

Assignment

Network Systems assignment 8

OBJECTIVE :

Design and configure a network in Cisco Packet Tracer with five separate LANs. Each LAN contains six PCs connected to a switch. Connect these five LANs using five routers through Serial link. Implement dynamic routing using OSPF protocol between the routers to establish communication between the LANs. Assign IP addresses to each device manually, as per the network details provided below. Verify the connectivity by pinging devices across the five LANs.

Following are the network details:

Network 1 (Class C):

Starting IP Address: 194.178.19.10

Router0 (Ethernet Interface): 194.178.19.1

Network 2 (Class B):

Starting IP Address: 171.15.12.10

Router1 (Ethernet Interface): 171.15.12.1

Network 3 (Class C):

Starting IP Address: 196.188.27.10

Router2 (Ethernet Interface): 196.188.27.1

Network 4 (Class B):

Starting IP Address: 173.17.1.10

Router3 (Ethernet Interface): 173.17.1.1

Network 5 (Class B):

Starting IP Address: 174.18.1.10

Router4 (Ethernet Interface): 174.18.1.1

Router Interconnection:

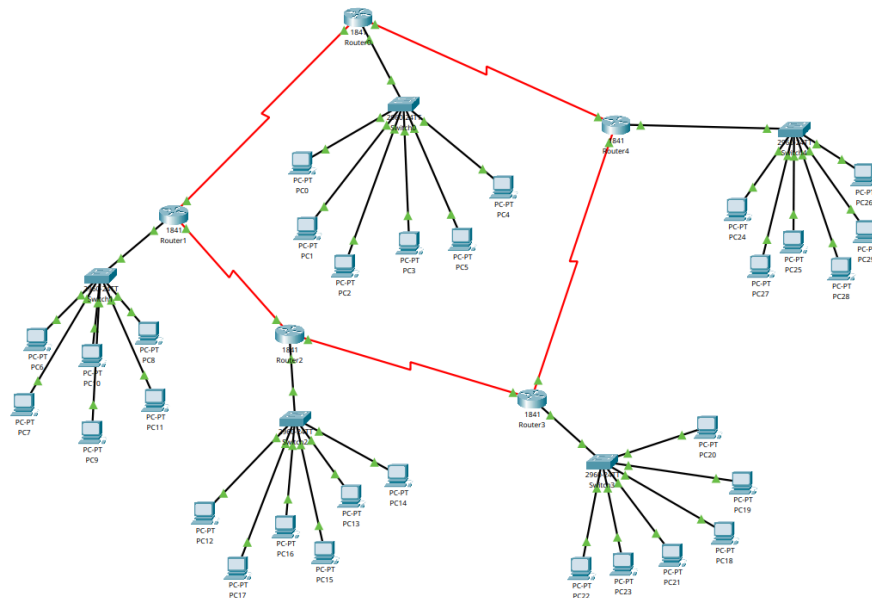
Network Address of Router0 to Router1: 10.0.0.0
Network Address of Router1 to Router2: 11.0.0.0
Network Address of Router2 to Router3: 12.0.0.0
Network Address of Router3 to Router4: 13.0.0.0

Establish a successful connection and verify the dynamic routing implementation.
Attach all screenshots (including IP configuration, OSPF routing configuration, successful ping outputs, and network structure) along with a description in a PDF file and submit.

What is OSPF?

OSPF is a smart routing protocol that helps routers in a network to take the shortest and the best path to send data.

Network structure

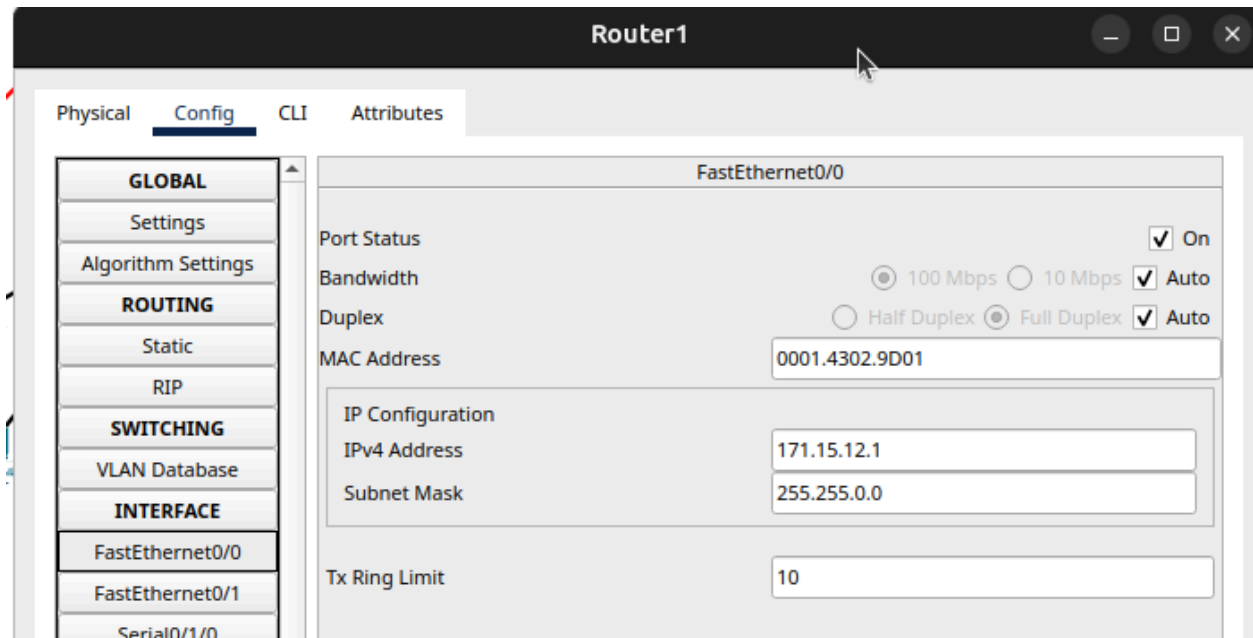


Connecting between each routers -

1. Router0 Serial0/0/0 to Router1 Serial0/0/0
2. Router1 Serial0/0/1 to Router2 Serial0/0/0
3. Router2 Serial0/0/1 to Router3 Serial0/0/0
4. Router3 Serial0/0/1 to Router4 Serial0/0/0
5. Router4 Serial0/0/1 to Router0 Serial0/0/1

Commands used -

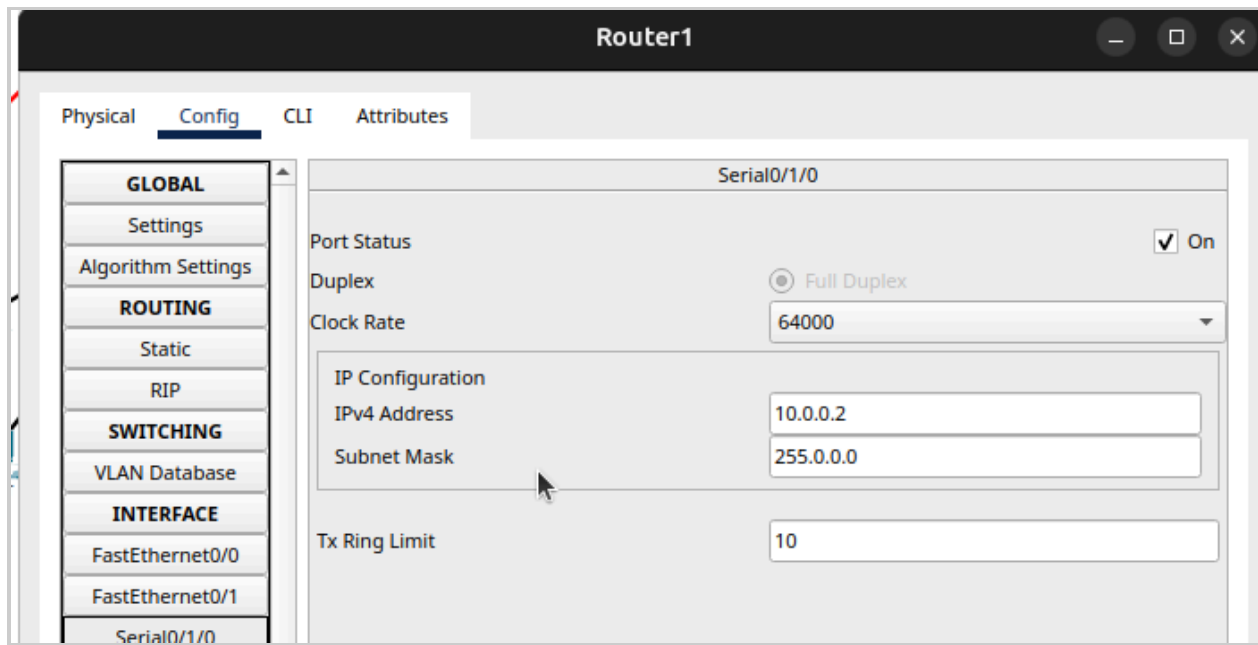
```
enable
configure terminal
interface FastEthernet0/0
ip address 194.178.19.1 255.255.255.0
no shutdown
exit
```



Setting up serial ports -

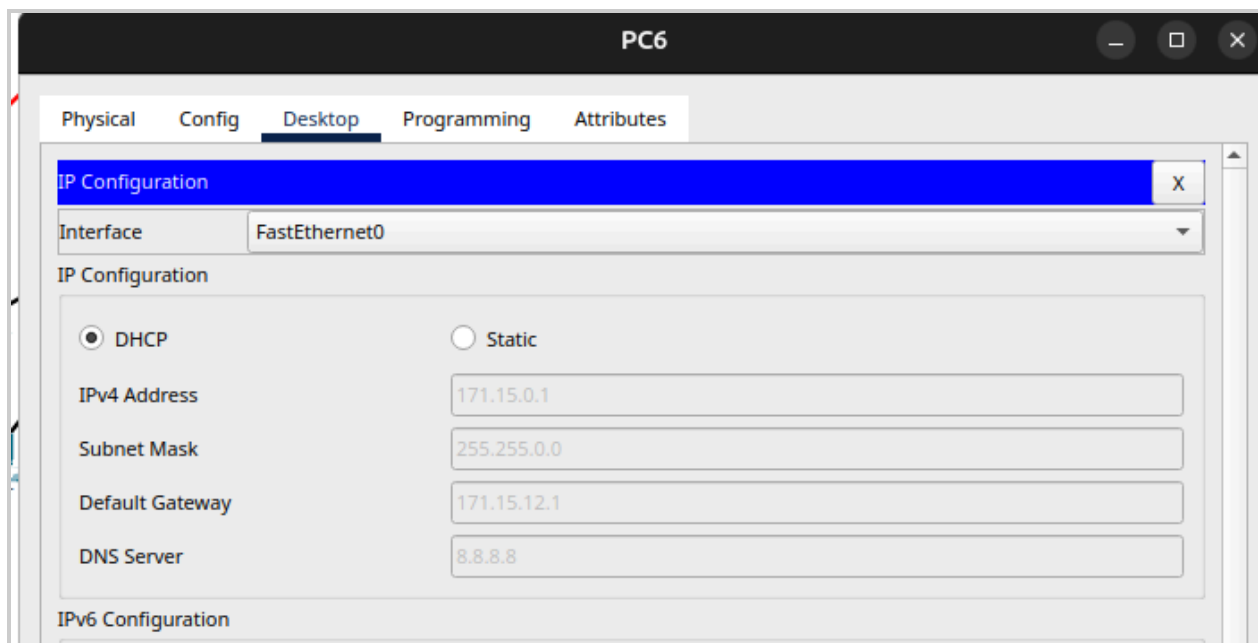
```
interface Serial0/0/0
ip address 10.0.0.1 255.0.0.0
no shutdown
exit
```

```
interface Serial0/0/1
ip address 13.0.0.2 255.0.0.0
no shutdown
exit
```



Configuring DHCP on all systems

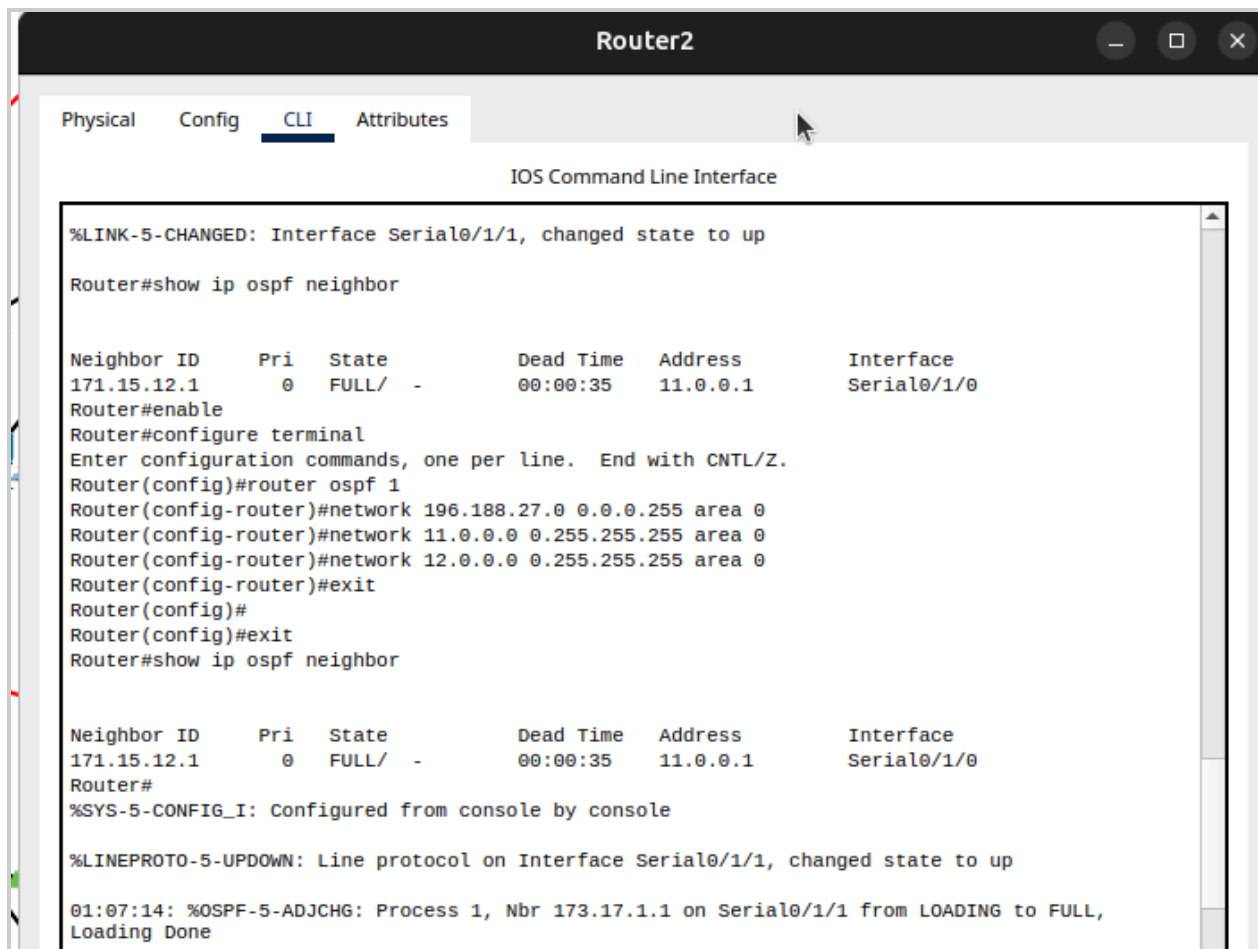
```
ip dhcp pool LAN1
network 194.178.19.0 255.255.255.0
default-router 194.178.19.1
dns-server 8.8.8.8
exit
```



Configuring OSPF on routers

Commands -

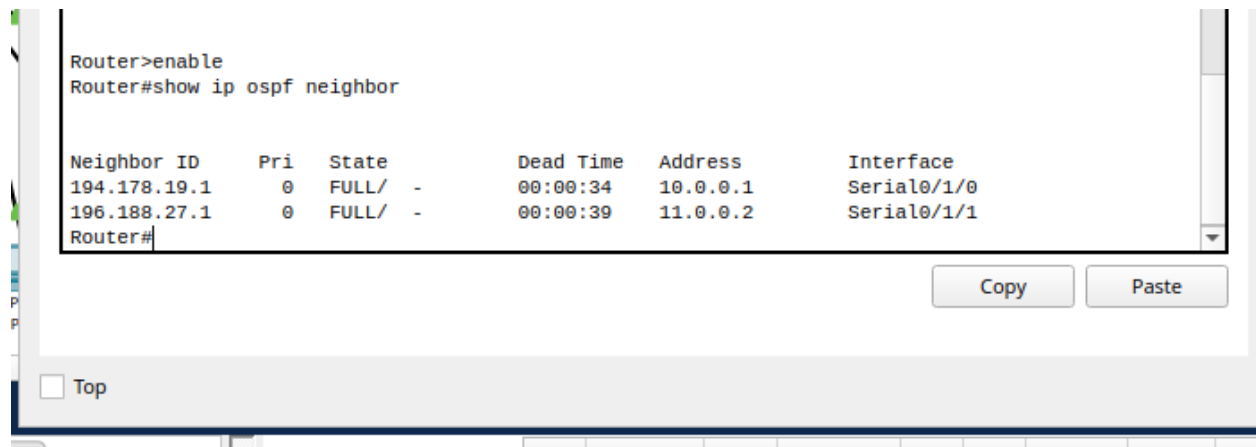
```
router ospf 1
network 194.178.19.0 0.0.0.255 area 0
network 10.0.0.0 0.255.255.255 area 0
network 13.0.0.0 0.255.255.255 area 0
exit
```



Checking/ verifying the connections -

Command - `show ip ospf neighbor`

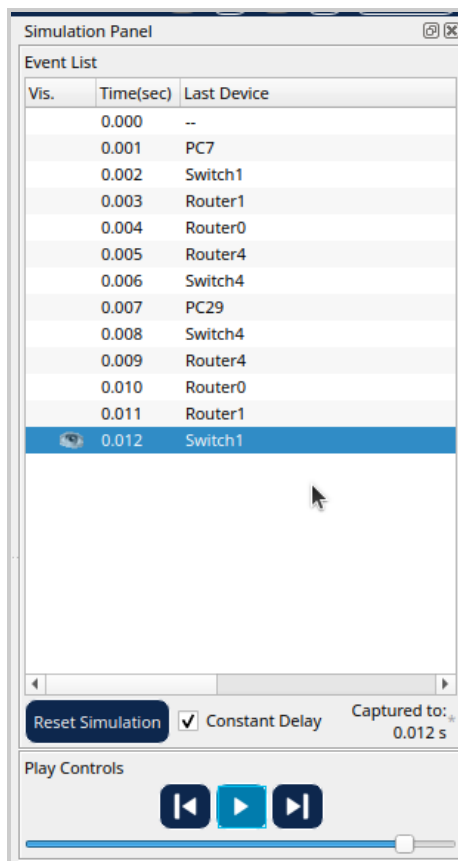
It takes a while for OSPF to configure.

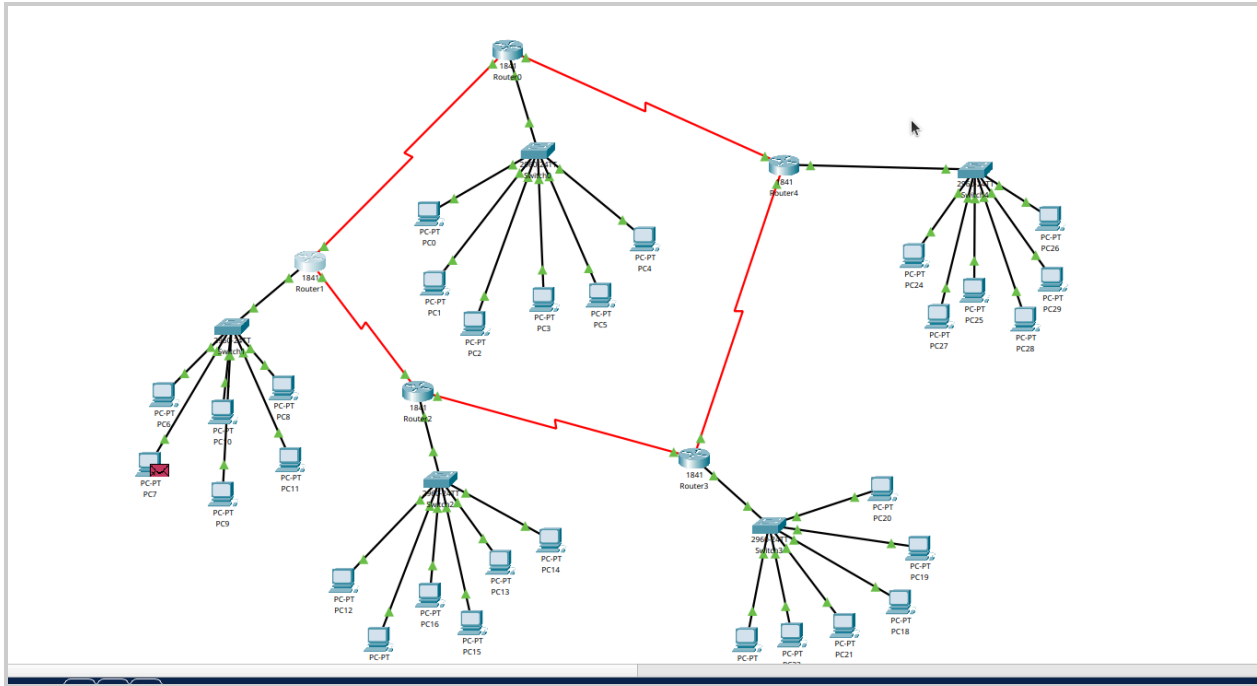


Since The Router is in FULL state, it confirms OSPF.

Pinging from LAN2 -> LAN5

Time	Event Status	Source	Destination	Type	Color	Time(sec)	Interface	From	To	Action
	Successful	PC7	PC29	ICMP		0.000	N	0	(edit)	(delete)





Here the message was sent from PC7 in LAN2 connected to Router 1.
The message was set to receive by PC26 in LAN5 connected to router 4.
Since the router was dynamically connected through OSPF it found the shortest path to be through -

Router1 → Router0 → Router4

Rather than going from -

Router1 → Router2 → Router3 → Router4

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