

## NETWORK PROTOCOLS AND SECURITY – LAB MANUAL – 2024

### Lab 11: Configuration of SMTP, FTP, DNS, HTTP and DHCP in Cisco packet tracer and verify the connection

#### Learning outcome:

- Learners will gain a solid understanding of SMTP, FTP, DNS, and HTTP
- Learners will acquire hands-on experience in configuring SMTP, FTP, DNS, and HTTP services using Cisco Packet Tracer.
- Understand the basic concepts of DHCP, including IP address allocation, lease duration, and the role of DHCP servers

#### **Implementation of SMTP, FTP, DNS and HTTP in Cisco packet tracer**

In Cisco Packet Tracer, you can simulate the implementation of various network protocols such as SMTP (Simple Mail Transfer Protocol), FTP (File Transfer Protocol), DNS (Domain Name System), and HTTP (Hypertext Transfer Protocol) to understand how these protocols work in a network environment. Here are the general steps for implementing these protocols:

#### **SMTP (Simple Mail Transfer Protocol):**

1. Topology Setup:
  - Create a network topology in Cisco Packet Tracer with devices such as routers, switches, and PCs.
2. Device Configuration:
  - Configure an email client on a PC (e.g., Outlook) and an email server (e.g., Mail Server) on another PC.
3. SMTP Configuration:
  - On the email client, configure the SMTP settings to point to the IP address or domain name of the email server.
4. Email Testing:
  - Send test emails from the client to the server to simulate the SMTP communication.

#### **FTP (File Transfer Protocol):**

1. Topology Setup:
  - Create a network topology with devices that support FTP, such as PCs or servers.

Course Title	NETWORK PROTOCOLS & SECURITY	ACADEMIC YEAR: 2023-24
Course Code(s)	23EC2210R, 23EC2210A, 23EC2210E	

## **NETWORK PROTOCOLS AND SECURITY – LAB MANUAL – 2024**

### **2. Device Configuration:**

- Set up an FTP server on one PC and configure an FTP client on another.

### **3. FTP Configuration:**

- Configure the FTP client with the server's IP address or domain.

### **4. File Transfer:**

- Initiate file transfers from the client to the server or vice versa to simulate FTP communication.

## **DNS (Domain Name System):**

### **1. Topology Setup:**

- Create a network topology with DNS servers, client devices, and routers.

### **2. Device Configuration:**

- Set up a DNS server on a PC or a dedicated DNS server device. Configure client devices to use the DNS server.

### **3. DNS Configuration:**

- Populate the DNS server with domain names and corresponding IP addresses.

### **4. Name Resolution:**

- Test DNS name resolution by attempting to access websites using domain names from client devices.

## **HTTP (Hypertext Transfer Protocol):**

### **1. Topology Setup:**

- Set up a network topology with web servers, client devices, and routers.

### **2. Device Configuration:**

- Configure a web server on a PC or a dedicated web server device. Set up web clients on other devices.

### **3. HTTP Configuration:**

- Populate the web server with web pages or applications.

### **4. Web Browsing:**

- Access web pages hosted on the server from client devices to simulate HTTP communication.

#### **General Tips:**

### **• Router Configuration:**

- Ensure that routers are properly configured to route traffic between devices.

### **• Addressing:**

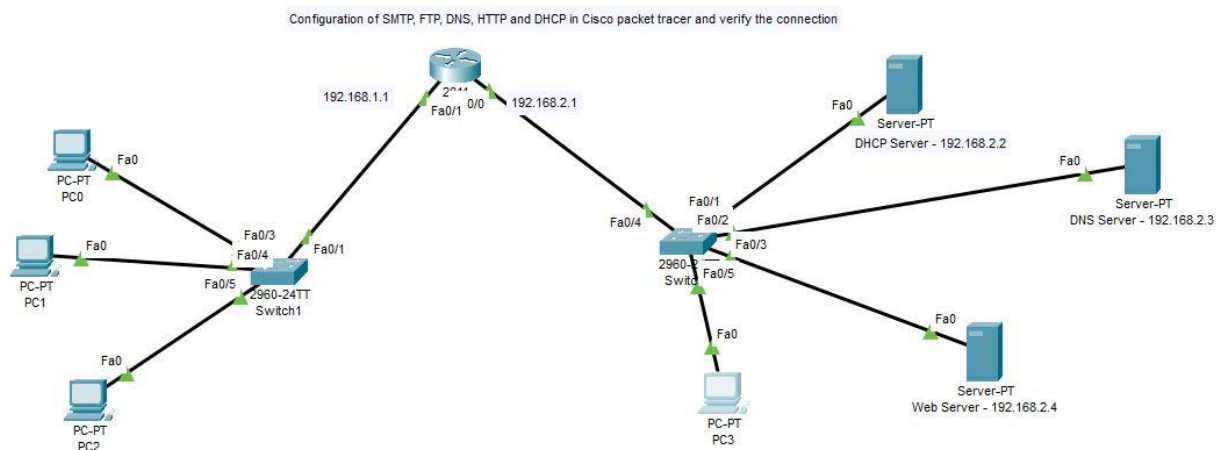
<b>Course Title</b>	<b>NETWORK PROTOCOLS &amp; SECURITY</b>	<b>ACADEMIC YEAR: 2023-24</b>
<b>Course Code(s)</b>	<b>23EC2210R, 23EC2210A, 23EC2210E</b>	

## NETWORK PROTOCOLS AND SECURITY – LAB MANUAL – 2024

- Use proper IP addressing and subnetting to ensure devices can communicate within the network.
- Firewall Settings:
  - Adjust firewall settings on devices if necessary to allow traffic for the respective protocols.
- Packet Tracer Simulation:
  - Utilize Packet Tracer's simulation mode to observe the flow of packets and troubleshoot any issues.

By following these steps, you can simulate the implementation of SMTP, FTP, DNS, and HTTP in Cisco Packet Tracer, allowing you to understand how these protocols operate in a network environment.

Configuration of SMTP, FTP, DNS, HTTP and DHCP in Cisco packet tracer and verify the connection



### ADDRESSING TABLE

Device Name	Device Configuration Name	IP Address
PC0	Client PC	<b>DHCP</b>
PC1	Client PC	<b>DHCP</b>
PC2	Client PC	<b>DHCP</b>
PC3	Client PC	<b>DHCP</b>
Switch-1	Switch 2960	-
Switch-2	Switch 2960	-
Router0	2811	Fa0/1 - 192.168.1.1 Fa0/0 – 192.168.2.1
Server PT	Web Server	192.168.2.4
Server PT	DNS Server	192.168.2.3
Server PT	DHCP	192.168.2.2

Course Title	NETWORK PROTOCOLS & SECURITY	ACADEMIC YEAR: 2023-24
Course Code(s)	23EC2210R, 23EC2210A, 23EC2210E	

## NETWORK PROTOCOLS AND SECURITY – LAB MANUAL – 2024

### CONFIGURATION

<b>Server PT (Web Server)</b>  IP Address- 192.168.2.4 Subnet Mask-255.255.255.0 Default Gateway: 192.168.1.1 DNS Server- 192.168.2.3	<b>Server PT (DHCP Server )</b>  IP Address- 192.168.2.2 Subnet Mask-255.255.255.0 Default Gateway: 192.168.1.1 DNS Server- 192.168.2.3
<b>Server PT(DNS Server)</b>  IP Address- 192.168.2.3 Subnet Mask-255.255.255.0 Default Gateway: 192.168.1.1 DNS Server- 192.168.2.3	

### Router CONFIGURATION – CLI commands

<b><u>DHCP configuration</u></b> Router> Router>en Router#config t Enter configuration commands, one per line. End with CNTL/Z. Router(config)#int fa0/1 Router(config-if)#ip address 192.168.1.1 255.255.255.0 Router(config-if)#int fa0/0 Router(config-if)#ip address 192.168.2.1 255.255.255.0 Router(config-if)#exit	<b>Router(config)#int fa0/1</b> <b>Router(config-if)#ip helper-address 192.168.2.2</b> <b>Router(config-if)#</b>
--	--

<b>Course Title</b>	<b>NETWORK PROTOCOLS &amp; SECURITY</b>	<b>ACADEMIC YEAR: 2023-24</b>
<b>Course Code(s)</b>	<b>23EC2210R, 23EC2210A, 23EC2210E</b>	

## **DHCP configuration**

**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: 192.168.2.1

DNS Server: 192.168.2.3

Start IP Address: 192 168 2 10

Subnet Mask: 255 255 255 0

Maximum Number of Users: 50

TFTP Server: 0.0.0.0

WLC Address: 0.0.0.0

**Add Save Remove**

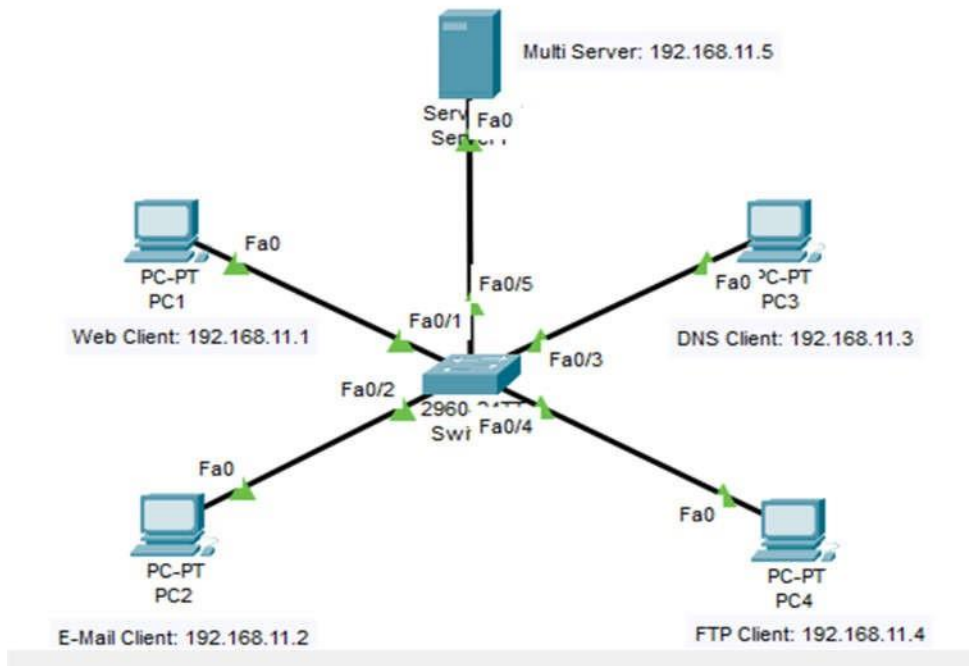
Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool1	192.168.1.1	192.168.2.3	192.168.1.10	255.255.255.0	50	0.0.0.0	0.0.0.0
serverPool	192.168.2.1	192.168.2.3	192.168.2.10	255.255.255.0	50	0.0.0.0	0.0.0.0

☐ Top

Configuration of SMTP, FTP, DNS, HTTP and DHCP in Cisco packet tracer and verify the connection

## NETWORK PROTOCOLS AND SECURITY – LAB MANUAL – 2024

Analyze the PDU's for TCP and UDP communications using cisco packet tracer



### ADDRESSING TABLE

Device Name	Device Configuration Name	IP Address
PC1	Web Client	192.168.11.1
PC2	E-Mail Client	192.168.11.2
PC3	DNS Client	192.168.11.3
PC4	FTP Client	192.168.11.4
Server	Multi Server	192.168.11.5

### CONFIGURATION

<b>PC1(Web Client)</b> IP Address- 192.168.11.1 Subnet Mask-255.255.255.0 DNS Server- 192.168.11.5	<b>PC2(E-Mail Client)</b> IP Address- 192.168.11.2 Subnet Mask-255.255.255.0 DNS Server- 192.168.11.5	<b>Server( Multi Server)</b> IP Address- 192.168.11.5 Subnet Mask-255.255.255.0 DNS Server- 192.168.11.5
<b>PC3(DNS Client)</b> IP Address- 192.168.11.3 Subnet Mask-255.255.255.0 DNS Server- 192.168.11.5	<b>PC4(FTP Client)</b> IP Address- 192.168.11.4 Subnet Mask-255.255.255.0 DNS Server- 192.168.11.5	

Course Title	NETWORK PROTOCOLS & SECURITY	ACADEMIC YEAR: 2023-24
Course Code(s)	23EC2210R, 23EC2210A, 23EC2210E	

## Service Configuration in Server

### 1. DNS service configuration

Server1

Physical Config **Services** Desktop Programming Attributes

**SERVICES**

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

**DNS**

DNS Service ☒ On ☐ Off

Resource Records

Name  Type **A Record** ▼

Address

**Add** **Save** **Remove**

No.	Name	Type	Detail
-----	------	------	--------

**DNS Cache**

☐ Top

Server1

Physical Config **Services** Desktop Programming Attributes

**SERVICES**

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

**DNS**

DNS Service ☒ On ☐ Off

Resource Records

Name  Type **A Record** ▼

Address

**Add** **Save** **Remove**

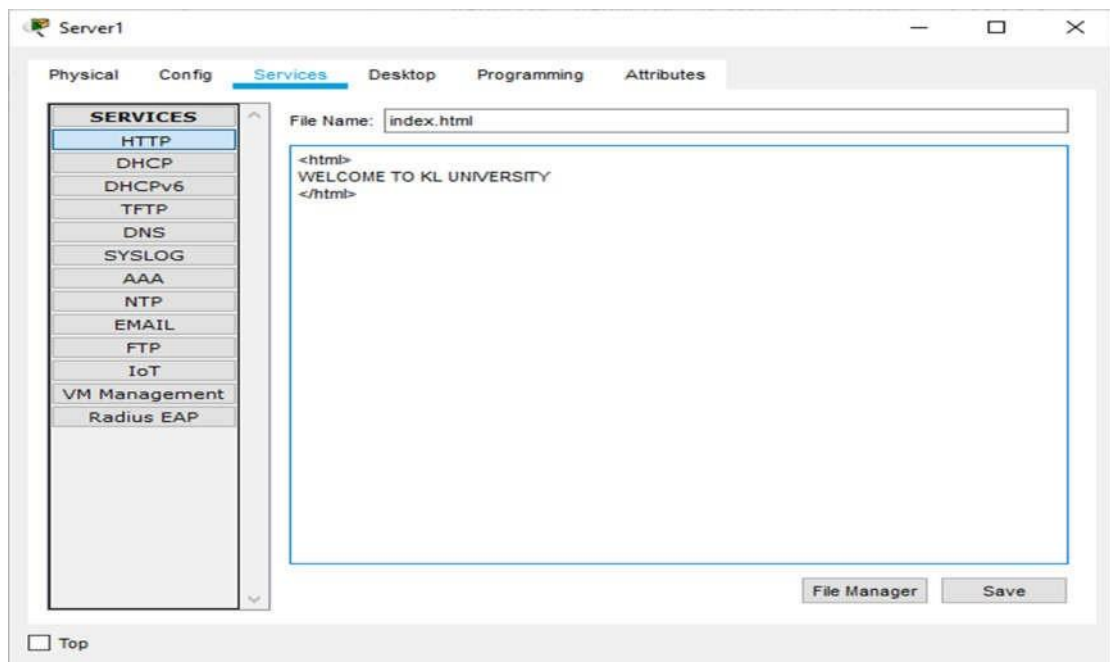
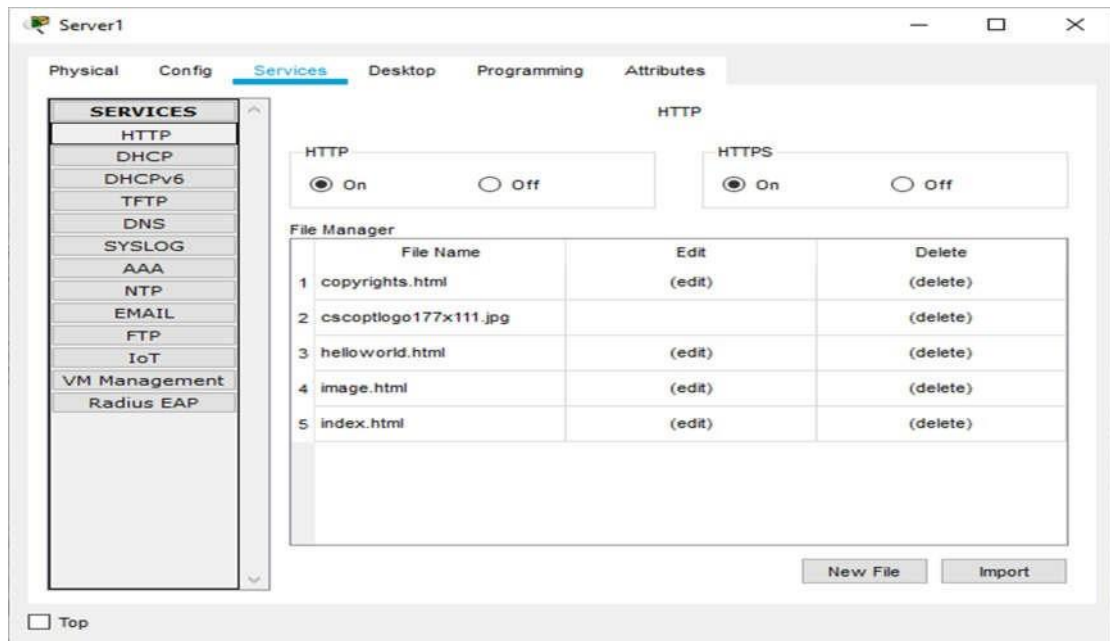
No.	Name	Type	Detail
0	www.google.com	A Record	192.168.11.5

**DNS Cache**

☐ Top

## NETWORK PROTOCOLS AND SECURITY – LAB MANUAL – 2024

### HTTP Service Configuration



To check the DNS resolution working properly, in the command prompt of **DNS Client** give the command in the command prompt C:\>nslookup www.google.com

Course Title	NETWORK PROTOCOLS & SECURITY	ACADEMIC YEAR: 2023-24
Course Code(s)	23EC2210R, 23EC2210A, 23EC2210E	



## NETWORK PROTOCOLS AND SECURITY – LAB MANUAL – 2024



```
Command Prompt

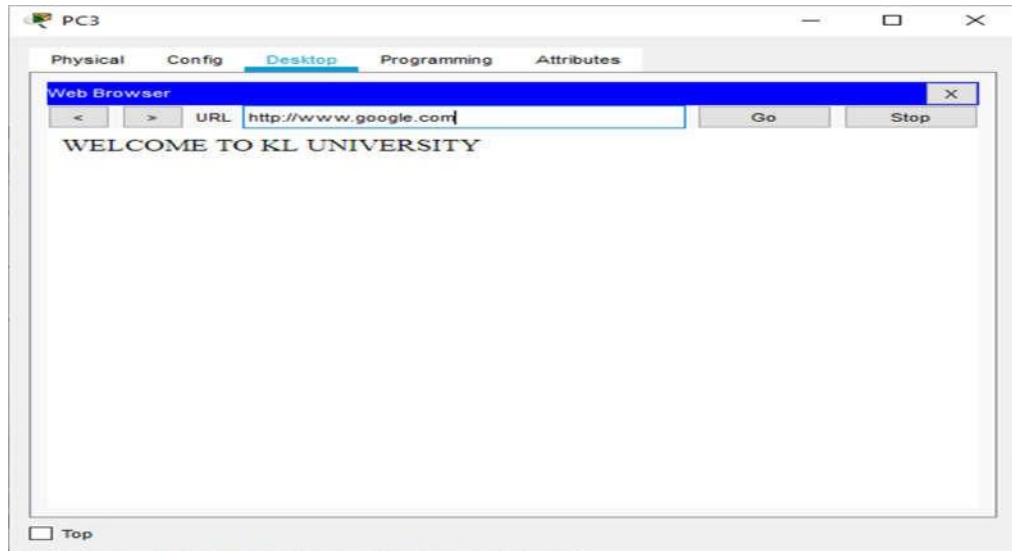
Packet Tracer PC Command Line 1.0
C:\>nslookup www.google.com

Server: [192.168.11.5]
Address: 192.168.11.5

Non-authoritative answer:
Name: www.google.com
Address: 192.168.11.5

C:\>|
```

Open the browser and give in the URL “www.google.com”



E-Mail configuration in PC1 (Web Client) and PC2 (E-Mail Client)

Course Title	NETWORK PROTOCOLS & SECURITY	ACADEMIC YEAR: 2023-24
Course Code(s)	23EC2210R, 23EC2210A, 23EC2210E	

## NETWORK PROTOCOLS AND SECURITY – LAB MANUAL – 2024

The screenshot shows a configuration window for PC1 with tabs for Physical, Config, Desktop, Programming, and Attributes. The 'Configure Mail' dialog is open, displaying the following fields:

- User Information:**
  - Your Name: Tushar
  - Email Address: tushar@gmail.com
- Server Information:**
  - Incoming Mail Server: 192.168.11.5
  - Outgoing Mail Server: 192.168.11.5
- Logon Information:**
  - User Name: tushar
  - Password: [masked]

Buttons at the bottom include Save, Clear, and Reset. A 'Top' link is at the bottom left.

The screenshot shows a configuration window for PC2 with tabs for Physical, Config, Desktop, Programming, and Attributes. The 'Configure Mail' dialog is open, displaying the following fields:

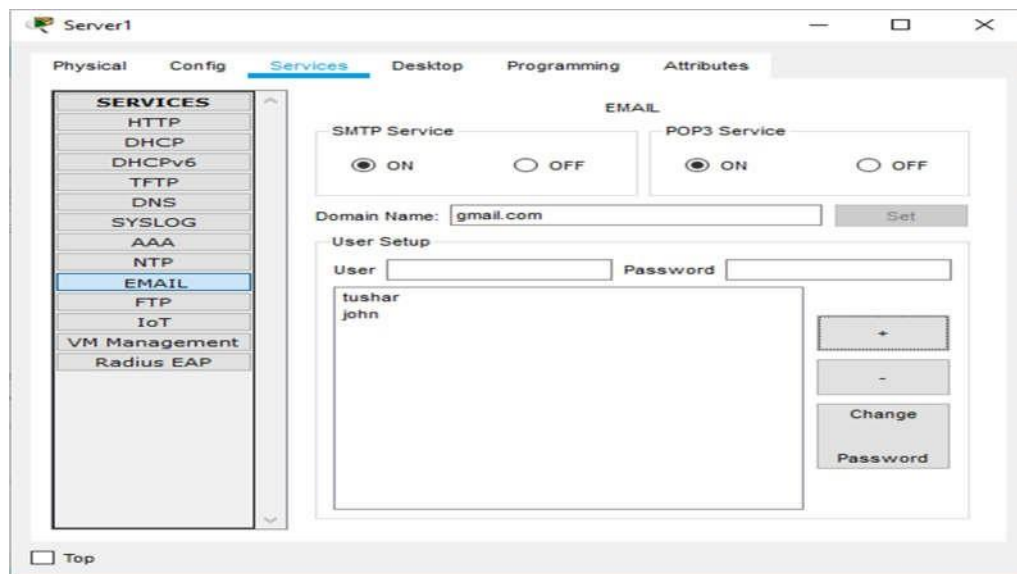
- User Information:**
  - Your Name: John
  - Email Address: john@gmail.com
- Server Information:**
  - Incoming Mail Server: 192.168.11.5
  - Outgoing Mail Server: 192.168.11.5
- Logon Information:**
  - User Name: john
  - Password: [masked]

Buttons at the bottom include Save, Clear, and Reset. A 'Top' link is at the bottom left.

**E-Mail service configuration in server (Multi Server)**

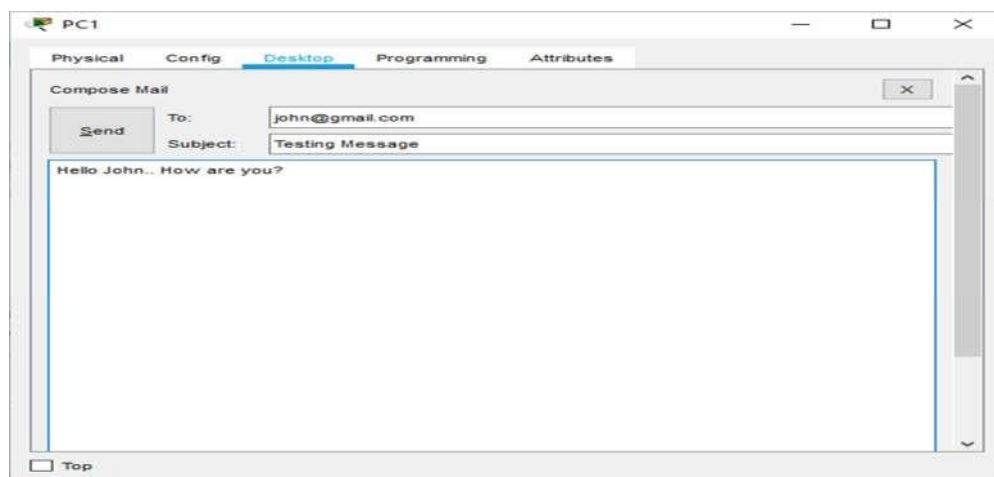
Course Title	NETWORK PROTOCOLS & SECURITY	ACADEMIC YEAR: 2023-24
Course Code(s)	23EC2210R, 23EC2210A, 23EC2210E	

## NETWORK PROTOCOLS AND SECURITY – LAB MANUAL – 2024



### Verification of the E-Mail configuration

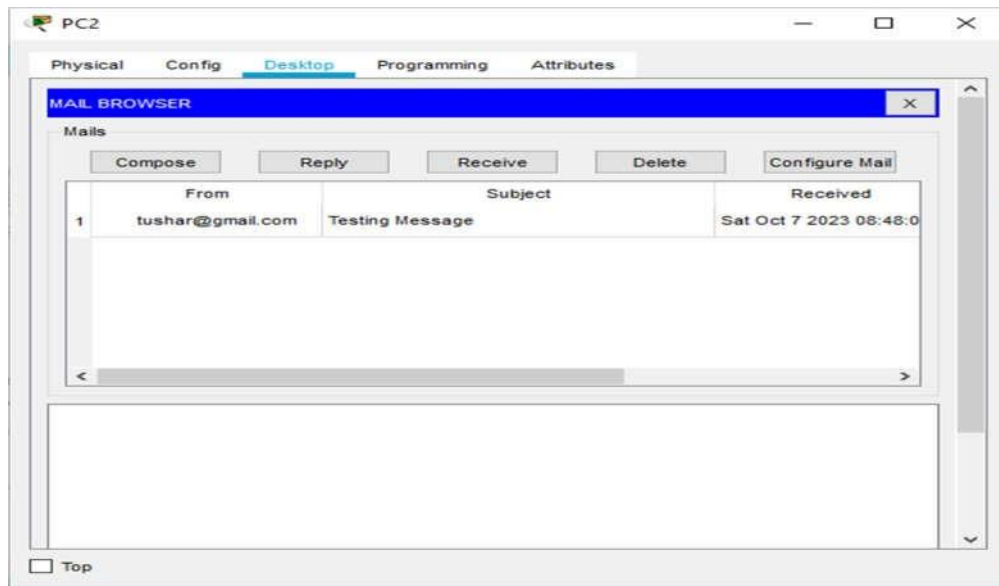
#### In PC1 (Web Client)



Go to Email of **PC2(E-Mail Client)** you will find the following message send from PC1(Web Client)

Course Title	NETWORK PROTOCOLS & SECURITY	ACADEMIC YEAR: 2023-24
Course Code(s)	23EC2210R, 23EC2210A, 23EC2210E	

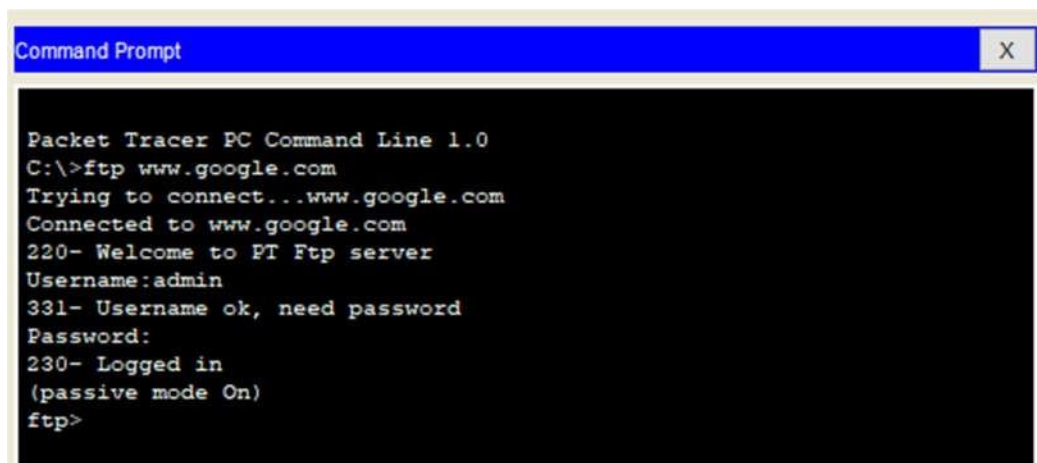
## NETWORK PROTOCOLS AND SECURITY – LAB MANUAL – 2024



### FTP Configuration in Server



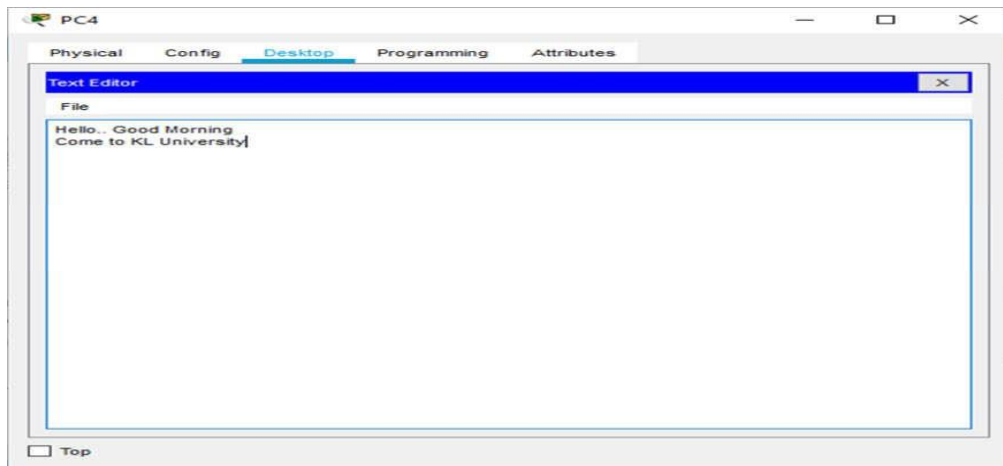
For checking FTP configuration in the command prompt of PC4 (FTP Client) give the command “ftp [www.google.com](http://www.google.com)”, you will get the following output



Now open the text editor of PC4 (FTP Client) and write some text and save as text.txt

Course Title	NETWORK PROTOCOLS & SECURITY	ACADEMIC YEAR: 2023-24
Course Code(s)	23EC2210R, 23EC2210A, 23EC2210E	

## NETWORK PROTOCOLS AND SECURITY – LAB MANUAL – 2024



From command prompt of PC4 (FTP Client) transfer the file to the server. For that first run the ftp service by giving command “c:\>ftp [www.google.com](http://www.google.com)”. Then provide the user ID and password. Then give the command “ftp>put text.txt” to upload the file in the server.

```
C:\>ftp www.google.com
Trying to connect...www.google.com
Connected to www.google.com
220- Welcome to PT Ftp server
Username:admin
331- Username ok, need password
Password:
230- Logged in
(passive mode On)
ftp>put text.txt

Writing file text.txt to www.google.com:
File transfer in progress...

[Transfer complete - 42 bytes]

42 bytes copied in 0.051 secs (823 bytes/sec)
ftp>
```

From command prompt of PC3 (DNS Client) download the file from the server. For that first run the ftp service by giving command “c:\>ftp [www.google.com](http://www.google.com)”. Then provide the user ID and password. Then give the command “ftp>get text.txt” to download the file from the server.

```
Command Prompt
C:\>nslookup www.google.com

Server: [192.168.11.5]
Address: 192.168.11.5

Non-authoritative answer:
Name: www.google.com
Address: 192.168.11.5

C:\>ftp www.google.com
Trying to connect...www.google.com
Connected to www.google.com
220- Welcome to PT Ftp server
Username:admin
331- Username ok, need password
Password:
230- Logged in
(passive mode On)
ftp>get text.txt

Reading file text.txt from www.google.com:
File transfer in progress...
```

Course Title	NETWORK PROTOCOLS & SECURITY	ACADEMIC YEAR: 2023-24
Course Code(s)	23EC2210R, 23EC2210A, 23EC2210E	

### **Implementation of DHCP in Cisco packet tracer**

Dynamic Host Configuration Protocol (DHCP) is a network protocol that automatically assigns IP addresses and other network configuration information to devices on a network.

Here are the steps involved in the implementation of DHCP in Cisco Packet Tracer:

#### **1. Build the Network Topology:**

- Launch Cisco Packet Tracer and create a network topology by adding devices such as routers, switches, and PCs to the workspace.
- 

#### **2. Configure Router Interfaces:**

- Access the command-line interface (CLI) of the router where you want to configure DHCP.
- Enter global configuration mode using the enable command and then configure terminal.
- Navigate to the interface configuration mode (e.g., interface FastEthernet0/0) for the interface connected to the local network.
- Use the ip address command to assign an IP address and subnet mask to the interface.

#### **3. Enable DHCP on the Router:**

- Enter the DHCP configuration mode by using the ip dhcp pool command, followed by a pool name.
- Define the network address and subnet mask for the DHCP pool.
- Specify the range of IP addresses to be dynamically assigned to devices in the network using the network and default-router commands.

**Example:**

**Router(config)# ip dhcp pool MY\_POOL**

**Router(dhcp-config)# network 192.168.1.0 255.255.255.0**

**Router(dhcp-config)# default-router 192.168.1.1**

**Router(dhcp-config)# exit**

#### **4. Configure DNS Servers (Optional):**

- Optionally, configure DNS servers to be assigned to DHCP clients using the dns-server command in DHCP pool configuration mode.

**Example:**

**Router(dhcp-config)# dns-server 8.8.8.8**

#### **5. Enable DHCP on the Router Interface:**

- Enter the interface configuration mode for the interface connected to the local network.
- Use the ip dhcp server command to enable DHCP on the interface.

**Example:**

**Router(config)# interface FastEthernet0/0**

**Router(config-if)# ip dhcp server MY\_POOL**

**Router(config-if)# exit**

#### **6. Verify DHCP Configuration:**

Course Title	NETWORK PROTOCOLS & SECURITY	ACADEMIC YEAR: 2023-24
Course Code(s)	23EC2210R, 23EC2210A, 23EC2210E	

## NETWORK PROTOCOLS AND SECURITY – LAB MANUAL – 2024

- Use the show ip dhcp binding command on the router to view a list of devices that have obtained IP addresses from the DHCP server.

**Example:**

**Router# show ip dhcp binding**

### 7. Test DHCP Configuration:

- Power on the client devices (PCs) in the network and set their network interfaces to obtain IP addresses automatically (DHCP).

### 8. Observe DHCP Requests and Responses:

- Use Packet Tracer's simulation mode to observe DHCP request and response messages between clients and the DHCP server.

### 9. Document Your Configuration:

- Create documentation that includes the DHCP configuration settings, such as the pool name, network address, subnet mask, default gateway, and DNS server information.

**10. Save Configuration:** - Save your router's configuration to ensure that your DHCP settings are preserved even after a reboot. Use the write memory or copy running-config startup-config command.

By following these steps, you can successfully implement DHCP in Cisco Packet Tracer, providing dynamic IP address assignments to devices in your simulated network.

Course Title	NETWORK PROTOCOLS & SECURITY	ACADEMIC YEAR: 2023-24
Course Code(s)	23EC2210R, 23EC2210A, 23EC2210E	