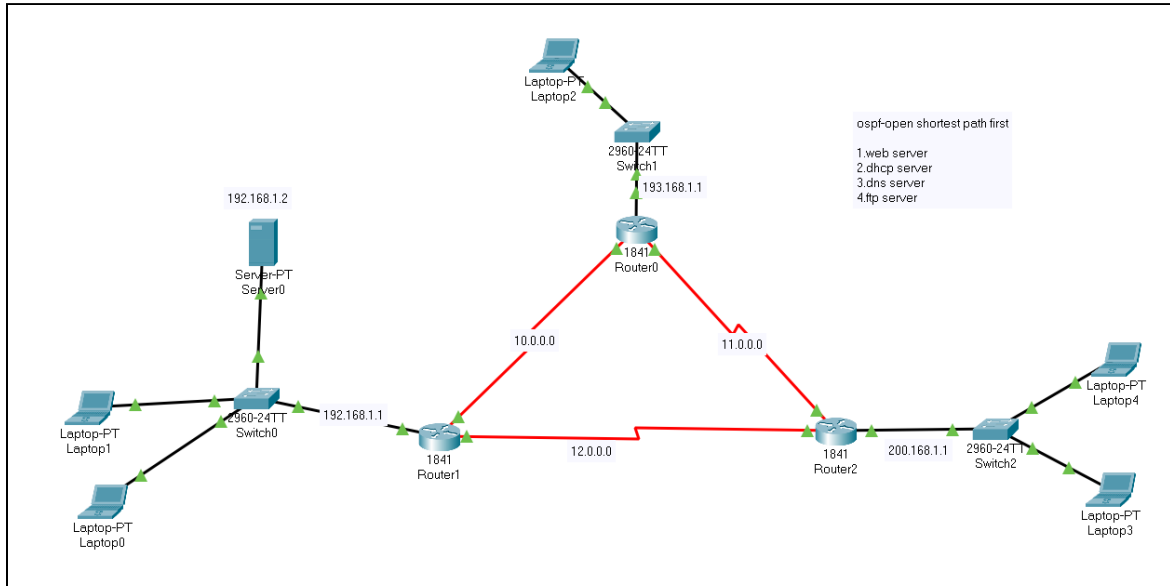**Experiment :**
Aim:
a. Implement open-shortest-path-first(ospf) routing.
b. Make a web server
c. Make a dhcp server
d. Make a dns server
e. Make a ftp server

Diagram :

Procedure:
1. Select 3 routers and add the WIC-2T module .
2. Assume the ip addresses as mentioned above.
3. Here the Server0 will act as web,dns,ftp,dhcp server all-in-one server
   (hence all the server have same ip=192.168.1.2)
   (we can have separate servers each with one ip, for simplicity i'm taking all-in-one)
4. Set the ip configuration of server0
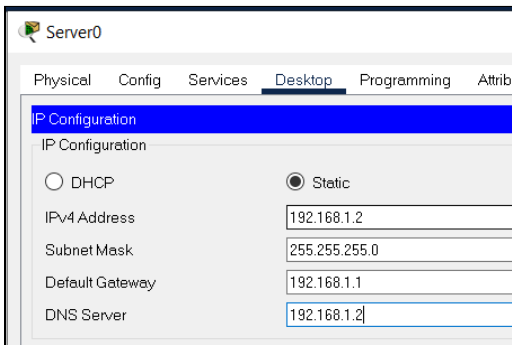
5. Let's setup the **dhcp config** for network 192.168.1.0(switch 0 part) .
   - Server0>Services>Dhcp
   - By default we have some settings change it like this n save. Remember to turn on the service
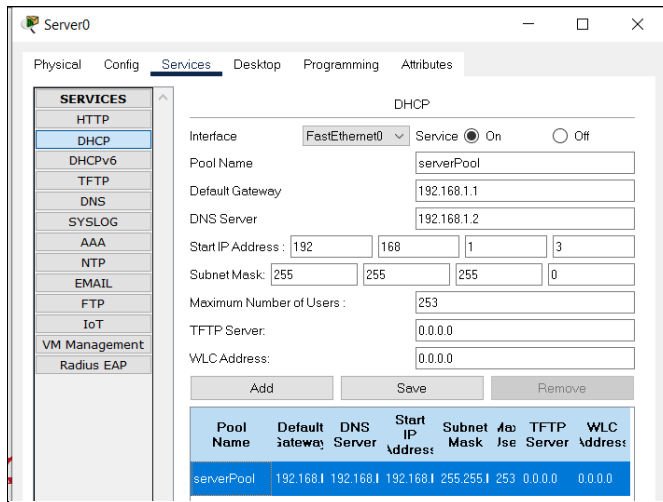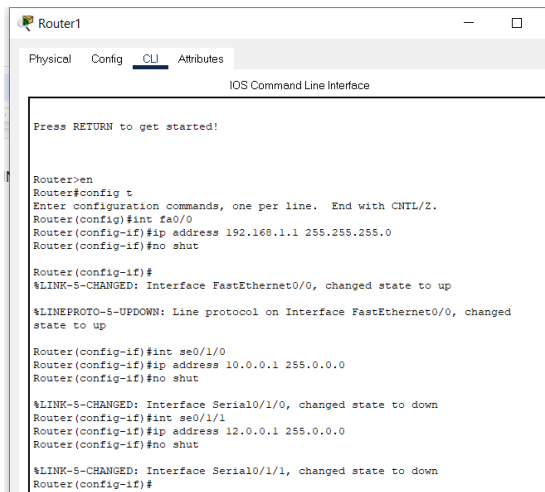
- Now got to laptop0>desktop>ipconfig and click dhcp . values will be set automatically
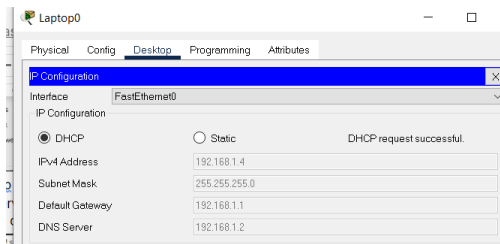
- Do the same for other laptops on these network.

6. Now lets configure router1 connected to switch0
    - assign ip address to all interfaces

- Now as for ospf protocol

```
Router(config-if)#router ospf 1      // 1 here is some name
Router(config-router)#net 192.168.1.0 0.0.0.255 area 0      // net ip wildcard area 0    wildcard is complement of subnet
// wildcard tells us the number of PCs possible in that network,area 0 means all routers belong to a particular region and they won't
know about any router in another area. ( area0 router can't communicate with area1 router).
Router(config-router)#net 10.0.0.0 0.255.255.255 area 0
Router(config-router)#net 12.0.0.0 0.255.255.255 area 0
Router(config-router)#end
```

```
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#router ospf 1
Router(config-router)#net 192.168.1.0 0.0.0.255 area 0
Router(config-router)#net 10.0.0.0 0.255.255.255 area 0
Router(config-router)#net 12.0.0.0 0.255.255.255 area 0
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

- Save the config

> Router#copy running-config startup-config
> Destination filename [startup-config]?
> Building configuration...
> [OK]

7. Let's configure router0 connected to switch1
   - We can make a router also to act as dhcp, so lets do it.
   - Assign ips and make a dhcp pool.
   - Gateway of pool will be 193.168.1.1 , dns would be server0 that is 192.168.1.2.
   - Lets name the pool as sw1 (switch1).
   - In the pool we enter the network whose ip has to be automated (net …)
   - Then the default router(gateway) and dns server is set. (refer picture down)
   - Now click laptop2>desktop>ip config and dhcp . values will be set automatically
   - Create the ospf protocol like that of router1.
   - Save the config

8. Let's configure router2 connected to switch2
   - Do the same way like step 7

- Gateway would be 200.168.1.1 and dns 192.168.1.2
- Save the config at last
- Now click laptop3,4>desktop>ip config and dhcp . values will be set automatically

9. Lets configure **dns server**
   - We know dns translates a string to an ip address so that we can have a connection.
   - Goto Server0>Services>dns . and add the following. Turn on the dns service.
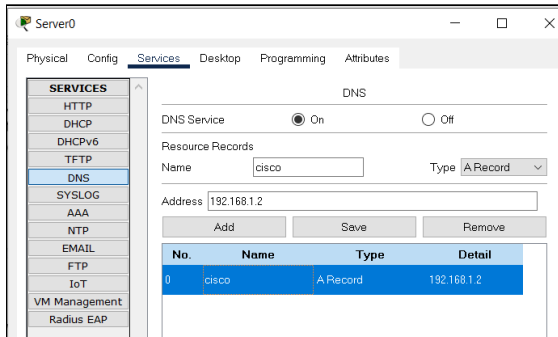
   - Now from any laptop if u do ping cisco. The dns server will put it ip that is 192.168.1.2 That is ping 192.168.1.2 on the backend and establish a connection.

10. For the **web server** part goto Server0>services>http and see to it that it is turned on.
    - There are few files by default . you can open and see them/edit them.
    - Let's have a name for the website . let the name be www.abc.com
    - But we can't just type this in a browser , first we need to make a dns entry
    - Go to the dns setting add another entry with name www.abc.com and address as 192.168.1.2
    - Now click any laptop>desktop>webBrowser and type http://www.abc.com , you will get the cisco default page.
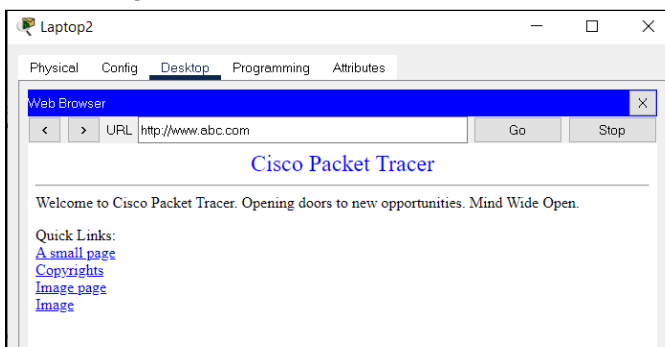
11. For **ftp server**
    - Ftp stands for file transfer protocol. We can upload/download files.
    - Goto Server0>services>ftp and turn it on.

- We can set some credentials to connect to this ftp server. By default we have username : cisco and password: cisco, we can add more accounts and set permissions.
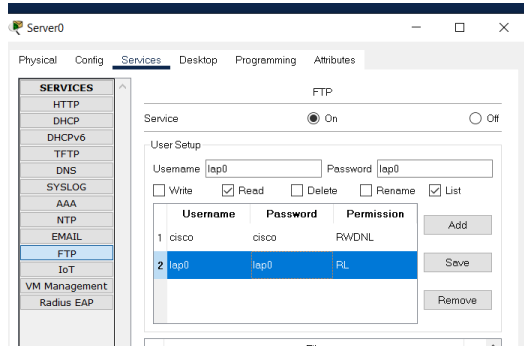

-
- .
- Let's have a name for this server (say **myfiles**) .
- Add this into dns server name **myfiles** and address as 192.168.1.2..
- Note we are using the same ip 192.168.1.2 as we are using the same server , if we have a different server than the address would be different.
- Now lets upload some file and check
- Click any laptop>desktop>text editor and type something , click file and save it with some name,let's take **firstfile.txt**
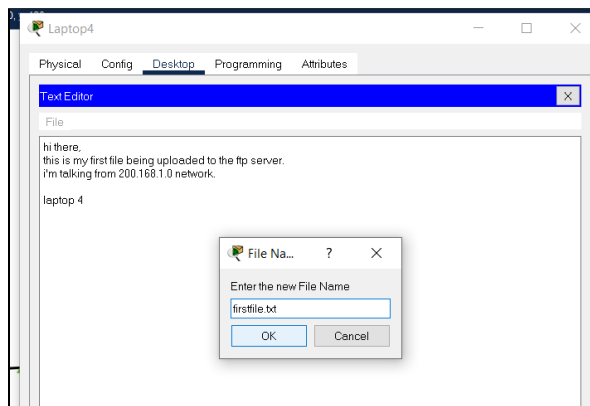

-
- We have a text file in laptop4 , lets upload it
- Open command prompt of laptop4>desktop>command prompt (used default credentials)

```
C:\>ftp myfiles
Trying to connect...myfiles
Connected to myfiles
220- Welcome to PT Ftp server
Username:cisco
331- Username ok, need password
Password:
230- Logged in
(passive mode On)
ftp>put firstfile.txt
Writing file firstfile.txt to myfiles:
File transfer in progress...
[Transfer complete - 114 bytes]
114 bytes copied in 0.014 secs (8142 bytes/sec)
ftp>
```
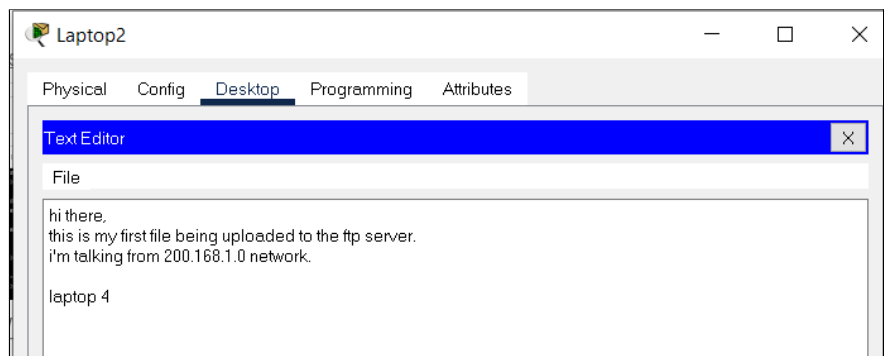
- we have successfully uploaded the firstfile.txt let's see if it is stored in the server
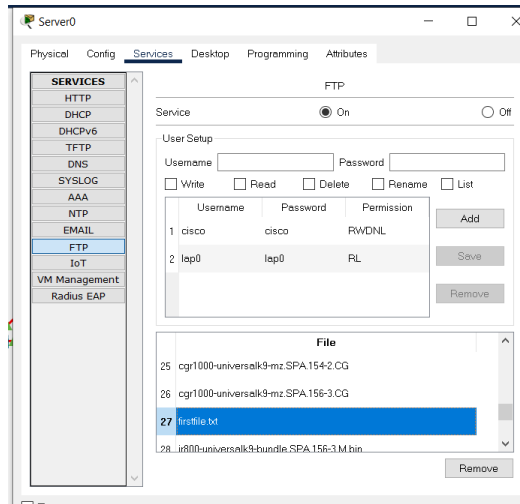
- There we have our file on the server , let's try downloading it .
- This time let's open laptop2 of network 193.168.1.0
- Open command prompt , connect to ftp myfiles.
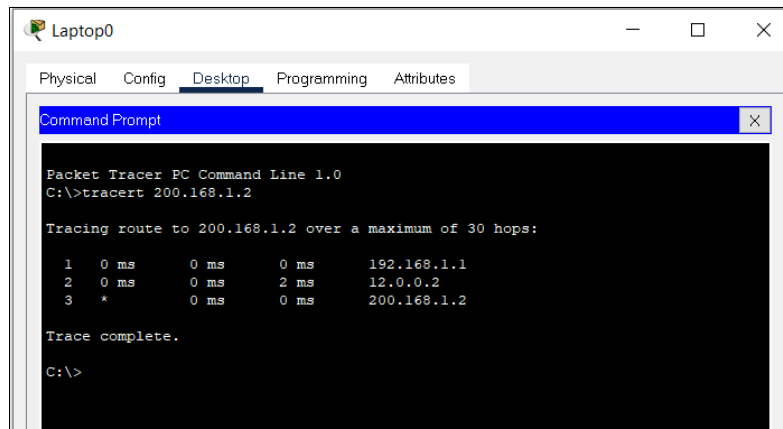   - Use the **get** command to download file
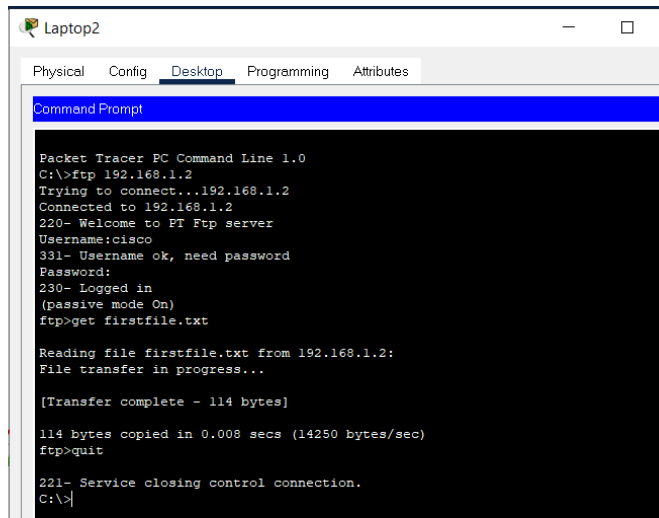
-
- Now open the text editor of this laptop , click file>open> select the file.
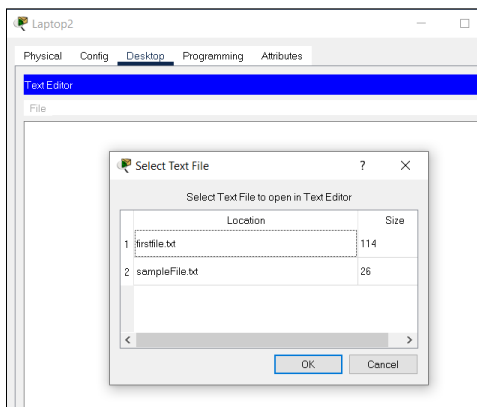
-
- The contents of the file are the same so this was a success.

12. Let's check if **ospf** is working properly
-   Open command prompt of laptop0 and type
    -   Tracert 200.168.1.2 (laptop3 in my diagram)

```
Laptop0                                          —    □    ×

Physical    Config    Desktop    Programming    Attributes

Command Prompt                                              X

Packet Tracer PC Command Line 1.0
C:\>tracert 200.168.1.2

Tracing route to 200.168.1.2 over a maximum of 30 hops:

    1    0 ms        0 ms        0 ms        192.168.1.1
    2    0 ms        0 ms        2 ms        12.0.0.2
    3    *           0 ms        0 ms        200.168.1.2

Trace complete.

C:\>
```

-   The route here shows that the packet from laptop0 travelled through router1(192.168.1.1) then hoped to router2 interface 12.0.0.2 and then via a switch it reached its destination pc 200.168.1.2.
-   There was one more path from router1 to router0 to router2 to destination,but this was a long path
-   Above two observations prove shortest path was taken

Conclusion : Web/dhcp/dns/ftp server and ospf protocol were implemented successfully.