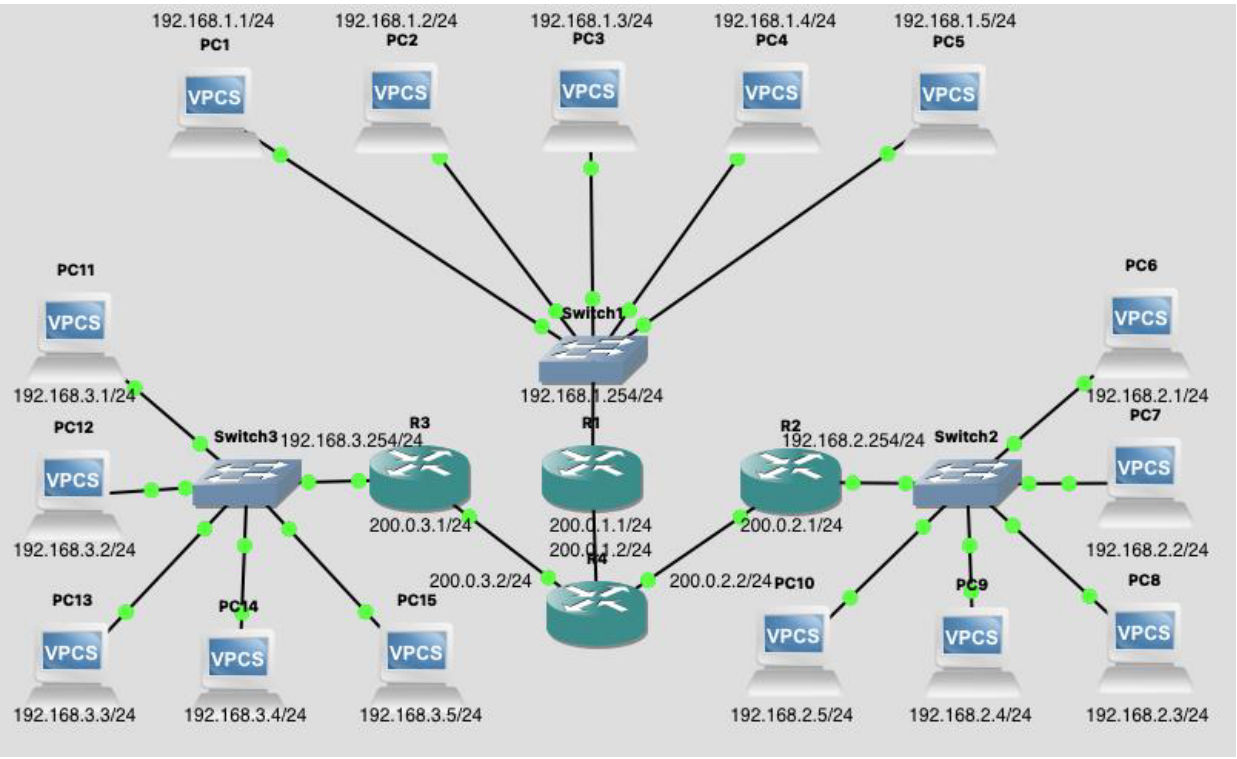
F29DC Lab 6

Topology A:



Topology A EIGRP Proof:

lucca — R1 — telnet localhost 5000 — 80×24

```
R1(config-if)#
*Mar  1 00:12:42.667: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state t
o up
*Mar  1 00:12:43.667: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/1, changed state to up
R1(config-if)#write
               ^
% Invalid input detected at '^' marker.

R1(config-if)#
R1#
*Mar  1 00:14:21.591: %SYS-5-CONFIG_I: Configured from console by console
R1#write
Building configuration...
[OK]
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#router eigrp 1
R1(config-router)#network 192.168.1.0 0.0.0.255
R1(config-router)#network 200.0.1.0 0.0.0.255
R1(config-router)#
*Mar  1 00:22:50.299: %DUAL-5-NBRCHANGE: IP-EIGRP(0) 1: Neighbor 200.0.1.2 (Fast
Ethernet0/1) is up: new adjacency
R1(config-router)#
```

lucca — R3 — telnet localhost 5002 — 80×24

```
et0/0, changed state to up
R3(config-if)#interface fa0/1
R3(config-if)#ip address 200.0.3.1 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#
*Mar  1 00:13:18.275: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state t
o up
*Mar  1 00:13:19.275: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/1, changed state to up
R3(config-if)#
R3#
*Mar  1 00:14:21.559: %SYS-5-CONFIG_I: Configured from console by console
R3#write
Building configuration...
[OK]
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#router eigrp 1
R3(config-router)#network 192.168.3.0 0.0.0.255
R3(config-router)#network 200.0.3.0 0.0.0.255
R3(config-router)#
*Mar  1 00:23:06.015: %DUAL-5-NBRCHANGE: IP-EIGRP(0) 1: Neighbor 200.0.3.2 (Fast
Ethernet0/1) is up: new adjacency
R3(config-router)#
```

lucca — R2 — telnet localhost 5001 — 80×24

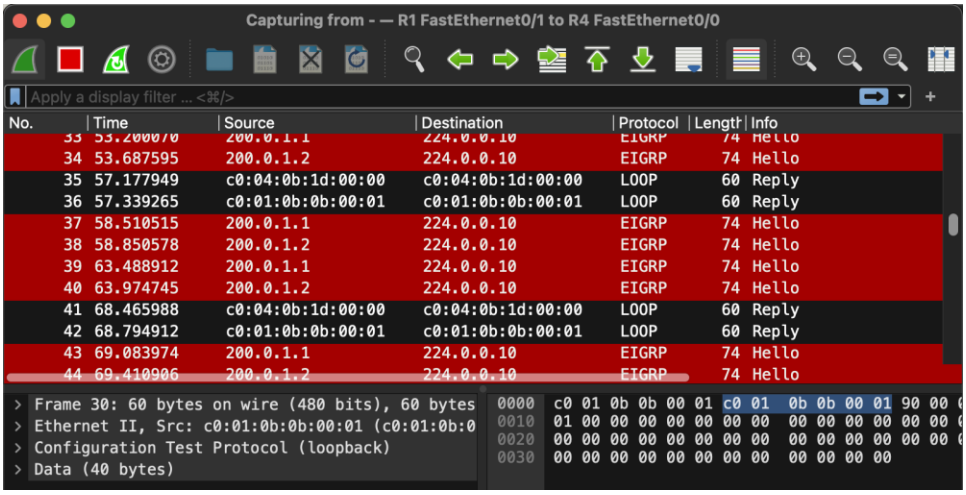
```
% Incomplete command.

R2(config-if)#ip address 200.0.2.1 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#
*Mar  1 00:12:59.663: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state t
o up
*Mar  1 00:13:00.663: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/1, changed state to up
R2(config-if)#
R2#
*Mar  1 00:14:20.915: %SYS-5-CONFIG_I: Configured from console by console
R2#write
Building configuration...
[OK]
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#router eigrp 1
R2(config-router)#network 192.168.2.0 0.0.0.255
R2(config-router)#network 200.0.2.0 0.0.0.255
R2(config-router)#
*Mar  1 00:22:56.587: %DUAL-5-NBRCHANGE: IP-EIGRP(0) 1: Neighbor 200.0.2.2 (Fast
Ethernet0/1) is up: new adjacency
R2(config-router)#
```

lucca — R4 — telnet localhost 5003 — 80×24

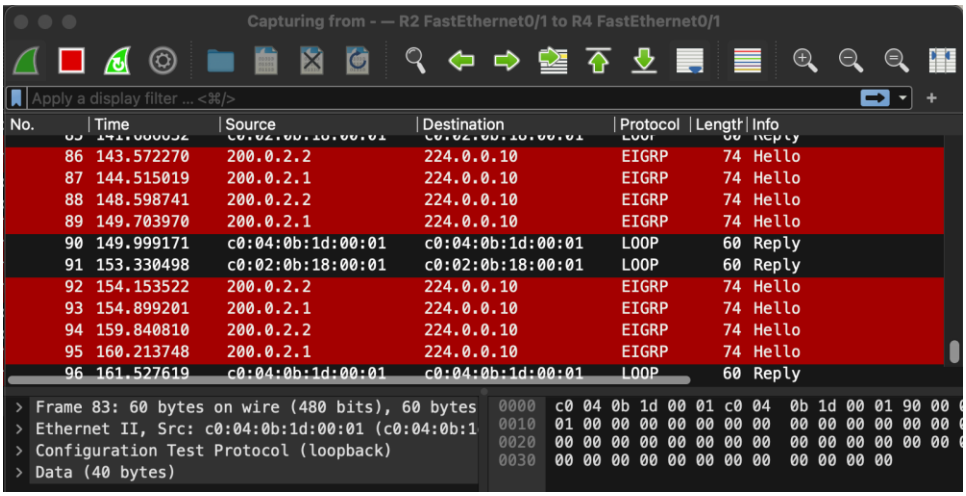
```
Building configuration...
[OK]
R4#ping 10.0.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.1.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
R4#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R4(config)#router eigrp 1
R4(config-router)#network 200.0.1.0 0.0.0.255
R4(config-router)#network 200.0.1.0 0.0.0.255
*Mar  1 00:22:48.971: %DUAL-5-NBRCHANGE: IP-EIGRP(0) 1: Neighbor 200.0.1.1 (Fast
Ethernet0/0) is up: new adjacency
R4(config-router)#network 200.0.2.0 0.0.0.255
R4(config-router)#
*Mar  1 00:22:59.859: %DUAL-5-NBRCHANGE: IP-EIGRP(0) 1: Neighbor 200.0.2.1 (Fast
Ethernet0/1) is up: new adjacency
R4(config-router)#network 200.0.3.0 0.0.0.255
R4(config-router)#
*Mar  1 00:23:10.447: %DUAL-5-NBRCHANGE: IP-EIGRP(0) 1: Neighbor 200.0.3.1 (Fast
Ethernet1/0) is up: new adjacency
R4(config-router)#
```

Topology A Test Cases:

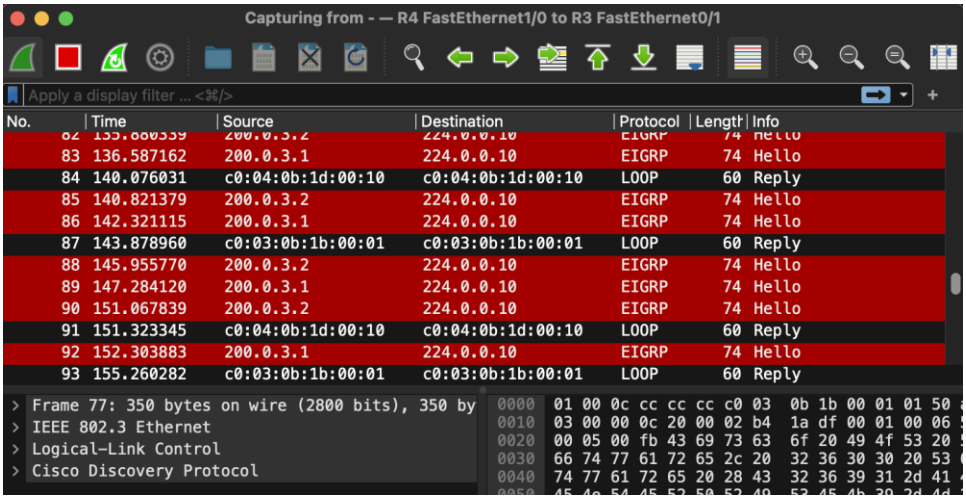
Topology A EIGRP R1-R4 No Changes:



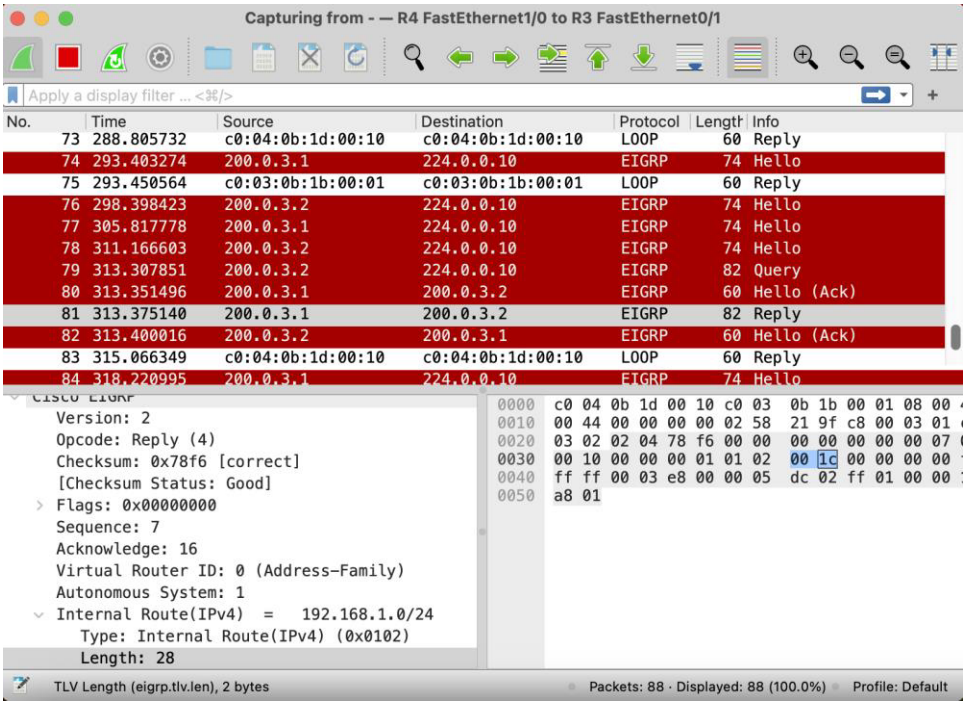
Topology A EIGRP R2-R4 No Changes:



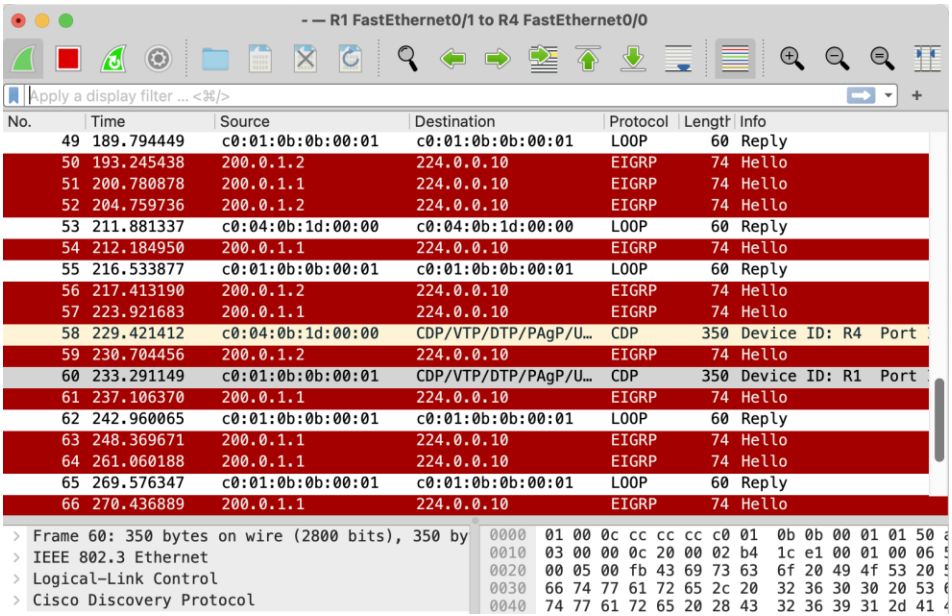
Topology A EIGRP R3-R4 No Changes:



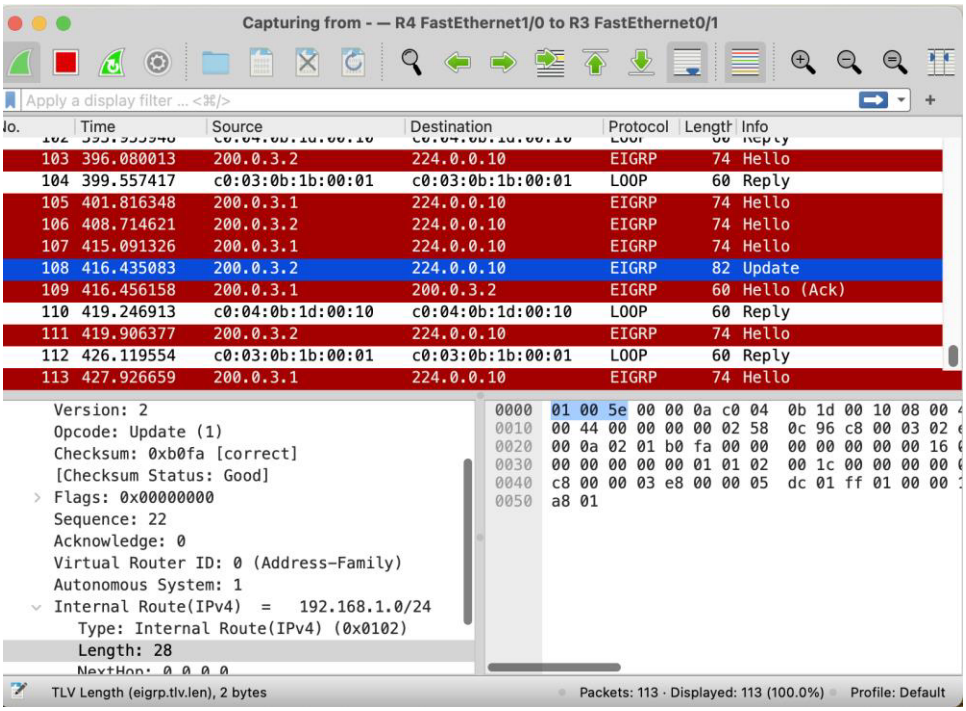
Topology A EIGRP Link Goes Down (Outsider Perspective):



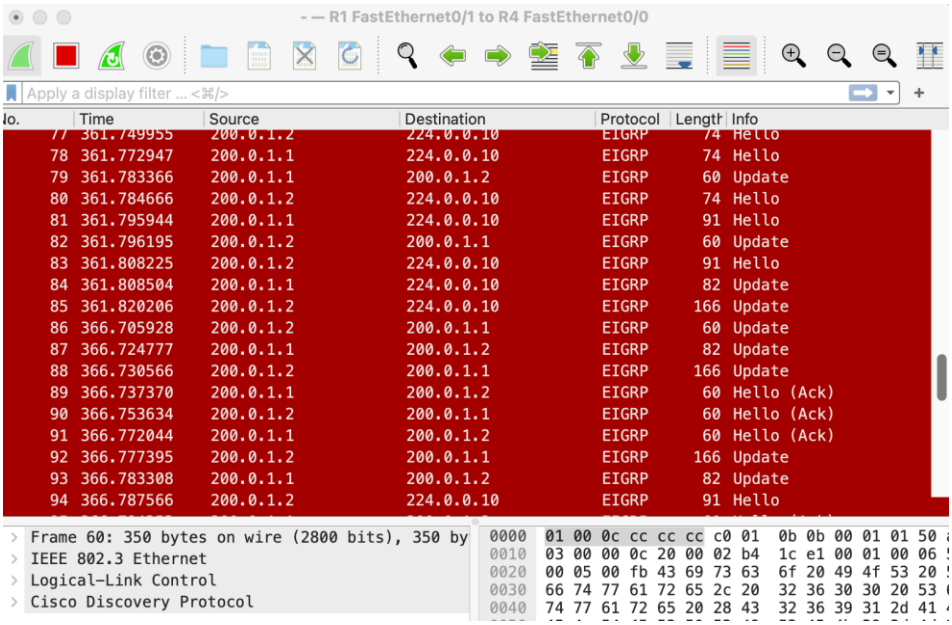
Topology A EIGRP Link Goes Down (Insider Perspective):



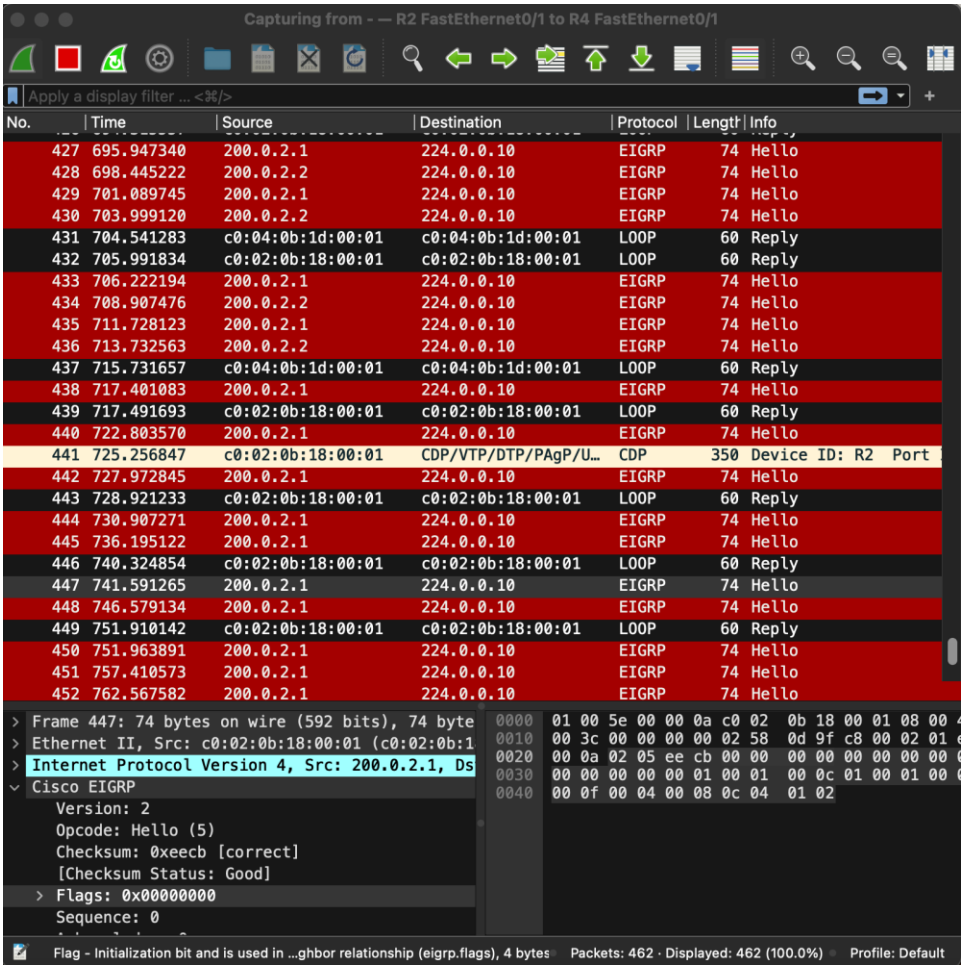
Topology A EIGRP Link Goes Back Up (Outsider Perspective):



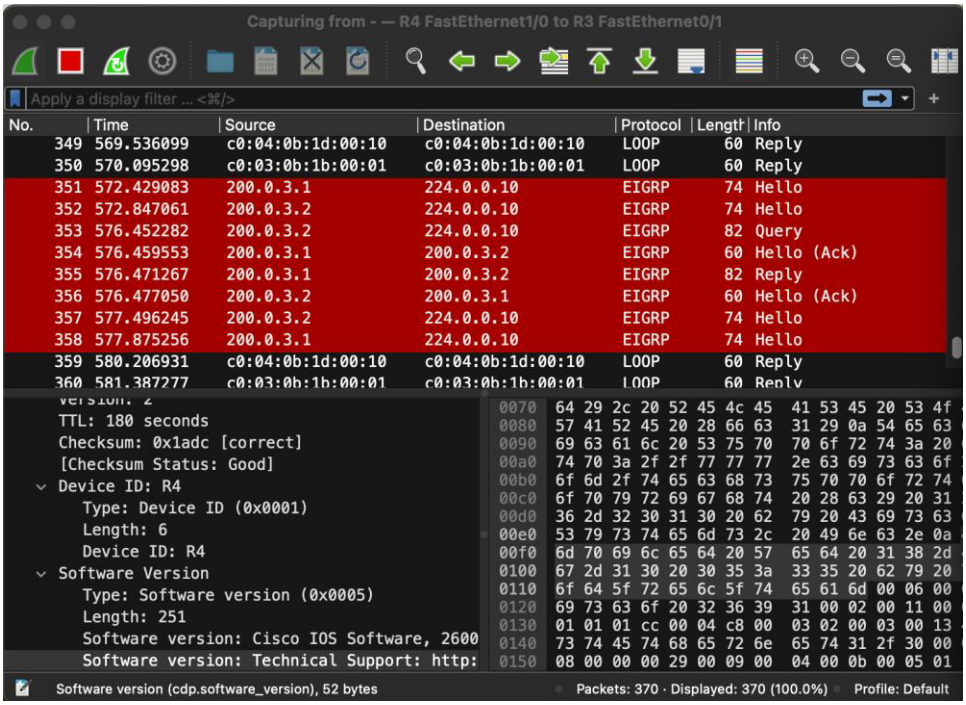
Topology A EIGRP Link Goes Back Up (Insider Perspective):



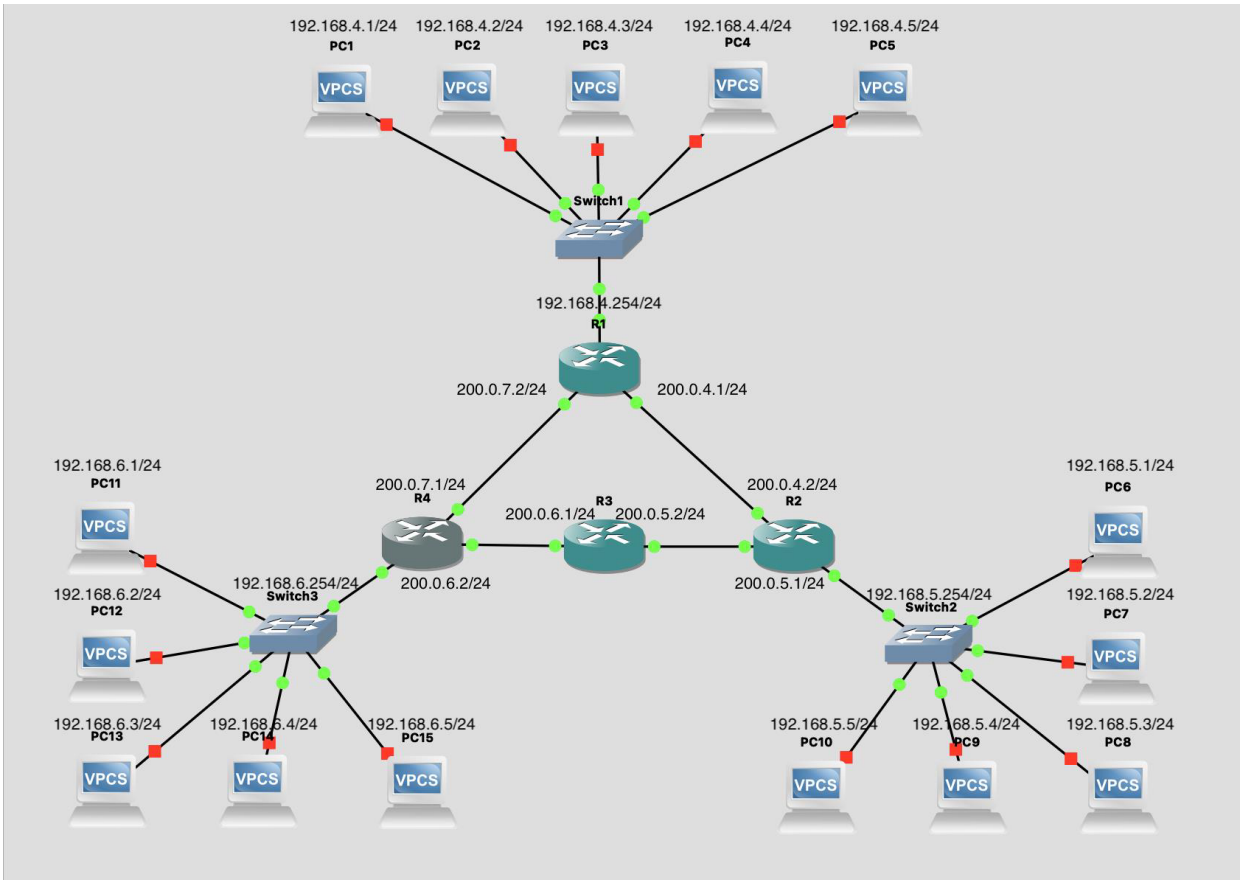
Topology A EIGRP Router Goes Down (Insider Perspective):



Topology A EIGRP Router Goes Down (Outsider Perspective):



Topology B:



Topology B OSPF Proof:

lucca — R1 — telnet localhost 5073 — 80×24

```
      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

C    200.0.4.0/24 is directly connected, FastEthernet0/1
C    200.0.7.0/24 is directly connected, FastEthernet1/0
C    192.168.4.0/24 is directly connected, FastEthernet0/0
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#router ospf
% Incomplete command.

R1(config)#router ospf 1
R1(config-router)#network 192.168.4.0 0.0.0.255 area 0
R1(config-router)#network 200.0.4.0 0.0.0.255 area 0
R1(config-router)#network 200.0.7.0 0.0.0.255 area 0
R1(config-router)#
*Mar  1 00:07:51.859: %OSPF-5-ADJCHG: Process 1, Nbr 200.0.5.1 on FastEthernet0/
1 from LOADING to FULL, Loading Done
R1(config-router)#
*Mar  1 00:09:38.295: %OSPF-5-ADJCHG: Process 1, Nbr 200.0.7.1 on FastEthernet1/
0 from LOADING to FULL, Loading Done
R1(config-router)#
```

lucca — R3 — telnet localhost 5071 — 80×24

```
Cisco IOS Software, 2600 Software (C2691-ADVENTERPRISEK9-M), Version 12.4(25d),
RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2010 by Cisco Systems, Inc.
Compiled Wed 18-Aug-10 05:35 by prod_rel_team
*Mar  1 00:00:07.915: %SNMP-5-COLDSTART: SNMP agent on host R3 is undergoing a c
old start
*Mar  1 00:00:08.091: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up
*Mar  1 00:00:08.095: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/1, changed state to up
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#no router rip
R3(config)#router ospf 1
R3(config-router)#network 200.0.5.0 0.0.0.255 area 0
R3(config-router)#network 200.0.6.0 0.0.0.255 area 0
R3(config-router)#
*Mar  1 00:08:56.779: %OSPF-5-ADJCHG: Process 1, Nbr 200.0.5.1 on FastEthernet0/
1 from LOADING to FULL, Loading Done
R3(config-router)#
*Mar  1 00:09:59.843: %OSPF-5-ADJCHG: Process 1, Nbr 200.0.7.1 on FastEthernet0/
0 from LOADING to FULL, Loading Done
R3(config-router)#
```

lucca — R2 — telnet localhost 5070 — 80×24

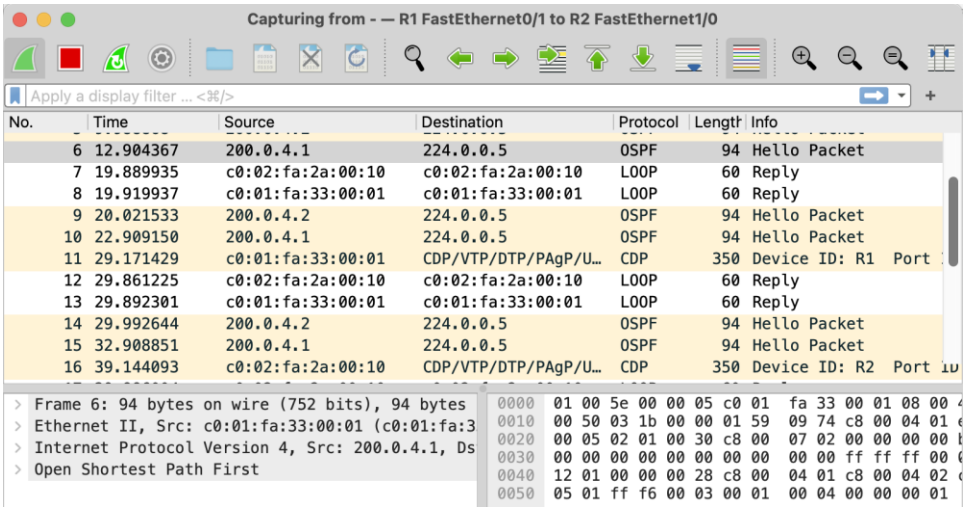
```
RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2010 by Cisco Systems, Inc.
Compiled Wed 18-Aug-10 05:35 by prod_rel_team
*Mar  1 00:00:08.495: %SNMP-5-COLDSTART: SNMP agent on host R2 is undergoing a c
old start
*Mar  1 00:00:08.723: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/1, changed state to up
*Mar  1 00:00:08.727: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#no router rip
R2(config)#router ospf 1
R2(config-router)#network 192.168.5.0 0.0.0.255 area 0
R2(config-router)#network 200.0.4.0 0.0.0.255 area 0
R2(config-router)#network 200.0.4.0 0.0.0.255 area 0
*Mar  1 00:07:41.855: %OSPF-5-ADJCHG: Process 1, Nbr 200.0.7.2 on FastEthernet1/
0 from LOADING to FULL, Loading Done
R2(config-router)#network 200.0.5.0 0.0.0.255 area 0
R2(config-router)#
*Mar  1 00:08:56.783: %OSPF-5-ADJCHG: Process 1, Nbr 200.0.6.1 on FastEthernet0/
1 from LOADING to FULL, Loading Done
R2(config-router)#
```

lucca — R4 — telnet localhost 5072 — 80×24

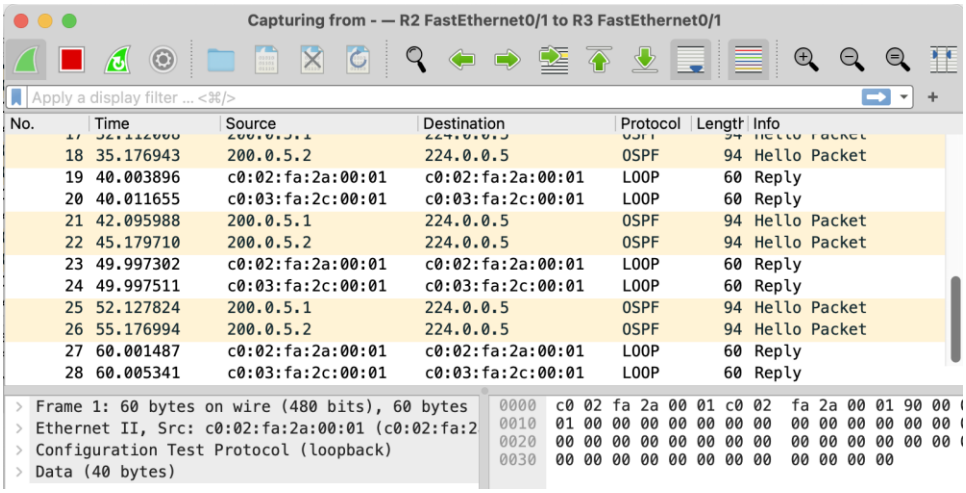
```
RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2010 by Cisco Systems, Inc.
Compiled Wed 18-Aug-10 05:35 by prod_rel_team
*Mar  1 00:00:08.415: %SNMP-5-COLDSTART: SNMP agent on host R4 is undergoing a c
old start
*Mar  1 00:00:08.679: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up
*Mar  1 00:00:08.679: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/1, changed state to up
R4#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R4(config)#no router rip
R4(config)#router ospf 1
R4(config-router)#network 192.168.6.0 0.0.0.255 area 0
R4(config-router)#network 200.0.6.0 0.0.0.255 area 0
R4(config-router)#network 200.0.7.0 0.0.0.255 area 0
R4(config-router)#
*Mar  1 00:09:28.287: %OSPF-5-ADJCHG: Process 1, Nbr 200.0.7.2 on FastEthernet0/
1 from LOADING to FULL, Loading Done
R4(config-router)#
*Mar  1 00:09:59.875: %OSPF-5-ADJCHG: Process 1, Nbr 200.0.6.1 on FastEthernet1/
0 from LOADING to FULL, Loading Done
R4(config-router)#
```

Topology A Test Cases:

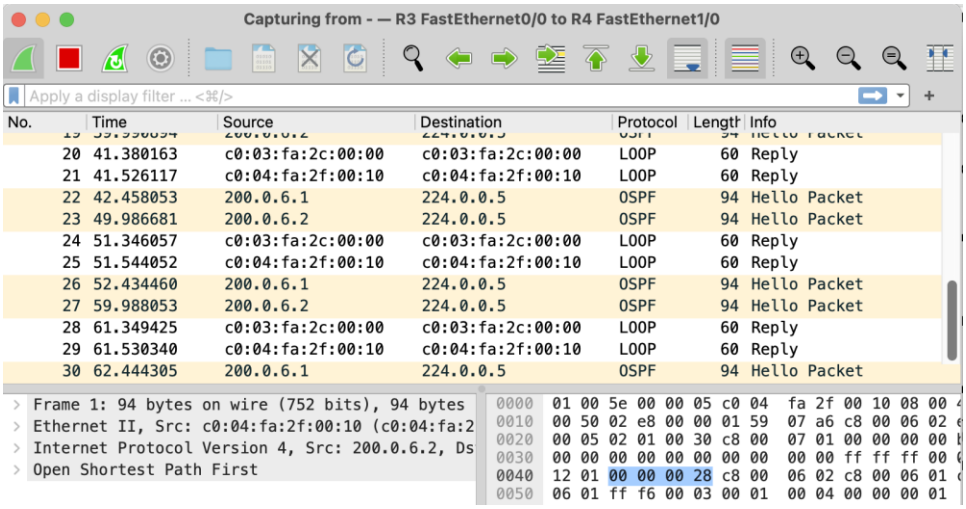
Topology B OSPF R1-R2 No Changes:



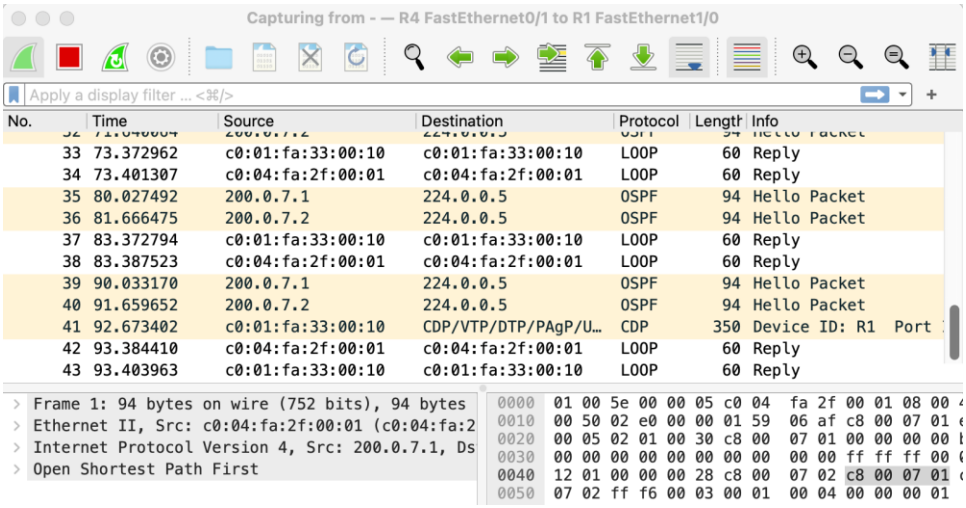
Topology B OSPF R2-R4 No Changes:



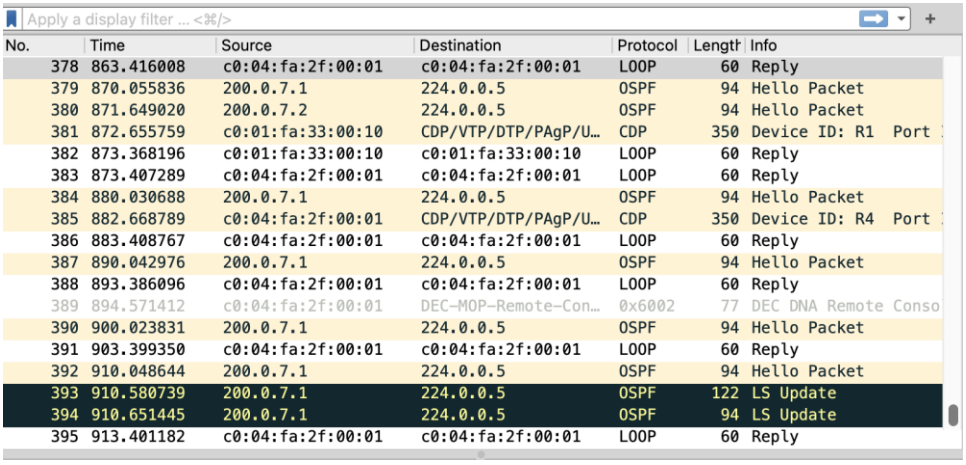
Topology B OSPF R3-R4 No Changes:



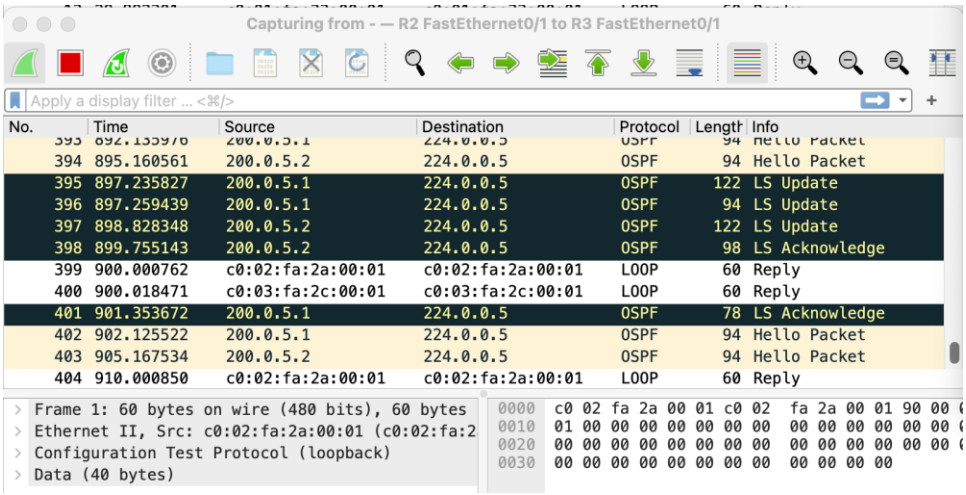
Topology B OSPF R4-R1 No Changes:



Topology B OSPF Link Goes Down (Insider Perspective):



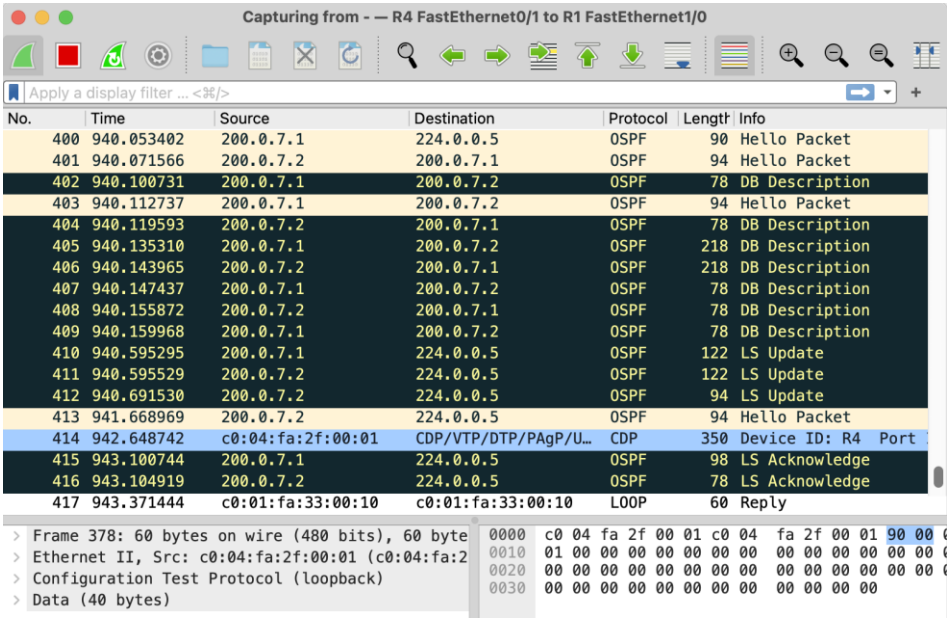
Topology B OSPF Link Goes Down (Outsider Perspective):



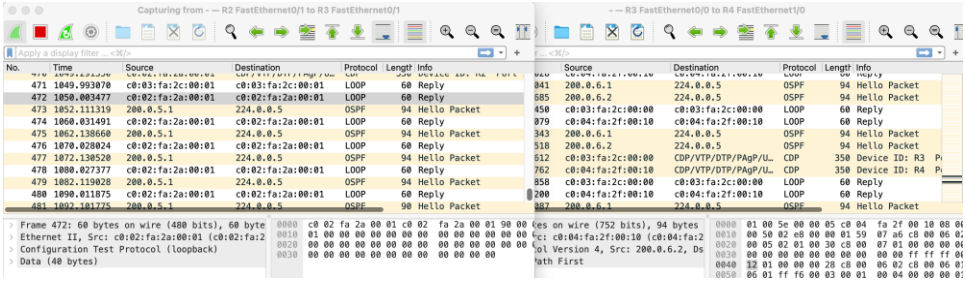
Topology B OSPF Link Goes Back Up (Outsider Perspective):

Much of the same as when the link goes down.

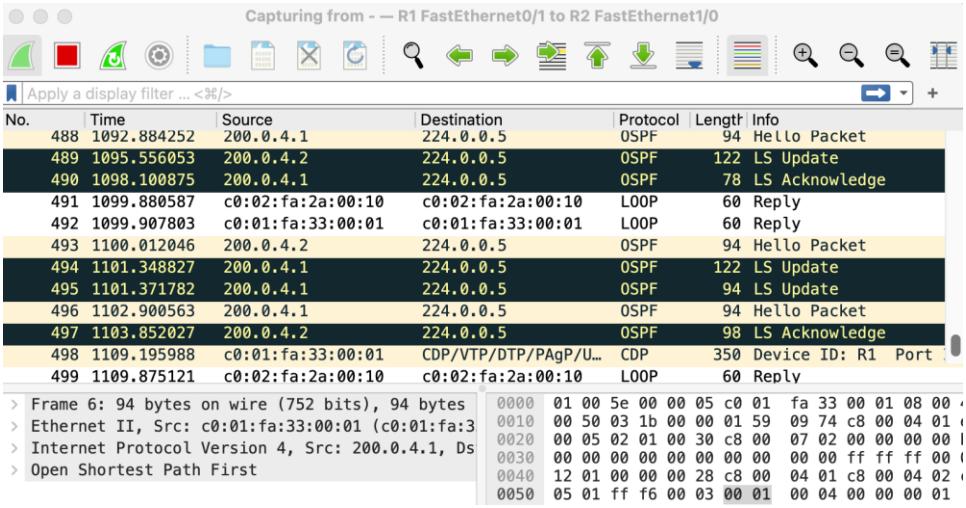
Topology B OSPF Link Goes Back Up (Insider Perspective):



Topology B OSPF Router Goes Down (Insider Perspective):



Topology B OSPF Router Goes Down (Outsider Perspective):



General Observation Notes:

My screenshots above show three different scenarios. The first scenario is one in which nothing has been taken offline. The second scenario shows what happens when a link is taken offline, and then what happens when it goes back online. The third scenario shows what happens when a router is taken offline.

EIGRP Observations:

In the first scenario (where nothing has been taken offline), routers from both sides of the link send EIGRP Hello messages to each other to show that they are still around. This phenomenon is present in every link between routers.

In the second scenario (when a link is taken offline), firstly, one of the routers repeatedly tries to get the other one to respond to no avail. After a while of this, it queries the rest of the routers, and they respond with an acknowledgment. If this link was to go back online after being down, a flurry of pings would go between the two routers connected to it, but mostly updates and acknowledgements.

In the third scenario (when a router is taken offline), much of the same happens, with the only difference being when one of the other routers is queried, it responds with a “reply” as well as the acknowledgment it did when being queried when the link tested above went offline.

OSPF Observations:

In the first scenario (where nothing has been taken offline), routers from both sides of the link send OSPF Hello messages to each other to show that they are still around. This phenomenon is present in every link between routers.

In the second scenario (when a link is taken offline), firstly, one of the routers repeatedly tries to get the other one to respond to no avail. After a while of this, the router that has not been able to ping the other updates with new routing information and sends these LS updates to other routers for them to update their routing tables. Those other routers then respond with LS acknowledgements. If this link was to go back online after being down, other routers would send LS updates and respond to each other with the same LS acknowledgements. The routers on each side of the link that went down would send each other a flurry of “DB Descriptions” and updates.

In the third scenario (when a router is taken offline), the topology treats it identically as it would in the case of a link going down and sends around the same sets of LS updates and acknowledgements (unlike the minor differences in how EIGRP treats this situation with replies).