



UNIVERSITY OF ASIA PACIFIC

Department of Computer Science & Engineering

Course Title – Computer Networks Lab

Course Code – CSE 320

Experiment No. – 01

Experiment name – Implement DNS & DHCP

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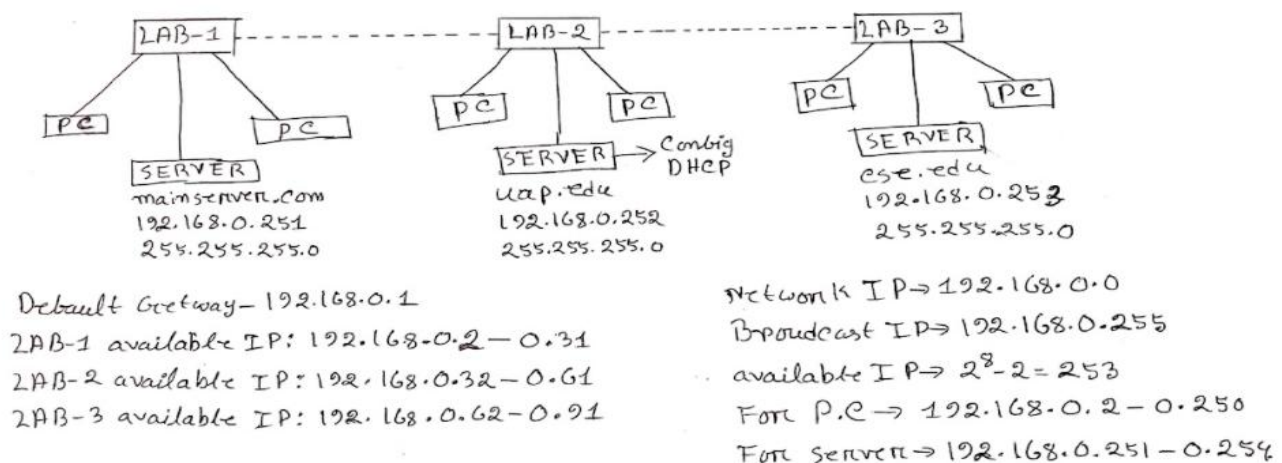
Problem Statement : Design LAN connection between Lab-1, Lab-2 & Lab-3 in a network [192.168.0.0/24](#). Implement DNS(Domain Name System) & DHCP(Dynamic Host Configuration Protocol).

Apparatus :

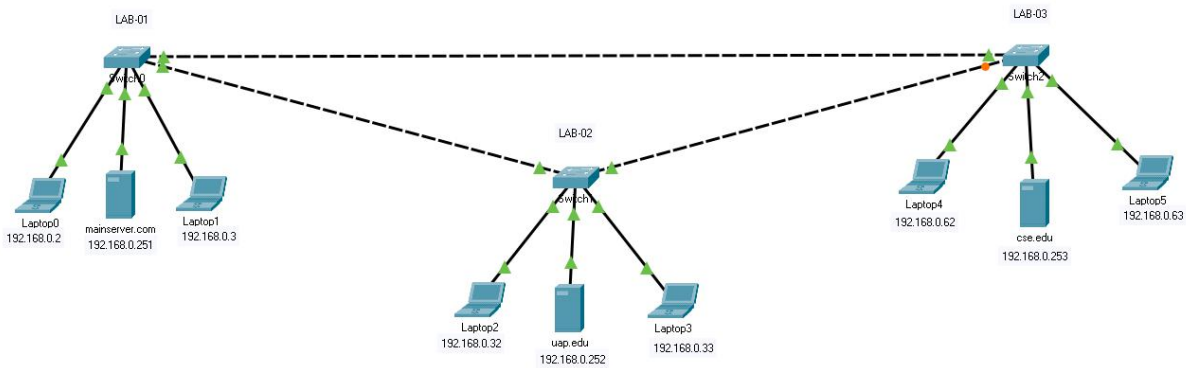
- PC / Computer
- Switch (2960)
- Server

Network Design : Let's say we need to design a LAN connection between 3 Lab.

Given IP: 192.168.0.0(Class- C Private IP). For DNS setup we will consider Server-1(under Lab-1) as [www.mainserver.com](#). Server-2(under Lab-2) as [www.uap.edu](#) and finally Server-3 (under Lab-3) as [www.cse.edu](#) . So first we need to design the Network Structure.



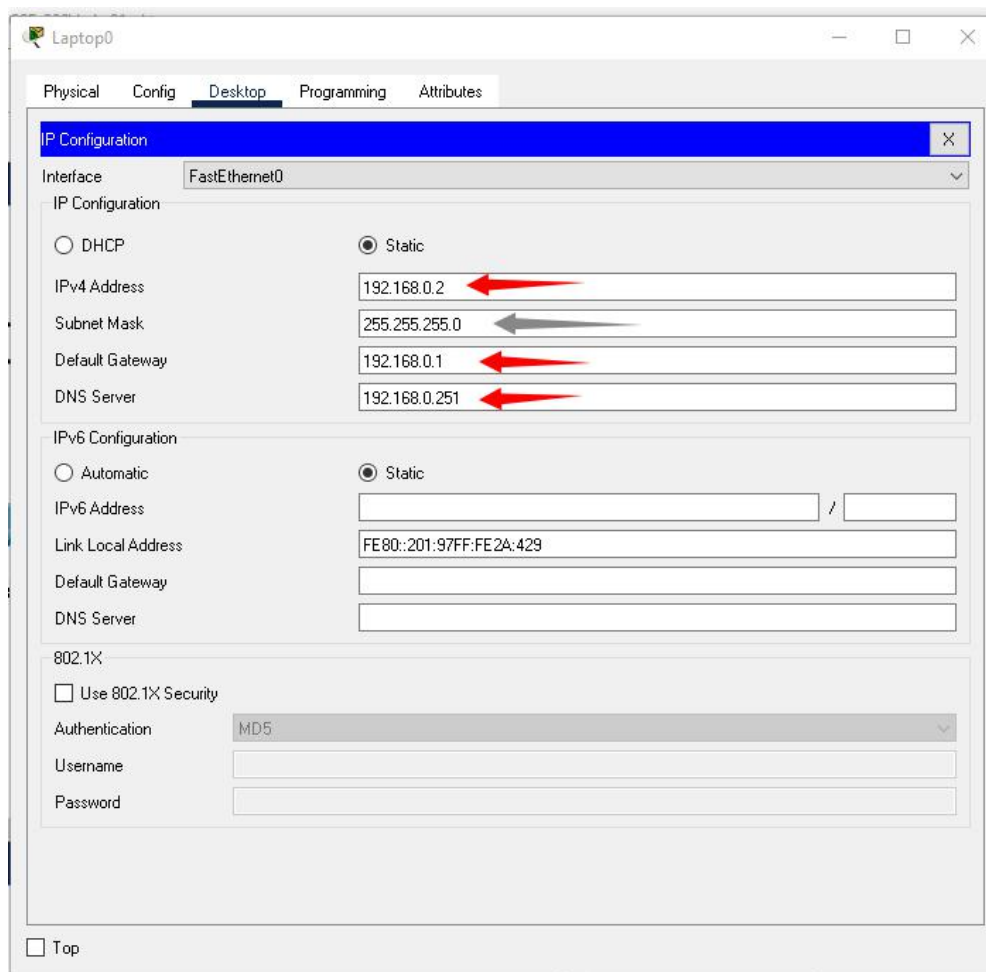
Now in Cisco Packet tracer we will implement our design. First we will put the necessary Switch, PC, Server. Then we will connect them. To connect our device, we will always remember that for the same type of device we need **copper cross-over** connection and for different type devices, we need to connect **copper straight-through** connection. So PC to Switch and Server to Switch connection will be straight through connection and Switch to Switch connection will be cross-over connection. Then we will note down the IP addresses of our connected PC & Server, Then we will rename the server and note down their IP addresses. Then we will identify LAB-1,2&3. Finally we will configure our devices. We will consider LAB-1's server(main server) as Host Server.



PC/Laptop Configuration :

First we will configure our PC. To configure our PC we will follow the mentioned steps below:

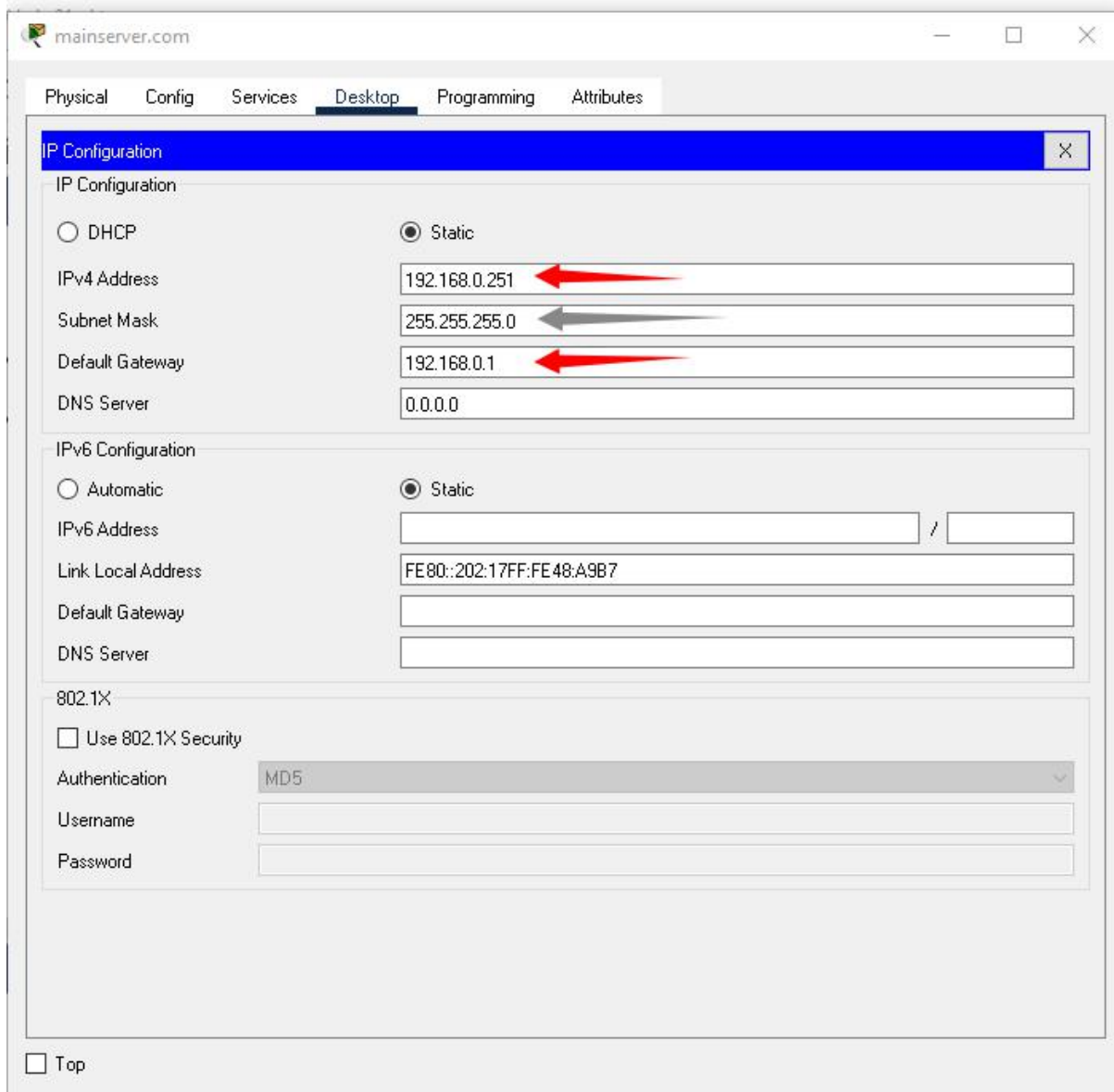
- Select a PC to configure. Then Desktop>IP Configuration.
- Here you will see a configure page. Fill up the IPv4(IP) Address according to the note. Default subnet mask will automatically fill up. Then set the Default Get way: **192.168.0.1**(Mentioned in Network Structure). Then put the DNS server: **192.168.0.251**



We will continue the same process for every PC/Laptop in our system. Then we will go for Server setup.

Server Setup :

- Select a server that you are supposed to configure.
- Go to Desktop > IP Configuration.
- Then you may see a configuration prompt.
- Insert IPv4 Address according to the note, Subnet mask will automatically set.
- Insert Default Getway: [192.168.0.1](#)
- Continue the same process(IPv4 Address depends on the note) for Server-2&3.



The screenshot shows a web-based network management interface with a tabbed menu at the top: Physical, Config, Services, Desktop (selected), Programming, and Attributes. A modal window titled 'IP Configuration' is open, featuring a blue header bar with a close button. The window is divided into three sections: IPv4 Configuration, IPv6 Configuration, and 802.1X. In the IPv4 section, the 'Static' radio button is selected. The IPv4 Address field contains '192.168.0.251', the Subnet Mask is '255.255.255.0', and the Default Gateway is '192.168.0.1'. Red arrows point to the IP address and gateway fields. The IPv6 section has 'Static' selected, with empty fields for IPv6 Address, Link Local Address (pre-filled with 'FE80::202:17FF:FE48:A9B7'), Default Gateway, and DNS Server. The 802.1X section has 'Use 802.1X Security' unchecked, 'Authentication' set to 'MD5', and empty fields for Username and Password. A 'Top' button is located at the bottom left of the window.

Field	Value
IPv4 Address	192.168.0.251
Subnet Mask	255.255.255.0
Default Gateway	192.168.0.1
DNS Server	0.0.0.0
IPv6 Address	
Link Local Address	FE80::202:17FF:FE48:A9B7
Default Gateway	
DNS Server	
802.1X Security	Use 802.1X Security
Authentication	MD5
Username	
Password	

Now we will check, our devices are connected or not using the following steps:

- Select a PC/Laptop.
- Select Desktop> Command Prompt
- Write ping #IP_Address(Assigned IP) for say ping [192.168.0.252](#) or ping [192.168.0.33](#)

The screenshot shows a Packet Tracer PC Command Line window for a device named 'Laptop0'. The window has tabs for Physical, Config, Desktop, Programming, and Attributes, with 'Desktop' selected. Inside the Command Prompt, two ping commands have been executed. The first command is 'C:\>ping 192.168.0.253', which is highlighted with a red box. The output shows four successful replies from 192.168.0.253 with 32 bytes of data, each taking less than 1ms and having a TTL of 128. The ping statistics show 4 packets sent, 4 received, 0 lost, and 0% loss. The second command is 'C:\>ping 192.168.0.63', also highlighted with a red box. The output shows four successful replies from 192.168.0.63 with 32 bytes of data, each taking less than 1ms and having a TTL of 128. The ping statistics show 4 packets sent, 4 received, 0 lost, and 0% loss. A large blue arrow points from the word 'Connected' to the two red boxes, indicating that the devices are connected.

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.0.253

Pinging 192.168.0.253 with 32 bytes of data:

Reply from 192.168.0.253: bytes=32 time<1ms TTL=128
Reply from 192.168.0.253: bytes=32 time<1ms TTL=128
Reply from 192.168.0.253: bytes=32 time<1ms TTL=128
Reply from 192.168.0.253: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.253:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.0.63

Pinging 192.168.0.63 with 32 bytes of data:

Reply from 192.168.0.63: bytes=32 time<1ms TTL=128
Reply from 192.168.0.63: bytes=32 time<1ms TTL=128
Reply from 192.168.0.63: bytes=32 time<1ms TTL=128
Reply from 192.168.0.63: bytes=32 time=11ms TTL=128

Ping statistics for 192.168.0.63:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 11ms, Average = 2ms

C:\>
```

Now we will configure the DNS server. In the DNS server we will specify a site name for a specific server. Like as we said that we will consider Server-1([192.168.0.251](#)) as [www.mainserver.com](#) Server-2([192.168.0.252](#)) as [www.uap.edu](#) and finally Server-3([192.168.0.253](#)) as [www.cse.edu](#) we will just implement this in DNS so that any

connected PC can visit the site when they are connected to the network. So we will configure Server-1 for DNS using the following steps.

DNS Configuration :

- Select SERVER-1. Then Services > DNS
- First ON the DNS. Then enter the Name(like www.uap.edu or www.cse.edu)
- Then enter the Address for say www.mainserver.com - 192.168.0.251
www.uap.edu - 192.168.0.251 www.cse.edu - 192.168.0.253
- Then click ADD button. And you can see the added Name bellow

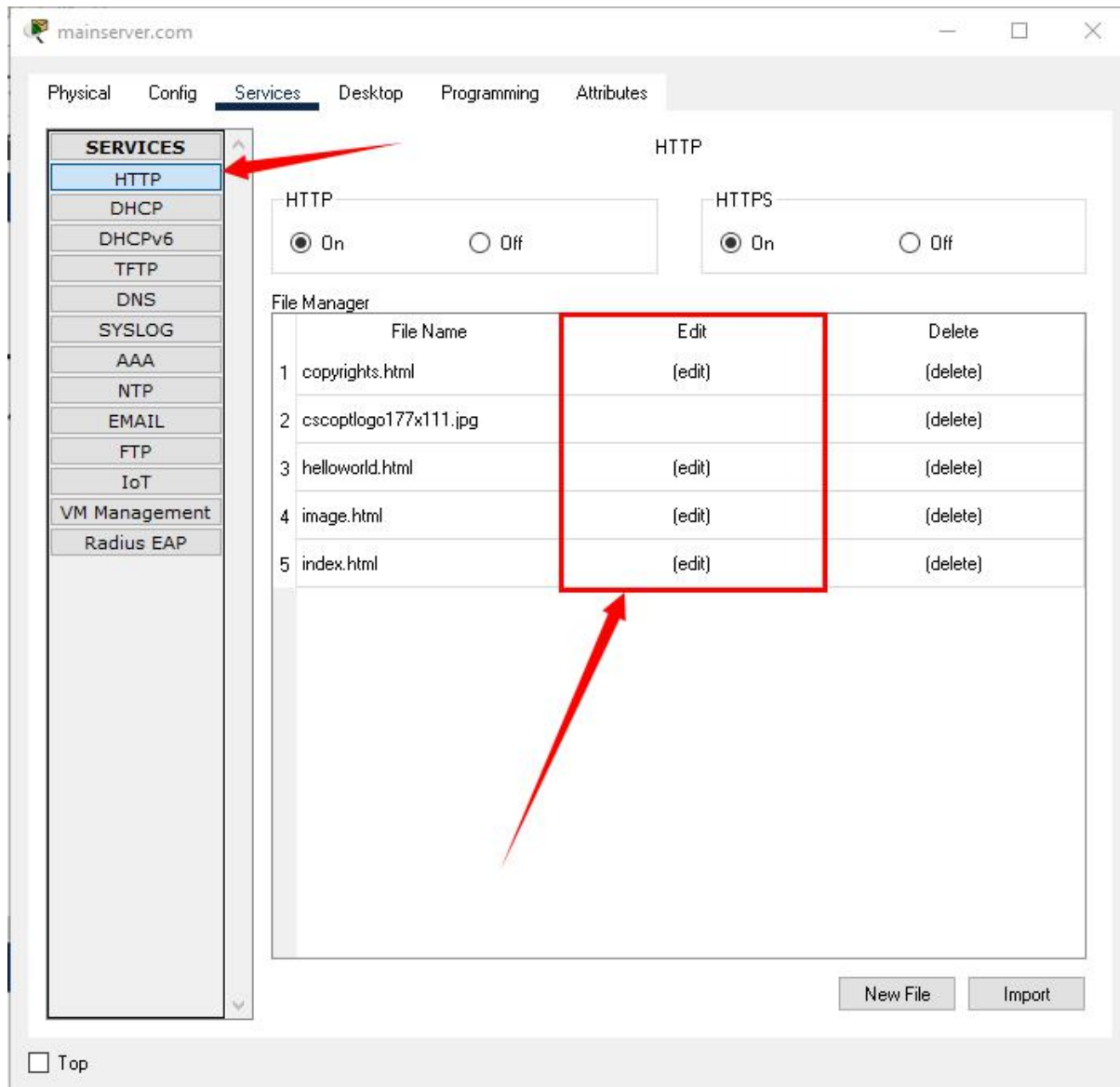
The screenshot shows the 'mainserver.com' configuration window with the 'Services' tab selected. The 'DNS' service is listed in the left sidebar and is currently 'On' (1). The 'Resource Records' section shows a new record being added with Name 'www.mainserver.com' (2) and Address '192.168.0.151' (3). The 'Add' button is highlighted (4). Below the form, a table titled 'Registered Addresses' lists the configured records:

No.	Name	Type	Detail
0	www.cse.edu	A Record	192.168.0.253
1	www.mainserver.com	A Record	192.168.0.251
2	www.uap.edu	A Record	192.168.0.252

A blue arrow points to the table with the text 'Registered Addresses'.

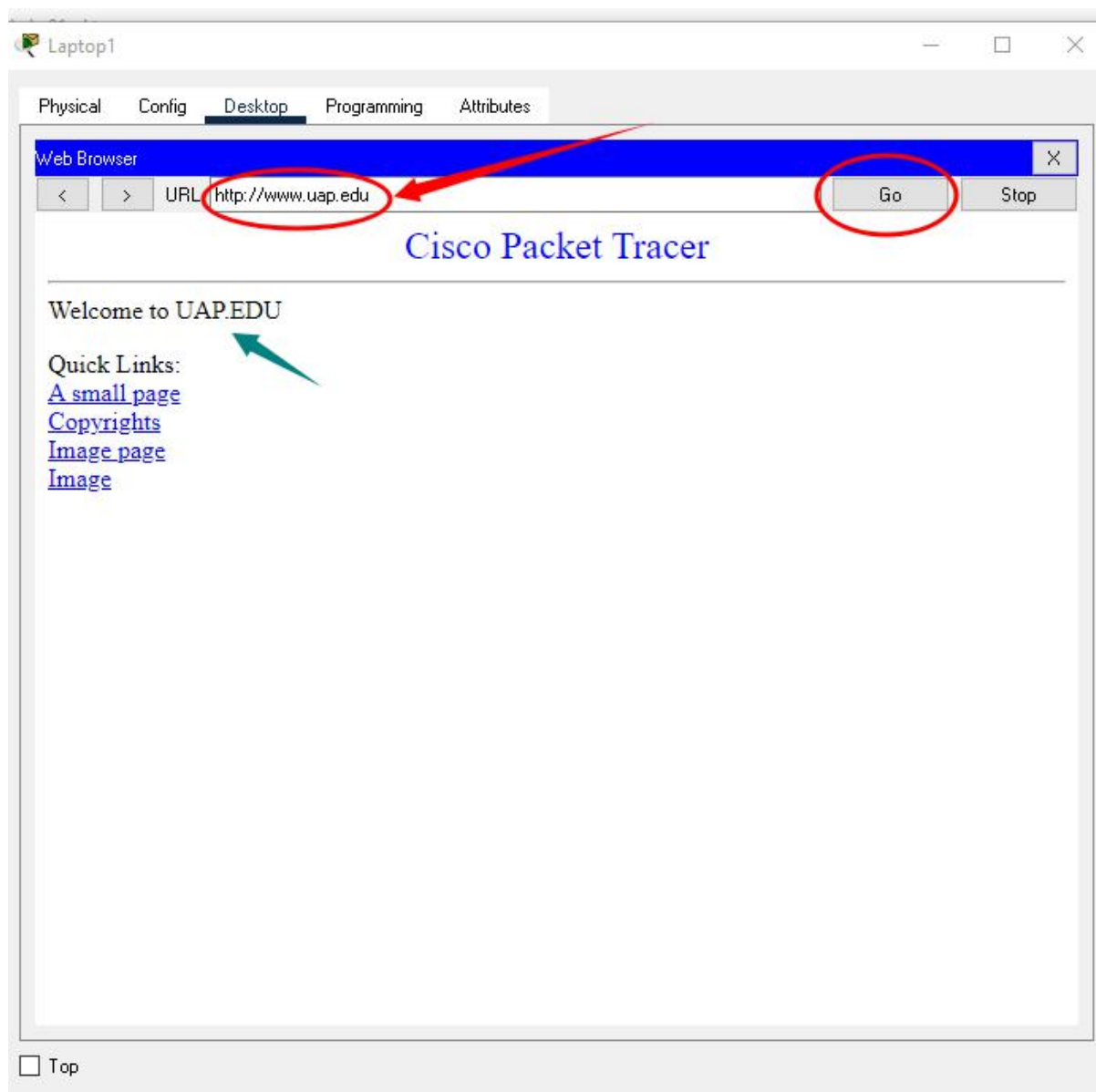
You can also configure the HTML part to specify what the page should show. For that just select a server. Then Services > HTTP where you can see a prompt to edit the

following section to control what the site should show. You can do this for any server(Server-1,2&3)



Now we will check, our DNS server is connected or not.

To identify this, we just need to select any PC connected to the network. Then we will select **Desktop > Web Browser**. Where you can see a web browser page. In the URL section we will search for one of our configured sites for say www.cse.edu and click Go or press enter. This will run a page. Which means that our DNS server is successfully configured. You can also check other added sites like www.mainserver.com or www.uap.edu



Now there is a problem. We have manually configured our PC/Laptop. Which is not a good idea. We are not supposed to insert IP address, Default Gateway, DNS Server every time when a device wants to get connected with the network. Again it is not possible to remember every device IP address. So we need some configuration so that devices can automatically configure themselves and provide the Service.

This problem can be solved by using DNCP server. In this process, new connected device will get the ip address, default gateway, DNS server by itself.

In our network we will configure Server-2 as a DHCP server. Remember one thing, a network may have many servers but it can't have many DHCP servers. It will causes conflicts and create problems in the network system.

Follow the steps Below to configure DHCP server:

DHCP Configuration :

- Select Server-2, then select Services > DHCP
- On the Service
- Enter Default Getway and DNS Server. Subnetmask will automatically insert.
- Define the Maximum number of Users
- Then Click Save

uap.edu

Physical Config **Services** Desktop Programming Attributes

SERVICES

- HTTP
- DHCP**
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

DHCP

Interface: FastEthernet0 Service: ☒ On ☐ Off

Pool Name: serverPool

Default Gateway: 192.168.0.1

DNS Server: 192.168.0.251

Start IP Address: 192 168 0 2

Subnet Mask: 255 255 255 0

Maximum Number of Users: 250

TFTP Server: 0.0.0.0

WLC Address: 0.0.0.0

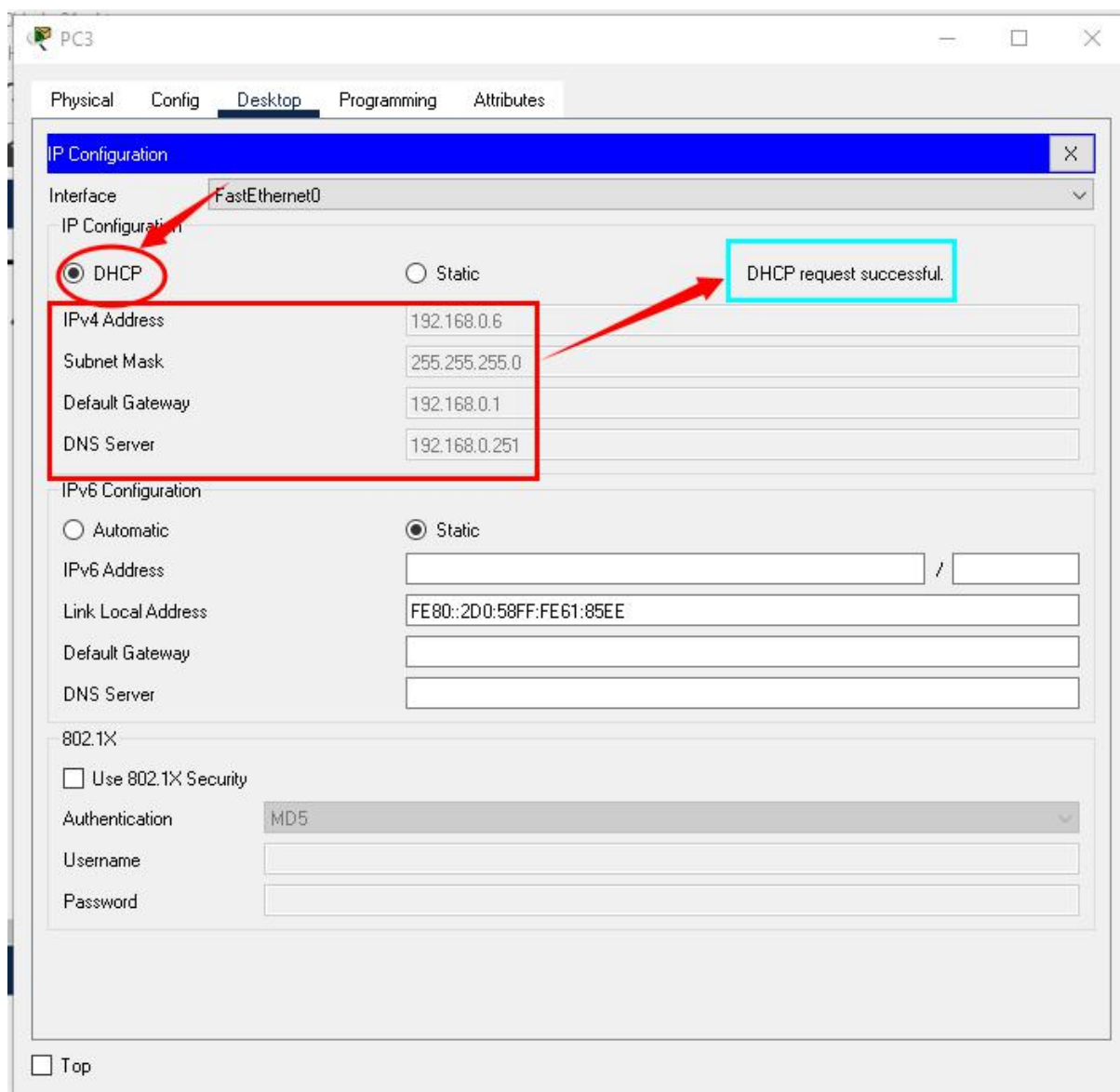
Add Save Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool	192.168.0.1	192.168.0.1	192.168.0.1	255.255.255.0	250	0.0.0.0	0.0.0.0

☐ Top

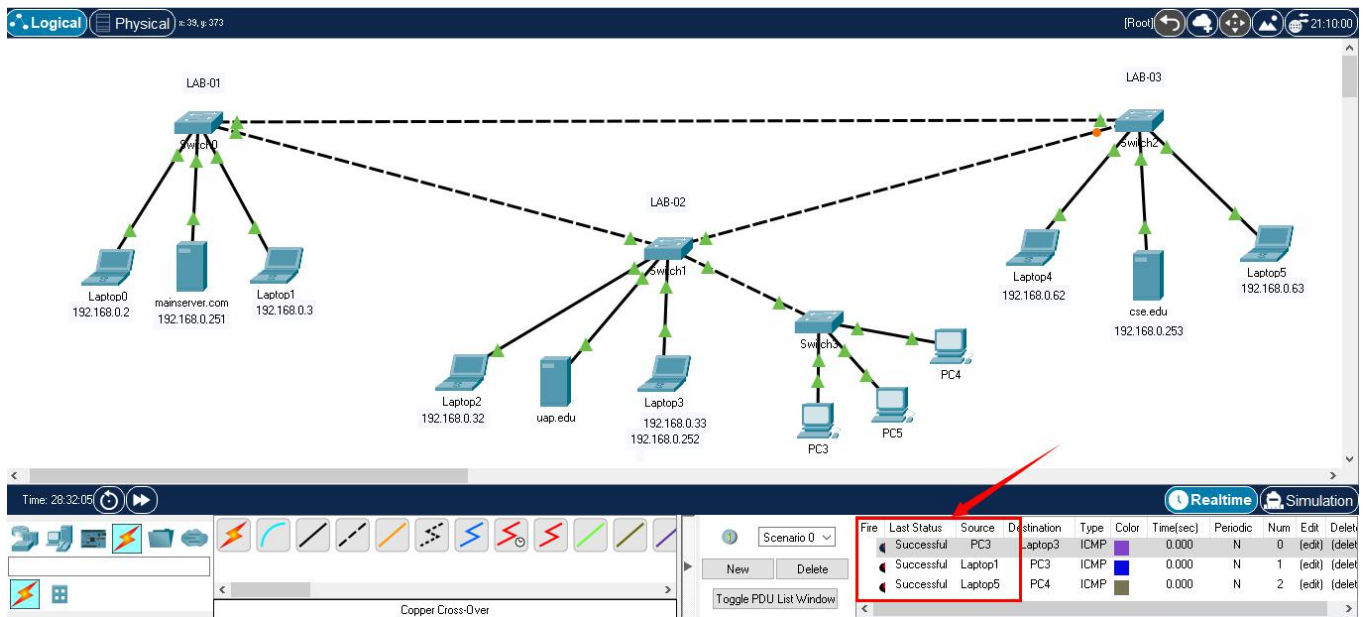
Now we need to check if our configuration is complete or not. For that we will add 2 new devices with the switch along with Server-2. First we will connect our new PC.

- ❖ Select one of the new devices. Click Desktop > IP Configuration.
- ❖ Select DHCP and wait for met moment
- ❖ Then you can see that your new PC automatically took the IP Address.



Do the same thing with another PC/Laptop and check if the connections are working properly or not.

Final Design :



Learning :

In this experiment, we learned about DNS & DHCP servers. How to connect PC - Switch -Switch and configure PC, DNS server & DHCP server.

Discussion:

It may take some time to establish a connection. Please wait until the node of the connection turns green. Be careful with cross-over & Straight through connection. Same Type Device- Cross-over, different type device: Straight - Through connection. Send packages from PC to PC or use Command prompt to check the connection between devices. If there were any kind of error, check the IPV4 addresses. Try to use switch-2960 with 24-ports.