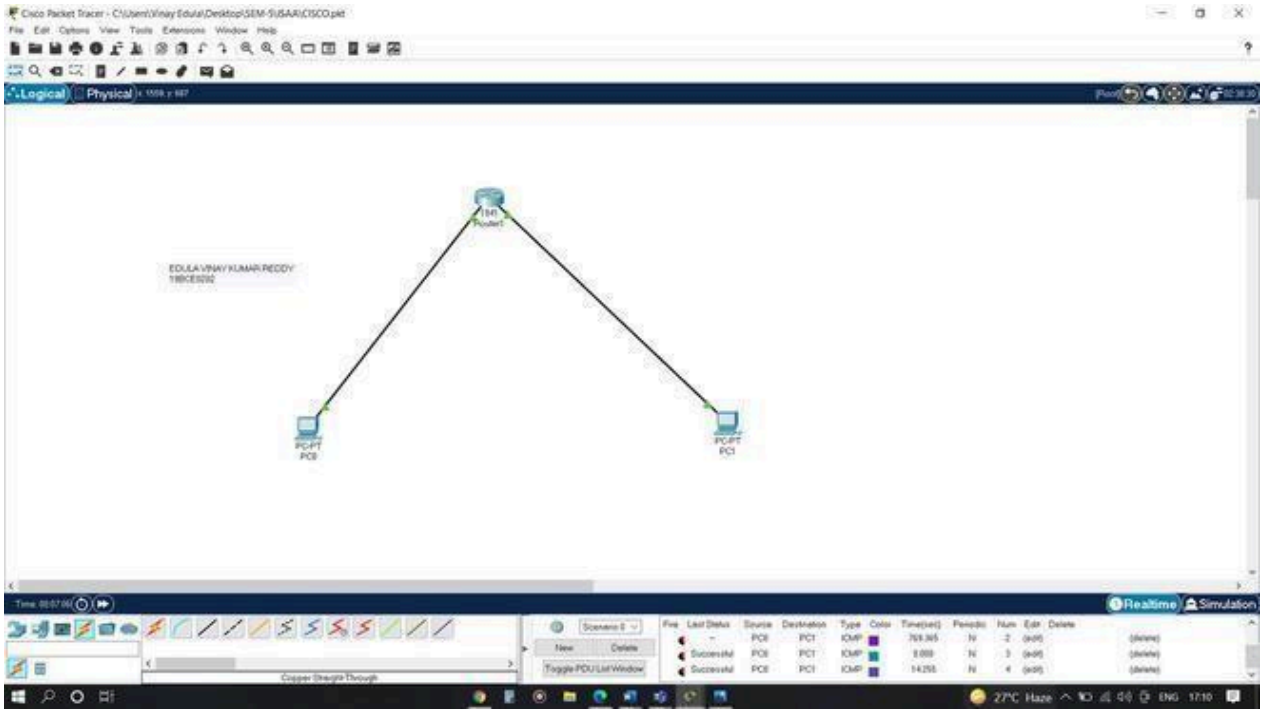
CS23532-COMPUTER NETWORKS-LAB MANUAL

Practical-10

AIM:-a) Internetworking with routers in CISCO PACKET TRACER simulator.

a) Design and configure a simple internetwork using a router.

In this network, a router and 2 PCs are used. Computers are connected with routers using a copper straight-through cable. After forming the network, to check network connectivity a simple PDU is transferred from PC0 to PC1.



Procedure:

Step-1(Configuring Router1):

1. Select the router and Open CLI.
2. Press ENTER to start configuring Router1.
3. Type enable to activate the privileged mode.

Router1 Command Line Interface:

Router>ena
ble
Router#confi
g t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.10.1
255.255.255.0 Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed
state to up Router(config-if)#interface FastEthernet0/1
Router(config-if)#ip address 192.168.20.1
255.255.255.0 Router(config-if)#no shutdown

Step-2(Configuring PCs)

1. Assign IP Addresses to every PC in the network.
2. Select the PC, Go to the desktop and select IP Configuration and assign an IP address, Default gateway, Subnet Mask
3. Assign the default gateway of PC0 as 192.168.10.1.
4. Assign the default gateway of PC1 as 192.168.20.1.

Step-3(Connecting PCs with Router):

1. Connect the FastEthernet0 port of PC0 with FastEthernet0/0 port of Router1 using a copper straight-through cable.
2. Connect the FastEthernet0 port of PC1 with FastEthernet0/1 port of Router1 using a copper straight-through cable.

Router Configuration Table:

Device Name	IP address FastEthernet 0 /0	Subnet Mask	IP Address FastEthernet0/1	Subnet Mask
Router1	192.168.10.1	255.255.255.0	192.168.20.1	255.255.255.0

PC Configuration Table:

Device Name	IP address	Subnet Mask	Gateway
PC 0	192.168.10.2	255.255.255.0	192.168.10.1
PC 1	192.168.20.2	255.255.255.0	192.168.20.1

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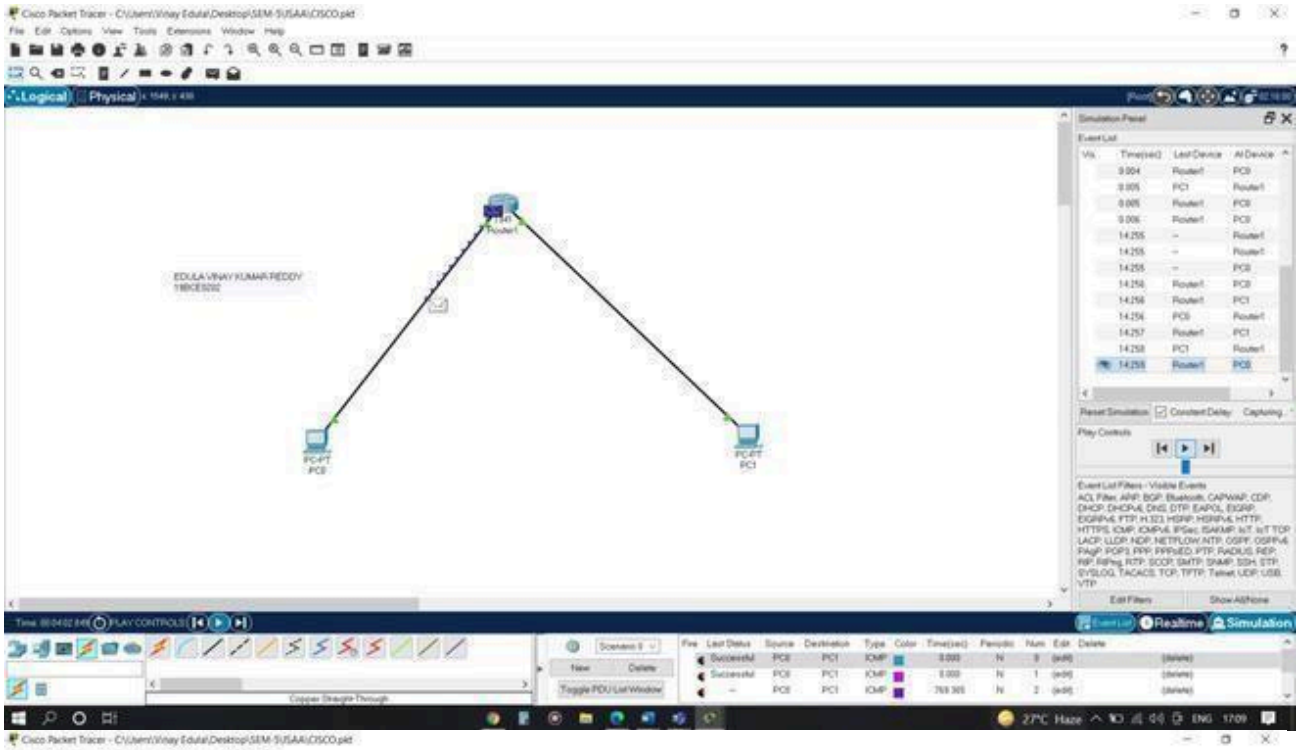
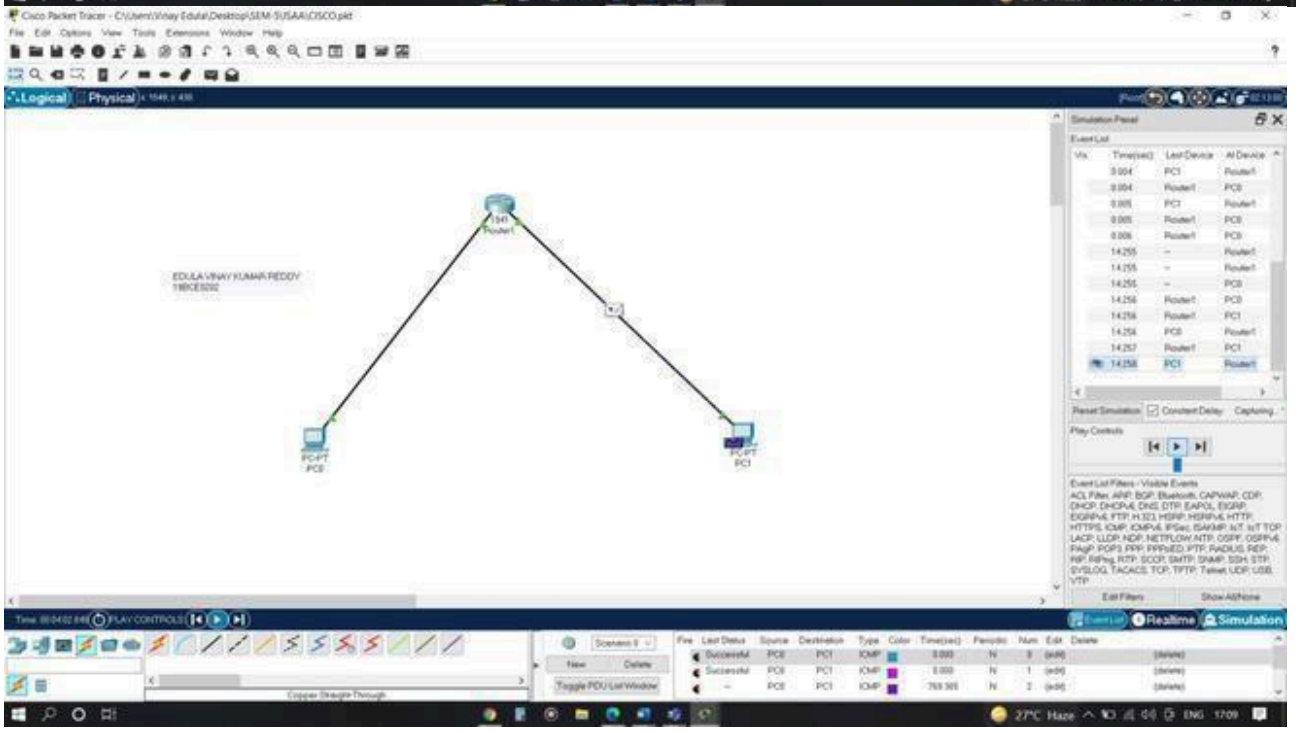
Designed Network topology:

Simulation of Designed Network Topology:

Sending a PDU From PC0 to PC1:





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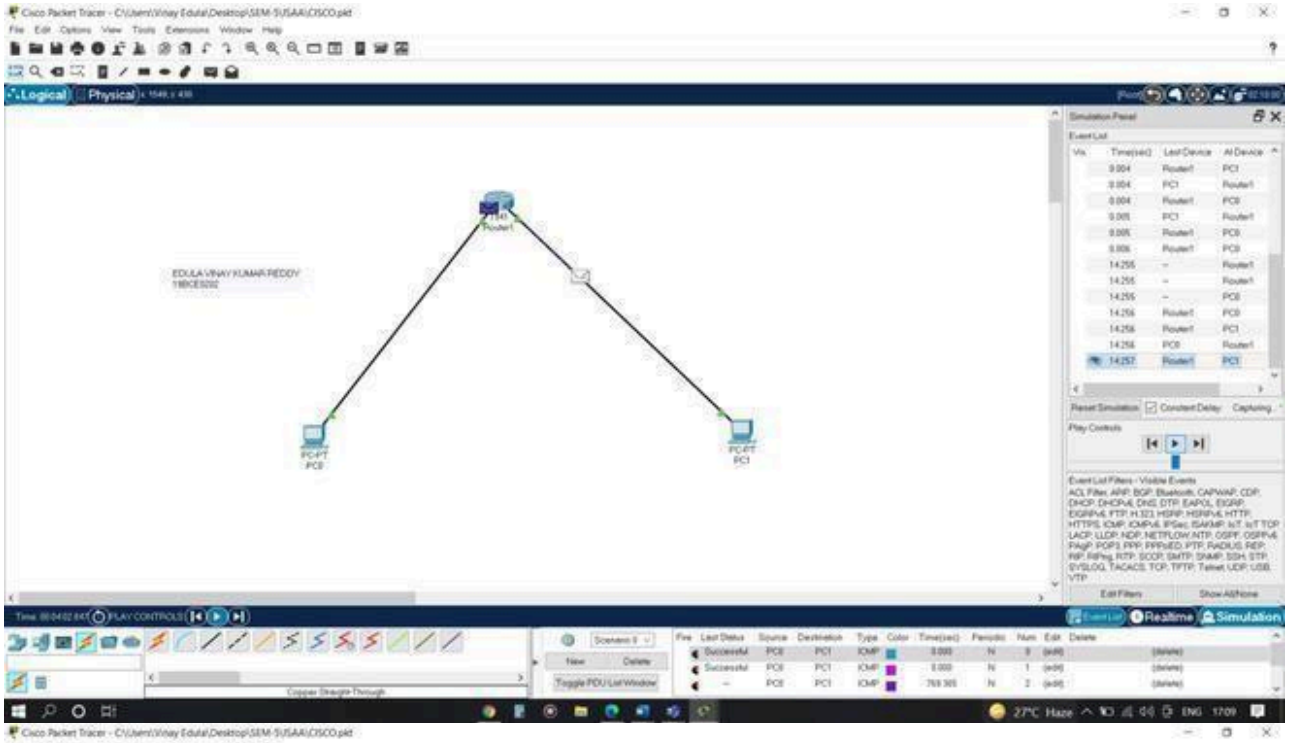
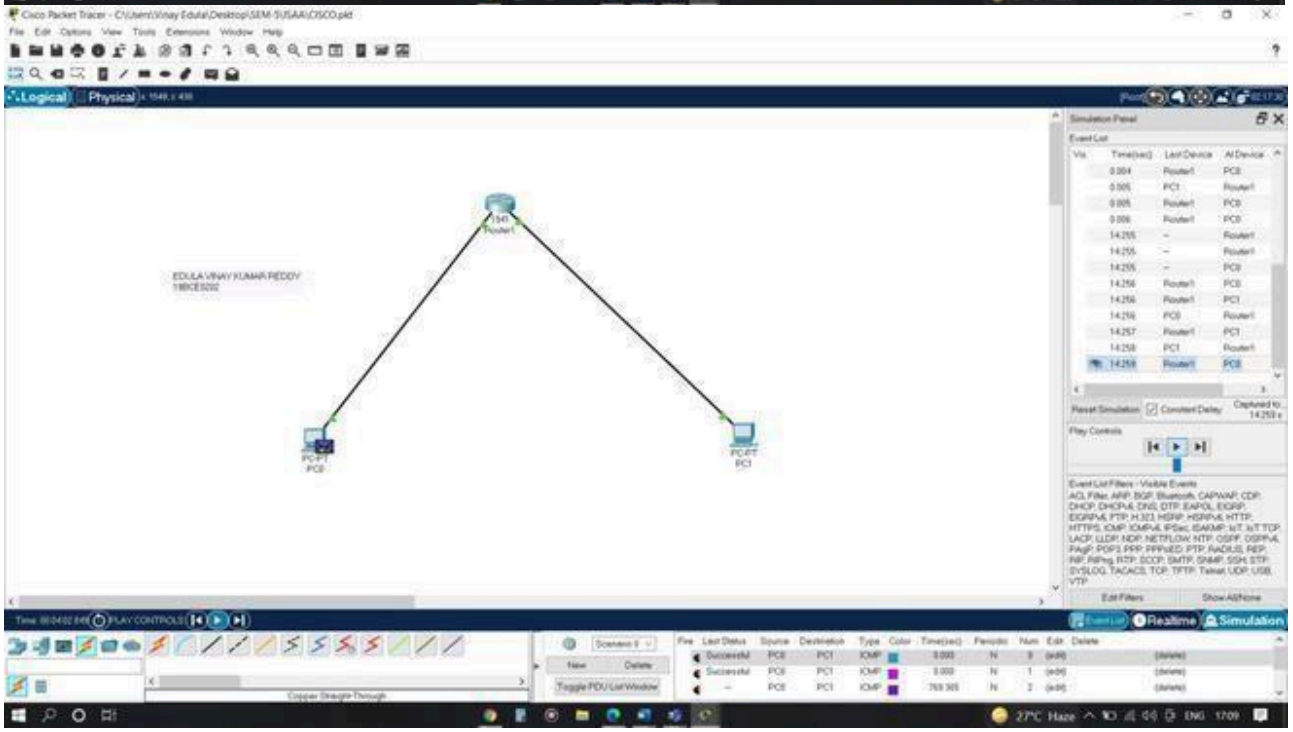
Acknowledgment From PC1 to PC0:





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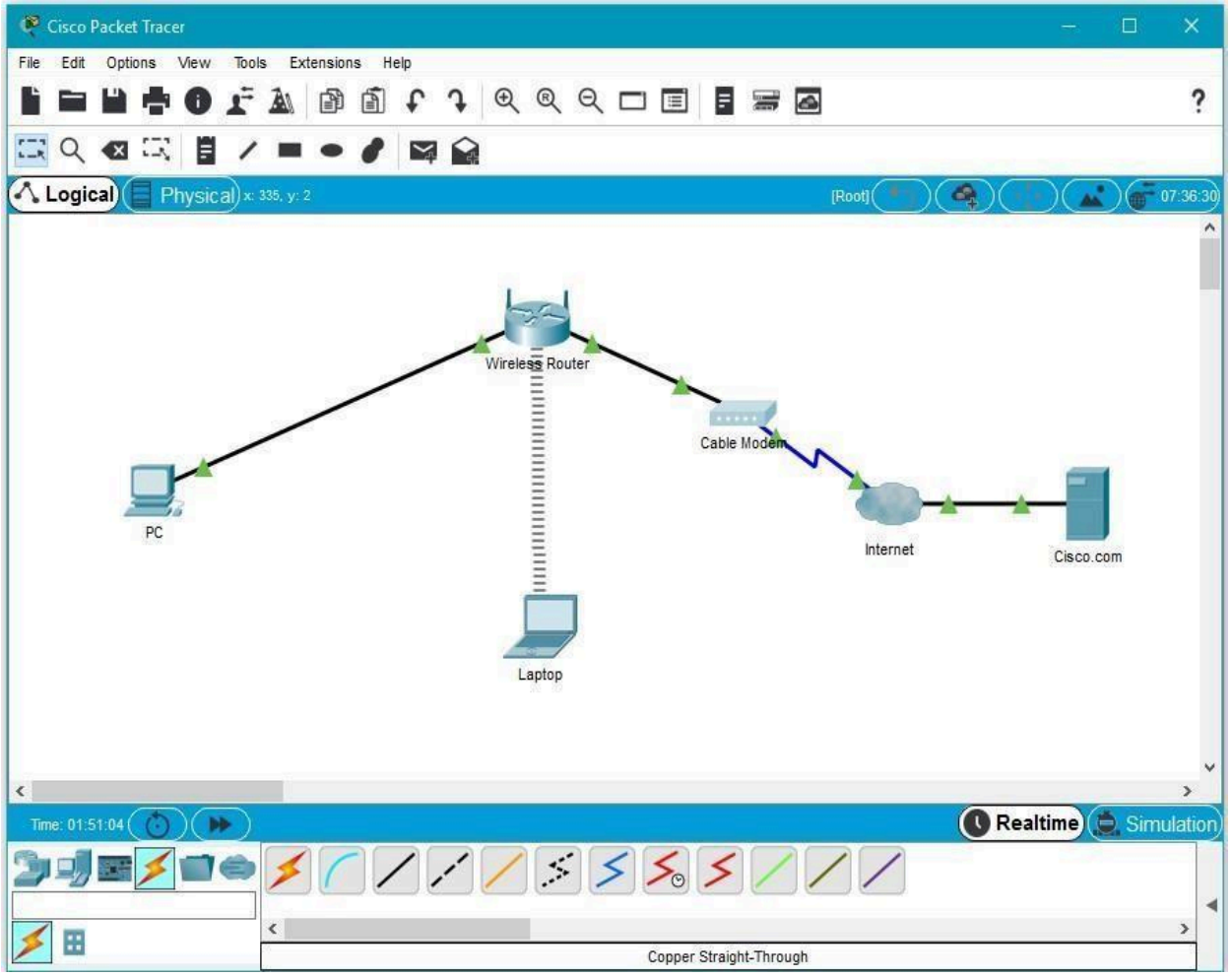
Practical 10

AIM:- b) Design and configure an internetwork using wireless router, DHCP server and internet cloud.



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
PC	Ethernet0	DHCP		192.168.0.1
Wireless Router	LAN	192.168.0.1	255.255.255.0	
Wireless Router	Internet	DHCP		
Cisco.com Server	Ethernet0	208.67.220.220	255.255.255.0	
Laptop	Wireless0	DHCP		

Objectives

Part 1: Build a Simple Network in the Logical Topology Workspace

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Part 2: Configure the Network Devices Part 3: Test Connectivity between Network Devices Part 4: Save the File and Close Packet Tracer

Part 1: Build a Simple Network in the Logical Topology

Workspace Step 1: Launch Packet Tracer.

Step 2: Build the topology

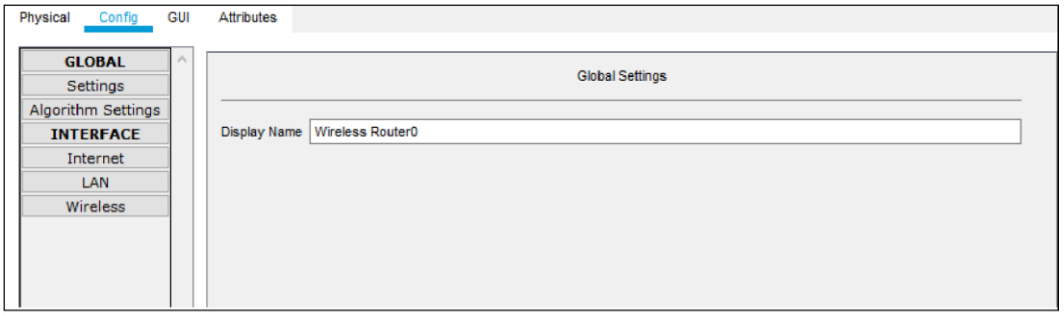
a. Add network devices to the workspace.

Using the device selection box, add the network devices to the workspace as shown in the topology diagram.

To place a device onto the workspace, first choose a device type from the **Device-Type Selection** box. Then, click on the desired device model from the **Device-Specific Selection** box. Finally, click on a location in the workspace to put your device in that location. If you want to cancel your selection, click the **Cancel** icon for that device. Alternatively, you can click and drag a device from the **Device-Specific Selection** box onto the workspace.

b. Change display names of the network devices.

To change the display names of the network devices click on the device icon on the Packet Tracer **Logical** workspace, then click on the **Config** tab in the device configuration window. Type the new name of the device into the **Display Name** box as show in the figure below.



c. Add the physical cabling between devices on the workspace

Using the device selection box, add the physical cabling between devices on the workspace as shown in the topology diagram.

The PC will need a copper straight-through cable to connect to the wireless router. Select the copper straight-through cable in the device selection box and attach it to the FastEthernet0 interface of the PC and the Ethernet 1 interface of the wireless router.

The wireless router will need a copper straight-through cable to connect to the cable modem. Select the copper straight-through cable in the device-selection box and attach it to the Internet interface of the wireless router and the Port 1 interface of the cable modem.

The cable modem will need a coaxial cable to connect to the Internet cloud. Select the coaxial cable in the device-selection box and attach it to the Port 0 interface of the cable modem and the coaxial interface of the Internet cloud.

The Interne cloud will need copper straight-through cable to connect to the Cisco.com server. Select the copper straight-through cable in the device-selection box and attach it to the Ethernet interface of the Internet cloud and the FastEthernet0 interface of the Cisco.com server.

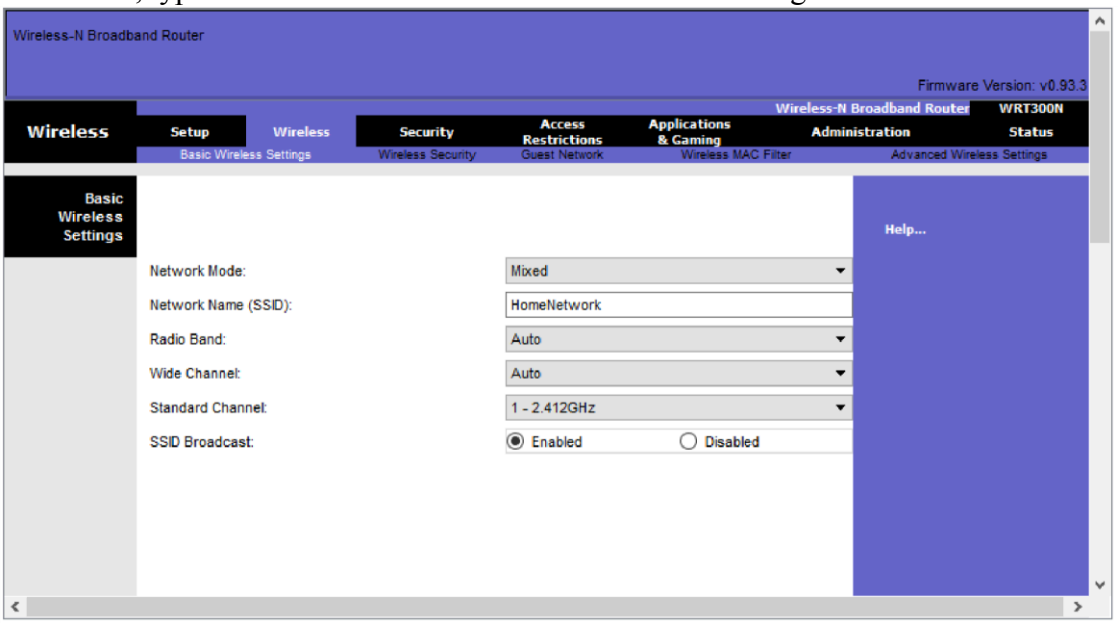
Part 2: Configure the Network

Devices Step 1: Configure the wireless

router

a. Create the wireless network on the wireless router

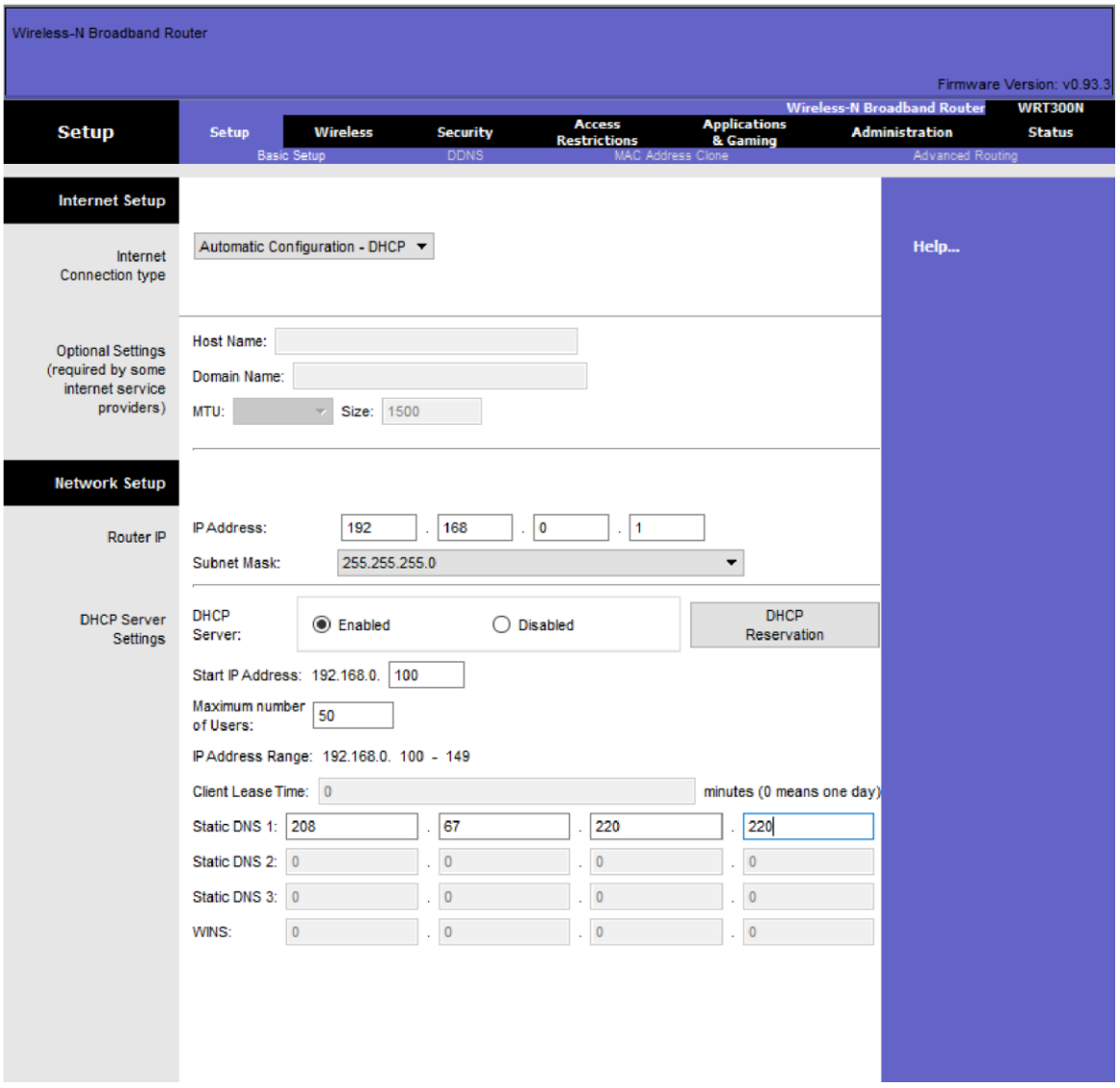
Click on the **Wireless Router** icon on the Packet Tracer **Logical** workspace to open the device configuration window.
In the wireless router configuration window, click on the **GUI** tab to view configuration options for the wireless router.
Next, click on the **Wireless** tab in the GUI to view the wireless settings. The only setting that needs to be changed from the defaults is the **Network Name (SSID)**. Here, type the name "HomeNetwork" as shown in the figure.



Configure the Internet connection on the wireless router
Click on the **Setup** tab in the wireless router GUI.

In the **DHCP Server** settings verify that the **Enabled** button is selected and configure the static IP address of the DNS server as 208.67.220.220 as shown in the figure.

b. Click on the **Save Settings** tab.



Step 2: Configure the laptop

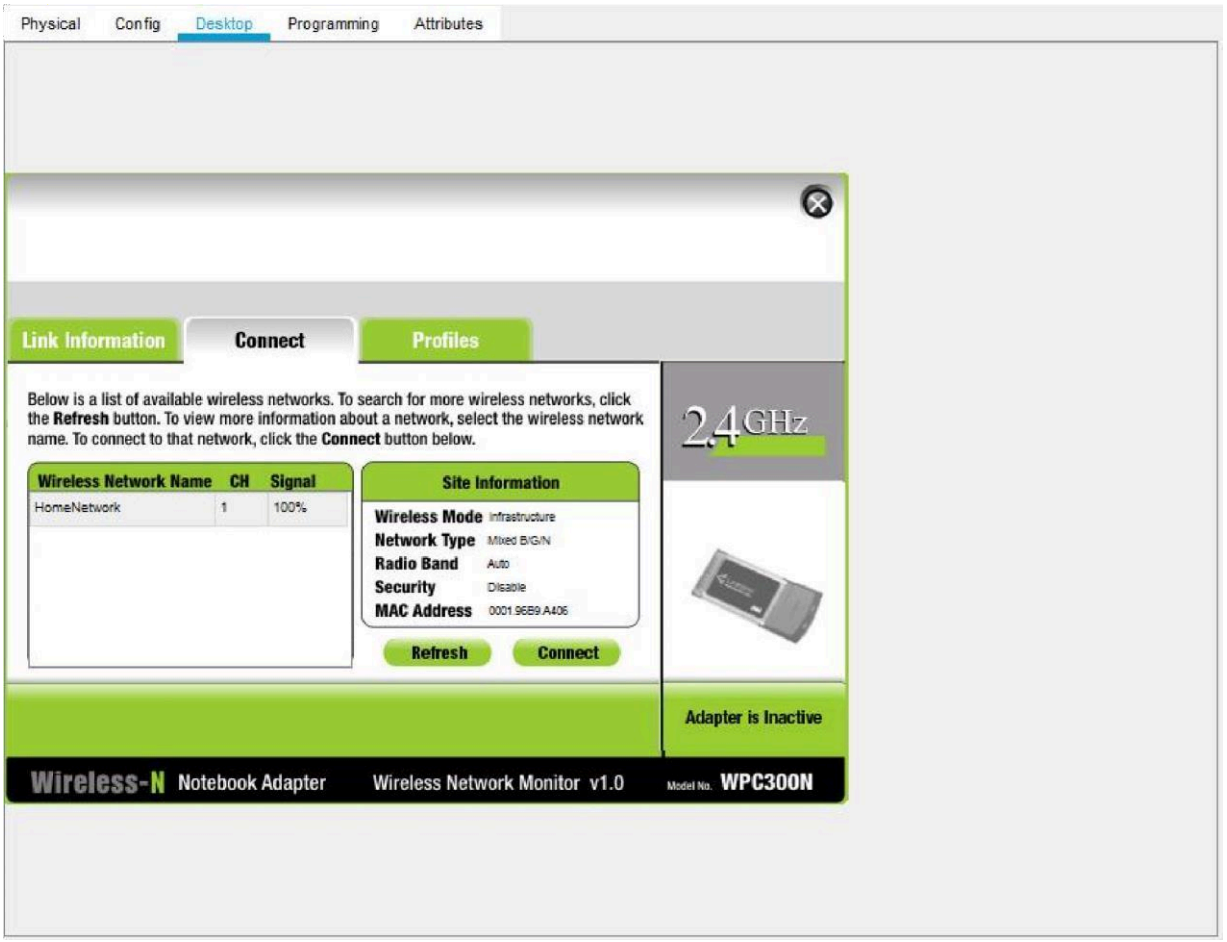
a. Configure the Laptop to access the wireless network

Click on the Laptop icon on the Packet Tracer **Logical** workspace and in the laptop configuration windows select the **Physical** tab.
In the **Physical** tab you will need to remove the Ethernet copper module and replace it with the Wireless WPC300N module.
To do this, you first power the Laptop off by clicking the power button on the side of the laptop. Then remove the currently installed Ethernet copper module by clicking on the module on the side of the laptop and dragging it to the **MODULES** pane on the left of the laptop window. Then install the Wireless WPC300N module by clicking on it in the **MODULES** pane and dragging it to the empty module port on the side of the laptop.
Power the laptop back on by clicking on the Laptop power button again.

With the wireless module installed, the next task is to connect the laptop to the wireless network.

Click on the **Desktop** tab at the top of the Laptop configuration window and select the **PC Wireless** icon.

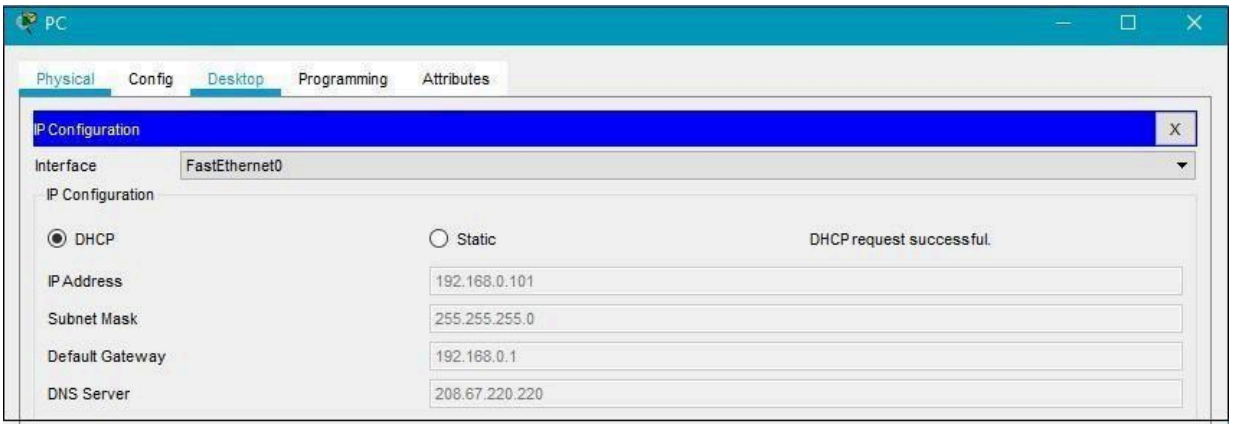
Once the Wireless-N Notebook Adapter settings are visible, select the **Connect** tab. The wireless network "HomeNetwork" should be visible in the list of wireless networks as shown in the figure.
Select the network, and click on the **Connect** tab found below the **Site Information pane.**



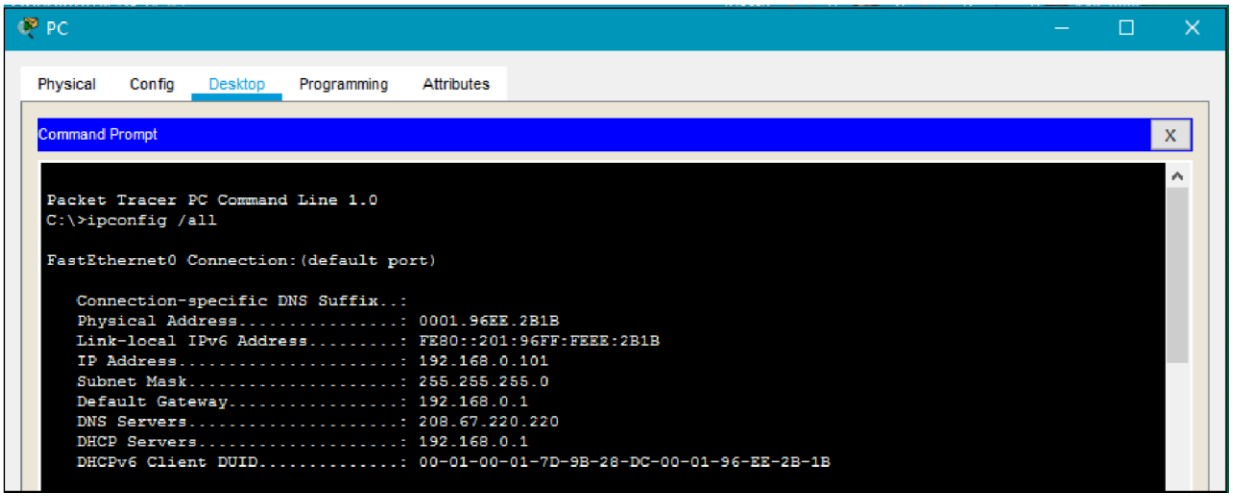
Step 3: Configure the PC

a. Configure the PC for the wired network

Click on the **PC** icon on the Packet Tracer **Logical** workspace and select the **Desktop** tab and then the **IP Configuration** icon.
In the IP Configuration window, select the **DCHP** radio button as shown in the figure so that the PC will use DCHP to receive an IPv4 address from the wireless router. Close the IP Configuration window.



Click on the Command Prompt icon. Verify that the PC has received an IPv4 address by issuing the **ipconfig /all** command from the command prompt as shown in the figure. The PC should receive an IPv4 address in the 192.168.0.x range.



Step 4: Configure the Internet cloud

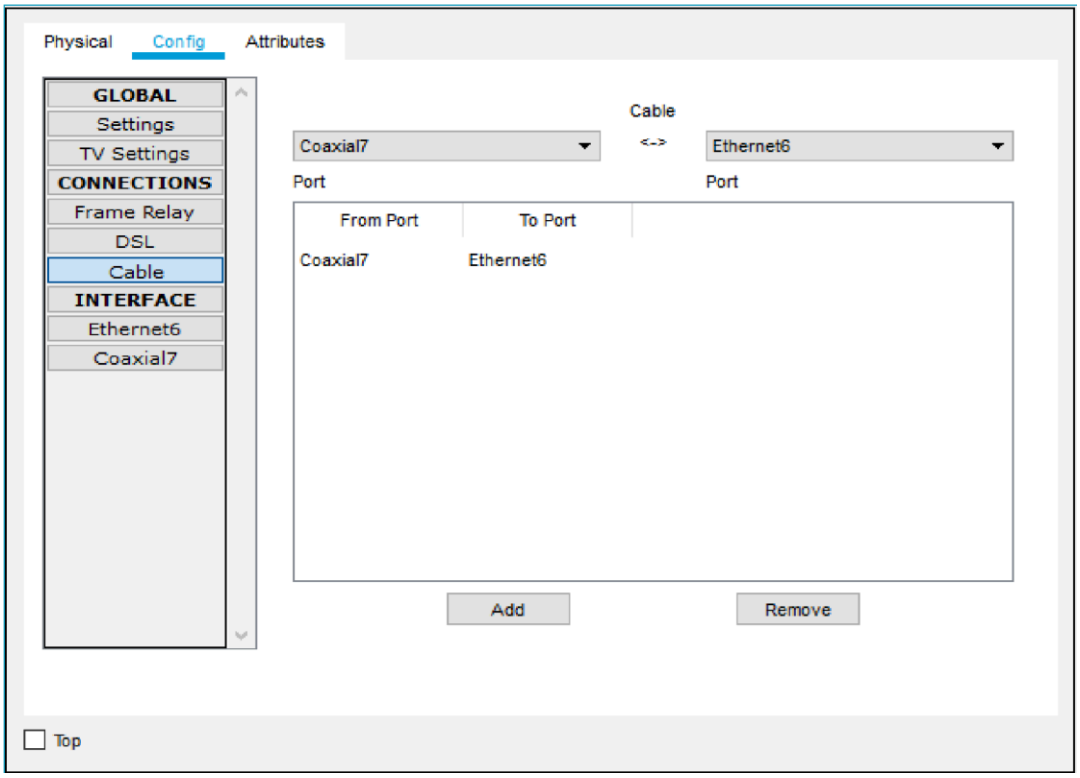
a. Install network modules if necessary

Click on the **Internet Cloud** icon on the Packet Tracer **Logical** workspace and then click on the **Physical** tab. The cloud device will need two modules if they are not already installed. The PT-CLOUD-NM-1CX which is for the cable modem service connection and the PT-CLOUD-NM-1CFE which is for a copper Ethernet cable connection. If these modules are missing, power off the physical cloud devices by clicking on the power button and drag each module to an empty module port on the device and then power the device back on.

b. Identify the From and To Ports

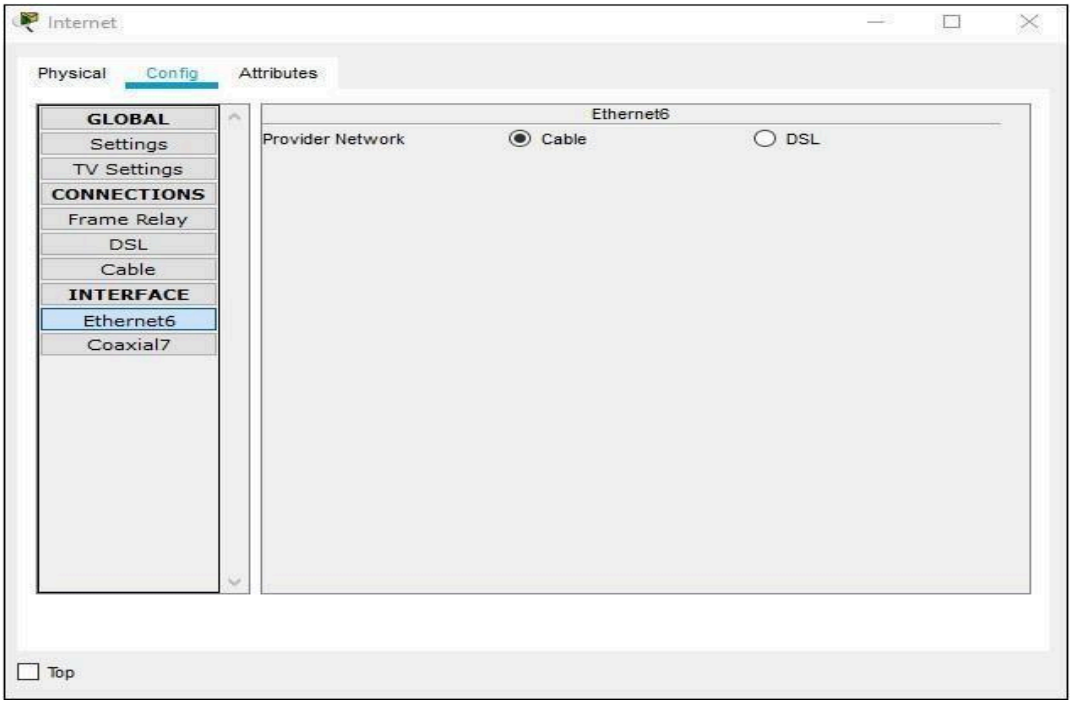
Click on the **Config** tab in the Cloud device window. In the left pane click on **Cable** under **CONNECTIONS**. In the first drop down box choose Coaxial and in the second drop down box choose

Ethernet then click the **Add** button to add these as the **From Port** and **To Port** as shown in the figure.



c. Identify the type of provider

While still in the **Config** tab click Ethernet under **INTERFACE** in the left pane. In the Ethernet configuration window select **Cable** as the Provider Network as shown in the figure.



Step 5: Configure the Cisco.com server

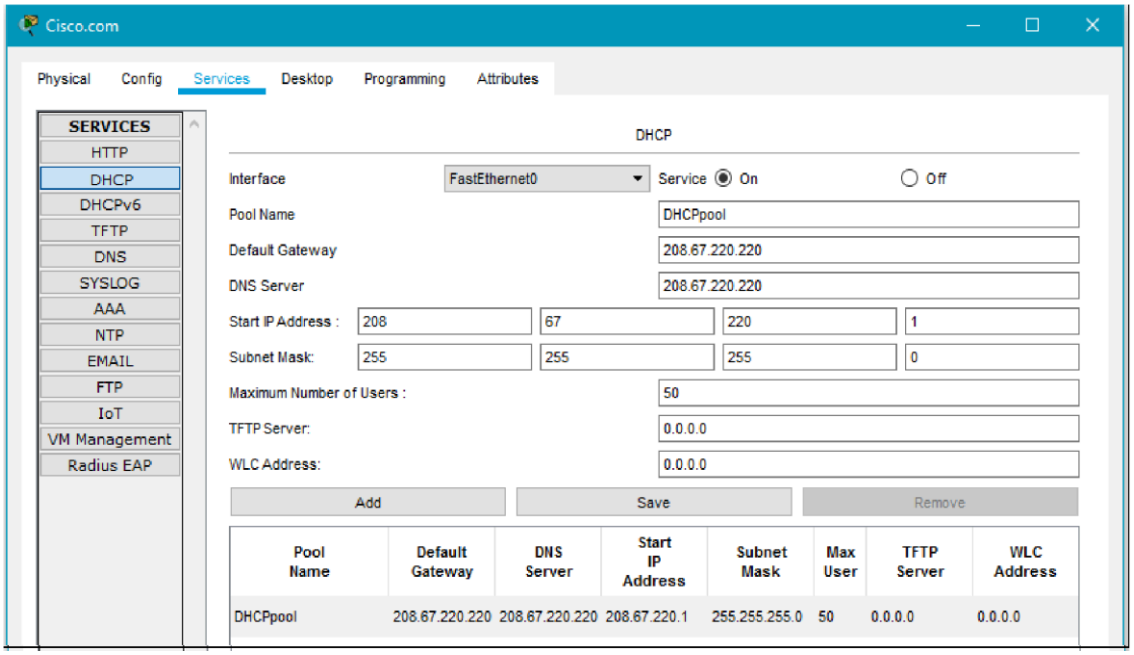
a. Configure the Cisco.com server as a DHCP server

Click on the Cisco.com server icon on the Packet Tracer **Logical** workspace and select the **Services** tab. Select **DHCP** from the **SERVICES** list in the left pane.

In the DHCP configuration window, configure a DHCP as shown in the figure with the following settings.

- Click **On** to turn the DCHP service
- on
- Pool name: DHCPpool
- Default Gateway: 208.67.220.220
- DNS Server: 208.67.220.220
- Starting IP Address: 208.67.220.1
- Subnet Mask 255.255.255.0
- Maximum number of Users: 50

Click **Add** to add the pool

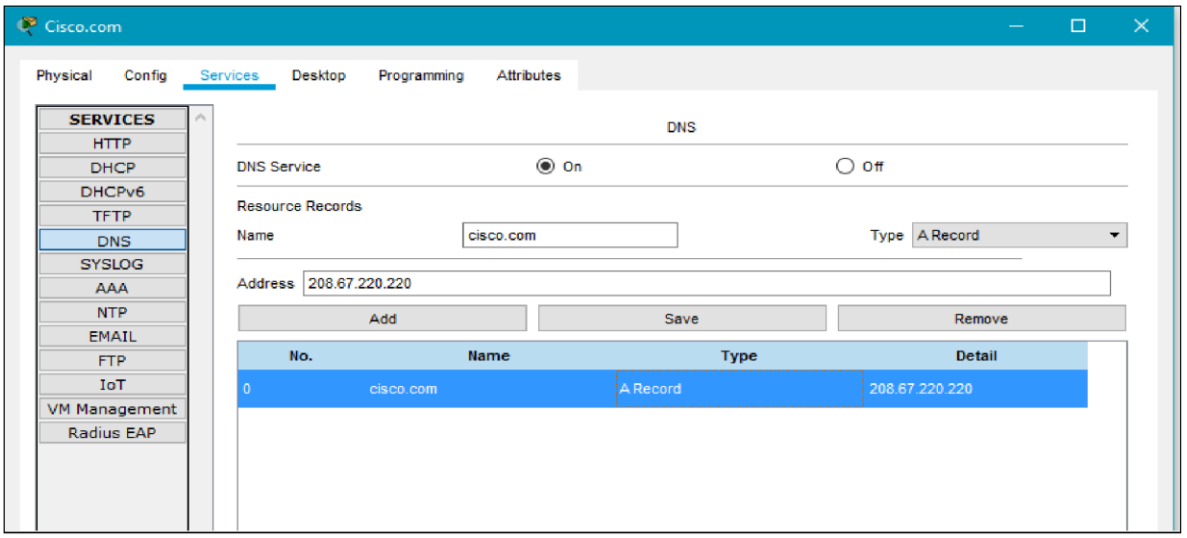


b. Configure the Cisco.com server as a DNS server to provide domain name to IPv4 address resolution.

While still in the **Services** tab, select **DNS** from the **SERVICES** listed in the left pane.

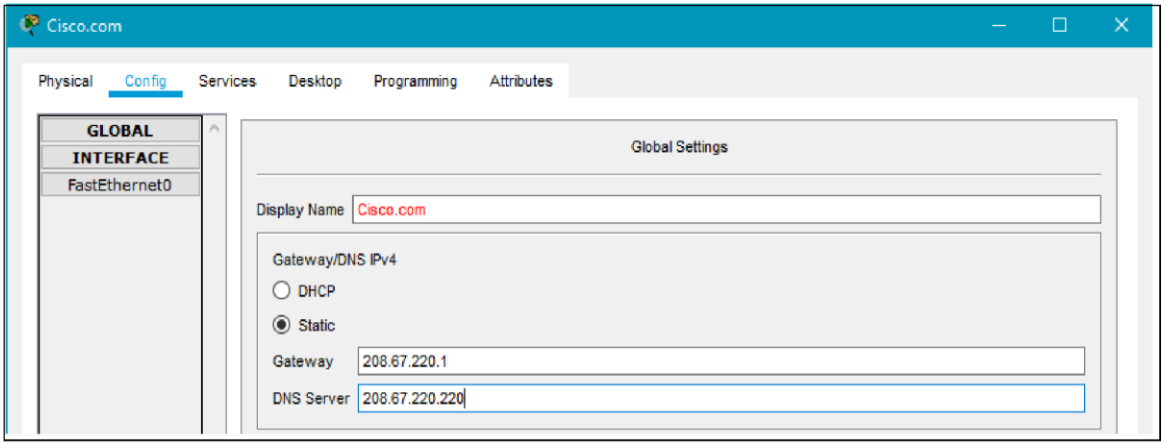
Configure the DNS service using the following settings as shown in the figure.

- Click **On** to turn the DNS service on
- Name: Cisco.com
- Type: A Record
- Address: 208.67.220.220



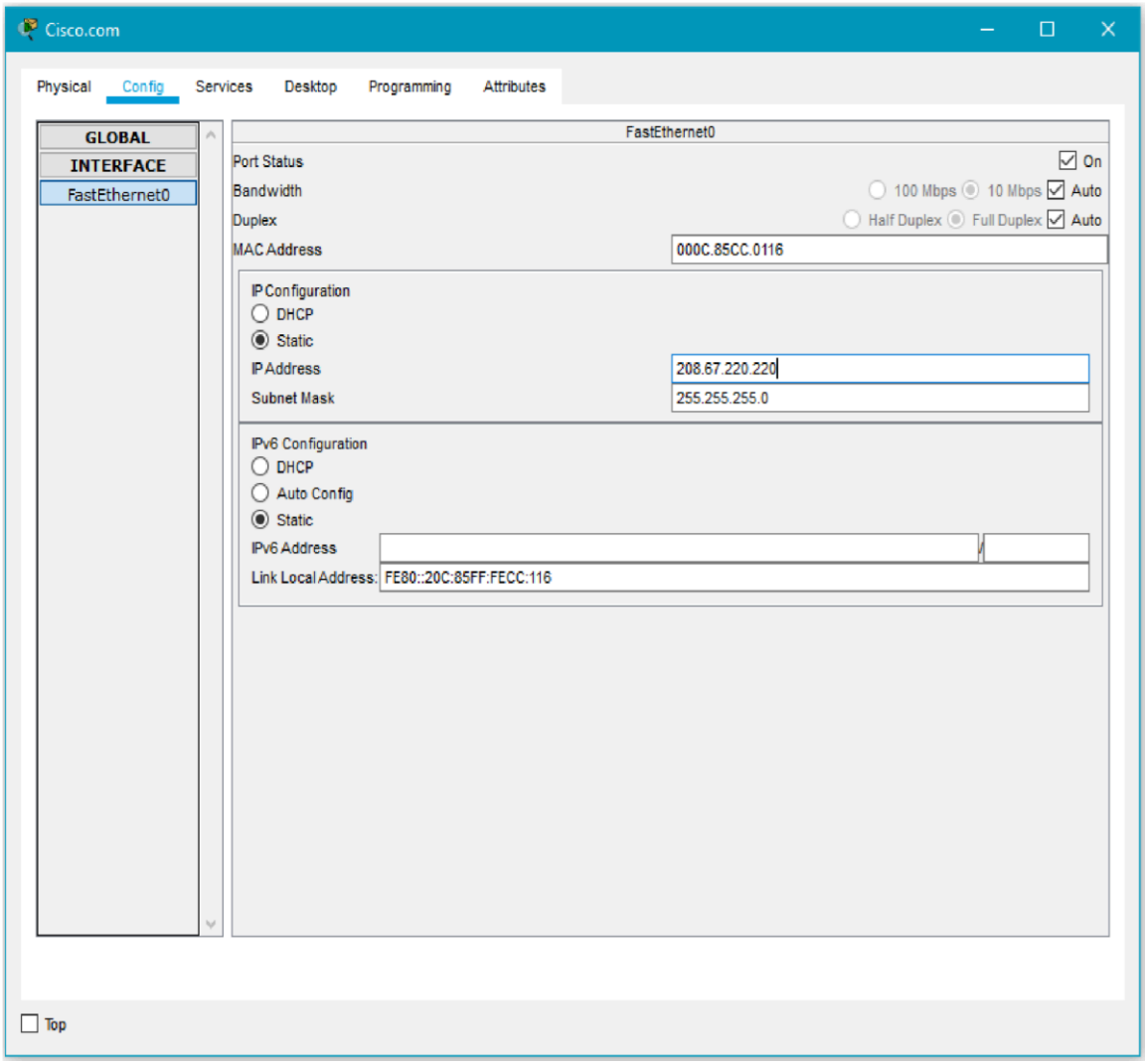
c. Configure the Cisco.com server Global settings. Select the **Config** tab.
Click on **Settings** in left pane.
Configure the Global settings of the server as follows:

- Select **Static**
- Gateway: 208.67.220.1
- DNS Server: 208.67.220.220



d. Configure the Cisco.com server FastEthernet0 Interface settings. Click on **Fast Ethernet** in left pane of the **Config** tab
Configure the Fast Ethernet Interface settings of the server as follows:

- Select **Static** under IP Configuration
- IP Address: 208.67.220.220
- Subnet Mask: 255.255.255.0



Part 3: Verify Connectivity

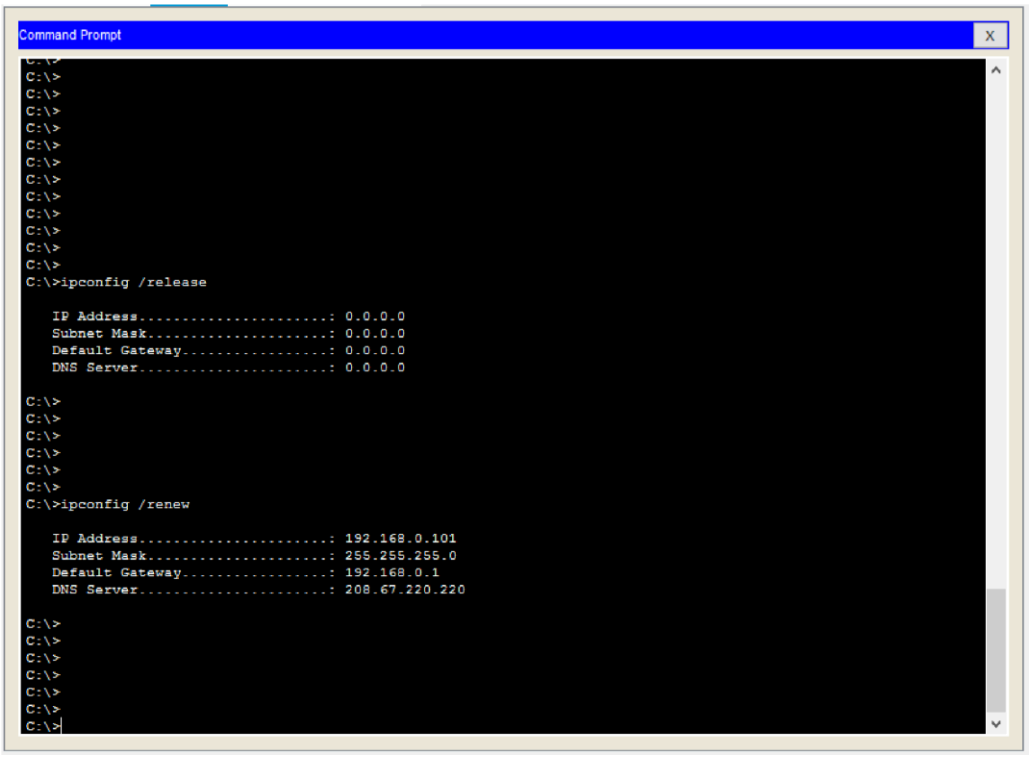
Step 1: Refresh the IPv4 settings on the PC

a) Verify that the PC is receiving IPv4 configuration information from DHCP.

Click on the **PC** on the Packet Tracer **Logical** workspace and then the select the **Desktop** tab of the PC configuration window.

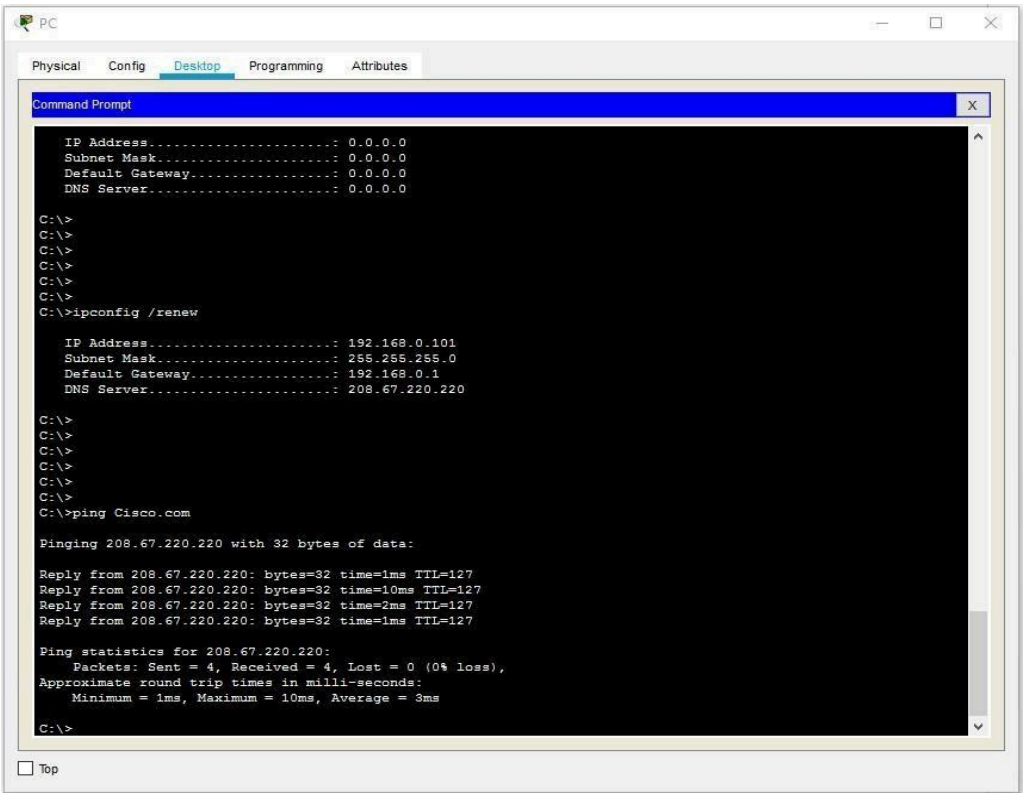
Click on the **Command Prompt** icon

In the command prompt refresh the IP settings by issuing the commands **ipconfig /release** and then **ipconfig /renew.** The output should show that the PC has an IP address in the 192.168.0.x range, a subnet mask, a default gateway, and DNS server address as shown in the figure.



b) Test connectivity to the Cisco.com server from the PC

From the command prompt, issue the command **ping Cisco.com.** It may take a few seconds for the ping to return. Four replies should be received as shown in the figure.



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Student observation:

1. Key Features of Configuring Wireless Router and DHCP Server

Wireless Router Configuration Features

- **Provides both wired and wireless connectivity — allows PCs and laptops to connect via Ethernet and Wi-Fi.**
- **Acts as a gateway — connects the local network (LAN) to the Internet.**
- **Enables DHCP — automatically assigns IP addresses to devices on the LAN.**
- **Wireless SSID configuration — helps create and identify the wireless network (e.g., "HomeNetwork").**
- **Supports security settings such as WPA2 encryption and password protection.**
- **Provides DNS configuration — can forward DNS requests to external DNS servers.**
- **Port forwarding and NAT — allows internal devices to access the Internet securely.**

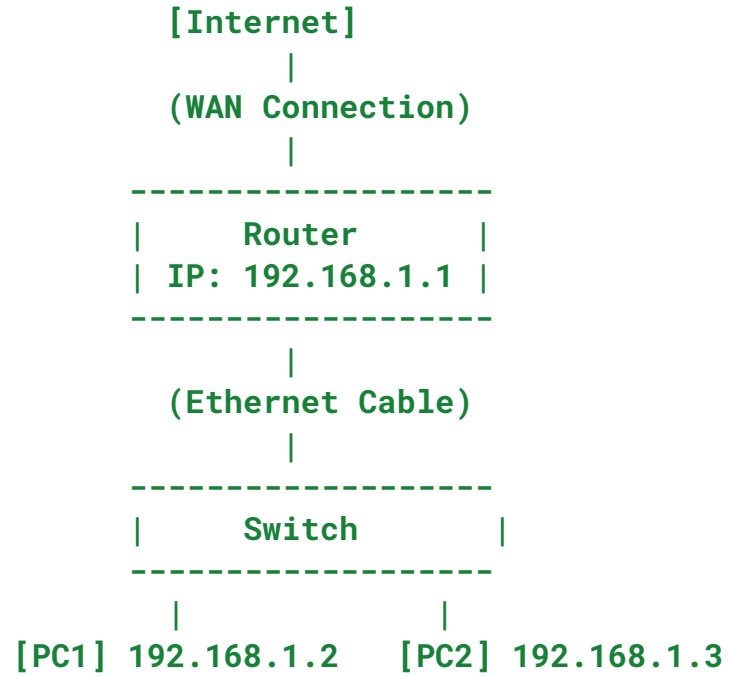
DHCP Server Configuration Features

1. **Automatic IP Assignment – DHCP dynamically provides IP addresses to hosts, eliminating manual configuration.**
2. **Centralized IP Management – manages all IPs in one place, reducing conflicts.**
3. **Address Pool Creation – allows defining a range of IPs for automatic allocation.**
4. **Gateway and DNS Assignment – also provides the correct default gateway and DNS information to each client.**
5. **Lease Time Management – reclaims unused IPs after lease expiry.**
6. **Reduces Configuration Errors – ensures accurate and consistent network parameters.**

2. Significance of DHCP Server in Internetworking

- **Simplifies Network Administration: Eliminates the need to manually configure IPs for each device.**
- **Prevents IP Conflicts: Automatically tracks which IPs are in use.**
- **Efficient IP Utilization: Reuses unused IPs dynamically.**
- **Enhances Mobility: Devices can move between networks and still obtain valid IPs.**
- **Ensures Uniform Configuration: All clients receive consistent subnet mask, gateway, and DNS information.**
- **Scalability: Makes managing large networks easy as the number of devices grows.**

3. Design and Configuration of an Inter-Network Using Switch, Router, and Ethernet Cables



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Device	Interface	IP Address	Subnet Mask	Default Gateway
Router	Fa0/0	192.168.1.1	255.255.255.0	—
PC1	Fa0	192.168.1.2	255.255.255.0	192.168.1.1
PC2	Fa0	192.168.1.3	255.255.255.0	192.168.1.1

Result:
The internetwork was successfully designed and configured using a switch, router, and Ethernet cables. All devices were able to communicate with each other using assigned IP addresses.