

Índice:

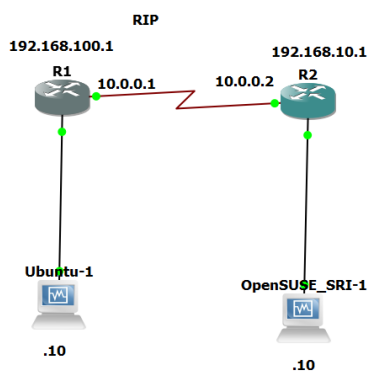
Enrutamiento Dinámico	2
a)RIP	2
b)OSPF	5
c)EIGRP	8

Enrutamiento Dinámico

a) RIP

Solución:

Escenario



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Para configurar el enrutamiento dinámico RIP debemos configurar los interfaces de red con sus respectivas IP. Una vez configurados y encendidos. Podemos introducir los comandos de enrutamiento RIP:

```
router rip
```

```
version 2
```

Una vez dentro tenemos que indicar cuales redes conoce el router

```
network 10.0.0.0
```

```
network 192.168.10.0
```

Rutas RIP

Para ver las rutas que ha creado hacemos un `show ip routes`

```

R1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       I - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - OOR, P - periodic downloaded static route, H - NHRP, l - LISP
       + - replicated route, % - next hop override

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    10.0.0.0/24 is directly connected, Serial1/0
L    10.0.0.1/32 is directly connected, Serial1/0
R    192.168.10.0/24 [120/1] via 10.0.0.2, 00:00:16, Serial1/0
R    192.168.100.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.100.0/24 is directly connected, FastEthernet0/0
L    192.168.100.1/32 is directly connected, FastEthernet0/0
R1#show runn

```

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Para ver la configuración general podemos usar `show running-config`

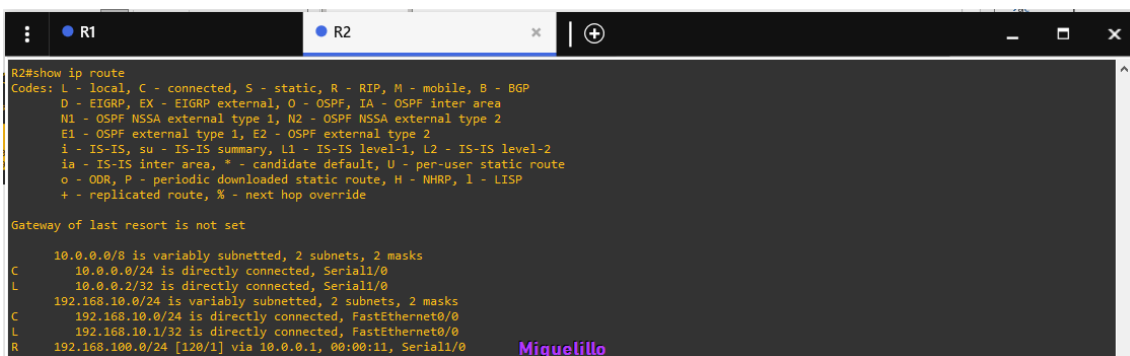


```

interface FastEthernet0/0
ip address 192.168.100.1 255.255.255.0
duplex half
!
interface Serial1/0
ip address 10.0.0.1 255.255.255.0
serial restart-delay 0
!
interface Serial1/1
no ip address
shutdown
serial restart-delay 0
!
interface Serial1/2
no ip address
shutdown
serial restart-delay 0
!
interface Serial1/3
no ip address
shutdown
serial restart-delay 0
!
router rip
version 2
network 10.0.0.0
network 192.168.100.0

```

Rutas del R2



```

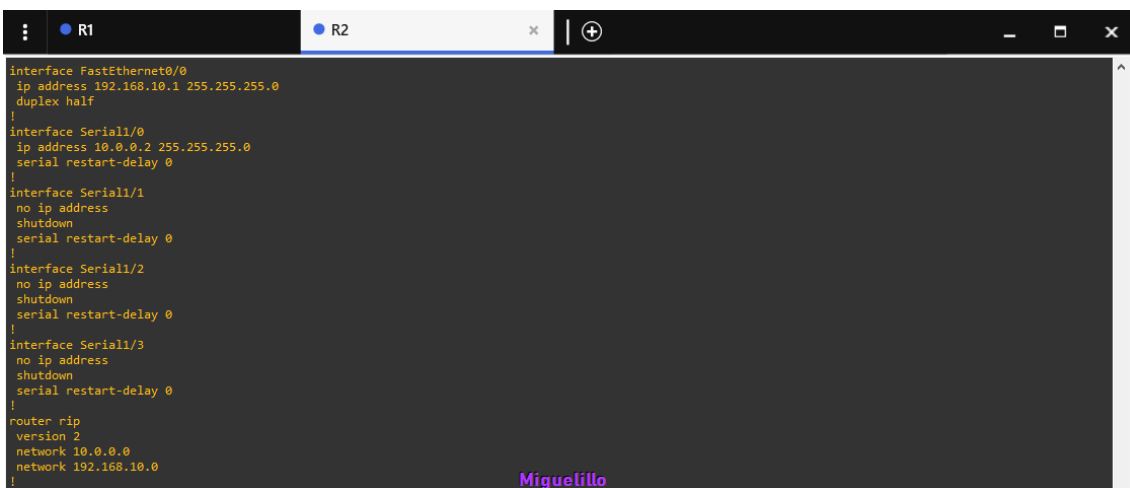
R2#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       I - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - OOR, P - periodic downloaded static route, H - NHRP, l - LISP
       + - replicated route, % - next hop override

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.0.0.0/24 is directly connected, Serial1/0
L       10.0.0.2/32 is directly connected, Serial1/0
C       192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.10.0/24 is directly connected, FastEthernet0/0
L       192.168.10.1/32 is directly connected, FastEthernet0/0
R       192.168.100.0/24 [120/1] via 10.0.0.1, 00:00:11, Serial1/0

```

Runing del R2



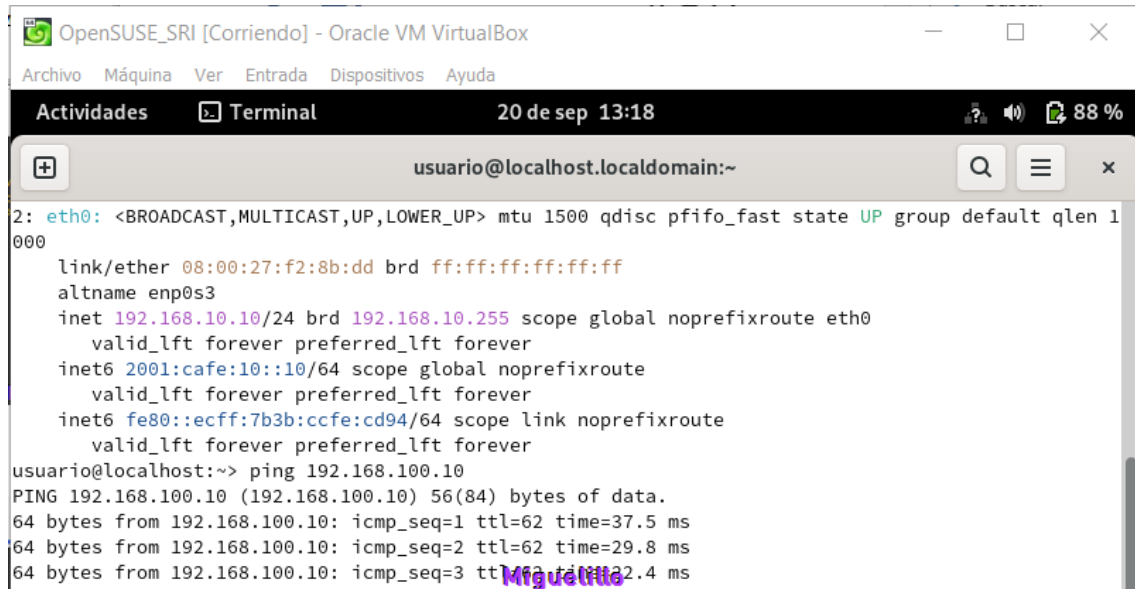
```

interface FastEthernet0/0
ip address 192.168.10.1 255.255.255.0
duplex half
!
interface Serial1/0
ip address 10.0.0.2 255.255.255.0
serial restart-delay 0
!
interface Serial1/1
no ip address
shutdown
serial restart-delay 0
!
interface Serial1/2
no ip address
shutdown
serial restart-delay 0
!
interface Serial1/3
no ip address
shutdown
serial restart-delay 0
!
router rip
version 2
network 10.0.0.0
network 192.168.10.0

```

Ping entre equipos de distintas redes

OpenSUSE



OpenSUSE_SRI [Corriendo] - Oracle VM VirtualBox

Archivo Máquina Ver Entrada Dispositivos Ayuda

Actividades Terminal 20 de sep 13:18 88 %

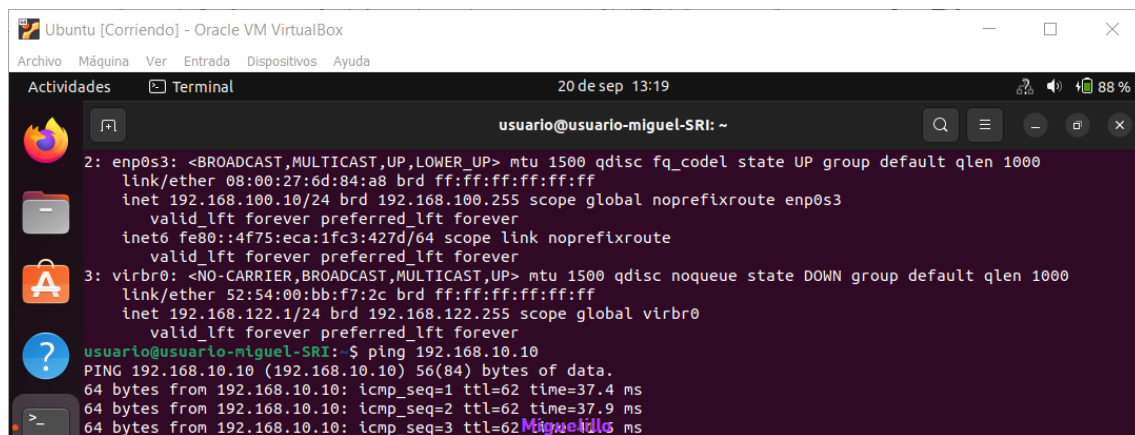
usuario@localhost.localdomain:~

```

2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:f2:8b:dd brd ff:ff:ff:ff:ff:ff
    altnam enp0s3
    inet 192.168.10.10/24 brd 192.168.10.255 scope global noprefixroute eth0
        valid_lft forever preferred_lft forever
    inet6 2001:cafe:10::10/64 scope global noprefixroute
        valid_lft forever preferred_lft forever
    inet6 fe80::ecff:7b3b:ccfe:cd94/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
usuario@localhost:~$ ping 192.168.100.10
PING 192.168.100.10 (192.168.100.10) 56(84) bytes of data.
64 bytes from 192.168.100.10: icmp_seq=1 ttl=62 time=37.5 ms
64 bytes from 192.168.100.10: icmp_seq=2 ttl=62 time=29.8 ms
64 bytes from 192.168.100.10: icmp_seq=3 ttl=62 time=32.4 ms

```

Ubuntu



Ubuntu [Corriendo] - Oracle VM VirtualBox

Archivo Máquina Ver Entrada Dispositivos Ayuda

Actividades Terminal 20 de sep 13:19 88 %

usuario@usuario-miguel-SRI: ~

```

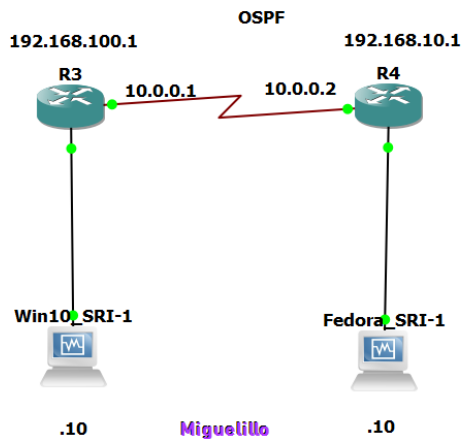
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:6d:84:a8 brd ff:ff:ff:ff:ff:ff
    inet 192.168.100.10/24 brd 192.168.100.255 scope global noprefixroute enp0s3
        valid_lft forever preferred_lft forever
    inet6 fe80::4f75:eca:1fc3:427d/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 52:54:00:bb:f7:2c brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.1/24 brd 192.168.122.255 scope global virbr0
        valid_lft forever preferred_lft forever
usuario@usuario-miguel-SRI:~$ ping 192.168.10.10
PING 192.168.10.10 (192.168.10.10) 56(84) bytes of data.
64 bytes from 192.168.10.10: icmp_seq=1 ttl=62 time=37.4 ms
64 bytes from 192.168.10.10: icmp_seq=2 ttl=62 time=37.9 ms
64 bytes from 192.168.10.10: icmp_seq=3 ttl=62 time=32.4 ms

```

b)OSPF

Solución:

Escenario:



Para configurar el OSPF tendremos que configurar las dos interfaces de red con sus respectivas IPs y seguidamente configuraremos el enrutamiento en este caso OSPF con:

```
router ospf 10
```

Una vez indicado tendremos que asignar id diferentes a los routers con:

```
router-id 1.1.1.1
```

Por último pondremos las redes que conocemos con una máscara inversa con:

```
network 192.168.100.0 0.0.0.255 area 0
```

```
R4#config t
Enter configuration commands, one per line. End with CNTL/Z.
R4(config)#interface FastEthernet 0/0
R4(config-if)#ip address 192.168.10.1 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#interface Serial0/0
R4(config-if)#ip address 10.0.0.2 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#exit
R4(config)#router ospf 10
R4(config-router)#router-id 2.2.2.2
R4(config-router)#network 192.168.10.0 0.0.0.255 area 0
R4(config-router)#network 10.0.0.0 255.255.255.0 area 0
R4(config-router)#
```

Para verificar miraremos las rutas y los vecinos.

```
R4#show ip ospf neighbor
Neighbor ID Pri State Dead Time Address Interface
1.1.1.1 0 FULL/- 00:00:38 10.0.0.1 Serial1/0

R4#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
ia - IS-IS inter area, * - candidate default, U - per-user static route
o - ODR, P - periodic downloaded static route, H - NHRP, I - LISP
+ - replicated route, % - next hop override

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 10.0.0.0/24 is directly connected, Serial1/0
L 10.0.0.2/32 is directly connected, Serial1/0
C 192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.10.0/24 is directly connected, FastEthernet0/0
L 192.168.10.1/32 is directly connected, FastEthernet0/0
O 192.168.100.0/24 [110/65] via 10.0.0.1, 00:15:17, Serial1/0
```

Router 3

Configuración

```

R3#config t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#interface FastEthernet 0/0
R3(config-if)#ip address 192.168.100.1 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#interface Se1/0
R3(config-if)#ip address 10.0.0.1 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#exit
R3(config)#router ospf 10
R3(config-router)#router-id 1.1.1.1
R3(config-router)#network 192.168.100.0 0.0.0.255 area 0
R3(config-router)#network 10.0.0.0 255.255.255.0 area 0
R3(config-router)#do

```

Rutas y vecinos

```

R3#show ip ospf neighbor
Neighbor ID Pri State Dead Time Address Interface
2.2.2.2 0 FULL/ - 00:00:32 10.0.0.2 Serial1/0

R3#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
ia - IS-IS inter area, * - candidate default, U - per-user static route
o - ODR, P - periodic downloaded static route, H - NHRP, I - LISP
+ - replicated route, % - next hop override

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 10.0.0.0/24 is directly connected, Serial1/0
L 10.0.0.1/32 is directly connected, Serial1/0
O 192.168.100.0/24 [110/65] via 10.0.0.2, 00:14:49, Serial1/0
L 192.168.100.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.100.0/24 is directly connected, FastEthernet0/0
L 192.168.100.1/32 is directly connected, FastEthernet0/0

```

Comprobación Fedora

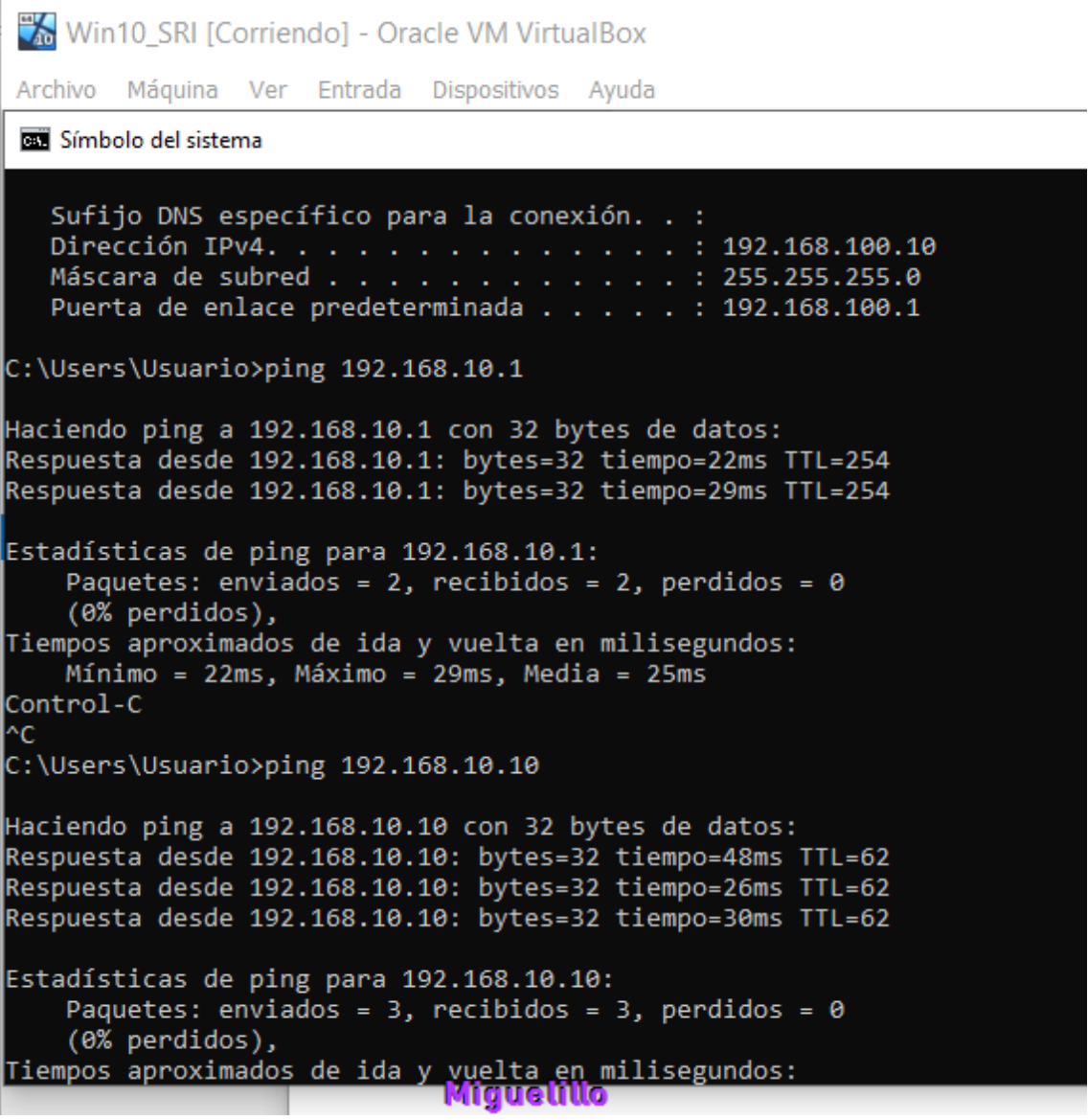
Configuraremos la tarjeta de red del cliente y haremos una comprobación con ping al otro router y al otro equipo

```

valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP gr
oup default qlen 1000
    link/ether 08:00:27:42:d8:98 brd ff:ff:ff:ff:ff:ff
    inet 192.168.10.10/24 brd 192.168.10.255 scope global noprefixroute enp0s3
        valid_lft forever preferred_lft forever
    inet6 fe80::3333:cd02:9f8d:f40/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
[usuario@fedora ~]$ ping 192.168.100.1
PING 192.168.100.1 (192.168.100.1) 56(84) bytes of data.
64 bytes from 192.168.100.1: icmp_seq=1 ttl=254 time=24.2 ms
64 bytes from 192.168.100.1: icmp_seq=2 ttl=254 time=23.1 ms
^C
--- 192.168.100.1 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1000ms
rtt min/avg/max/mdev = 23.138/23.673/24.209/0.535 ms
[usuario@fedora ~]$ ping 192.168.100.10
PING 192.168.100.10 (192.168.100.10) 56(84) bytes of data.
64 bytes from 192.168.100.10: icmp_seq=1 ttl=126 time=35.2 ms
64 bytes from 192.168.100.10: icmp_seq=2 ttl=126 time=31.8 ms
64 bytes from 192.168.100.10: icmp_seq=3 ttl=126 time=38.4 ms
^C
--- 192.168.100.10 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2004ms
rtt min/avg/max/mdev = 31.787/35.128/38.358/2.683 ms
[usuario@fedora ~]$

```

Comprobación Windows



```
Win10_SRI [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

Símbolo del sistema

Sufijo DNS específico para la conexión. . . :
Dirección IPv4. . . . . : 192.168.100.10
Máscara de subred . . . . . : 255.255.255.0
Puerta de enlace predeterminada . . . . . : 192.168.100.1

C:\Users\Usuario>ping 192.168.10.1

Haciendo ping a 192.168.10.1 con 32 bytes de datos:
Respuesta desde 192.168.10.1: bytes=32 tiempo=22ms TTL=254
Respuesta desde 192.168.10.1: bytes=32 tiempo=29ms TTL=254

Estadísticas de ping para 192.168.10.1:
    Paquetes: enviados = 2, recibidos = 2, perdidos = 0
    (0% perdidos),
    Tiempos aproximados de ida y vuelta en milisegundos:
        Mínimo = 22ms, Máximo = 29ms, Media = 25ms
Control-C
^C
C:\Users\Usuario>ping 192.168.10.10

Haciendo ping a 192.168.10.10 con 32 bytes de datos:
Respuesta desde 192.168.10.10: bytes=32 tiempo=48ms TTL=62
Respuesta desde 192.168.10.10: bytes=32 tiempo=26ms TTL=62
Respuesta desde 192.168.10.10: bytes=32 tiempo=30ms TTL=62

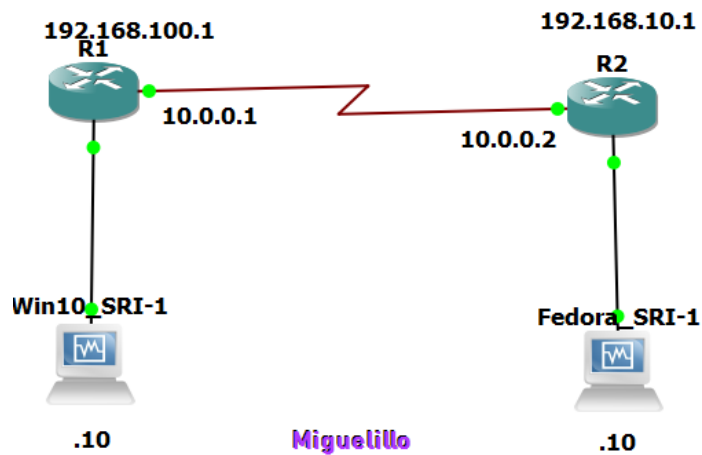
Estadísticas de ping para 192.168.10.10:
    Paquetes: enviados = 3, recibidos = 3, perdidos = 0
    (0% perdidos),
    Tiempos aproximados de ida y vuelta en milisegundos:
```

Miguelillo

c)EIGRP

Solución:

Escenario:



Para configurar el OSPF tendremos que configurar las dos interfaces de red con sus respectivas IPs y seguidamente configuraremos el enrutamiento en este caso OSPF con:

```
router eigrp 100
```

Una vez indicado tendremos que asignar id diferentes a los routers con:

```
eigrp router-id 2.2.2.2
```

Por último pondremos las redes que conocemos con una máscara inversa con:

```
network 192.168.100.0 0.0.0.255
```

```

R1
R1(config)#interface FastEthernet 0/0
R1(config-if)#ip address 192.168.100.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#interface Ser1/0
R1(config-if)#ip address 10.0.0.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#router eigrp 100
R1(config-router)#eigrp router-id 1.1.1.1
R1(config-router)#network 192.168.100.0 0.0.0.255
R1(config-router)#network 10.0.0.0 255.255.255.0

```

Para verificar miraremos las rutas y los vecinos.

```

R1#show ip eigrp neighbors
EIGRP-IPv4 Neighbors for AS(100)
H Address          Interface         Hold Uptime   SRTT    RTO  Q  Seq
                               (sec)         (ms)          Cnt  Num
0  10.0.0.2          Ser1/0            12 00:06:55   15    100  0  3
R1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       + - replicated route, % - next hop override
Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    10.0.0.0/24 is directly connected, Serial1/0
L    10.0.0.1/32 is directly connected, Serial1/0
D    192.168.10.0/24 [90/2172416] via 10.0.0.2, 00:06:58, Serial1/0
O    192.168.100.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.100.0/24 is directly connected, FastEthernet0/0
L    192.168.100.1/32 is directly connected, FastEthernet0/0
R1#

```

Router 2

Configuración

```

R2
R2(config)#interface FastEthernet 0/0
R2(config-if)#ip address 192.168.10.1 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#interface Serial0
R2(config-if)#ip address 10.0.0.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#router eigrp 100
R2(config-router)#eigrp router-id 2.2.2.2
R2(config-router)#network 192.168.10.0 0.0.0.255
R2(config-router)#network 10.0.0.0 255.255.255.0
Miguelillo

```

Rutas y vecinos

```

R2
R2#show ip eigrp neighbors
EIGRP-IPv4 Neighbors for AS(100)
H Address Interface Hold Uptime SRTT RTO Q Seq
(sec) (ms) Cnt Num
0 10.0.0.1 Serial0 13 00:00:33 16 100 0 3
R2#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       I - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       + - replicated route, % - next hop override
Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 10.0.0.0/24 is directly connected, Serial1/0
L 10.0.0.2/32 is directly connected, Serial1/0
192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.10.0/24 is directly connected, FastEthernet0/0
L 192.168.10.1/32 is directly connected, FastEthernet0/0
O 192.168.100.0/24 [90/2172416] via 10.0.0.1, 00:00:35, Serial1/0
R2#
Miguelillo

```

Windows

Configuraremos la tarjeta de red del cliente y haremos una comprobación con ping al otro router y al otro equipo

```

Win10_SRI [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
CN Símbolo del sistema
Sufijo DNS específico para la conexión. . . :
Dirección IPv4. . . . . : 192.168.100.10
Máscara de subred . . . . . : 255.255.255.0
Puerta de enlace predeterminada . . . . : 192.168.100.1

C:\Users\Usuario>ping 192.168.10.1

Haciendo ping a 192.168.10.1 con 32 bytes de datos:
Respuesta desde 192.168.10.1: bytes=32 tiempo=30ms TTL=254
Respuesta desde 192.168.10.1: bytes=32 tiempo=27ms TTL=254

Estadísticas de ping para 192.168.10.1:
    Paquetes: enviados = 2, recibidos = 2, perdidos = 0
            (0% perdidos),
    Tiempos aproximados de ida y vuelta en milisegundos:
        Mínimo = 27ms, Máximo = 30ms, Media = 28ms
Control-C
^C
C:\Users\Usuario>ping 192.168.10.10

Haciendo ping a 192.168.10.10 con 32 bytes de datos:
Respuesta desde 192.168.10.10: bytes=32 tiempo=33ms TTL=62
Respuesta desde 192.168.10.10: bytes=32 tiempo=39ms TTL=62
Respuesta desde 192.168.10.10: bytes=32 tiempo=31ms TTL=62
Respuesta desde 192.168.10.10: bytes=32 tiempo=41ms TTL=62

Estadísticas de ping para 192.168.10.10:
    Paquetes: enviados = 4, recibidos = 4, perdidos = 0
            (0% perdidos),
    Tiempos aproximados de ida y vuelta en milisegundos:
        Mínimo = 31ms, Máximo = 41ms, Media = 36ms
Miguelillo

```

Fedora



Fedora_SRI [Corriendo] - Oracle VM VirtualBox

[Archivo](#) [Máquina](#) [Ver](#) [Entrada](#) [Dispositivos](#) [Ayuda](#)Actividades **Terminal**

```
usuario@fedora:~  
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000  
    link/ether 08:00:27:42:d8:98 brd ff:ff:ff:ff:ff:ff  
    inet 192.168.10.10/24 brd 192.168.10.255 scope global noprefixroute enp0s3  
        valid_lft forever preferred_lft forever  
    inet6 fe80::3333:cd02:9f8d:f40/64 scope link noprefixroute  
        valid_lft forever preferred_lft forever  
[usuario@fedora ~]$ ping 192.168.100.1  
PING 192.168.100.1 (192.168.100.1) 56(84) bytes of data.  
64 bytes from 192.168.100.1: icmp_seq=1 ttl=254 time=29.0 ms  
64 bytes from 192.168.100.1: icmp_seq=2 ttl=254 time=12.1 ms  
^C  
--- 192.168.100.1 ping statistics ---  
2 packets transmitted, 2 received, 0% packet loss, time 1001ms  
rtt min/avg/max/mdev = 12.143/20.565/28.987/8.422 ms  
[usuario@fedora ~]$ ping 192.168.100.10  
PING 192.168.100.10 (192.168.100.10) 56(84) bytes of data.  
64 bytes from 192.168.100.10: icmp_seq=1 ttl=126 time=39.3 ms  
64 bytes from 192.168.100.10: icmp_seq=2 ttl=126 time=32.1 ms  
^C
```

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