**Exp: no: 5**

Performance analysis of routing protocols using simulation tool.

**Aim:**

To simulate routing protocols for Data Link layer and Network Layer, and to write the syntax, execute the commands, and capture the screenshots

1. Construct 3 to 4 networks each connected by a router and enable packet transmission between all the networks.

**Syntax:**

**Step 1: Setting up Devices**

**Components in the Topology:**

1. 3 Routers (1841) - Router 4, Router 5, Router 6
2. 3 Switches (2960) - Switch 0, Switch 1, Switch 2
3. 6 PCs - PC0, PC1 (Network A), PC2, PC3 (Network B), PC4, PC5 (Network C)

**Step 2: Device Connections**

**Connecting the Devices:**

* **PCs to Switches:**
  + Network A:
    - PC0 -> Switch0 (FastEthernet0/1)
    - PC1 -> Switch0 (FastEthernet0/2)
  + Network B:
    - PC2 -> Switch1 (FastEthernet0/1)
    - PC3 -> Switch1 (FastEthernet0/2)
  + Network C:
    - PC4 -> Switch2 (FastEthernet0/1)
    - PC5 -> Switch2 (FastEthernet0/2)
* **Switches to Routers:**
  + Switch0 -> Router 4 (FastEthernet0/0)
  + Switch1 -> Router 5 (FastEthernet0/0)
  + Switch2 -> Router 6 (FastEthernet0/0)
* **Router-to-Router Connections (using Serial Interfaces):**
  + Router 4 (Se0/0/0) -> Router 5 (Se0/0/0)
  + Router 5 (Se0/0/1) -> Router 6 (Se0/0/0)
  + Router 6 (Se0/0/1) -> Router 4 (Se0/0/1)

**Step 3: Configuring PCs**

For Each PC:

**Go to:** Desktop -> IP Configuration.

* **Network A (PC0, PC1):**
  + IP Addresses:
    - PC0: 192.168.1.2
    - PC1: 192.168.1.3
  + Subnet Mask: 255.255.255.0
  + Default Gateway: 192.168.1.1 (Router 4's IP)
* **Network B (PC2, PC3):**
  + IP Addresses:
    - PC2: 192.168.2.2
    - PC3: 192.168.2.3
  + Subnet Mask: 255.255.255.0
  + Default Gateway: 192.168.2.1 (Router 5's IP)
* **Network C (PC4, PC5):**
  + IP Addresses:
    - PC4: 192.168.3.2
    - PC5: 192.168.3.3
  + Subnet Mask: 255.255.255.0
  + Default Gateway: 192.168.3.1 (Router 6's IP)

**Step 4: Configuring the Routers**

**Router Configuration Steps:**

**Router 4 (Network A):**

1. Configure FastEthernet Interface (Fa0/0):
   * IP Address: 192.168.1.1
   * Subnet Mask: 255.255.255.0
   * Turn on the interface.
2. Configure Serial Interface (Se0/0/0) - Link to Router 5:
   * IP Address: 10.0.0.2
   * Subnet Mask: 255.0.0.0
   * Clock Rate: 148000
   * Turn on the interface.
3. Configure Serial Interface (Se0/0/1) - Link to Router 6:
   * IP Address: 11.0.0.1
   * Subnet Mask: 255.0.0.0
   * Clock Rate: 148000
   * Turn on the interface.

**Router 5 (Network B):**

1. Configure FastEthernet Interface (Fa0/0):
   * IP Address: 192.168.2.1
   * Subnet Mask: 255.255.255.0
   * Turn on the interface.
2. Configure Serial Interface (Se0/0/0) - Link to Router 4:
   * IP Address: 10.0.0.1
   * Subnet Mask: 255.0.0.0
   * Turn on the interface.
3. Configure Serial Interface (Se0/0/1) - Link to Router 6:
   * IP Address: 12.0.0.2
   * Subnet Mask: 255.0.0.0
   * Clock Rate: 148000
   * Turn on the interface.

**Router 6 (Network C):**

1. Configure FastEthernet Interface (Fa0/0):
   * IP Address: 192.168.3.1
   * Subnet Mask: 255.255.255.0
   * Turn on the interface.
2. Configure Serial Interface (Se0/0/0) - Link to Router 5:
   * IP Address: 12.0.0.1
   * Subnet Mask: 255.0.0.0
   * Turn on the interface.
3. Configure Serial Interface (Se0/0/1) - Link to Router 4:
   * IP Address: 11.0.0.2
   * Subnet Mask: 255.0.0.0
   * Turn on the interface.

**Step 5: Configuring Routing (RIP)**

Enabling RIP on Each Router:

1. Router 4 (Network A):
   * Network: 10.0.0.0 (Router 4 and Router 5 connection)
   * Network: 11.0.0.0 (Router 4 and Router 6 connection)
2. Router 5 (Network B):
   * Network: 10.0.0.0 (Router 4 and Router 5 connection)
   * Network: 12.0.0.0 (Router 5 and Router 6 connection)
3. Router 6 (Network C):
   * Network: 11.0.0.0 (Router 4 and Router 6 connection)
   * Network: 12.0.0.0 (Router 5 and Router 6 connection)

Save configurations after setting up RIP for all routers.

**Step 6: Testing the Network**

**To test the connectivity:**

1. Ping from a PC in one network to the router in the same network:
   * For example, from PC0 (192.168.1.2) to Router 4 (192.168.1.1).
2. Ping from a PC in one network to a router in a different network:
   * For example, from PC0 (192.168.1.2) to Router 6 (192.168.3.1).
3. Ping between PCs across networks:
   * Ping from PC0 (192.168.1.2) in Network A to PC4 (192.168.3.2) in Network C.
   * If the ping is successful, the routing between networks is configured properly.

**Output:**

**A diagram of a network

Description automatically generated**

**A screenshot of a computer

Description automatically generated**

**A screenshot of a computer

Description automatically generated**

**A screenshot of a computer

Description automatically generated**

**A screenshot of a computer

Description automatically generated**

**Result:**

All experiments have been successfully executed, with no errors or issues encountered. The expected results have been achieved, as demonstrated by the attached screenshots.