CIDR: Ejemplos

Area de Ingeniería Telemática
http://www.tlm.unavarra.es

Arquitectura de Redes, Sistemas y Servicios
3º Ingeniería de Telecomunicación

Temario

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2. Arquitecturas de protocolos
3. **Conmutación de paquetes**
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   - LANs IEEE 802.11 (WiFi)
   - ATM
   - Protocolos de Internet
     - Internetworking
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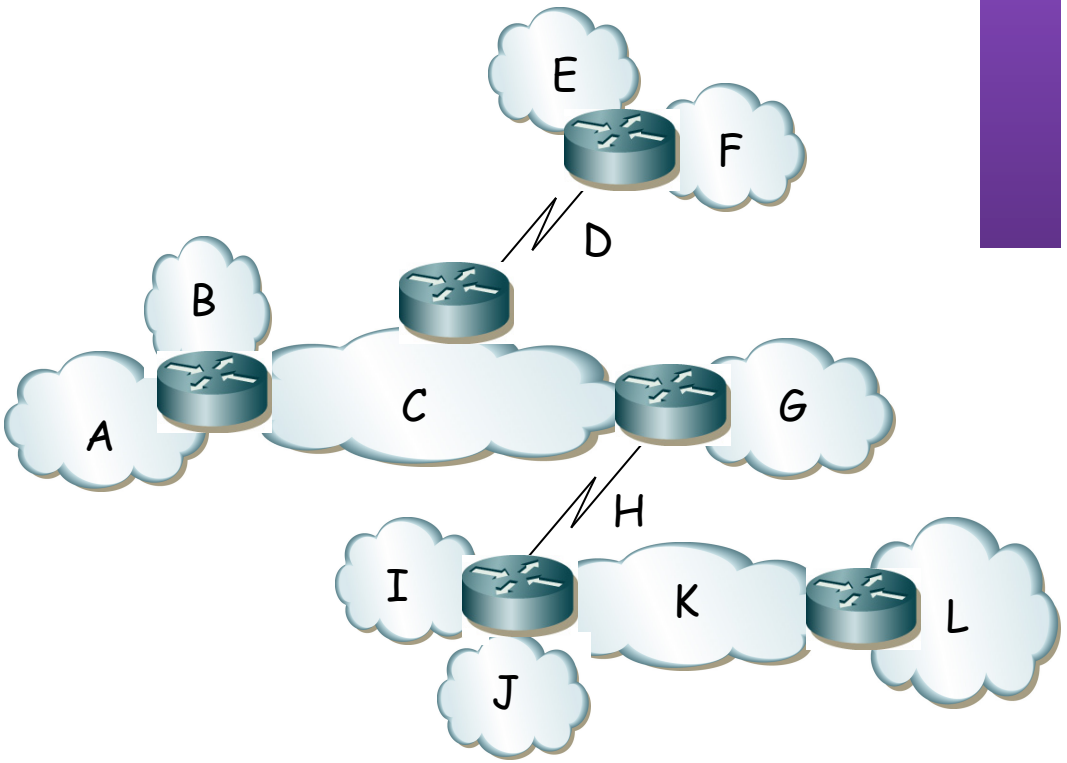
     - Fragmentación e ICMP. IP en LAN
4. Conmutación de circuitos
5. Tecnologías
6. Control de acceso al medio en redes de área local
7. Servicios de Internet

Ejemplo (2)

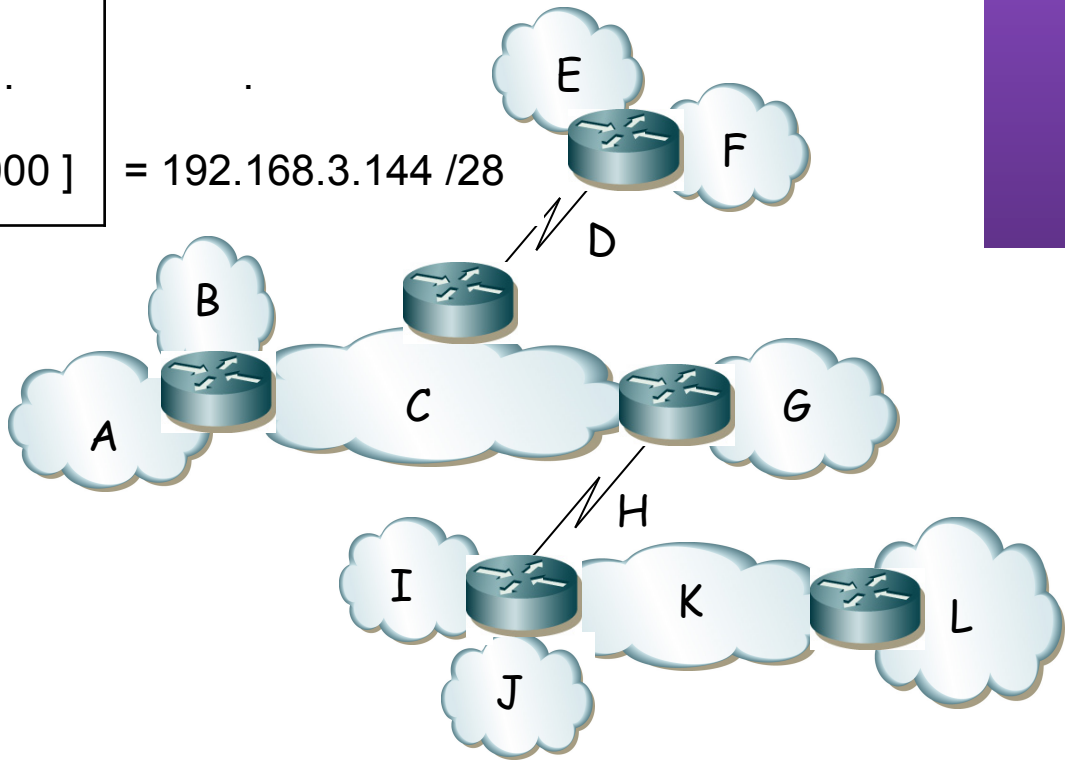
- Máscaras de longitud variable (VLSM o CIDR)
- Red D y H no van a necesitar más de 2 direcciones
- 10 redes de 10 hosts



Ejemplo (2)

- 10 redes de 10 hosts

A	192.168.3	.	[0000]	[0000]	= 192.168.3.0 /28
B	192.168.3	.	[0001]	[0000]	= 192.168.3.16 /28
C	192.168.3	.	[0010]	[0000]	= 192.168.3.32 /28
.	.	.	.	.	.
.	.	.	.	.	.
L	192.168.3	.	[1001]	[0000]	= 192.168.3.144 /28



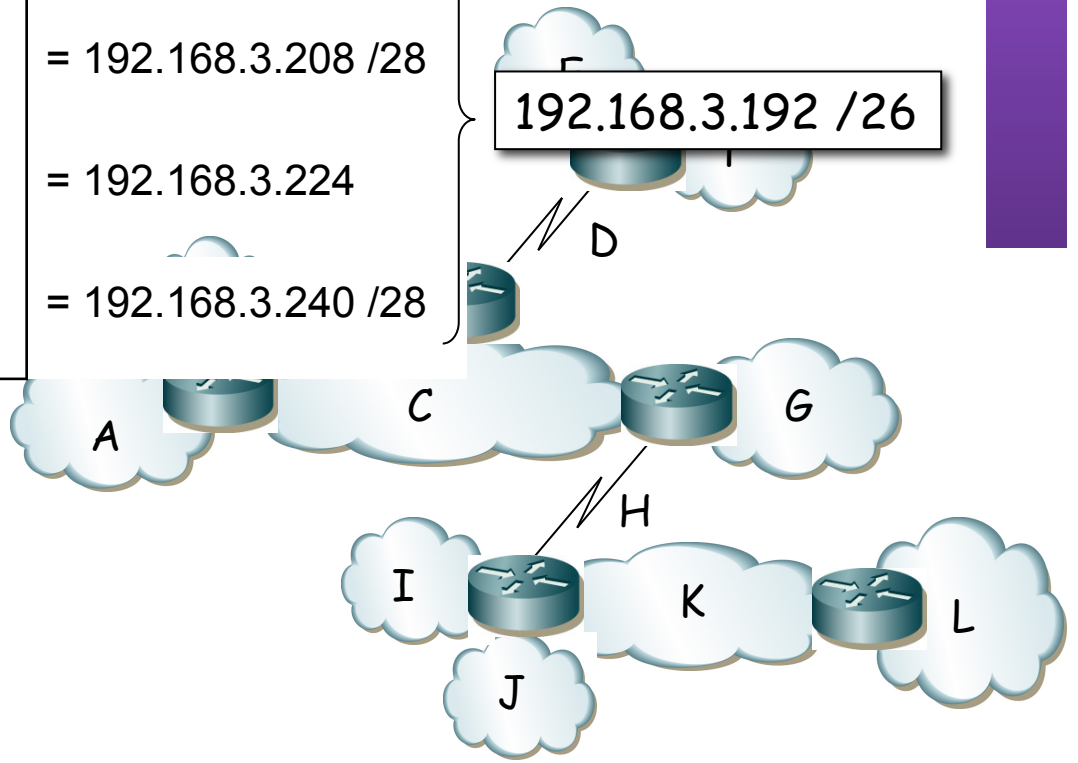
Ejemplo (2)

- Libres:

192.168.3	.	[**1010**]	[0000]	= 192.168.3.160 /28
192.168.3	.	[**1011**]	[0000]	= 192.168.3.176 /28
192.168.3	.	[**1100**]	[0000]	= 192.168.3.192 /28
192.168.3	.	[**1101**]	[0000]	= 192.168.3.208 /28
192.168.3	.	[**1110**]	[0000]	= 192.168.3.224
192.168.3	.	[**1111**]	[0000]	= 192.168.3.240 /28

192.168.3.160 /27

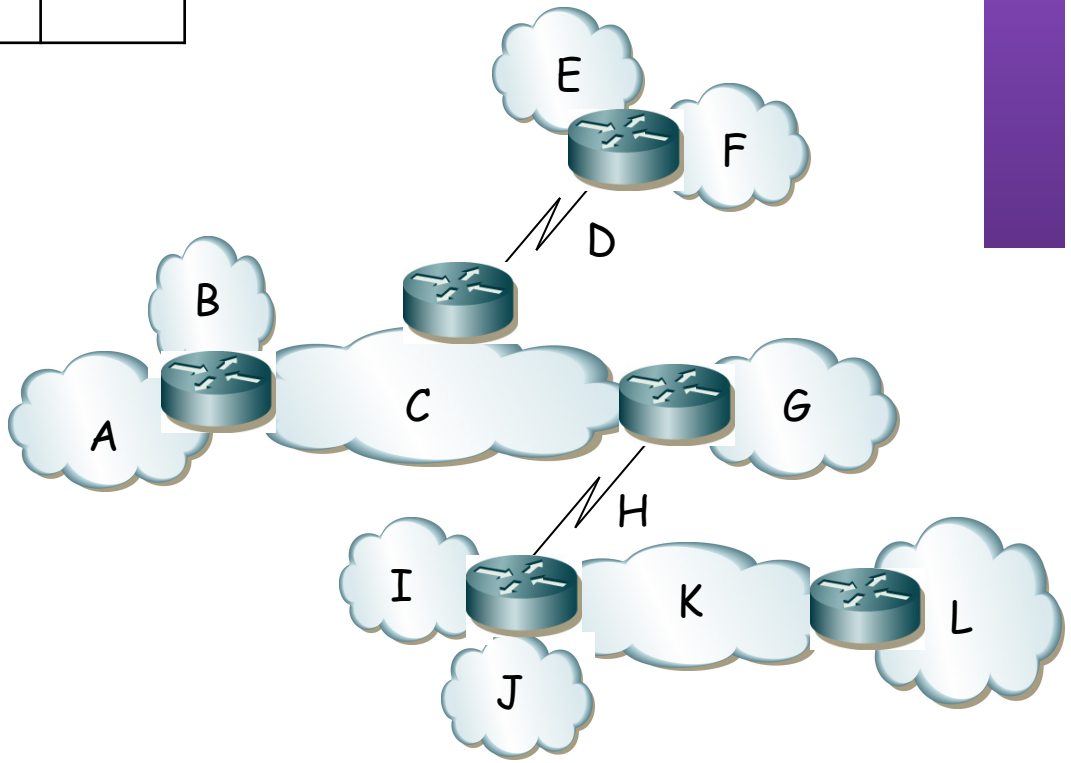
192.168.3.192 /26



Ejemplo (2)

- 2 redes de 2 hosts
- 2 hosts (+2) → 2^2=4, 2 bits para el host-id
- Por ejemplo dentro de 192.168.3.160 /27

D	192.168.3	.	[101]	[000]	[00]	= 192.168.3.160 /30
H	192.168.3	.	[101]	[001]	[00]	= 192.168.3.164 /30



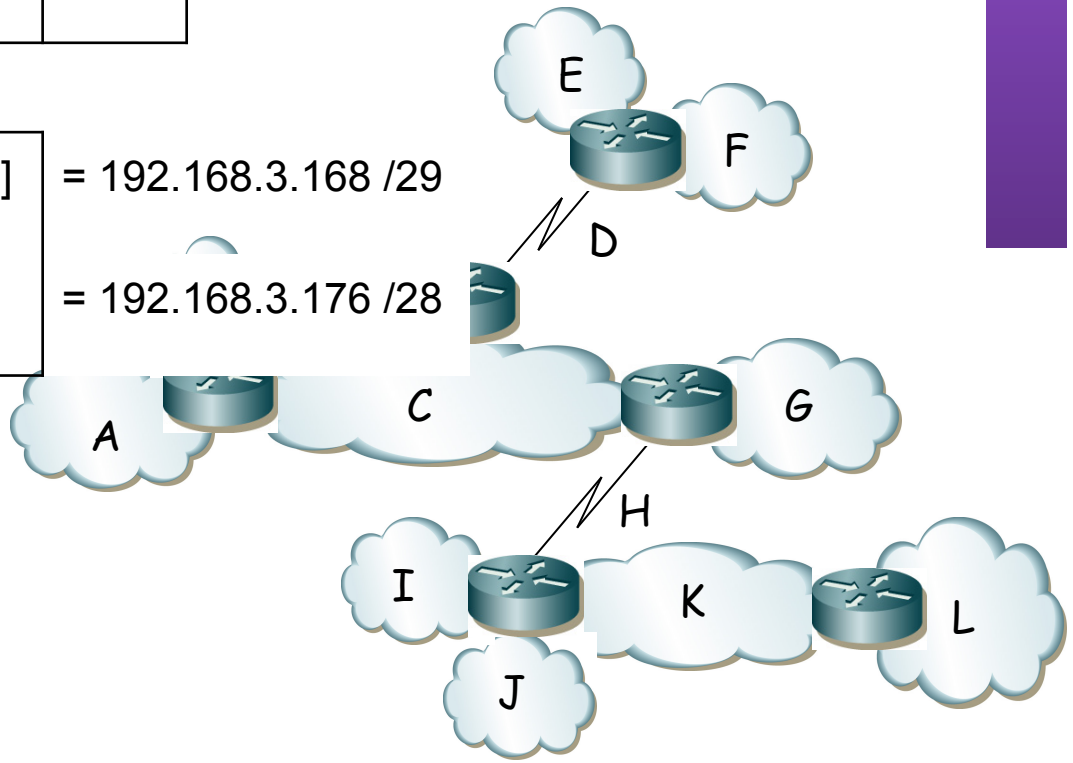
Ejemplo (2)

- 2 redes de 2 hosts
- 2 hosts (+2) → 2^2=4, 2 bits para el host-id
- Por ejemplo dentro de 192.168.3.160 /27

D	192.168.3	.	[101]	[000]	[00]	= 192.168.3.160 /30
H	192.168.3	.	[101]	[001]	[00]	= 192.168.3.164 /30

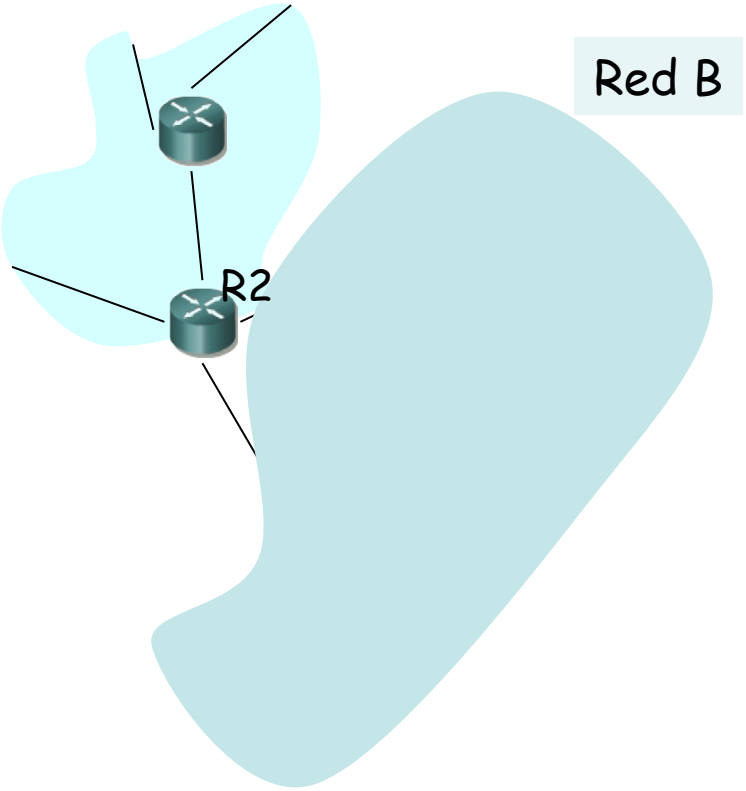
Libres en 192.168.3.160 /27:

192.168.3	.	[101]	[0 1]	[000]	= 192.168.3.168 /29
192.168.3	.	[101]	[1]	[0000]	= 192.168.3.176 /28



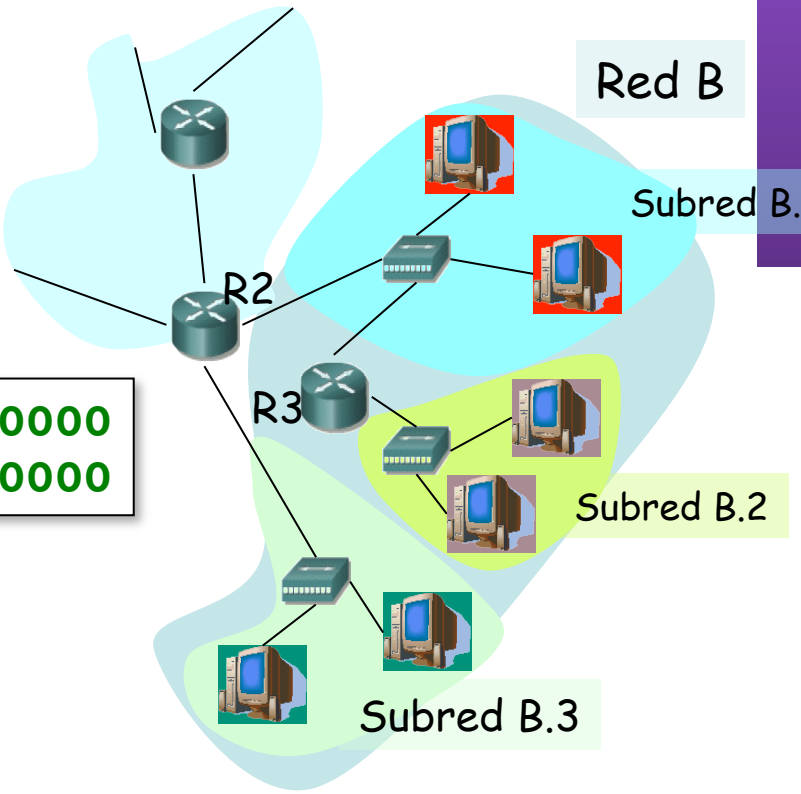
Ejemplo (2)

- Supongamos que nuestra red tiene asignado el espacio de direcciones 193.65.72.0/22
- Queremos subdividir nuestro espacio de direcciones en 3 redes (…)



Ejemplo (2)

- Supongamos que nuestra red tiene asignado el espacio de direcciones 193.65.72.0/22
- Queremos subdividir nuestro espacio de direcciones en 3 redes (…)
- La subred B.1 tendrá 320 hosts
- La subred B.2 85 hosts
- La subred B.3 113 hosts



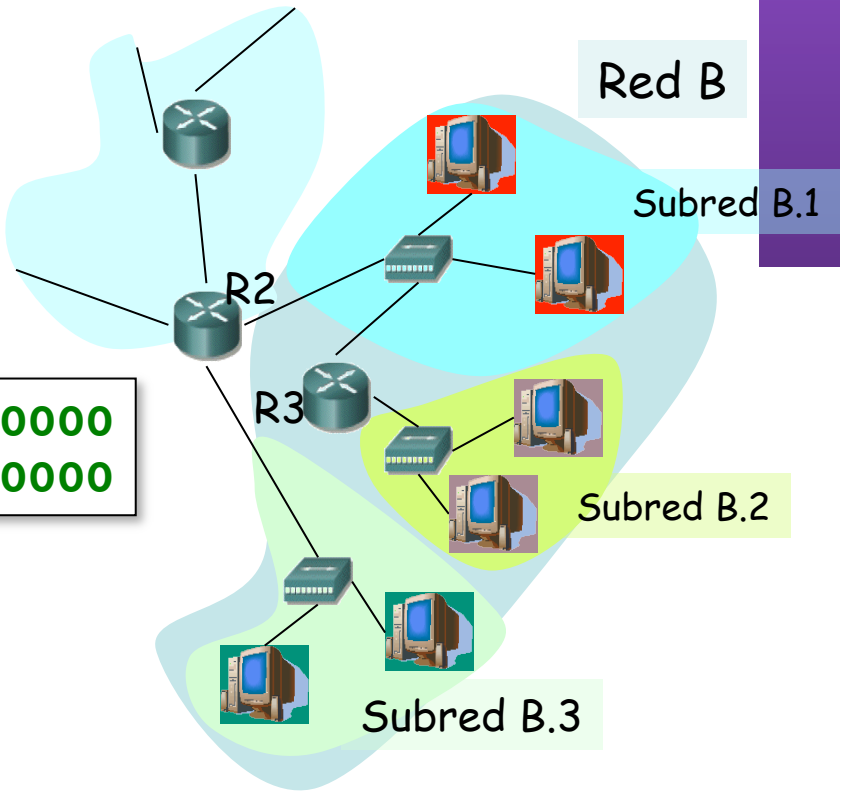
Mask= 11000001 01000001 01001000 00000000
11111111 11111111 11111100 00000000

Ejemplo (2)

- Supongamos que nuestra red tiene asignado el espacio de direcciones 193.65.72.0/22
- Queremos subdividir nuestro espacio de direcciones en 3 redes (…)
- La subred B.1 tendrá 320 hosts
- La subred B.2 85 hosts
- La subred B.3 113 hosts

- Subred B.1:
  - $2^8 < 320 < 2^9$
  - 9 bits en el host-ID (…)

```
11000001 01000001 01001000 00000000
11111111 11111111 11111100 00000000
```
Mask=



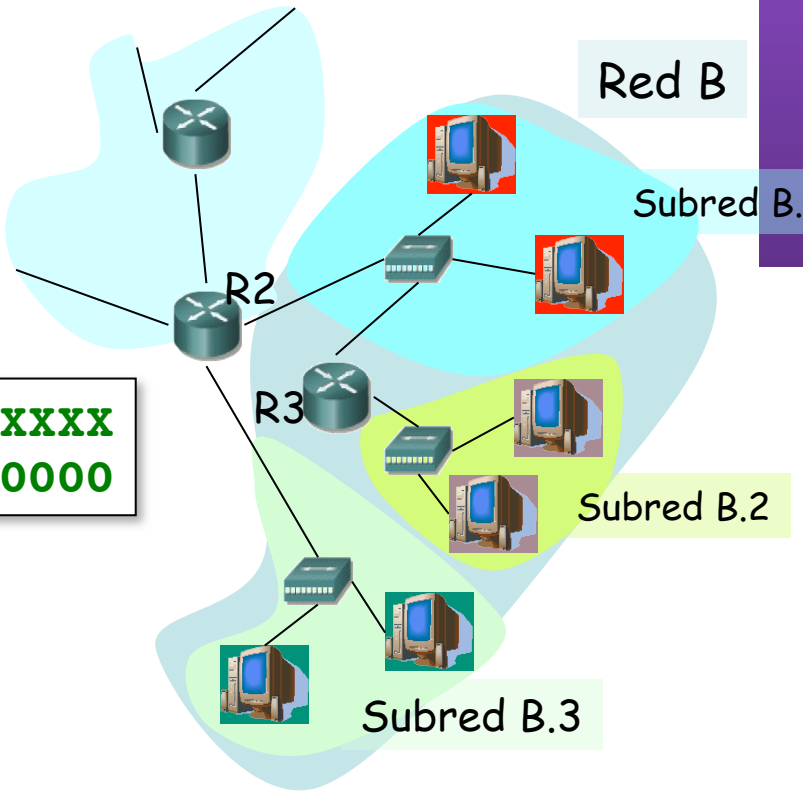
Ejemplo (2)

- Supongamos que nuestra red tiene asignado el espacio de direcciones 193.65.72.0/22
- Queremos subdividir nuestro espacio de direcciones en 3 redes (…)
- La subred B.1 tendrá 320 hosts
- La subred B.2 85 hosts
- La subred B.3 113 hosts

- Subred B.1:
  - $2^8 < 320 < 2^9$
  - 9 bits en el host-ID (…)

```
11000001 01000001 0100100x xxxxxxxx
Mask=
11111111 11111111 1111111 0 00000000
```

- 193.65.72.0/23



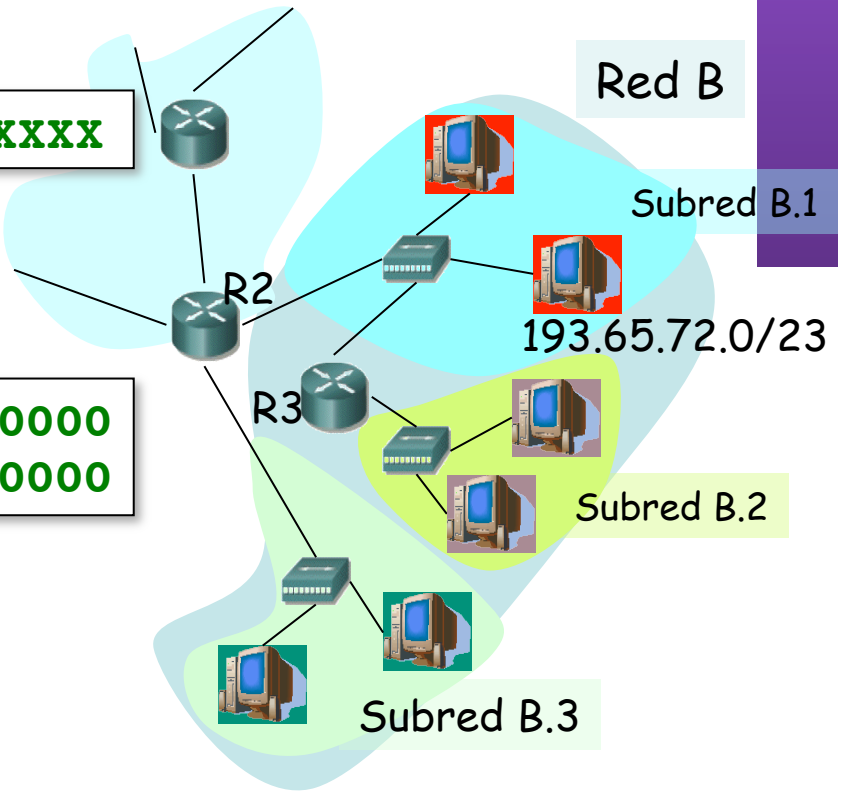
Ejemplo (2)

- Supongamos que nuestra red tiene asignado el espacio de direcciones 193.65.72.0/22
- Queremos subdividir nuestro espacio de direcciones en 3 redes (…)
- La subred B.1 tendrá 320 hosts
- La subred B.2 85 hosts
- La subred B.3 113 hosts

B.1 `0x xxxxxxxx`

- Subred B.2:
  - $2^6 < 85 < 2^7$
  - 7 bits en el host-ID (…)

```
11000001 01000001 01001000 00000000
Mask=
11111111 11111111 11111100 00000000
```



Ejemplo (2)

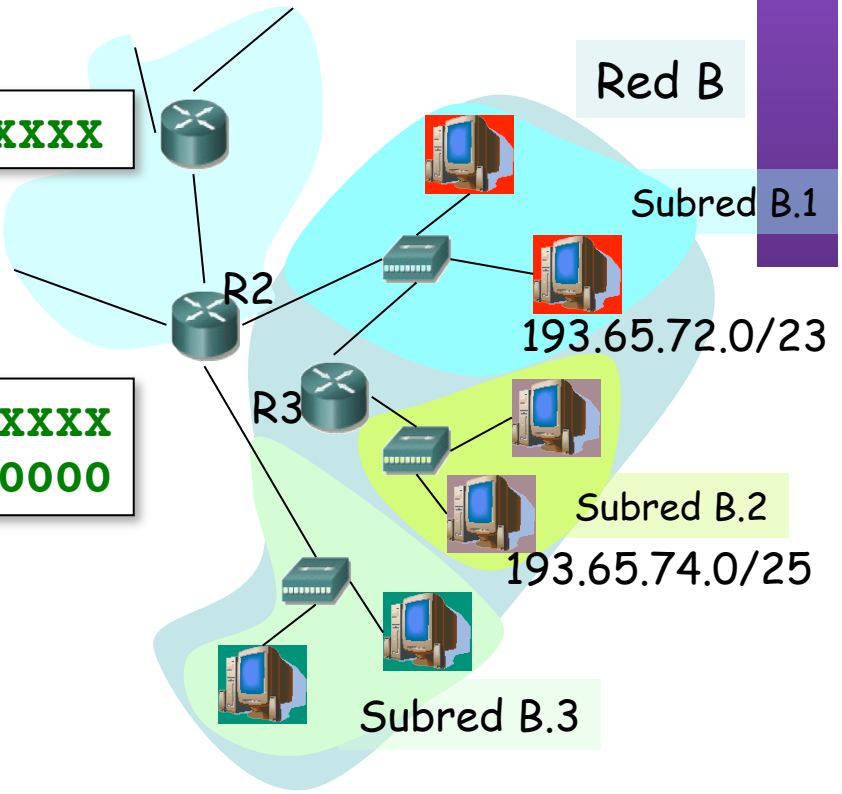
- Supongamos que nuestra red tiene asignado el espacio de direcciones 193.65.72.0/22
- Queremos subdividir nuestro espacio de direcciones en 3 redes (…)
- La subred B.1 tendrá 320 hosts
- La subred B.2 85 hosts
- La subred B.3 113 hosts

B.1 **0x xxxxxxxx**

- Subred B.2:
  - $2^6 < 85 < 2^7$
  - 7 bits en el host-ID (…)

```
11000001 01000001 01001010 0xxxxxxx
11111111 11111111 11111111 10000000
```
Mask=

- 193.65.74.0/25



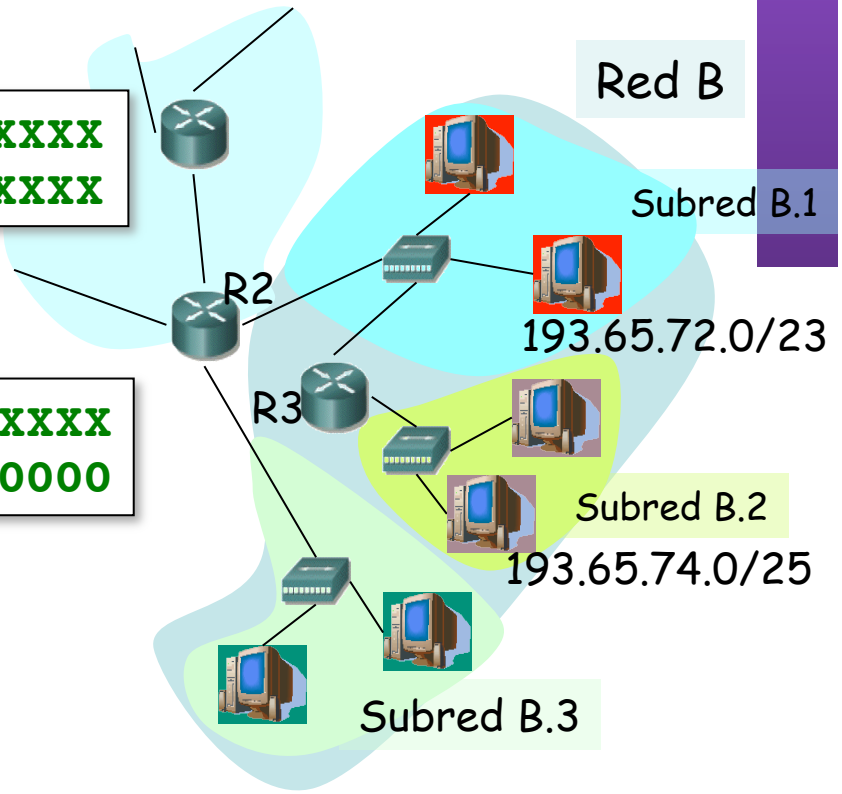
Ejemplo (2)

- Supongamos que nuestra red tiene asignado el espacio de direcciones 193.65.72.0/22
- Queremos subdividir nuestro espacio de direcciones en 3 redes (…)
- La subred B.1 tendrá 320 hosts
- La subred B.2 85 hosts
- La subred B.3 113 hosts

```
B.1  0X XXXXXXXX
B.2  10 0XXXXXXX
```

- Subred B.3:
  - $2^6 < 113 < 2^7$
  - 7 bits en el host-ID (…)

```
Mask= 11111111 11111111 11111100 00000000
      11000001 01000001 01001000 0XXXXXXX
```



Ejemplo (2)

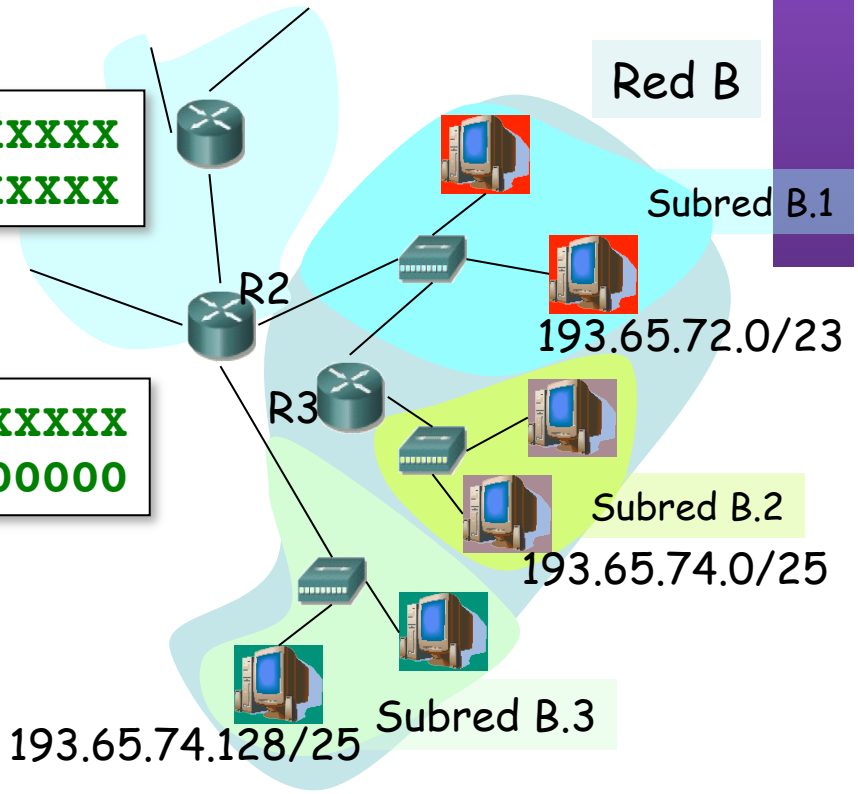
- Supongamos que nuestra red tiene asignado el espacio de direcciones 193.65.72.0/22
- Queremos subdividir nuestro espacio de direcciones en 3 redes (…)
- La subred B.1 tendrá 320 hosts
- La subred B.2 85 hosts
- La subred B.3 113 hosts

```
B.1  0x xxxxxxxx
B.2  10 0xxxxxxx
```

- Subred B.3:
  - $2^6 < 113 < 2^7$
  - 7 bits en el host-ID

```
11000001 01000001 01001010 1xxxxxxx
Mask=
11111111 11111111 11111111 10000000
```

- 193.65.74.128/25



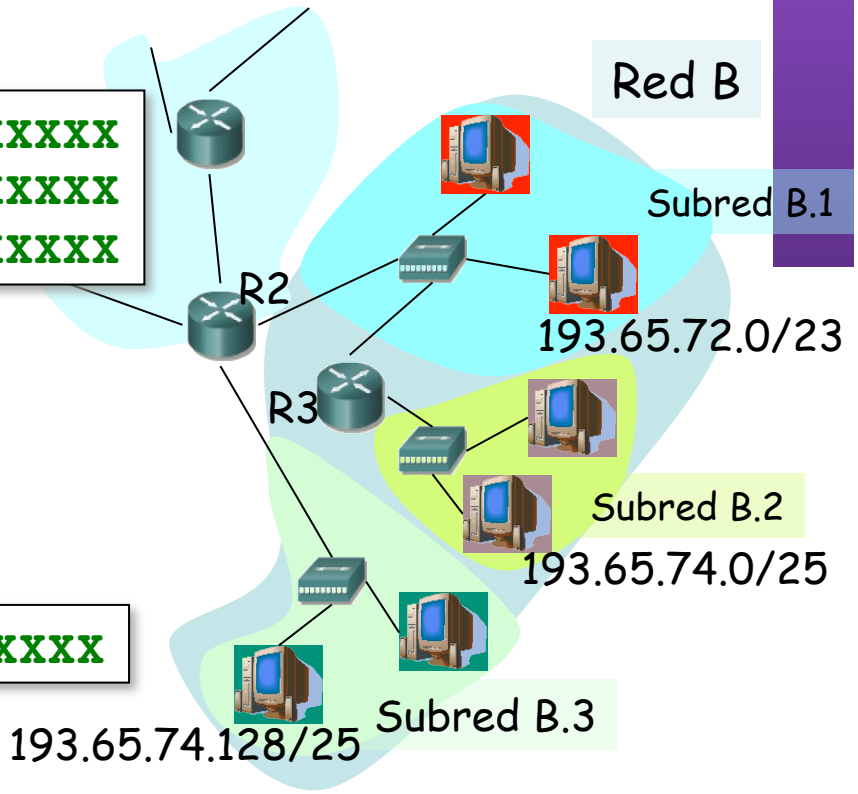
Ejemplo (2)

- Supongamos que nuestra red tiene asignado el espacio de direcciones 193.65.72.0/22
- Queremos subdividir nuestro espacio de direcciones en 3 redes (…)
- La subred B.1 tendrá 320 hosts
- La subred B.2 85 hosts
- La subred B.3 113 hosts

- B.1: 193.65.72.0/23
- B.2: 193.65.74.0/25
- B.3: 193.65.74.128/25
- No hay intersecciones
- Queda libre:
  - 193.65.75.0/24

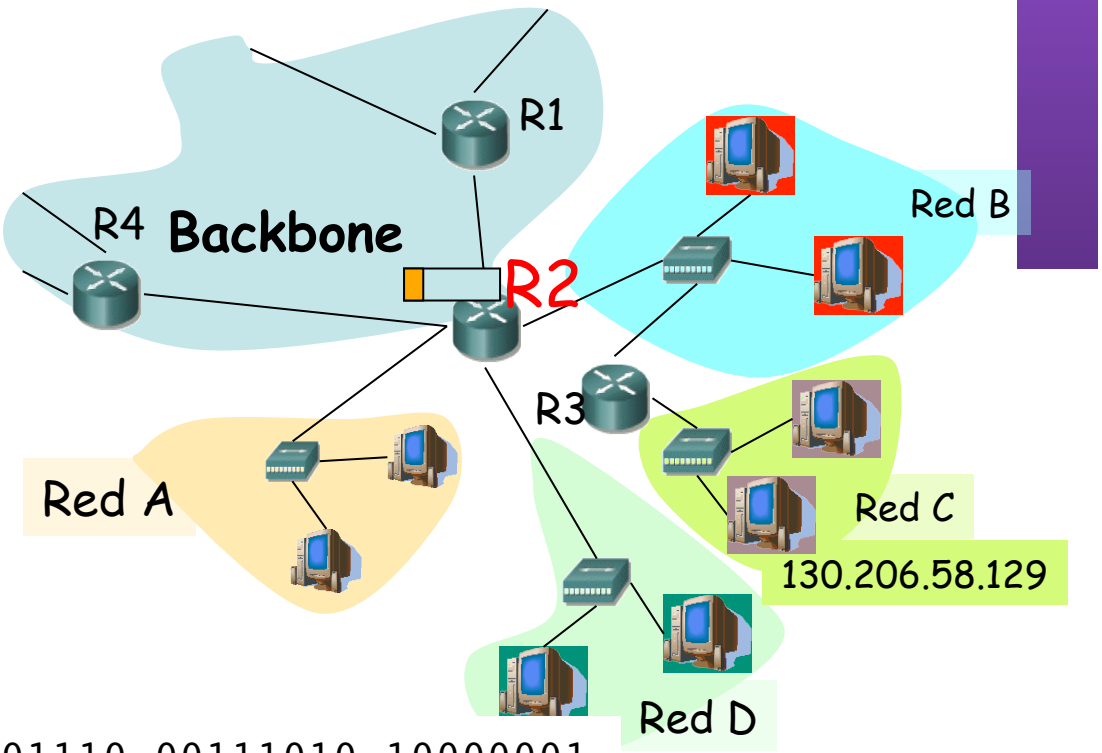
```
B.1  0x  xxxxxxxx
B.2  10  0xxxxxxx
B.3  10  1xxxxxxx
```

```
Libre  11  xxxxxxxx
```



Ejemplo (3): IP_d=130.206.58.129

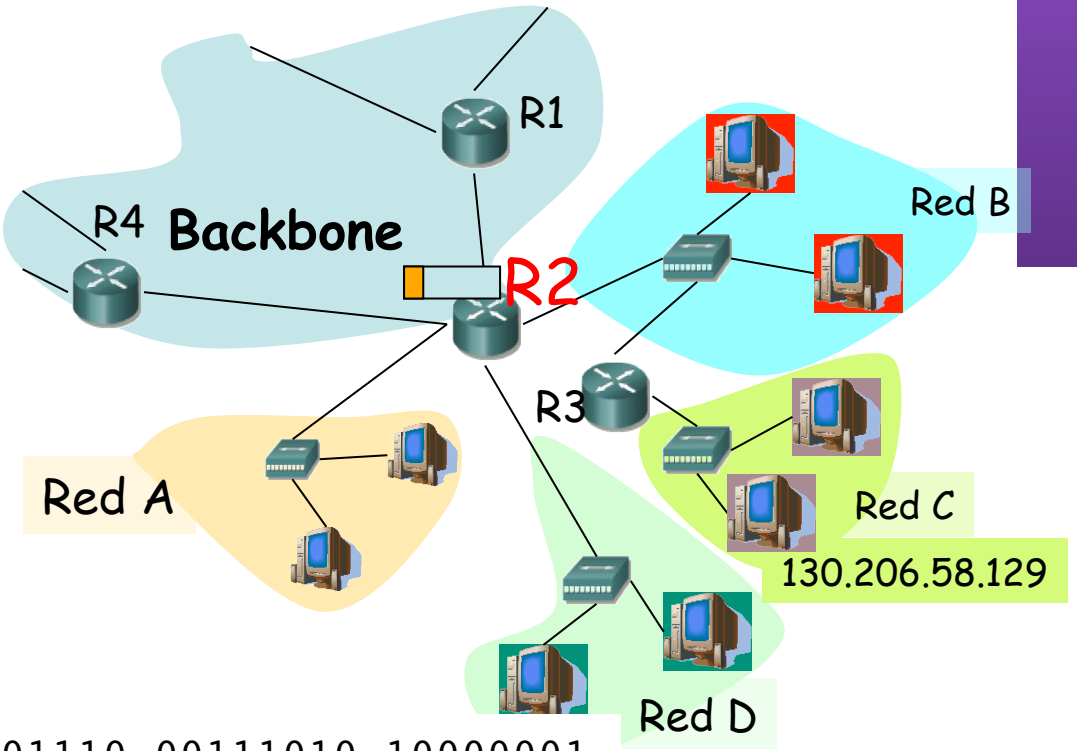
Destino	Next-hop	if
130.206.16.0/20	-	1
130.206.56.0/21	130.206.16.1 (R3)	1
130.206.64.0/18	-	2
201.24.16.0/23	-	3
201.0.0.0/10	10.50.44.1 (R4)	4
0.0.0.0/0	10.50.43.13 (R1)	0



130.206.58.129 = 10000010 11001110 00111010 10000001

Ejemplo (3): IP_d=130.206.58.129

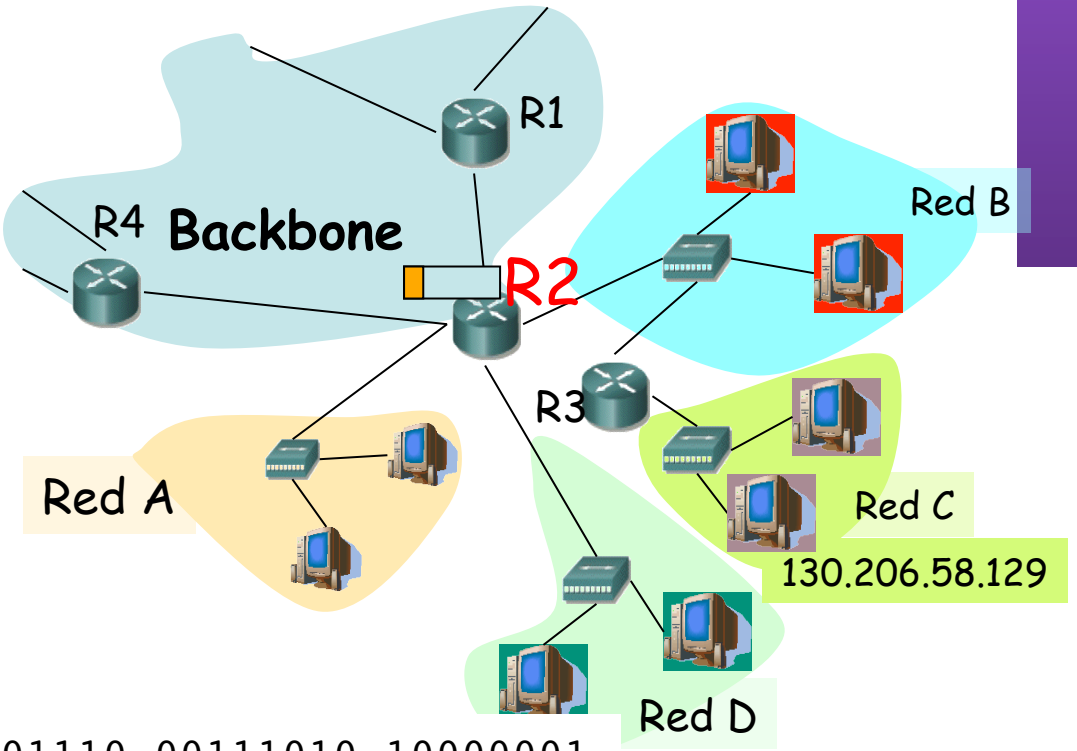
IP_d =		Destino	Next-hop	if
	10000010 11001110 00010000 00000000	130.206.16.0/20	-	1
	10000010 11001110 00111000 00000000	130.206.56.0/21	130.206.16.1 (R3)	1
	10000010 11001110 01000000 00000000	130.206.64.0/18	-	2
	11001001 00011000 00010000 00000000	201.24.16.0/23	-	3
	10000010 00000000 00000000 00000000	201.0.0.0/10	10.50.44.1 (R4)	4
	00000000 00000000 00000000 00000000	0.0.0.0/0	10.50.43.13 (R1)	0



130.206.58.129 = 10000010 11001110 00111010 10000001

Ejemplo (3): IP_d=130.206.58.129

IP_d =		Destino	Next-hop	if
	10000010 11001110 00010000 00000000	130.206.16.0/20	-	1
	10000010 11001110 00111000 00000000	130.206.56.0/21	130.206.16.1 (R3)	1
	10000010 11001110 01000000 00000000	130.206.64.0/18	-	2
	11001001 00011000 00010000 00000000	201.24.16.0/23	-	3
	10000010 00000000 00000000 00000000	201.0.0.0/10	10.50.44.1 (R4)	4
	00000000 00000000 00000000 00000000	0.0.0.0/0	10.50.43.13 (R1)	0

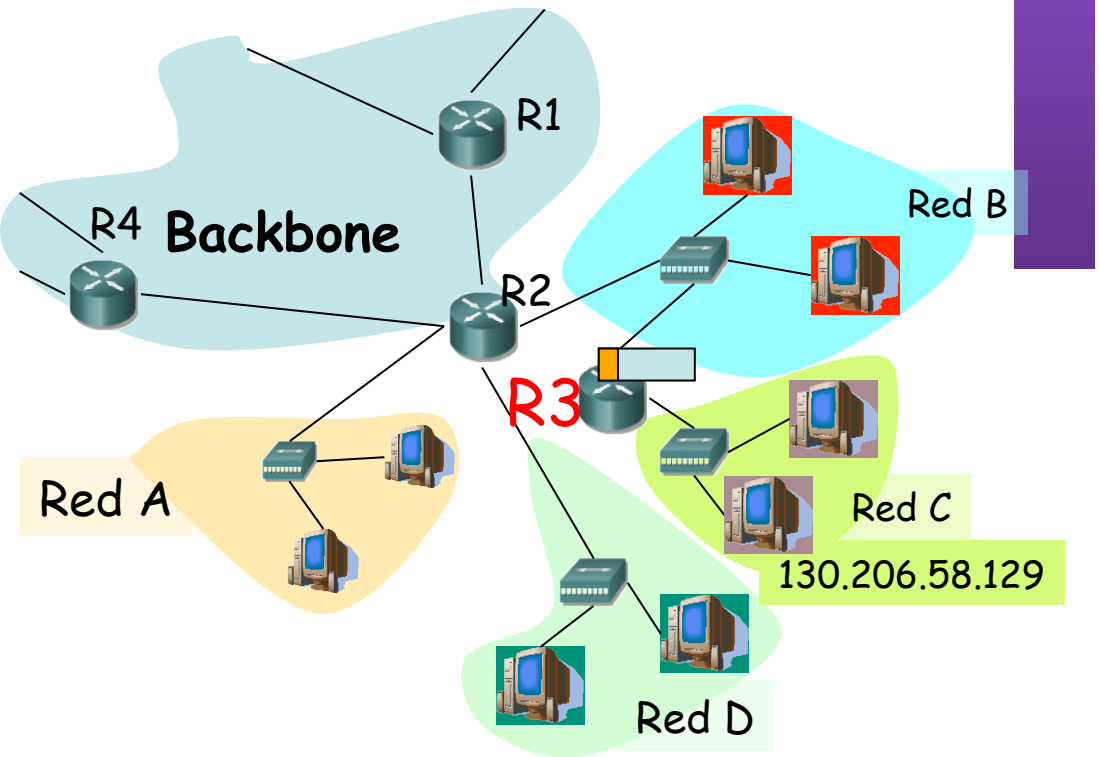


130.206.58.129 = 10000010 11001110 00111010 10000001

Ejemplo (3): IP_d=130.206.58.129

Destino	Next-hop	if
130.206.16.0/20	-	0
130.206.56.0/21	-	1
0.0.0.0/0	130.206.16.2 (R2)	0

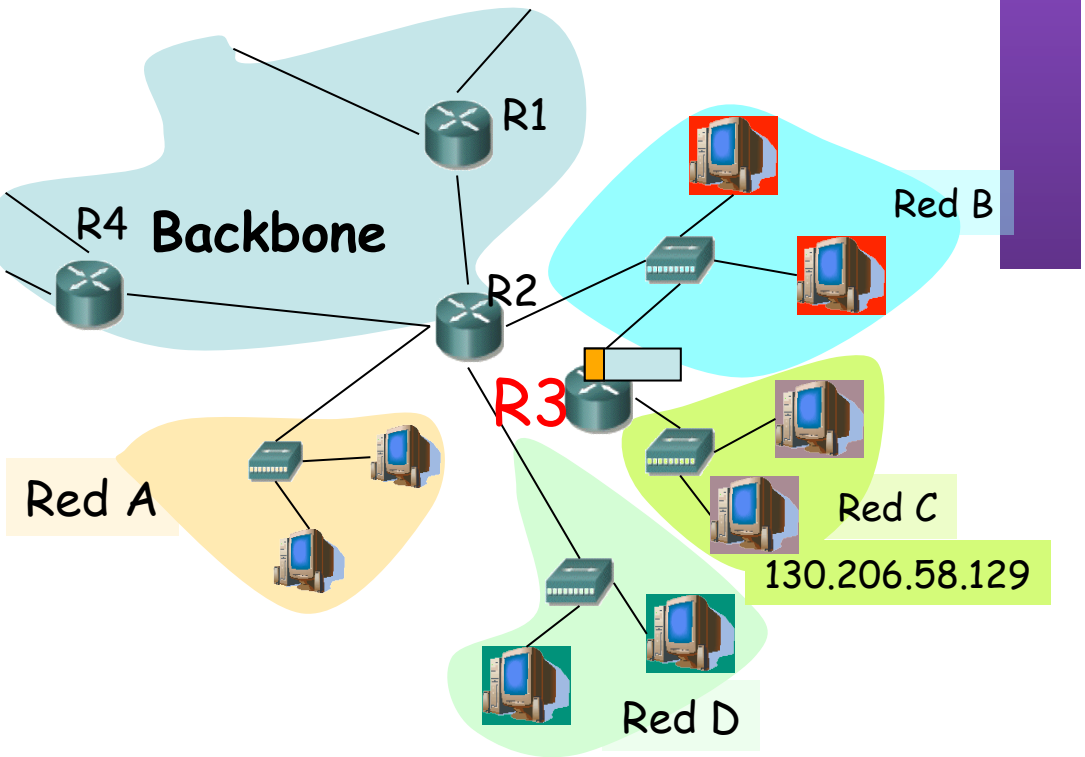
R3



Ejemplo (3): IP_d=130.206.58.129

IP_d =	10000010	11001110	00111010	10000001	Destino	Next-hop	if
	10000010	11001110	00010000	00000000	130.206.16.0/20	-	0
	10000010	11001110	00111000	00000000	130.206.56.0/21	-	1
	00000000	00000000	00000000	00000000	0.0.0.0/0	130.206.16.2 (R2)	0

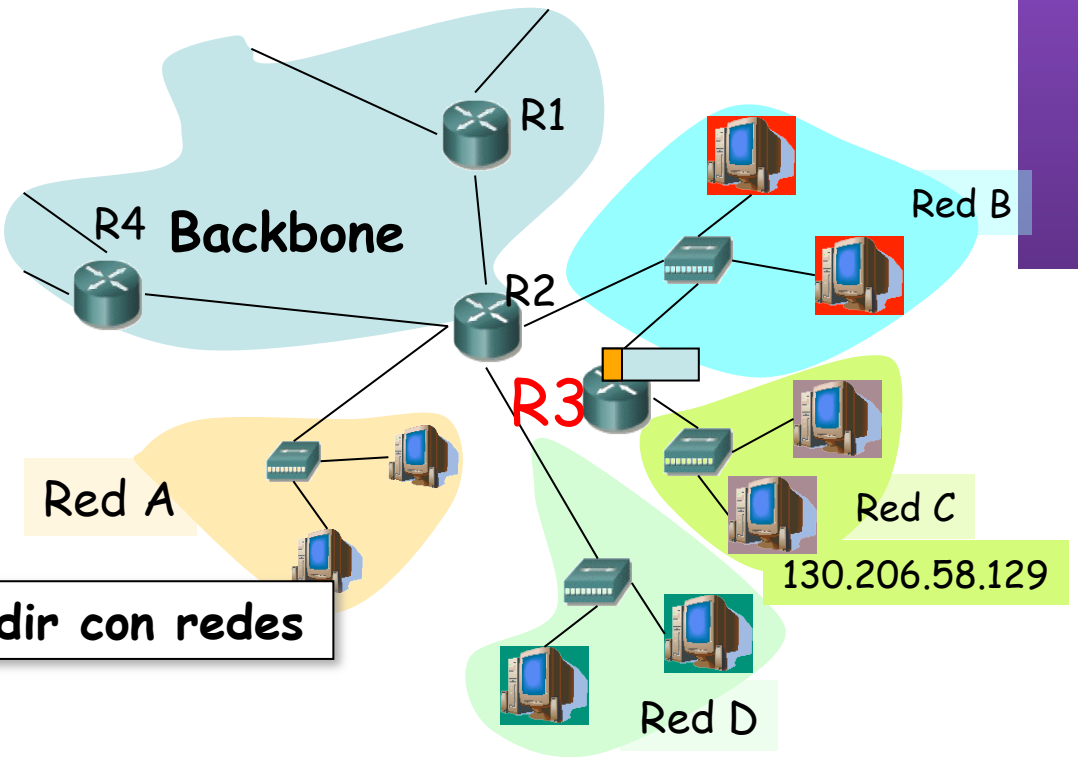
R3



Ejemplo (3): IP_d=130.206.58.129

IP_d =	10000010 11001110 00111010 10000001	Destino	Next-hop	if
	10000010 11001110 00010000 00000000	130.206.16.0/20	-	0
	10000010 11001110 00111000 00000000	130.206.56.0/21	-	1
	00000000 00000000 00000000 00000000	0.0.0.0/0	130.206.16.2 (R2)	0

R3



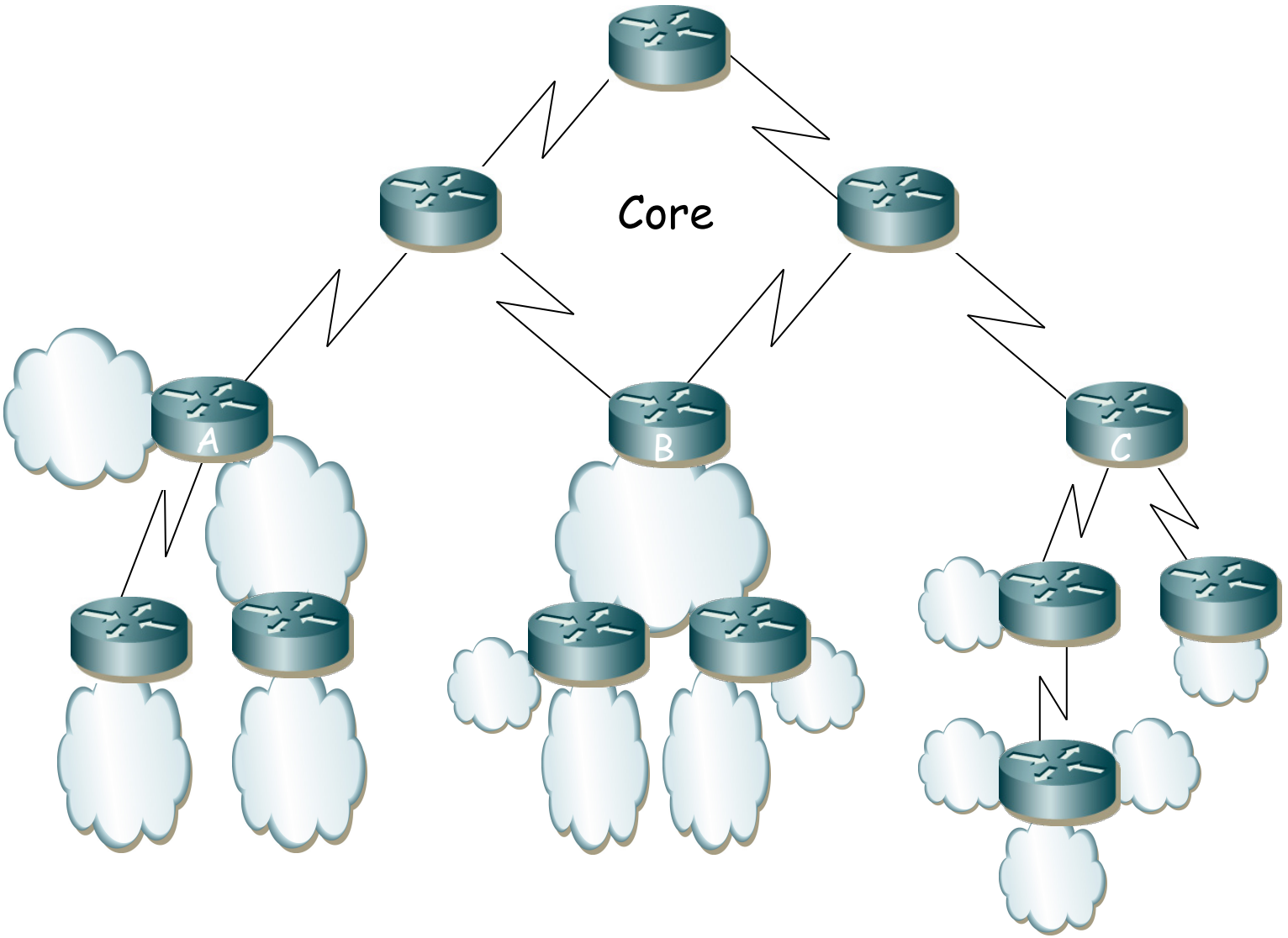
Las rutas no necesitan coincidir con redes

Ejercicio

- Dada la red 130.206.128.0/22 cree tres subredes para 500 hosts, 200 y 64 hosts

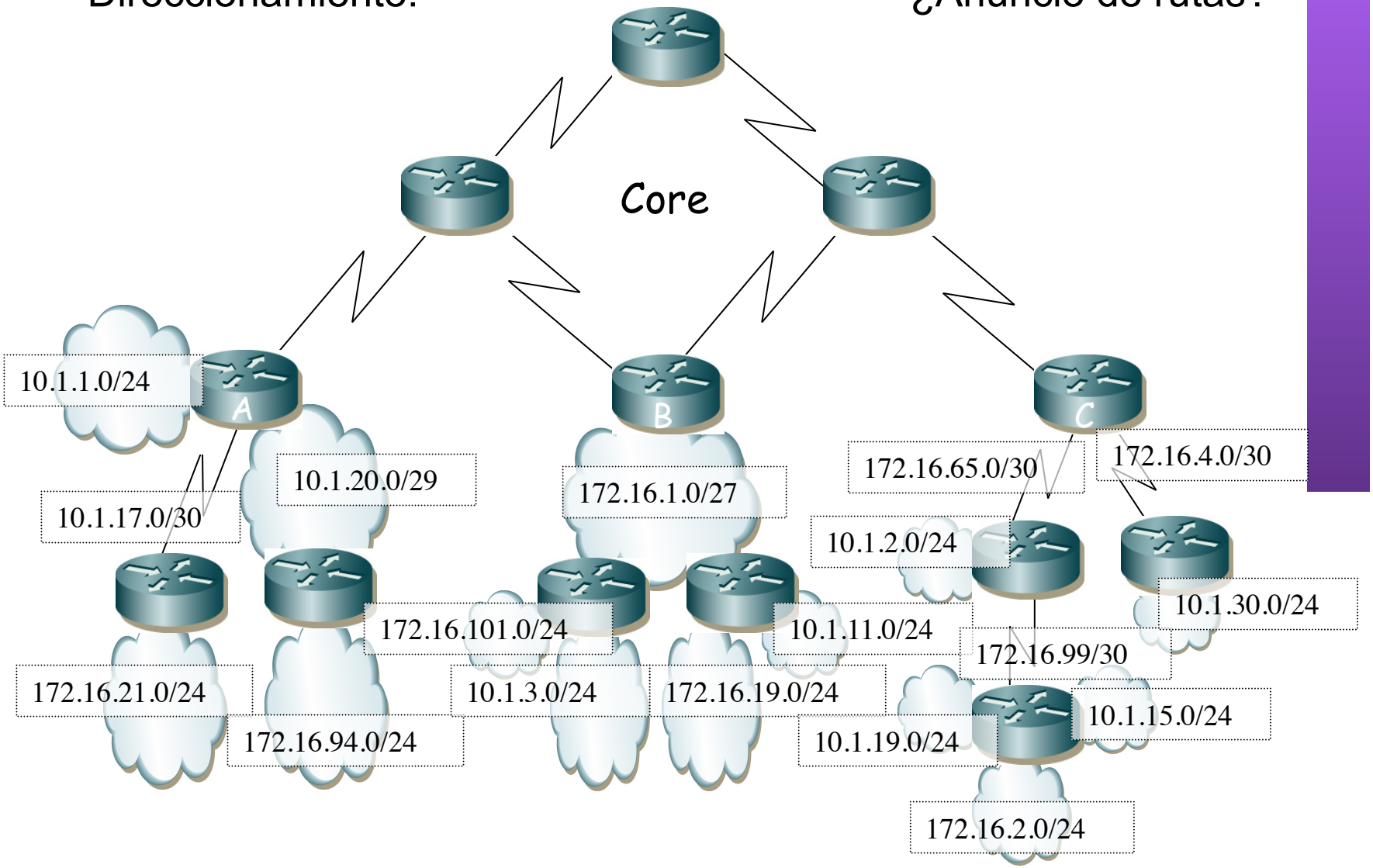
5 minutos

Ejemplo: Resúmenes



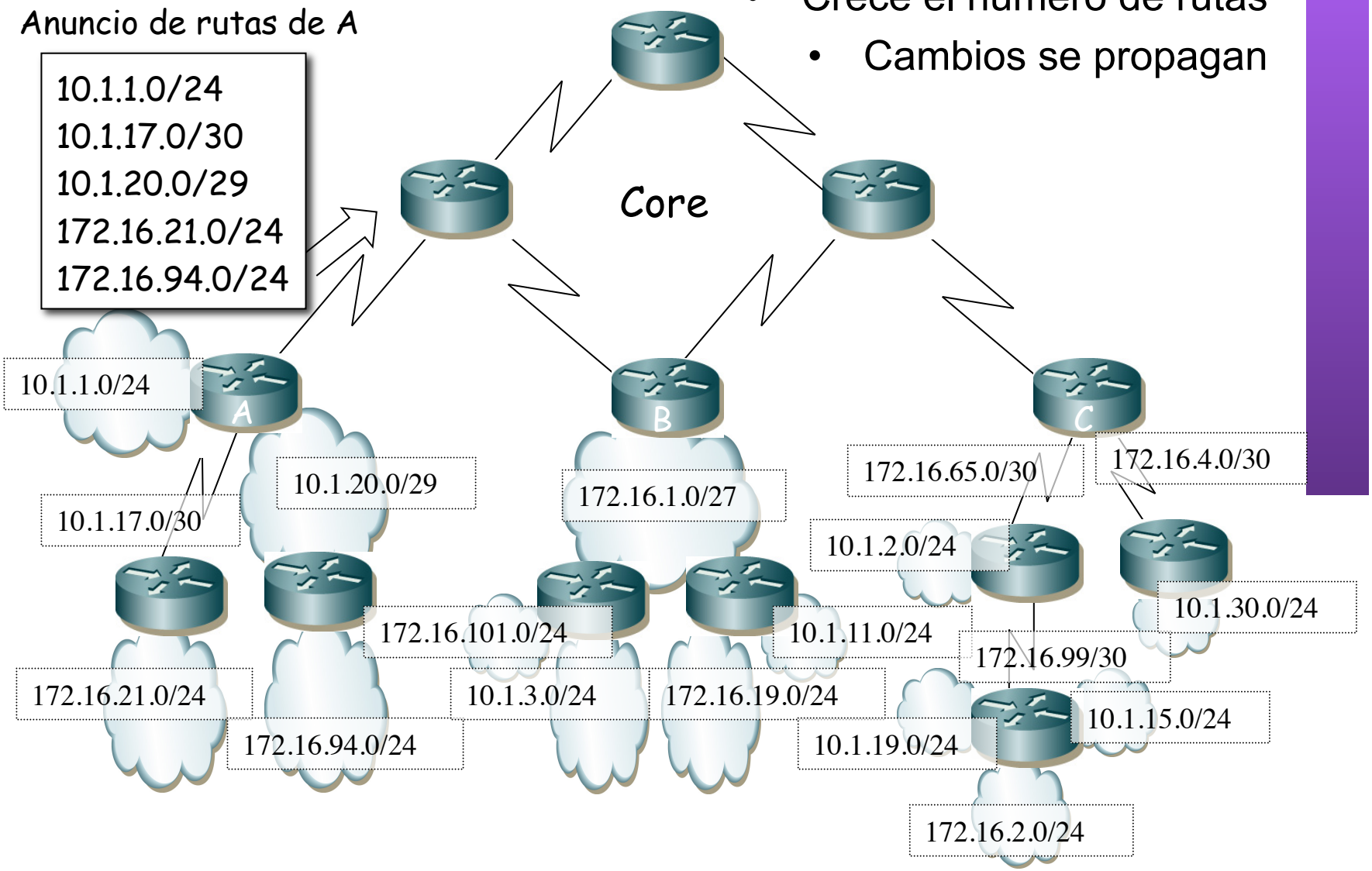
Ejemplo: Resúmenes

- Direccionamiento:
- ¿Anuncio de rutas?



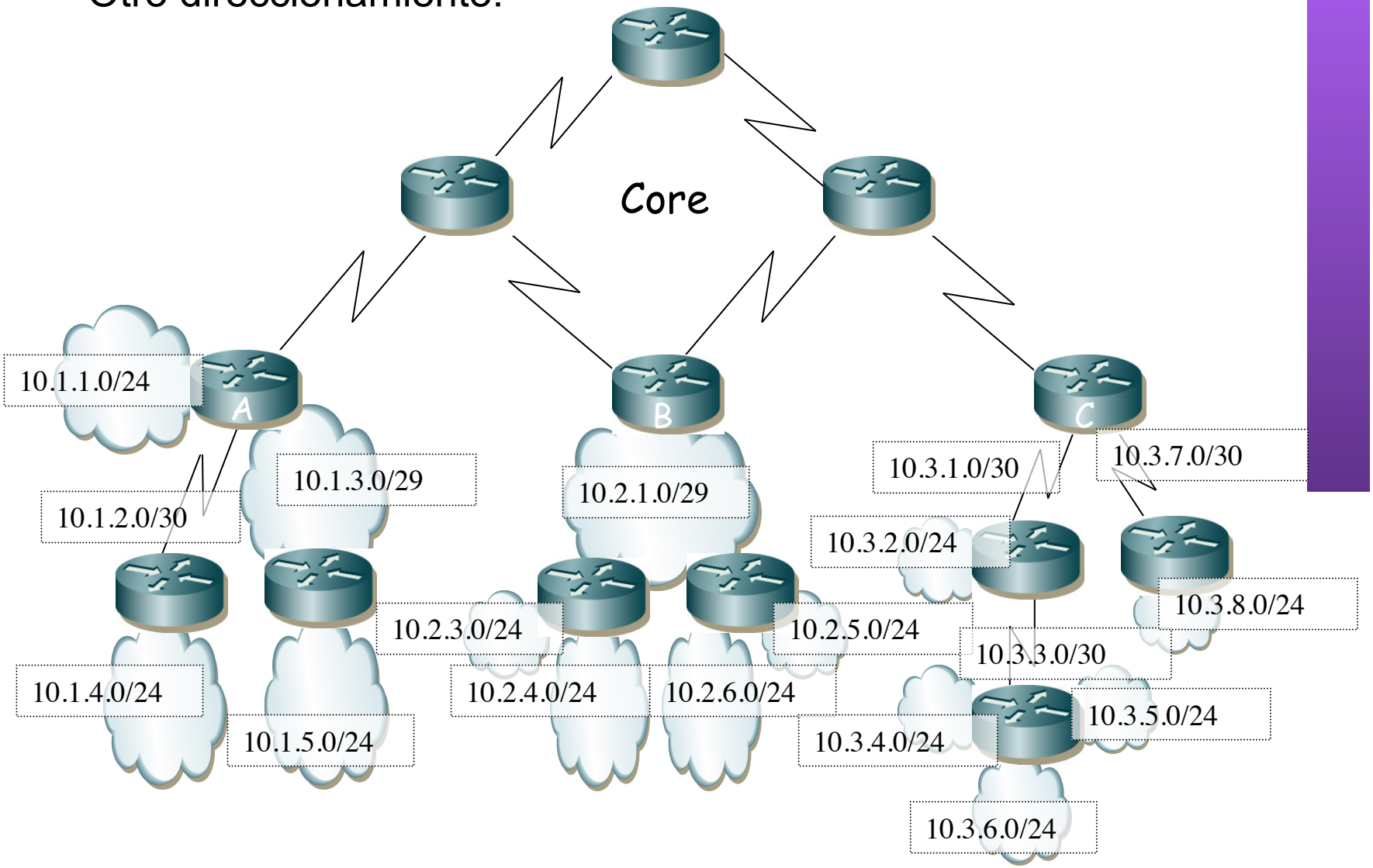
Ejemplo: Resúmenes

- Crece el número de rutas
  - Cambios se propagan



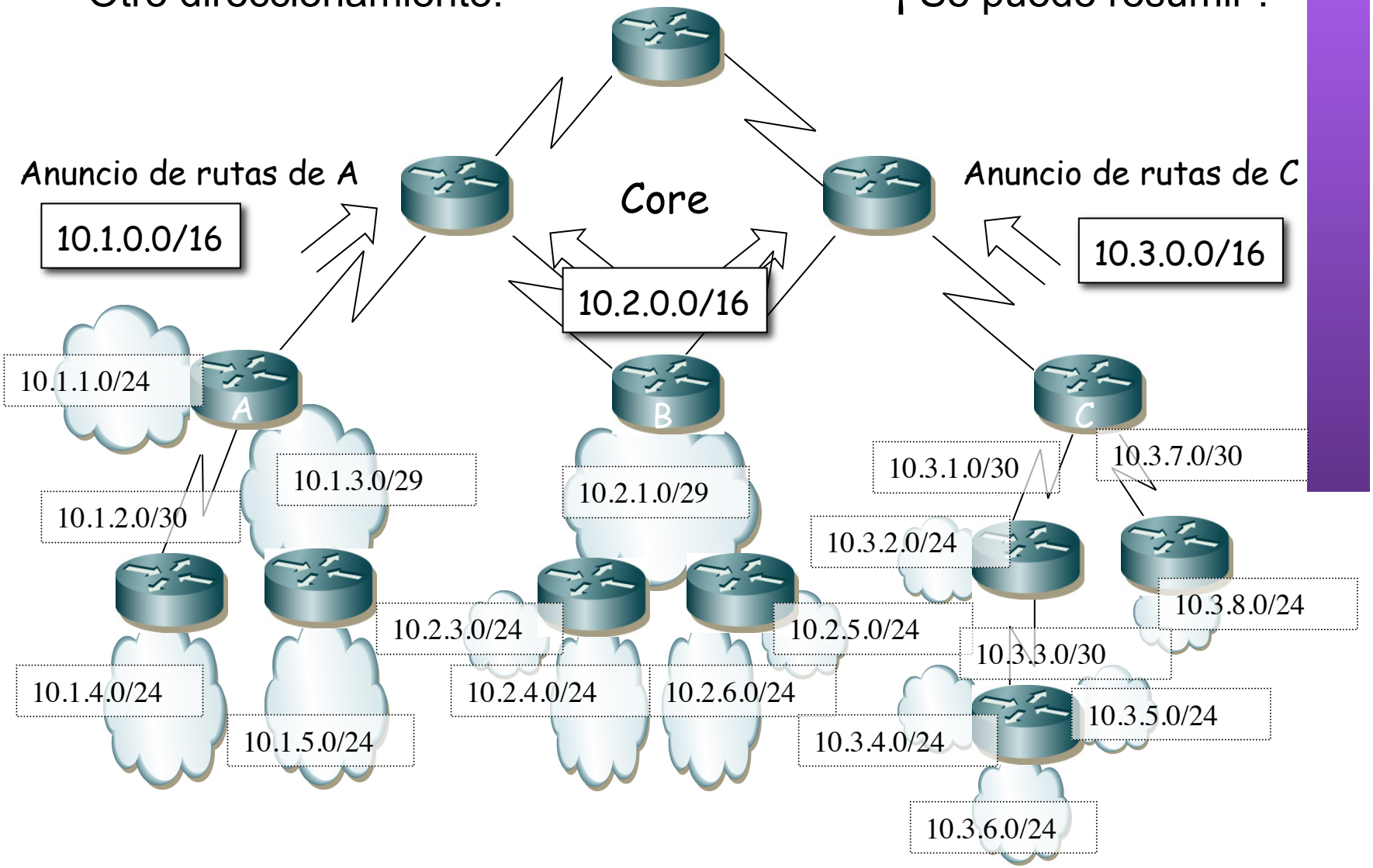
Ejemplo: Resúmenes

- Otro direccionamiento:

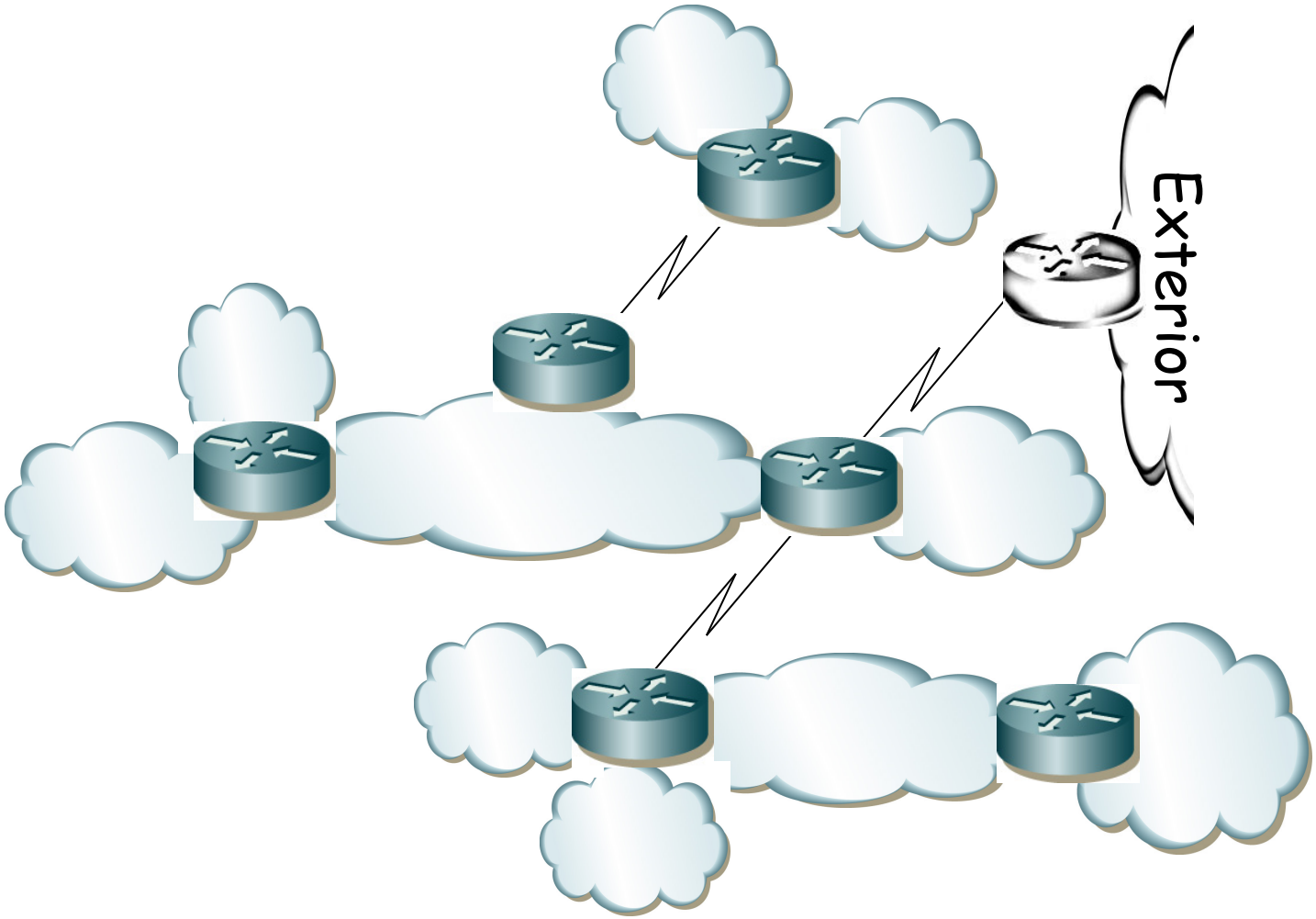


Ejemplo: Resúmenes

- Otro direccionamiento:
- ¡ Se puede resumir !

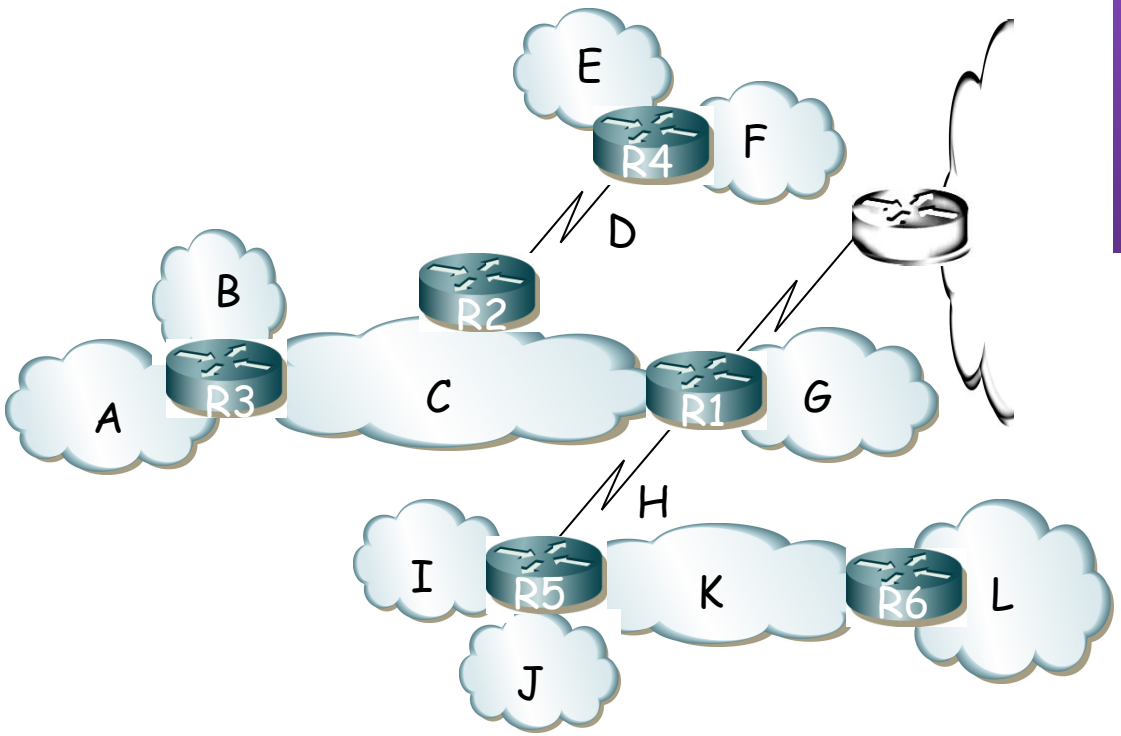


Ejemplo (4)



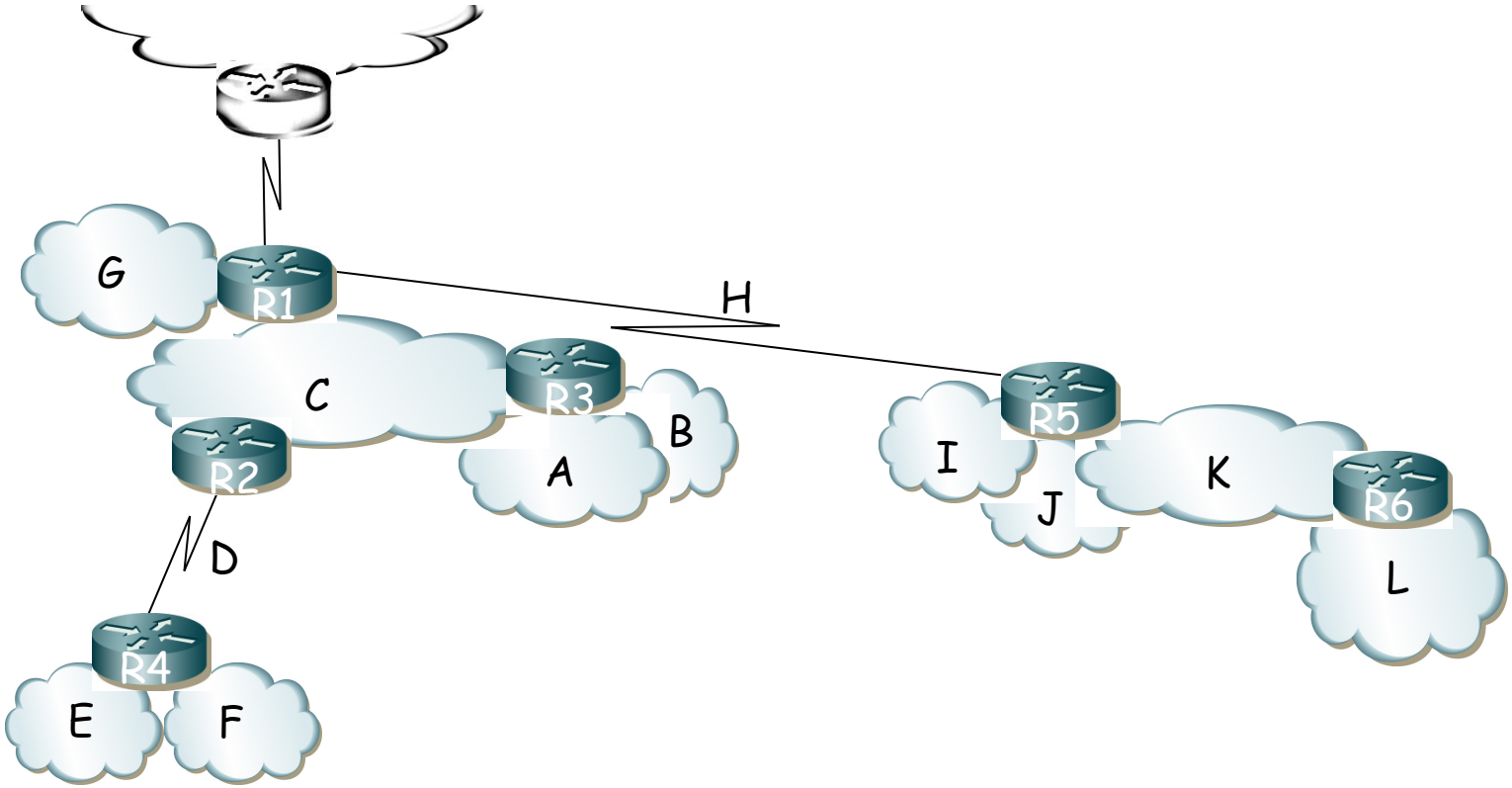
Ejemplo (4)

- 12 Subredes
- Máximo 10 hosts por red
- Red 192.168.3.0/24
- Que se pueda resumir



Ejemplo (4)

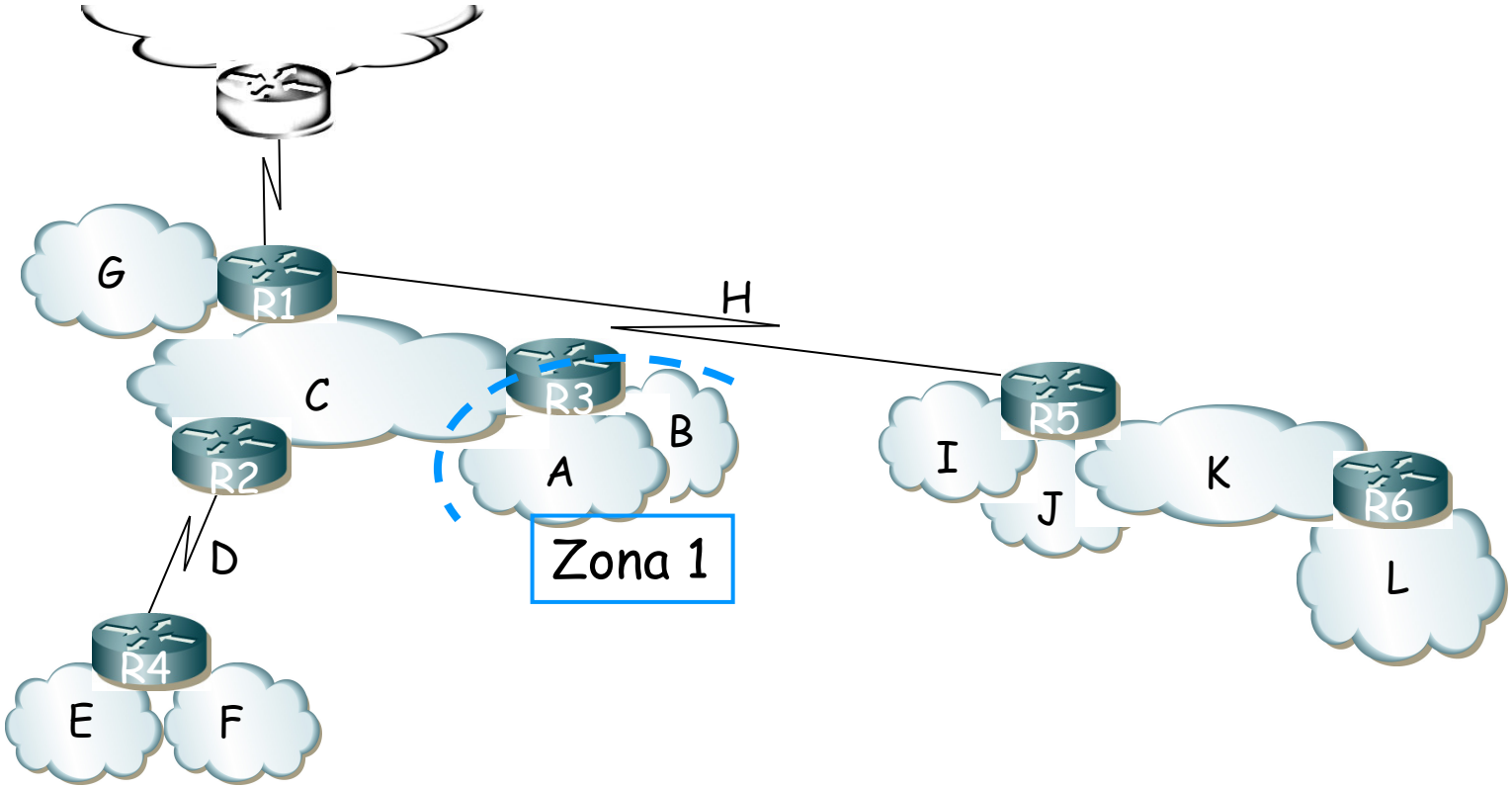
- Redibujando la topología:



Ejemplo (4)

A	192.168.3	.	[000]	[0]	[0000]	= 192.168.3.0 /28
B	192.168.3	.	[000]	[1]	[0000]	= 192.168.3.16 /28

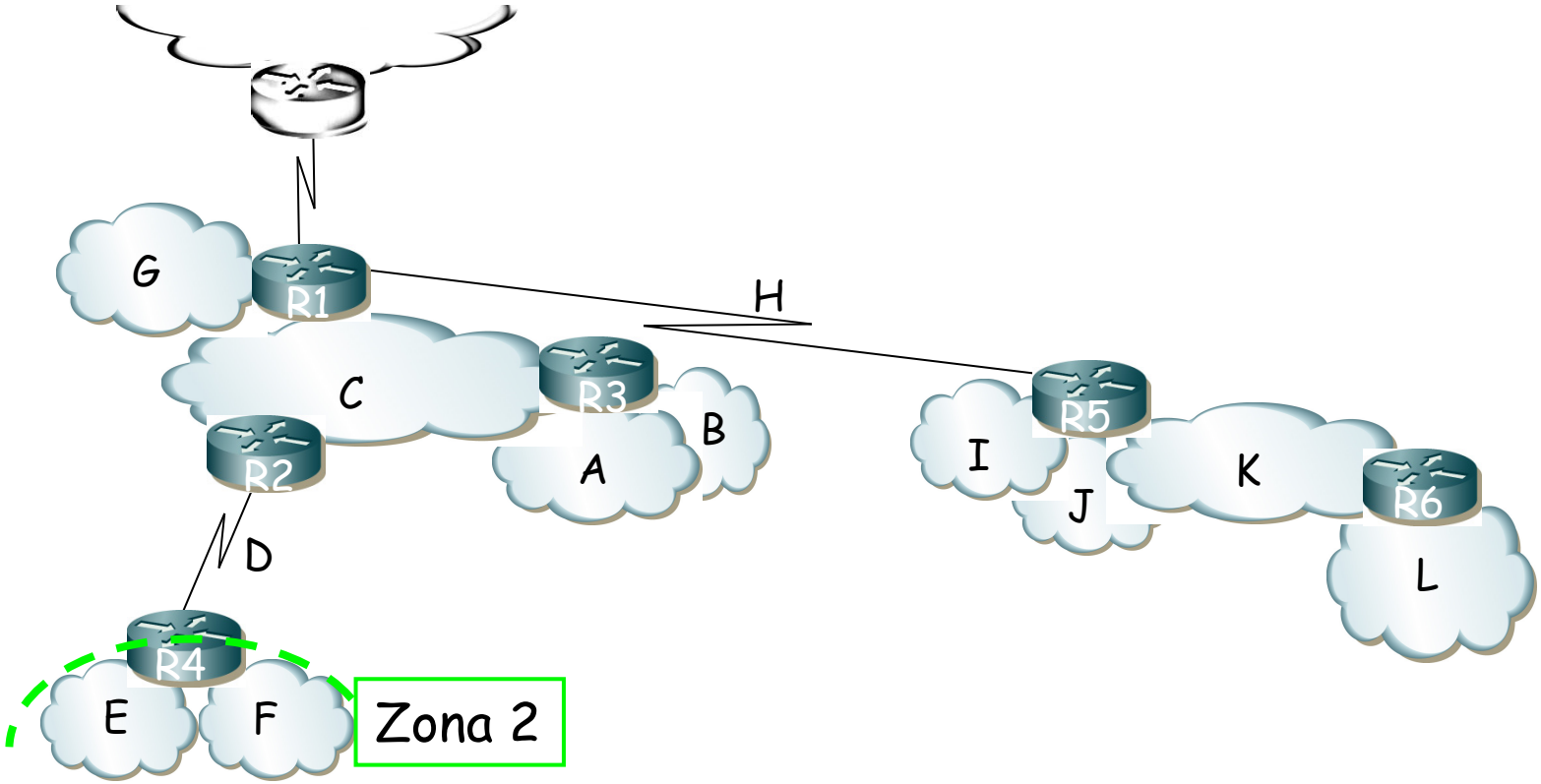
Zona 1:
192.168.3.0 /27



Ejemplo (4)

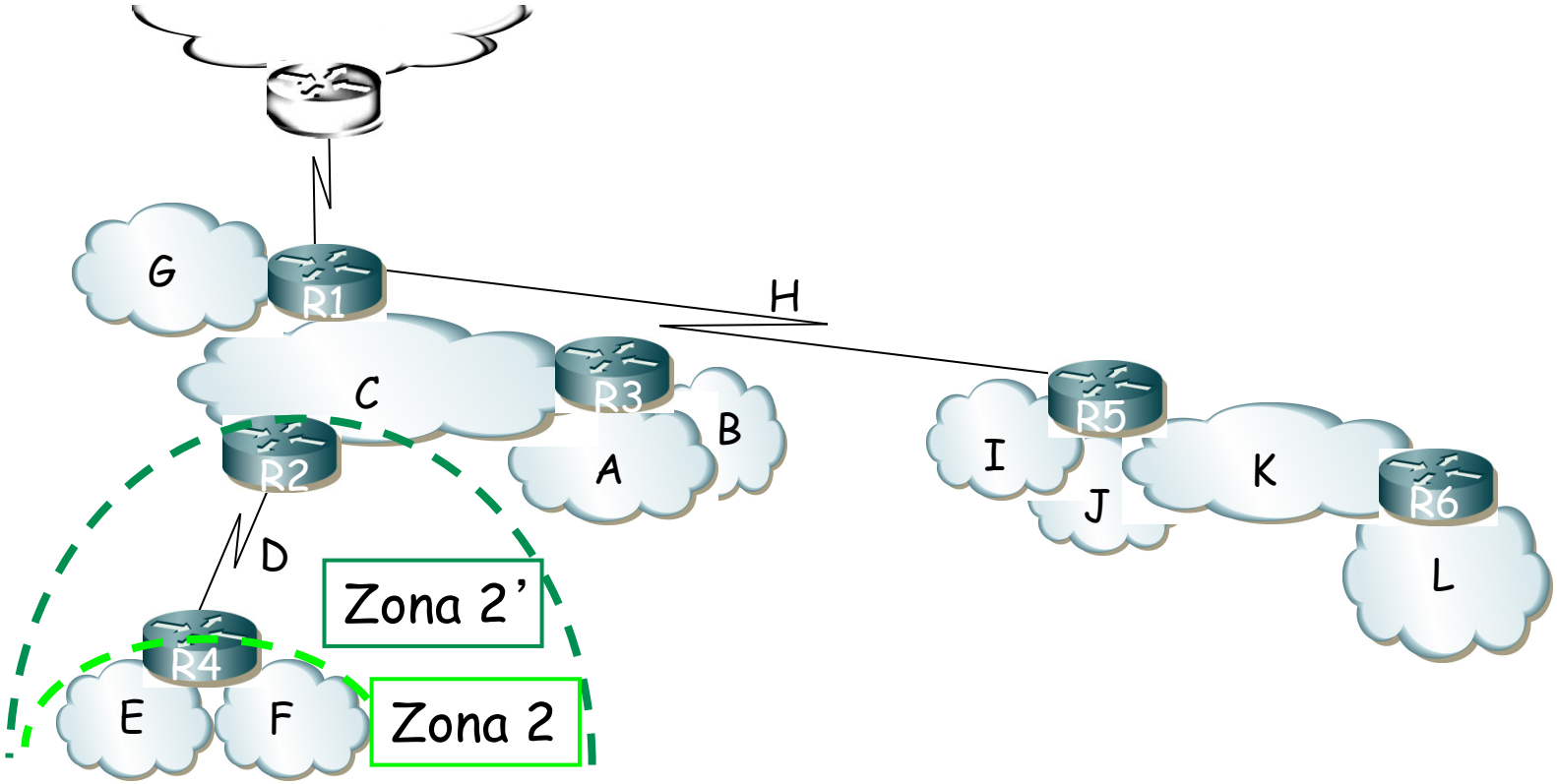
E	192.168.3	.	[010]	[0]	[0000]	= 192.168.3.64 /28
F	192.168.3	.	[010]	[1]	[0000]	= 192.168.3.80 /28

Zona 2:
192.168.3.64 /27



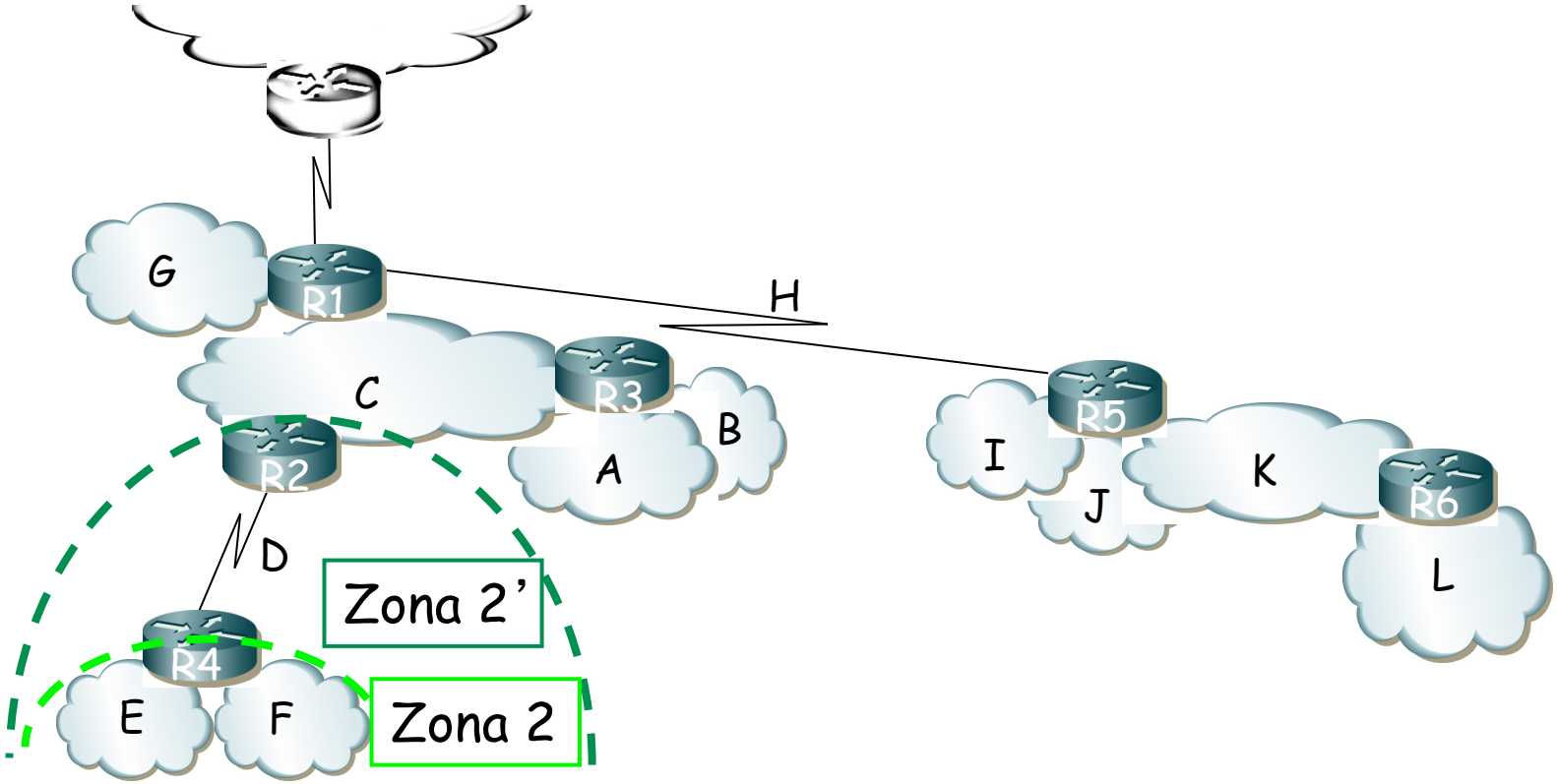
Ejemplo (4)

Zona 2 | 192.168.3 | . | [010] | [00000] | = 192.168.3.64 /27



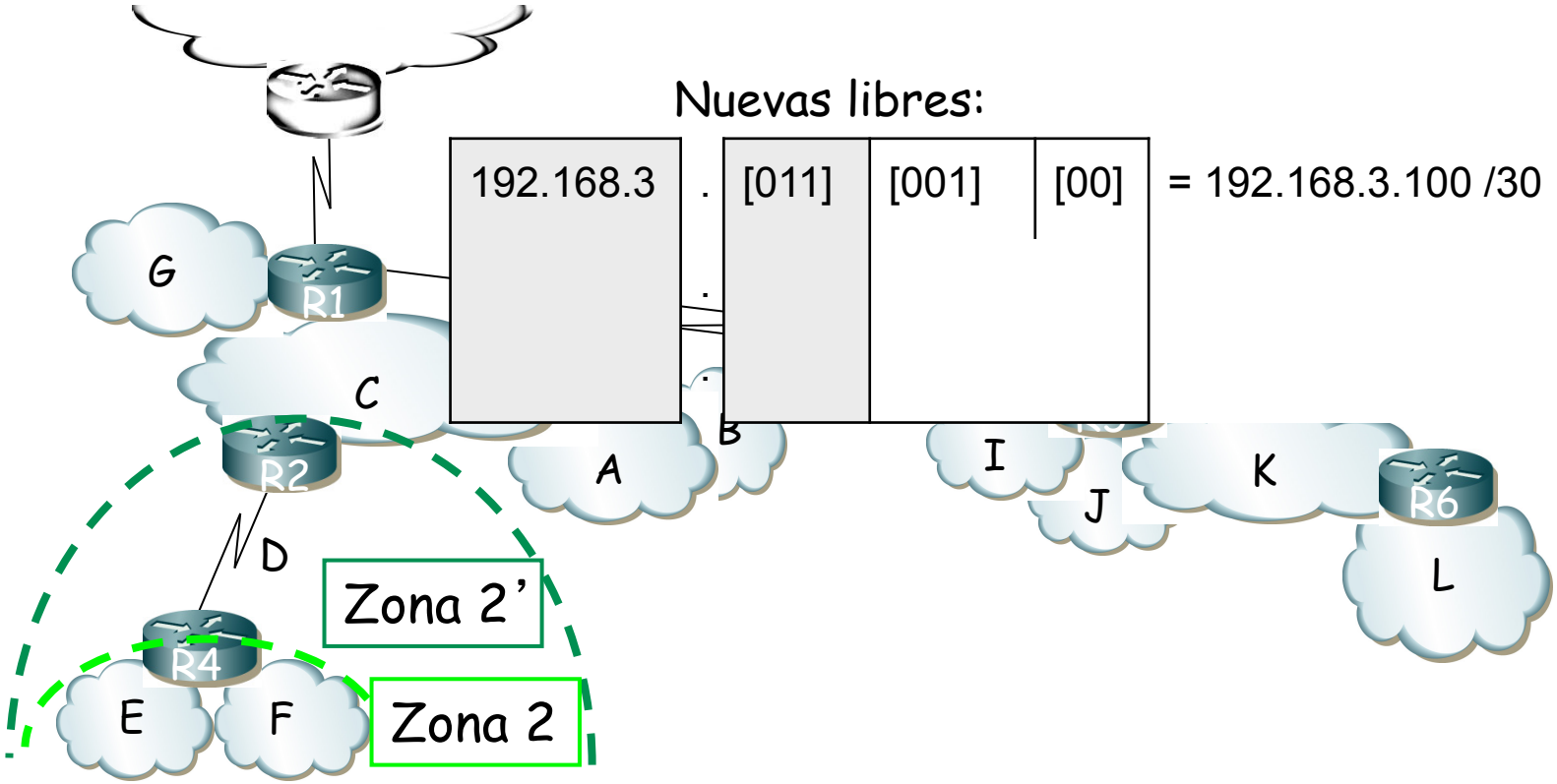
Ejemplo (4)

Zona 2	192.168.3	.	[010]	[00000]	= 192.168.3.64 /27
D	192.168.3	.	[011]	[000] [00]	= 192.168.3.96 /30



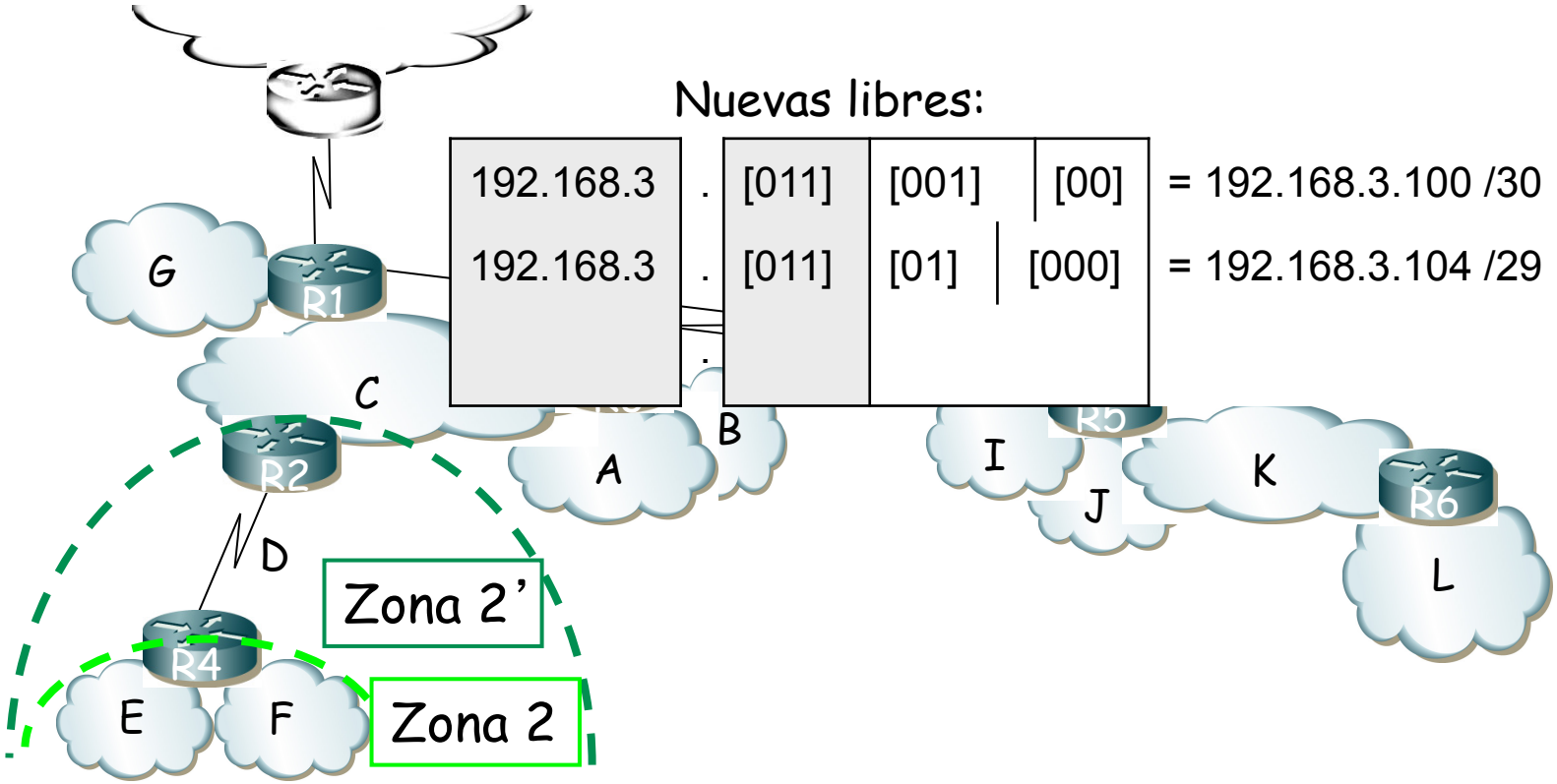
Ejemplo (4)

Zona 2	192.168.3	.	[010]	[00000]	= 192.168.3.64 /27
D	192.168.3	.	[011]	[000] [00]	= 192.168.3.96 /30



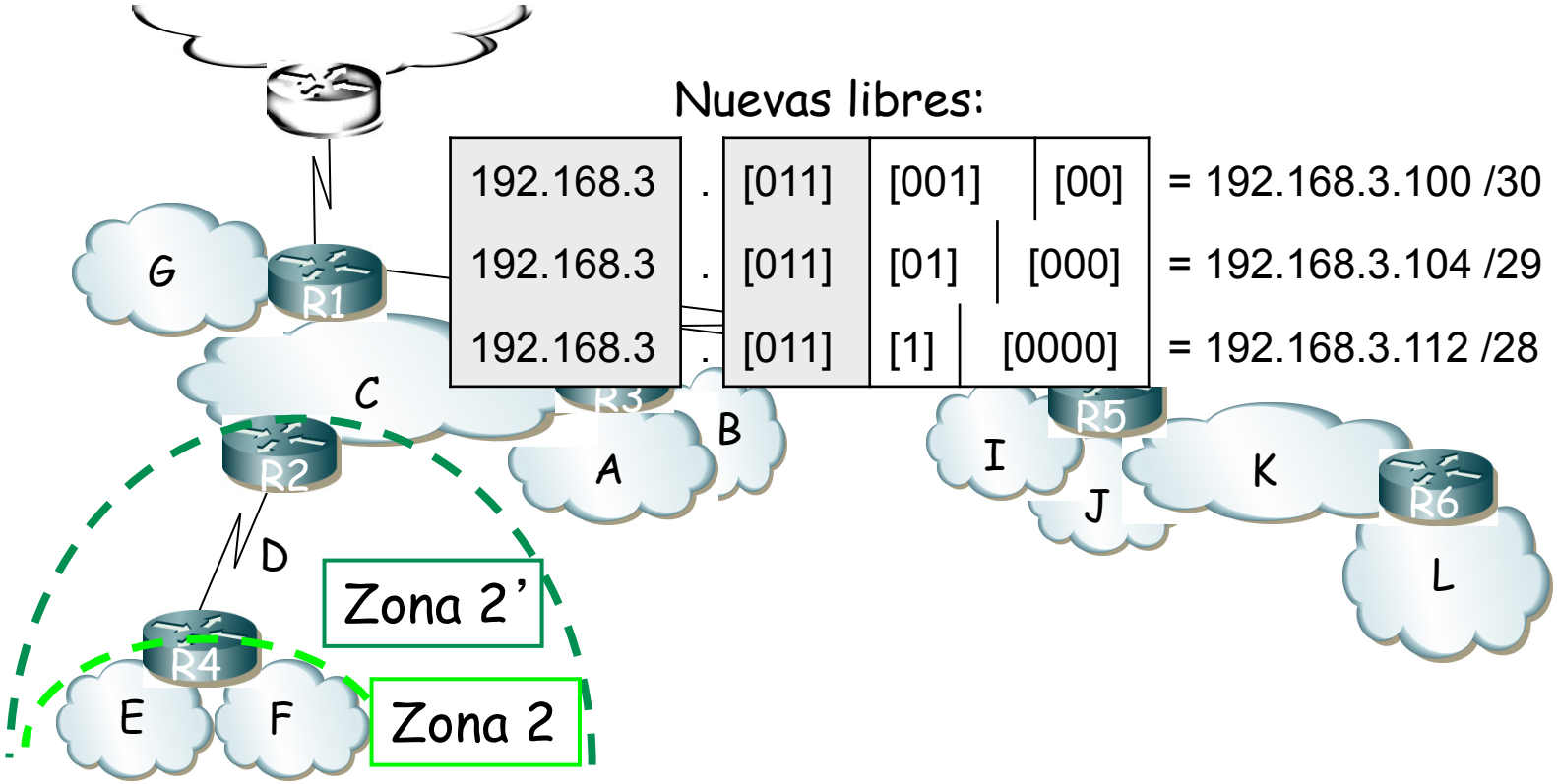
Ejemplo (4)

Zona 2	192.168.3	.	[010]	[00000]	= 192.168.3.64 /27
D	192.168.3	.	[011]	[000] [00]	= 192.168.3.96 /30



Ejemplo (4)

Zona 2	192.168.3	.	[010]	[00000]	= 192.168.3.64 /27
D	192.168.3	.	[011]	[000] [00]	= 192.168.3.96 /30



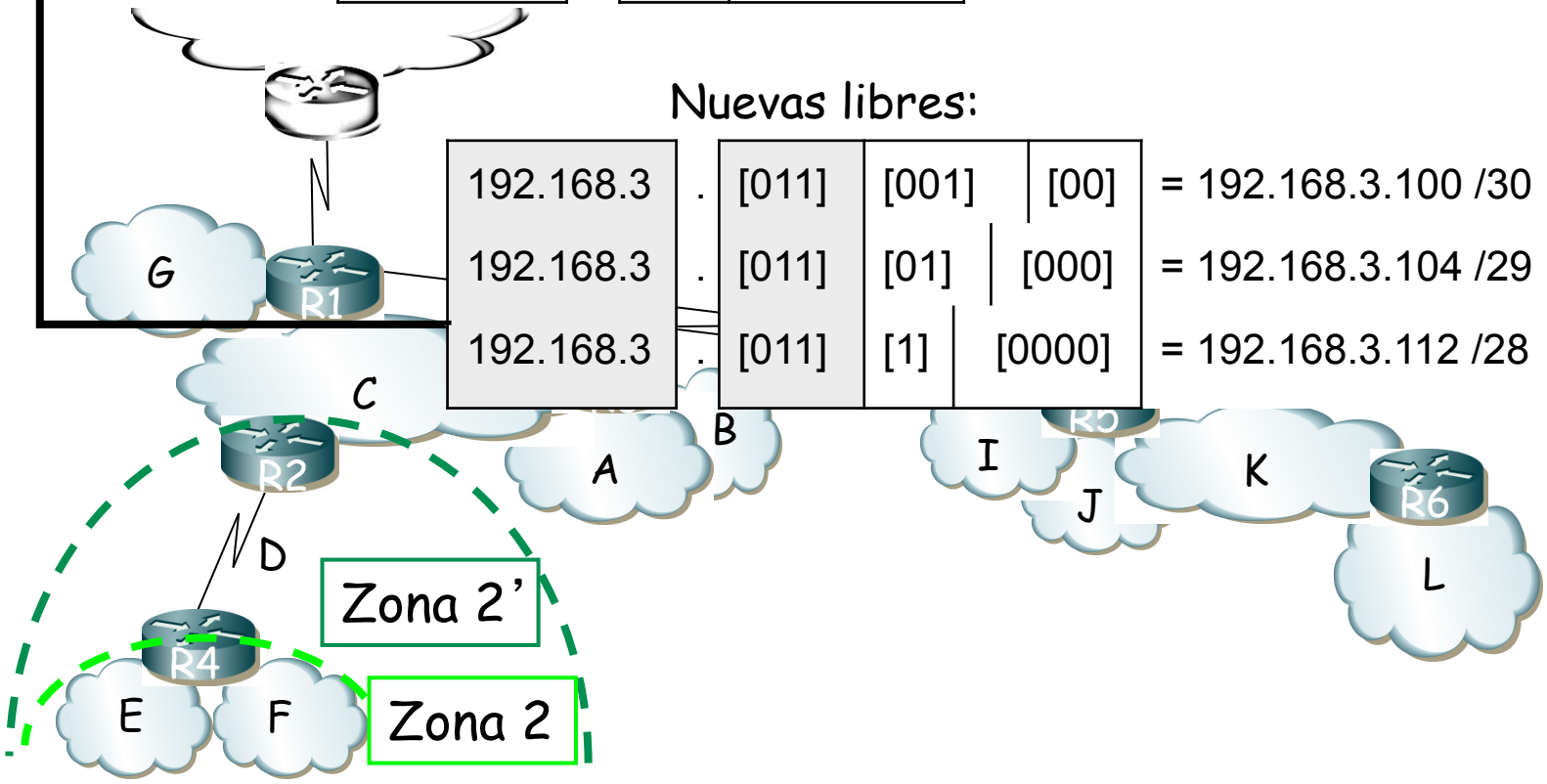
Ejemplo (4)

Zona 2	192.168.3	.	[010]	[00000]	= 192.168.3.64 /27
D	192.168.3	.	[011]	[000] [00]	= 192.168.3.96 /30

Zona2'	192.168.3	.	[01]	[000000] = 192.168.3.64 /26

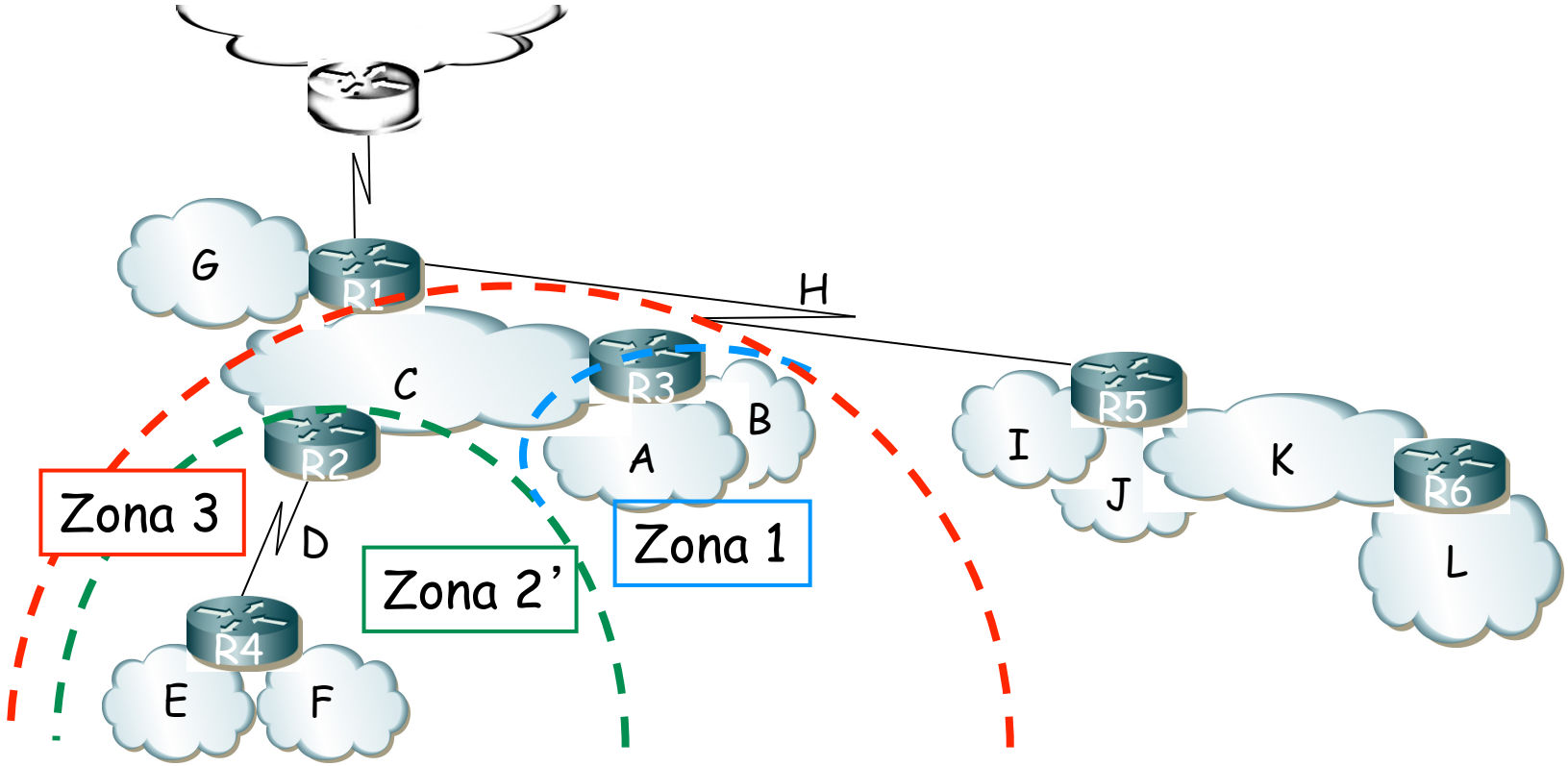
Nuevas libres:

192.168.3	.	[011]	[001]	[00] = 192.168.3.100 /30
192.168.3	.	[011]	[01]	[000] = 192.168.3.104 /29
192.168.3	.	[011]	[1]	[0000] = 192.168.3.112 /28



Ejemplo (4)

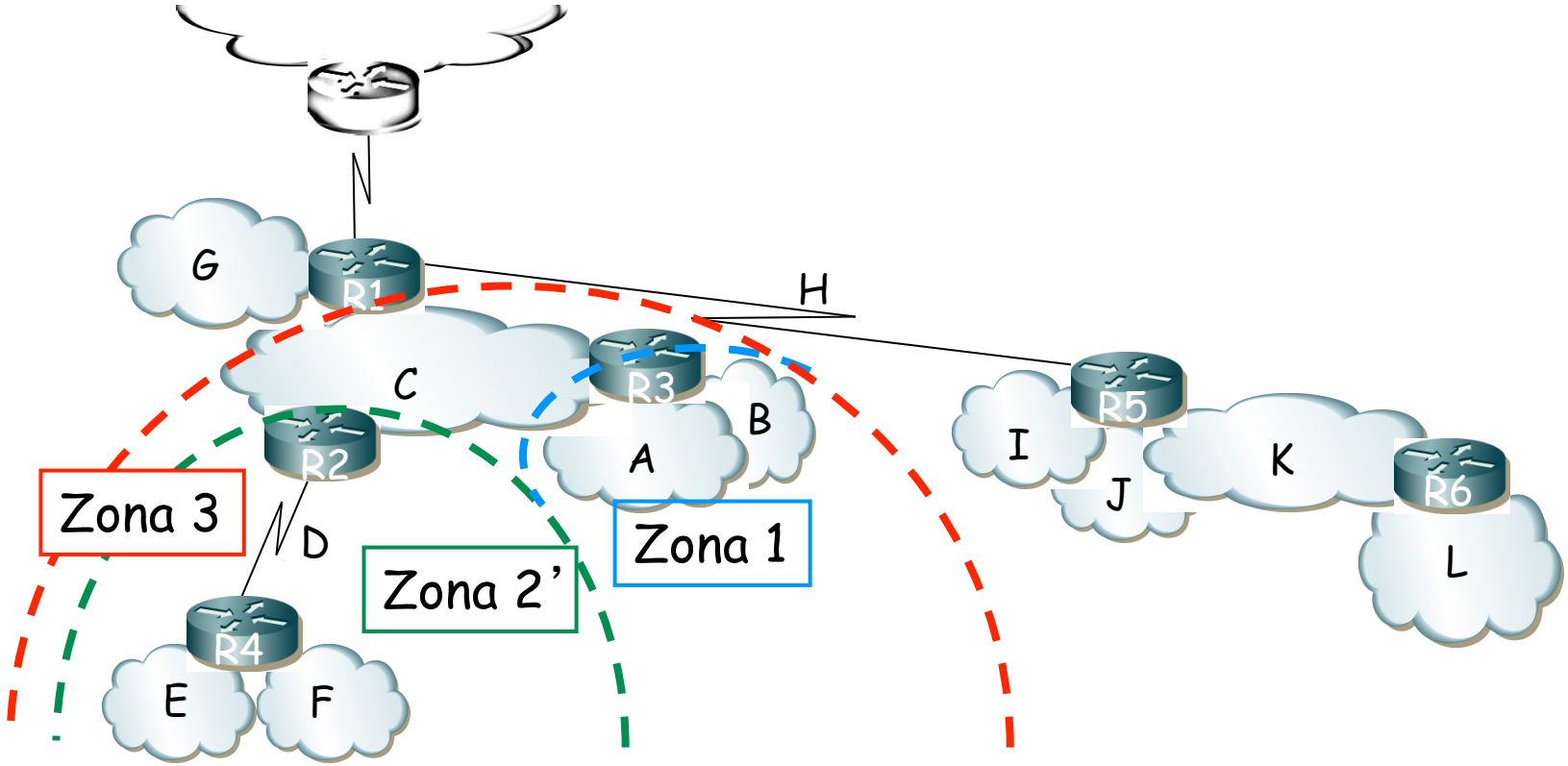
Zona 1	192.168.3	.	[000]	[00000]	= 192.168.3.0 /27
Zona2'	192.168.3	.	[01]	[000000]	= 192.168.3.64 /26



Ejemplo (4)

Zona 1	192.168.3	.	[000]	[00000]	= 192.168.3.0 /27
Zona2'	192.168.3	.	[01]	[000000]	= 192.168.3.64 /26

C	192.168.3	.	[001]	[0]	[0000]	= 192.168.3.32 /28



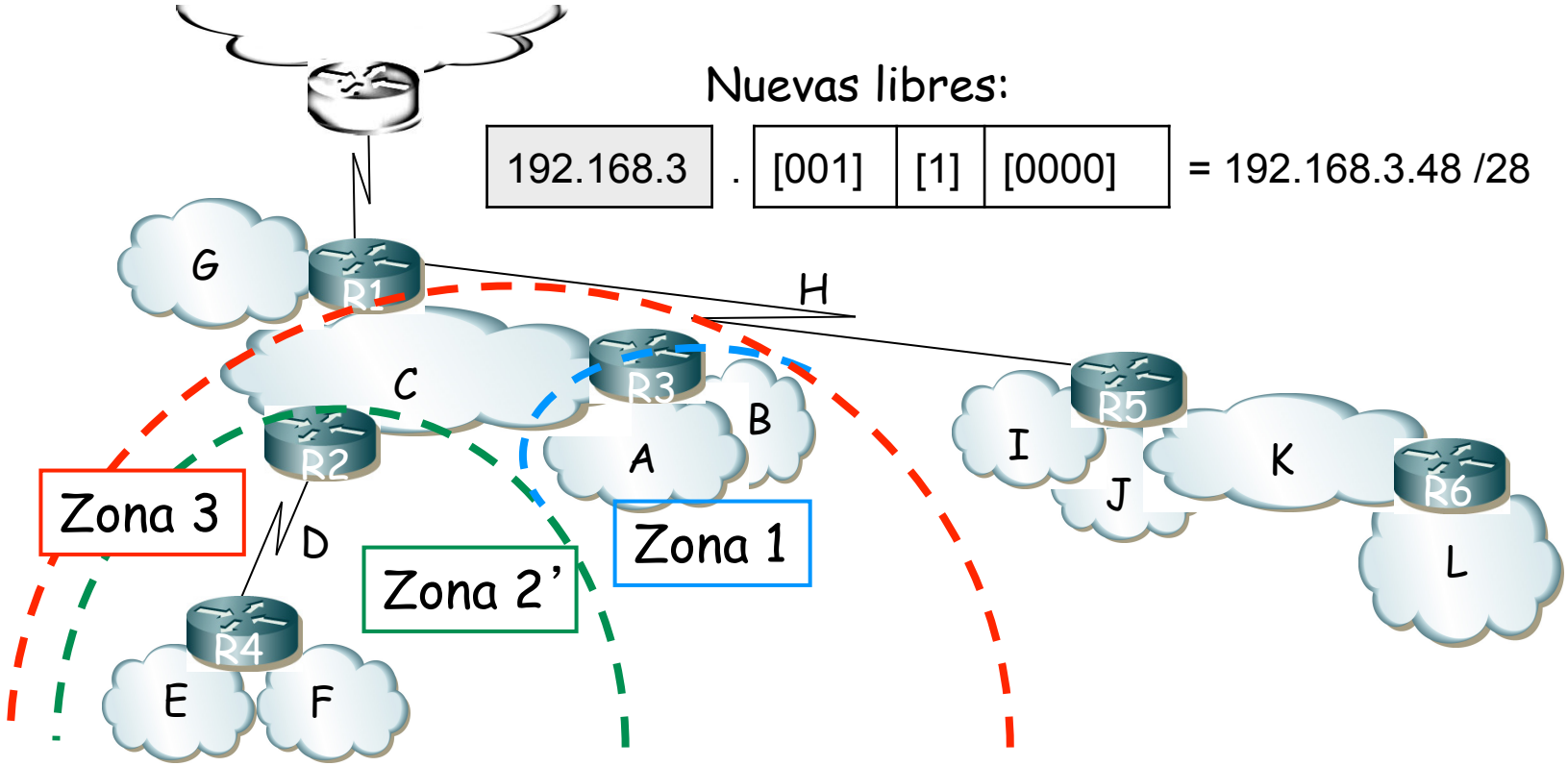
Ejemplo (4)

Zona 1	192.168.3	.	[000]	[00000]	= 192.168.3.0 /27
Zona2'	192.168.3	.	[01]	[000000]	= 192.168.3.64 /26

C	192.168.3	.	[001]	[0]	[0000]	= 192.168.3.32 /28

Nuevas libres:

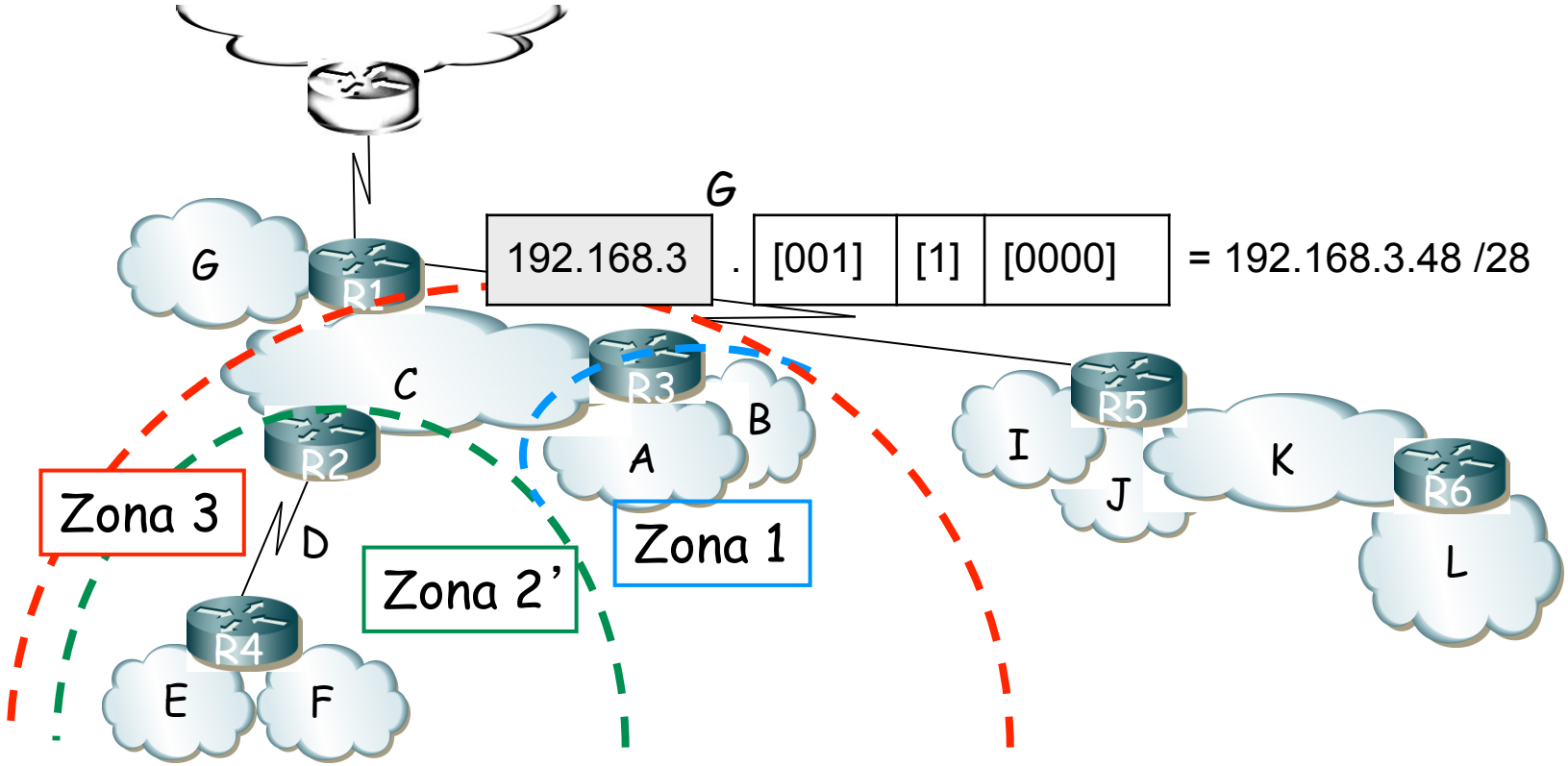
192.168.3	.	[001]	[1]	[0000]	= 192.168.3.48 /28



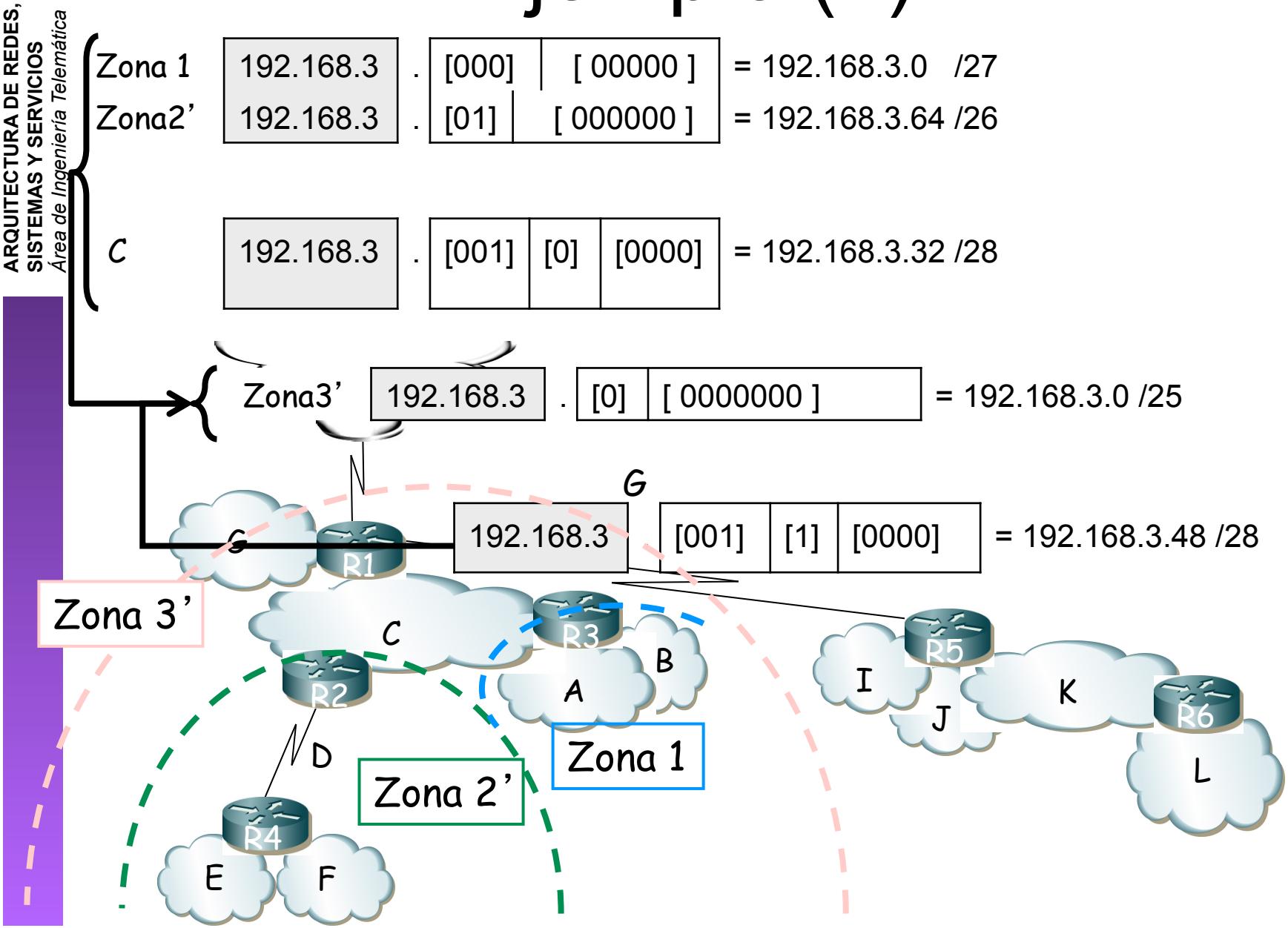
Ejemplo (4)

Zona 1	192.168.3	.	[000]	[00000]	= 192.168.3.0 /27
Zona2'	192.168.3	.	[01]	[000000]	= 192.168.3.64 /26

C	192.168.3	.	[001]	[0]	[0000]	= 192.168.3.32 /28

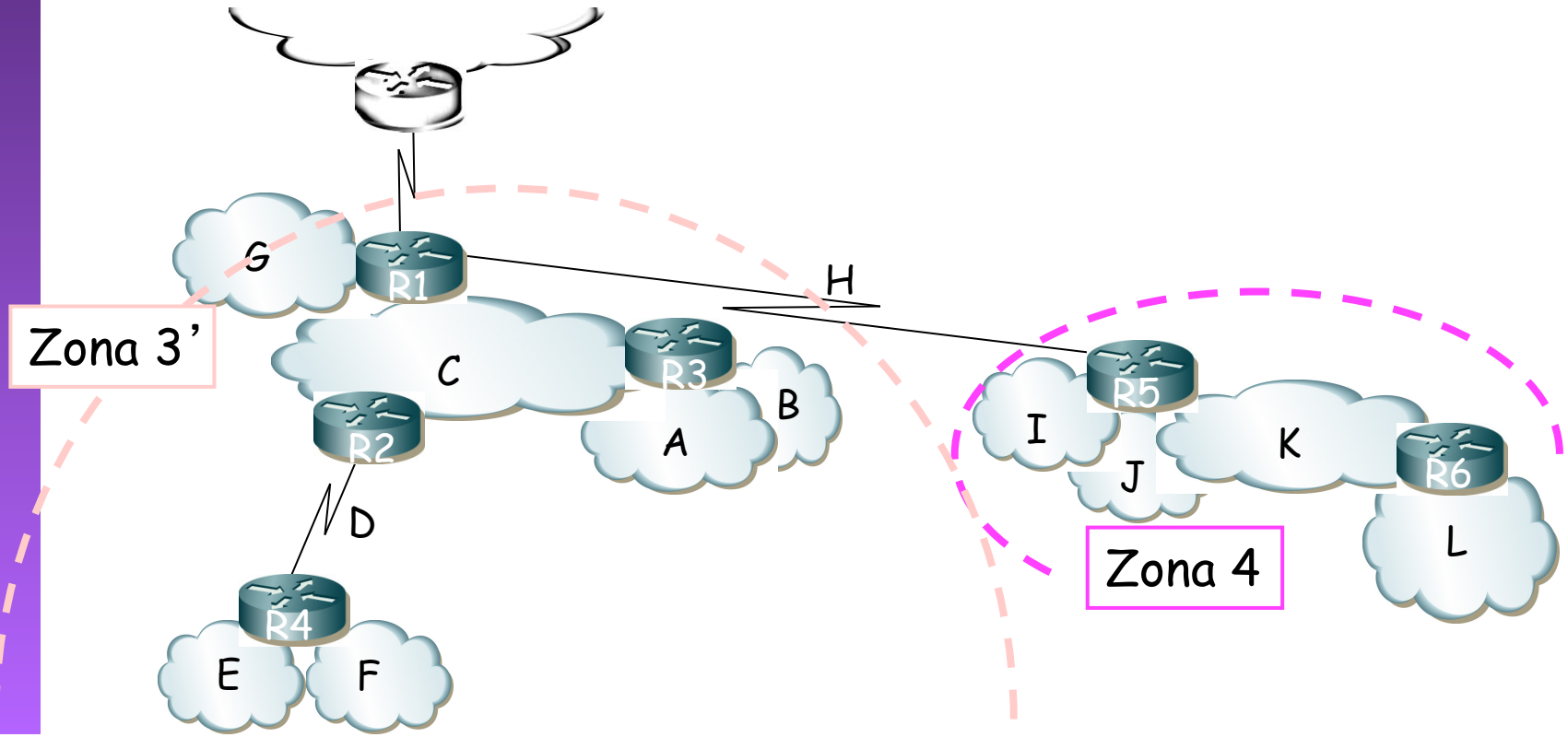


Ejemplo (4)


Zona 1
192.168.3 . [000] [00000] = 192.168.3.0 /27
Zona2'
192.168.3 . [01] [000000] = 192.168.3.64 /26
C
192.168.3 . [001] [0] [0000] = 192.168.3.32 /28
Zona3'
192.168.3 . [0] [0000000] = 192.168.3.0 /25
G
192.168.3 [001] [1] [0000] = 192.168.3.48 /28
R1
R2
R3
R4
R5
R6
Zona 3'
Zona 1
Zona 2'
A
B
C
D
E
F
I
J
K
L

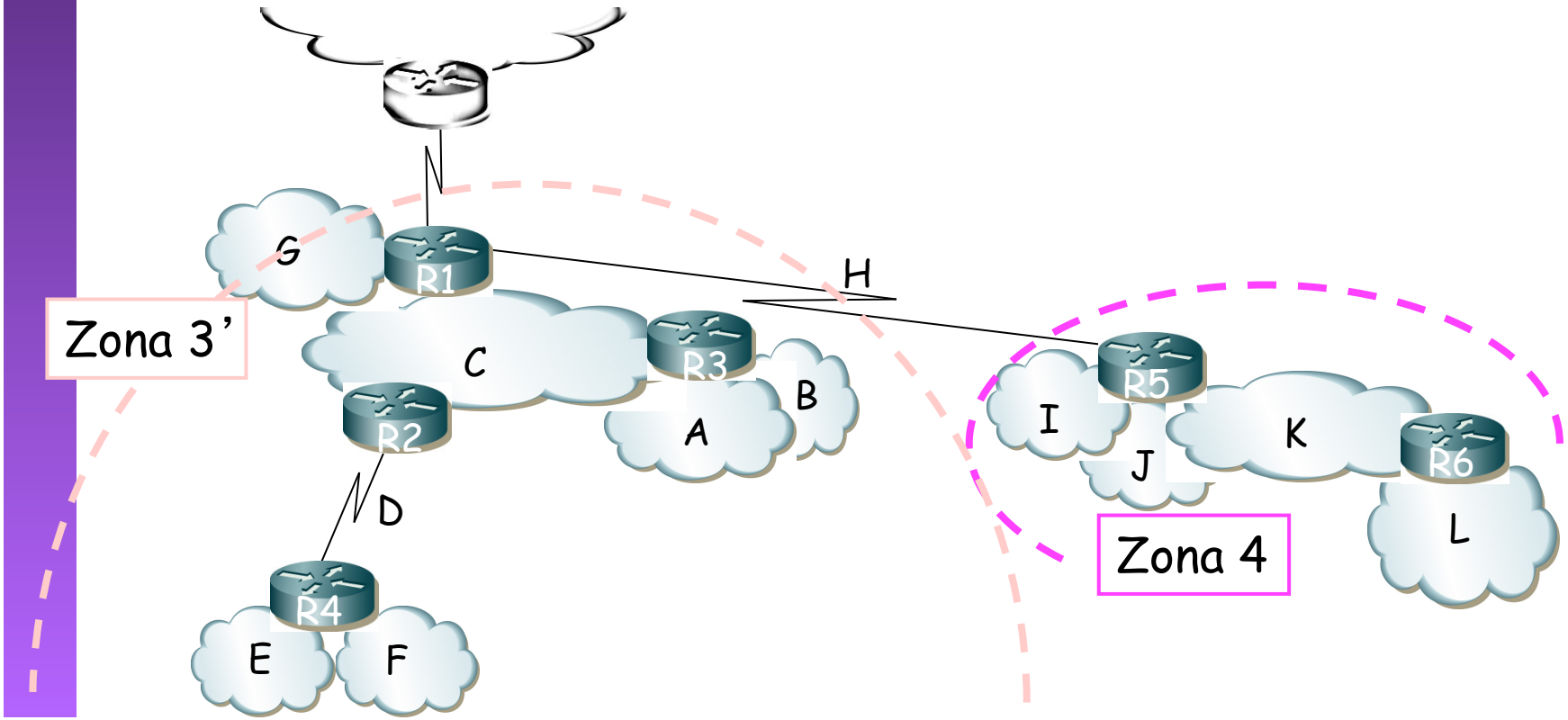
Ejemplo (4)

Zona3' | 192.168.3 | . | [0] | [0000000] | = 192.168.3.0 /25



Ejemplo (4)

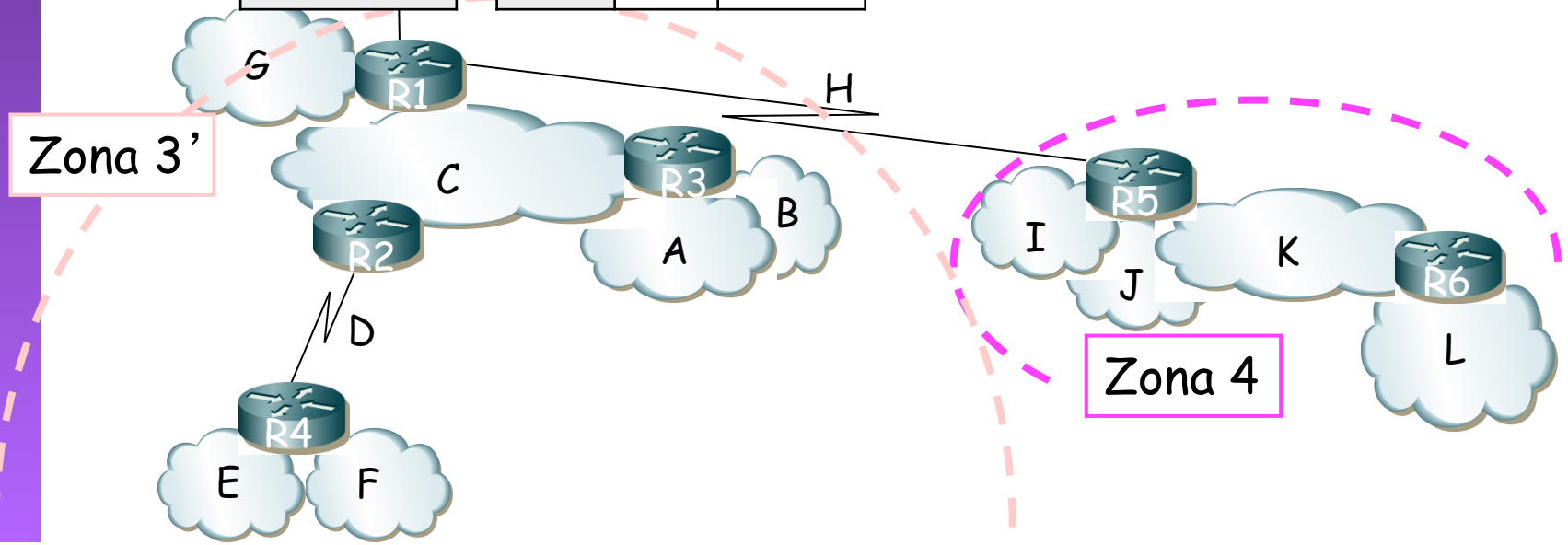
Zona3'	192.168.3	.	[0]	[0000000]	= 192.168.3.0 /25
Zona 4	192.168.3	.	[10]	[000000]	= 192.168.3.128 /26



Ejemplo (4)

Zona3'	192.168.3	.	[0]	[0000000]	= 192.168.3.0 /25
Zona 4	192.168.3	.	[10]	[000000]	= 192.168.3.128 /26

I	192.168.3	.	[10]	[00]	[0000] = 192.168.3.128 /28
J	192.168.3	.	[10]	[01]	[0000] = 192.168.3.136 /28
K	192.168.3	.	[10]	[10]	[0000] = 192.168.3.144 /28
L	192.168.3	.	[10]	[11]	[0000] = 192.168.3.152 /28

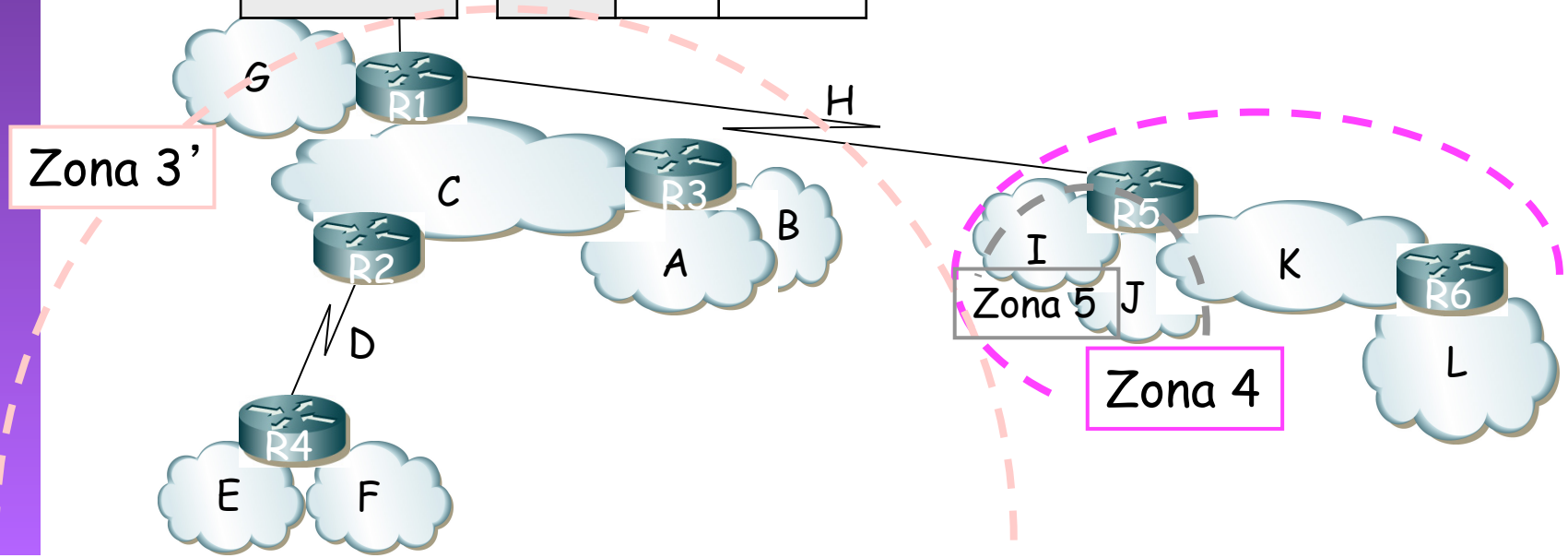


Ejemplo (4)

Zona3'	192.168.3	.	[0]	[0000000]	= 192.168.3.0 /25
Zona 4	192.168.3	.	[10]	[000000]	= 192.168.3.128 /26

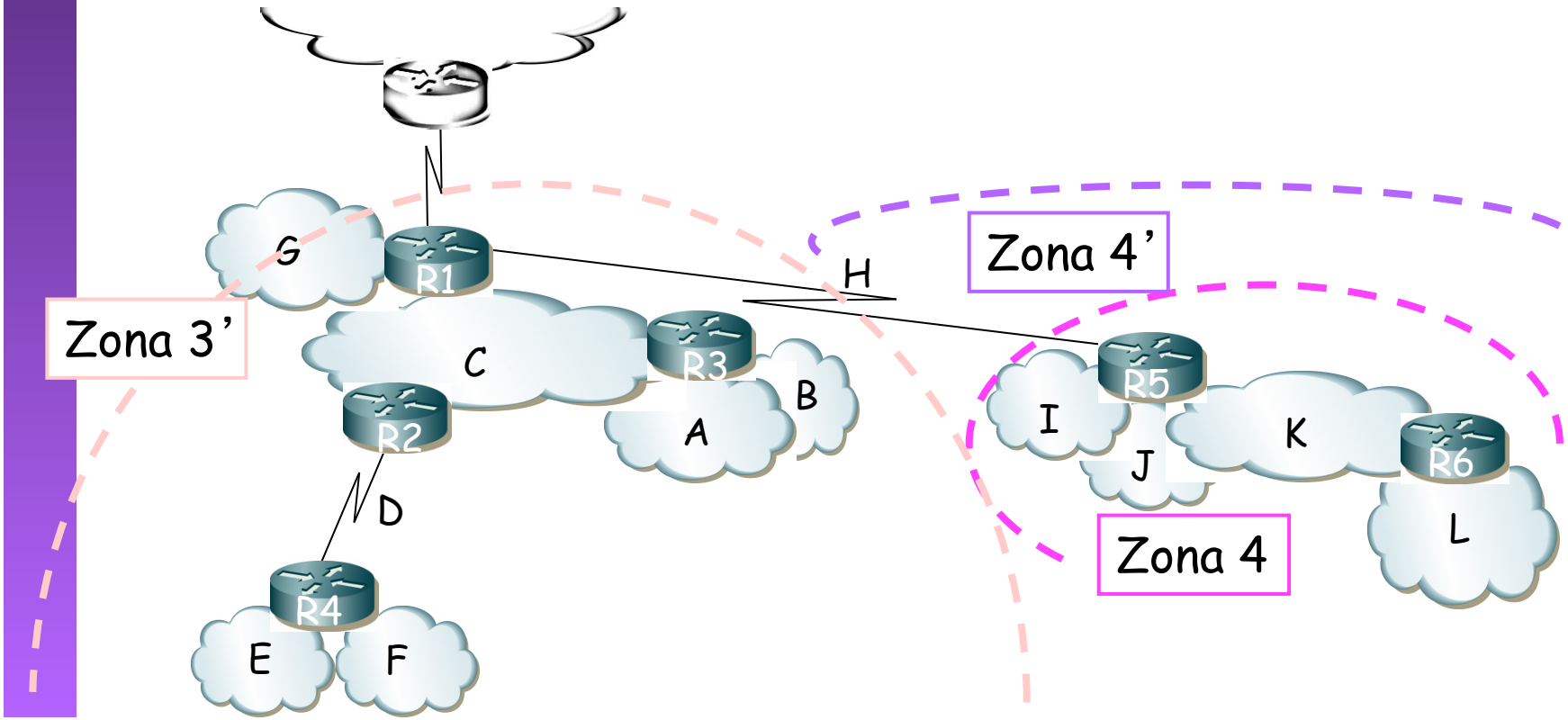
I	192.168.3	.	[10]	[00]	[0000]	= 192.168.3.128 /28
J	192.168.3	.	[10]	[01]	[0000]	= 192.168.3.136 /28
K	192.168.3	.	[10]	[10]	[0000]	= 192.168.3.144 /28
L	192.168.3	.	[10]	[11]	[0000]	= 192.168.3.152 /28

Zona 5:
192.168.3.128 /27



Ejemplo (4)

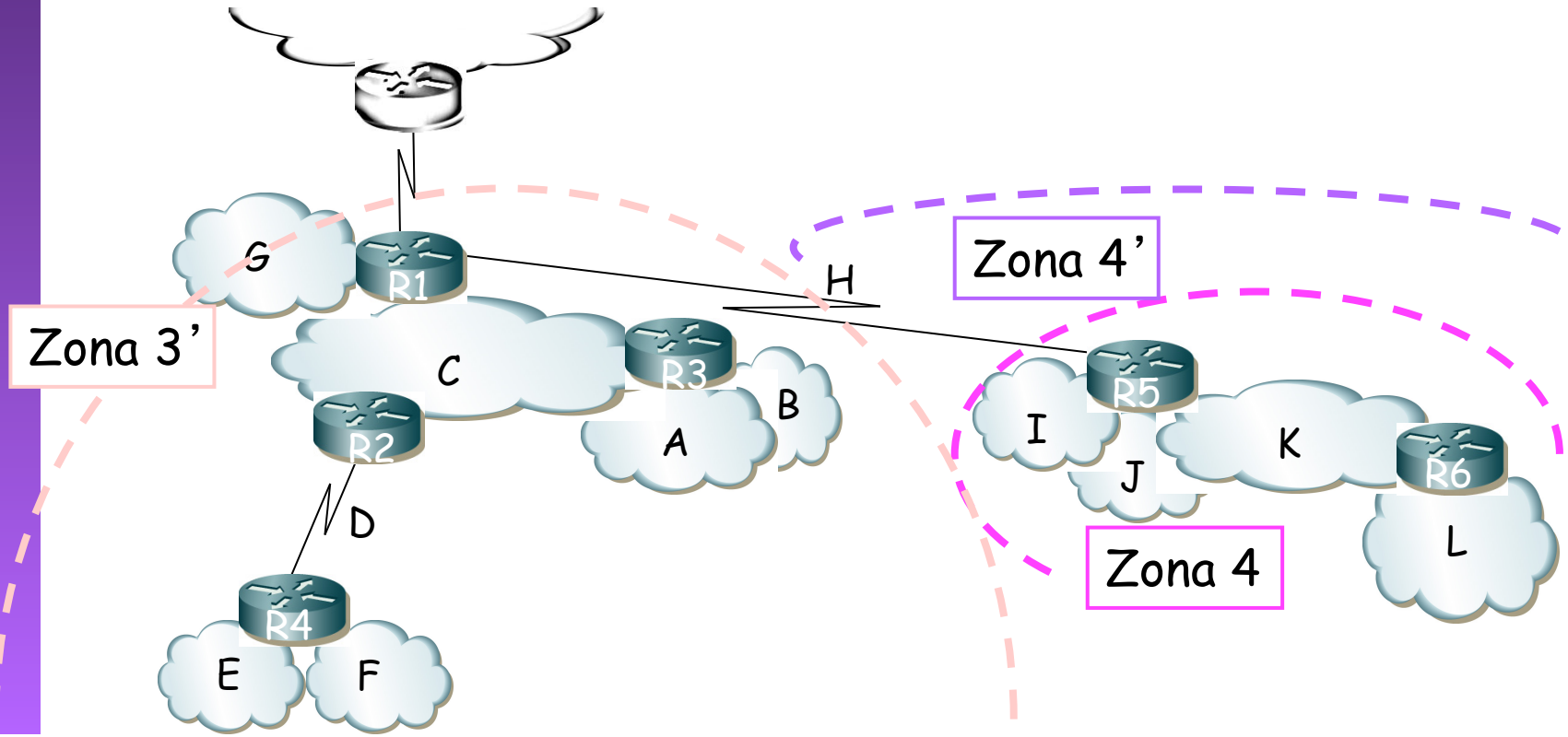
Zona3'	192.168.3	.	[0]	[0000000]	= 192.168.3.0 /25
Zona 4	192.168.3	.	[10]	[000000]	= 192.168.3.128 /26



Ejemplo (4)

Zona3'	192.168.3	.	[0]	[0000000]	= 192.168.3.0 /25
Zona 4	192.168.3	.	[10]	[000000]	= 192.168.3.128 /26

H	192.168.3	.	[11]	[0000]	[00]	= 192.168.3.192 /30



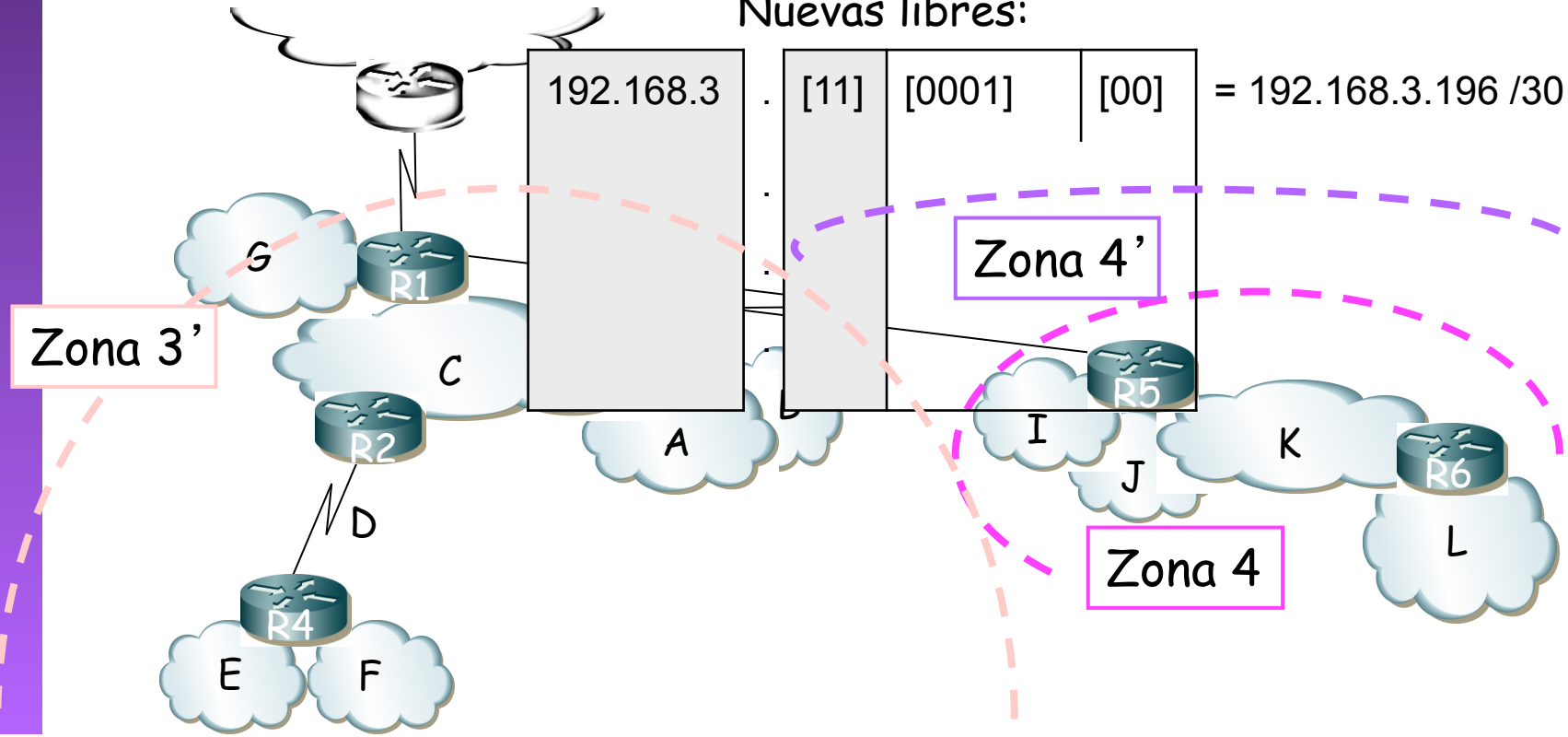
Ejemplo (4)

Zona3'	192.168.3	.	[0]	[0000000]	= 192.168.3.0 /25
Zona 4	192.168.3	.	[10]	[000000]	= 192.168.3.128 /26

H	192.168.3	.	[11]	[0000]	[00]	= 192.168.3.192 /30

Nuevas libres:

192.168.3	.	[11]	[0001]	[00]	= 192.168.3.196 /30



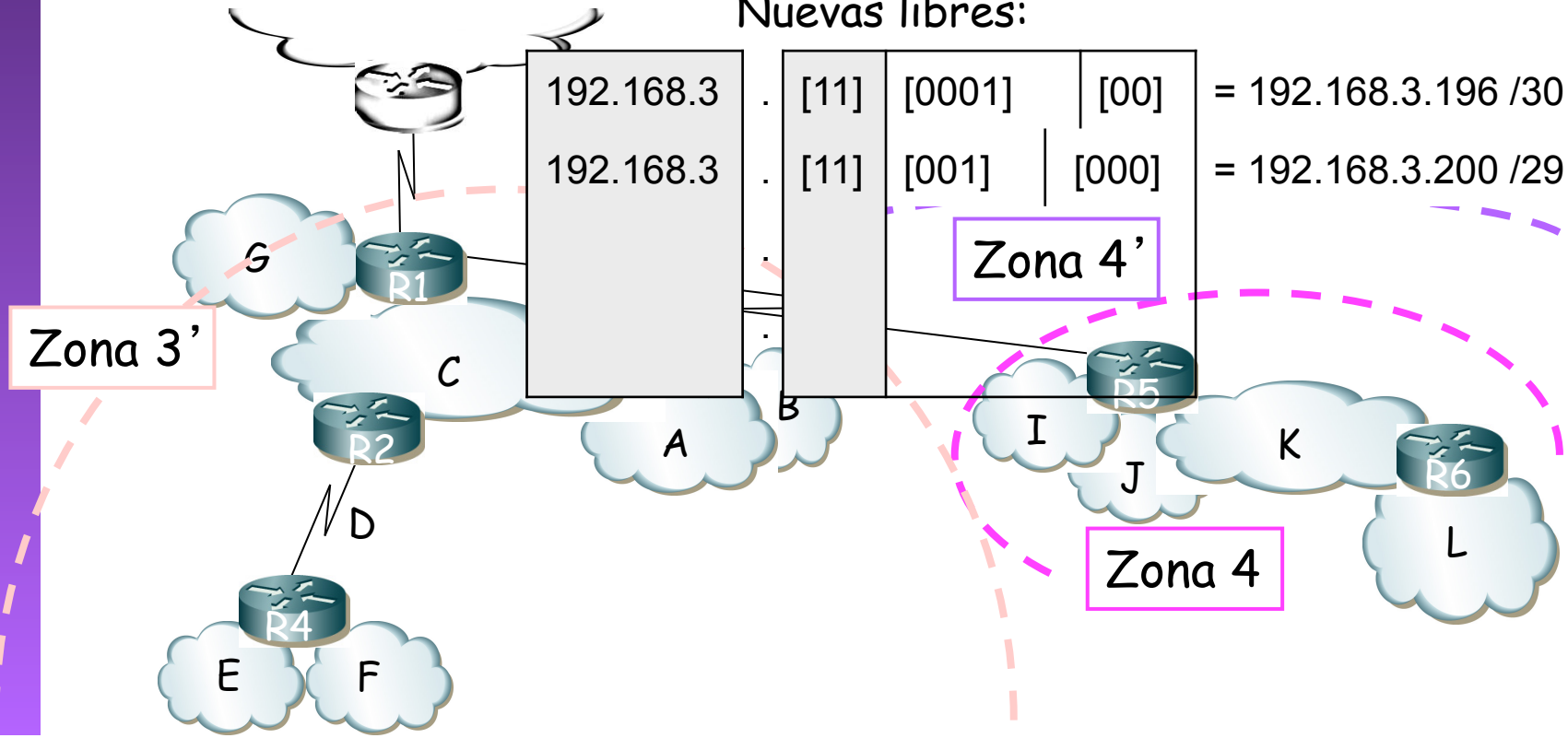
Ejemplo (4)

Zona3'	192.168.3	.	[0]	[0000000]	= 192.168.3.0 /25
Zona 4	192.168.3	.	[10]	[000000]	= 192.168.3.128 /26

H	192.168.3	.	[11]	[0000]	[00]	= 192.168.3.192 /30

Nuevas libres:

192.168.3	.	[11]	[0001]	[00]	= 192.168.3.196 /30
192.168.3	.	[11]	[001]	[000]	= 192.168.3.200 /29



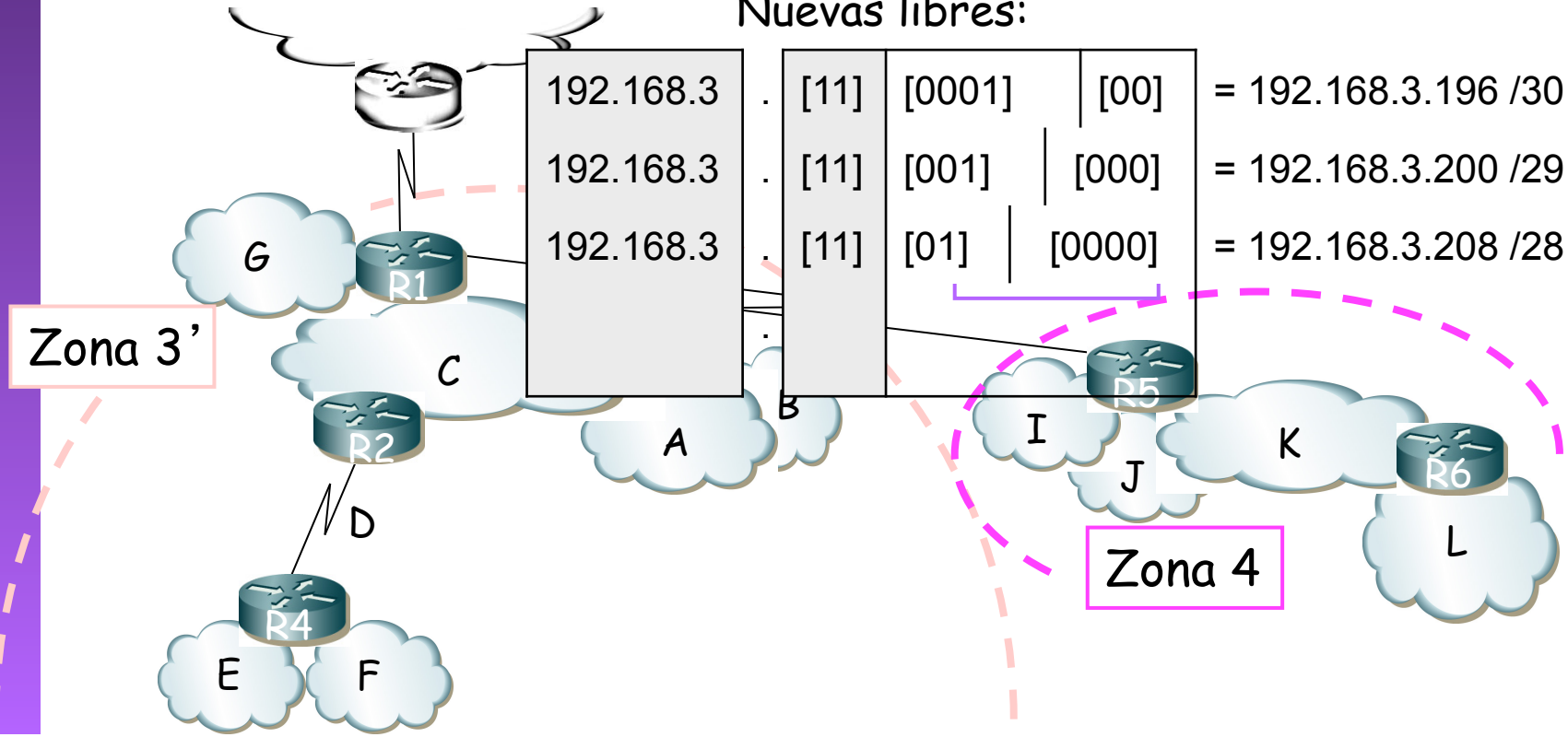
Ejemplo (4)

Zona3'	192.168.3	.	[0]	[0000000]	= 192.168.3.0 /25
Zona 4	192.168.3	.	[10]	[000000]	= 192.168.3.128 /26

H	192.168.3	.	[11]	[0000]	[00]	= 192.168.3.192 /30

Nuevas libres:

192.168.3	.	[11]	[0001]	[00]	= 192.168.3.196 /30
192.168.3	.	[11]	[001]	[000]	= 192.168.3.200 /29
192.168.3	.	[11]	[01]	[0000]	= 192.168.3.208 /28



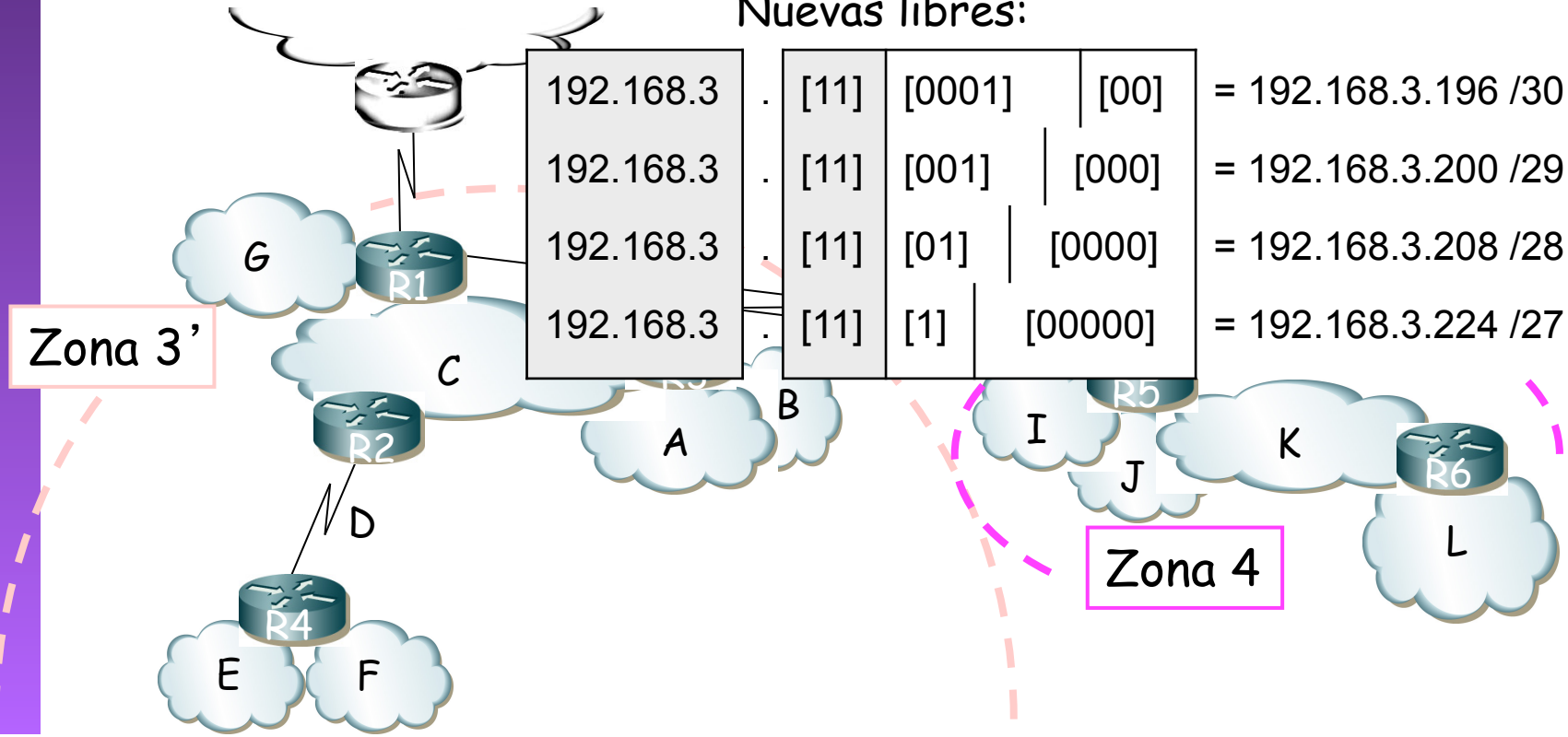
Ejemplo (4)

Zona3'	192.168.3	.	[0]	[0000000]	= 192.168.3.0 /25
Zona 4	192.168.3	.	[10]	[000000]	= 192.168.3.128 /26

H	192.168.3	.	[11]	[0000]	[00]	= 192.168.3.192 /30

Nuevas libres:

192.168.3	.	[11]	[0001]	[00]	= 192.168.3.196 /30
192.168.3	.	[11]	[001]	[000]	= 192.168.3.200 /29
192.168.3	.	[11]	[01]	[0000]	= 192.168.3.208 /28
192.168.3	.	[11]	[1]	[00000]	= 192.168.3.224 /27



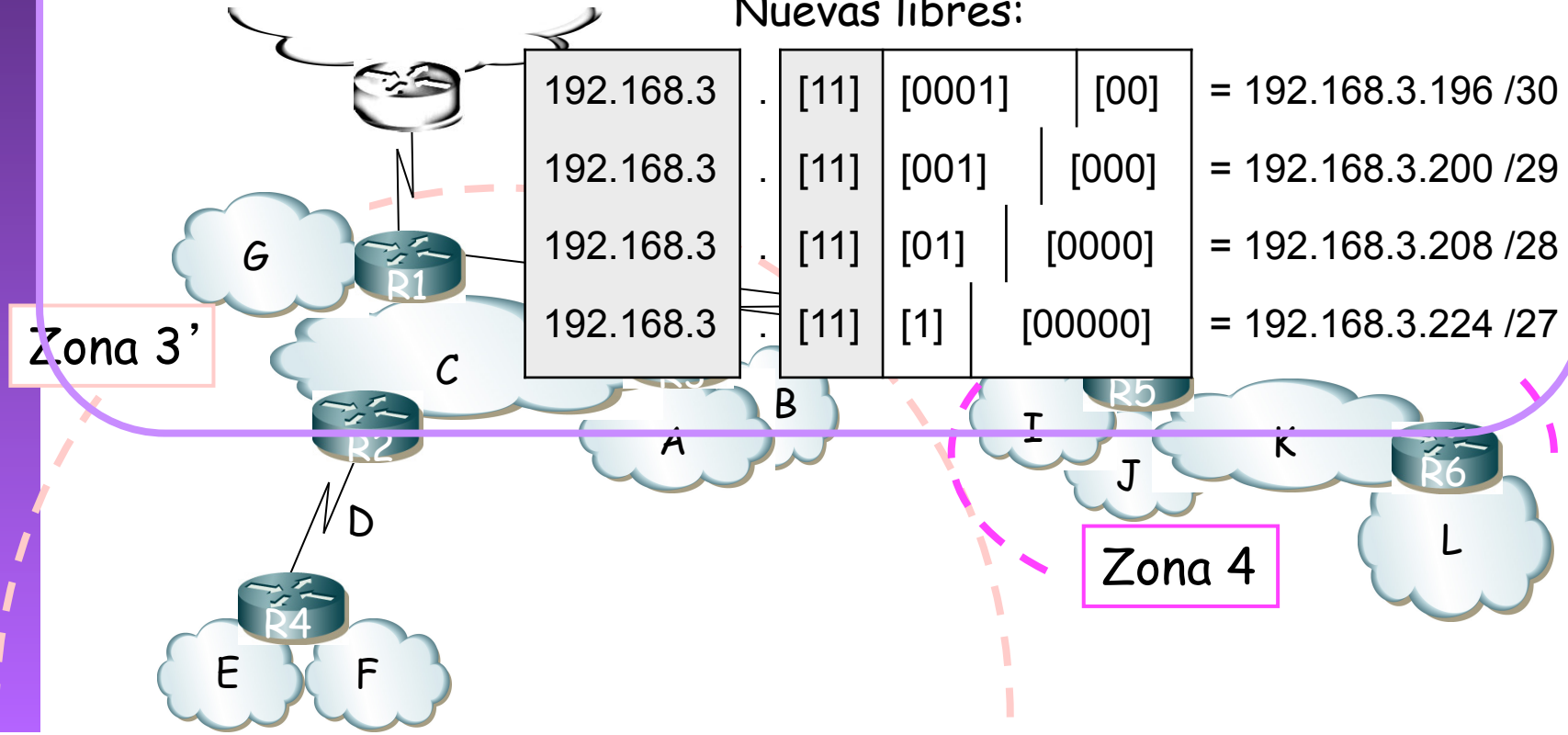
Ejemplo (4)

Zona3'	192.168.3	.	[0]	[0000000]	= 192.168.3.0 /25
Zona 4	192.168.3	.	[10]	[000000]	= 192.168.3.128 /26

H	192.168.3	.	[11]	[0000]	[00]	= 192.168.3.192 /30

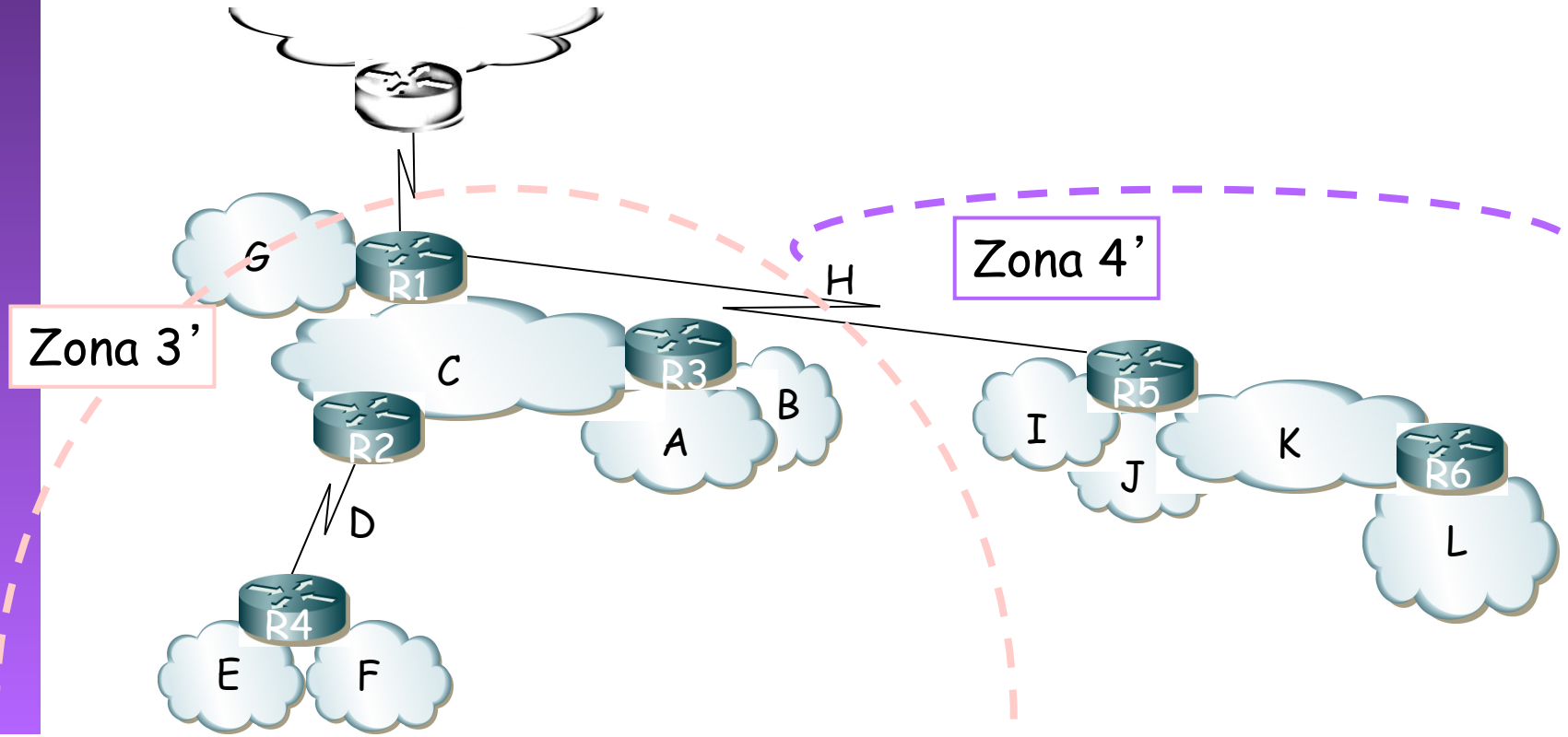
Nuevas libres:

192.168.3	.	[11]	[0001]	[00]	= 192.168.3.196 /30
192.168.3	.	[11]	[001]	[000]	= 192.168.3.200 /29
192.168.3	.	[11]	[01]	[0000]	= 192.168.3.208 /28
192.168.3	.	[11]	[1]	[00000]	= 192.168.3.224 /27



Ejemplo (4)

Zona3'	192.168.3	. [0]	[0000000]	= 192.168.3.0 /25
Zona4'	192.168.3	. [1]	[0000000]	= 192.168.3.128 /25

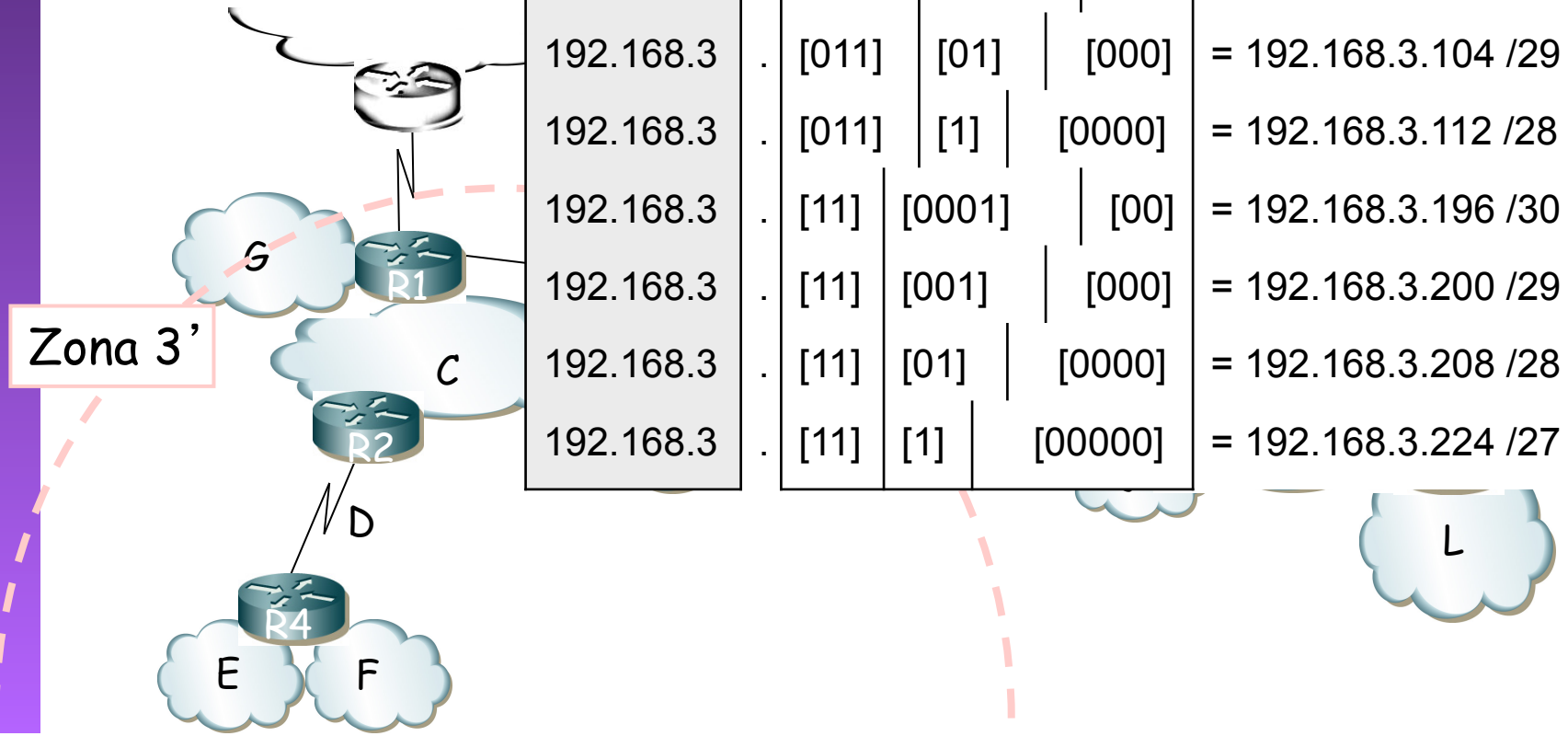


Ejemplo (4)

Zona3'	192.168.3	.	[0]	[0000000]	= 192.168.3.0 /25
Zona4'	192.168.3	.	[1]	[0000000]	= 192.168.3.128 /25

Libres totales:

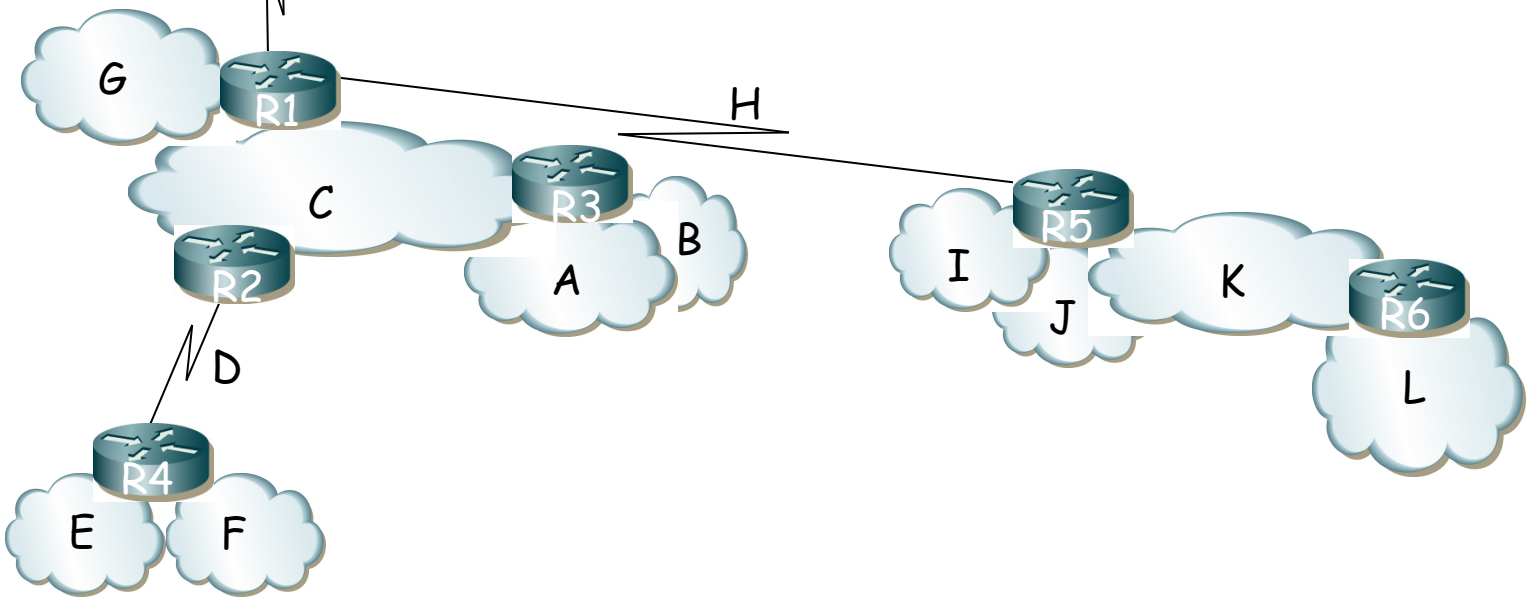
192.168.3	.	[011]	[001]	[00] = 192.168.3.100 /30
192.168.3	.	[011]	[01]	[000] = 192.168.3.104 /29
192.168.3	.	[011]	[1]	[0000] = 192.168.3.112 /28
192.168.3	.	[11]	[0001]	[00] = 192.168.3.196 /30
192.168.3	.	[11]	[001]	[000] = 192.168.3.200 /29
192.168.3	.	[11]	[01]	[0000] = 192.168.3.208 /28
192.168.3	.	[11]	[1]	[00000] = 192.168.3.224 /27



Ejemplo (4)

Tabla de rutas de R1:

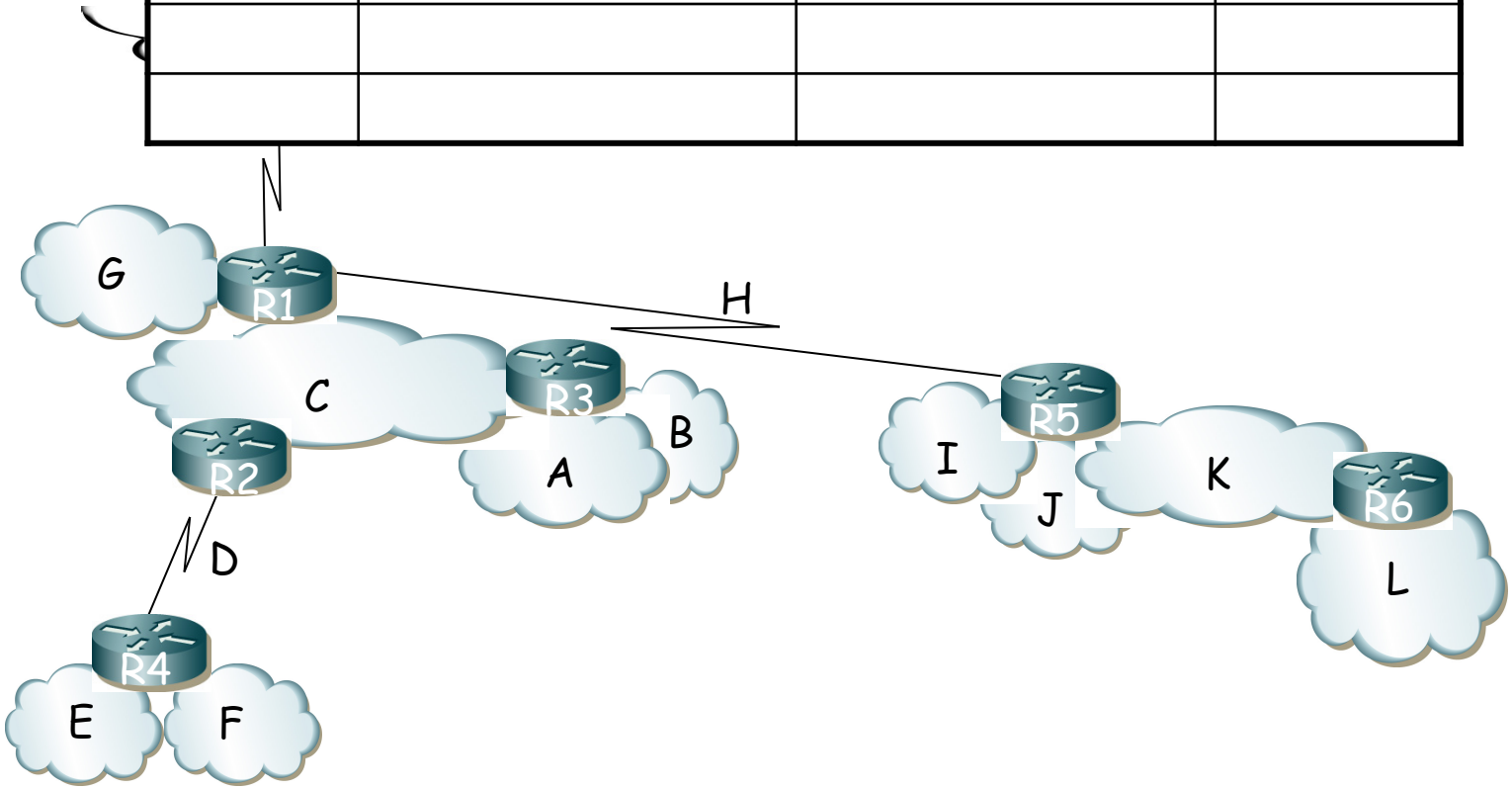
Destino		Next-hop	Interfaz



Ejemplo (4)

Tabla de rutas de R1:

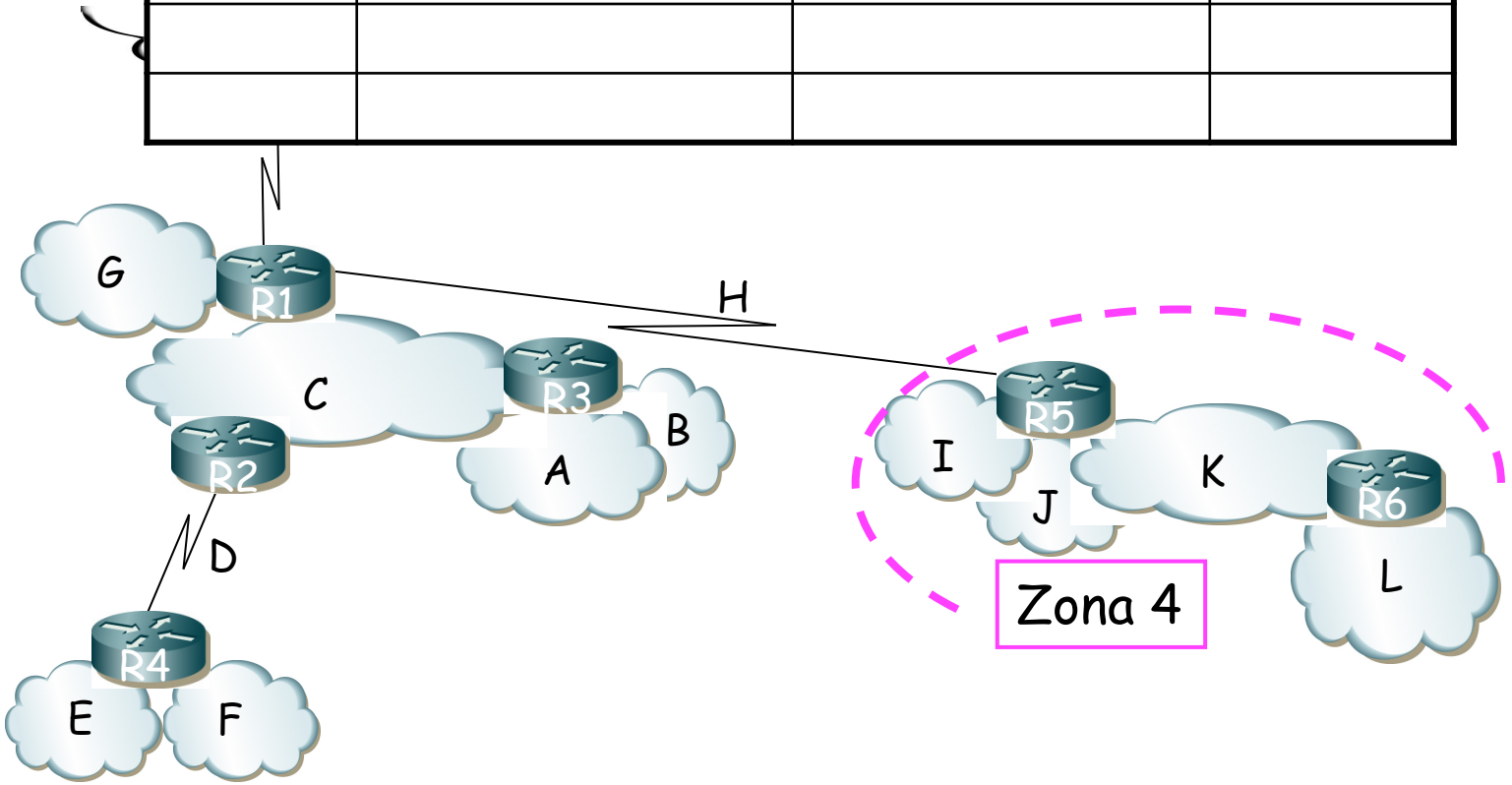
Destino		Next-hop	Interfaz
Red C	192.168.3.32 /28	(dir.connected)	ifR1RedC
Red G	192.168.3.48 /28	(dir.connected)	ifR1RedG
Red H	192.168.3.192 /30	(dir.connected)	ifR1RedH



Ejemplo (4)

Tabla de rutas de R1:

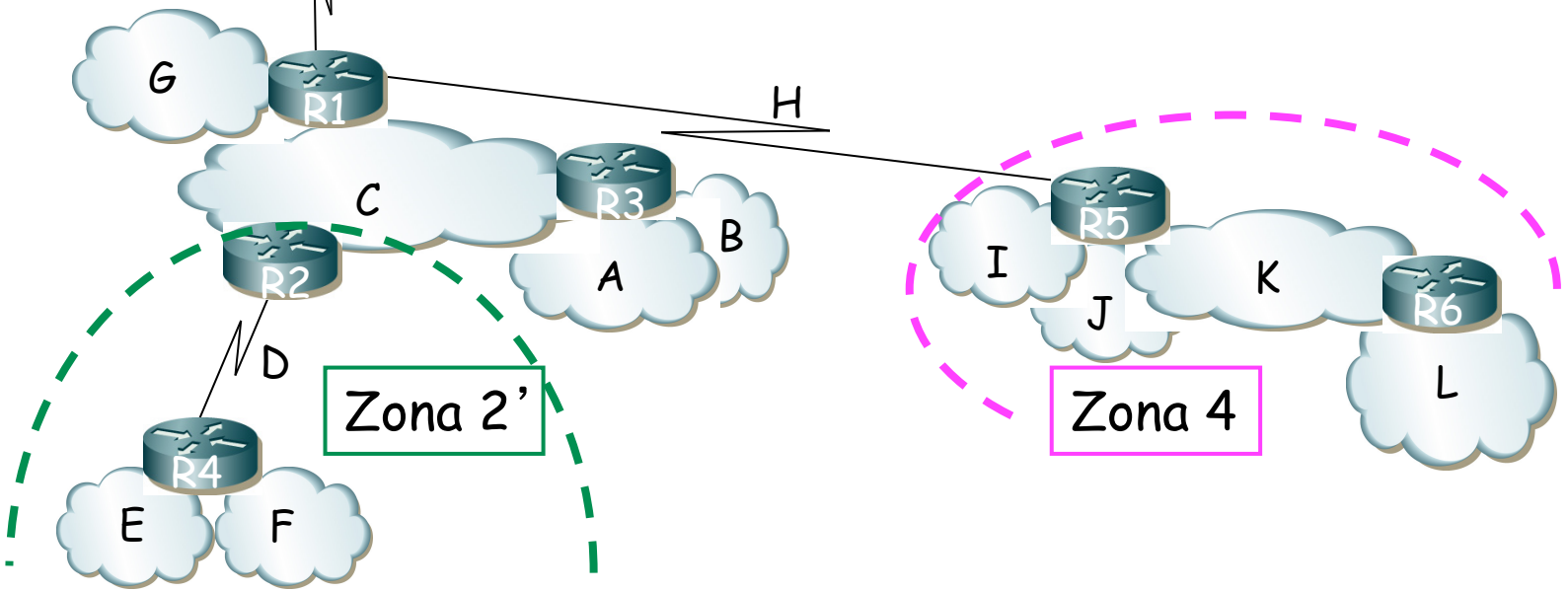
Destino		Next-hop	Interfaz
Red C	192.168.3.32 /28	(dir.connected)	ifR1RedC
Red G	192.168.3.48 /28	(dir.connected)	ifR1RedG
Red H	192.168.3.192 /30	(dir.connected)	ifR1RedH
Zona 4	192.168.3.128 /26	IPR5ifRedH	ifR1RedH



Ejemplo (4)

Tabla de rutas de R1:

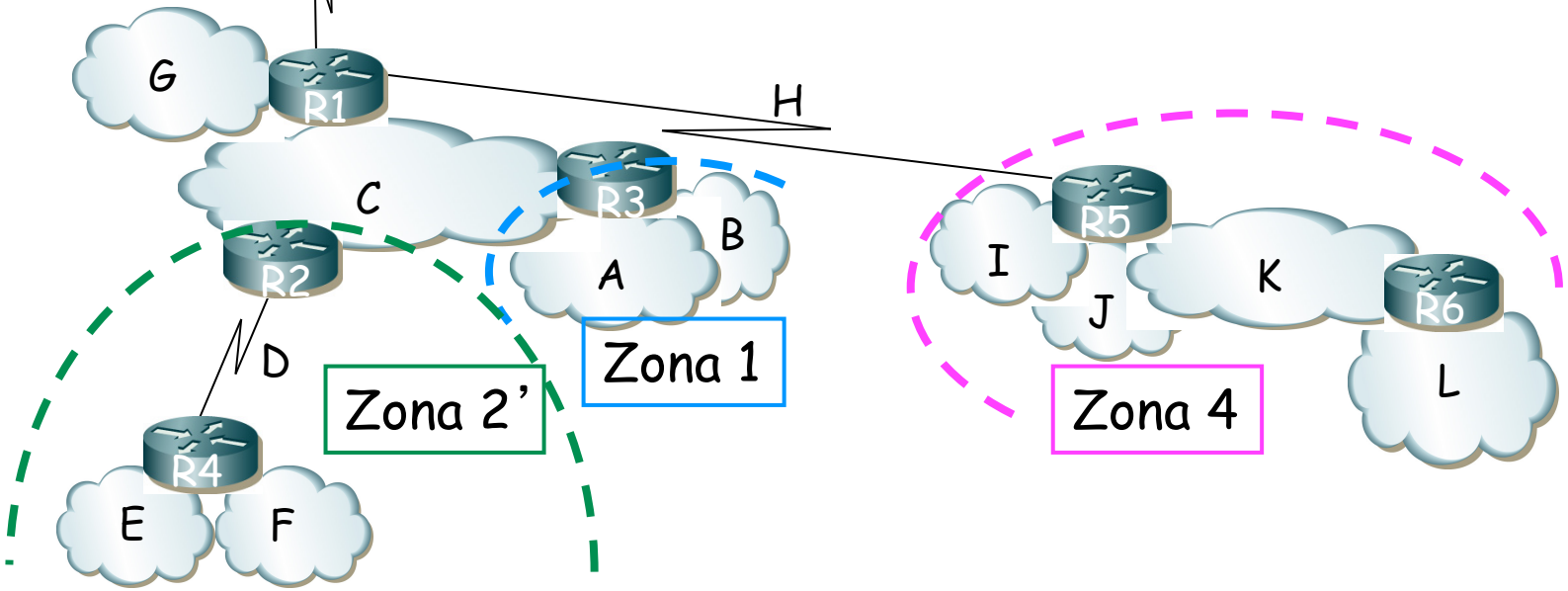
Destino		Next-hop	Interfaz
Red C	192.168.3.32 /28	(dir.connected)	ifR1RedC
Red G	192.168.3.48 /28	(dir.connected)	ifR1RedG
Red H	192.168.3.192 /30	(dir.connected)	ifR1RedH
Zona 4	192.168.3.128 /26	IPR5ifRedH	ifR1RedH
Zona 2'	192.168.3.64 /26	IPR2ifRedC	ifR1RedC



Ejemplo (4)

Tabla de rutas de R1:

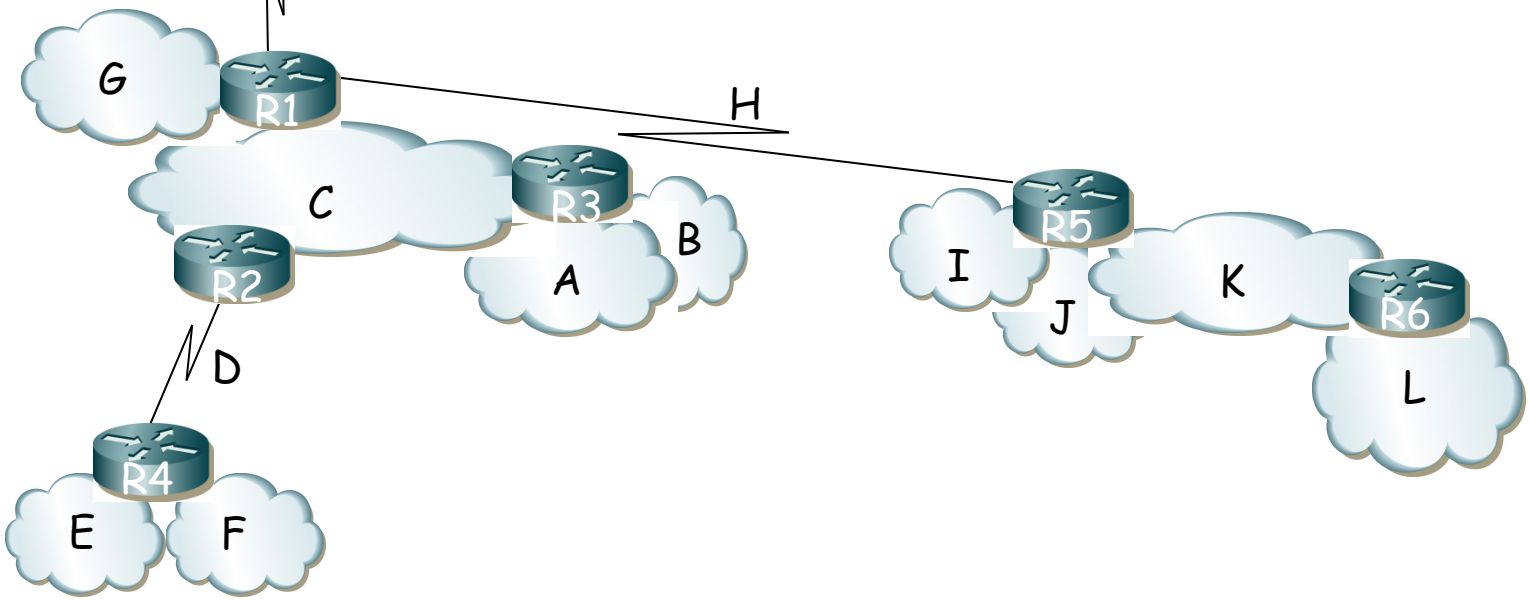
Destino		Next-hop	Interfaz
Red C	192.168.3.32 /28	(dir.connected)	ifR1RedC
Red G	192.168.3.48 /28	(dir.connected)	ifR1RedG
Red H	192.168.3.192 /30	(dir.connected)	ifR1RedH
Zona 4	192.168.3.128 /26	IPR5ifRedH	ifR1RedH
Zona 2'	192.168.3.64 /26	IPR2ifRedC	ifR1RedC
Zona 1	192.168.3.0 /27	IPR3ifRedC	ifR1RedC



Ejemplo (4)

Tabla de rutas de R5:

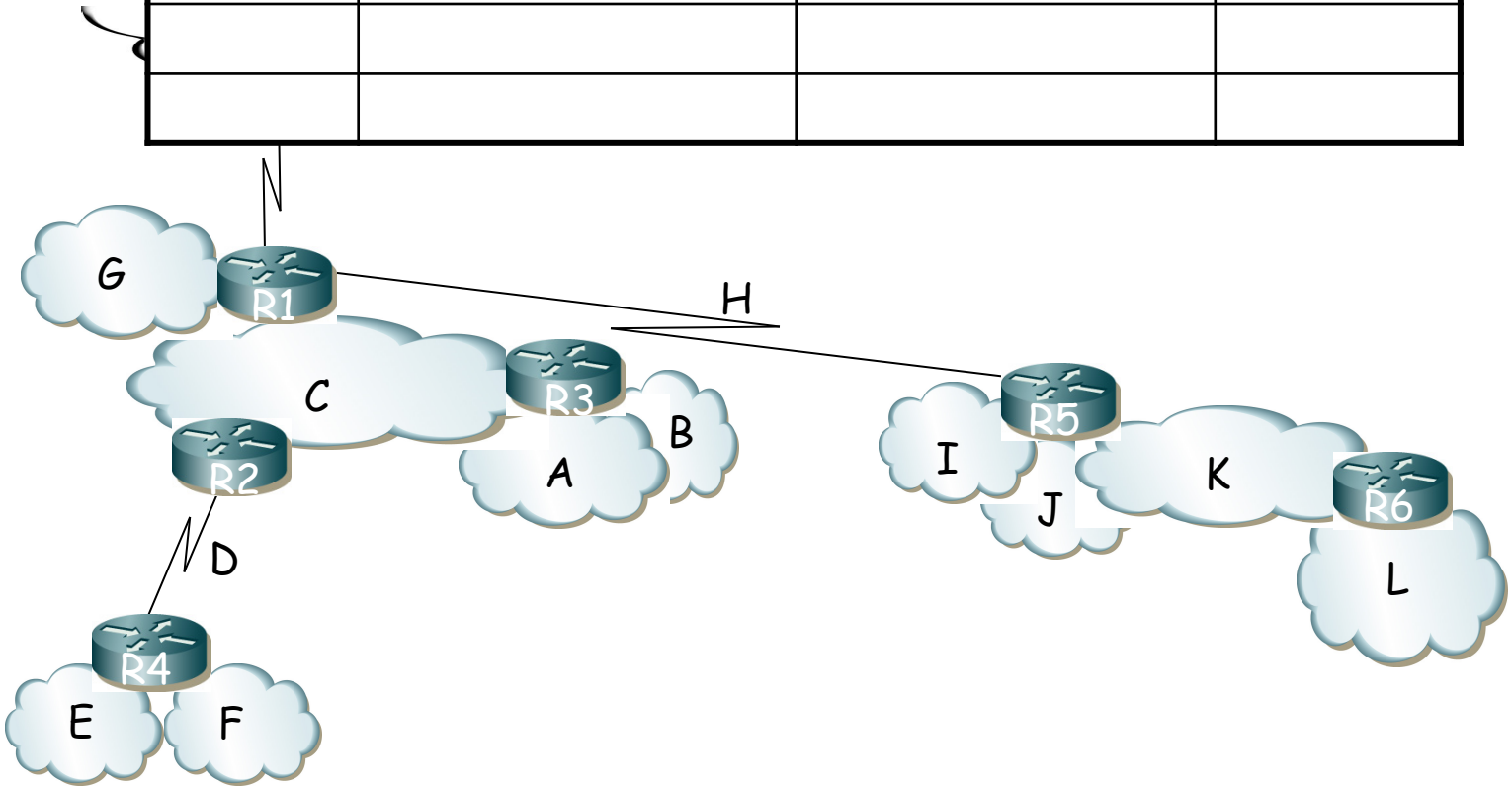
Destino		Next-hop	Interfaz



Ejemplo (4)

Tabla de rutas de R5:

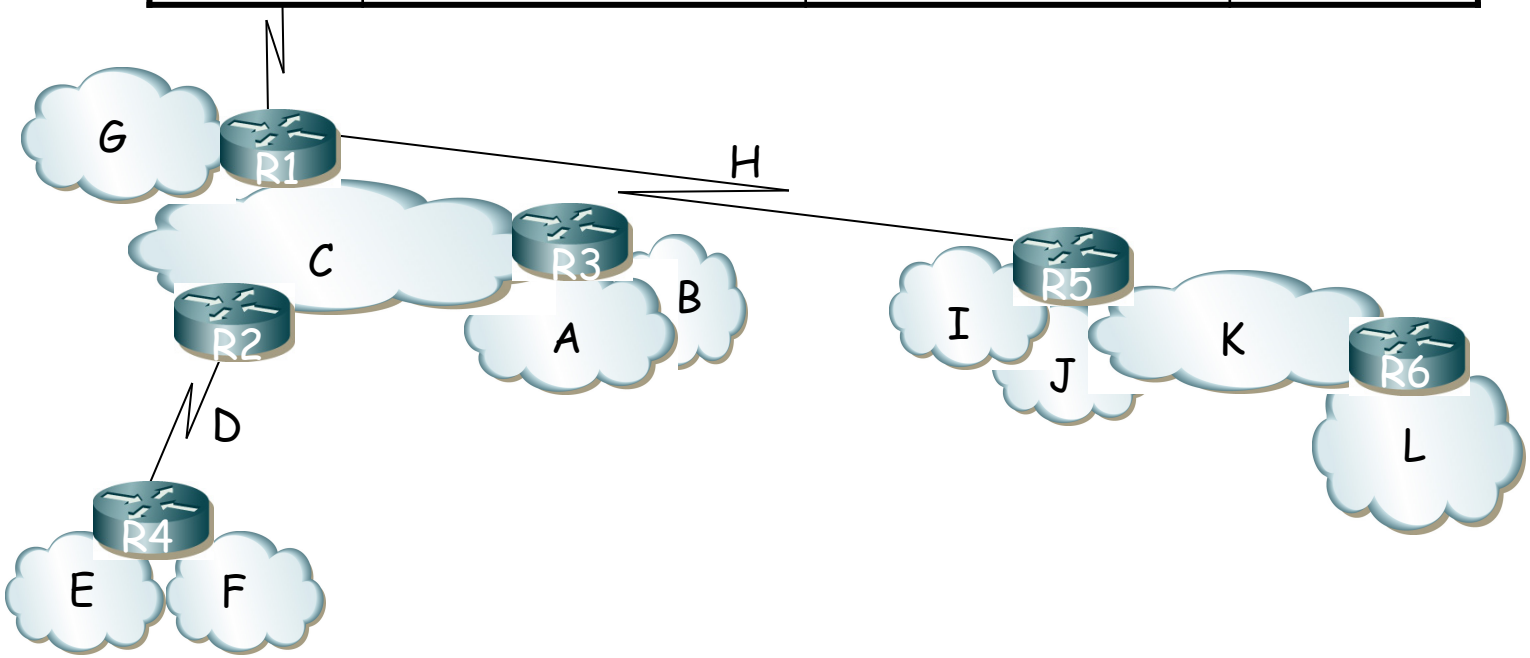
Destino		Next-hop	Interfaz
Red I	192.168.3.128 /28	(dir.connected)	ifR5RedI
Red J	192.168.3.136 /28	(dir.connected)	ifR5RedJ
Red K	192.168.3.136 /28	(dir.connected)	ifR5RedK
Red H	192.168.3.192 /30	(dir.connected)	ifR5RedH



Ejemplo (4)

Tabla de rutas de R5:

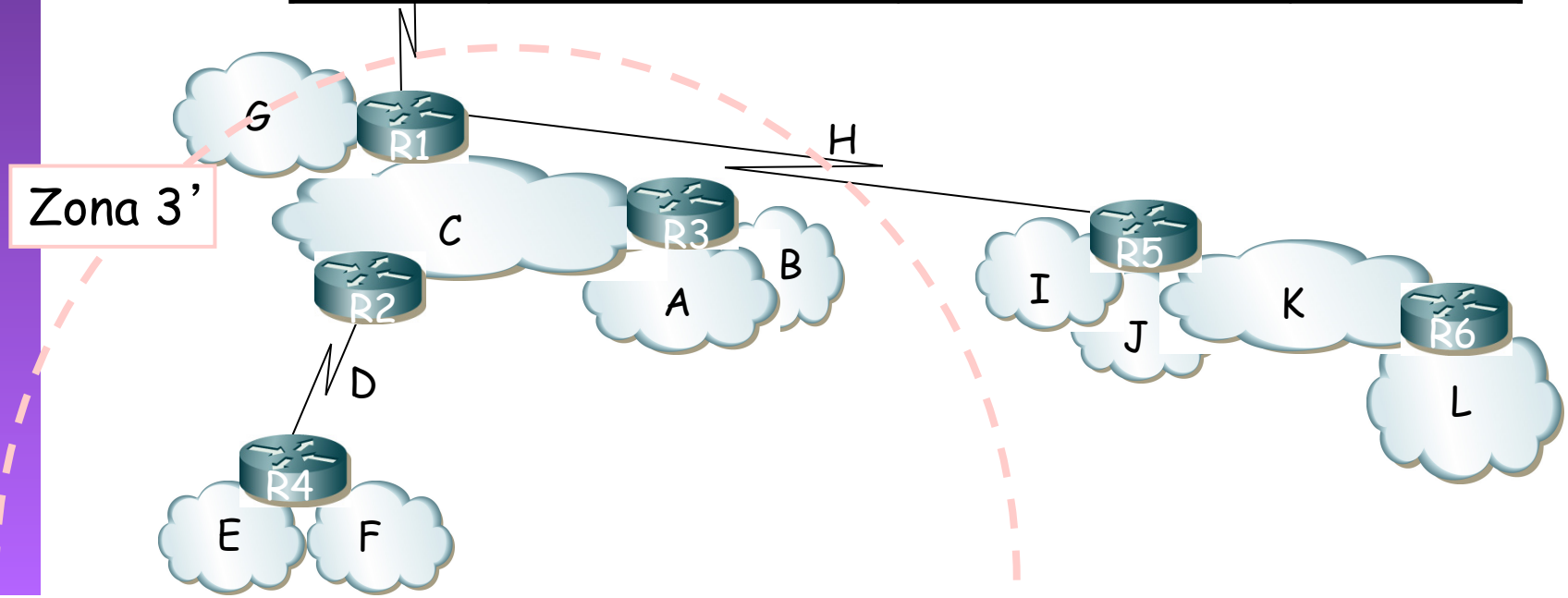
Destino		Next-hop	Interfaz
Red I	192.168.3.128 /28	(dir.connected)	ifR5RedI
Red J	192.168.3.136 /28	(dir.connected)	ifR5RedJ
Red K	192.168.3.136 /28	(dir.connected)	ifR5RedK
Red H	192.168.3.192 /30	(dir.connected)	ifR5RedH
Red L	192.168.3.152 /28	IPR6ifRedK	ifR5RedK



Ejemplo (4)

Tabla de rutas de R5:

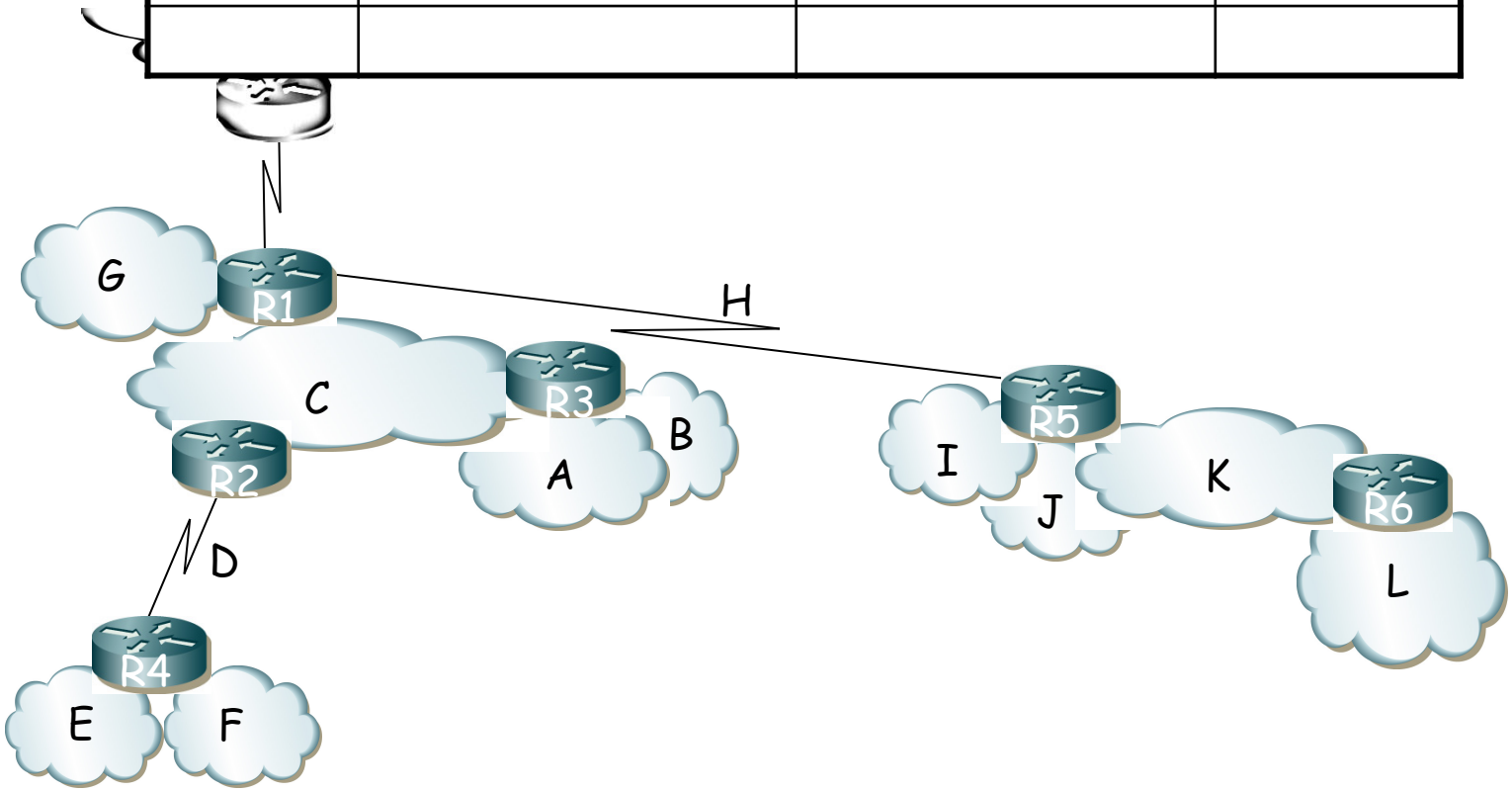
Destino		Next-hop	Interfaz
Red I	192.168.3.128 /28	(dir.connected)	ifR5RedI
Red J	192.168.3.136 /28	(dir.connected)	ifR5RedJ
Red K	192.168.3.136 /28	(dir.connected)	ifR5RedK
Red H	192.168.3.192 /30	(dir.connected)	ifR5RedH
Red L	192.168.3.152 /28	IPR6ifRedK	ifR5RedK
Zona 3'	192.168.3.0 /25	IPR1ifRedH	ifR5RedH



Ejemplo (4)

Tabla de rutas de R6:

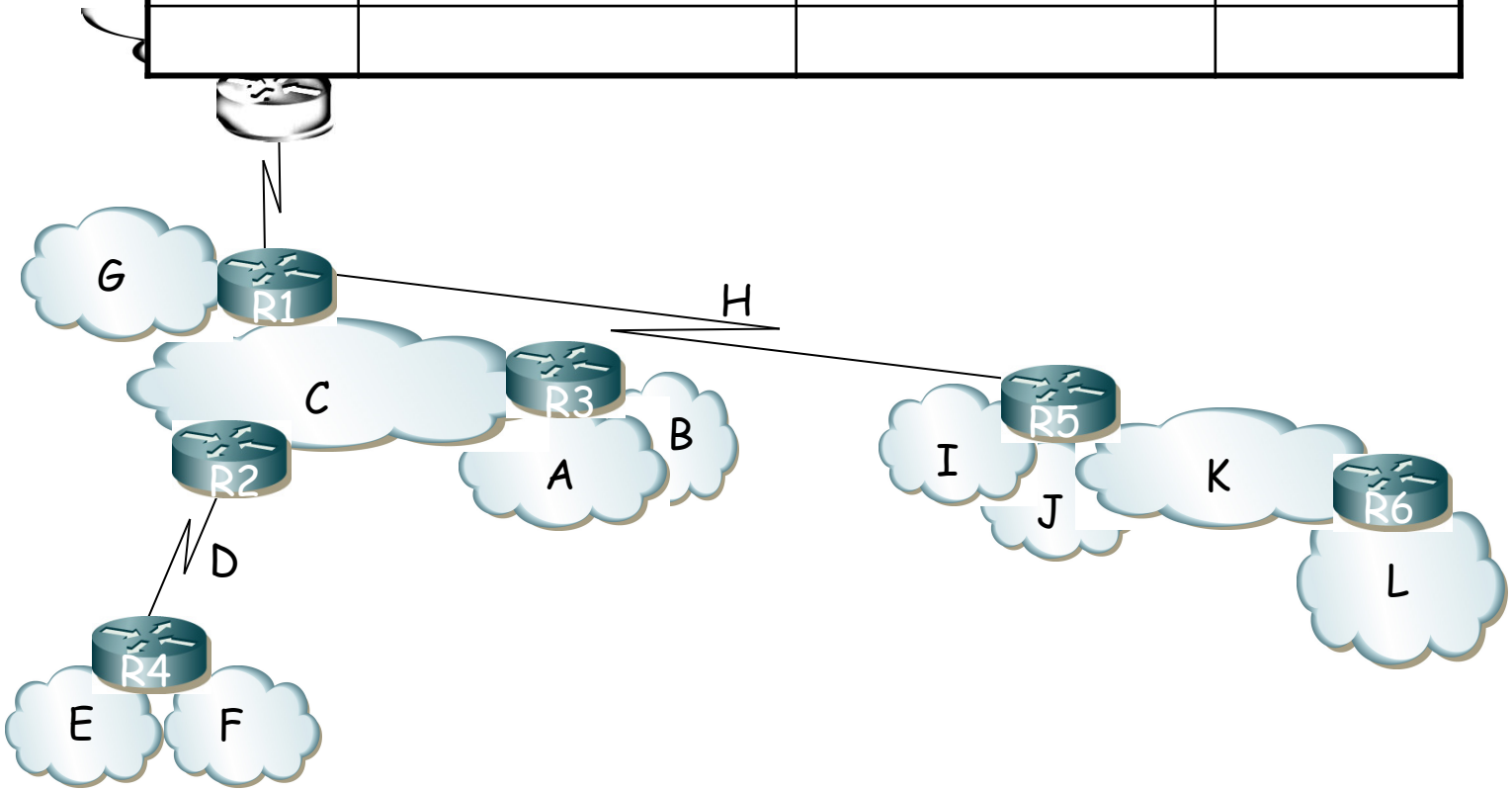
Destino		Next-hop	Interfaz



Ejemplo (4)

Tabla de rutas de R6:

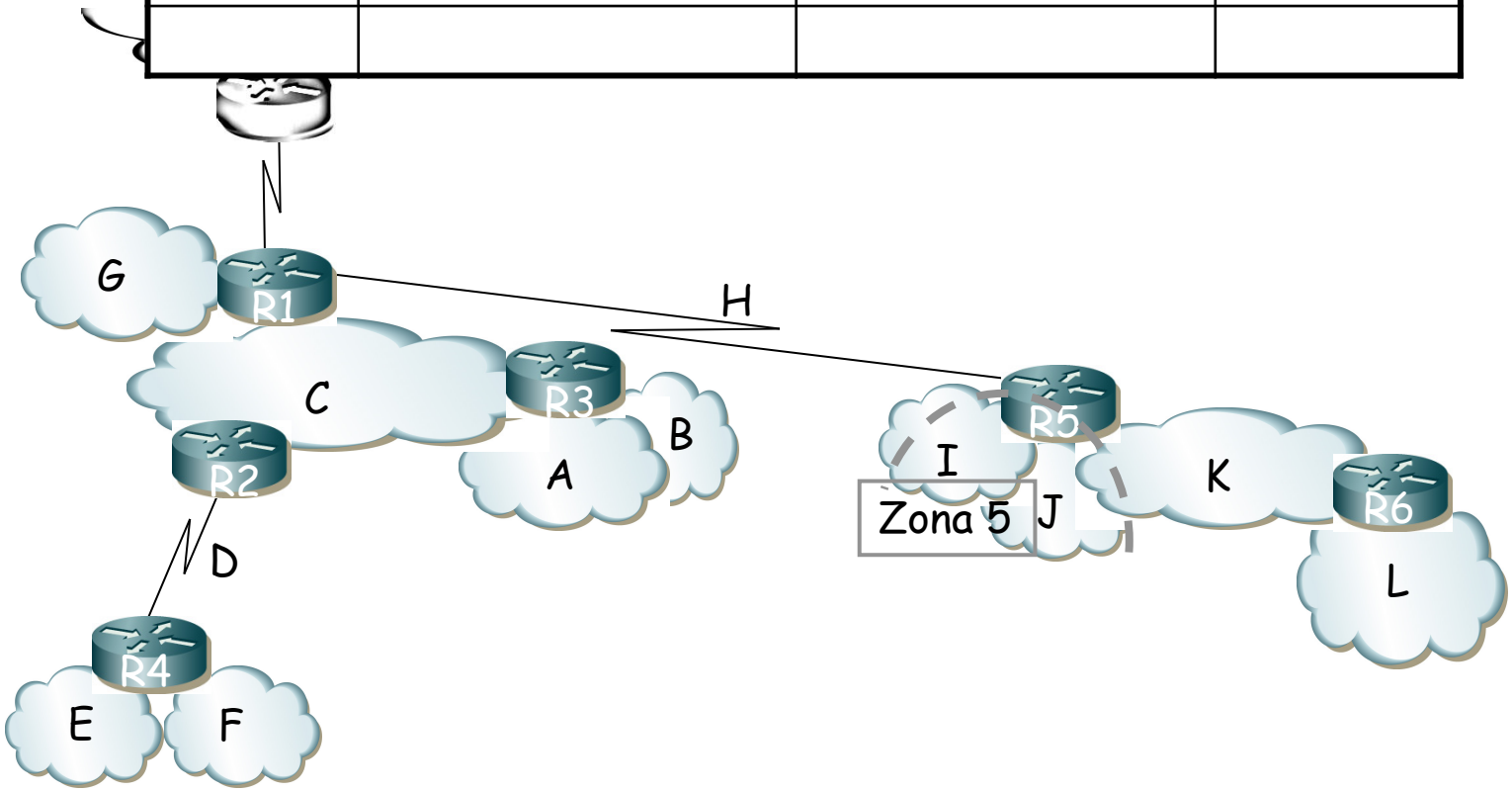
Destino		Next-hop	Interfaz
Red K	192.168.3.136 /28	(dir.connected)	ifR6RedK
Red L	192.168.3.152 /28	(dir.connected)	ifR6RedL



Ejemplo (4)

Tabla de rutas de R6:

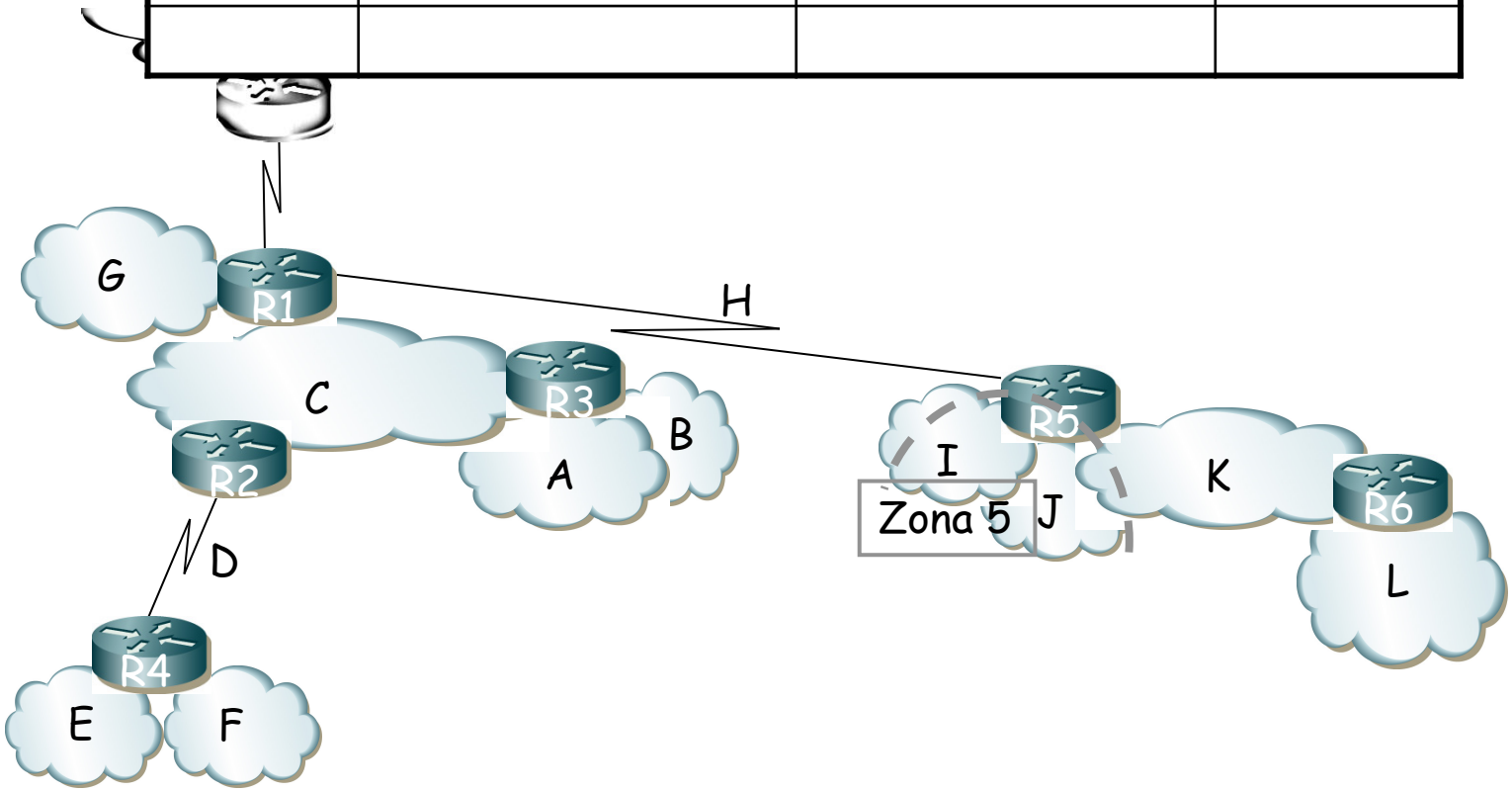
Destino		Next-hop	Interfaz
Red K	192.168.3.136 /28	(dir.connected)	ifR6RedK
Red L	192.168.3.152 /28	(dir.connected)	ifR6RedL
Zona 5	192.168.3.128 /27	IPR5ifRedK	ifR6RedK



Ejemplo (4)

Tabla de rutas de R6:

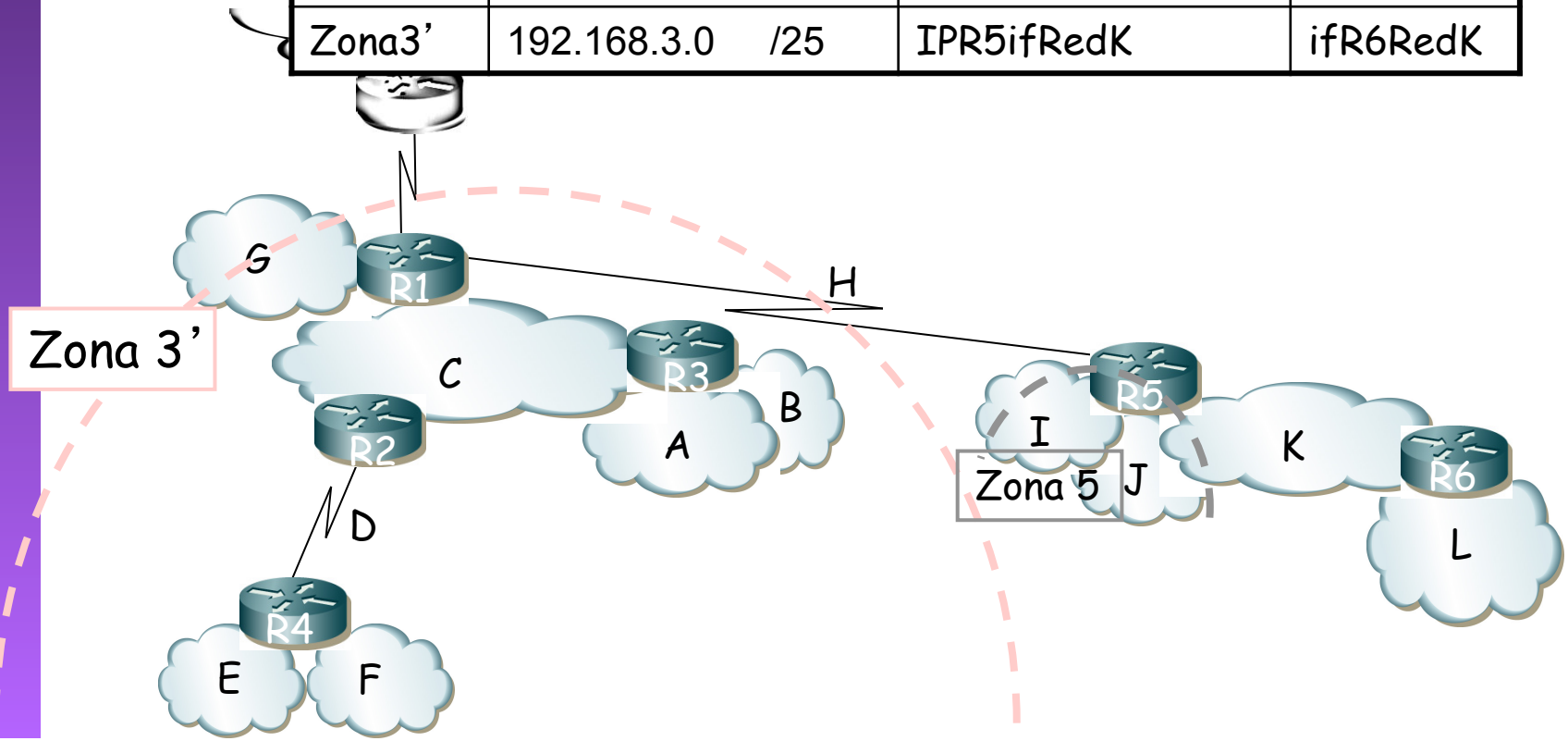
Destino		Next-hop	Interfaz
Red K	192.168.3.136 /28	(dir.connected)	ifR6RedK
Red L	192.168.3.152 /28	(dir.connected)	ifR6RedL
Zona 5	192.168.3.128 /27	IPR5ifRedK	ifR6RedK
Red H	192.168.3.192 /30	IPR5ifRedK	ifR6RedK



Ejemplo (4)

Tabla de rutas de R6:

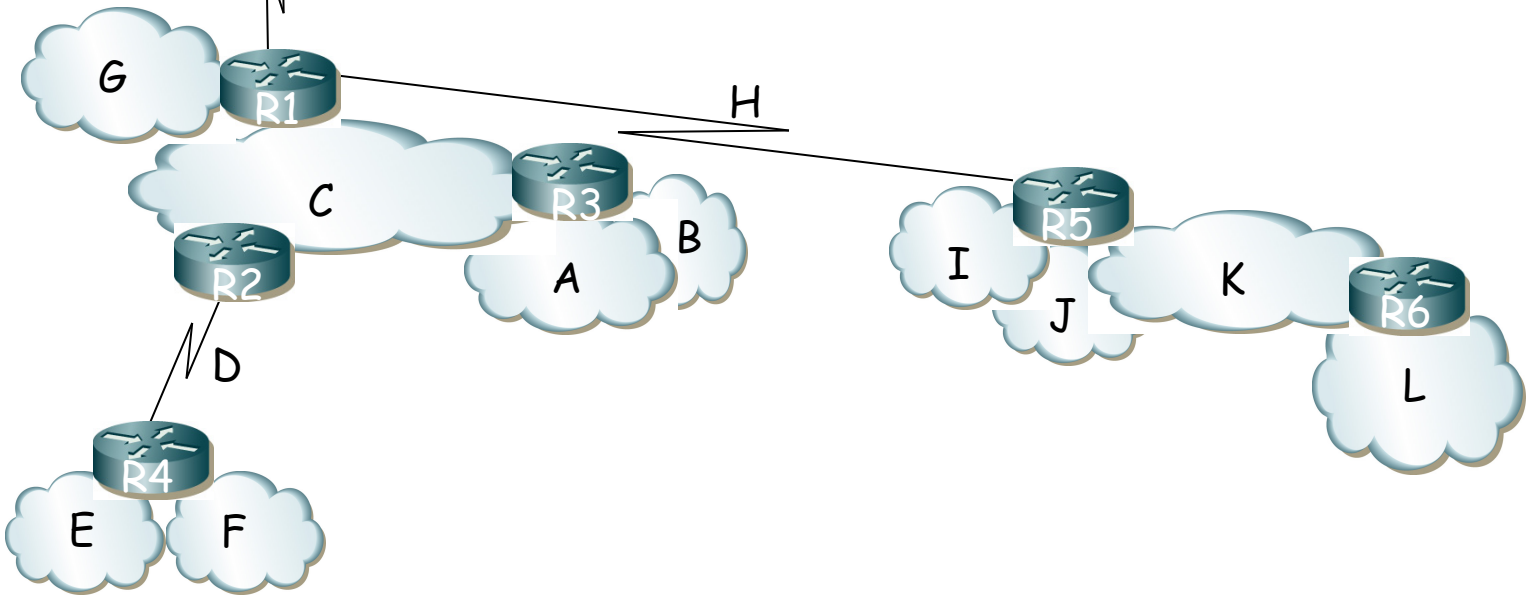
Destino		Next-hop	Interfaz
Red K	192.168.3.136 /28	(dir.connected)	ifR6RedK
Red L	192.168.3.152 /28	(dir.connected)	ifR6RedL
Zona 5	192.168.3.128 /27	IPR5ifRedK	ifR6RedK
Red H	192.168.3.192 /30	IPR5ifRedK	ifR6RedK
Zona3'	192.168.3.0 /25	IPR5ifRedK	ifR6RedK



Ejemplo (4)

Tabla de rutas de R3:

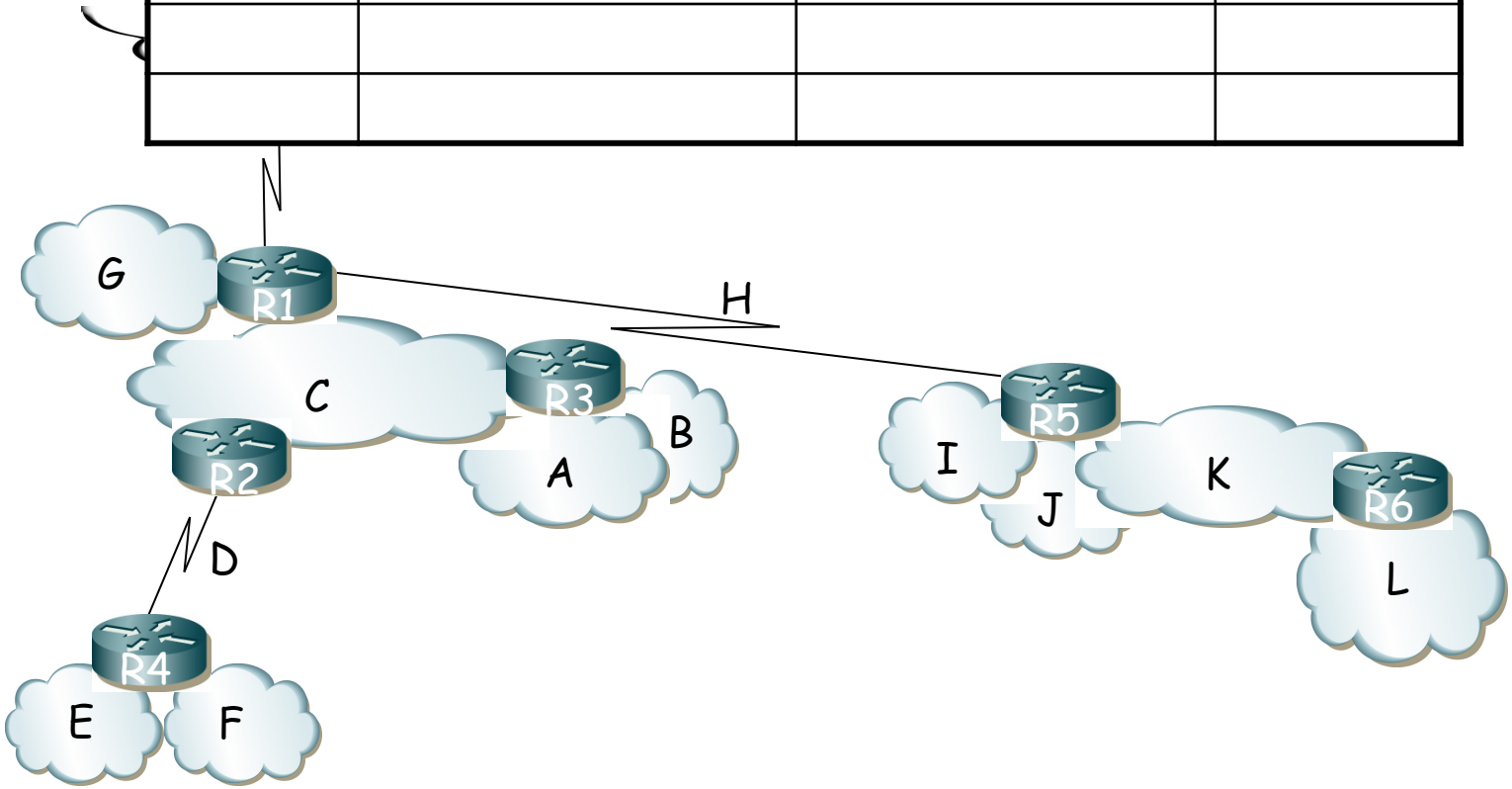
Destino		Next-hop	Interfaz



Ejemplo (4)

Tabla de rutas de R3:

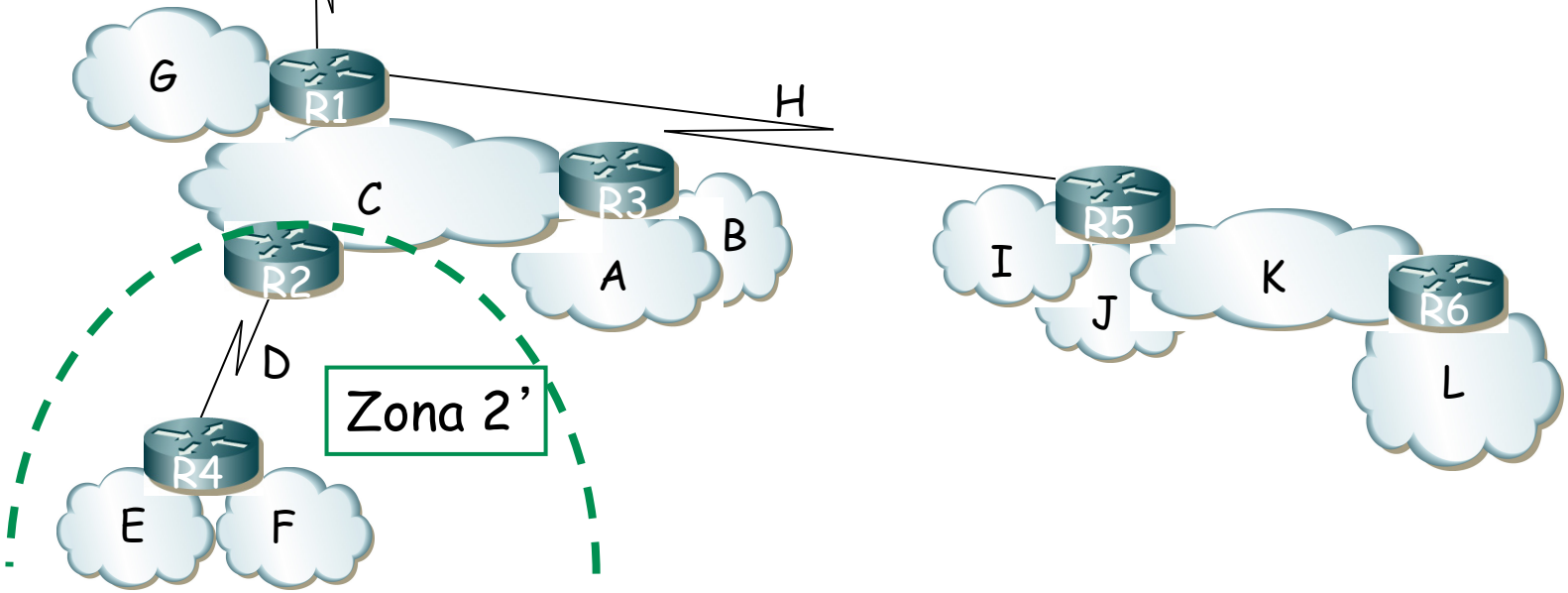
Destino		Next-hop	Interfaz
Red A	192.168.3.0 /28	(dir.connected)	ifR3RedA
Red B	192.168.3.16 /28	(dir.connected)	ifR3RedB
Red C	192.168.3.32 /28	(dir.connected)	ifR3RedC



Ejemplo (4)

Tabla de rutas de R3:

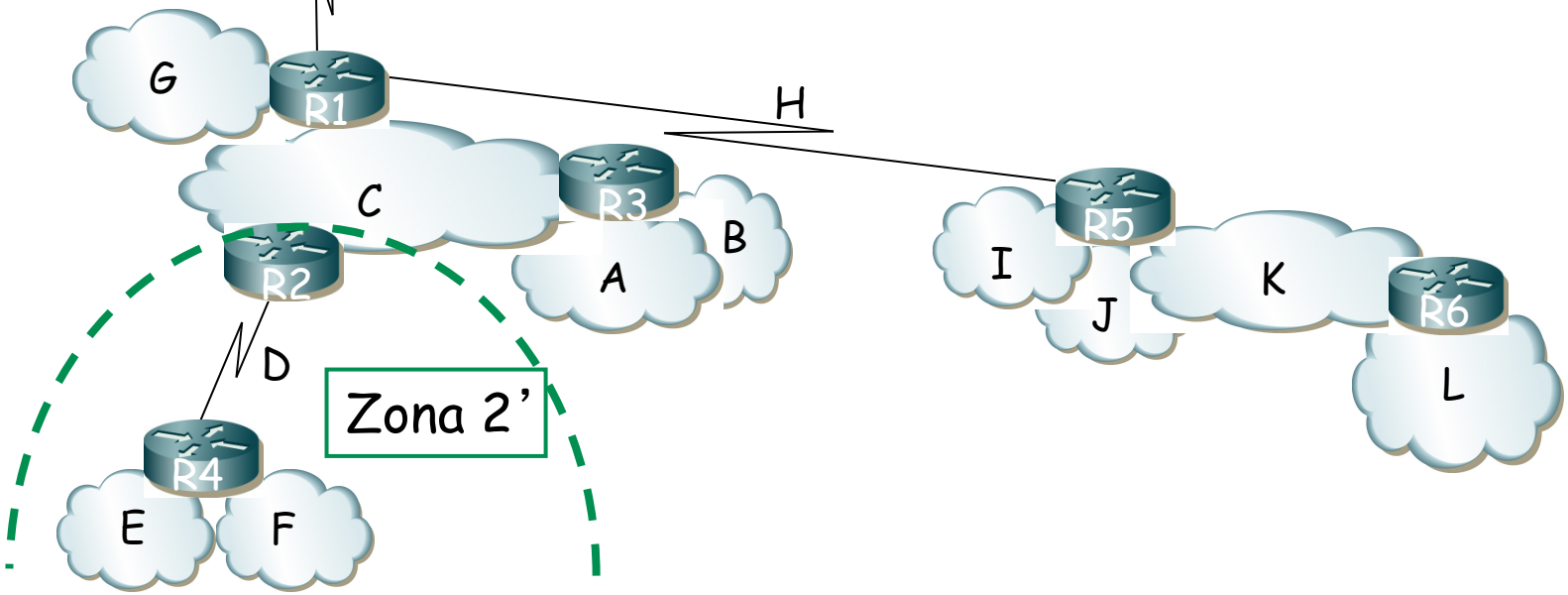
Destino		Next-hop	Interfaz
Red A	192.168.3.0 /28	(dir.connected)	ifR3RedA
Red B	192.168.3.16 /28	(dir.connected)	ifR3RedB
Red C	192.168.3.32 /28	(dir.connected)	ifR3RedC
Zona2'	192.168.3.64 /26	IPR2ifRedC	ifR3RedC



Ejemplo (4)

Tabla de rutas de R3:

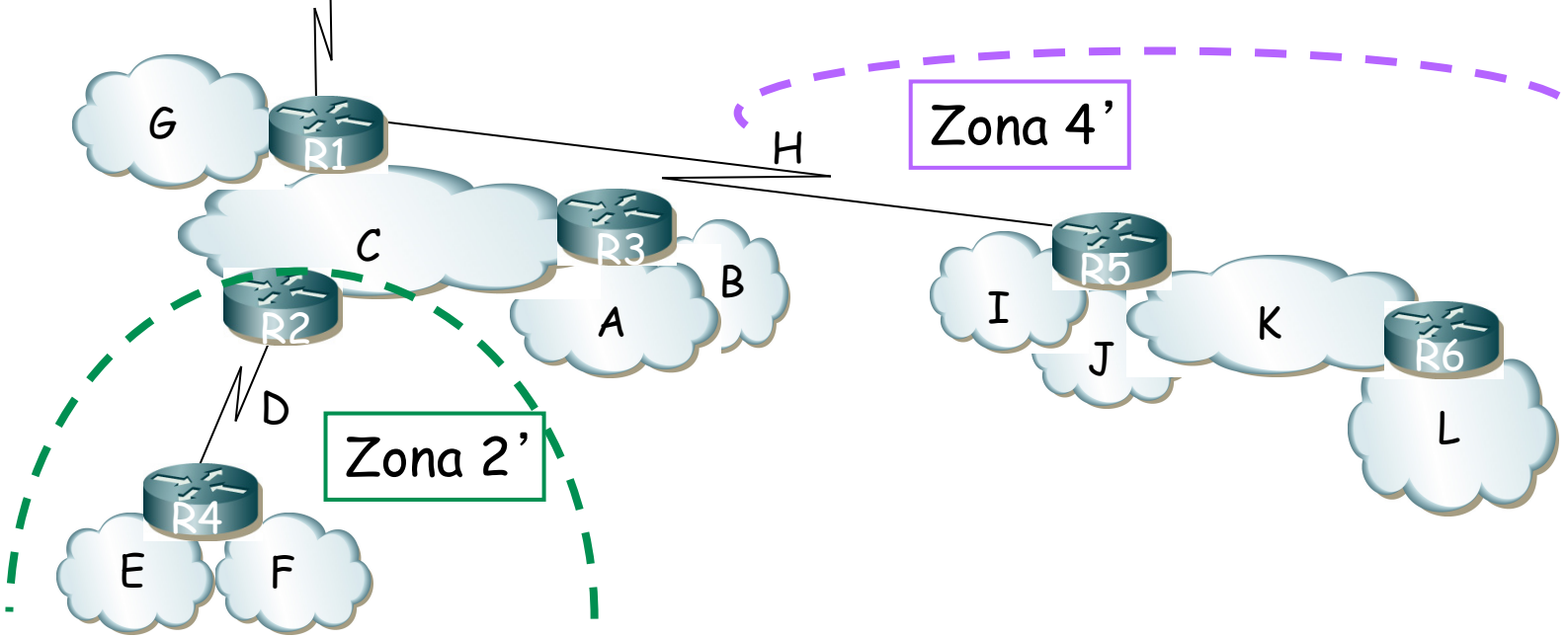
Destino		Next-hop	Interfaz
Red A	192.168.3.0 /28	(dir.connected)	ifR3RedA
Red B	192.168.3.16 /28	(dir.connected)	ifR3RedB
Red C	192.168.3.32 /28	(dir.connected)	ifR3RedC
Zona2'	192.168.3.64 /26	IPR2ifRedC	ifR3RedC
Red G	192.168.3.48 /28	IPR1ifRedC	ifR3RedC



Ejemplo (4)

Tabla de rutas de R3:

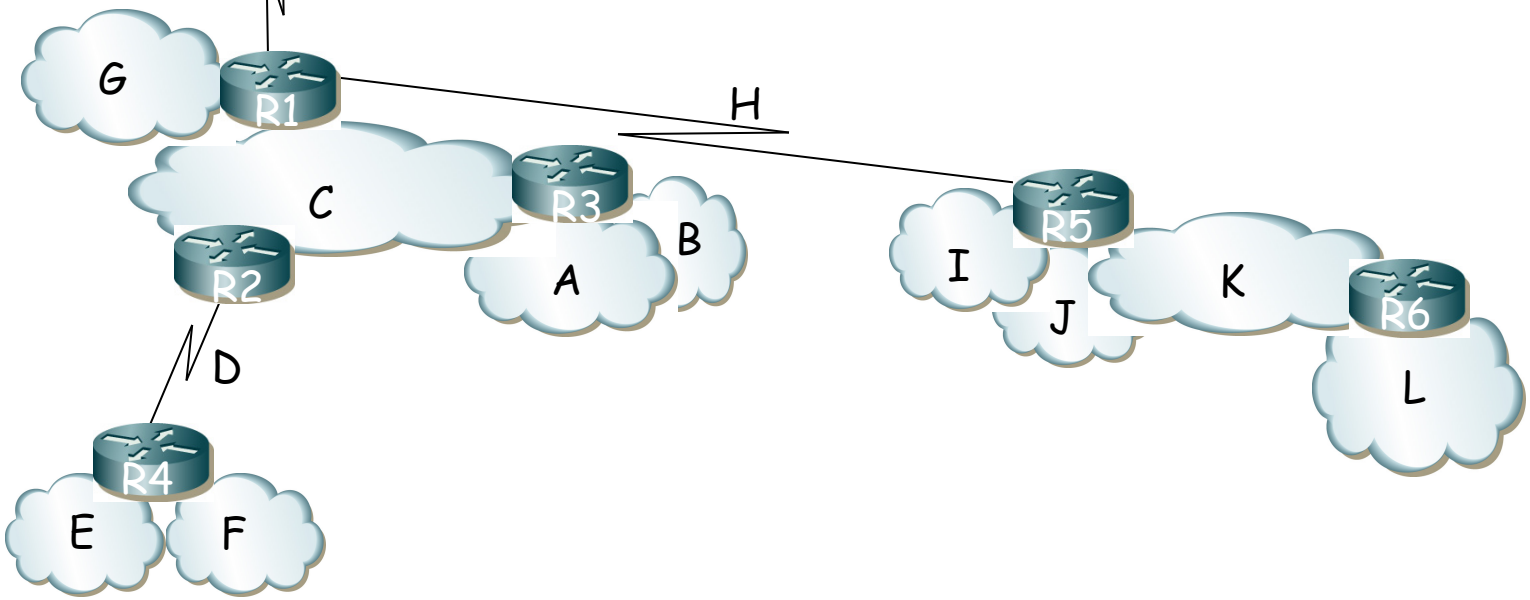
Destino		Next-hop	Interfaz
Red A	192.168.3.0 /28	(dir.connected)	ifR3RedA
Red B	192.168.3.16 /28	(dir.connected)	ifR3RedB
Red C	192.168.3.32 /28	(dir.connected)	ifR3RedC
Zona2'	192.168.3.64 /26	IPR2ifRedC	ifR3RedC
Red G	192.168.3.48 /28	IPR1ifRedC	ifR3RedC
Zona4'	192.168.3.128 /25	IPR1ifRedC	ifR3RedC



Ejemplo (4)

Tabla de rutas de R2:

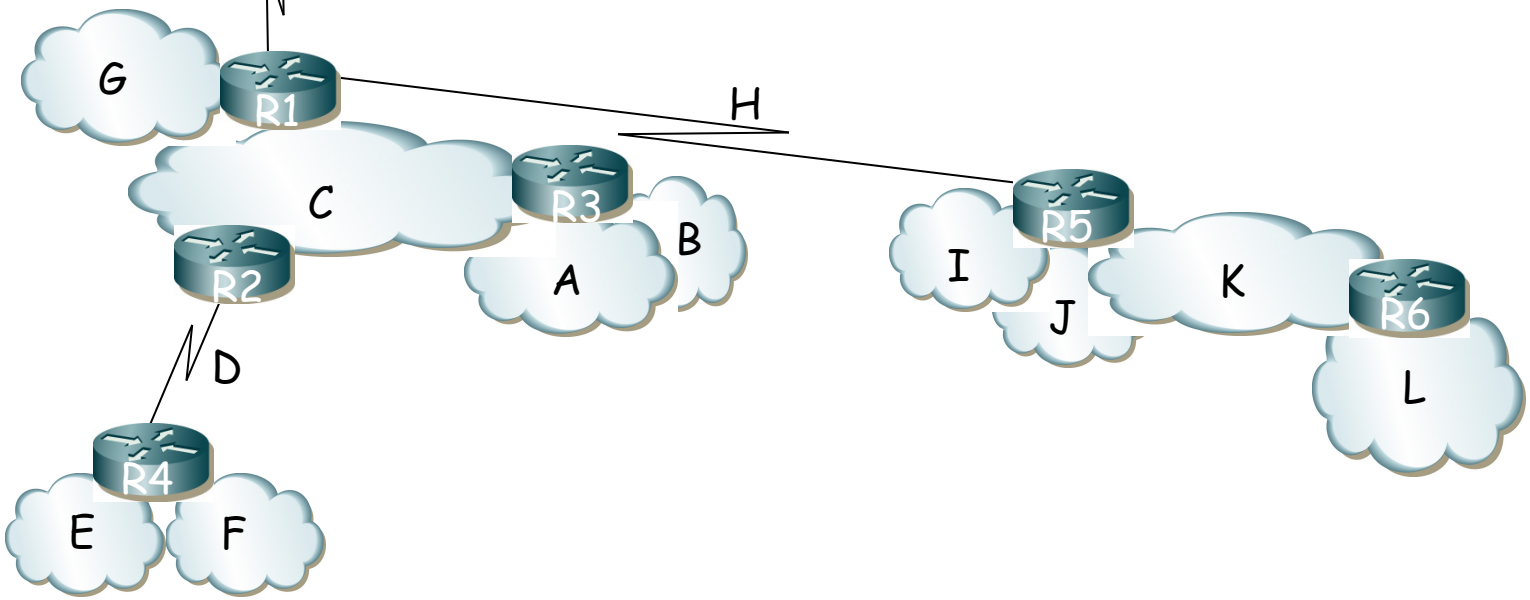
Destino		Next-hop	Interfaz



Ejemplo (4)

Tabla de rutas de R2:

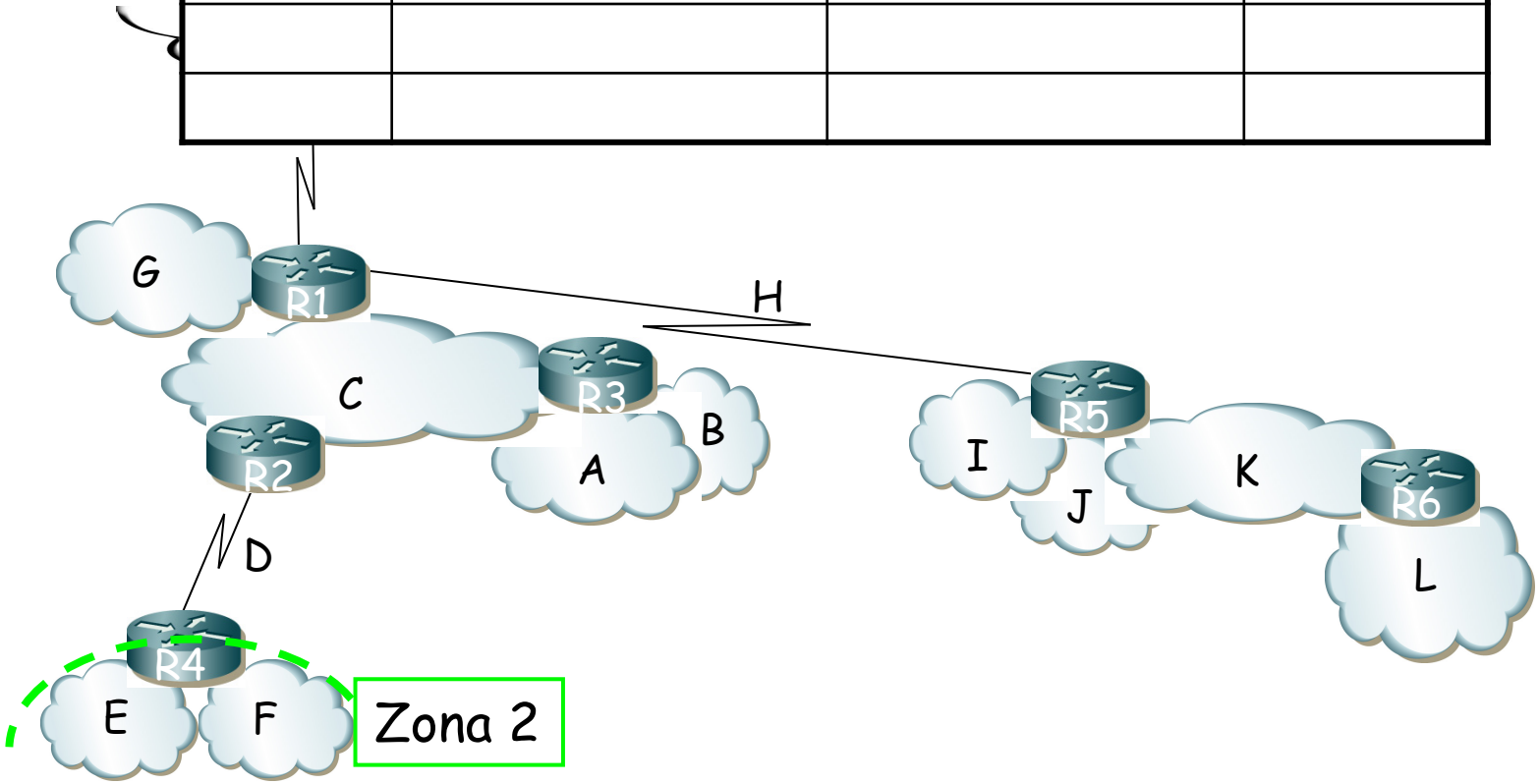
Destino		Next-hop	Interfaz
Red D	192.168.3.96 /30	(dir.connected)	ifR2RedD
Red C	192.168.3.32 /28	(dir.connected)	ifR2RedC



Ejemplo (4)

Tabla de rutas de R2:

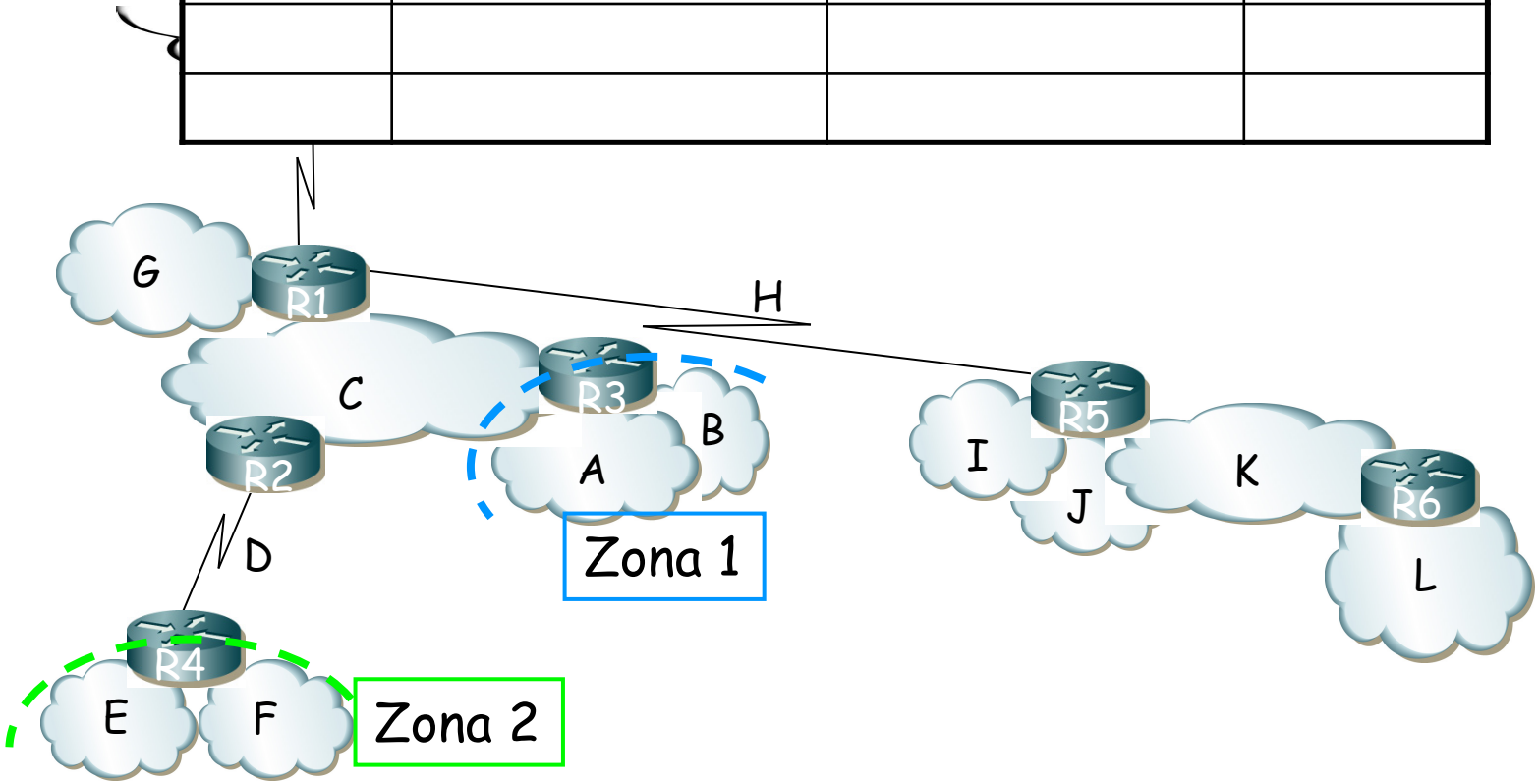
Destino		Next-hop	Interfaz
Red D	192.168.3.96 /30	(dir.connected)	ifR2RedD
Red C	192.168.3.32 /28	(dir.connected)	ifR2RedC
Zona 2	192.168.3.64 /27	IPR4ifRedD	ifR2RedD



Ejemplo (4)

Tabla de rutas de R2:

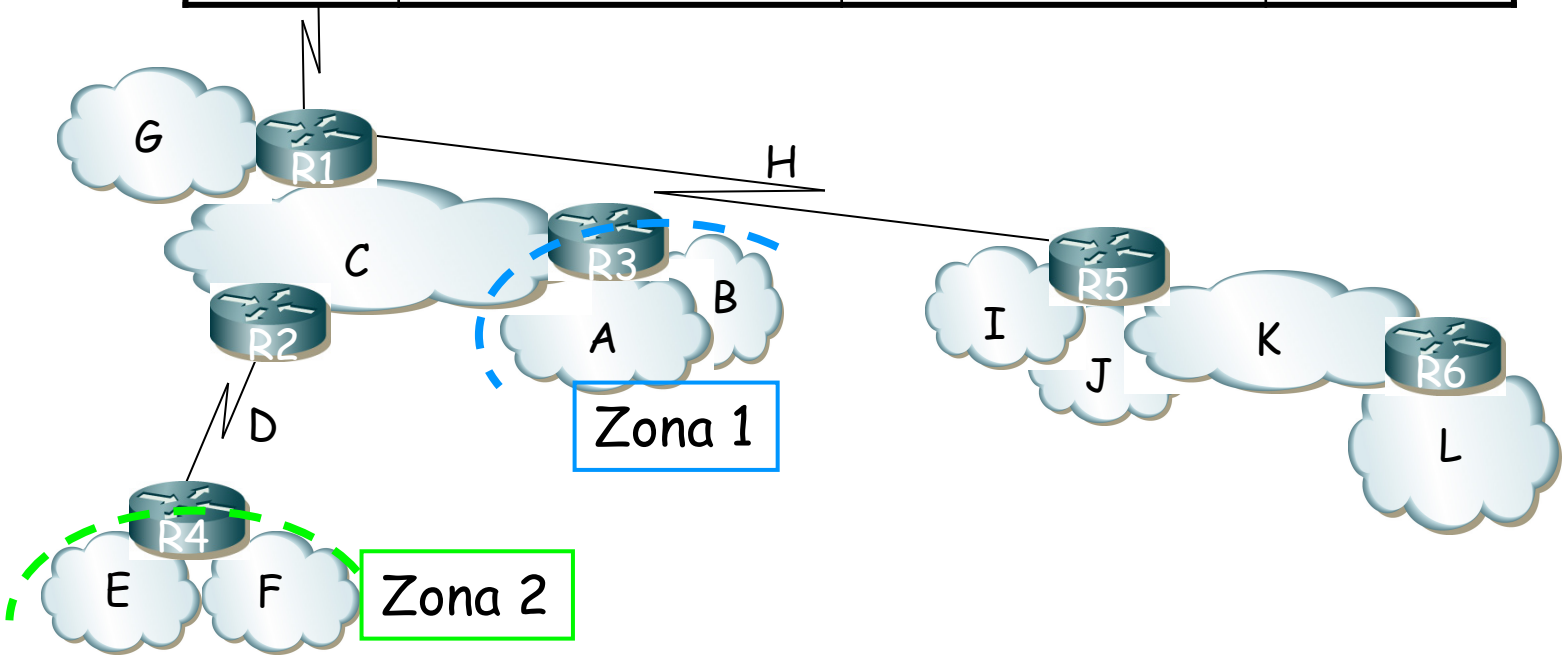
Destino		Next-hop	Interfaz
Red D	192.168.3.96 /30	(dir.connected)	ifR2RedD
Red C	192.168.3.32 /28	(dir.connected)	ifR2RedC
Zona 2	192.168.3.64 /27	IPR4ifRedD	ifR2RedD
Zona 1	192.168.3.0 /27	IPR3ifRedC	ifR2RedC



Ejemplo (4)

Tabla de rutas de R2:

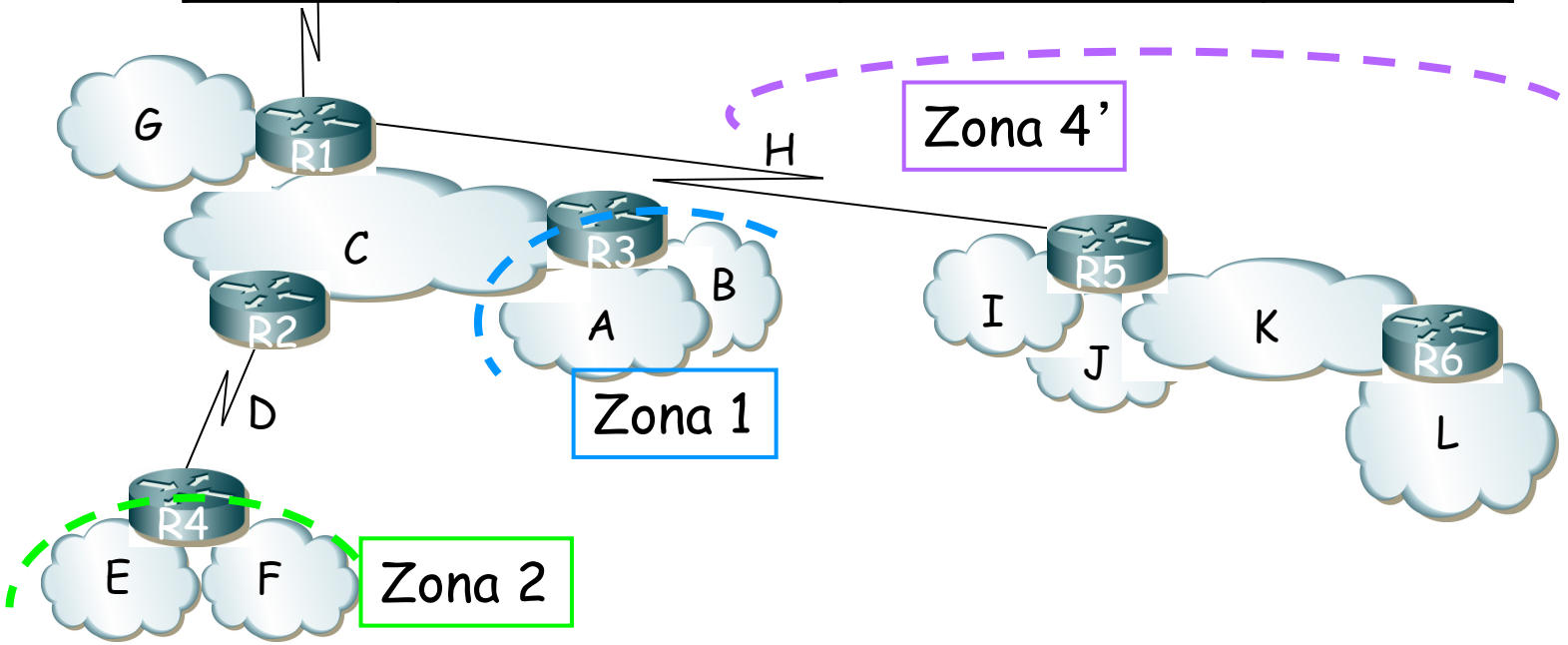
Destino		Next-hop	Interfaz
Red D	192.168.3.96 /30	(dir.connected)	ifR2RedD
Red C	192.168.3.32 /28	(dir.connected)	ifR2RedC
Zona 2	192.168.3.64 /27	IPR4ifRedD	ifR2RedD
Zona 1	192.168.3.0 /27	IPR3ifRedC	ifR2RedC
Red G	192.168.3.48 /28	IPR1ifRedC	ifR2RedC



Ejemplo (4)

Tabla de rutas de R2:

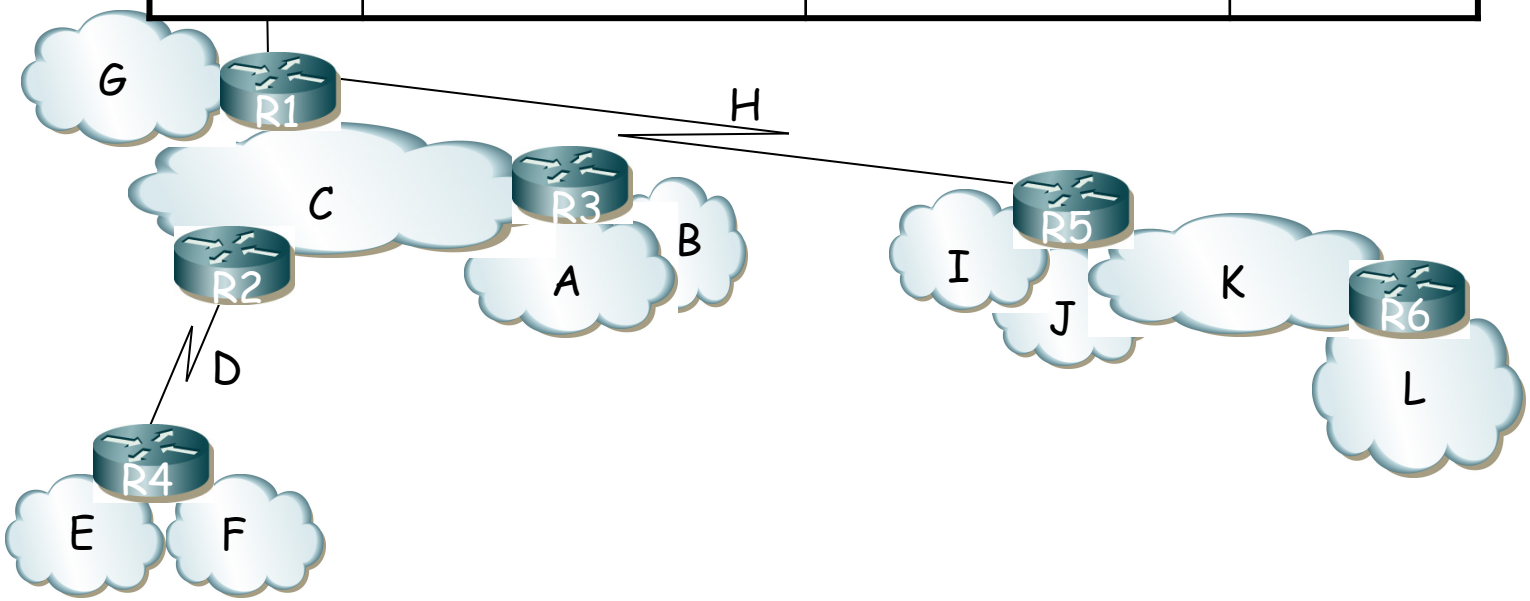
Destino		Next-hop	Interfaz
Red D	192.168.3.96 /30	(dir.connected)	ifR2RedD
Red C	192.168.3.32 /28	(dir.connected)	ifR2RedC
Zona 2	192.168.3.64 /27	IPR4ifRedD	ifR2RedD
Zona 1	192.168.3.0 /27	IPR3ifRedC	ifR2RedC
Red G	192.168.3.48 /28	IPR1ifRedC	ifR2RedC
Zona4'	192.168.3.128 /25	IPR1ifRedC	ifR2RedC



Ejemplo (4)

Tabla de rutas de R4:

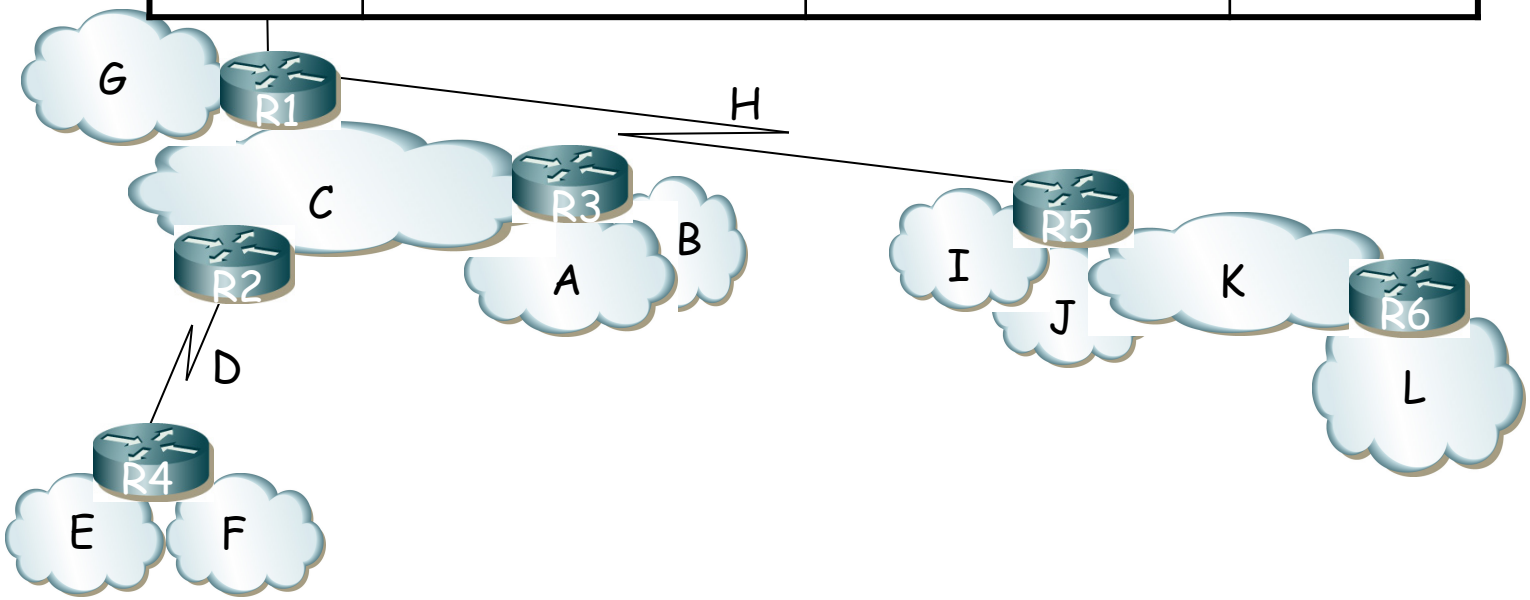
Destino		Next-hop	Interfaz



Ejemplo (4)

Tabla de rutas de R4:

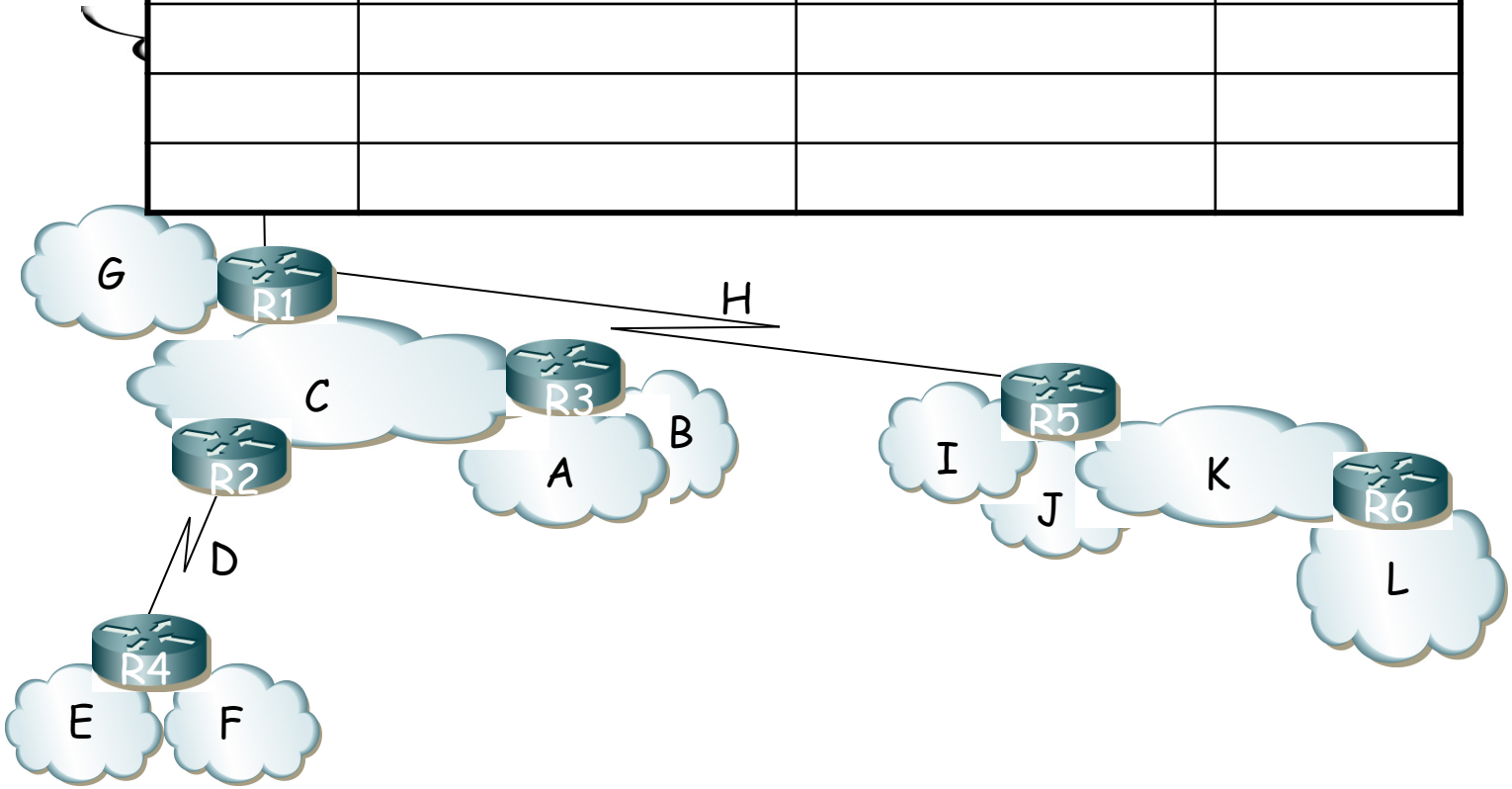
Destino		Next-hop	Interfaz
Red D	192.168.3.96 /30	(dir.connected)	ifR4RedD
Red E	192.168.3.64 /28	(dir.connected)	ifR4RedE
Red F	192.168.3.80 /28	(dir.connected)	ifR4RedF



Ejemplo (4)

Tabla de rutas de R4:

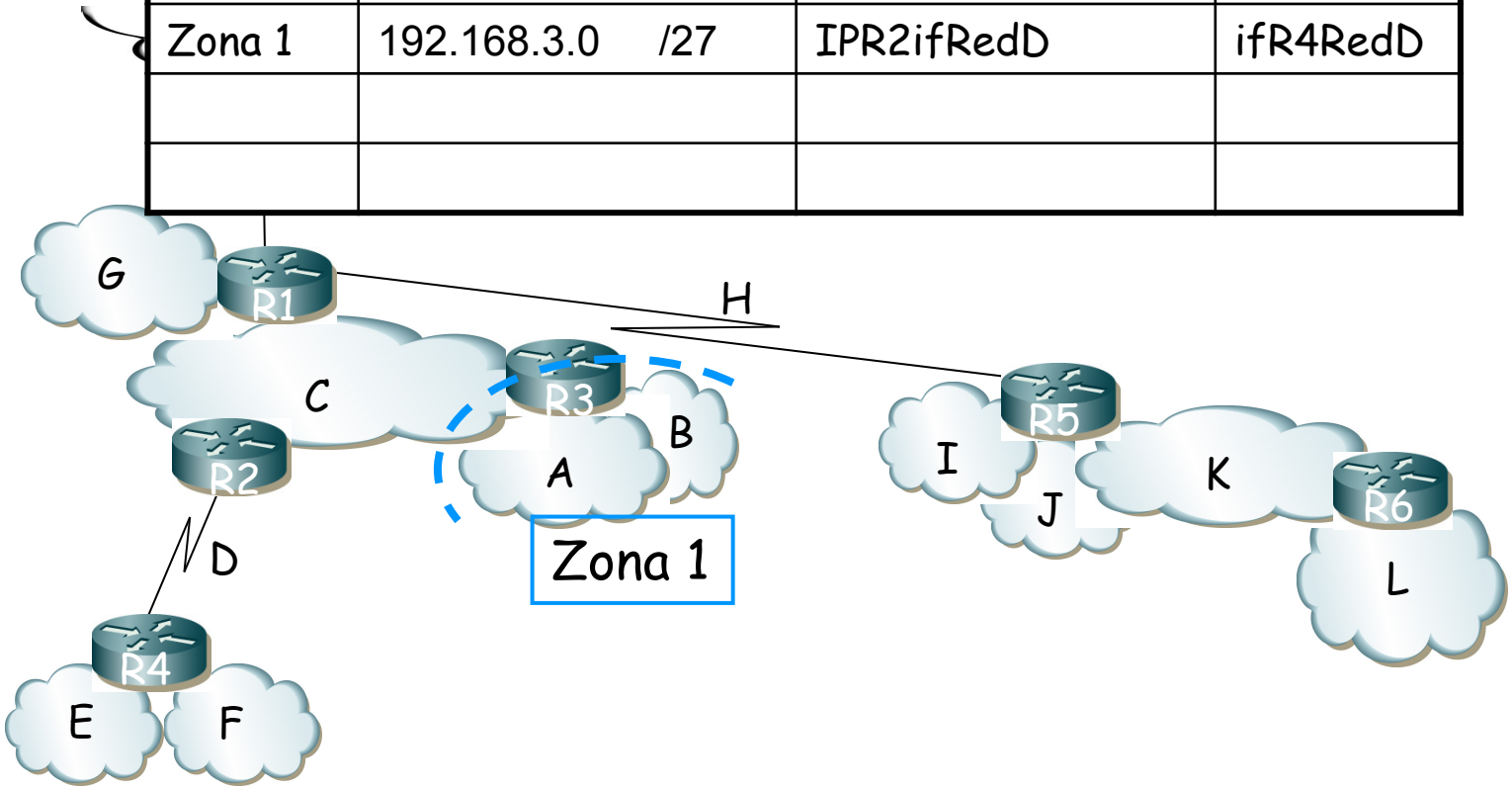
Destino		Next-hop	Interfaz
Red D	192.168.3.96 /30	(dir.connected)	ifR4RedD
Red E	192.168.3.64 /28	(dir.connected)	ifR4RedE
Red F	192.168.3.80 /28	(dir.connected)	ifR4RedF
Red C	192.168.3.32 /28	IPR2ifRedD	ifR4RedD



Ejemplo (4)

Tabla de rutas de R4:

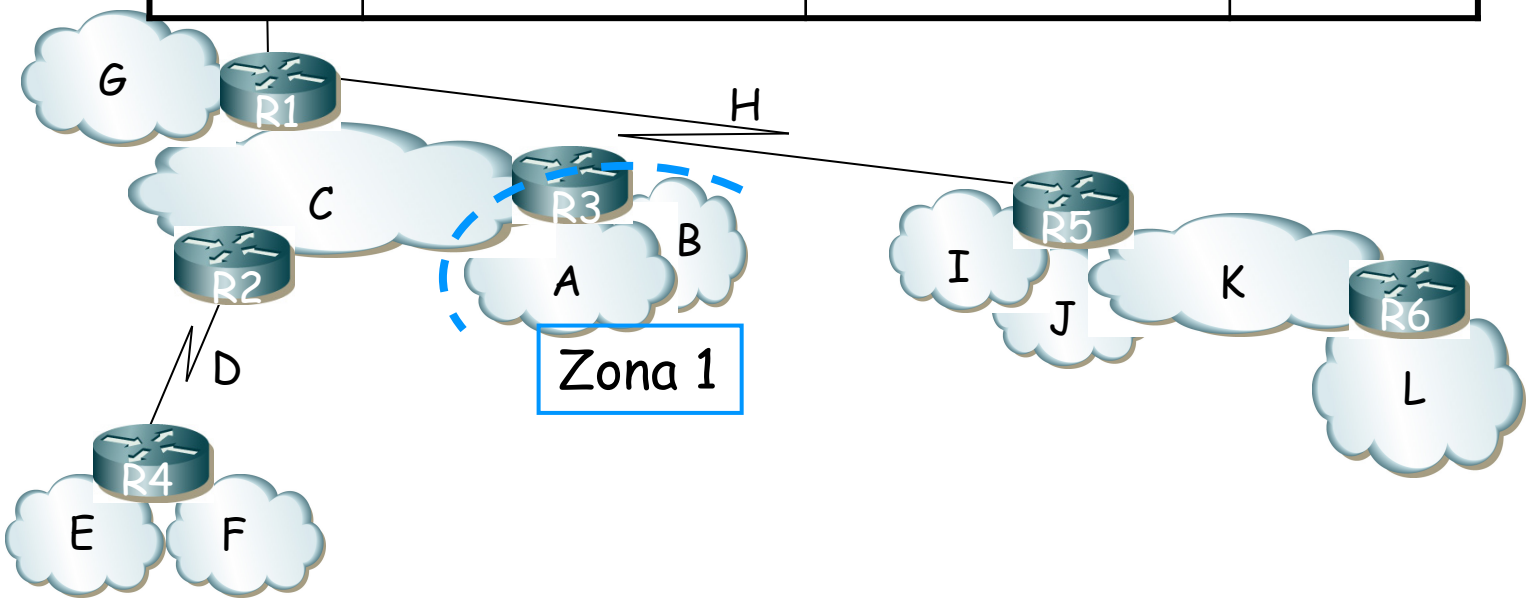
Destino		Next-hop	Interfaz
Red D	192.168.3.96 /30	(dir.connected)	ifR4RedD
Red E	192.168.3.64 /28	(dir.connected)	ifR4RedE
Red F	192.168.3.80 /28	(dir.connected)	ifR4RedF
Red C	192.168.3.32 /28	IPR2ifRedD	ifR4RedD
Zona 1	192.168.3.0 /27	IPR2ifRedD	ifR4RedD



Ejemplo (4)

Tabla de rutas de R4:

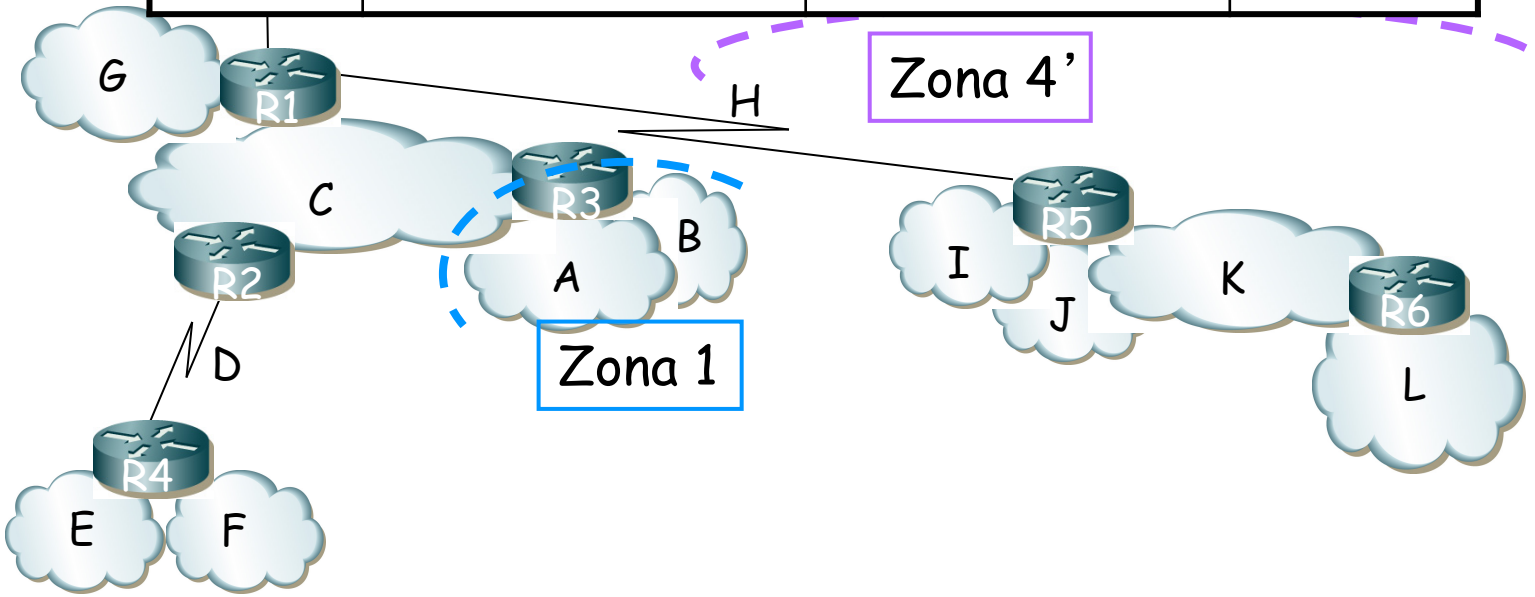
Destino		Next-hop	Interfaz
Red D	192.168.3.96 /30	(dir.connected)	ifR4RedD
Red E	192.168.3.64 /28	(dir.connected)	ifR4RedE
Red F	192.168.3.80 /28	(dir.connected)	ifR4RedF
Red C	192.168.3.32 /28	IPR2ifRedD	ifR4RedD
Zona 1	192.168.3.0 /27	IPR2ifRedD	ifR4RedD
Red G	192.168.3.48 /28	IPR2ifRedD	ifR4RedD



Ejemplo (4)

Tabla de rutas de R4:

Destino		Next-hop	Interfaz
Red D	192.168.3.96 /30	(dir.connected)	ifR4RedD
Red E	192.168.3.64 /28	(dir.connected)	ifR4RedE
Red F	192.168.3.80 /28	(dir.connected)	ifR4RedF
Red C	192.168.3.32 /28	IPR2ifRedD	ifR4RedD
Zona 1	192.168.3.0 /27	IPR2ifRedD	ifR4RedD
Red G	192.168.3.48 /28	IPR2ifRedD	ifR4RedD
Zona4 '	192.168.3.128 /25	IPR2ifRedD	ifR4RedD

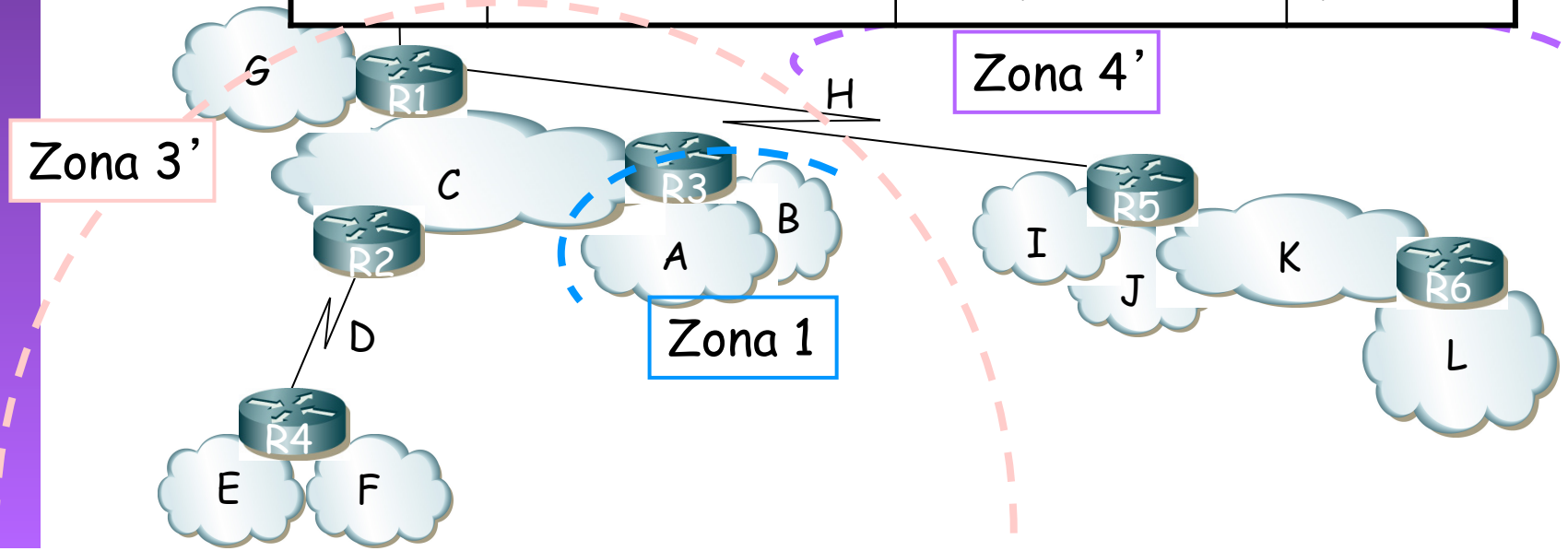


Ejemplo (4)

Mejora 1

Tabla de rutas de R4:

Destino		Next-hop	Interfaz
Red D	192.168.3.96 /30	(dir.connected)	ifR4RedD
Red E	192.168.3.64 /28	(dir.connected)	ifR4RedE
Red F	192.168.3.80 /28	(dir.connected)	ifR4RedF
Red C	192.168.3.32 /28	IPR2ifRedD	ifR4RedD
Zona 1	192.168.3.0 /27	IPR2ifRedD	ifR4RedD
Red G	192.168.3.48 /28	IPR2ifRedD	ifR4RedD
Zona4'	192.168.3.128 /25	IPR2ifRedD	ifR4RedD

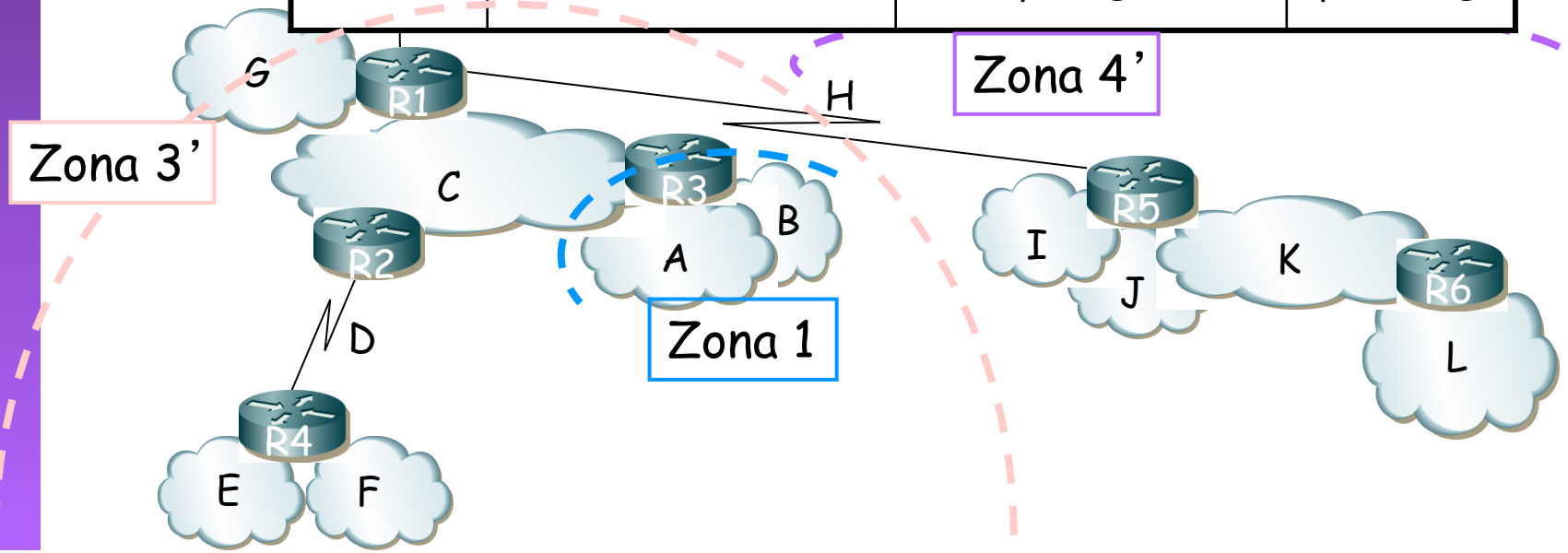


Ejemplo (4)

Mejora 1

Tabla de rutas de R4:

Destino		Next-hop	Interfaz
Red D	192.168.3.96 /30	(dir.connected)	ifR4RedD
Red E	192.168.3.64 /28	(dir.connected)	ifR4RedE
Red F	192.168.3.80 /28	(dir.connected)	ifR4RedF
Zona3'	192.168.3.0 /25	IPR2ifRedD	ifR4RedD
Zona4'	192.168.3.128 /25	IPR2ifRedD	ifR4RedD

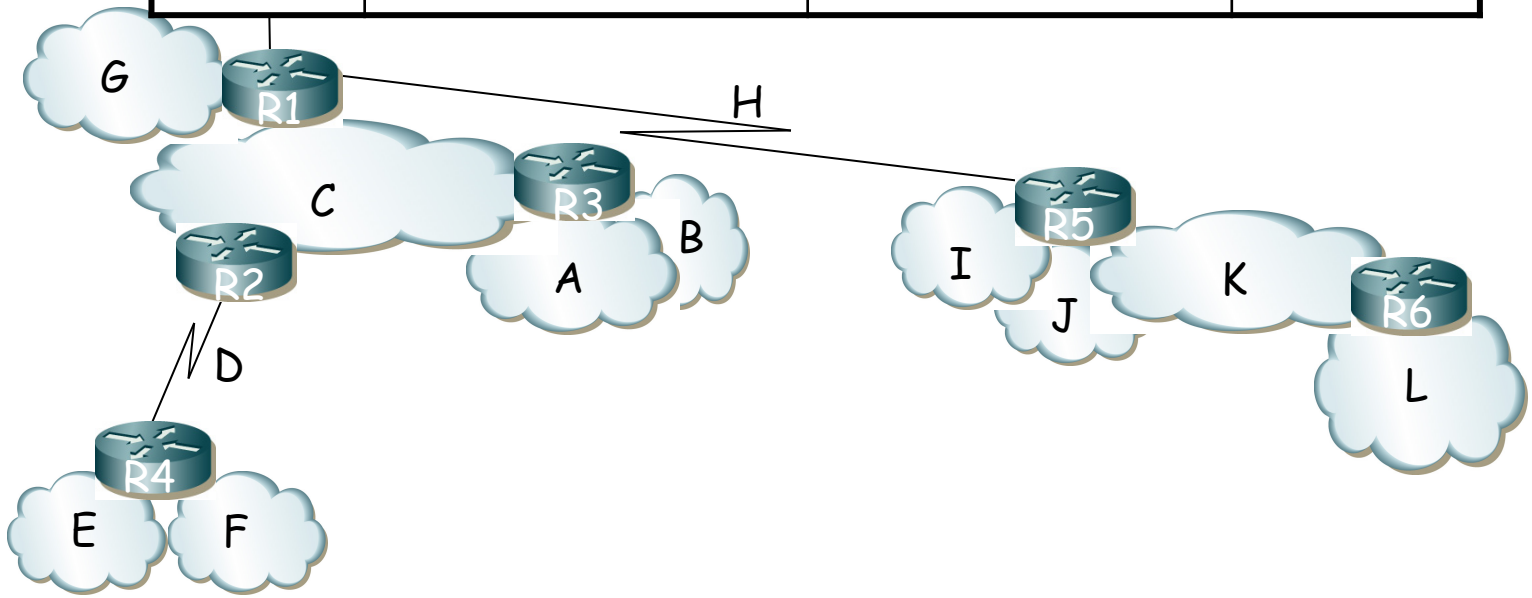


Ejemplo (4)

Mejora 2

Tabla de rutas de R4:

Destino		Next-hop	Interfaz
Red D	192.168.3.96 /30	(dir.connected)	ifR4RedD
Red E	192.168.3.64 /28	(dir.connected)	ifR4RedE
Red F	192.168.3.80 /28	(dir.connected)	ifR4RedF
Red	192.168.3.0 /24	IPR2ifRedD	ifR4RedD

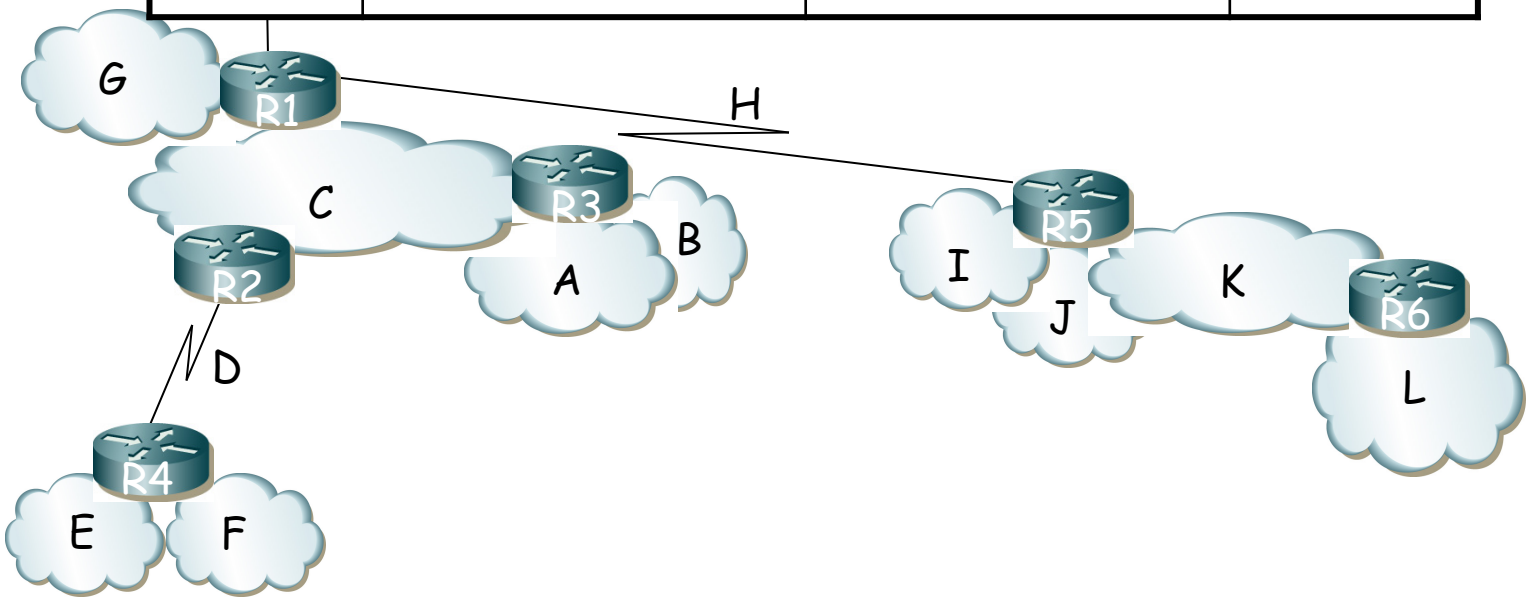


Ejemplo (4)

Mejora 3

Tabla de rutas de R4:

Destino			Next-hop	Interfaz
Red D	192.168.3.96	/30	(dir.connected)	ifR4RedD
Red E	192.168.3.64	/28	(dir.connected)	ifR4RedE
Red F	192.168.3.80	/28	(dir.connected)	ifR4RedF
(def.)	0.0.0.0	/0	IPR2ifRedD	ifR4RedD



CIDR

Permite:

- Asignar **redes más ajustadas** al tamaño necesario
- Bloque puede estar en cualquier rango disponible (**ignora clases**)

Necesita:

- Rutas deben emplear máscara
- El protocolo de enrutamiento debe transportar las máscaras
- Debería hacerse un reparto manteniendo jerarquía

Regional Internet Registries (RIR):

- RIPE NCC (www.ripe.net)
  Europa, Oriente Medio, Asia Central, África norecuatorial
- ARIN (www.arin.net)
  América, parte del Caribe y África subecuatorial
- APNIC (www.apnic.net)
  Asia y Pacífico
- LACNIC (www.lacnic.net)
  América Latina y Caribe

Resumen

- Más flexibilidad en el tamaño de las redes empleando la máscara de subred
- Asignar espacios de direcciones más ajustados a las necesidades
- CIDR ignora el significado de las clases A, B y C
- Resumir varias rutas en una sola siempre que tengan un prefijo común
- Reducir con ello los tamaños de las tablas de rutas