Lab 6: Configuration of Dynamic Routing Protocols

Objective

- To understand the concepts of dynamic routing protocols.
- To configure RIP, EIGRP, OSPF, and BGP using CLI on routers.

Theory

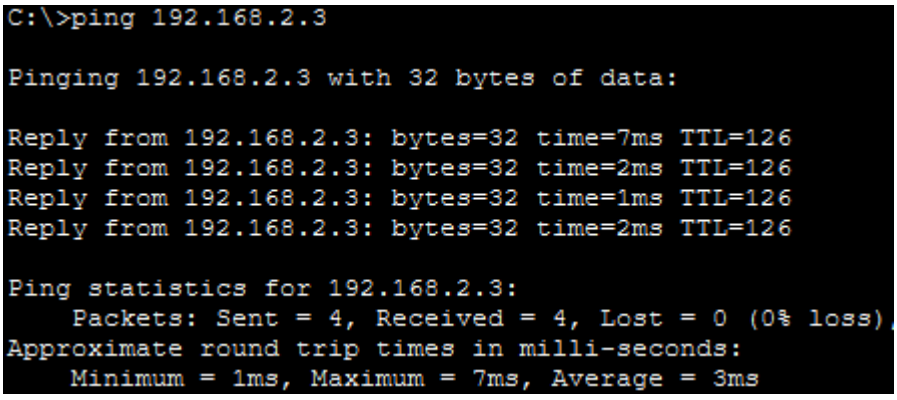
Dynamic routing protocols automatically determine the best paths for data transmission by exchanging routing information among routers. RIP uses hop count as a metric and is suitable for small networks. EIGRP is an advanced distance-vector protocol that uses multiple metrics for efficient routing. OSPF is a link-state protocol that calculates shortest paths using Dijkstra's algorithm and supports large networks. BGP is a path-vector protocol used for inter-domain routing and forms the backbone of the Internet.

Observations

All routing protocols successfully enabled communication between different networks. Ping tests confirmed correct route propagation and protocol functionality.

Outputs

BGP 1



EIGRP 1

```
C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time<1ms TTL=126
Reply from 192.168.2.2: bytes=32 time<1ms TTL=126
Reply from 192.168.2.2: bytes=32 time<1ms TTL=126
Reply from 192.168.2.2: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

OSPF 1

```
C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time=1ms TTL=126
Reply from 192.168.2.2: bytes=32 time<1ms TTL=126
Reply from 192.168.2.2: bytes=32 time=1ms TTL=126
Reply from 192.168.2.2: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

RIP 1

```
C:\>ping 192.168.2.3

Pinging 192.168.2.3 with 32 bytes of data:

Reply from 192.168.2.3: bytes=32 time<1ms TTL=126
Reply from 192.168.2.3: bytes=32 time=1ms TTL=126
Reply from 192.168.2.3: bytes=32 time<1ms TTL=126
Reply from 192.168.2.3: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.2.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Conclusion

This experiment provided practical exposure to configuring and comparing multiple dynamic routing protocols. Each protocol demonstrated distinct characteristics in terms of scalability, efficiency, and application scope. RIP proved simple but limited, EIGRP showed improved performance, OSPF highlighted scalability within enterprises, and BGP emphasized its importance in large-scale inter-network communication. Overall, the lab strengthened our understanding of how routing decisions are made dynamically in real-world networks.