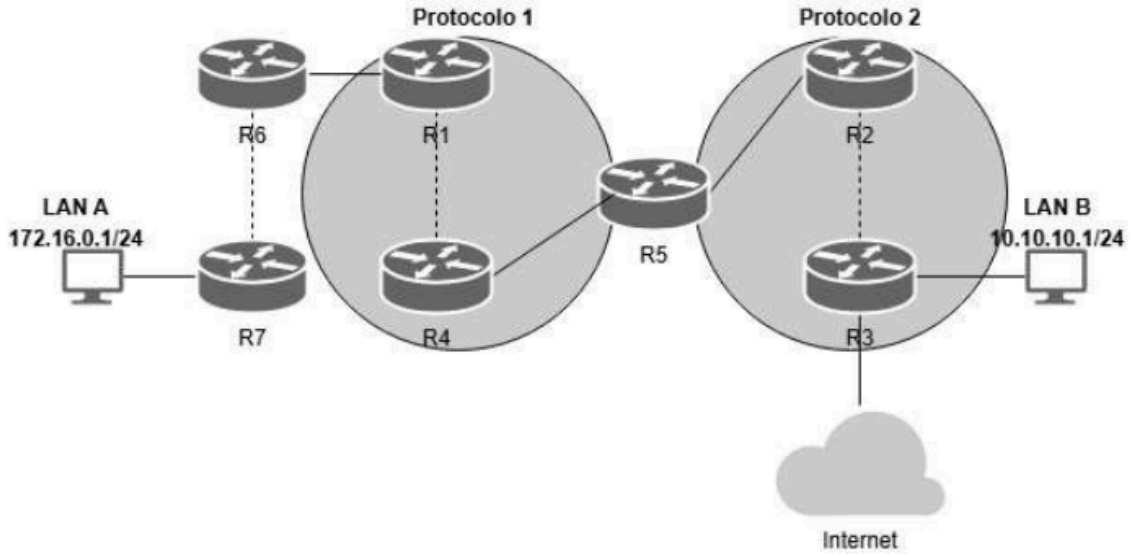
La red a utilizar es la 192.168.X.0/24, donde "X" son los dos últimos dígitos de su cédula. Usted debe realizar el subnetting que considere adecuado. Se recomienda utilizar máscara fija. Debe garantizar mínimo 4 hosts por subred. **La LAN A y LAN B ya tienen direccionamiento asignado.**

Se recomienda utilizar el enrutador 3745, con dos puertos Fast Ethernet adicionales y dos tarjetas wic-2T para los puertos seriales. Las interfaces representadas con líneas punteadas son de tipo serial y el resto son interfaces tipo ethernet.

La topología a implementar es la siguiente:



Los enrutadores R6 y R7 no ejecutan ningún protocolo de enrutamiento. Las interfaces de R4, R1 y una de las interfaces de R5 estarán incluidas en un protocolo de enrutamiento especificado en la tabla de este documento. A su vez, la interfaz derecha de R5 y las interfaces de R2 y R3 estarán incluidas en otro protocolo también especificado en la tabla.

El enrutador 3 debe conectarse a la red del laboratorio.

Usted debe realizar lo siguiente:

1. Correcta configuración de los enrutadores (sólo incluir las interfaces indicadas en cada protocolo de enrutamiento) para garantizar conectividad completa (ping) entre todas las redes. **TODOS LOS ENRUTADORES DEBEN TENER UNA RUTA (específica o general) PARA LLEGAR A LA LAN A Y LA LAN B.**

Recuerde elegir cuidadosamente en cuáles enrutadores realiza la redistribución y justificar la configuración de áreas y tipos de interfaces en los protocolos **(1.5 unidades).**

a. Indicar el camino que toma un paquete que va de la LAN A a la LAN B, mostrando las decisiones que toman los enrutadores basados en su tabla de enrutamiento.**(0.5 unidades)**
b. Tomar la LAN B en la tabla de enrutamiento de R6 y demostrar que la métrica mostrada en la tabla es correcta También indique los DR y BDR de la red . **(0.5 unidades)**

2. Establecer conexión con la topología propuesta por el profesor en el laboratorio y con al menos uno de sus compañeros. **(1.5 unidades)**

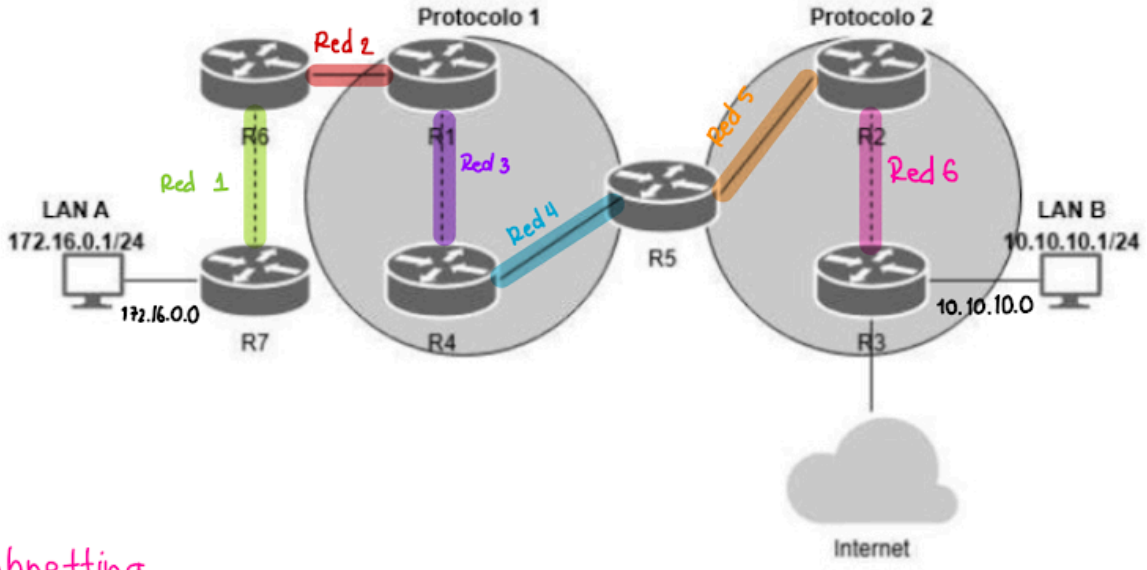
Debe adjuntar las configuraciones de los routers (show running-config) en un archivo de texto. En la sustentación se harán preguntas sobre los puntos realizados. Si las preguntas no son contestadas satisfactoriamente (incluso si la configuración es correcta), no se asignará puntaje sobre ese punto.

Protocolo 1	Protocolo 2	Último dígito de la cédula
RIP	OSPF	0-1
RIP	ISIS	2-3
OSPF	RIP	4
OSPF	ISIS	5
ISIS	RIP	6-7
ISIS	OSPF	8-9

SOLUCIÓN

192.168.89.0/24

↳ mínimo 4 host por red



Subnetting

↳ Con máscara 27

redes → 3 bits para dominios de broadcast

↳ $2^5 = 32$ direcciones de red

Red 1 { 192.168.89.0 ⋮ 192.168.89.31

Red 2 { 192.168.89.32 ⋮ 192.168.89.63

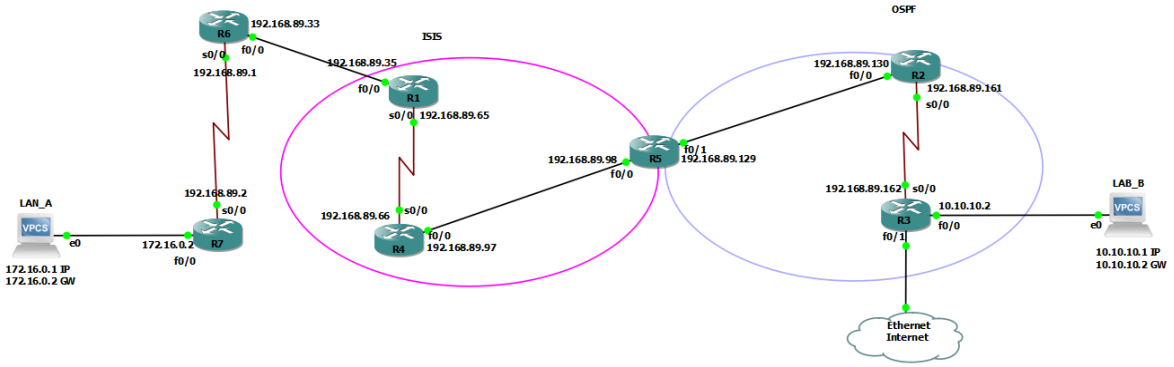
Red 3 { 192.168.89.64 ⋮ 192.168.89.95

Red 4 { 192.168.89.96 ⋮ 192.168.89.127

Red 5 { 192.168.89.128 ⋮ 192.168.89.159

Red 6 { 192.168.89.160 ⋮ 192.168.89.191

Red 7 { 192.168.89.192 ⋮ 192.168.89.223



Configuración de IP en computadores:

```
LAB_B> ip 10.10.10.1/24 gateway 10.10.10.2
Checking for duplicate address...
PC1 : 10.10.10.1 255.255.255.0 gateway 10.10.10.2
```

Configuración de IP en routers

```
R6(config)#inter s0/0
R6(config-if)#ip address 192.168.89.1 255.255.255.224
R6(config-if)#exit
R6(config)#inter f0/0
R6(config-if)#ip address 192.168.89.33 255.255.255.224
R6(config-if)#exit
R6(config)#exit
R6#wr
```

Entre interfaces seriales se comprueba conectividad, así como entre los hosts LAN_A y LAN_B con el router al que están directamente conectados.

```
LAN_A> ping 172.16.0.2
84 bytes from 172.16.0.2 icmp_seq=1 ttl=255 time=14.012 ms
84 bytes from 172.16.0.2 icmp_seq=2 ttl=255 time=16.006 ms
84 bytes from 172.16.0.2 icmp_seq=3 ttl=255 time=14.387 ms
84 bytes from 172.16.0.2 icmp_seq=4 ttl=255 time=15.296 ms
84 bytes from 172.16.0.2 icmp_seq=5 ttl=255 time=15.279 ms
```

```
R4#ping 192.168.89.65

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.89.65, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 32/32/36 ms
```

```
LAB_B> ping 10.10.10.2
84 bytes from 10.10.10.2 icmp_seq=1 ttl=255 time=14.970 ms
84 bytes from 10.10.10.2 icmp_seq=2 ttl=255 time=15.438 ms
84 bytes from 10.10.10.2 icmp_seq=3 ttl=255 time=13.236 ms
84 bytes from 10.10.10.2 icmp_seq=4 ttl=255 time=15.546 ms
84 bytes from 10.10.10.2 icmp_seq=5 ttl=255 time=15.520 ms
```

Configuración de rutas estáticas para habilitar la conectividad entre las redes directamente conectadas de enrutadores.

---

ip route A.A.A.A B.B.B.B C.C.C.C

RED destino
Gateway
Salto

En R4:

```
R4#conf term
Enter configuration commands, one per line.  End with CNTL/Z.
R4(config)#ip route 172.16.0.0 255.255.255.0 192.168.89.65
R4(config)#ip route 192.168.89.0 255.255.255.224 192.168.89.65
R4(config)#ip route 192.168.89.32 255.255.255.224 192.168.89.65
R4(config)#ip route 192.168.89.64 255.255.255.224 192.168.89.65
R4(config)#ip route 192.168.89.96 255.255.255.224 192.168.89.98
R4(config)#ip route 192.168.89.128 255.255.255.224 192.168.89.98
R4(config)#ip route 192.168.89.160 255.255.255.224 192.168.89.98
R4(config)#ip route 10.10.10.0 255.255.255.0 192.168.89.98
R4(config)#exit
R4#wr
Building configuration...
```

Algunos pines para comprobar conectividad:

```
R4#ping 172.16.0.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.0.2, timeout is 2 seconds:
!..!.
Success rate is 40 percent (2/5), round-trip min/avg/max = 60/62/64 ms
R4#ping 172.16.0.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.0.1, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 56/234/760 ms
R4#ping 172.16.0.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.0.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 60/74/96 ms
R4#ping 172.16.0.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.0.2, timeout is 2 seconds:
!.!.!
Success rate is 60 percent (3/5), round-trip min/avg/max = 60/61/64 ms
R4#ping 172.16.0.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.0.2, timeout is 2 seconds:
!.!.!
Success rate is 60 percent (3/5), round-trip min/avg/max = 64/65/68 ms
```

En R5:

```
R5#conf term
Enter configuration commands, one per line.  End with CNTL/Z.
R5(config)#ip route 172.16.0.0 255.255.255.0 192.168.89.97
R5(config)#ip route 192.168.89.0 255.255.255.224 192.168.89.97
R5(config)#ip route 192.168.89.32 255.255.255.224 192.168.89.97
R5(config)#ip route 192.168.89.64 255.255.255.224 192.168.89.97
R5(config)#ip route 192.168.89.96 255.255.255.224 192.168.89.97
R5(config)#ip route 192.168.89.128 255.255.255.224 192.168.89.130
R5(config)#ip route 192.168.89.160 255.255.255.224 192.168.89.130
R5(config)#ip route 10.10.10.0 255.255.255.0 192.168.89.130
R5(config)#exit
R5#wr
Building configuration...
```

Algunos pines para verificar conectividad:

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.0.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 100/117/128 ms
R5#ping 192.168.89.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.89.2, timeout is 2 seconds:
.!.!.
Success rate is 40 percent (2/5), round-trip min/avg/max = 80/86/92 ms
```

Tras haber configurado todos los routers con rutas estáticas, se hace un ping desde R3 a algunas interfaces de la topología:

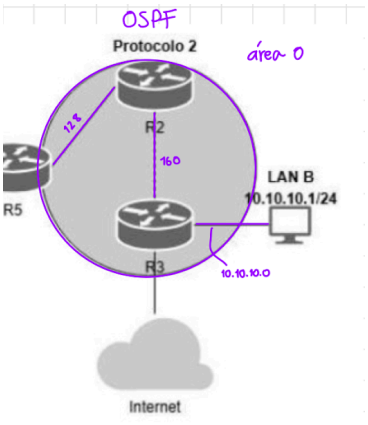
```
Success rate is 60 percent (3/5), round-trip min/avg/max = 92/102/120 ms
R3#ping 172.16.0.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.0.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 92/126/152 ms
R3#ping 192.168.89.33

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.89.33, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 92/111/132 ms
R3#ping 192.168.89.97

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.89.97, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 88/102/144 ms
R3#ping 192.168.89.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.89.2, timeout is 2 seconds:
!.!.!
Success rate is 60 percent (3/5), round-trip min/avg/max = 120/221/420 ms
```

También se comprueba conectividad entre ambos hosts LAN_A y LAN_B:

```
LAN_A> ping 10.10.10.1
84 bytes from 10.10.10.1 icmp_seq=1 ttl=57 time=122.303 ms
84 bytes from 10.10.10.1 icmp_seq=2 ttl=57 time=121.708 ms
84 bytes from 10.10.10.1 icmp_seq=3 ttl=57 time=124.747 ms
84 bytes from 10.10.10.1 icmp_seq=4 ttl=57 time=122.530 ms
84 bytes from 10.10.10.1 icmp_seq=5 ttl=57 time=122.946 ms
```

```
LAB_B> ping 172.16.0.1
84 bytes from 172.16.0.1 icmp_seq=1 ttl=57 time=121.691 ms
84 bytes from 172.16.0.1 icmp_seq=2 ttl=57 time=123.384 ms
84 bytes from 172.16.0.1 icmp_seq=3 ttl=57 time=122.583 ms
84 bytes from 172.16.0.1 icmp_seq=4 ttl=57 time=122.858 ms
84 bytes from 172.16.0.1 icmp_seq=5 ttl=57 time=119.946 ms
```

Configuración de OSPF



Configuración de OSPF en R2:

```
R2#conf term
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#router ospf 100
R2(config-router)#network 192.168.89.128 0.0.0.31 area 0
R2(config-router)#network 192.168.89.160  0.0.0.31 area 0
```

```
R2#sh ip ospf database

            OSPF Router with ID (192.168.89.161) (Process ID 100)

                Router Link States (Area 0)

Link ID         ADV Router      Age         Seq#       Checksum Link count
192.168.89.129  192.168.89.129  177         0x80000001 0x000711 1
192.168.89.161  192.168.89.161  35          0x80000005 0x00DF46 3
192.168.89.162  192.168.89.162  1787        0x80000002 0x00F59C 3

                Net Link States (Area 0)

Link ID         ADV Router      Age         Seq#       Checksum
192.168.89.130  192.168.89.161  176         0x80000001 0x00C93D
```

Selección DR y BDR:

Cada router tiene una prioridad de interfaz en OSPF que puede ser configurada manualmente. El router con la prioridad más alta es seleccionado como DR, y el segundo más alto como BDR. Si las prioridades son iguales, OSPF elige el router con la IP más alta en el segmento.

Los routers que asumen el rol de DR y BDR manejan mayor tráfico y procesamiento de información, ya que son responsables de generar y distribuir las actualizaciones de la tabla de enrutamiento en el área OSPF. Por tanto, conviene que el DR y el BDR sean routers con recursos suficientes para manejar esta carga sin afectar su rendimiento.

```
R5#sh ip ospf neighbor

Neighbor ID     Pri   State           Dead Time   Address         Interface
195.195.195.195  10   EXSTART/DR      00:00:38    192.168.89.130  FastEthernet0/1
```

```
R2#sh ip ospf neighbor

Neighbor ID     Pri   State           Dead Time   Address         Interface
255.255.255.255   0   FULL/  -        00:00:36    192.168.89.162  Serial0/0
192.168.89.129    1   FULL/BDR        00:00:35    192.168.89.129  FastEthernet0/0
```

Configuración de ISIS

R1 con NSAP 49.0000.0000.0000.0001.00

```
R1(config)#router isis
R1(config-router)#net 49.0000.0000.0000.0001.00
R1(config-router)#exit
```

```
R1(config)#inter f0/0
R1(config-if)#ip router isis
```

```
R1(config-if)#isis circuit-type level-1
R1(config-if)#exit
```

```
R1(config)#inter s0/0
R1(config-if)#ip router isis
```

```
R1(config-if)#isis circuit-type level-1
```

R4 con NSAP 49.0000.0000.0000.0004.00

```
R4#conf term
Enter configuration commands, one per line.  End with CNTL/Z.
R4(config)#router isis
R4(config-router)#net 49.0000.0000.0000.0004.00
R4(config-router)#exit
R4(config)#inter s0/0
R4(config-if)#ip router isis
R4(config-if)#isis circuit-type level-1
R4(config-if)#exit
R4(config)#inter f0/0
R4(config-if)#ip router isis
R4(config-if)#isis circuit-type level-1
```

R5 con NSAP 49.0000.0000.0000.0005.00

```
R5(config)#router isis
R5(config-router)#net 49.0000.0000.0000.0005.00
R5(config-router)#exit
R5(config)#inter f0/0
R5(config-if)#ip router isis
R5(config-if)#isis circuit-type level-1
```

Redistribución

Se seleccionan los routers que conectan las áreas o segmentos donde se ejecutan diferentes protocolos, en este caso, R5.

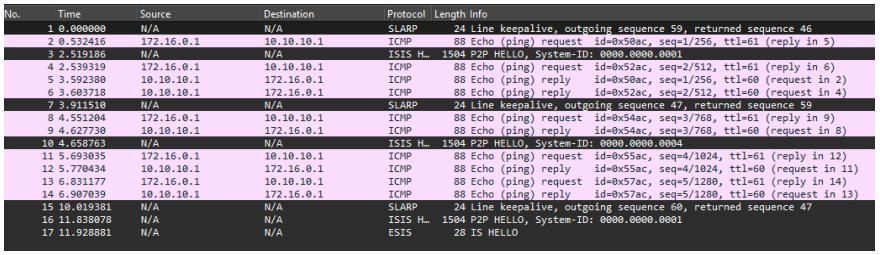
```
R5(config)#router ospf 100
R5(config-router)#redistribute isis metric-type 1 subnets
R5(config-router)#exit
R5(config)#router isis
R5(config-router)#redistribute ospf 100 metric 10
R5(config-router)#exit
```

PUNTOS

1.

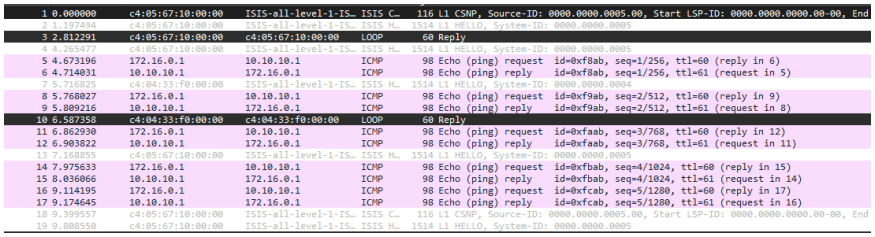
a. Al revisar todas las interfaces de la topología cuando se hace ping desde LAN_A hasta LAN_B, el paquete viaja primero de LAN_A hasta R7, luego por la interfaz serial para ir a R6. Llega hasta R1 y luego intervienen los protocolos ISIS y OSPF.

R1 - R4



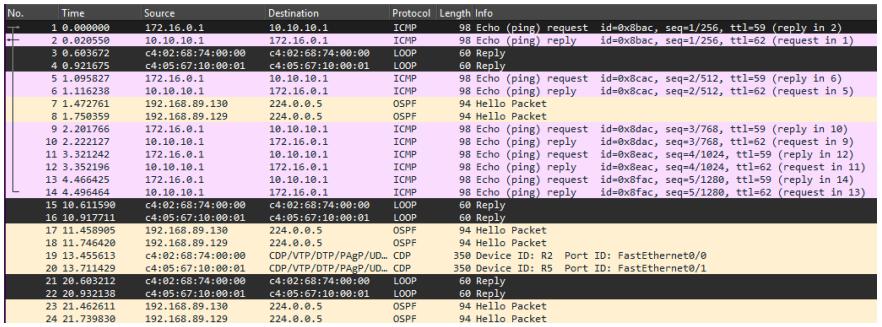
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	N/A	N/A	SLARP	24	Line keepalive, outgoing sequence 59, returned sequence 46
2	0.532416	172.16.0.1	10.10.10.1	ICMP	88	Echo (ping) request id=0x50ac, seq=1/256, ttl=61 (reply in 5)
3	2.519186	N/A	N/A	ISIS H…	1504	P2P HELLO, System-ID: 0000.0000.0001
4	2.539319	172.16.0.1	10.10.10.1	ICMP	88	Echo (ping) request id=0x52ac, seq=2/512, ttl=61 (reply in 6)
5	3.592380	10.10.10.1	172.16.0.1	ICMP	88	Echo (ping) reply id=0x50ac, seq=1/256, ttl=60 (request in 2)
6	3.603718	10.10.10.1	172.16.0.1	ICMP	88	Echo (ping) reply id=0x52ac, seq=2/512, ttl=60 (request in 4)
7	3.911510	N/A	N/A	SLARP	24	Line keepalive, outgoing sequence 47, returned sequence 59
8	4.551204	172.16.0.1	10.10.10.1	ICMP	88	Echo (ping) request id=0x54ac, seq=3/768, ttl=61 (reply in 9)
9	4.627730	10.10.10.1	172.16.0.1	ICMP	88	Echo (ping) reply id=0x54ac, seq=3/768, ttl=60 (request in 8)
10	4.658763	N/A	N/A	ISIS H…	1504	P2P HELLO, System-ID: 0000.0000.0004
11	5.693035	172.16.0.1	10.10.10.1	ICMP	88	Echo (ping) request id=0x55ac, seq=4/1024, ttl=61 (reply in 12)
12	5.770434	10.10.10.1	172.16.0.1	ICMP	88	Echo (ping) reply id=0x55ac, seq=4/1024, ttl=60 (request in 11)
13	6.831177	172.16.0.1	10.10.10.1	ICMP	88	Echo (ping) request id=0x57ac, seq=5/1280, ttl=61 (reply in 14)
14	6.907039	10.10.10.1	172.16.0.1	ICMP	88	Echo (ping) reply id=0x57ac, seq=5/1280, ttl=60 (request in 13)
15	10.019381	N/A	N/A	SLARP	24	Line keepalive, outgoing sequence 60, returned sequence 47
16	11.838078	N/A	N/A	ISIS H…	1504	P2P HELLO, System-ID: 0000.0000.0001
17	11.928881	N/A	N/A	ESIS	28	IS HELLO

R4 - R5



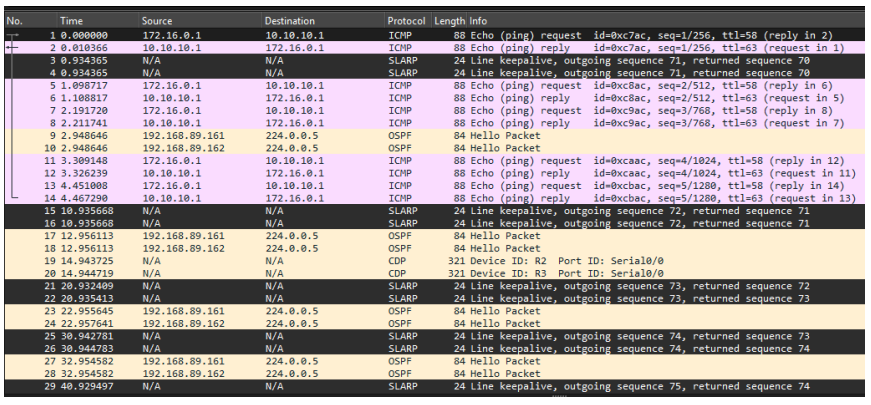
1	0.000000	c4:05:67:10:00:00	ISIS-all-level-1-IS…	ISIS C…	116	L1 CSNP, Source-ID: 0000.0000.0005.00, Start LSP-ID: 0000.0000.0000.00-00, End
2	1.197494	c4:05:67:10:00:00	ISIS-all-level-1-IS…	ISIS H…	1514	L1 HELLO, System-ID: 0000.0000.0005
3	2.812291	c4:05:67:10:00:00	c4:05:67:10:00:00	LOOP	60	Reply
4	4.265477	c4:05:67:10:00:00	ISIS-all-level-1-IS…	ISIS H…	1514	L1 HELLO, System-ID: 0000.0000.0005
5	4.673196	172.16.0.1	10.10.10.1	ICMP	98	Echo (ping) request id=0xf8ab, seq=1/256, ttl=60 (reply in 6)
6	4.714031	10.10.10.1	172.16.0.1	ICMP	98	Echo (ping) reply id=0xf8ab, seq=1/256, ttl=61 (request in 5)
7	5.716025	c4:0a:33:f0:00:00	ISIS-all-level-1-IS…	ISIS H…	1514	L1 HELLO, System-ID: 0000.0000.0004
8	5.768027	172.16.0.1	10.10.10.1	ICMP	98	Echo (ping) request id=0xf9ab, seq=2/512, ttl=60 (reply in 9)
9	5.809216	10.10.10.1	172.16.0.1	ICMP	98	Echo (ping) reply id=0xf9ab, seq=2/512, ttl=61 (request in 8)
10	6.587358	c4:04:33:f0:00:00	c4:04:33:f0:00:00	LOOP	60	Reply
11	6.862930	172.16.0.1	10.10.10.1	ICMP	98	Echo (ping) request id=0xfaab, seq=3/768, ttl=60 (reply in 12)
12	6.903822	10.10.10.1	172.16.0.1	ICMP	98	Echo (ping) reply id=0xfaab, seq=3/768, ttl=61 (request in 11)
13	7.168055	c4:05:67:10:00:00	ISIS-all-level-1-IS…	ISIS H…	1514	L1 HELLO, System-ID: 0000.0000.0005
14	7.975633	172.16.0.1	10.10.10.1	ICMP	98	Echo (ping) request id=0xfbab, seq=4/1024, ttl=60 (reply in 15)
15	8.036066	10.10.10.1	172.16.0.1	ICMP	98	Echo (ping) reply id=0xfbab, seq=4/1024, ttl=61 (request in 14)
16	9.114195	172.16.0.1	10.10.10.1	ICMP	98	Echo (ping) request id=0xfcab, seq=5/1280, ttl=60 (reply in 17)
17	9.174645	10.10.10.1	172.16.0.1	ICMP	98	Echo (ping) reply id=0xfcab, seq=5/1280, ttl=61 (request in 16)
18	9.399557	c4:05:67:10:00:00	ISIS-all-level-1-IS…	ISIS C…	116	L1 CSNP, Source-ID: 0000.0000.0005.00, Start LSP-ID: 0000.0000.0000.00-00, End
19	9.808550	c4:05:67:10:00:00	ISIS-all-level-1-IS…	ISIS H…	1514	L1 HELLO, System-ID: 0000.0000.0005

R5 - R2



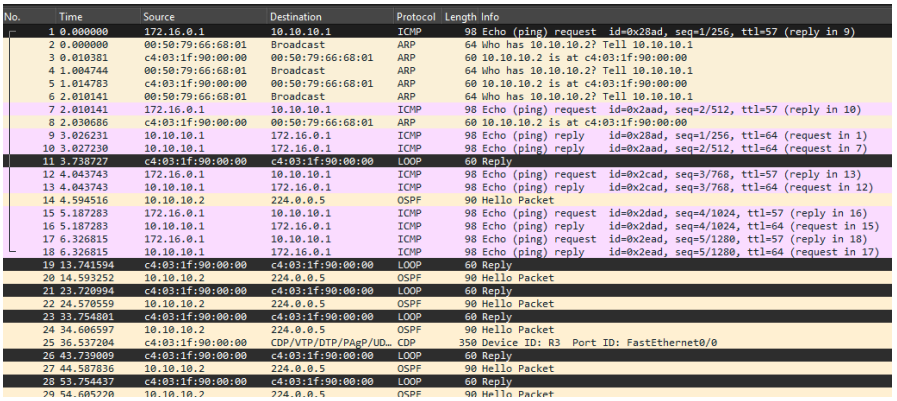
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	172.16.0.1	10.10.10.1	ICMP	98	Echo (ping) request id=0x8bac, seq=1/256, ttl=59 (reply in 2)
2	0.020550	10.10.10.1	172.16.0.1	ICMP	98	Echo (ping) reply id=0x8bac, seq=1/256, ttl=62 (request in 1)
3	0.603672	c4:02:68:74:00:00	c4:02:68:74:00:00	LOOP	60	Reply
4	0.921675	c4:05:67:10:00:01	c4:05:67:10:00:01	LOOP	60	Reply
5	1.095827	172.16.0.1	10.10.10.1	ICMP	98	Echo (ping) request id=0x8cac, seq=2/512, ttl=59 (reply in 6)
6	1.116238	10.10.10.1	172.16.0.1	ICMP	98	Echo (ping) reply id=0x8cac, seq=2/512, ttl=62 (request in 5)
7	1.472761	192.168.89.130	224.0.0.5	OSPF	94	Hello Packet
8	1.750359	192.168.89.129	224.0.0.5	OSPF	94	Hello Packet
9	2.201766	172.16.0.1	10.10.10.1	ICMP	98	Echo (ping) request id=0x8dac, seq=3/768, ttl=59 (reply in 10)
10	2.222127	10.10.10.1	172.16.0.1	ICMP	98	Echo (ping) reply id=0x8dac, seq=3/768, ttl=62 (request in 9)
11	3.321242	172.16.0.1	10.10.10.1	ICMP	98	Echo (ping) request id=0x8eac, seq=4/1024, ttl=59 (reply in 12)
12	3.352196	10.10.10.1	172.16.0.1	ICMP	98	Echo (ping) reply id=0x8eac, seq=4/1024, ttl=62 (request in 11)
13	4.466425	172.16.0.1	10.10.10.1	ICMP	98	Echo (ping) request id=0x8fac, seq=5/1280, ttl=59 (reply in 14)
14	4.496464	10.10.10.1	172.16.0.1	ICMP	98	Echo (ping) reply id=0x8fac, seq=5/1280, ttl=62 (request in 13)
15	10.611590	c4:02:68:74:00:00	c4:02:68:74:00:00	LOOP	60	Reply
16	10.917711	c4:05:67:10:00:01	c4:05:67:10:00:01	LOOP	60	Reply
17	11.458905	192.168.89.130	224.0.0.5	OSPF	94	Hello Packet
18	11.746420	192.168.89.129	224.0.0.5	OSPF	94	Hello Packet
19	13.455613	c4:02:68:74:00:00	CDP/VTP/DTP/PAgP/UD…	CDP	350	Device ID: R2 Port ID: FastEthernet0/0
20	13.711429	c4:05:67:10:00:01	CDP/VTP/DTP/PAgP/UD…	CDP	350	Device ID: R5 Port ID: FastEthernet0/1
21	20.603212	c4:02:68:74:00:00	c4:02:68:74:00:00	LOOP	60	Reply
22	20.932138	c4:05:67:10:00:01	c4:05:67:10:00:01	LOOP	60	Reply
23	21.462611	192.168.89.130	224.0.0.5	OSPF	94	Hello Packet
24	21.739830	192.168.89.129	224.0.0.5	OSPF	94	Hello Packet

R2 - R3



No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	172.16.0.1	10.10.10.1	ICMP	88	Echo (ping) request id=0xc7ac, seq=1/256, ttl=58 (reply in 2)
2	0.010366	10.10.10.1	172.16.0.1	ICMP	88	Echo (ping) reply id=0xc7ac, seq=1/256, ttl=63 (request in 1)
3	0.934365	N/A	N/A	SLARP	24	Line keepalive, outgoing sequence 71, returned sequence 70
4	0.934365	N/A	N/A	SLARP	24	Line keepalive, outgoing sequence 71, returned sequence 70
5	1.098717	172.16.0.1	10.10.10.1	ICMP	88	Echo (ping) request id=0xc8ac, seq=2/512, ttl=58 (reply in 6)
6	1.108817	10.10.10.1	172.16.0.1	ICMP	88	Echo (ping) reply id=0xc8ac, seq=2/512, ttl=63 (request in 5)
7	2.191720	172.16.0.1	10.10.10.1	ICMP	88	Echo (ping) request id=0xc9ac, seq=3/768, ttl=58 (reply in 8)
8	2.211741	10.10.10.1	172.16.0.1	ICMP	88	Echo (ping) reply id=0xc9ac, seq=3/768, ttl=63 (request in 7)
9	2.948646	192.168.89.161	224.0.0.5	OSPF	84	Hello Packet
10	2.948646	192.168.89.162	224.0.0.5	OSPF	84	Hello Packet
11	3.309148	172.16.0.1	10.10.10.1	ICMP	88	Echo (ping) request id=0xcaac, seq=4/1024, ttl=58 (reply in 12)
12	3.326239	10.10.10.1	172.16.0.1	ICMP	88	Echo (ping) reply id=0xcaac, seq=4/1024, ttl=63 (request in 11)
13	4.451008	172.16.0.1	10.10.10.1	ICMP	88	Echo (ping) request id=0xcbac, seq=5/1280, ttl=58 (reply in 14)
14	4.467290	10.10.10.1	172.16.0.1	ICMP	88	Echo (ping) reply id=0xcbac, seq=5/1280, ttl=63 (request in 13)
15	10.935668	N/A	N/A	SLARP	24	Line keepalive, outgoing sequence 72, returned sequence 71
16	10.935668	N/A	N/A	SLARP	24	Line keepalive, outgoing sequence 72, returned sequence 71
17	12.956113	192.168.89.161	224.0.0.5	OSPF	84	Hello Packet
18	12.956113	192.168.89.162	224.0.0.5	OSPF	84	Hello Packet
19	14.943725	N/A	N/A	CDP	321	Device ID: R2 Port ID: Serial0/0
20	14.944719	N/A	N/A	CDP	321	Device ID: R3 Port ID: Serial0/0
21	20.932409	N/A	N/A	SLARP	24	Line keepalive, outgoing sequence 73, returned sequence 72
22	20.935413	N/A	N/A	SLARP	24	Line keepalive, outgoing sequence 73, returned sequence 73
23	22.955645	192.168.89.161	224.0.0.5	OSPF	84	Hello Packet
24	22.957641	192.168.89.162	224.0.0.5	OSPF	84	Hello Packet
25	30.942781	N/A	N/A	SLARP	24	Line keepalive, outgoing sequence 74, returned sequence 73
26	30.944783	N/A	N/A	SLARP	24	Line keepalive, outgoing sequence 74, returned sequence 74
27	32.954582	192.168.89.161	224.0.0.5	OSPF	84	Hello Packet
28	32.954582	192.168.89.162	224.0.0.5	OSPF	84	Hello Packet
29	40.929497	N/A	N/A	SLARP	24	Line keepalive, outgoing sequence 75, returned sequence 74

R3 - LAN_B



No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	172.16.0.1	10.10.10.1	ICMP	98	Echo (ping) request id=0x28ad, seq=1/256, ttl=57 (reply in 9)
2	0.000000	00:50:79:66:68:01	Broadcast	ARP	64	Who has 10.10.10.2? Tell 10.10.10.1
3	0.010381	c4:03:1f:90:00:00	00:50:79:66:68:01	ARP	60	10.10.10.2 is at c4:03:1f:90:00:00
4	1.004744	00:50:79:66:68:01	Broadcast	ARP	64	Who has 10.10.10.2? Tell 10.10.10.1
5	1.014783	c4:03:1f:90:00:00	00:50:79:66:68:01	ARP	60	10.10.10.2 is at c4:03:1f:90:00:00
6	2.010141	00:50:79:66:68:01	Broadcast	ARP	64	Who has 10.10.10.2? Tell 10.10.10.1
7	2.010141	172.16.0.1	10.10.10.1	ICMP	98	Echo (ping) request id=0x2aad, seq=2/512, ttl=57 (reply in 10)
8	2.030686	c4:03:1f:90:00:00	00:50:79:66:68:01	ARP	60	10.10.10.2 is at c4:03:1f:90:00:00
9	3.026231	10.10.10.1	172.16.0.1	ICMP	98	Echo (ping) reply id=0x28ad, seq=1/256, ttl=64 (request in 1)
10	3.027230	10.10.10.1	172.16.0.1	ICMP	98	Echo (ping) reply id=0x2aad, seq=2/512, ttl=64 (request in 7)
11	3.738727	c4:03:1f:90:00:00	c4:03:1f:90:00:00	LOOP	60	Reply
12	4.043743	172.16.0.1	10.10.10.1	ICMP	98	Echo (ping) request id=0x2cad, seq=3/768, ttl=57 (reply in 13)
13	4.043743	10.10.10.1	172.16.0.1	ICMP	98	Echo (ping) reply id=0x2cad, seq=3/768, ttl=64 (request in 12)
14	4.594516	10.10.10.2	224.0.0.5	OSPF	90	Hello Packet
15	5.187283	172.16.0.1	10.10.10.1	ICMP	98	Echo (ping) request id=0x2dad, seq=4/1024, ttl=57 (reply in 16)
16	5.187283	10.10.10.1	172.16.0.1	ICMP	98	Echo (ping) reply id=0x2dad, seq=4/1024, ttl=64 (request in 15)
17	6.326815	172.16.0.1	10.10.10.1	ICMP	98	Echo (ping) request id=0x2ead, seq=5/1280, ttl=57 (reply in 18)
18	6.326815	10.10.10.1	172.16.0.1	ICMP	98	Echo (ping) reply id=0x2ead, seq=5/1280, ttl=64 (request in 17)
19	13.741594	c4:03:1f:90:00:00	c4:03:1f:90:00:00	LOOP	60	Reply
20	14.593252	10.10.10.2	224.0.0.5	OSPF	90	Hello Packet
21	23.720994	c4:03:1f:90:00:00	c4:03:1f:90:00:00	LOOP	60	Reply
22	24.570559	10.10.10.2	224.0.0.5	OSPF	90	Hello Packet
23	33.754801	c4:03:1f:90:00:00	c4:03:1f:90:00:00	LOOP	60	Reply
24	34.606597	10.10.10.2	224.0.0.5	OSPF	90	Hello Packet
25	36.537204	c4:03:1f:90:00:00	CDP/VTP/DTP/PAgP/UD…	CDP	350	Device ID: R3 Port ID: FastEthernet0/0
26	43.739009	c4:03:1f:90:00:00	c4:03:1f:90:00:00	LOOP	60	Reply
27	44.587836	10.10.10.2	224.0.0.5	OSPF	90	Hello Packet
28	53.754437	c4:03:1f:90:00:00	c4:03:1f:90:00:00	LOOP	60	Reply
29	54.605220	10.10.10.2	224.0.0.5	OSPF	90	Hello Packet

b. Ahora, el DR está en la interfaz f0/1 de R5 y el BDR en la interfaz f0/0 de R2.

```
R6#sh ip route
Codes: 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

Gateway of last resort is not set

     192.168.89.0/27 is subnetted, 6 subnets
C       192.168.89.32 is directly connected, FastEthernet0/0
C       192.168.89.0 is directly connected, Serial0/0
S       192.168.89.96 [1/0] via 192.168.89.35
S       192.168.89.64 [1/0] via 192.168.89.35
S       192.168.89.160 [1/0] via 192.168.89.35
S       192.168.89.128 [1/0] via 192.168.89.35
     172.16.0.0/24 is subnetted, 1 subnets
S       172.16.0.0 [1/0] via 192.168.89.2
     10.0.0.0/24 is subnetted, 1 subnets
S       10.10.10.0 [1/0] via 192.168.89.35
```