STUDY AND SIMULATION OF OSPF ROUTING PROTOCOL USING CISCO PACKET TRACER

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Abstract
In this paper, routing is the way the packet must be designed to flow the path that are assigned by the user in router. The Routing protocol OSPF has been studied and implemented using 'Cisco Packet tracer'. The results are checked using ping command. Here the virtual network is created to test the OSPF protocol. The paper also explains about the assigning of ip address and configuring them router as well as in pc's.
Keywords: OSPF, Cisco Packet Tracer, Simulation of OSPF, IP address

1. INTRODUCTION

Routing is the selection of the path that the data or packet has been chosen .It mainly depends on the techniques and the number of the devices that are connected to the network. To route a packet we must have the packet destination address (IP) because for packet to reach from one device to other the address of one device must be known such that they can communicate each other and also we want the neighboring devices information and also the topology of the network because to study the path(for that we can use ospf technique).They are three types of routing techniques. They are : Static routing, Default Routing, Dynamic Routing.
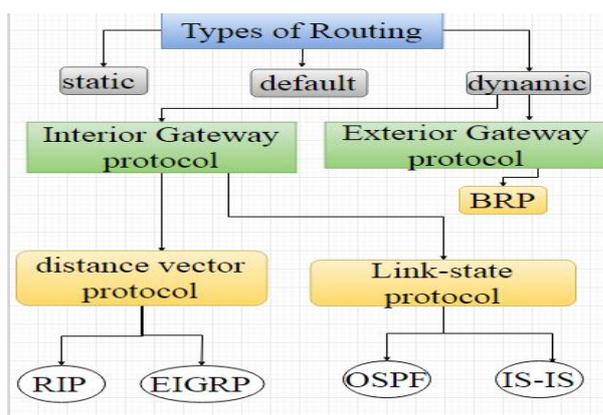
2. OSPF (OPEN SHORT PATH FIRST)

Here we are mainly focusing on the OSPF technique, OSPF stands for OPEN SHORT PATH FIRST. It is a standard protocol. It comes under link-state protocol as shown in the above figure. It uses shortest path algorithm. It has unlimited hop count. The metric cost of it is=10^8/B.W(bandwidth).The Administrative distance is 110.It is a classful protocol. Each time it uses a unique id

and the same network must contain the same area code. The area code may be any number. It uses the ip and wild card mask irrespective of sub netting mask to add the each network.

3. TOPOLOGY FOR SIMULATION OF OSPF

Here, we considered the network model that contains two routers, two switches, four computers (end devices).The Cisco packet Tracker is used for this simulation of OSPF routing technique. The connection between the two routers is done by using Serial DCE cable and for computer to switch we use the copper straight-through cable. The Network model is shown below:
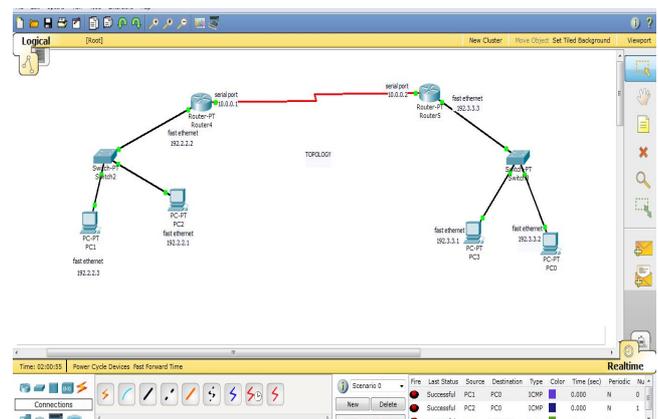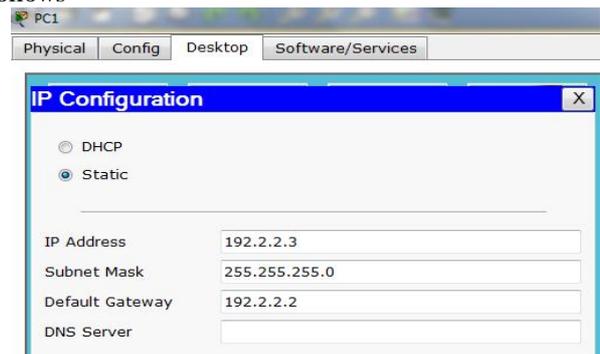

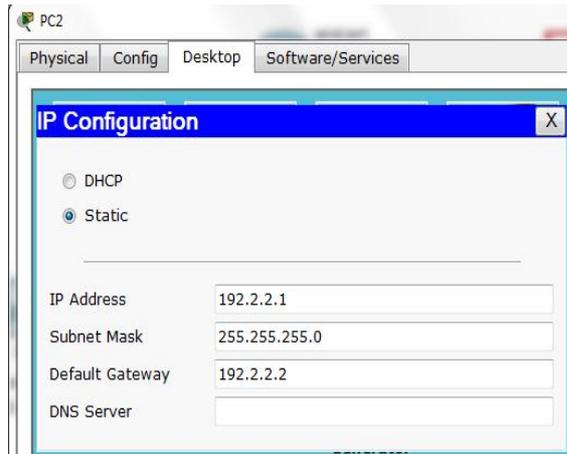**FIGURE 2:** the network model used for simulation of OSPF

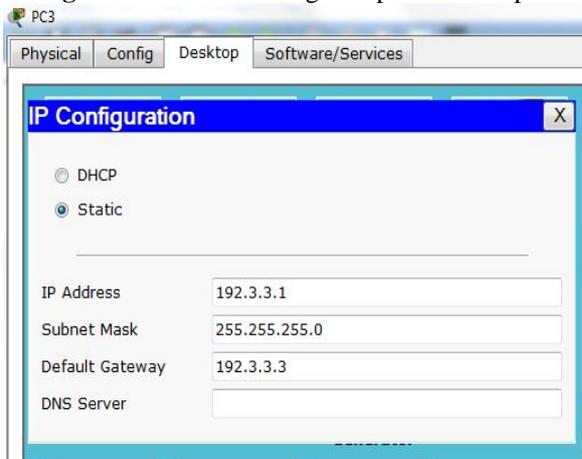## 4. CONFIGURING THE NETWORK MODEL USING OSPF:

IP ADDRESS ASSIGN IN PC'S:
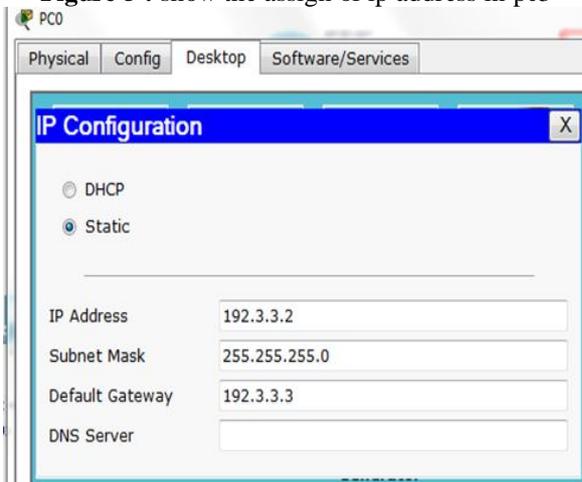a.Firstly, computers (pc's) must be assign ip address as follows

Figures 3: show the assign of ip address in pc1

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Figures 4: show the assign of ip address in pc2

Figure 5 : show the assign of ip address in pc3

Figure 6 : show the assign of ip address in pc0

b. In the all above pc's the default gateway is the fast Ethernet ip address of the routers they are connected with there Ethernet ports using copper straight through cable.
c. After the connections are performed physically, configuring the router need to be done. In figure1, router4 is configured as follows:

```
Router#en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#ip address 192.2.2.2 255.255.255.0
Router(config-if)#int s2/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#clock rate 64000
Router(config-if)#exit
Router(config)#router ospf 7
Router(config-router)#network 10.0.0.0 0.255.255.255 area 7
Router(config-router)#
00:23:49: %OSPF-5-ADJCHG: Process 7, Nbr 10.0.0.2 on Serial2/0 from LOADING to F
ULL, Loading Done
```

Figure 7: shows the configuration of router4
d.After that the router 5 needs to configure using OSPF

```
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#ip address 192.3.3.3 255.255.255.0
Router(config-if)#int s2/0
Router(config-if)#ip address 10.0.0.2 255.0.0.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial2/0, changed state to up

Router(config-if)#exit
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router(config)#router ospf 7
Router(config-router)#network 10.0.0.0 0.255.255.255 area 7
Router(config-router)#exit
```

Figure 8 : shows the configuration of router5 in CLI(command line interface)
e. After the above code is done there is link-up line protocol is made there such that the ospf has done
f. In the above the fa0/0 is the Fast Ethernet ,and S2/0 is the serial port.
g. Router ospf 7 the '7' gives the area and thus must be same for all the router such that they all are in the same domain. The area code may be any number

5. EXAMING THE CONFIGURATION:
The network model that is implemented has verified using ping command from any pc's that attached to the router. Here we are using the pc1 and pinging the address to the another pc0 . The result is shown in the below figure

Figure 9: shows the ping command from pc1 to pc0

6. CONCLUSION

Routing is used to trace the path for the network and in this paper we implemented the virtual network model using cisco packet tracer. There are different types of routing techquices are there but due to the usage and area of necessity we use the require one.The OSPF is used for the area where more routers are used and also large network usage.It mainly use is that it has unlimited hop count and Irrespective of other techniques it uses a concept of area to ease management and traffic control.

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