	G H Patel College of Engineering and Technology	

COMPUTER ENGINEERING DEPARTMENT

Project Report

on

GCET Campus Network Simulation

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1. Introduction

The GCET (G H Patel College of Engineering and Technology) Campus Network Simulation was designed using Cisco Packet Tracer to reflect a functional network layout connecting various departments and administrative blocks within the campus. The objective of this simulation is to ensure that all departments have access to essential network services such as DNS, HTTP, and intra-campus communication through routers and switches.

2. Network Topology Overview

The campus network comprises the following components:

- **2 Routers**: Main campus router and extended router for Civil Department.
- **10 PCs**: Spread across the departments and administrative block.
- **6 Switches**: One for each department and the server room.
- **2 Servers**: DNS and HTTP servers located in the server room.
- **1 Laptop**: Used for administrative purposes, also located in the server room.

The network is divided into several segments:

1. **Server Room**: Contains two servers (DNS and HTTP) connected to a switch, along with a laptop for network administration.
2. **Computer Department**: Contains two PCs connected to a switch.
3. **IT Department**: Contains two PCs connected to a switch.
4. **EC Department**: Contains two PCs connected to a switch.
5. **Civil Department**: Contains two PCs connected to a switch, linked to a secondary router.
6. **Administration Block**: Contains two PCs connected to a switch.

3. Network Setup

The following technologies were utilized in the GCET Campus Network Simulation:

Dynamic Routing using RIP (Routing Information Protocol):

RIP allows routers to share routing information automatically using hop count as a metric. This ensures updated routes are maintained across the network. It facilitates efficient communication between departments and servers.

DNS Server

The DNS server resolves domain names into IP addresses, enabling easier access to network resources. Devices communicate using familiar names instead of numerical IPs. It centralizes name resolution for the entire campus network.

Router Extension

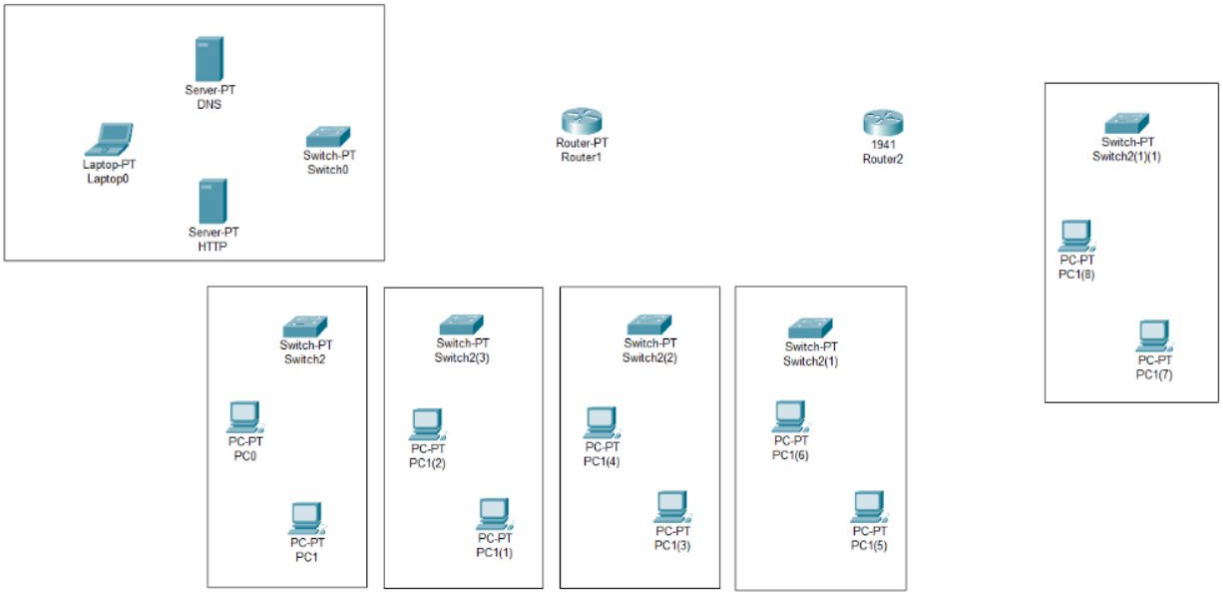
The main campus router is extended to the Civil Department via a secondary router using a serial connection. This setup improves network scalability. It ensures effective data flow between distant departments and the central network.

Topology:

Step 1: Device Placement

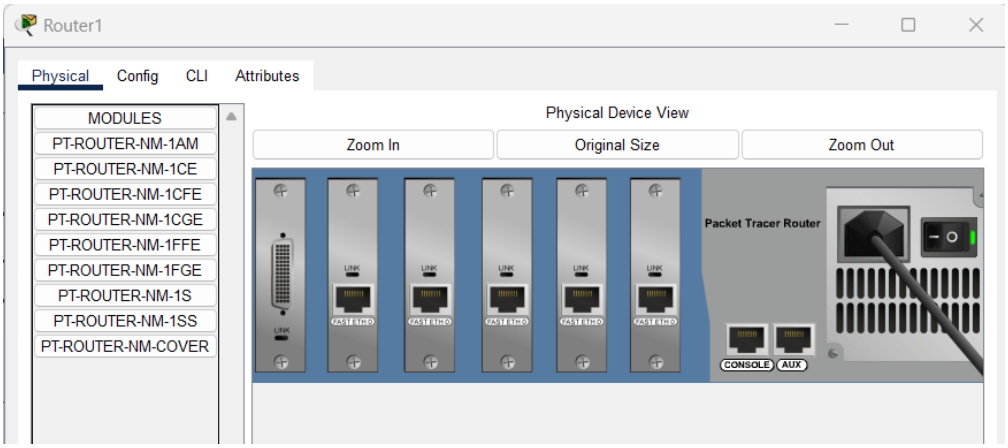
- Select **10 PCs**, **6 switches**, **2 routers**, **2 servers**, and **1 laptop**.
- Place them according to the layout:
    - **Server Room**: 2 servers (DNS, HTTP) and 1 laptop connected to a switch.
    - **Computer, IT, EC, Civil Departments**: Each has a switch connected to 2 PCs.
    - **Administration Block**: Contains 2 PCs connected to a switch.

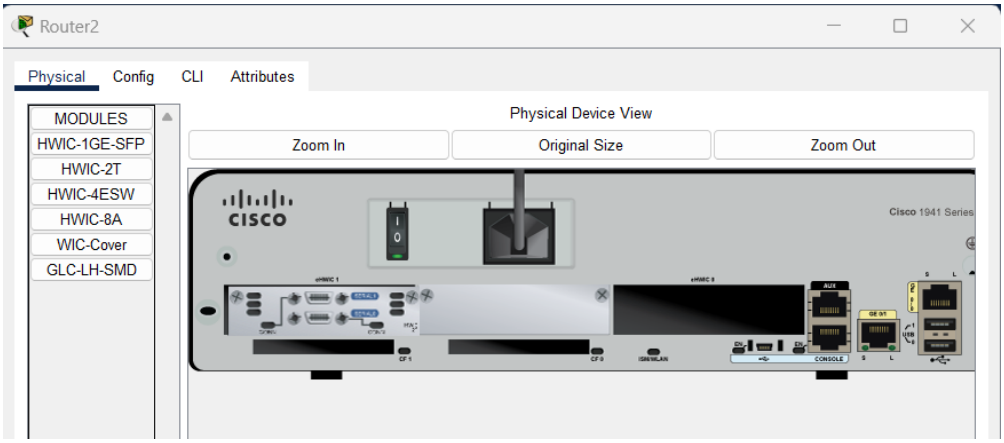
- **Main Campus Router**: Connected to the Computer, IT, and EC department switches, and the Server Room switch.
- **Secondary Router**: Connected to the Civil Department switch, linked to the Main Router via a serial cable



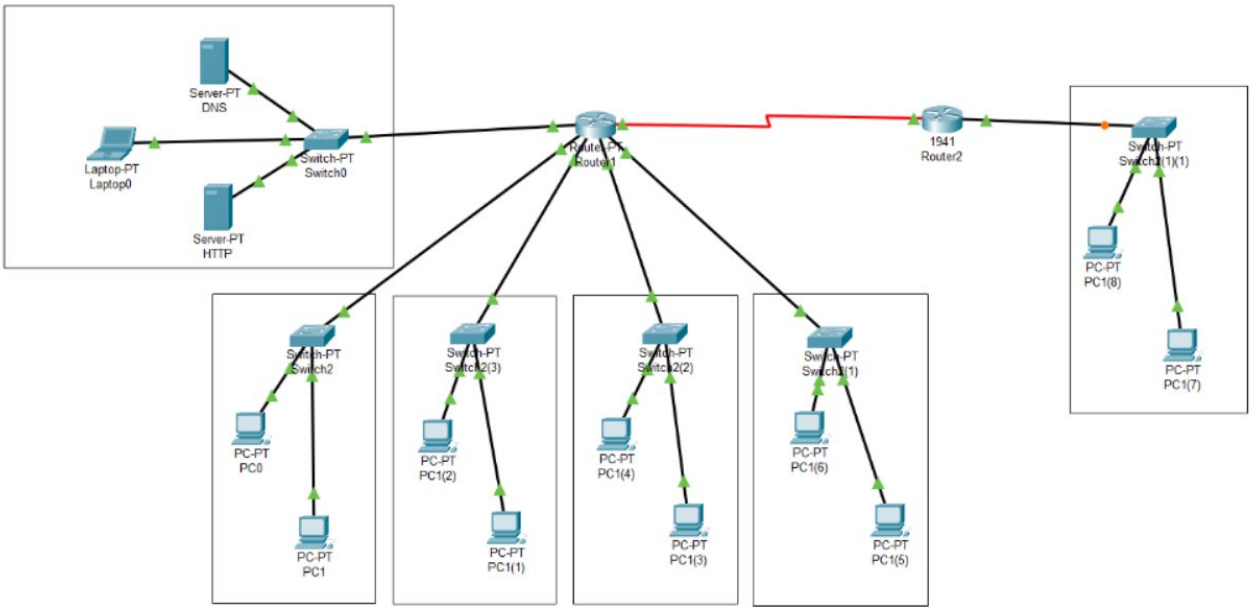
Step 2:

- Select Main router, go to **Physical** view, and **turn off the power**.
- Insert the 4 **PT-ROUTER-NM-1CFE** module for the Fast Ethernet port **and PT-ROUTER-NM-1S module** for the Serial port.
- **Power on** the routers.
- For the **Secondary Router**, connect **HWIC-2T** module for the Serial port and connecting it with main router.





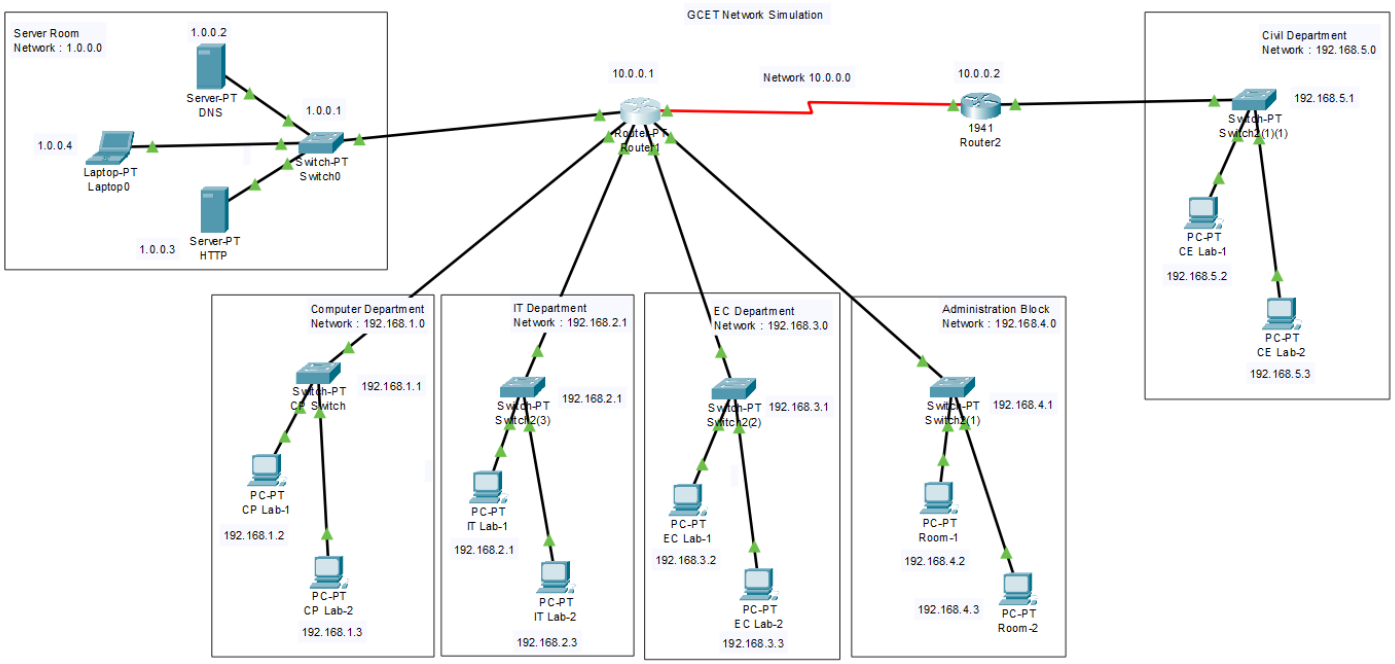
- Use appropriate **Ethernet cables** to connect:
    - Servers and laptop to the **Server Room switch**.
    - Each department's PCs to their respective switches.
    - **Switches to routers** (departments and servers connected to the Main Router, Civil Department to the Secondary Router).
- Use a **serial cable** to connect the **Secondary Router** to the **Main Router**.

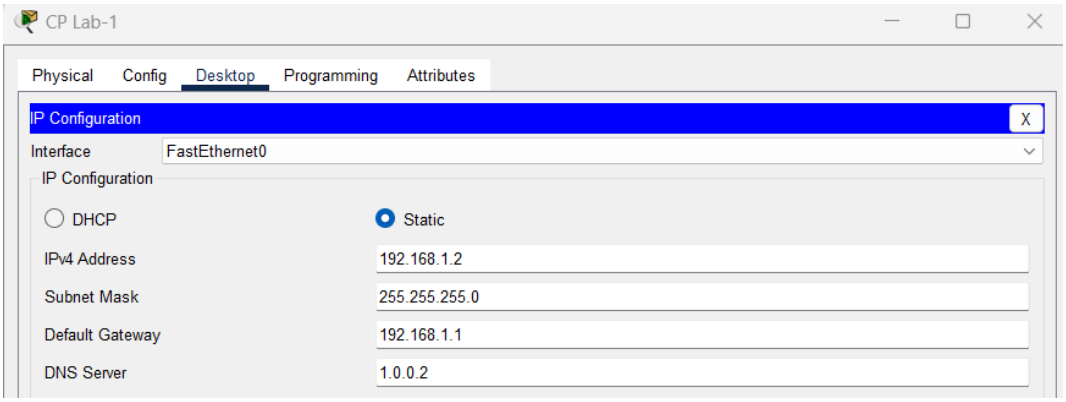


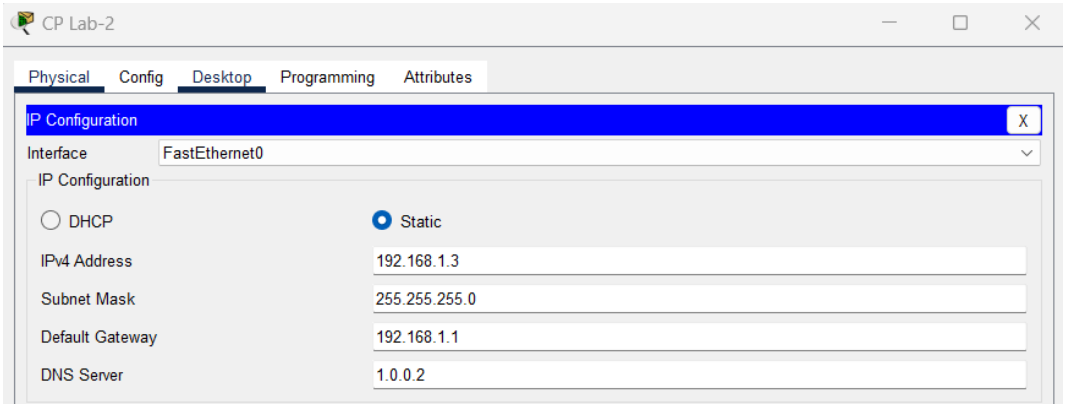
Step 4: Assign IP Addresses

- Assign **IP addresses** to the **PCs** (each department should be on a separate network).
- Configure **routers' Fast Ethernet ports** to match the network of the connected departments and servers.

- Configure **serial ports** on both routers with appropriate IPs from the same network.

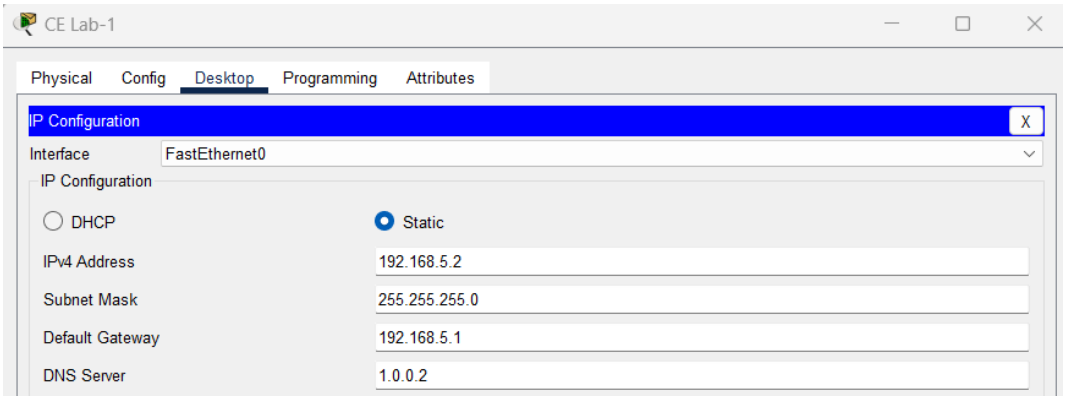


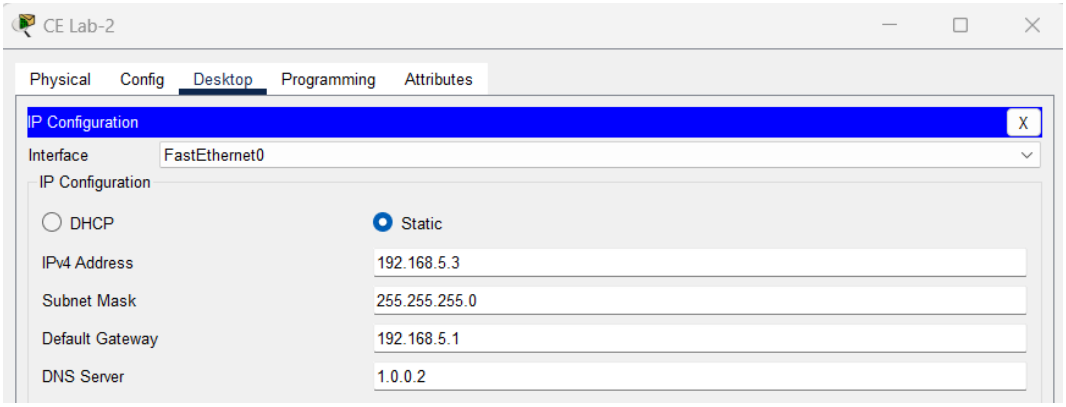




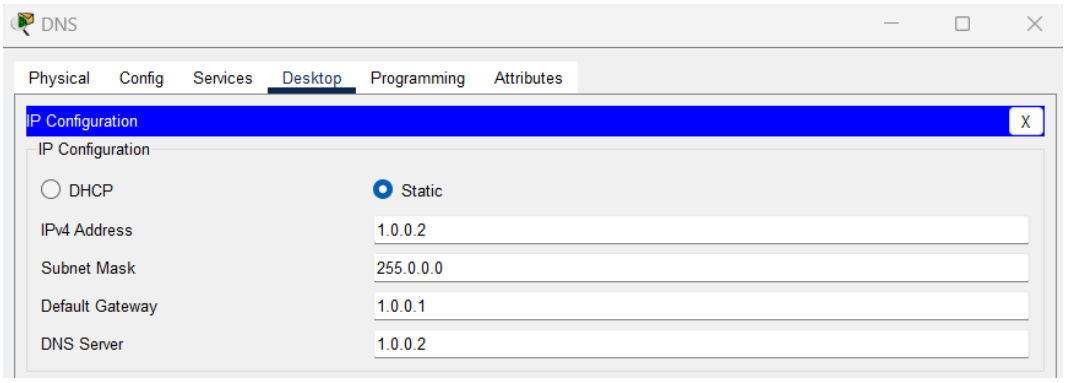
Do the same for PCs of other Departments as well connected to main router.

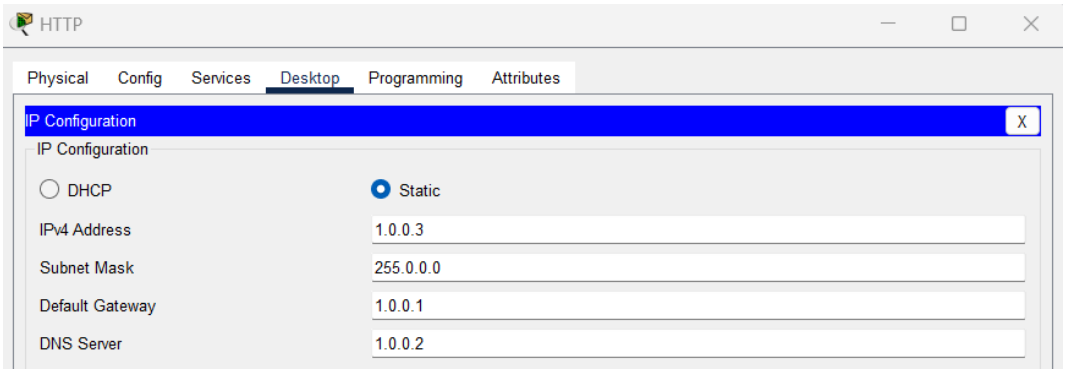
Civil Department



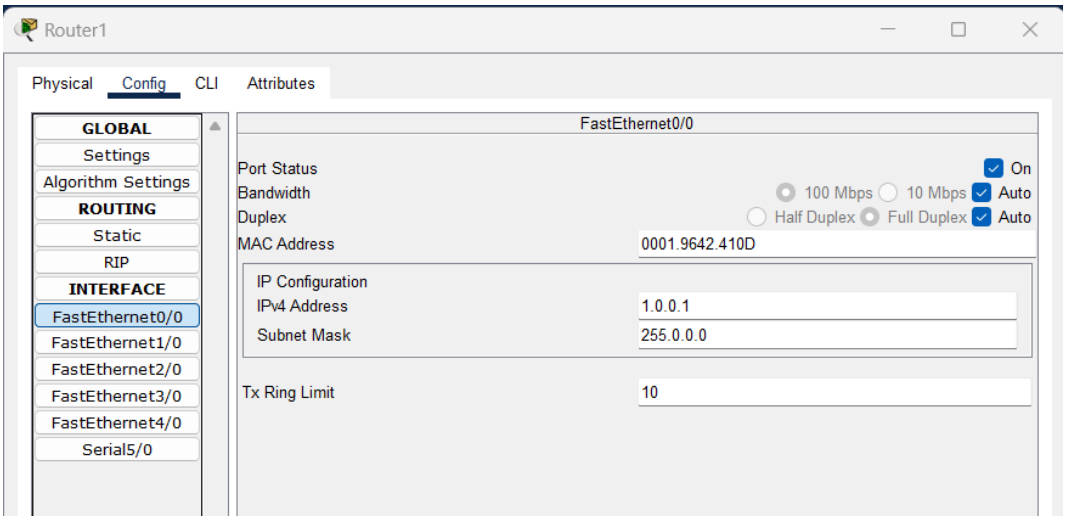


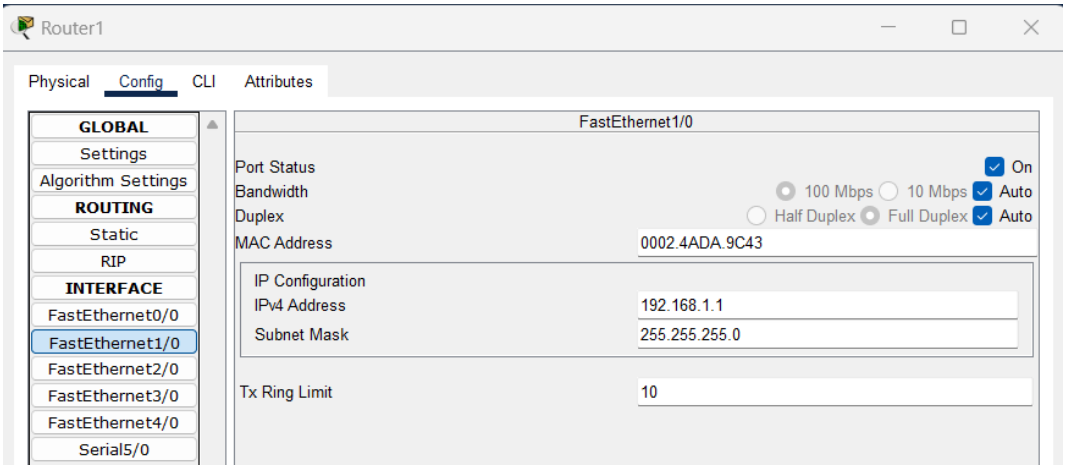
Server Room

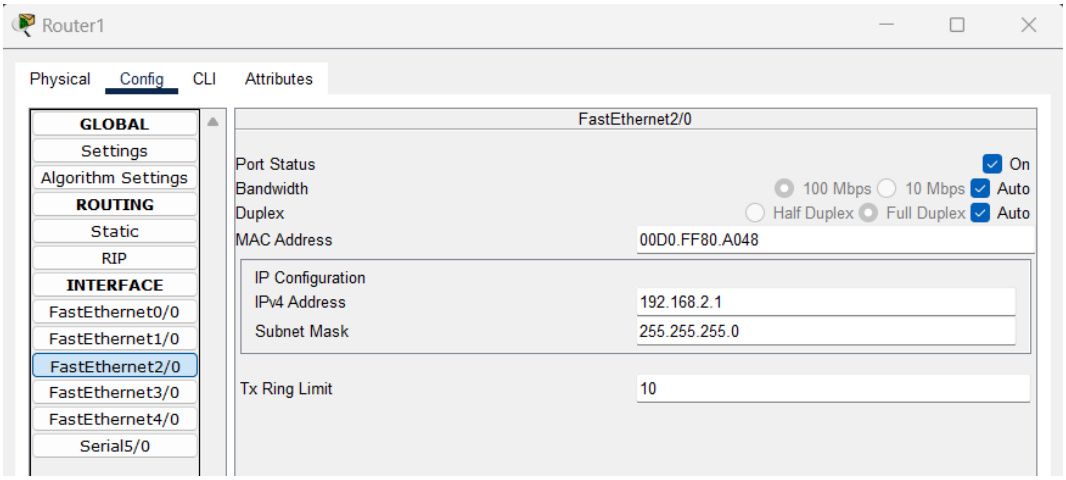


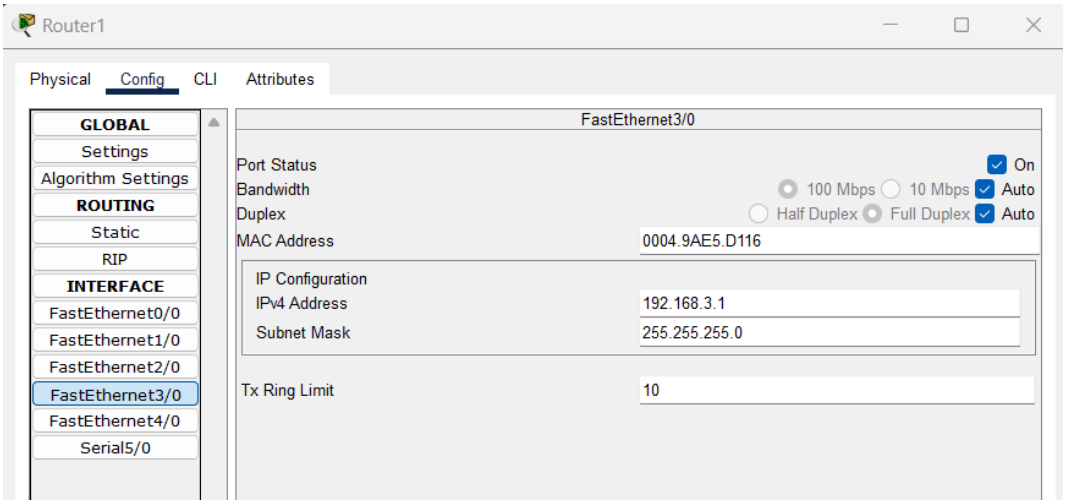


Main Router Config





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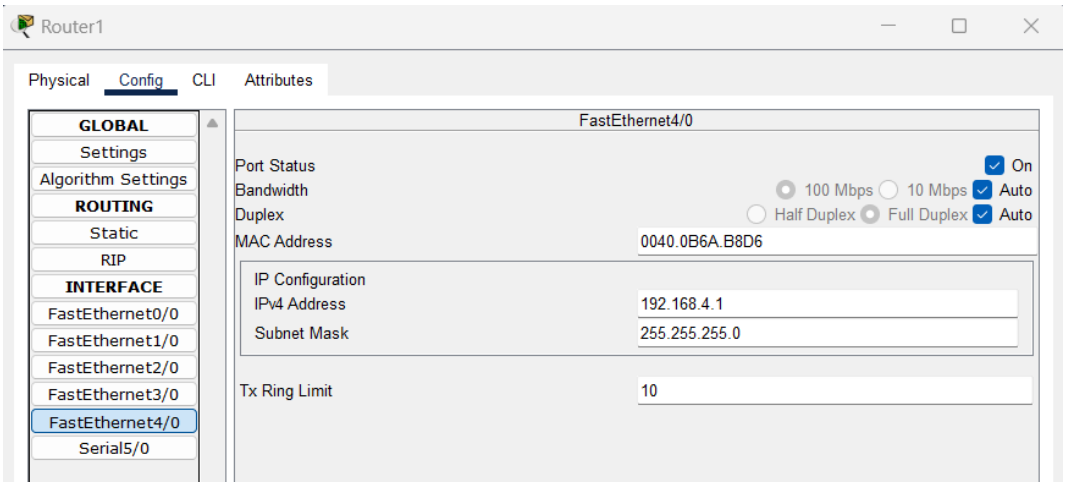
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
INTERFACE
FastEthernet0/0
FastEthernet1/0
FastEthernet2/0
FastEthernet3/0
FastEthernet4/0
Serial5/0
FastEthernet3/0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0004.9AE5.D116
IP Configuration
IPv4 Address
192.168.3.1
Subnet Mask
255.255.255.0
Tx Ring Limit
10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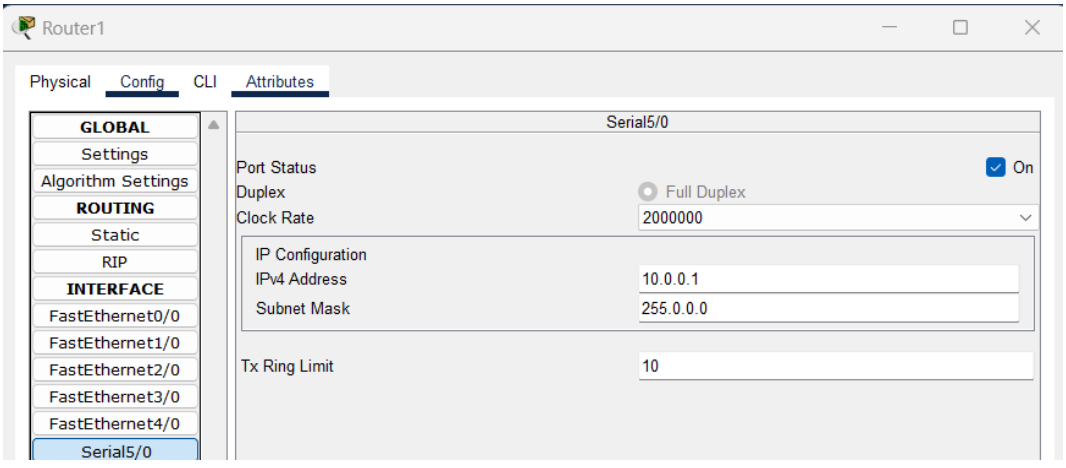
FastEthernet2/0
FastEthernet3/0
FastEthernet4/0
Serial5/0
FastEthernet4/0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0040.0B6A.B8D6
IP Configuration
IPv4 Address
192.168.4.1
Subnet Mask
255.255.255.0
Tx Ring Limit
10


Router1
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Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
INTERFACE
FastEthernet0/0
FastEthernet1/0
FastEthernet2/0
FastEthernet3/0
FastEthernet4/0
Serial5/0
Serial5/0
Port Status
On
Duplex
Full Duplex
Clock Rate
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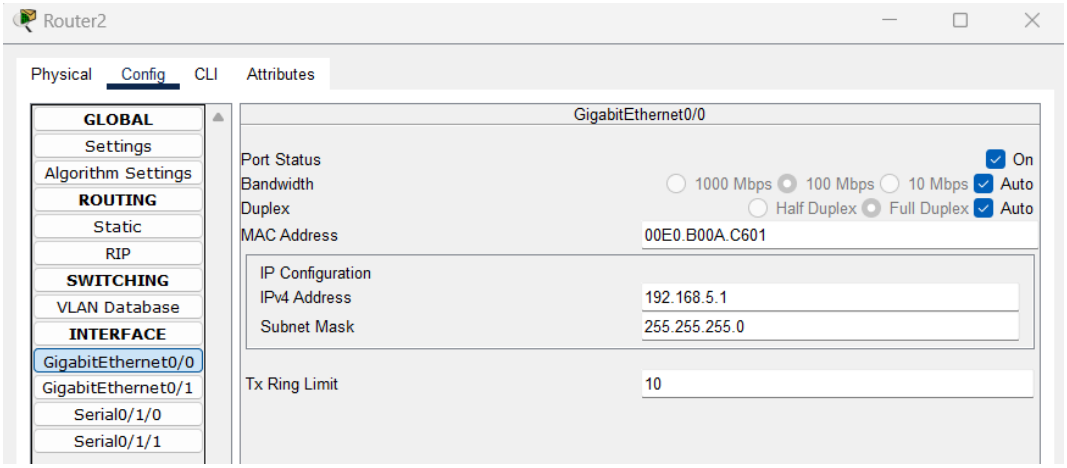
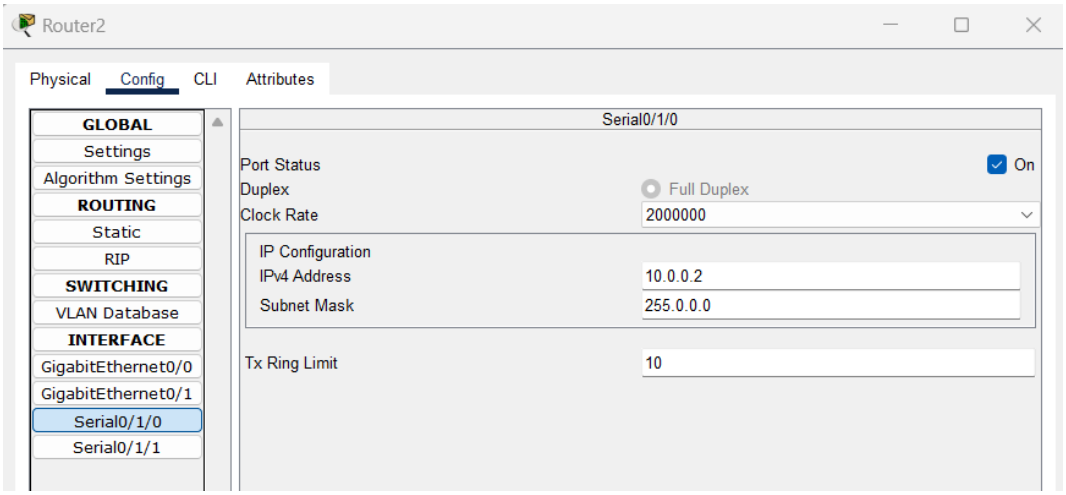
IP Configuration
IPv4 Address
10.0.0.1
Subnet Mask
255.0.0.0
Tx Ring Limit
10

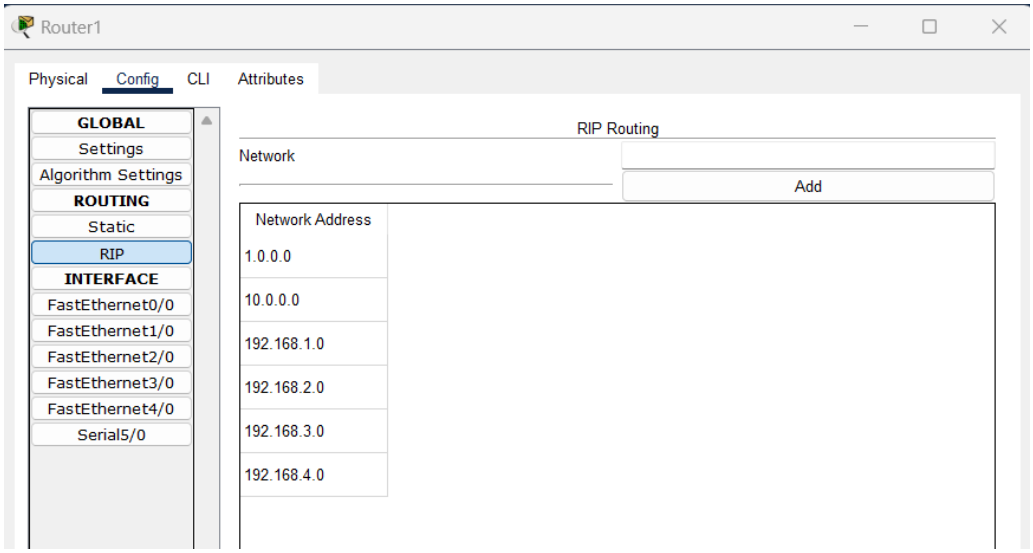
Extended Router Config

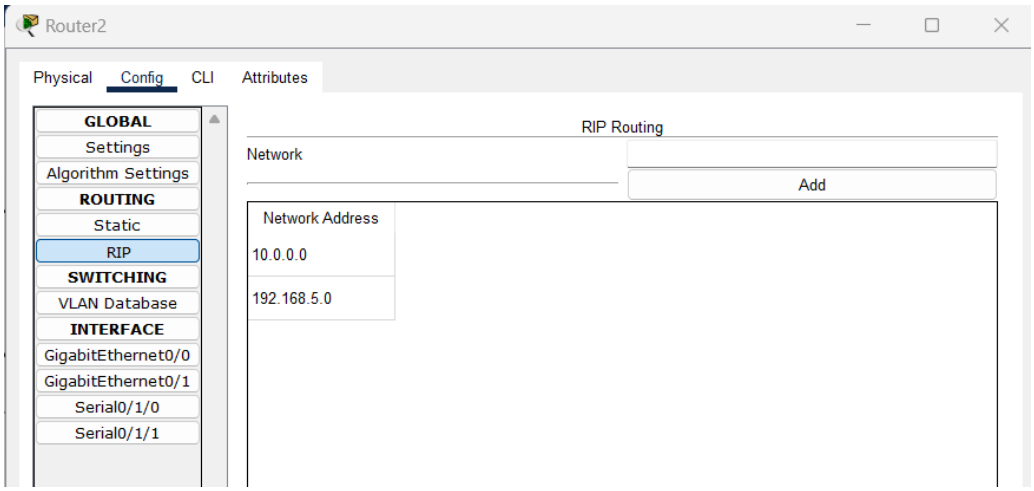




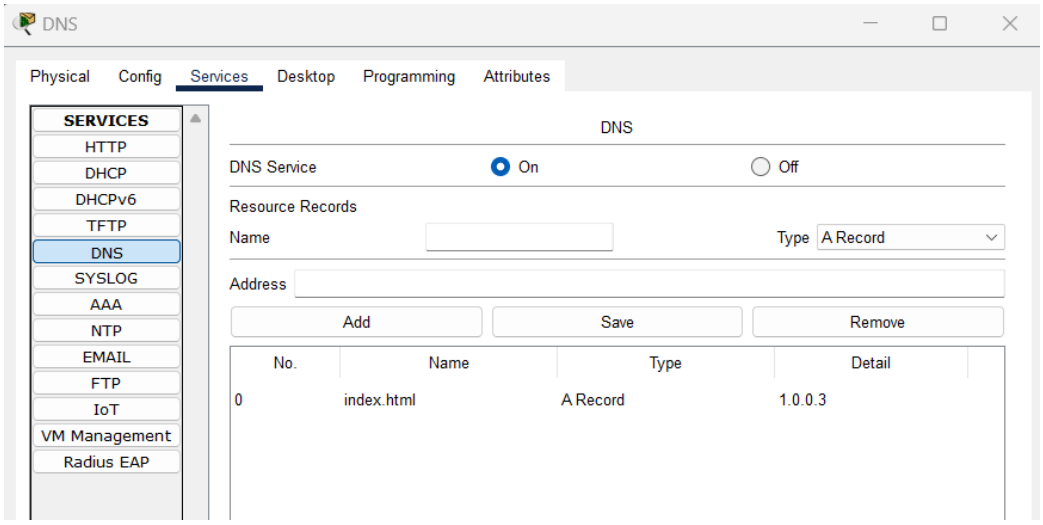
Step 5: Configuring RIP on Routers

- In the **Config** tab of each router, enable **RIP** and add the **network addresses** for each department and server.
- Ensure all routers are configured to communicate across networks using RIP.



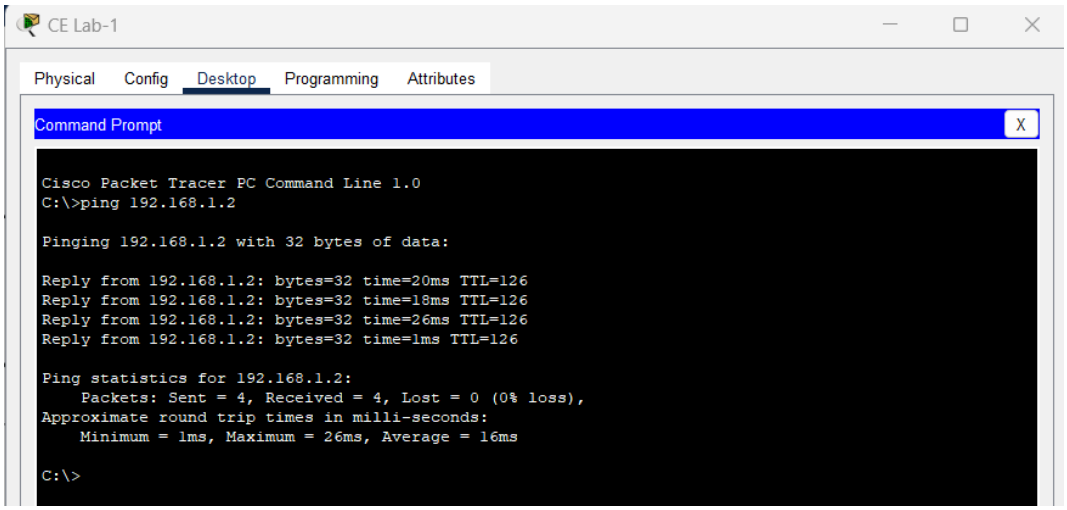


Step 6: Go to DNS Server and select services and then DNS and then do the following



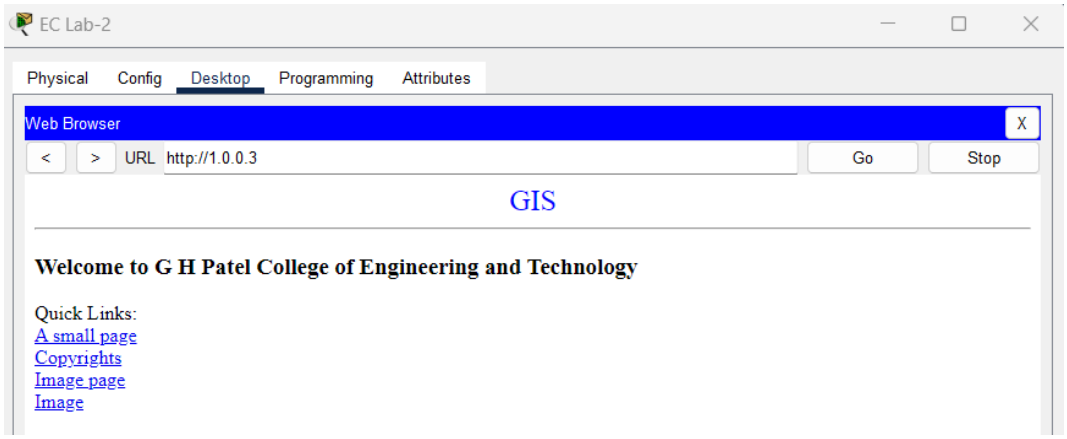
Step 7: Testing the Network

- Test the setup pinging from a **PC in one department** (e.g., PC in Computer Department) to a **PC in another department** (e.g., PC in Civil Department).
- Ensure that the packet travels through the routers successfully, verifying the RIP configuration.



Step 8: Testing Sever Web

Now open Browser from any PC and enter the URL we added in DNS Server to see if the GIS is working



4. Conclusion

The GCET Campus Network Simulation successfully demonstrates the integration of various network components, including PCs, switches, routers, and servers, utilizing technologies such as dynamic routing with RIP and DNS services. The simulation illustrates efficient communication across different departments and enables access to web resources, highlighting the importance of proper network configuration and management in a real-world educational setting. Overall, this project enhances understanding of networking principles and practical implementation in a campus environment.