Experiment No.: 04

Experiment Name: Configuring a Network Topology Using OSPF Protocol.

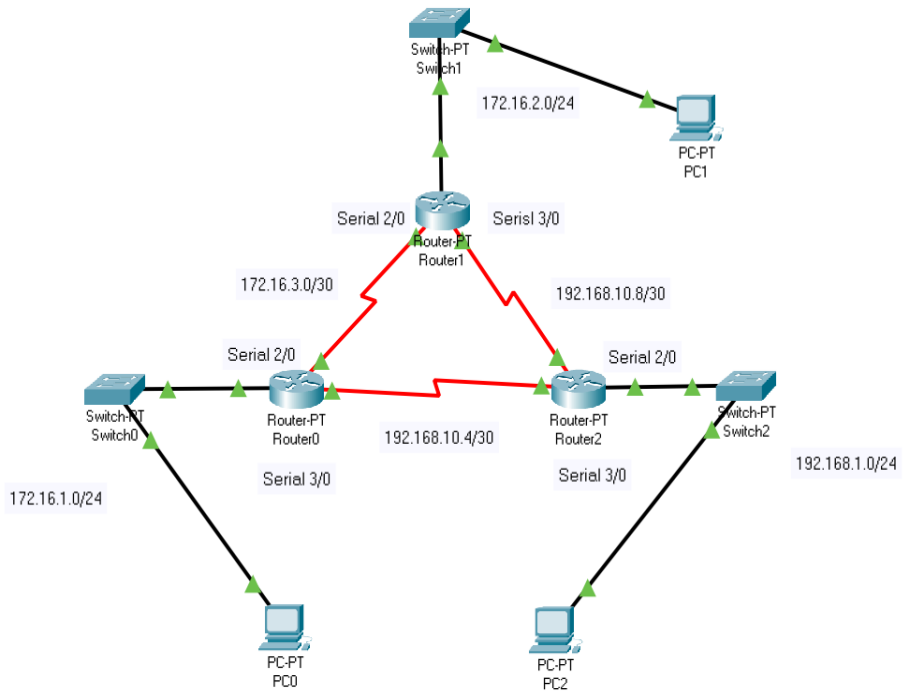
Objective:

- To learn computer networking protocols
- To learn basics of OSPF protocol
- To configure a network using OSPF protocol

Introduction:

Open Shortest Path First (OSPF) is a very widely used link-state interior gateway protocols (IGP). This protocol routes Internet Protocol (IP) packets by gathering link-state information from neighboring routers and constructing a map of the network. OSPF routers send many message types including hello messages, link state requests and updates and database descriptions. Dijkstra's algorithm is then used to find the shortest path to the destination. Shortest Path First (SPF) calculations are computed either periodically or upon a received Link State Advertisement (LSA), depending on the protocol implementation. Topology changes are detected very quickly using this protocol. Another advantage of OSPF is that its many configurable parameters make it a very flexible and robust protocol. Contrary to RIP, however, OSPF has the disadvantage of being too complicated.

Topology:



Command:

1. **PC Configuration:**

PC-PT PC0:

IP Address: 172. 16. 1. 2

Subnet Mask: 255. 255. 255. 0

Default Gateway: 172. 16. 1. 1

PC-PT PC1:

IP Address: 172. 16. 2. 2

Subnet Mask: 255. 255. 255. 0

Default Gateway: 172. 16. 2. 1

PC-PT PC2:

IP Address: 192. 168. 1. 2

Subnet Mask: 255. 255. 255. 0

Default Gateway: 192. 168. 1. 1

2. **Interface Configuring:**

Router-PT Router0:

Router > no

Router# conf terminal

Router(config)# interface fastEthernet 0/0

Router(config-if)# ip address 172. 16. 1. 1 255. 255. 255. 0

Router(config-if)# no shutdown

Router(config-if)# exit

Router(config)# interface serial 2/0

Router(config-if)# ip address 172. 16. 3. 1 255. 255. 255. 252

Router(config-if)# clock rate 64000

Router(config-if)# no shutdown

Router(config-if)# exit

Router(config)# interface serial 3/0

Router(config-if)# ip address 192. 168. 10. 5 255. 255. 255. 252

Router(config-if)# clock rate 64000

Router(config-if)# no shutdown

Router(config-if)# exit

Router-PT Router1:

Router > no

Router# conf terminal

Router(config)# interface fastEthernet 0/0

Router(config-if)# ip address 172. 16. 2. 1 255. 255. 255. 0

Router(config-if)# no shutdown

Router(config-if)# exit

Router(config)# interface serial 2/0

Router(config-if)# ip address 172. 16. 3. 2 255. 255. 255. 252

Router(config-if)# no shutdown

Router(config-if)# exit

Router(config)# interface serial 3/0

Router(config-if)# ip address 192. 168. 10. 9 255. 255. 255. 252

Router(config-if)# no shutdown

Router(config-if)# exit

Router-PT Router2:

Router > no

Router# conf terminal

Router(config)# interface fastEthernet 0/0

Router(config-if)# ip address 192. 168. 1. 1 255. 255. 255. 0

Router(config-if)# no shutdown

Router(config-if)# exit

Router(config)# interface serial 2/0

Router(config-if)# ip address 192.168.10.10 255. 255. 255. 252

Router(config-if)# no shutdown

Router(config-if)# exit

Router(config)# interface serial 3/0

Router(config-if)# ip address 192. 168. 10. 6 255. 255. 255. 252

Router(config-if)# no shutdown

Router(config-if)# exit

3. EIGRP Configuring:

Router-PT Router0:

Router > no

Router# conf terminal

Router(config)# router ospf 1

Router(config-router)# network 172. 16. 1. 0 0. 0. 0. 255 area 0

Router(config-router)# network 172. 16. 3. 0 0. 0. 0. 3 area 0

Router(config-router)# network 192. 168. 10. 4 0. 0. 0. 3 area 0

Router-PT Router1:

Router > no

Router# conf terminal

Router(config)# router ospf 1

Router(config-router)# network 172. 16. 2. 0 0. 0. 0. 255 area 0

Router(config-router)# network 172. 16. 3. 0 0. 0. 0. 3 area 0

Router(config-router)# network 192. 168. 10. 8 0. 0. 0. 3 area 0

Router-PT Router2:

Router > no

Router# conf terminal

Router(config)# router ospf 1

Router(config-router)# network 192. 168. 10. 8 0. 0. 0. 3 area 0

Router(config-router)# network 192. 168. 1. 0 0. 0. 0. 255 area 0

Router(config-router)# network 192. 168. 10. 4 0. 0. 0. 3 area 0

Result & Analysis:

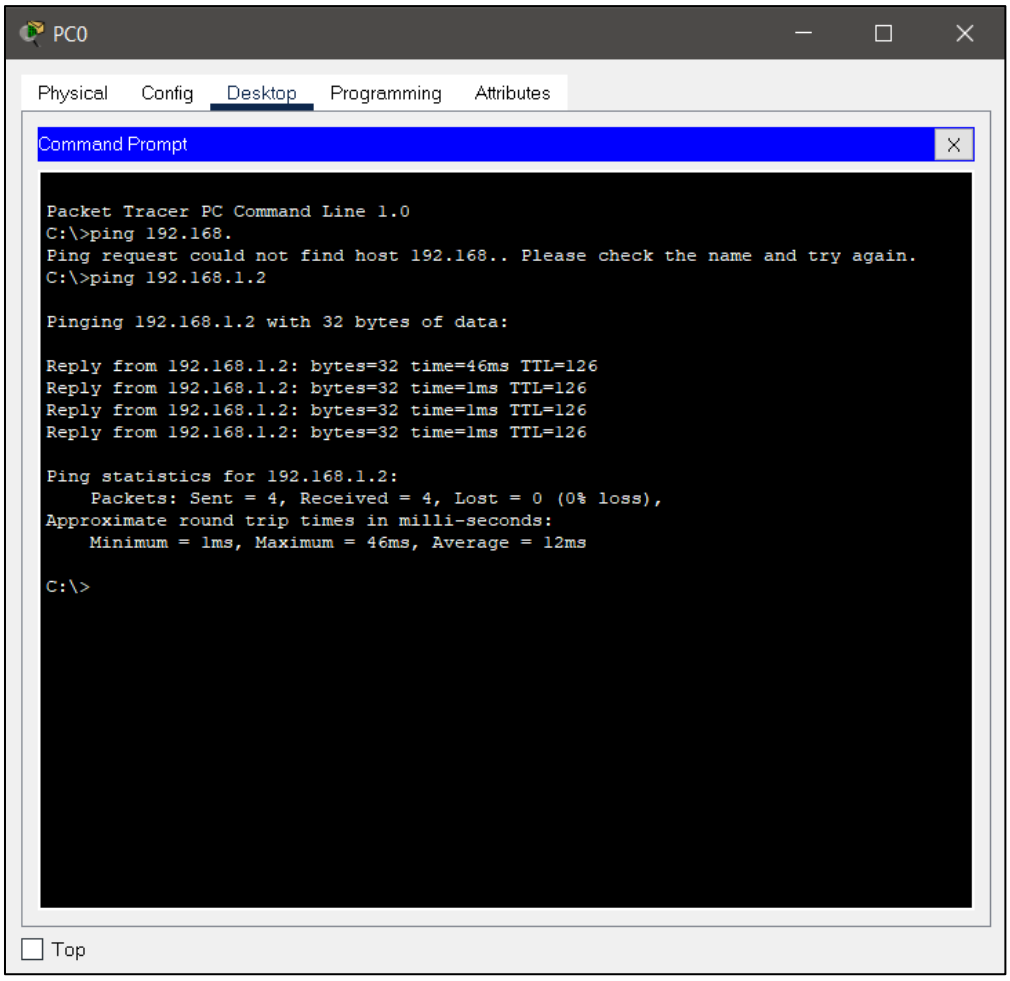


Figure 01: Ping from **PC-PT PC0** to **PC-PT PC2**

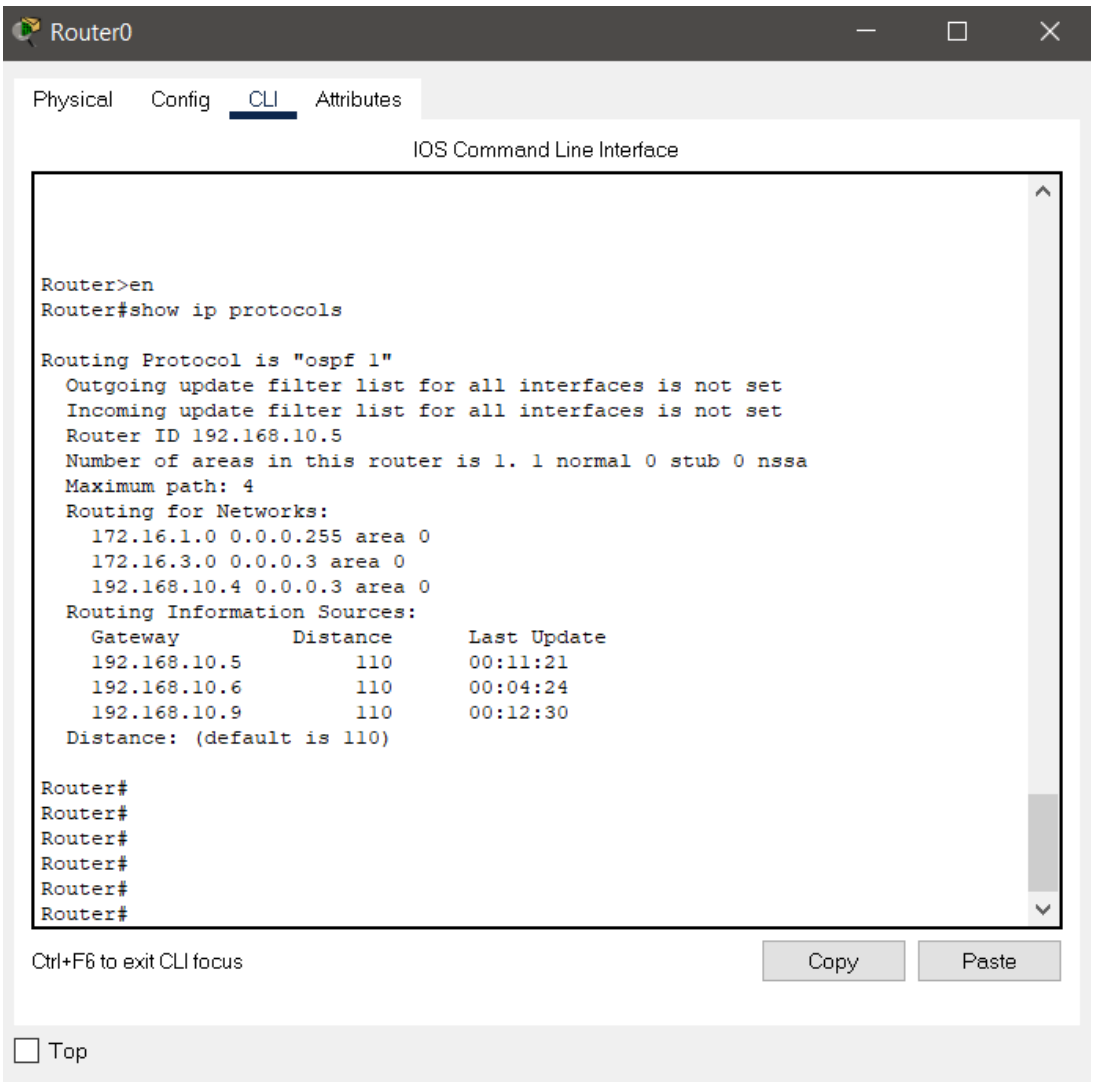


Figure 02: IP Protocols **Router-PT Router0**

Conclusion:

In this experiment, a network topology was configured using OSPF protocol. The network was built properly and worked without any data loss. OSPF finds the best path for routers to take information or packets and takes packets to neighbors once something in the routing table has changed, instead of regular updates every 30 seconds. Because it is a link-state routing protocol then topology information will be shared with nearest neighbors and has the ability to detect changes or failures within seconds. It provides fast convergence and excellent scalability as well as efficiently using network bandwidth (Cisco, 2013).