

OBSERVATION

Area 0 - backbone network

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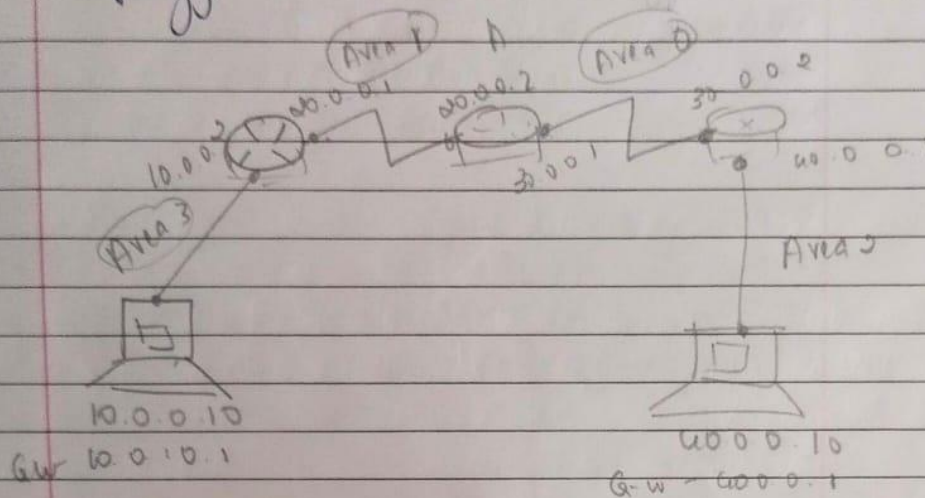
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SAB-7

dem:

Configure OSPF routing protocol

Topology



Procedure:

Connect 3 PCs and 3 routers using cable

- Configure the PCs with IP address & gateway as per the topology shown
- Configure each of the routers according to the IP address given in the topology
- Encapsulation type and clock rate need to be set as done in RIP protocol experiment
- Now enable up routing by the following commands in routers

Step 1 - router ospf 1 router-id 1

Step 2 - router-id 1.1.1.1

Step 3 - network 10.0.0.0 0.0.0.255 area 0

Step #C R1 (config) # router ospf 1  
# R1 (config-router) # router-id 1.1.1.1  
R1 (config-router) # network 10.0.0.0 0.255.255.255  
R1 (config-router) # network 20.0.0.0 0.255.255.255

R2 (config) # router ospf 1  
R2 (config-router) # router-id 2.2.2.2  
R2 (config-router) # network 30.0.0.0 0.255.255.255  
R2 (config-router) # network 30.0.0.0 0.255.255.255

R3 (config) # router ospf 1  
R3 (config-router) # router-id 3.3.3.3  
R3 (config-router) # network 32.0.0.0 0.255.255.255  
R3 (config-router) # network 40.0.0.0 0.255.255.255

- Creating interfaces

R1 (config-if) # interface Ser0/0  
R1 (config-if) # interface loopback 0  
R1 (config-if) # ip add 172.16.1.1 255.255.0.0  
R1 (config-if) # no shut down

R2 (config-if) # interface Ser0/0  
R2 (config-if) # interface loopback 0  
R2 (config-if) # ip add 172.16.1.2 255.255.0.0  
R2 (config-if) # no shut down

R3 (config) # interface Ser0/0  
R3 (config-if) # interface loopback 0  
R3 (config-if) # ip add 172.16.1.3 255.255.0.0  
R3 (config-if) # no shut



\* Creating virtual link between R1 & R2

R1 (config) # router ospf 1

R1 (config-router) # area 0 virtual-link 2.2.2.2

R1 (config-router) # exit

R2 (config) # router ospf 1

R2 (config-router) # area 0 virtual-link 1.1.1.1

R2 (config-router) # exit

\* Now check the connect

Output ping

ping> ping 40.0.0.10

Pinging 40.0.0.10 with 32 bytes of data:

Reply from 40.0.0.10: bytes=32 time=11ms TTL=65

Reply from 40.0.0.10: bytes=32 time=9ms TTL=65

Reply from 40.0.0.10: bytes=32 time=9ms TTL=65

Reply from 40.0.0.10: bytes=32 time=8ms TTL=65

Ping statistics for 40.0.0.10

Packets: Sent = 4, Received = 4, Loss = 0 (0% loss)

Approximate round trip times in milliseconds:

Minimum = 8ms Maximum = 11ms Average = 9ms

Observation - Link

\* OSPF is a link state routing protocol that is used to find the best path between source and destination nodes using Dijkstra's algorithm.

### Span algorithm

- The network is divided into 4 areas where area 0 is the backbone
- After we make the virtual link between the area which is not connected to the backbone area, we can ping messages successfully



## TOPOLOGY & OUTPUT

The Logical View shows a network topology with three routers (Router2, Router3, Router4) and two PCs (PC0, PC1). Router2 is connected to Router3 via their Serial2/0 and Serial3/0 interfaces. Router3 is connected to Router4 via their Serial2/0 and Serial3/0 interfaces. Router2 is connected to PC0 via its Fa0/0 interface, and Router4 is connected to PC1 via its Fa0/0 interface. The status bar at the bottom shows the time as 00:02:30.560 and the simulation controls.

**Simulation Panel**

Event List

Vis.	Time(sec)	Last De	At Dev	Type	Info
	2.329	Router2	PC0	OSPF	
	2.331	--	Rout...	OSPF	
	2.331	--	Rout...	OSPF	
	2.332	Router3	Rout...	OSPF	
	2.332	Router4	PC1	OSPF	

Reset Simulation ☒ Constant Delay Captured to: 2.332 s

Play Controls: Back Auto Capture / Play Capture / Forward

Event List Filters - Visible Events

ACL Filter, ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, LACP, NTP, NETFLOW, NTP, OSPF, OSPFv6, PAgg, POP3, RADIUS, RIP, RIPng, RTSP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TFTP, Telnet, UDP, VTP

Edit Filters Show All/None

Scenario 0

Fire Last Stat. Sourc Destinatio Type Colo Time(c Period Num Edit Delete

Successful PC0 PC1 IC... 0.000 N 0 (ed... (delete)

The Logical View shows the same network topology as above. A Command Prompt window is open on PC0, displaying the output of a ping command to 40.0.0.10.

**Command Prompt**

```
Ping statistics for 40.0.0.10:
  Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 11ms, Average = 5ms

PC>ping 40.0.0.10

Pinging 40.0.0.10 with 32 bytes of data:

Reply from 40.0.0.10: bytes=32 time=9ms TTL=125
Reply from 40.0.0.10: bytes=32 time=10ms TTL=125
Reply from 40.0.0.10: bytes=32 time=2ms TTL=125
Reply from 40.0.0.10: bytes=32 time=2ms TTL=125

Ping statistics for 40.0.0.10:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 10ms, Average = 5ms
```