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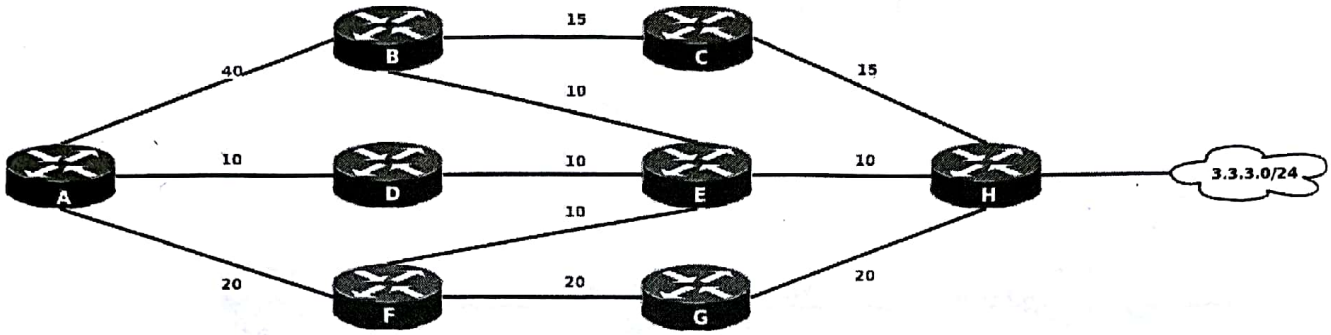
IBF. NET3008
SOLUTION
19 Points in total

NET3008 – EIGRP
04.Q

Q.1
A network administrator came to you for advice while trying to implement load balancing across part of their **EIGRP** network.



Record all possible paths from router **A** to the network **3.3.3.0 / 24**. Give the neighbor from where the network is learn, the **FD** and the **AD**. Indicate the Successor (**S**) and if there is Feasible Successor (**FS**).

/ 5

	Network 3.3.3.0 / 24	**Neighbor**	**FD**	**AD**	
(1)	A-B-C-H	B	40+15+15 = 70	15+5 = 30	
(2)	A-B-E-H	B	40+10+10 = 60	10+10 = 20	FS
(3)	A-D-E-H	D	10+10+10 = 30	10+10 = 20	S
(4)	A-F-E-H	F	20+10+10 = 40	10+10 = 20	FS
(5)	A-F-G-H	F	20+20+20 = 60	20+20 = 40	~~FS~~

FC:
AD of FS should be less than FD of S

AD(FS) < FD(S) Rule to remember

[MARKING]
1 Point for EACH correct path
-2 if S not selected -2 for each FS not selected
-1 for extra path

If the following commands are configured on all routers:

```
r(config)#router eigrp 100
r(config-router)#variance 2
```

Marking 1 if correct routes + calculations presented

traffic from router **A** to the network **3.3.3.0 / 24** will be load balanced across how many paths? Present the calculations

/1

To enable load balancing using a variance of 2:

FD(Fs) < FD(s) * variance. Only applied for Fs!

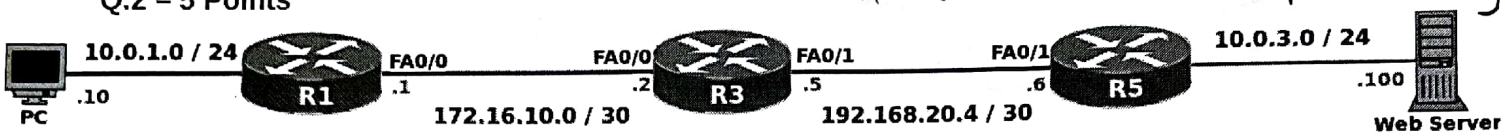
For (2) B: 30 < 60 ✓

For (4) F: 40 < 60 ✓

Two new routes through B + F will be installed in the routing table

Traffic will be shared proportionally

Q.2 – 5 Points



PC is unable to communicate with the web server

```
C:\>ping 10.0.3.100
Pinging 10.0.3.100 with 32 bytes of data:
Reply from 10.0.1.1: Destination host unreachable.
Reply from 10.0.1.1: Destination host unreachable.
Reply from 10.0.1.1: Destination host unreachable.
Reply from 10.0.1.1: Destination host unreachable.
Ping statistics for 10.0.3.100:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss)
```

The following **show** commands are given in the all the routers

R1#show ip protocols

```
Routing Protocol is "eigrp 100"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Default networks flagged in outgoing updates
  Default networks accepted from incoming updates
  Redistributing: eigrp 100
  EIGRP-IPv4 Protocol for AS(100)
    Metric weight K1=1, K2=0, K3=1, K4=0, K5=0
    NSF-aware route hold timer is 240
    Router-ID: 10.0.1.1
    Topology : 0 (base)
      Active Timer: 3 min
      Distance: internal 90 external 170
      Maximum path: 4
      Maximum hopcount 100
      Maximum metric variance 1

  Automatic Summarization: enabled
  Automatic address summarization:
    10.0.0.0/8 for Fa0/1
      Summarizing with metric 5120
    172.16.0.0/16 for Fa0/0
      Summarizing with metric 2169856
  Maximum path: 4
  Routing for Networks:
    172.16.0.0
    10.0.0.0
  Routing Information Sources:
    Gateway         Distance      Last Update
    172.16.10.2          90            6805
  Distance: internal 90 external 170
```

R3#show ip protocols

```
Routing Protocol is "eigrp 100"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Default networks flagged in outgoing updates
  Default networks accepted from incoming updates
  Redistributing: eigrp 100
  EIGRP-IPv4 Protocol for AS(100)
    Metric weight K1=1, K2=0, K3=1, K4=0, K5=0
    NSF-aware route hold timer is 240
    Router-ID: 172.16.10.2
    Topology : 0 (base)
      Active Timer: 3 min
      Distance: internal 90 external 170
      Maximum path: 4
      Maximum hopcount 100
      Maximum metric variance 1

  Automatic Summarization: enabled
  Automatic address summarization:
    172.16.0.0/16 for Serial0/0/1
      Summarizing with metric 2169856
    192.168.20.0/24 for Serial0/0/0
      Summarizing with metric 2169856
  Maximum path: 4
  Routing for Networks:
    172.16.0.0
    192.168.20.0
  Routing Information Sources:
    Gateway         Distance      Last Update
    172.16.10.1          90            6805
    192.168.20.6         90            8670
  Distance: internal 90 external 170
```

R5#show ip protocols

```
Routing Protocol is "eigrp 100"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Default networks flagged in outgoing updates
  Default networks accepted from incoming updates
  Redistributing: eigrp 100
  EIGRP-IPv4 Protocol for AS(100)
    Metric weight K1=1, K2=0, K3=1, K4=0, K5=0
    NSF-aware route hold timer is 240
    Router-ID: 10.0.2.1
    Topology : 0 (base)
      Active Timer: 3 min
      Distance: internal 90 external 170
      Maximum path: 4
      Maximum hopcount 100
      Maximum metric variance 1

  Automatic Summarization: enabled
  Automatic address summarization:
    10.0.0.0/8 for Serial0/0/0
      Summarizing with metric 5120
    192.168.20.0/24 for GigabitEthernet0/0
      Summarizing with metric 2169856
  Maximum path: 4
  Routing for Networks:
    192.168.20.0
    10.0.0.0
  Routing Information Sources:
    Gateway         Distance      Last Update
    192.168.20.5         90            8670
  Distance: internal 90 external 170
```

Giving the output of the above command, propose a hypothesis of what is the root cause of the problem. **Clearly explain** why the problem occurs and propose a solution and give the commands to implement the solution

PROBLEM [1 MARK]

Auto-summary is enabled and the ip design is using classless ips and discontinous networks (10.x.x.0/24)

EXPLANATION [2 MARKS]

R1 will have a summary route (throug EIGRP)

D 10.0.0.0/8 is a summary Null0 } only entries for 10. Network

C 10.0.1.0/24 directly connected fa0/0

A packet going to 10.0.3.100 would by sent to the Null0 device, never leaving R1!

/5

SOLUTION [1 mark]

Disable auto summary

IMPLEMENTATION (COMMANDS) [1 mark]

Do in All routers,

Rx(config)# router eigrp 10

Rx(config-router)# no auto-summary

Not:

① There is not need to redo the network command

② Confussion with interfaces do not change the fact that R1 autosummarization will not let the packet travel out of R1!

Q.3 – 2 Points

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# ipv6 router eigrp 100
% IPv6 routing not enabled
Router(config)#
```

An administrator attempts to configure **EIGRP** for IPv6 on a router and receives the error message that is shown. Which command must be issued by the administrator before EIGRP for IPv6 can be configured?

Router(config)# IPv6 unicast-routing /1

Routing must be enable to configure a routing protocol. ipv6 routing is not enable by default.

Q.4 – 6 Points ← key word

Which address best summarizes the IPv6 addresses [redacted]**:ACAD::/48**, [redacted]**:9001::/48**, and [redacted]**:8752::/49**? Write down the calculations

/1

Remember: Each hextet contains 4 hexadecimal digits

ACAD	1010	1100	1010	1101
9001	1001	0000	0000	0001
8752	1000	0111	0101	0010

↳ Represents 8!

8 4 2 1

Remember to convert A ⇒ 10 = 8+2

8 4 2 1
1 0 1 0

A - 10
B - 11
C - 12
D - 13

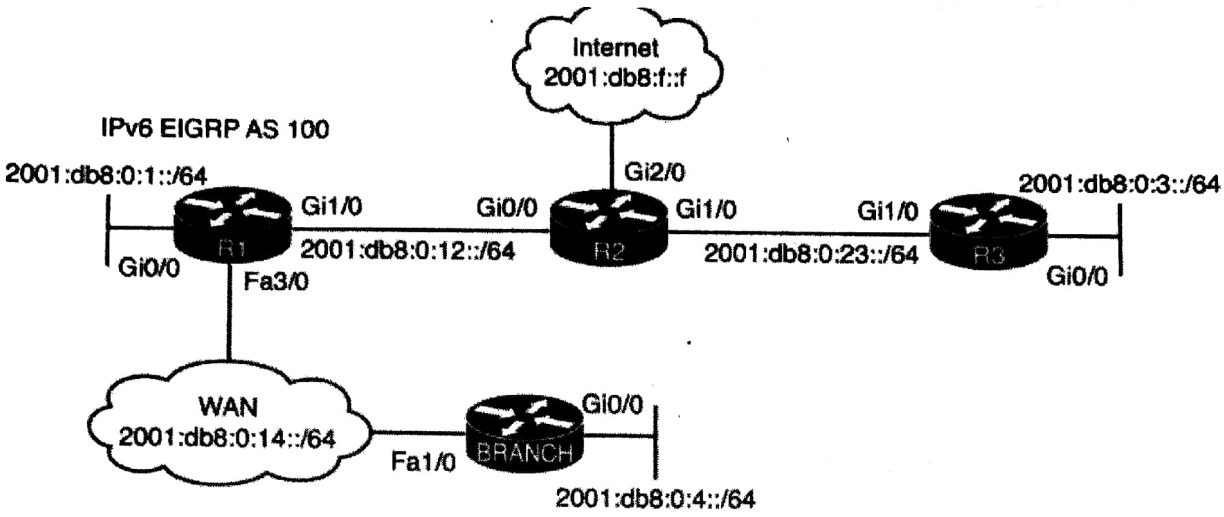
32 +2 = 34

Summarized address: 2001:DB8:8::/34

What is the purpose of a Null0 ~~route~~ in the routing table?

/1

A null0 is a virtual interface, also known as a blackhole route or a bit bucket. It is a network route that goes no where. Matching packets are dropped. Use to prevent routing loops



Users in the Branch network of 2001:db8:0:4::/64 have indicated that they are not able to access the Internet. To verify the problem, you ping 2001:db8:f::f with a source address of 2001:db8:0:4::4

```
Branch#ping
Protocol [ip]: ipv6
Target IPv6 address: 2001:db8:f::f
Repeat count [5]:
Datagram size [100]:
Timeout in seconds [2]:
Extended commands? [no]: y
Source address or interface: 2001:db8:0:4::4
UDP protocol? [no]:
Verbose? [no]:
Precedence [0]:
DSCP [0]: Include hop by hop option? [no]:
Include destination option? [no]:
Sweep range of sizes? [no]:
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:F::F, timeout is 2 seconds:
Packet sent with a source address of 2001:DB8:0:4::4
.....
Success rate is 0 percent (0/5)
```

The following **show** commands are given in order to further find the cause of the problem:

```
Branch#show ipv6 eigrp topology
EIGRP-IPv6 Topology Table for AS(100)/ID(4.4.4.4)
Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
       r - reply Status, s - sia Status

P 2001:DB8:0:4::/64, 1 successors, FD is 2816
        via Connected, GigabitEthernet0/0
P 2001:DB8:0:1::/64, 1 successors, FD is 28416
        via FE80::C820:17FF:FE04:54 (28416/2816), FastEthernet1/0
P 2001:DB8:0:14::/64, 1 successors, FD is 28160
        via Connected, FastEthernet1/0
P 2001:DB8:0:12::/64, 1 successors, FD is 28416
        via FE80::C820:17FF:FE04:54 (28416/2816), FastEthernet1/0


R1#show ipv6 eigrp topology
EIGRP-IPv6 Topology Table for AS(100)/ID(10.1.12.1)
Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
       r - reply Status, s - sia Status

P 2001:DB8:0:4::/64, 1 successors, FD is 28416
        via FE80::C828:DFF:FEF4:1C (28416/2816), FastEthernet3/0
P 2001:DB8:0:1::/64, 1 successors, FD is 2816
        via Connected, GigabitEthernet0/0
P 2001:DB8:0:3::/64, 1 successors, FD is 3328
        via FE80::C821:17FF:FE04:8 (3328/3072), GigabitEthernet1/0
P ::/0, 1 successors, FD is 2816
        via FE80::C821:17FF:FE04:8 (2816/256), GigabitEthernet1/0
P 2001:DB8:0:14::/64, 1 successors, FD is 28160
        via Connected, FastEthernet3/0
P 2001:DB8:0:12::/64, 1 successors, FD is 2816
        via Connected, GigabitEthernet1/0
P 2001:DB8:0:23::/64, 1 successors, FD is 3072
        via FE80::C821:17FF:FE04:8 (3072/2816), GigabitEthernet1/0


R1#show run | section ipv6 router eigrp
ipv6 router eigrp 100
 passive-interface default
 no passive-interface GigabitEthernet1/0
 no passive-interface FastEthernet3/0
 eigrp stub connected summary
```

Giving the output of the above command, propose a hypothesis of what is the root cause of the problem. Clearly **explain** why the problem occurs and propose a solution and give the commands to implement the solution

PROBLEM

Branch is not learning the default route from R1, which would be used to reach the "internet".

EXPLANATION

R1 is advertising the default route, as shown in topology as ::/0, but Branch does not have the route in its topology table.
This could be caused by multiple reasons. but as R1 Eigrp configuration is shown, you should notice that R1 has been configured as Eigrp stub router advertising connected and summary routes.

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SOLUTION

Remove stub configuration from R1.
Given the topology Branch should be conf. as stub

IMPLEMENTATION (COMMANDS)

R1 (config-router) no eigrp stub

Branch(config-router) eigrp stub [No necessary to obtain full marks]