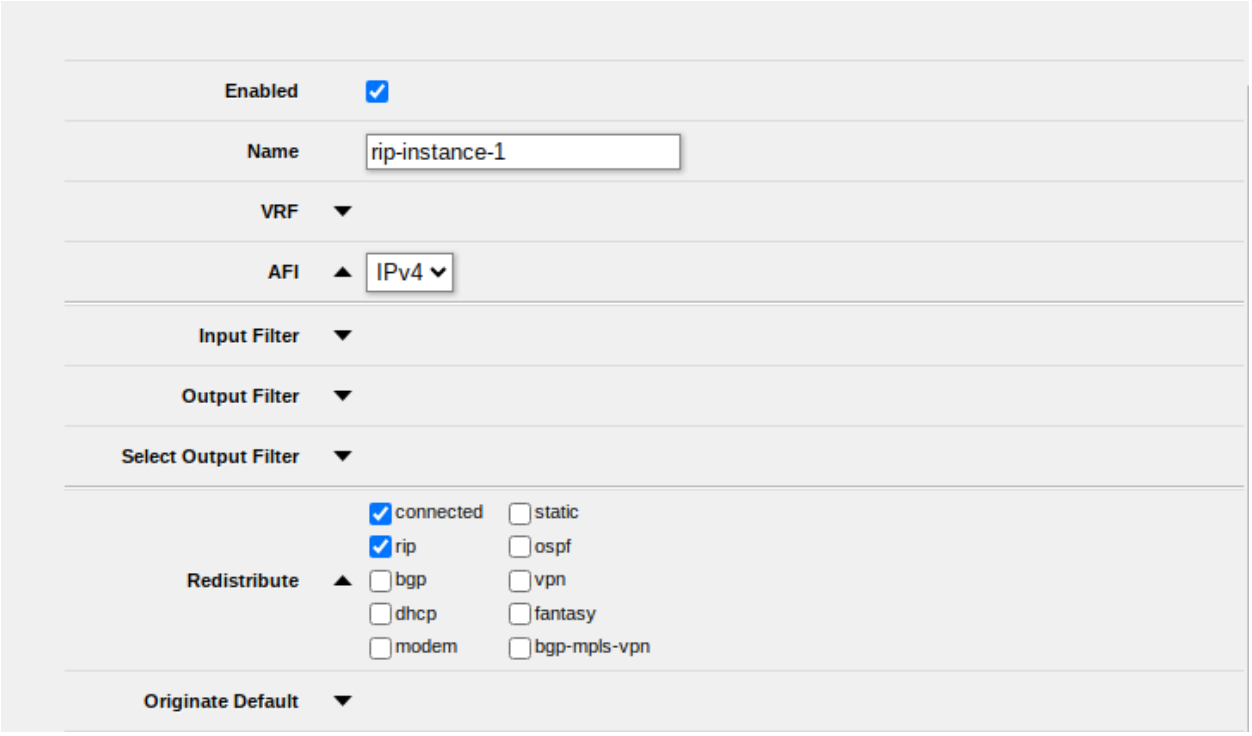
Tabla rutas nueva router 2:

		Comment	▲ Dst. Address	Gateway	Distance	Pref. Source
-	DAr		0.0.0.0/0	10.10.100.129%ether1	120	
-	DAC		10.10.100.128/25	%ether1		
-	DAC		172.16.2.0/23	%ether2		
-	DAr		192.168.1.0/24	10.10.100.129%ether1	120	
-	DAr		192.168.100.0/30	10.10.100.129%ether1	120	

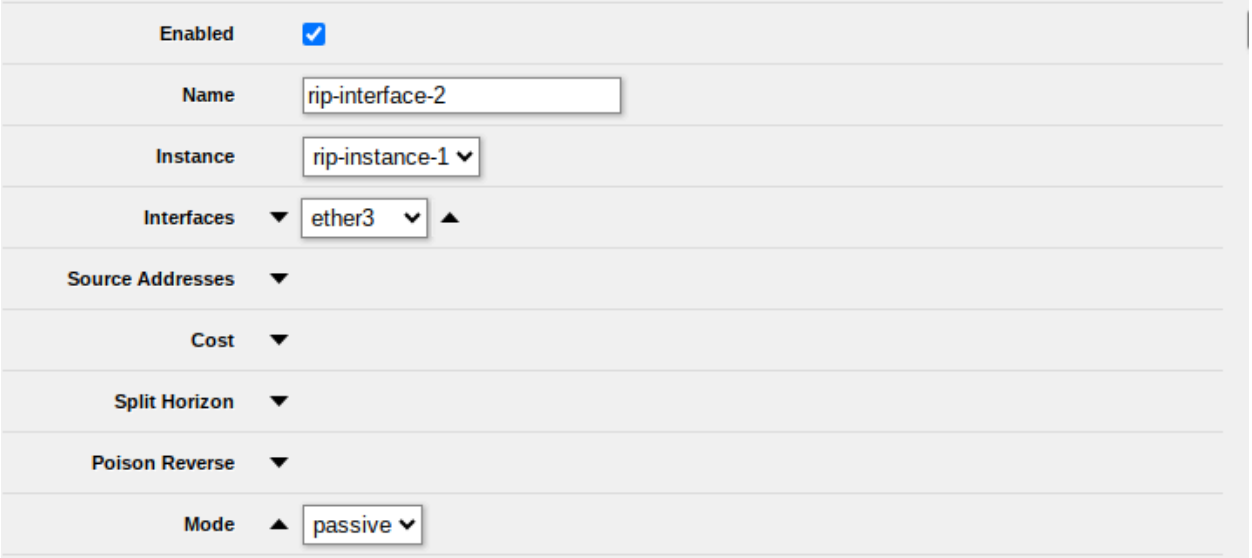
Tabla rutas router 3:

		Comment	▲ Dst. Address	Gateway
-	DAC		172.16.2.0/23	%ether2
-	DAC		192.168.4.0/24	%ether3
-	DAC		192.168.100.0/30	%ether1

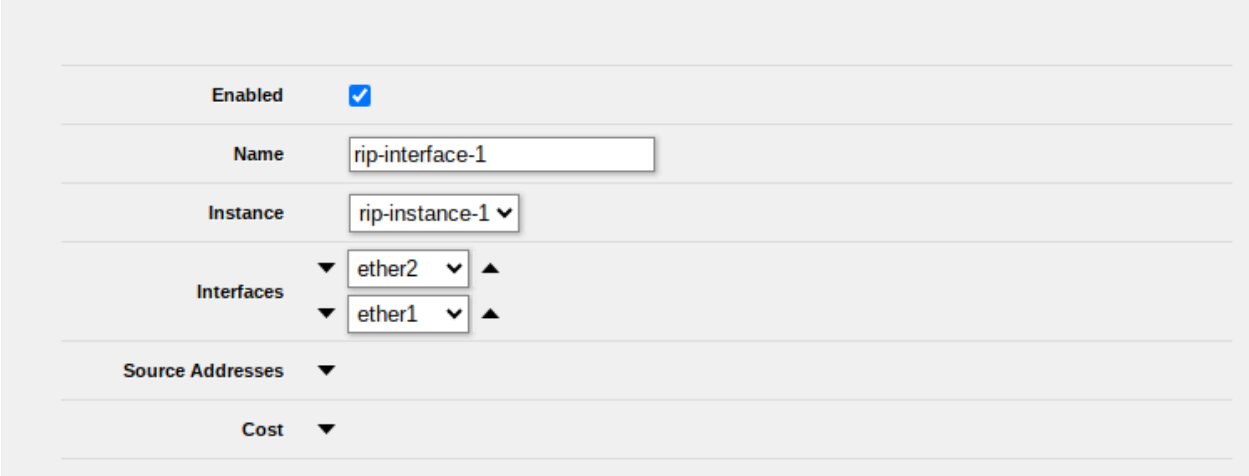
5. Activa RIP en R3 en todas las interfaces solo para las rutas conectadas y las RIP. En la interfaz e3 debe estar configurada en modo pasivo. Anota las rutas existentes en los tres routers.



RIP pasivo en e3:



RIP en e1 y e2:



Nueva tabla router 1:

7 items

		Comment	▲ Dst. Address	Gateway	Distance	Pref. Source	
-	DAd		0.0.0.0/0	10.20.0.1	1		
-	DAC		10.10.100.128/25	%ether2			
-	DAC		10.20.0.0/16	%ether1			
-	DAr+		172.16.2.0/23	192.168.100.1%ether3	120		
-	DAr		172.16.2.0/23	10.10.100.254%ether2	120		
-	DAr		192.168.4.0/24	192.168.100.1%ether3	120		
-	DAC		192.168.100.0/30	%ether3			

Nueva tabla router 2:

7 items

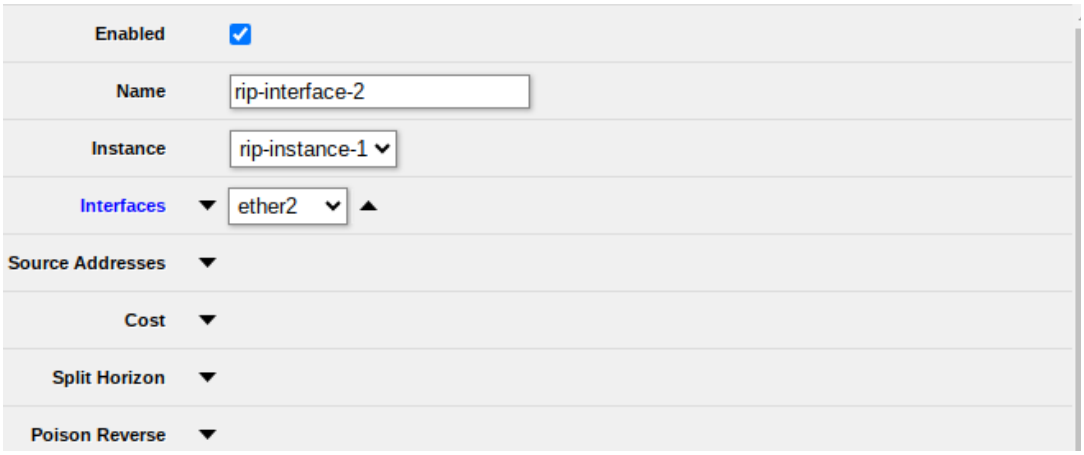
		Comment	▲ Dst. Address	Gateway
-	DAr		0.0.0.0/0	10.10.100.129%ether1
-	DAC		10.10.100.128/25	%ether1
-	Dr		172.16.2.0/23	10.10.100.129%ether1
-	DAC		172.16.2.0/23	%ether2
-	DAr		192.168.4.0/24	10.10.100.129%ether1
-	DAr		192.168.100.0/30	10.10.100.129%ether1
-	DAr		192.168.108.0/24	10.10.100.129%ether1

Nueva tabla router 3:

6 items

		Comment	▲ Dst. Address	Gateway	Distance
-	DAr		0.0.0.0/0	192.168.100.2%ether1	120
-	DAr		10.10.100.128/25	192.168.100.2%ether1	120
-	DAC		172.16.2.0/23	%ether2	
-	DAC		192.168.4.0/24	%ether3	
-	DAC		192.168.100.0/30	%ether1	
-	DAr		192.168.108.0/24	192.168.100.2%ether1	120

6. Activa RIP en la interfaz e2 de R2 para las interfaces conectadas y las RIP. Anota las rutas ECMP (Equal Cost MultiPath) de cada router (DAr+). Fíjate en que la gateway de cada ruta sea distinta.



Nueva tabla router 1:

9 items

		Comment	▲ Dst. Address	Gateway	Distance
-	DAd		0.0.0.0/0	192.168.108.2	1
-	Dr		10.10.100.128/25	192.168.100.1%ether3	120
-	DAC		10.10.100.128/25	%ether2	
-	DAr+		172.16.2.0/23	192.168.100.1%ether3	120
-	DAr		172.16.2.0/23	10.10.100.254%ether2	120
-	DAr		192.168.4.0/24	192.168.100.1%ether3	120
-	Dr		192.168.100.0/30	10.10.100.254%ether2	120
-	DAC		192.168.100.0/30	%ether3	
-	DAC		192.168.108.0/24	%ether1	

Nueva tabla router 2:

8 items

		Comment	▲ Dst. Address	Gateway	Distance
-	DAr		0.0.0.0/0	10.10.100.129%ether1	120
-	DAC		10.10.100.128/25	%ether1	
-	Dr		172.16.2.0/23	10.10.100.129%ether1	120
-	DAC		172.16.2.0/23	%ether2	
-	DAr		192.168.4.0/24	172.16.3.254%ether2	120
-	DAr+		192.168.100.0/30	10.10.100.129%ether1	120
-	DAr+		192.168.100.0/30	172.16.3.254%ether2	120
-	DAr		192.168.108.0/24	10.10.100.129%ether1	120

Nueva tabla router 3:

8 items

		Comment	▲ Dst. Address	Gateway	Distance
-	DAr		0.0.0.0/0	192.168.100.2%ether1	120
-	DAr+		10.10.100.128/25	172.16.2.1%ether2	120
-	DAr		10.10.100.128/25	192.168.100.2%ether1	120
-	DAC		172.16.2.0/23	%ether2	
-	DAC		192.168.4.0/24	%ether3	
-	Dr		192.168.100.0/30	172.16.2.1%ether2	120
-	DAC		192.168.100.0/30	%ether1	
-	DAr		192.168.108.0/24	192.168.100.2%ether1	120

7. En el R1 aumenta el coste RIP de la interfaz e2 a 2 y verifica si hay alguna ECMP en la tabla de encaminamiento de este router.

7 items

		Comment	▲ Dst. Address	Gateway	Distance
-	DAd		0.0.0.0/0	192.168.108.2	1
-	Dr		10.10.100.128/25	192.168.100.1%ether3	120
-	DAC		10.10.100.128/25	%ether2	
-	DAr		172.16.2.0/23	192.168.100.1%ether3	120
-	DAr		192.168.4.0/24	192.168.100.1%ether3	120
-	DAC		192.168.100.0/30	%ether3	
-	DAC		192.168.108.0/24	%ether1	

8. En el R1 aumenta el coste RIP de la interfaz e3 a 3 y verifica si hay alguna ECMP en la tabla de encaminamiento de este router.

8 items

		Comment	▲ Dst. Address	Gateway	Distance
-	DAd		0.0.0.0/0	192.168.108.2	1
-	DAC		10.10.100.128/25	%ether2	
-	Dr		10.10.100.128/25	192.168.100.1%ether3	120
-	DAr		172.16.2.0/23	10.10.100.254%ether2	120
-	DAr+		192.168.4.0/24	10.10.100.254%ether2	120
-	DAr		192.168.4.0/24	192.168.100.1%ether3	120
-	DAC		192.168.100.0/30	%ether3	
-	DAC		192.168.108.0/24	%ether1	

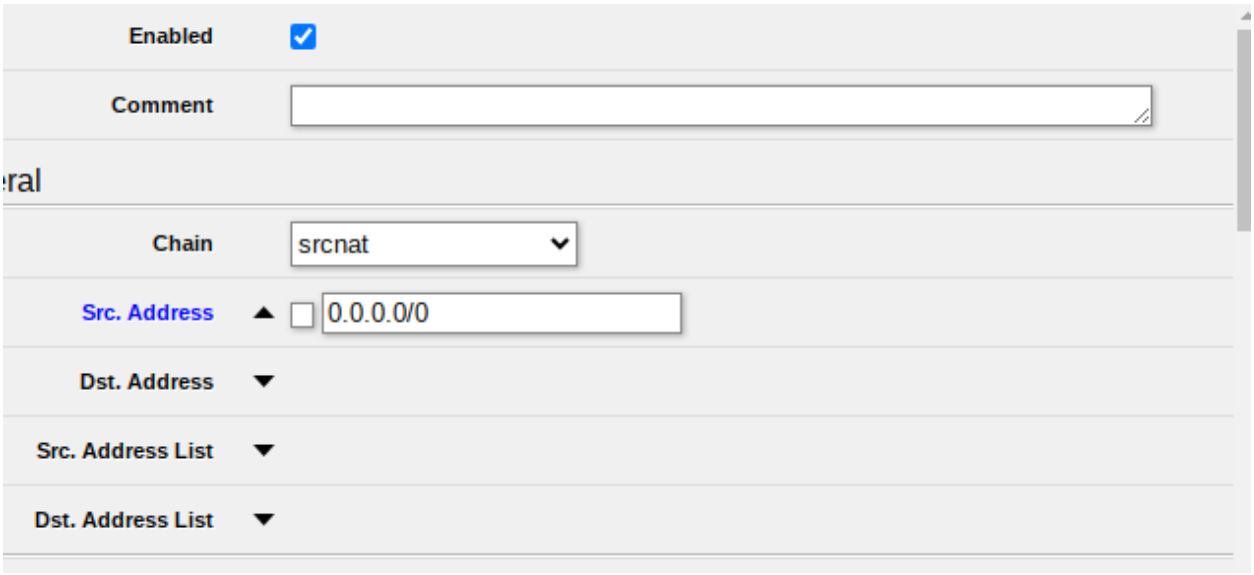
Nueva tabla router 3:

10 items

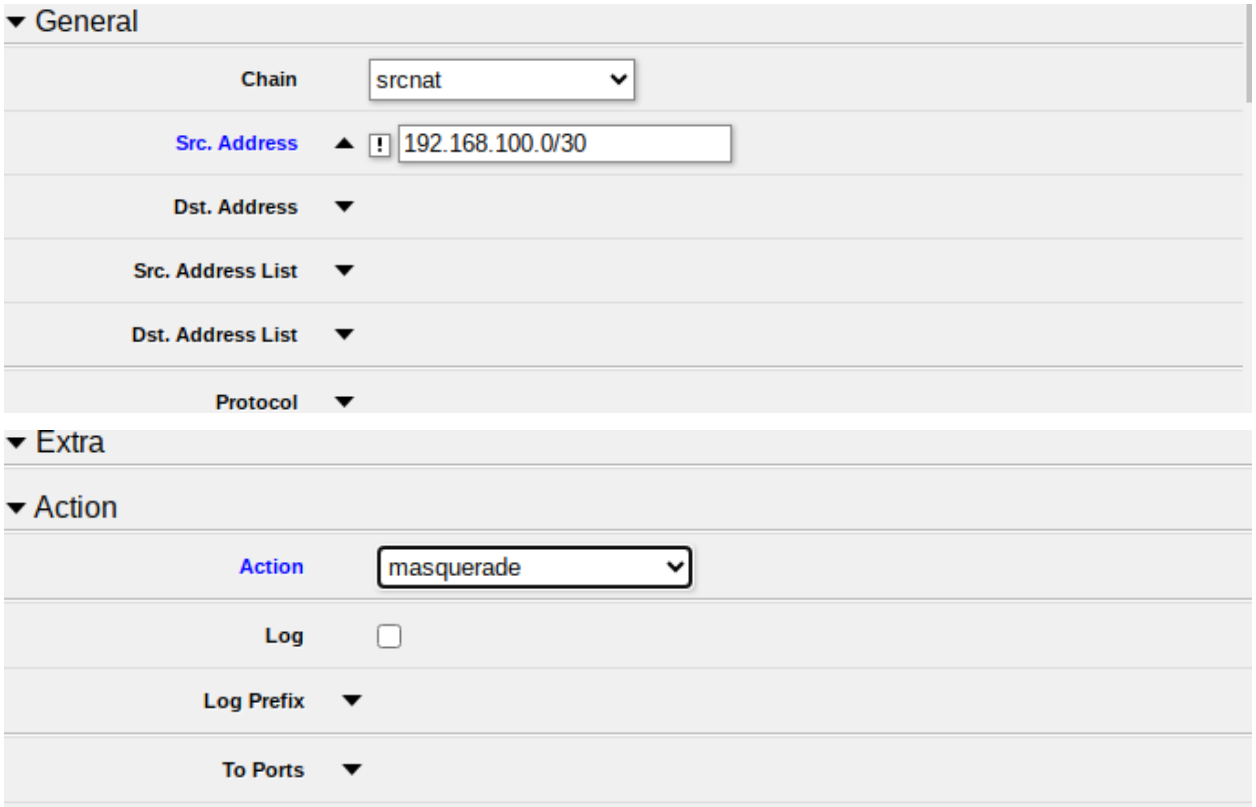
		Comment	▲ Dst. Address	Gateway	Distance
-	DAr		0.0.0.0/0	192.168.100.2%ether1	120
-	DAr+		10.10.100.128/25	172.16.2.1%ether2	120
-	DAr		10.10.100.128/25	192.168.100.2%ether1	120
-	Dr		172.16.2.0/23	192.168.100.2%ether1	120
-	DAC		172.16.2.0/23	%ether2	
-	Dr		192.168.4.0/24	192.168.100.2%ether1	120
-	DAC		192.168.4.0/24	%ether3	
-	Dr		192.168.100.0/30	172.16.2.1%ether2	120
-	DAC		192.168.100.0/30	%ether1	
-	DAr		192.168.108.0/24	192.168.100.2%ether1	120

9. Activa el NAT en R1 para que las redes LAN1, LAN2 y LAN3 pero no la red 192.168.100.0/30 puedan acceder a Internet.

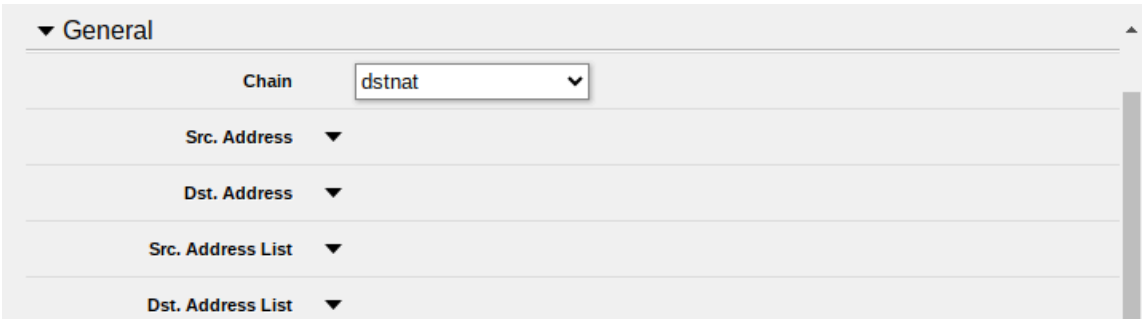
Permitimos NAT:

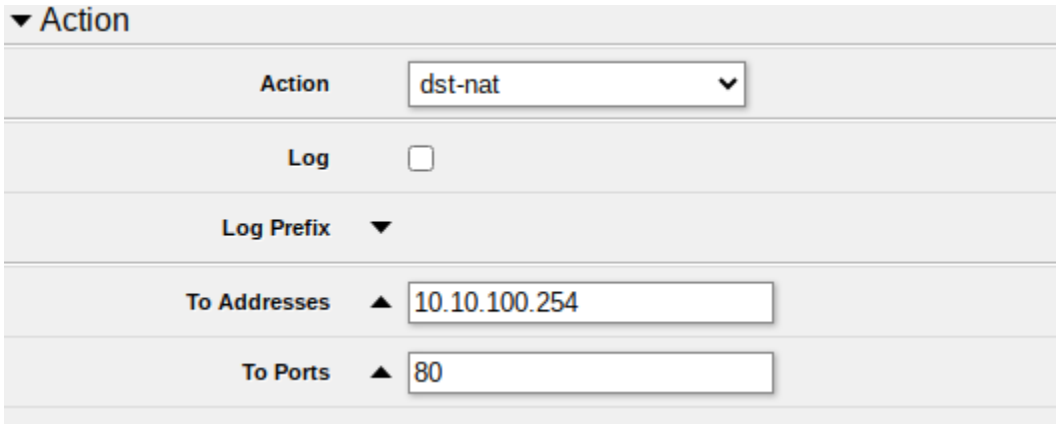


Evitamos que la red que conecta los dos routers puedan acceder a internet:

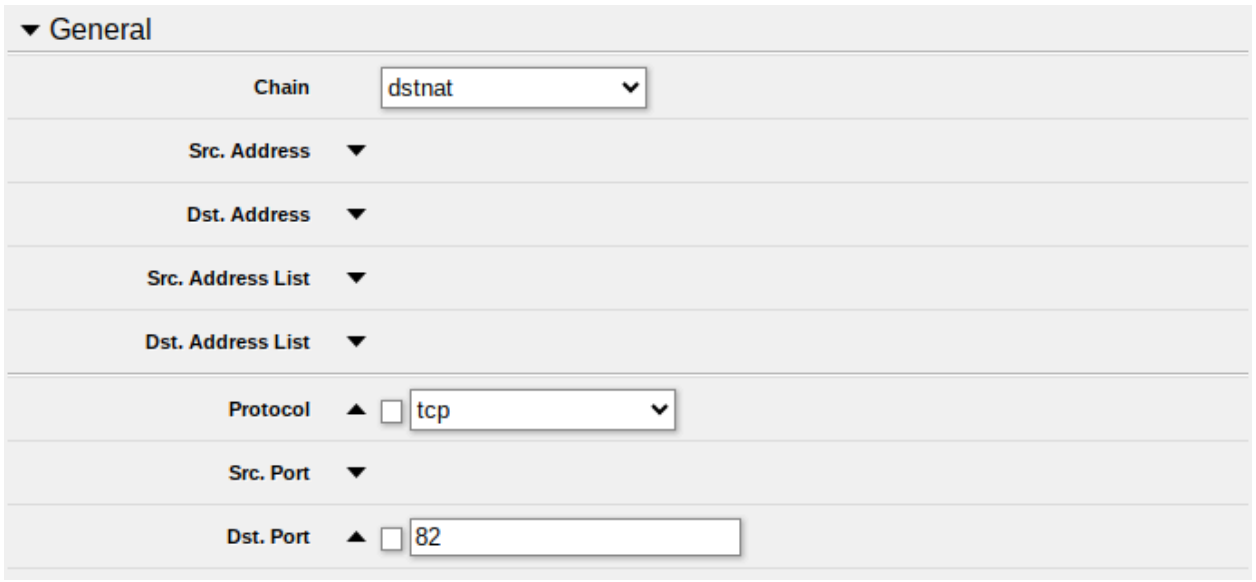


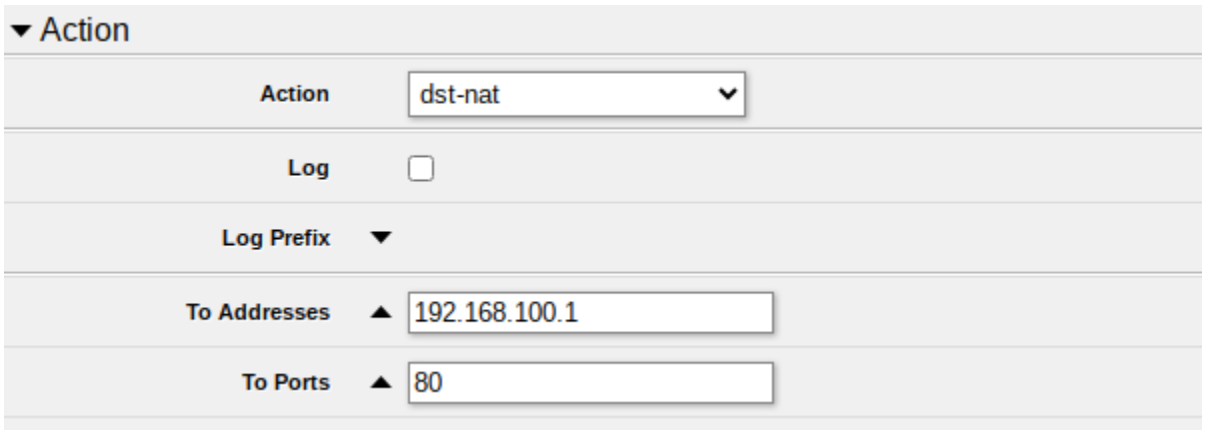
10. Abre en R1 el puerto 81 para poder acceder a la gestión del router R2 desde la red CHERNE (redirige al R2 IP de la LAN1 y puerto 80)





11. Abre en R1 el puerto 82 para poder acceder a la gestión del router R3 desde la red CHERNE (redirige al R3 IP 192.168.100.1 y puerto 80)





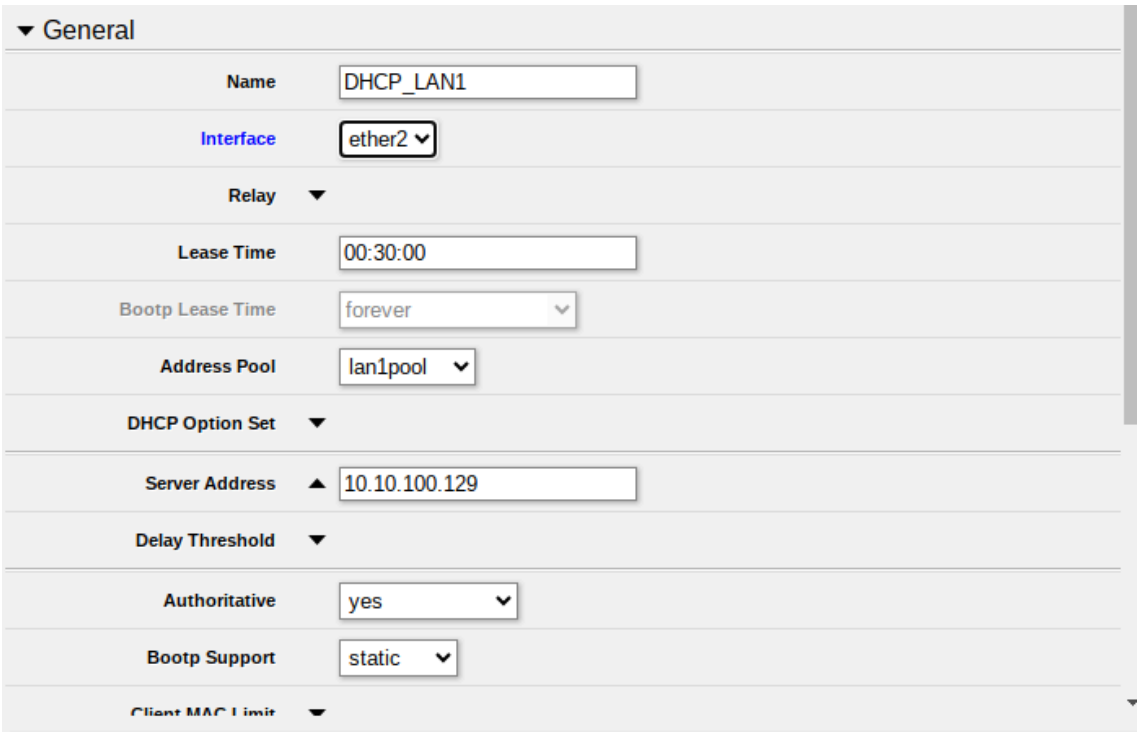
12. Crea en R1 3 pools de direcciones: lan1pool: 10.10.100.200-10.10.100.210, lan2pool: 172.16.3.0-172.16.3.200, lan3pool: 192.168.4.100-192.168.4.150. Después crea tres DHCP server en R1. En todos asigna el parámetro Server Address con la IP de la interfaz e2 de R1. El segundo DHCP server debe tener como Relay la IP de e2 del R2 y tercero debe tener como Relay la IP de e3 del R3. La puerta de enlace que debe asignar para la LAN2 es la correspondiente al R3. El DNS de la LAN1 es 8.8.8.8, LAN2 1.1.1.1 y LAN3 8.8.4.4.

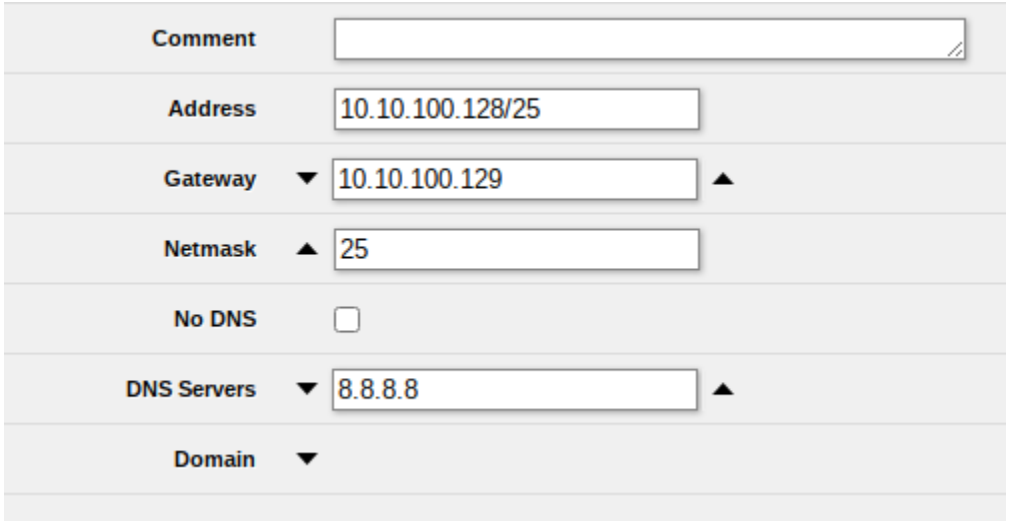
POOLS:

3 items

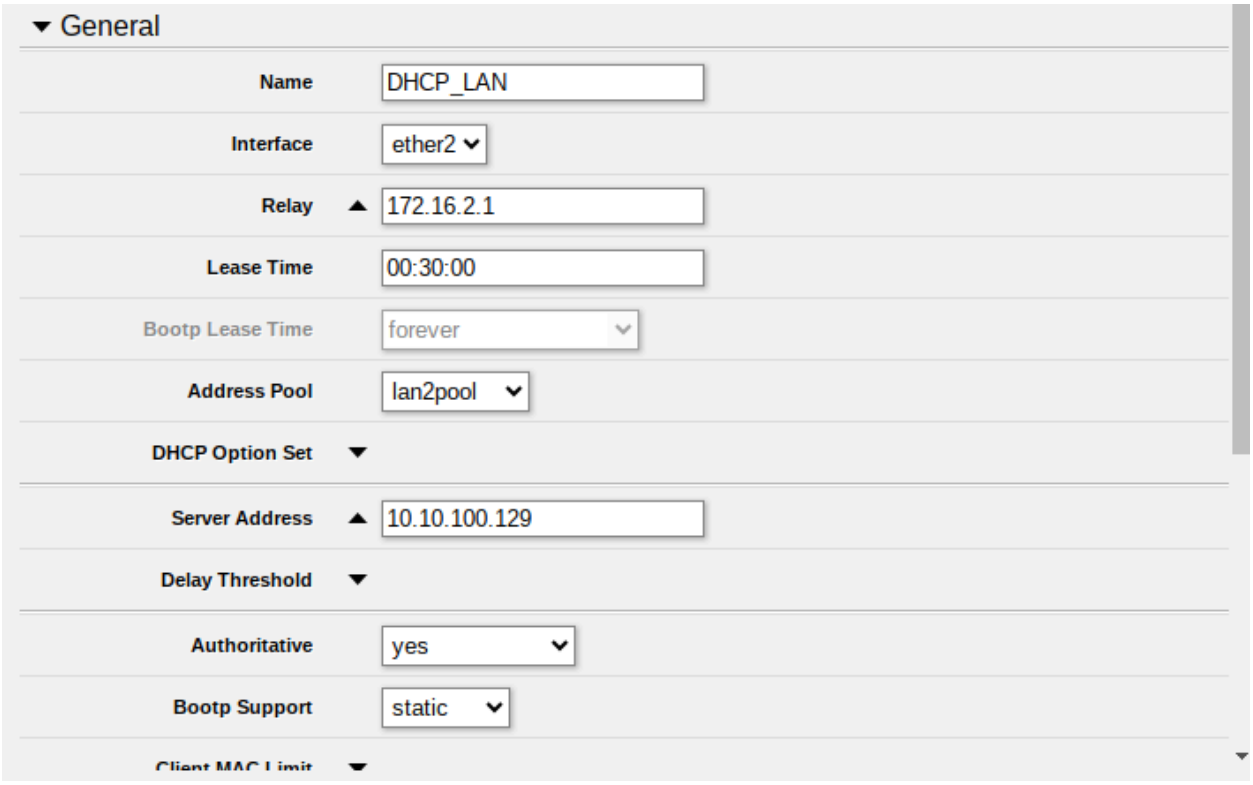
		Comment	▲ Name	Addresses	Next Pool
-			lan1pool	10.10.100.200-10.10.100.210	none
-			lan2pool	172.16.3.0-172.16.3.200	none
-			lan3pool	192.168.4.100-192.168.4.150	none

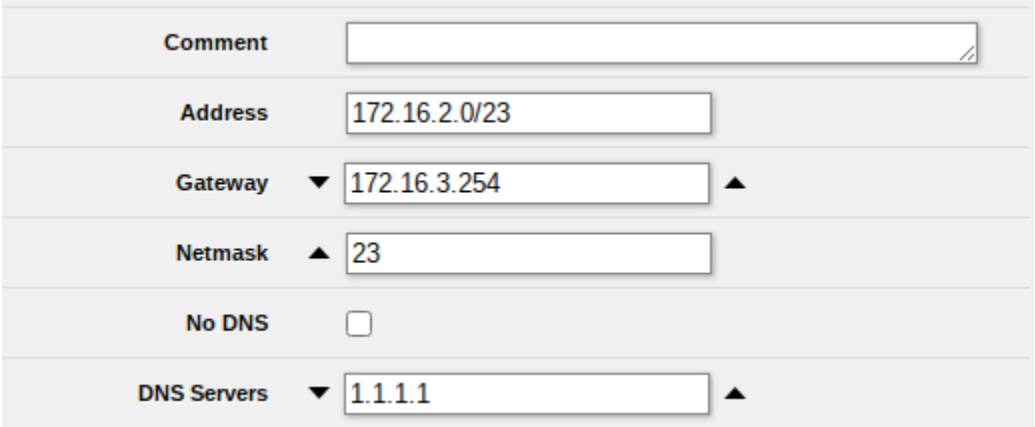
DHCP Lan1:



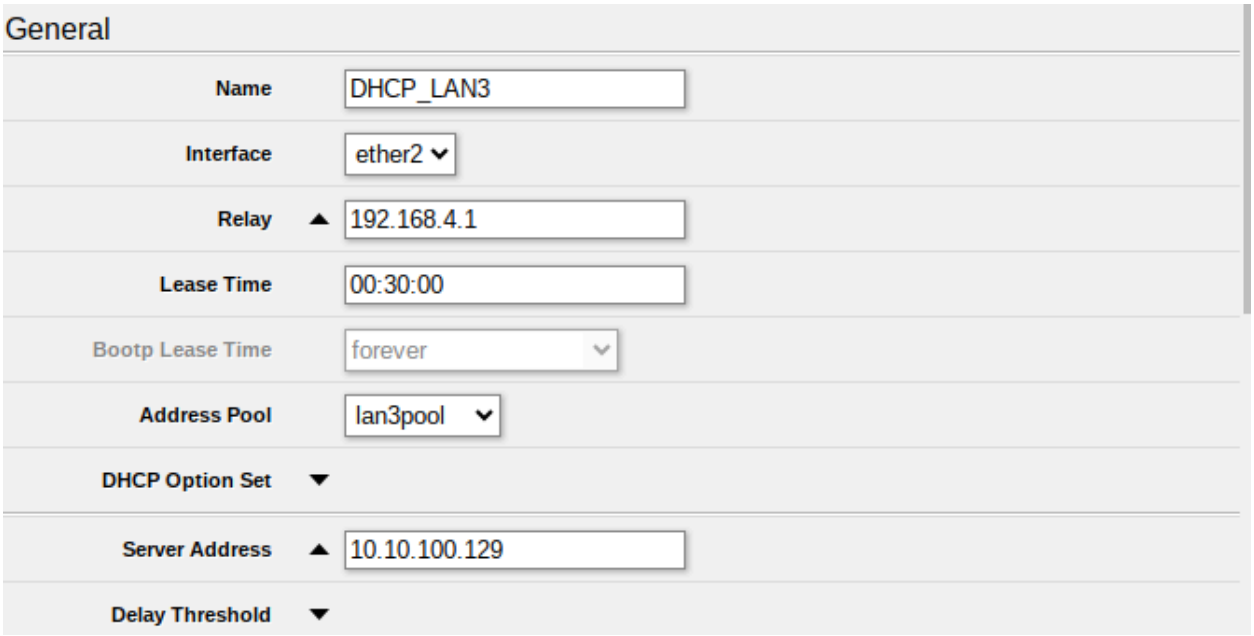

Comment
Address
10.10.100.128/25
Gateway
10.10.100.129
Netmask
25
No DNS
DNS Servers
8.8.8.8
Domain

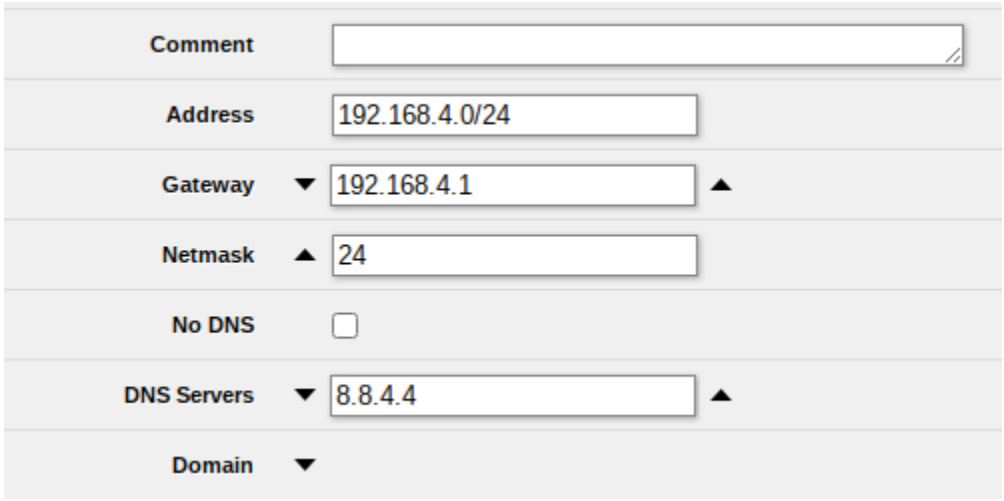
DHCP Lan2:


General
Name
DHCP_LAN
Interface
ether2
Relay
172.16.2.1
Lease Time
00:30:00
Bootp Lease Time
forever
Address Pool
lan2pool
DHCP Option Set
Server Address
10.10.100.129
Delay Threshold
Authoritative
yes
Bootp Support
static

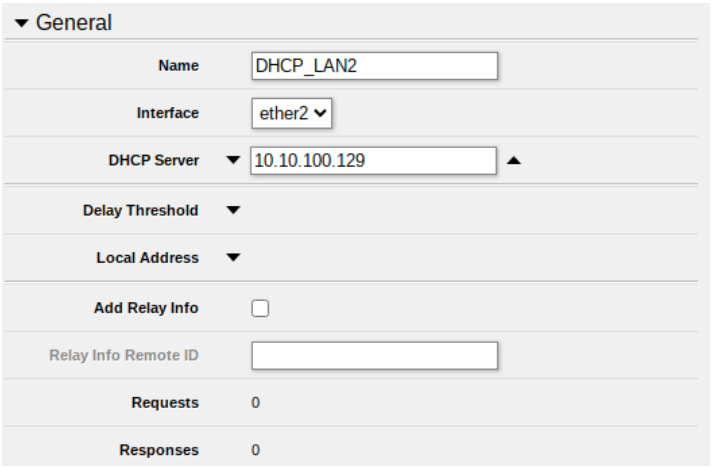

Comment
Address
172.16.2.0/23
Gateway
172.16.3.254
Netmask
23
No DNS
DNS Servers
1.1.1.1

DHCP Lan3:

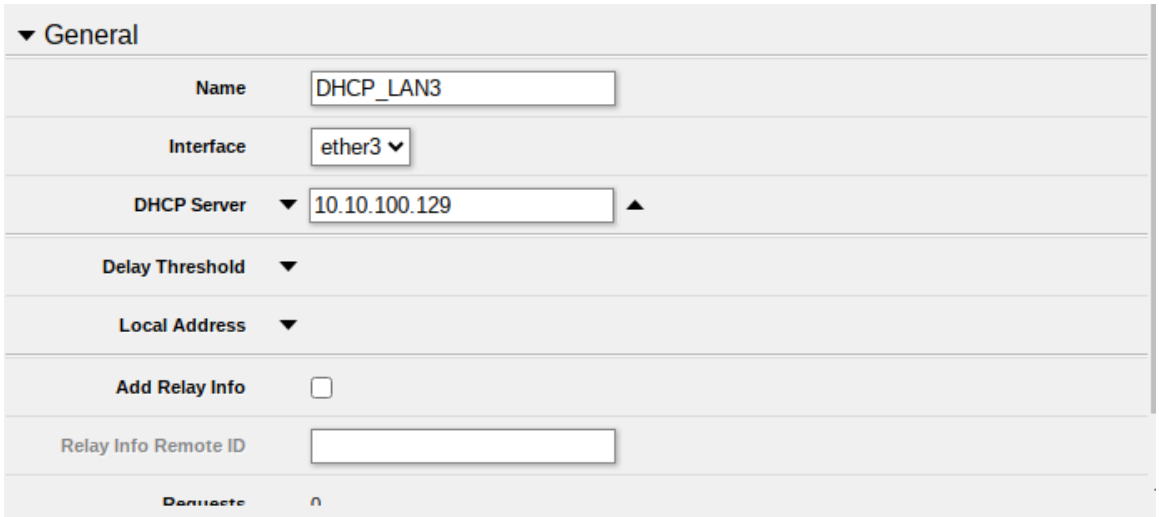

General
Name
DHCP_LAN3
Interface
ether2
Relay
192.168.4.1
Lease Time
00:30:00
Bootp Lease Time
forever
Address Pool
lan3pool
DHCP Option Set
Server Address
10.10.100.129
Delay Threshold


Comment
Address
192.168.4.0/24
Gateway
192.168.4.1
Netmask
24
No DNS
DNS Servers
8.8.4.4
Domain

R2:


General
Name
DHCP_LAN2
Interface
ether2
DHCP Server
10.10.100.129
Delay Threshold
Local Address
Add Relay Info
Relay Info Remote ID
Requests
0
Responses
0

R3:


General
Name
DHCP_LAN3
Interface
ether3
DHCP Server
10.10.100.129
Delay Threshold
Local Address
Add Relay Info
Relay Info Remote ID

13. Conecta un cliente en la LAN2 y obtén configuración IP dinámica. Seguidamente ejecuta ping -t1 8.8.8.8 y anota la dirección IP que responde. Después haz lo mismo con ping -t2 8.8.8.8

```
root@abraham-vmwarevirtualplatform:/home/abra# ping -t1 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
From 172.16.3.254 icmp_seq=1 Time to live exceeded
From 172.16.3.254 icmp_seq=2 Time to live exceeded
From 172.16.3.254 icmp_seq=3 Time to live exceeded
From 172.16.3.254 icmp_seq=4 Time to live exceeded
^C
```

```
root@abraham-vmwarevirtualplatform:/home/abra# ping -t2 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
From 10.10.100.129 icmp_seq=1 Time to live exceeded
From 10.10.100.129 icmp_seq=2 Time to live exceeded
^C
```

14. Guarda la configuración de cada Router y súbela a la plataforma. Para guardar la configuración ve a Files -> Backup (pon el nombre <tu_nombre>_Router1 , <tu_nombre>_Router2 y <tu_nombre>_Router3 respectivamente), click en Backup luego en Download y súbelo en la tarea asignada.

Interfaces:

Router 1:
ether1 = bridged
ether2 = LAN1
ether3 = conexión de Router 1 con Router 3

Router 2:
ether1 = LAN1
ether2 = LAN2

Router 3:
ether1 = conexión de Router 1 con Router 3
ether2 = LAN2
ether3 = LAN3