WORKSHEET 2.4

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Branch: CSE **Section/Group: 808/B**
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Subject: Computer Networks **Subject Code: 21CSH-256**

1. **Aim:**
   Configure a network using Link State Routing Protocol using Packet Tracer or NS2.
2. **Software Requirements:**
   Packet Tracer

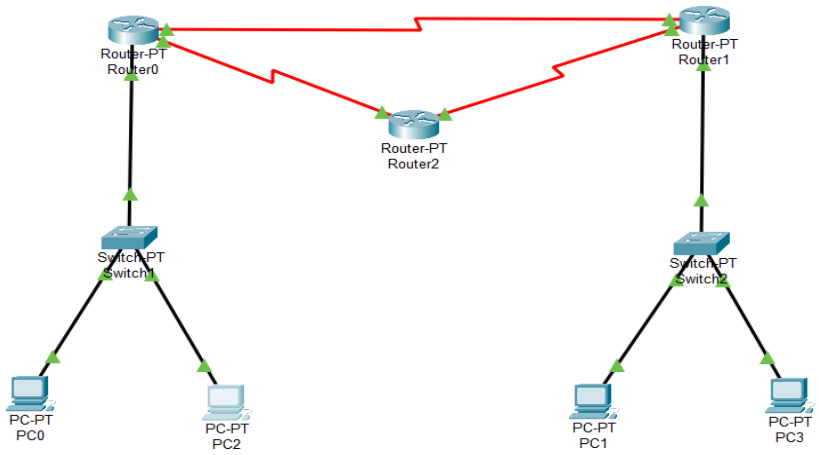
3. **Hardware Requirements:**

   - Processor – Any suitable Processor e.g., Celeron
   - Main Memory - 128MBRAM
   - Hard Disk – minimum 20 GB IDE Hard Disk
   - Removable Drives – 1.44MB
   - Floppy Disk Drive –52X IDE CD-ROM Drive
   - PS/2 HCL
   - Keyboard and Mouse

4. **Method:-**
   Open Shortest Path First (OSPF) is an open standard protocol developed by IETF due limitations with the Routing Information Protocol (RIP). OSPF's major advantages over RIP and other distance vector routing protocol include fast convergence, support for large scalable networks etc. OSPF uses cost as the metric which is much more robust then RIP's hop count which puts the limit to maximum 16 routes and also allows for equal cost load balancing for more efficient use of multiple paths.

   OSPF uses the Hello protocol to form and keep track of neighborships, and it builds adjacencies with neighbors by exchanging link-state information using link state advertisements.

Configuration:



OSPF Configuration

Router(config-if)#exit

Router(config)#router ospf 1

Router(config-router)#network 192.168.1.0 0.0.0.255 area 0

Router(config-router)#network 10.0.0.0 0.255.255.255 area 0

Router(config-router)#network 20.0.0.0 0.255.255.255 area0

Router(config-router)#network 20.0.0.0 0.255.255.255 area 0

Router(config-router)#exit

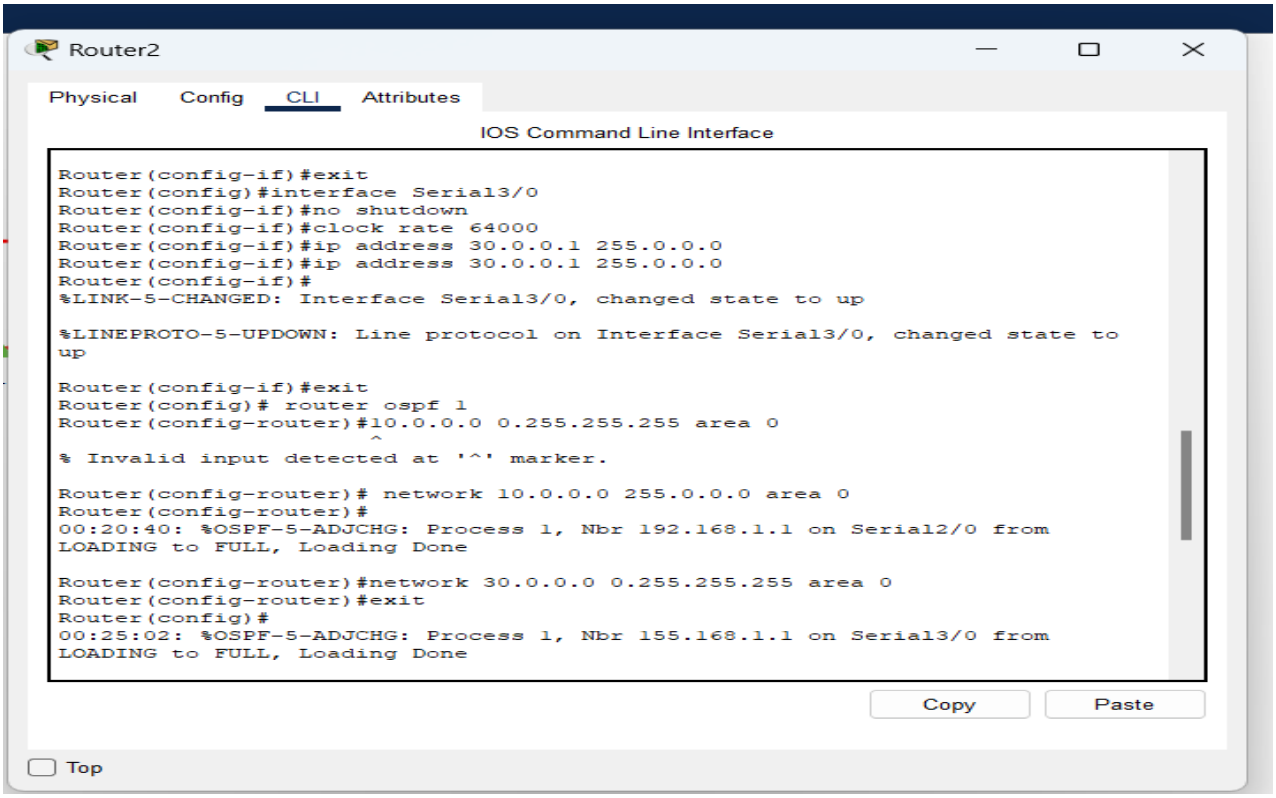
Router(config)#

00:20:53: %OSPF-5-ADJCHG: Process 1, Nbr 30.0.0.1 on Serial2/0 from LOADING to FULL,

Loading Done

00:24:09: %OSPF-5-ADJCHG: Process 1, Nbr 155.168.1.1 on Serial3/0 from LOADING to FULL,

Loading Done



OSPF configuration is also very simple, we enter the routing protocol configuration mode by entering the command ‘router ospf 100’, 100 is the OSPF process number, and then we enable the ospf process on our. links using the network command. OSPF uses the concept of areas to logically divide the network for scability

Modifying OSPF Update

OSPF uses cost as the metric which is based on the interface bandwidth. The formula to calculate cost is shown below

COST = REFERENCE_BANDWIDTH / INTERFACE_BANDWITDH

Where, REF_ BANDWITDH = 100 Mbps

So Router B will have an OSPF route in its routing table for the prefix 10.10.1.0/24 with a metric of 2 (1+1) since both links are Fast Ethernet (100 Mbps). This can be confirmed by viewing the Router B’s routing table.

RB# show ip route | include 10.10.1.0/24

10.10.1.0 [110/2] via 192.168.1.1, 00:10:06, FastEthernet0/0

We can modify the cost of an OSPF enabled interface using the command ‘ip ospf cost [cost]”

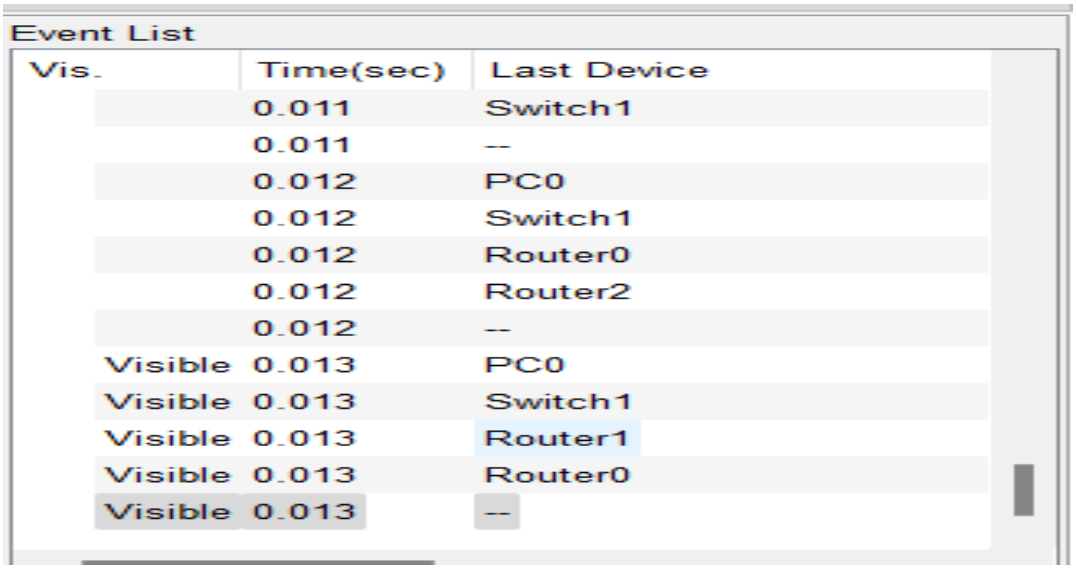
RouterA(config)# interface fastethernet 0/1

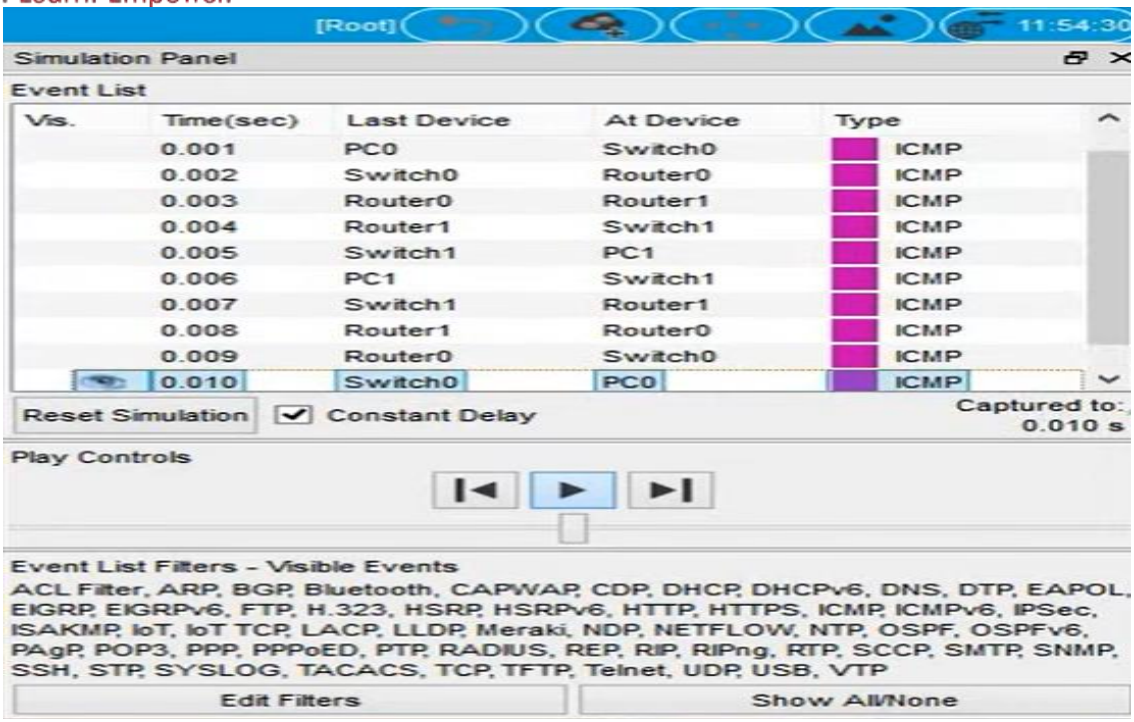
RouterA(config-if)# ip ospf cost 10

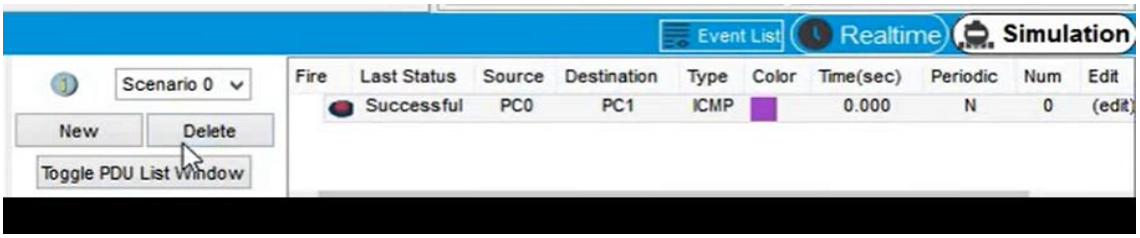
We have modified the cost of Fast Ethernet 0/1 Interface on Router A to 10, and now the routing table on Router B will have the following information.

RB# show ip route | include 10.10.1.0/24
10.10.1.0 [110/11] via 192.168.1.1, 00:2:05, FastEthernet0/0

5.Result:







6.Learning Outcomes:

Learnt and understand the concept of Distance Vector Routing Protocol.

And able to perform it on the Cisco Packet Tracer platform