

RC2 Resumos dos Guiões 4 – 6

Guião 4

1.2

- show interface Tunnel 0

```
R1#show interface Tunnel 0
Tunnel0 is up, line protocol is up
  Hardware is Tunnel
  MTU 17920 bytes, BW 100 Kbit/sec, DLY 50000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation TUNNEL, loopback not set
  Keepalive not set
  Tunnel source 200.1.1.1, destination 200.2.2.2
  Tunnel protocol/transport IP/IP
  Tunnel TTL 255, Fast tunneling enabled
  Tunnel transport MTU 1480 bytes
  Tunnel transmit bandwidth 8000 (kbps)
  Tunnel receive bandwidth 8000 (kbps)
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/0 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    0 packets input, 0 bytes, 0 no buffer
    Received 0 broadcasts (0 IP multicasts)
    0 runs, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    0 packets output, 0 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 unknown protocol drops
    0 output buffer failures, 0 output buffers swapped out
```

```
R2#show interface Tunnel 0
Tunnel0 is up, line protocol is up
  Hardware is Tunnel
  MTU 17920 bytes, BW 100 Kbit/sec, DLY 50000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation TUNNEL, loopback not set
  Keepalive not set
  Tunnel source 200.2.2.2, destination 200.1.1.1
  Tunnel protocol/transport IP/IP
  Tunnel TTL 255, Fast tunneling enabled
  Tunnel transport MTU 1480 bytes
  Tunnel transmit bandwidth 8000 (kbps)
  Tunnel receive bandwidth 8000 (kbps)
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/0 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    0 packets input, 0 bytes, 0 no buffer
    Received 0 broadcasts (0 IP multicasts)
    0 runs, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    0 packets output, 0 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 unknown protocol drops
    0 output buffer failures, 0 output buffers swapped out
```

- show ip route (?)

```

192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.1.0/24 is directly connected, FastEthernet0/1
L    192.168.1.1/32 is directly connected, FastEthernet0/1
O    192.168.2.0/24 [110/3] via 200.1.1.10, 00:05:44, FastEthernet0/0
O    192.168.10.0/24 [110/2] via 200.1.1.10, 00:05:44, FastEthernet0/0
200.1.1.0/24 is variably subnetted, 2 subnets, 2 masks
C    200.1.1.0/24 is directly connected, FastEthernet0/0
L    200.1.1.1/32 is directly connected, FastEthernet0/0
O    200.2.2.0/24 [110/2] via 200.1.1.10, 00:05:44, FastEthernet0/0
R1#
```

Esta Routing Table não mostra a static route do tunnel, pois o tunnel não possui uma network associada ainda.

1.3

- show ip route

```

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    10.1.1.0/30 is directly connected, Tunnel0
L    10.1.1.1/32 is directly connected, Tunnel0
192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.1.0/24 is directly connected, FastEthernet0/1
L    192.168.1.1/32 is directly connected, FastEthernet0/1
S    192.168.2.0/24 is directly connected, Tunnel0
O    192.168.10.0/24 [110/2] via 200.1.1.10, 00:42:22, FastEthernet0/0
200.1.1.0/24 is variably subnetted, 2 subnets, 2 masks
C    200.1.1.0/24 is directly connected, FastEthernet0/0
L    200.1.1.1/32 is directly connected, FastEthernet0/0
O    200.2.2.0/24 [110/2] via 200.1.1.10, 00:42:22, FastEthernet0/0
R1#
```

A static route do Tunnel já é mostrada na routing table.

Uma VTI requer: um identificador numérico (entre 0 a 2147483647), um IP address acumulado (permite com que o Tunnel apareça na routing table), um tipo de Tunnel, o Tunnel source e destination.

O GRE header identifica o tipo de encapsulamento usado no pacote e outras informações.

1.6

```
10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C   10.1.1.0/30 is directly connected, Tunnel0
L   10.1.1.2/32 is directly connected, Tunnel0
S   192.168.1.0/24 is directly connected, Tunnel0
    192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.168.2.0/24 is directly connected, FastEthernet0/1
L   192.168.2.2/32 is directly connected, FastEthernet0/1
S   192.168.10.0/24 is directly connected, Tunnel0
O   200.1.1.0/24 [110/2] via 200.2.2.10, 01:10:27, FastEthernet0/0
    200.2.2.0/24 is variably subnetted, 2 subnets, 2 masks
C   200.2.2.0/24 is directly connected, FastEthernet0/0
L   200.2.2.2/32 is directly connected, FastEthernet0/0
R2#
```

183	294.466425	192.168.2.100	192.168.10.100	ICMP	122 Echo (ping) request	id=0x3fb0, seq=5/1280, ttl=63 (no response found!)
184	294.481793	192.168.2.100	192.168.10.100	ICMP	98 Echo (ping) request	id=0x3fb0, seq=5/1280, ttl=62 (no response found!)

- Primeiro Pacote:

- > Frame 183: 122 bytes on wire (976 bits), 122 bytes captured (976 bits) on interface -, id 0
- > Ethernet II, Src: ca:03:4f:40:00:08 (ca:03:4f:40:00:08), Dst: ca:01:23:3c:00:08 (ca:01:23:3c:00:08)
- > Internet Protocol Version 4, Src: 200.2.2.2, Dst: 200.1.1.1
- > Generic Routing Encapsulation (IP)
- > Internet Protocol Version 4, Src: 192.168.2.100, Dst: 192.168.10.100
- > Internet Control Message Protocol

- Segundo Pacote:

- > Frame 184: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0
- > Ethernet II, Src: ca:01:23:3c:00:08 (ca:01:23:3c:00:08), Dst: ca:03:4f:40:00:08 (ca:03:4f:40:00:08)
- > Internet Protocol Version 4, Src: 192.168.2.100, Dst: 192.168.10.100
- > Internet Control Message Protocol

2.1. Sem conexão.

2.2. Com conexão, mesmo com o IPv6 no RA desligado, R1 consegue conectar R2 com o IPv6 através do Tunnel.

2.3

```
23 20.886498 2001::1 2001::2 ICMPv6 138 Echo (ping) request id=0x22c0, seq=4, hop limit=64 (reply in 24)
- 24 20.931580 2001::2 2001::1 ICMPv6 138 Echo (ping) reply id=0x22c0, seq=4, hop limit=64 (request in 23)
> Frame 15: 138 bytes on wire (1104 bits), 138 bytes captured (1104 bits) on interface -, id 0
> Ethernet II, Src: ca:01:23:3c:00:08 (ca:01:23:3c:00:08), Dst: ca:03:4f:40:00:08 (ca:03:4f:40:00:08)
v Internet Protocol Version 4, Src: 200.1.1.1, Dst: 200.2.2.2
  0100 .... = Version: 4
  .... 0101 = Header Length: 20 bytes (5)
  > Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
  Total Length: 124
  Identification: 0x0053 (83)
  > 000. .... = Flags: 0x0
  ...0 0000 0000 0000 = Fragment Offset: 0
  Time to Live: 255
  Protocol: Generic Routing Encapsulation (47)
  Header Checksum: 0x27f9 [validation disabled]
  [Header checksum status: Unverified]
  Source Address: 200.1.1.1
  Destination Address: 200.2.2.2
v Generic Routing Encapsulation (IPv6)
  > Flags and Version: 0x0000
  Protocol Type: IPv6 (0x86dd)
> Internet Protocol Version 6, Src: 2001::1, Dst: 2001::2
> Internet Control Message Protocol v6
```

2.4

13	8.595052	2001:1:1::100	2001:2:2::100	ICMPv6	142 Echo (ping) request id=0x4ae2, seq=5, hop limit=63 (reply in 14)
14	8.655655	2001:2:2::100	2001:1:1::100	ICMPv6	142 Echo (ping) reply id=0x4ae2, seq=5, hop limit=61 (request in 13)
> Frame 13: 142 bytes on wire (1136 bits), 142 bytes captured (1136 bits) on interface -, id 0					
> Ethernet II, Src: ca:01:23:3c:00:08 (ca:01:23:3c:00:08), Dst: ca:03:4f:40:00:08 (ca:03:4f:40:00:08)					
v Internet Protocol Version 4, Src: 200.1.1.1, Dst: 200.2.2.2					
0100 = Version: 4					
.... 0101 = Header Length: 20 bytes (5)					
> Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)					
Total Length: 128					
Identification: 0x005d (93)					
> 000. = Flags: 0x0					
...0 0000 0000 0000 = Fragment Offset: 0					
Time to Live: 255					
Protocol: Generic Routing Encapsulation (47)					
Header Checksum: 0x27eb [validation disabled]					
[Header checksum status: Unverified]					
Source Address: 200.1.1.1					
Destination Address: 200.2.2.2					
v Generic Routing Encapsulation (IPv6)					
> Flags and Version: 0x0000					
Protocol Type: IPv6 (0x86dd)					
> Internet Protocol Version 6, Src: 2001:1:1::100, Dst: 2001:2:2::100					
> Internet Control Message Protocol v6					

2.5

26	31.358982	2001:a::2	2001:a::1	ICMPv6	134 Echo (ping) request id=0x0d52, seq=4, hop limit=64 (reply in 27)
27	31.374050	2001:a::1	2001:a::2	ICMPv6	134 Echo (ping) reply id=0x0d52, seq=4, hop limit=64 (request in 26)
> Frame 26: 134 bytes on wire (1072 bits), 134 bytes captured (1072 bits) on interface -, id 0					
> Ethernet II, Src: ca:03:4f:40:00:08 (ca:03:4f:40:00:08), Dst: ca:01:23:3c:00:08 (ca:01:23:3c:00:08)					
v Internet Protocol Version 4, Src: 200.2.2.2, Dst: 200.1.1.1					
0100 = Version: 4					
.... 0101 = Header Length: 20 bytes (5)					
> Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)					
Total Length: 120					
Identification: 0x001e (30)					
> 000. = Flags: 0x0					
...0 0000 0000 0000 = Fragment Offset: 0					
Time to Live: 254					
Protocol: IPv6 (41)					
Header Checksum: 0x2938 [validation disabled]					
[Header checksum status: Unverified]					
Source Address: 200.2.2.2					
Destination Address: 200.1.1.1					
v Internet Protocol Version 6, Src: 2001:a::2, Dst: 2001:a::1					
0110 = Version: 6					
> 0000 0000 = Traffic Class: 0x00 (DSCP: CS0, ECN: Not-ECT)					
.... 0000 0000 0000 0000 = Flow Label: 0x00000					
Payload Length: 60					
Next Header: ICMPv6 (58)					
Hop Limit: 64					
Source Address: 2001:a::2					
Destination Address: 2001:a::1					
> Internet Control Message Protocol v6					

Guião 5

1.

- show bgp summary

```
Neighbor      V      AS MsgRcvd MsgSent   TblVer  InQ  OutQ Up/Down  State/PfxRcd
200.1.2.2      4      1002     10     10       6    0    0 00:04:46      3
R1#
```

- show ip route

```
192.10.10.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.10.10.0/24 is directly connected, FastEthernet0/1
L    192.10.10.1/32 is directly connected, FastEthernet0/1
B    192.20.0.0/24 [20/0] via 200.1.2.2, 00:07:12
B    192.20.1.0/24 [20/2] via 200.1.2.2, 00:04:30
    200.1.2.0/24 is variably subnetted, 2 subnets, 2 masks
C    200.1.2.0/24 is directly connected, FastEthernet0/0
L    200.1.2.1/32 is directly connected, FastEthernet0/0
B    200.20.20.0/24 [20/0] via 200.1.2.2, 00:06:42
R1#
```

- show ip bgp

```
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure, S Stale, m multipath, b backup-path, x best-external, f RT-Filter
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network          Next Hop        Metric LocPrf Weight Path
*> 192.10.10.0       0.0.0.0          0           32768 i
*> 192.20.0.0        200.1.2.2         0           0 1002 i
*> 192.20.1.0        200.1.2.2         2           0 1002 ?
*> 200.20.20.0       200.1.2.2         0           0 1002 ?
R1#
```

A rede 192.30.30.0 não é captada pelo R1, e também a rede 192.10.10.0 não é captada pelo R3.

2.

R2A:

```
   Network          Next Hop        Metric LocPrf Weight Path
*> 192.10.10.0       200.1.2.1         0           0 1001 i
*> 192.20.0.0        0.0.0.0          0           32768 i
* i192.20.1.0       200.20.20.22      0          100      0 ?
*>                  200.20.20.22      2           32768 ?
* i192.30.30.0      200.3.2.3         0          100      0 1003 i
* i200.20.20.0      200.20.20.22      0          100      0 ?
*>                  0.0.0.0          0           32768 ?
R2A#

B    192.10.10.0/24 [20/0] via 200.1.2.1, 00:13:23
C    192.20.0.0/24 is variably subnetted, 2 subnets, 2 masks
L    192.20.0.0/24 is directly connected, FastEthernet1/0
L    192.20.0.1/32 is directly connected, FastEthernet1/0
O    192.20.1.0/24 [110/2] via 200.20.20.22, 00:10:10, FastEthernet0/1
    200.1.2.0/24 is variably subnetted, 2 subnets, 2 masks
C    200.1.2.0/24 is directly connected, FastEthernet0/0
L    200.1.2.2/32 is directly connected, FastEthernet0/0
    200.20.20.0/24 is variably subnetted, 2 subnets, 2 masks
C    200.20.20.0/24 is directly connected, FastEthernet0/1
L    200.20.20.2/32 is directly connected, FastEthernet0/1
R2A#
```

O next-hop da rede 192.30.30.0 devia ser 200.20.20.22.

R2B:

```

Network      Next Hop      Metric LocPrf Weight Path
* i192.10.10.0 200.1.2.1      0     100      0 1001 i
*>i192.20.0.0   200.20.20.2    0     100      0 i
*> 192.20.1.0   0.0.0.0        0           32768 ?
* i            200.20.20.2    2     100      0 ?
*> 192.30.30.0 200.3.2.3      0           0 1003 i
*> 200.20.20.0 0.0.0.0        0           32768 ?
* i            200.20.20.2    0     100      0 ?
R2B#

B    192.20.0.0/24 [200/0] via 200.20.20.2, 00:16:42
    192.20.1.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.20.1.0/24 is directly connected, FastEthernet1/0
L    192.20.1.1/32 is directly connected, FastEthernet1/0
B    192.30.30.0/24 [20/0] via 200.3.2.3, 00:16:04
    200.3.2.0/24 is variably subnetted, 2 subnets, 2 masks
C    200.3.2.0/24 is directly connected, FastEthernet0/0
L    200.3.2.2/32 is directly connected, FastEthernet0/0
    200.20.20.0/24 is variably subnetted, 2 subnets, 2 masks
C    200.20.20.0/24 is directly connected, FastEthernet0/1
L    200.20.20.22/32 is directly connected, FastEthernet0/1
R2B#
```

O next-hop da rede 192.10.10.0 devia ser 200.20.20.2.

Neste momento, o next-hop attribute é propagado pelas interfaces de cada router. (?)

3.

R2A:

```

Network      Next Hop      Metric LocPrf Weight Path
*> 192.10.10.0 200.1.2.1      0           0 1001 i
*> 192.20.0.0   0.0.0.0        0           32768 i
* i192.20.1.0   200.20.20.22    0     100      0 ?
*>             200.20.20.22    2           32768 ?
*>i192.30.30.0 200.20.20.22    0     100      0 1003 i
* i200.20.20.0 200.20.20.22    0     100      0 ?
*>             0.0.0.0        0           32768 ?
R2A#
```

```

B    192.10.10.0/24 [20/0] via 200.1.2.1, 00:01:08
    192.20.0.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.20.0.0/24 is directly connected, FastEthernet1/0
L    192.20.0.1/32 is directly connected, FastEthernet1/0
O    192.20.1.0/24 [110/2] via 200.20.20.22, 00:01:26, FastEthernet0/1
B    192.30.30.0/24 [200/0] via 200.20.20.22, 00:01:08
    200.1.2.0/24 is variably subnetted, 2 subnets, 2 masks
C    200.1.2.0/24 is directly connected, FastEthernet0/0
L    200.1.2.2/32 is directly connected, FastEthernet0/0
    200.20.20.0/24 is variably subnetted, 2 subnets, 2 masks
C    200.20.20.0/24 is directly connected, FastEthernet0/1
L    200.20.20.2/32 is directly connected, FastEthernet0/1
R2A#
```

R2B:

```

Network      Next Hop      Metric LocPrf Weight Path
*>i192.10.10.0 200.20.20.2    0     100      0 1001 i
*>i192.20.0.0   200.20.20.2    0     100      0 i
* i192.20.1.0   200.20.20.2    2     100      0 ?
*>             0.0.0.0        0           32768 ?
*> 192.30.30.0 200.3.2.3      0           0 1003 i
* i200.20.20.0 200.20.20.2    0     100      0 ?
*>             0.0.0.0        0           32768 ?
R2B#
```

```

B    192.10.10.0/24 [200/0] via 200.20.20.2, 00:02:03
B    192.20.0.0/24 [200/0] via 200.20.20.2, 00:02:03
    192.20.1.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.20.1.0/24 is directly connected, FastEthernet1/0
L    192.20.1.1/32 is directly connected, FastEthernet1/0
B    192.30.30.0/24 [20/0] via 200.3.2.3, 00:02:04
    200.3.2.0/24 is variably subnetted, 2 subnets, 2 masks
C    200.3.2.0/24 is directly connected, FastEthernet0/0
L    200.3.2.2/32 is directly connected, FastEthernet0/0
    200.20.20.0/24 is variably subnetted, 2 subnets, 2 masks
C    200.20.20.0/24 is directly connected, FastEthernet0/1
L    200.20.20.22/32 is directly connected, FastEthernet0/1
R2B#

```

Os next-hop agora são partilhados entre os routers R2A e R2B. (?)

4.

Router 1 – Router2A:

```

> Frame 37: 107 bytes on wire (856 bits), 107 bytes captured (856 bits) on interface -, id 0
> Ethernet II, Src: ca:01:13:14:00:08 (ca:01:13:14:00:08), Dst: ca:02:4b:60:00:08 (ca:02:4b:60:00:08)
> Internet Protocol Version 4, Src: 200.1.2.1, Dst: 200.1.2.2
> Transmission Control Protocol, Src Port: 51421, Dst Port: 179, Seq: 1, Ack: 1, Len: 53
v Border Gateway Protocol - OPEN Message
  Marker: ffffffffffffffffffffffffffffffffff
  Length: 53
  Type: OPEN Message (1)
  Version: 4
  My AS: 1001
  Hold Time: 180
  BGP Identifier: 200.1.2.1
  Optional Parameters Length: 24
  > Optional Parameters

```

OPEN Message: estabelece uma conexão BGP;

```

> Frame 40: 73 bytes on wire (584 bits), 73 bytes captured (584 bits) on interface -, id 0
> Ethernet II, Src: ca:02:4b:60:00:08 (ca:02:4b:60:00:08), Dst: ca:01:13:14:00:08 (ca:01:13:14:00:08)
> Internet Protocol Version 4, Src: 200.1.2.2, Dst: 200.1.2.1
> Transmission Control Protocol, Src Port: 179, Dst Port: 51421, Seq: 54, Ack: 54, Len: 19
v Border Gateway Protocol - KEEPALIVE Message
  Marker: ffffffffffffffffffffffffffffffffff
  Length: 19
  Type: KEEPALIVE Message (4)

```

KEEPALIVE Message: enviadas quando o período de tempo do KEEPALIVE é excedido sem ocorrer um UPDATE.

61	80.783981	200.1.2.1	200.1.2.2	BGP	108 UPDATE Message
62	81.019006	200.1.2.2	200.1.2.1	BGP	239 UPDATE Message, UPDATE Message, UPDATE Message, UPDATE Message


```

> Frame 62: 239 bytes on wire (1912 bits), 239 bytes captured (1912 bits) on interface -, id 0
> Ethernet II, Src: ca:02:4b:60:00:08 (ca:02:4b:60:00:08), Dst: ca:01:13:14:00:08 (ca:01:13:14:00:08)
> Internet Protocol Version 4, Src: 200.1.2.2, Dst: 200.1.2.1
> Transmission Control Protocol, Src Port: 179, Dst Port: 51421, Seq: 92, Ack: 169, Len: 185
✓ Border Gateway Protocol - UPDATE Message
  Marker: ffffffffffffffffffffffffffffffff
  Length: 54
  Type: UPDATE Message (2)
  Withdrawn Routes Length: 0
  Total Path Attribute Length: 27
  ✓ Path attributes
    > Path Attribute - ORIGIN: IGP
    > Path Attribute - AS_PATH: 1002
    > Path Attribute - NEXT_HOP: 200.1.2.2
    > Path Attribute - MULTI_EXIT_DISC: 0
  ✓ Network Layer Reachability Information (NLRI)
    > 192.20.0.0/24
✓ Border Gateway Protocol - UPDATE Message
  Marker: ffffffffffffffffffffffffffffffff
  Length: 54
  Type: UPDATE Message (2)
  Withdrawn Routes Length: 0
  Total Path Attribute Length: 27
  ✓ Path attributes
    > Path Attribute - ORIGIN: INCOMPLETE
    > Path Attribute - AS_PATH: 1002
    > Path Attribute - NEXT_HOP: 200.1.2.2
    > Path Attribute - MULTI_EXIT_DISC: 2
  ✓ Network Layer Reachability Information (NLRI)
    > 192.20.1.0/24
> Border Gateway Protocol - UPDATE Message
✓ Border Gateway Protocol - UPDATE Message
  Marker: ffffffffffffffffffffffffffffffff
  Length: 23
  Type: UPDATE Message (2)
  Withdrawn Routes Length: 0
  Total Path Attribute Length: 0

```

Note: routers may send an empty UPDATE BGP message (no NLRI and no Withdrawn Routes) to notify its peer that (at the moment) it has sent all known networks. It is known as End-of-RIB marker.

5.

R3 f0/1 Disconnect:

```

> Frame 308: 81 bytes on wire (648 bits), 81 bytes captured (648 bits) on interface -, id 0
> Ethernet II, Src: ca:02:4b:60:00:08 (ca:02:4b:60:00:08), Dst: ca:01:13:14:00:08 (ca:01:13:14:00:08)
> Internet Protocol Version 4, Src: 200.1.2.2, Dst: 200.1.2.1
> Transmission Control Protocol, Src Port: 179, Dst Port: 51421, Seq: 575, Ack: 435, Len: 27
✓ Border Gateway Protocol - UPDATE Message
  Marker: ffffffffffffffffffffffffffffffff
  Length: 27
  Type: UPDATE Message (2)
  Withdrawn Routes Length: 4
  ✓ Withdrawn Routes
    > 192.30.30.0/24
  Total Path Attribute Length: 0

```


R3 f0/1 Connected:

```
> Frame 330: 105 bytes on wire (840 bits), 105 bytes captured (840 bits) on interface -, id 0
> Ethernet II, Src: ca:02:4b:60:00:08 (ca:02:4b:60:00:08), Dst: ca:01:13:14:00:08 (ca:01:13:14:00:08)
> Internet Protocol Version 4, Src: 200.1.2.2, Dst: 200.1.2.1
> Transmission Control Protocol, Src Port: 179, Dst Port: 51421, Seq: 621, Ack: 454, Len: 51
v Border Gateway Protocol - UPDATE Message
  Marker: ffffffffffffffffffffffffffffffffff
  Length: 51
  Type: UPDATE Message (2)
  Withdrawn Routes Length: 0
  Total Path Attribute Length: 24
  v Path attributes
    > Path Attribute - ORIGIN: IGP
    > Path Attribute - AS_PATH: 1002 1003
    > Path Attribute - NEXT_HOP: 200.1.2.2
  v Network Layer Reachability Information (NLRI)
    > 192.30.30.0/24
```

6.

```
> Frame 392: 176 bytes on wire (1408 bits), 176 bytes captured (1408 bits) on interface -, id 0
> Ethernet II, Src: ca:02:4b:60:00:08 (ca:02:4b:60:00:08), Dst: ca:01:13:14:00:08 (ca:01:13:14:00:08)
> Internet Protocol Version 4, Src: 200.1.2.2, Dst: 200.1.2.1
> Transmission Control Protocol, Src Port: 179, Dst Port: 51421, Seq: 729, Ack: 530, Len: 122
v Border Gateway Protocol - UPDATE Message
  Marker: ffffffffffffffffffffffffffffffffff
  Length: 27
  Type: UPDATE Message (2)
  Withdrawn Routes Length: 4
  v Withdrawn Routes
    > 192.20.0.0/24
  Total Path Attribute Length: 0
v Border Gateway Protocol - UPDATE Message
  Marker: ffffffffffffffffffffffffffffffffff
  Length: 68
  Type: UPDATE Message (2)
  Withdrawn Routes Length: 0
  Total Path Attribute Length: 41
  v Path attributes
    > Path Attribute - ORIGIN: IGP
    > Path Attribute - AS_PATH: 1002
    > Path Attribute - AGGREGATOR: AS: 1002 origin: 200.20.20.2
    > Path Attribute - ATOMIC_AGGREGATE
    > Path Attribute - NEXT_HOP: 200.1.2.2
    > Path Attribute - MULTI_EXIT_DISC: 0
  v Network Layer Reachability Information (NLRI)
    > 192.20.0.0/23
v Border Gateway Protocol - UPDATE Message
  Marker: ffffffffffffffffffffffffffffffffff
  Length: 27
  Type: UPDATE Message (2)
  Withdrawn Routes Length: 4
  v Withdrawn Routes
    > 192.20.1.0/24
  Total Path Attribute Length: 0
```

```
192.10.10.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.10.10.0/24 is directly connected, FastEthernet0/1
L    192.10.10.1/32 is directly connected, FastEthernet0/1
B    192.20.0.0/23 [20/0] via 200.1.2.2, 00:02:25
B    192.30.30.0/24 [20/0] via 200.1.2.2, 00:05:33
    200.1.2.0/24 is variably subnetted, 2 subnets, 2 masks
C    200.1.2.0/24 is directly connected, FastEthernet0/0
L    200.1.2.1/32 is directly connected, FastEthernet0/0
B    200.20.20.0/24 [20/0] via 200.1.2.2, 00:19:49
R1#
```

7a. Não foi detetada nenhuma mensagem de UPDATE, pois as duas redes foram agregadas numa máscara de 23, e uma delas ainda continua funcional, por isso R1 não deteta que a rede foi desligada.

7b. Agora como as duas redes foram desligadas, R1 recebe a mensagem UPDATE da rede agregada.

```
> Frame 542: 81 bytes on wire (648 bits), 81 bytes captured (648 bits) on interface -, id 0
> Ethernet II, Src: ca:02:4b:60:00:08 (ca:02:4b:60:00:08), Dst: ca:01:13:14:00:08 (ca:01:13:14:00:08)
> Internet Protocol Version 4, Src: 200.1.2.2, Dst: 200.1.2.1
> Transmission Control Protocol, Src Port: 179, Dst Port: 51421, Seq: 1003, Ack: 682, Len: 27
✓ Border Gateway Protocol - UPDATE Message
  Marker: ffffffffffffffffffffffffffffffffffffffff
  Length: 27
  Type: UPDATE Message (2)
  Withdrawn Routes Length: 4
  ✓ Withdrawn Routes
    > 192.20.0.0/23
    Total Path Attribute Length: 0
```

Assim uma das desvantagens de agregar redes é o facto de os routers não conseguirem identificar se uma rede ainda está disponível.

8. R1:

```
192.10.10.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.10.10.0/24 is directly connected, FastEthernet0/1
L    192.10.10.1/32 is directly connected, FastEthernet0/1
B    192.20.0.0/24 [20/0] via 200.1.2.2, 00:01:31
B    192.20.1.0/24 [20/2] via 200.1.2.2, 00:01:31
B    192.30.30.0/24 [20/0] via 200.1.2.2, 00:01:31
200.1.2.0/24 is variably subnetted, 2 subnets, 2 masks
C    200.1.2.0/24 is directly connected, FastEthernet0/0
L    200.1.2.1/32 is directly connected, FastEthernet0/0
B    200.20.20.0/24 [20/0] via 200.1.2.2, 00:01:31
R1#
```

```
C    2001:1:2::/64 [0/0]
    via FastEthernet0/0, directly connected
L    2001:1:2::1/128 [0/0]
    via FastEthernet0/0, receive
C    2001:10:10::/64 [0/0]
    via FastEthernet0/1, directly connected
L    2001:10:10::1/128 [0/0]
    via FastEthernet0/1, receive
B    2001:20::/64 [20/0]
    via FE80::C802:48FF:FE60:8, FastEthernet0/0
B    2001:20:1::/64 [20/2]
    via FE80::C802:48FF:FE60:8, FastEthernet0/0
B    2001:20:20::/64 [20/0]
    via FE80::C802:48FF:FE60:8, FastEthernet0/0
B    2001:30:30::/64 [20/0]
    via FE80::C802:48FF:FE60:8, FastEthernet0/0
L    FF00::/8 [0/0]
    via Null0, receive
```

9. Devia aparecer o atributo MP_REACH_NLRI, que mostra um set de destinos alcançáveis.

10. Devia aparecer o atributo MP_UNREACH_NLRI, que mostra um set de destinos não alcançáveis.

11.

Network	Next Hop	Metric	LocPrf	Weight	Path
*> ::/0	2001:1:2::2			0	1002 1003 i
*> 2001:10:10::/64	::	0		32768	i
*> 2001:20::/64	2001:1:2::2	0		0	1002 i
*> 2001:20:1::/64	2001:1:2::2	2		0	1002 ?
*> 2001:20:20::/64	2001:1:2::2	0		0	1002 i
*> 2001:30:30::/64	2001:1:2::2			0	1002 1003 i

NS