University of Asia Pacific

Department of Computer Science & Engineering

Computer Networks Lab

CSE 320

OSPE Report

Submitted to:

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OSPF : Open Shortest Path First OSPF is a routing protocol for Internet Protocol IP networks. It uses a Link State routing LSR algorithm and falls into the group of interior gateway protocols IGPs, operating within a single autonomous system AS.

OSPF gathers link state information from available routers and constructs a topology map of the network. The topology is presented as a routing table to the Internet Layer for routing packets by their destination IP address. OSPF supports Internet Protocol Version-4 IPv4 and Internet Protocol Version 6 IPv6 networks and supports the Classless Inter-Domain Routing CIDR addressing model.

OSPF is widely used in large enterprise networks. IS-IS, another LSR-based protocol, is more common in large service provider networks.

OSPF Fundamentals: Open Shortest Path First OSPF is a link-state routing protocol that is used to find the best path between the source and the destination router using its own Shortest Path First. OSPF is developed by Internet Engineering Task Force IETF as one of the Interior Gateway Protocol IGP, i.e, the protocol which aims at moving the packet within a large

autonomous system or routing domain. It is a network layer protocol which works on protocol number 89 and uses AD value 110. OSPF uses multicast address 224.0.0.5 for normal communication and 224.0.0.6 for update to designated router DR/Backup Designated Router BDR.

OSPF States: The device operating OSPF goes through certain states. These states are:

Down – In this state, no hello packets have been received on the interface.
Note – The Downstate doesn't mean that the interface is physically down. Here, it means that the OSPF adjacency process has not started yet.

INIT – In this state, the hello packets have been received from the other router.

2WAY – In the 2WAY state, both the routers have received the hello packets from other routers. Bidirectional connectivity has been established.
Note – In between the 2WAY state and Exstart state, the DR and BDR election takes place.
Exstart – In this state, NULL DBD are exchanged. In this state, the master and slave elections take place. The router having the higher router I'd become the master while the other becomes the slave. This election decides Which router will send its DBD first (routers who have formed a neighbourship

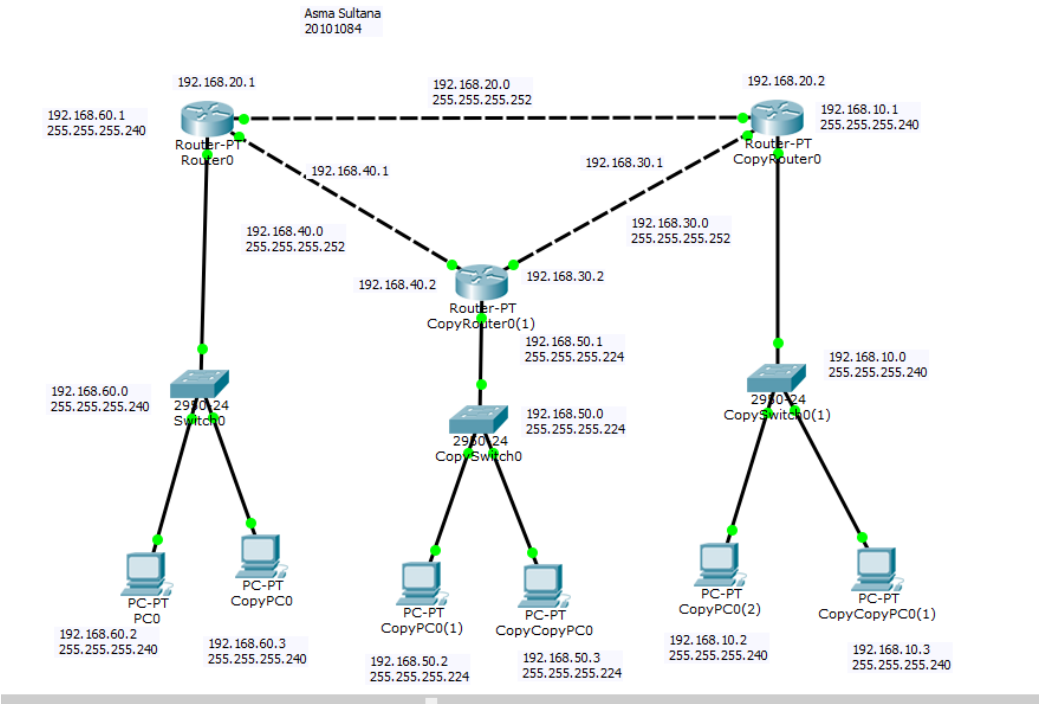
will take part in this election).

Exchange – In this state, the actual DBDs are exchanged.

Loading – In this state, LSR, LSU, and LSA (Link State Acknowledgement) are exchanged.

Important – When a router receives DBD from other router, it compares its own DBD with the other router DBD. If the received DBD is more updated than its own DBD then the router will send LSR to the other router stating what links are needed. The other router replies with the LSU containing the updates that are needed.

OSPF Structure:



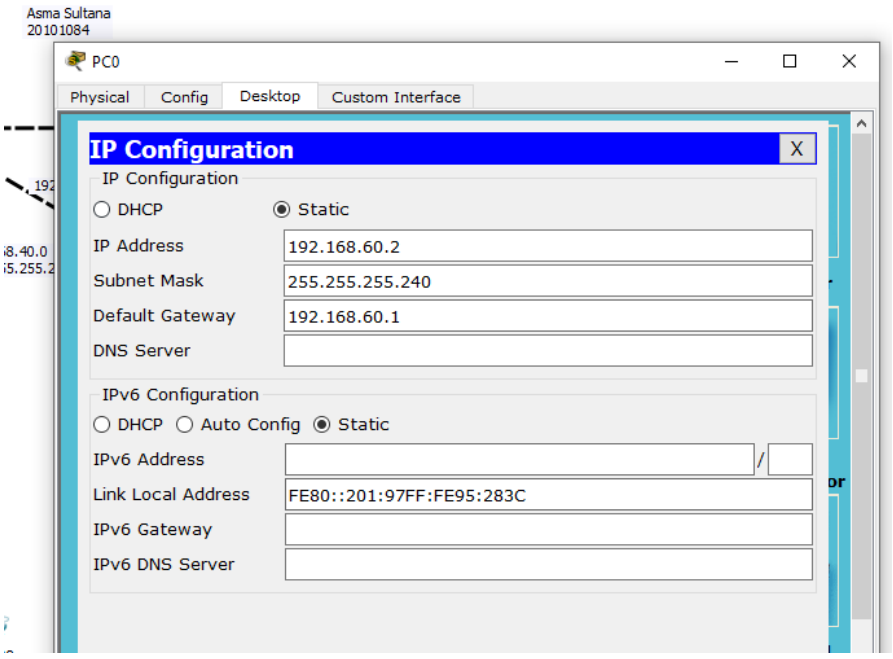
Equipment:

- 1841 router
- 2960-24 switch
- PC-PT end devices
- Wire

STEP FOR OSPF:

1. Connect all the devices with proper wire.
2. Setup the router
3. Put correct ip address in OSPF
4. Configure all pc with use OSPF protocol
5. For checking pass message to one pc to another

IP ADDRESSING PC:



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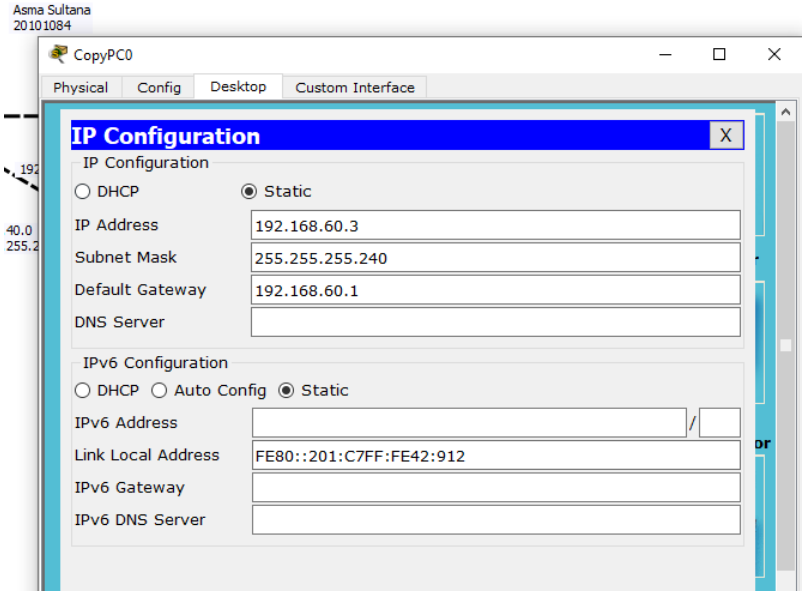

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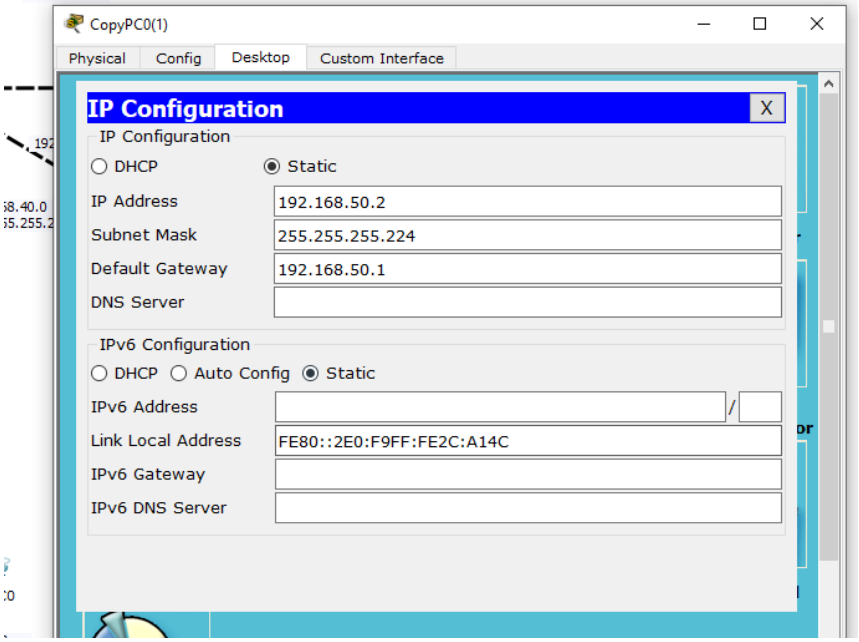

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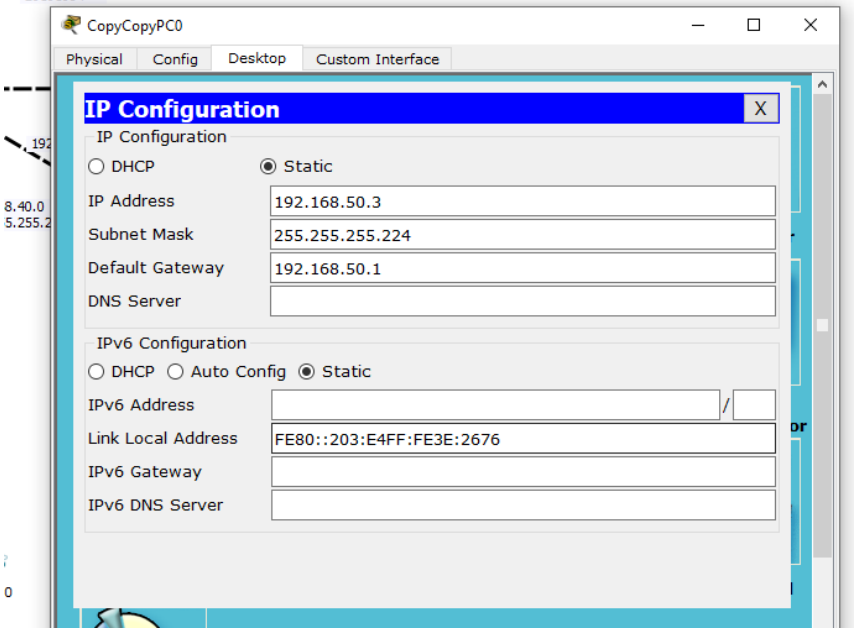

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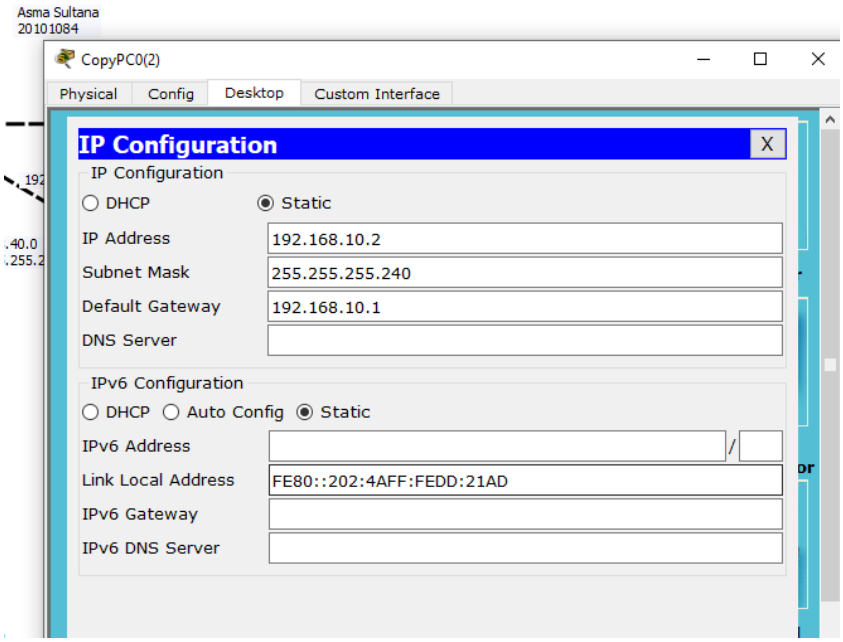
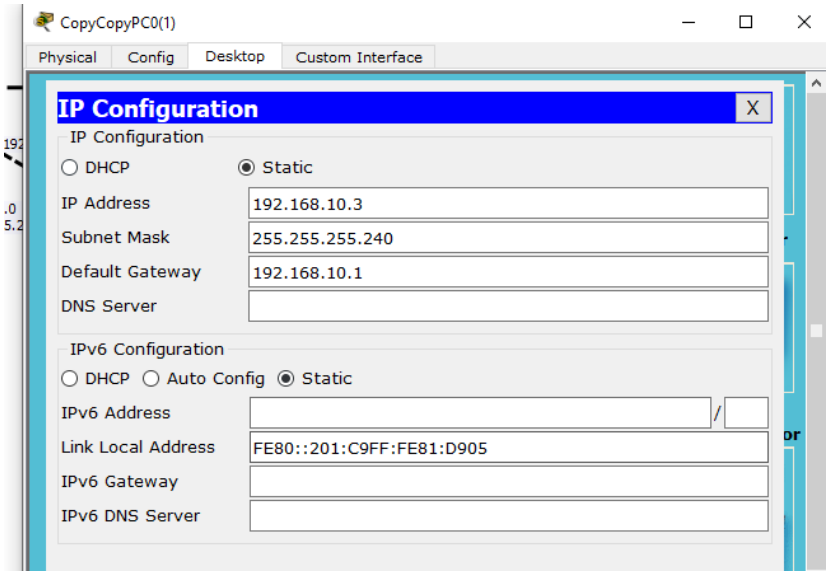
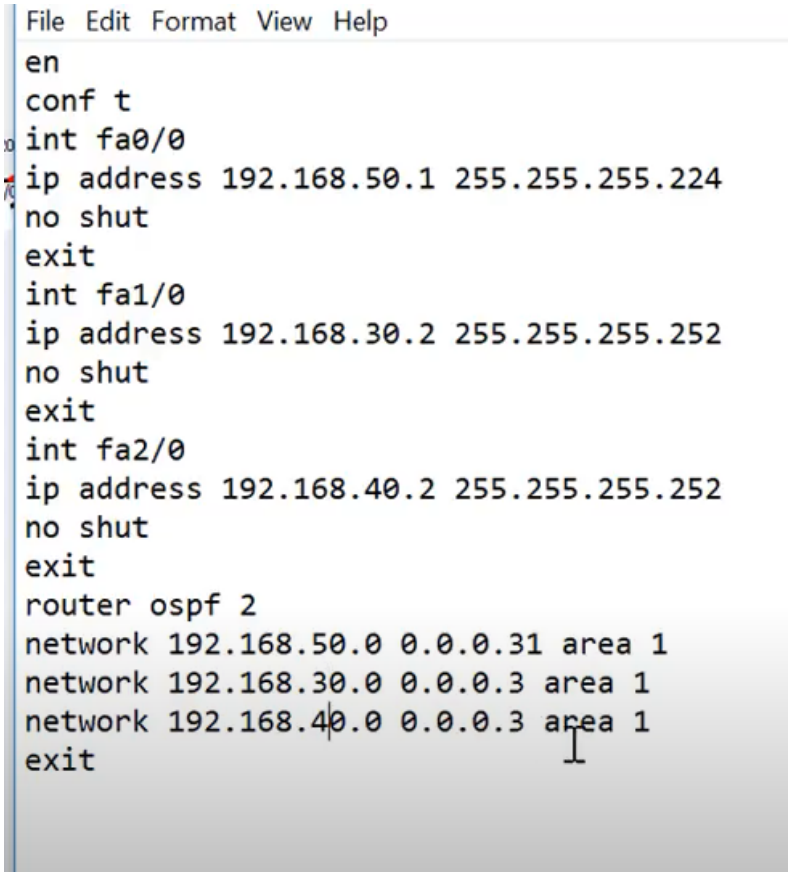


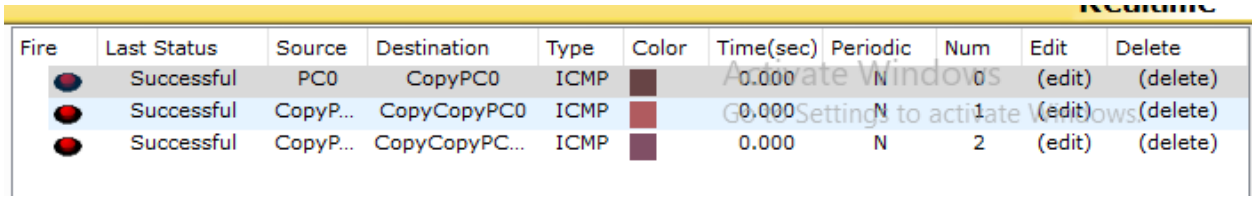


FOR ROUTER CONFIGURE:



```
en
conf t
int fa0/0
ip address 192.168.10.1 255.255.255.240
no shut
exit
int fa1/0
ip address 192.168.20.2 255.255.255.252
no shut
exit
int fa2/0
ip address 192.168.30.1 255.255.255.252
no shut
exit
router ospf 3
network 192.168.10.0 0.0.0.15 area 1
network 192.168.30.0 0.0.0.3 area 1
network 192.168.20.0 0.0.0.3 area 1
exit
```

Connection Between PCs:



Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	CopyPC0	ICMP		0.000	N	0	(edit)	(delete)
	Successful	CopyP...	CopyCopyPC0	ICMP		0.000	N	1	(edit)	(delete)
	Successful	CopyP...	CopyCopyPC...	ICMP		0.000	N	2	(edit)	(delete)

Here we see the message will be sent properly. We have successfully done OSPF.