Experiment – 6

IMPLEMENTATION OF OSPF ROUTING PROTOCOL

AIM: Implementation of OSPF routing Protocol.

OSPF ROUTING:

OSPF (Open Shortest Path First) is a dynamic routing protocol used to automatically determine and update routes in an IP network. It operates within a hierarchical structure and uses link-state information to calculate the shortest and most efficient path for data packets. Unlike static routing, where routes are manually set and remain fixed, OSPF adjusts dynamically to changes in the network topology, ensuring that data is routed efficiently without the need for manual intervention by a network administrator.

OSPF is known for its scalability and fast convergence in complex networks.

Network Setup:

- Router1: Connected to Router4 via a serial link (12.0.0.0 network) and to Switch0 with the 192.168.1.0 network.
  - Connected PCs: PC0 (192.168.1.1), PC1 (192.168.1.2)
- Router4: Acts as the central router, connected to Router1, Router5, and Switch2.
  - Networks: 10.0.0.0 (to Router5), 12.0.0.0 (to Router1), 11.0.0.0 (to Router6)
  - Connected PCs: PC4 (192.168.2.1), PC5 (192.168.2.2)
- Router5: Connected to Router4 via a serial link (10.0.0.0 network) and to Switch1 with the 192.168.3.0 network.
  - Connected PCs: PC2 (192.168.3.1), PC3 (192.168.3.2)

Simulation & Results:

- A successful ICMP packet was sent from PC3 (172.168.1.3) to PC4 (15.0.0.2), demonstrating that the OSPF protocol is successfully routing packets between networks.
- The routers dynamically calculated the most efficient path, ensuring that traffic takes the shortest and least congested route.

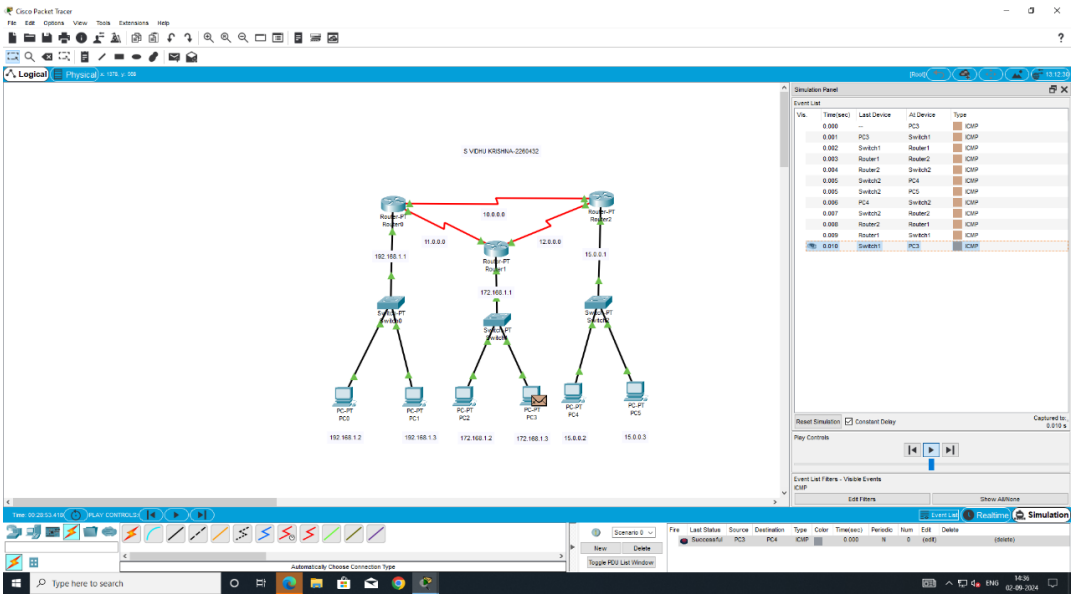
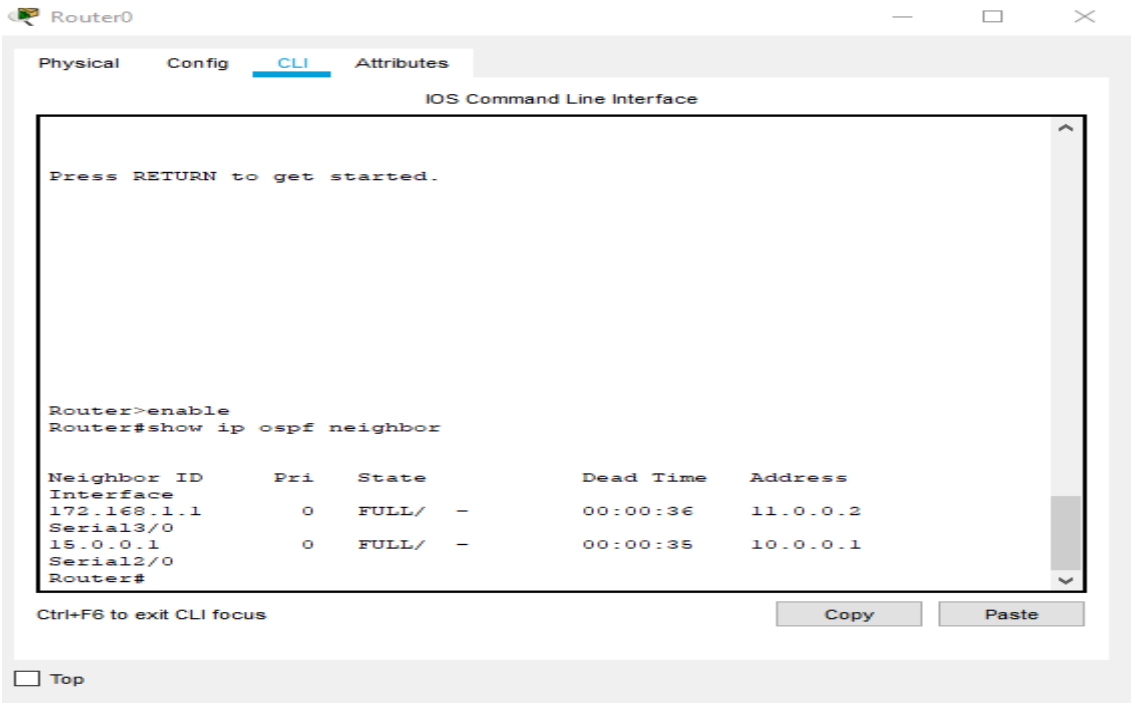


Fig. OSPF Routing



The image shows the output of the show ip ospf neighbour command on Router0. It lists two OSPF neighbours with their neighbour IDs (172.168.1.1 and 15.0.0.1), both in the "FULL" state, meaning they have successfully formed OSPF adjacencies. The router has established connections through interfaces Serial3/0 (to 11.0.0.2) and Serial2/0 (to 10.0.0.1), confirming OSPF is functioning and synchronizing route information across these neighbours.