BPA-KOM Lab 2: Comparison of Static and Dynamic Routing

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1. Note about my results

In this lab, the provided diagram B2 had the following network assignments:

- Network for link R2 ↔ R4: `10.4.0.0/16`

- Network for link R4 ↔ R3: `10.3.0.0/16`

In my implementation of the lab, the above networks were mistakenly swapped; however all lab objectives were achieved successfully, and the swapped networks did not affect the outcome.

The networks I worked with for links R2 ↔ R4 and R4 ↔ R3:

- Network for link R2 ↔ R4: `10.3.0.0/16`

- Network for link R4 ↔ R3: `10.4.0.0/16`

Additionally, the serial ports used for routers R1, R3, and R4 were port 1 instead of 3. I discovered the reason for the differing serial numbers after completing the lab and have since amended the file for future labs; however, to avoid repeating commands for most objectives, the original serial port assignments were retained.

This note's purpose is only to serve as clarification for when the CLI commands don't precisely match the instructed ones.

2. Objective 1

Task Assignment:
The aim of this task was to create the appropriate topology in Cisco Packet Tracer.

Solution:
The topology was created, using the appropriate switches and routers. The routers were then connected using Serial DTE (Data Terminal Equipment) connection.
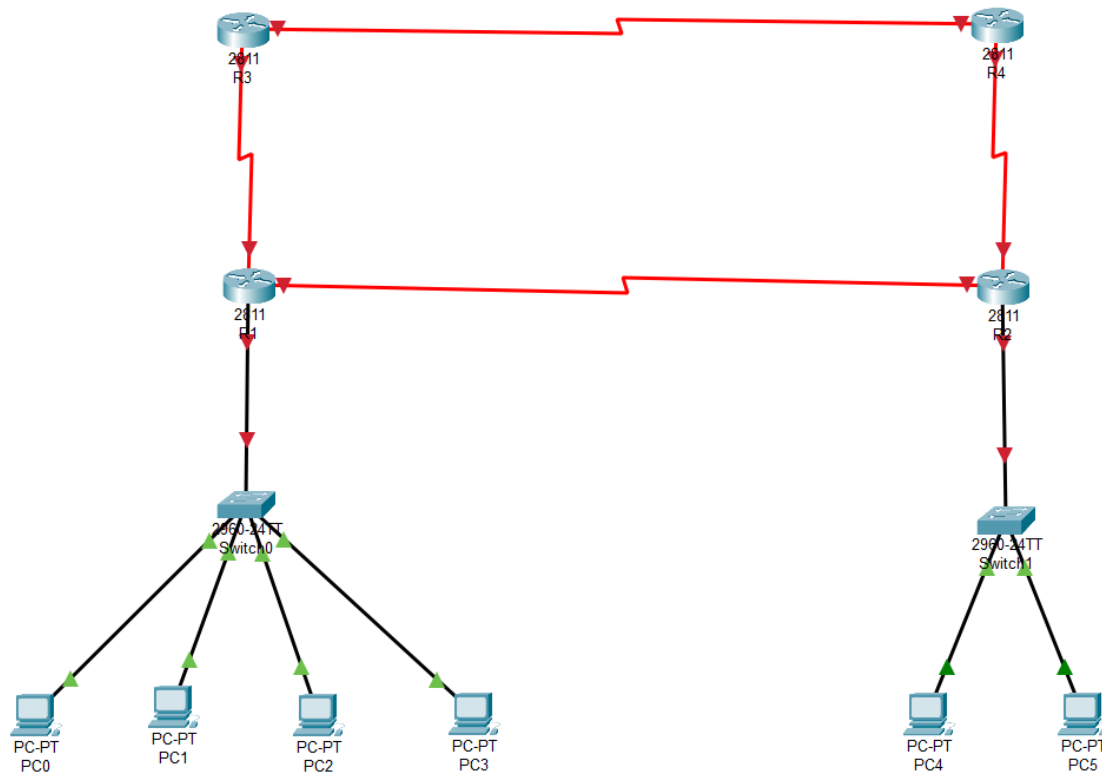
Figure 1: Logical Topology.

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3. Objective 2

Task Assignment:
The aim of this task was to set up addressing on all the devices.

Solution:
To be able to configure addressing on the routers, the user must be in **Configuration mode**.

For each router, its LAN interface was assigned a specific IP address and subnet mask to define its network. The interface was then activated using `no shutdown`.

The configuration of addresses corresponded with the following rules:

- R1 and R4 are using the **first** available host addresses from their particular networks on the serial interfaces.

- R2 and R3 are using the **last** available host addresses from their particular networks on the serial interfaces

As a result of the configuration, the interfaces went up and changed colour from red to green. The correct configuration was verified by issuing the appropriate ping command from local PCs.
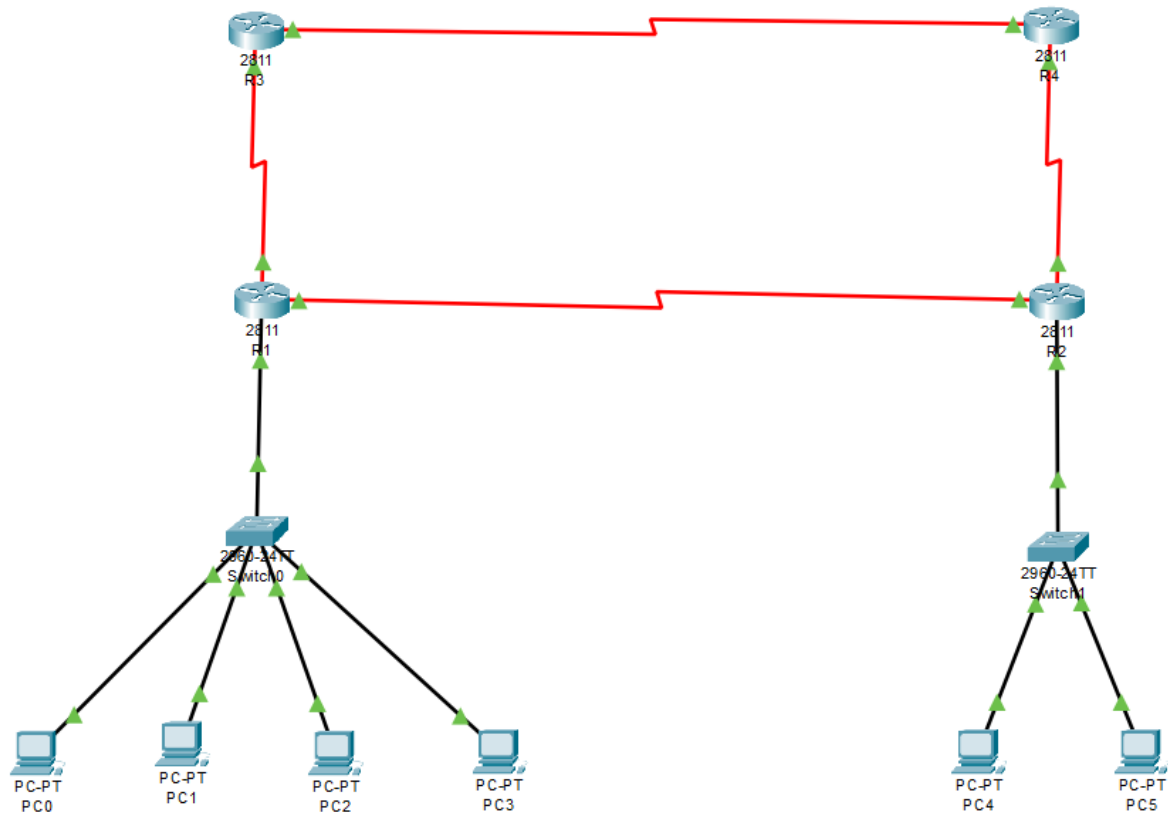

Figure 2: Topology with now activated interfaces.

4. Objective 3

Task Assignment:
The aim of this task was to explore the contents of the routing tables on the routers.

Solution:
The routing tables of the routers were displayed using the `show ip route` command in Privileged EXEC mode

```
R1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
C       10.1.0.0/16 is directly connected, Serial0/1/0
L       10.1.0.1/32 is directly connected, Serial0/1/0
C       10.2.0.0/16 is directly connected, Serial0/1/1
L       10.2.0.1/32 is directly connected, Serial0/1/1
     192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.1.0/24 is directly connected, FastEthernet0/0
L        192.168.1.254/32 is directly connected, FastEthernet0/0
```

Figure 3: Router R1's routing table

```
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
C        10.1.0.0/16 is directly connected, Serial0/3/0
L        10.1.255.254/32 is directly connected, Serial0/3/0
C        10.3.0.0/16 is directly connected, Serial0/3/1
L        10.3.255.254/32 is directly connected, Serial0/3/1
     192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.2.0/24 is directly connected, FastEthernet0/0
L        192.168.2.254/32 is directly connected, FastEthernet0/0
```

Figure 4: Router R2's routing table

```
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
C        10.2.0.0/16 is directly connected, Serial0/1/1
L        10.2.255.254/32 is directly connected, Serial0/1/1
C        10.4.0.0/16 is directly connected, Serial0/1/0
L        10.4.255.254/32 is directly connected, Serial0/1/0
```

Figure 5: Router R3's routing table

```
R4#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
C        10.3.0.0/16 is directly connected, Serial0/1/1
L        10.3.0.1/32 is directly connected, Serial0/1/1
C        10.4.0.0/16 is directly connected, Serial0/1/0
L        10.4.0.1/32 is directly connected, Serial0/1/0
```

Figure 6: Router R4's routing table

In the above tables, the individual records of paths can be seen having either a C code or an L code.

- The **C** code shows that the path is directly connected to the router

- The **L** code shows the router's own (local) IP address associated with an interface.

5. Objective 4

Task Assignment:
The aim of this task was to configure static routing so that all the devices can reach each other.

Solution:
To configure static routes, every network that the router should be able to communicate with was specified. Through specifying, the idea of reaching the destination (unknown network) via the shortest path possible is maintained.

Following are the routing tables of each router after the setup of static routing.

```
R1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
C       10.1.0.0/16 is directly connected, Serial0/1/0
L       10.1.0.1/32 is directly connected, Serial0/1/0
C       10.2.0.0/16 is directly connected, Serial0/1/1
L       10.2.0.1/32 is directly connected, Serial0/1/1
S       10.3.0.0/16 is directly connected, Serial0/1/0
S       10.4.0.0/16 is directly connected, Serial0/1/1
     192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, FastEthernet0/0
L       192.168.1.254/32 is directly connected, FastEthernet0/0
S    192.168.2.0/24 is directly connected, Serial0/1/0
```

Figure 7: Router R1's routing table after static routing.

```
R2#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
C       10.1.0.0/16 is directly connected, Serial0/3/0
L       10.1.255.254/32 is directly connected, Serial0/3/0
S       10.2.0.0/16 is directly connected, Serial0/3/0
C       10.3.0.0/16 is directly connected, Serial0/3/1
L       10.3.255.254/32 is directly connected, Serial0/3/1
S       10.4.0.0/16 is directly connected, Serial0/3/1
S    192.168.1.0/24 is directly connected, Serial0/3/0
     192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.2.0/24 is directly connected, FastEthernet0/0
L       192.168.2.254/32 is directly connected, FastEthernet0/0
```

Figure 8: Router R2's routing table after static routing.

```
R3#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
S       10.1.0.0/16 is directly connected, Serial0/1/1
C       10.2.0.0/16 is directly connected, Serial0/1/1
L       10.2.255.254/32 is directly connected, Serial0/1/1
S       10.3.0.0/16 is directly connected, Serial0/1/0
C       10.4.0.0/16 is directly connected, Serial0/1/0
L       10.4.255.254/32 is directly connected, Serial0/1/0
S    192.168.1.0/24 is directly connected, Serial0/1/1
S    192.168.2.0/24 is directly connected, Serial0/1/1
```

Figure 9: Router R3's routing table after static routing.

```
R4#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
S       10.1.0.0/16 is directly connected, Serial0/1/1
S       10.2.0.0/16 is directly connected, Serial0/1/0
C       10.3.0.0/16 is directly connected, Serial0/1/1
L       10.3.0.1/32 is directly connected, Serial0/1/1
C       10.4.0.0/16 is directly connected, Serial0/1/0
L       10.4.0.1/32 is directly connected, Serial0/1/0
S    192.168.1.0/24 is directly connected, Serial0/1/1
S    192.168.2.0/24 is directly connected, Serial0/1/1
```

Figure 10: Router R4's routing table after static routing.

New records are visible in all the tables; all having S code meaning that they are Static records. This means that the static routing configuration was successful.

6. Objective 5

Task Assignment:
The aim of this task was to remove the link connecting R1 and R2 to explore its effects on the reachability between LANs.

Solution:
Via the deletion tool, the connection between R1 and R2 was removed. The effect of this on R1's routing table can be seen:

```
R1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
C       10.2.0.0/16 is directly connected, Serial0/1/1
L       10.2.0.1/32 is directly connected, Serial0/1/1
S       10.4.0.0/16 is directly connected, Serial0/1/1
     192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, FastEthernet0/0
L       192.168.1.254/32 is directly connected, FastEthernet0/0
```

Figure 11: Router R1's routing table after severing R1↔R2 link.

It can be noted that all networks previously reachable via Serial port 0/1/0 of R1 are no longer reachable. These include the networks 10.1.0.0/16 and 10.3.0.0/16, as well as the local IP address 10.1.0.1/32. Additionally, the LAN 192.168.2.0/24 is no longer reachable.

The reason R2's LAN and network 10.3.0.0/16 (*in reference topology 10.4.0.0/16*) are no longer reachable, even though there still exists a route via R3 and R4 is because no static routes are configured for that path; All the connection records indicate this as they are all labelled as directly connected. For static routing, routers only know manually configured routes, so even if a physical path exists, it cannot be used unless configured otherwise.

The ping utility was then used to test the connectivity from any PC inside R1's LAN to active interfaces on R4.

```
C:\>ping 10.4.255.254

Pinging 10.4.255.254 with 32 bytes of data:

Reply from 10.4.255.254: bytes=32 time=13ms TTL=254
Reply from 10.4.255.254: bytes=32 time=1ms TTL=254
Reply from 10.4.255.254: bytes=32 time=9ms TTL=254
Reply from 10.4.255.254: bytes=32 time=9ms TTL=254

Ping statistics for 10.4.255.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 13ms, Average = 8ms

C:\>ping 10.3.0.1

Pinging 10.3.0.1 with 32 bytes of data:

Reply from 192.168.1.254: Destination host unreachable.
Request timed out.
Reply from 192.168.1.254: Destination host unreachable.
Reply from 192.168.1.254: Destination host unreachable.

Ping statistics for 10.3.0.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Figure 12: Testing connectivity from R1's LAN to active interfaces on R4

It can be seen that the ping for interface R4↔R3 was successful because R1 is still directly connected to R3. However, ping for interface R4↔R2 failed. This is because even though they are on the same device, there is no configured route for R1 to reach R4; had the R1↔R2 connection still be established, the ping would have succeeded as R1 would be directly connected to R2.

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7. Objective 6

Task Assignment:
The aim of this task was to reconnect the previously removed link and replace the previously implemented static routing with dynamic routing using the RIP protocol.

Solution:
R1 and R2 were reconnected. The routing table of R1 then printed as follows:

```
R1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
C       10.1.0.0/16 is directly connected, Serial0/1/0
L       10.1.0.1/32 is directly connected, Serial0/1/0
C       10.2.0.0/16 is directly connected, Serial0/1/1
L       10.2.0.1/32 is directly connected, Serial0/1/1
S       10.3.0.0/16 is directly connected, Serial0/1/0
S       10.4.0.0/16 is directly connected, Serial0/1/1
     192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, FastEthernet0/0
L       192.168.1.254/32 is directly connected, FastEthernet0/0
S    192.168.2.0/24 is directly connected, Serial0/1/0
```

Figure 13: R1's routing table after re-establishing R1↔R2

It can be noted that no new records appeared, as the records were not deleted from the memory of the router when the interface was removed.

All static routes were then deleted from the routers using command template `Rx(config)#no ip route <network> <subnet-mask> <serial port>`. Then, dynamic routing using the **RIPv1** protocol was configured for all the routers. R1's routing table now looks as follows:

```
R1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
C       10.1.0.0/16 is directly connected, Serial0/1/0
L       10.1.0.1/32 is directly connected, Serial0/1/0
C       10.2.0.0/16 is directly connected, Serial0/1/1
L       10.2.0.1/32 is directly connected, Serial0/1/1
R       10.3.0.0/16 [120/1] via 10.1.255.254, 00:00:08, Serial0/1/0
R       10.4.0.0/16 [120/1] via 10.2.255.254, 00:00:09, Serial0/1/1
     192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, FastEthernet0/0
L       192.168.1.254/32 is directly connected, FastEthernet0/0
R    192.168.2.0/24 [120/1] via 10.1.255.254, 00:00:08, Serial0/1/0
```

Figure 14: R1's routing table after dynamic routing

In total, this new table presents 3 new records, all indicated with the **R** code, which

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means that the entries were dynamically learned via the RIP protocol.

After dynamic routing, R3's routing table now looks as follows:

```
R3#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
R       10.1.0.0/16 [120/1] via 10.2.0.1, 00:00:02, Serial0/1/1
C       10.2.0.0/16 is directly connected, Serial0/1/1
L       10.2.255.254/32 is directly connected, Serial0/1/1
R       10.3.0.0/16 [120/1] via 10.4.0.1, 00:00:27, Serial0/1/0
C       10.4.0.0/16 is directly connected, Serial0/1/0
L       10.4.255.254/32 is directly connected, Serial0/1/0
R     192.168.1.0/24 [120/1] via 10.2.0.1, 00:00:02, Serial0/1/1
R     192.168.2.0/24 [120/2] via 10.2.0.1, 00:00:02, Serial0/1/1
                     [120/2] via 10.4.0.1, 00:00:27, Serial0/1/0
```

Figure 15: R3's routing table after dynamic routing showing active load balancing

One can note that the bottom two rows are two different routes to reach R2's LAN. Since both routes are of equal distance, RIP uses both of these and divides traffic equally in a process called **load balancing**.

---

8. Objective 7

Task Assignment:
The aim of this task was to once again remove the link connecting R1 and R2 to explore its affects on the reachability between LANs now that dynamic routing has been implemented.

Solution:

After deleting the link of R1 and R2 once again, R1's routing table prints as follows:

```
R1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
C       10.2.0.0/16 is directly connected, Serial0/1/1
L       10.2.0.1/32 is directly connected, Serial0/1/1
R       10.3.0.0/16 [120/2] via 10.2.255.254, 00:00:17, Serial0/1/1
R       10.4.0.0/16 [120/1] via 10.2.255.254, 00:00:17, Serial0/1/1
     192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, FastEthernet0/0
L       192.168.1.254/32 is directly connected, FastEthernet0/0
R    192.168.2.0/24 [120/3] via 10.2.255.254, 00:00:17, Serial0/1/1
```

Figure 16: R1's routing table after severing R1↔R2 once again.

The networks 10.3.0.0/16 (*in reference topology 10.4.0.0/16*) and 192.168.2.0/24 are still available as can be noted. This differs from the result that was seen after deleting the R1↔R2 link when static routing was configured.

The route used to reach the networks is [120/2] for 10.3.0.0/16 and [120/3] for 192.168.2.0/24. These routes were both learned dynamically; the 120 indicates the administrative distance, which is used by RIP, while the second number ([120/x]) indicates the hop count, which is the number of routers needed to reach that particular network.

Below is R3's routing table

```
R3#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
C       10.2.0.0/16 is directly connected, Serial0/1/1
L       10.2.255.254/32 is directly connected, Serial0/1/1
R       10.3.0.0/16 [120/1] via 10.4.0.1, 00:00:20, Serial0/1/0
C       10.4.0.0/16 is directly connected, Serial0/1/0
L       10.4.255.254/32 is directly connected, Serial0/1/0
R    192.168.1.0/24 [120/1] via 10.2.0.1, 00:00:22, Serial0/1/1
R    192.168.2.0/24 [120/2] via 10.4.0.1, 00:00:20, Serial0/1/0
```

Figure 17: R3's routing table after severing R1↔R2 once again.

It can be noted that load balancing is no longer active, as only one valid path to the LAN remains, which is via R4.

9. Final Questions

Question 1: What is the difference between static and dynamic routing?
Static routing involves manually configured paths for network traffic, which do not change unless manually updated. Dynamic routing, on the other hand uses routing protocols such as RIP, which, after configured, automatically discover and update routes based on the present configuration.

Question 2: What is routing table and what does it contain?
A routing table is a data structure in the router which stores and displays information about which networks are reachable, and how. It contains:

- The connection code (eg: C/S/R/D)

- The destination network

- The subnet mask

- Potential values for administrative distance and hop count

- The next-hop IP address

- The age of the route

- The exit interface used to reach the next hop

Question 3: What is the next-hop IP address?
The next-hop IP address is the address of the next router along the path to the destination network.

Question 4: What must be specified while configuring the static routes on Cisco devices?
When configuring the static routes on Cisco routers, in the command the following parameters must be set:

- The Destination network and subnet mask. This defines which network the static route is for

- The exit interface OR even the next-hop IP address. This specifies where to send the packets to reach the destination network.

Question 5: What is a load balancing?
Load balancing is when there are more than one equidistant routes to a destination network, and a protocol distributes the network traffic between the routes so to use resources more efficiently.