SAVEETHA SCHOOL OF ENGINEERING

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CAPSTONE PROJECT

Allocation of IP Address Range and Connecting LAN, WAN, MAN Networks Using Cisco Packet Tracer

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COURSE NAME: Computer Network for IoT

INTRODUCTION

This capstone project involves designing a scalable network infrastructure to integrate three separate companies into a single, unified network. The project will address the needs of LAN, MAN, and WAN environments while ensuring logical separation and security for different departments within each company. Key tasks include allocating an appropriate IP address range, subnetting, configuring routers with the RIPv2 protocol, implementing VLANs for departmental separation, and thoroughly testing the network for connectivity and routing accuracy. This setup will provide a robust and flexible network solution that supports current requirements and future growth.

LITERATURE REVIEW

The literature on network design emphasizes effective IP address allocation and subnetting for optimizing address usage and enhancing security. Subnetting allows for network traffic isolation, while RIPv2 supports dynamic routing in small to medium-sized networks through Classless Inter-Domain Routing (CIDR). VLANs are crucial for logical network segmentation, improving performance and security by isolating broadcast domains and separating departments within the same physical infrastructure. A hierarchical network design approach is recommended for scalability and fault isolation. Best practices for network integration include using private IP spaces and proper routing and VLAN configurations to address IP conflicts and security concerns. Comprehensive network testing, including connectivity and performance monitoring, is essential to validate the overall network's functionality and security

METHODOLOGY

Software:

- Cisco Packet Tracer

Network Design:

Network consist of

- 3 routers
- 9 switches
- 18 PC

All routers were connected to one another, and each routers connected three switches.The switches are connected to the PCs.

IP Address Allocation:

Company A

Step 1: let us assume switch 1 consist of 2 PCs and 1 router then,

- Router1 IP address – 144.186.96.0
- PC0 IP address be – 144.186.96.10
- PC1 IP address be –144.186.96.11

Step 2: at switch2 consist of 2 PCs and 1 router then,

- Router1 IP address - 144.186.97.0
- PC2 IP address be - 144.186.97.10
- PC3 IP address be - 144.186.97.11

Step 3: at switch3 consist of 1 PCs and 1 router then,

- Router1 IP address - 144.186.98.0
- PC4 IP address be - 144.186.98.10

Step 4: Company B:

at switch4 consist of 3 PCs and 1 router

- Router2 IP address – 172.16.0.1
- PC5 IP address be - 172.16.0.10
- PC6 IP address be - 172.16.0.11
- PC7 IP address be-172.16.0.12

Step 5: at switch5 consist of 2 PCs and 1 router then,

- Router2 IP address - 172.16.1.1
- PC8 IP address be - 172.16.1.11
- PC9 2 IP address be - 172.16.2.10

Step 6: at switch6 consists of 2 PCs and 1 router,

- Router2 IP address-172.16.2.1
- PC9 2 IP address be - 172.16.2.10
- PC10 IP address be- 172.16.2.11

Step 7: Company C

At switch7 consists of 2 PCs and 1 router,

- Router3 IP address- 192.168.0.1
- PC11 IP address be- 192.168.0.10
- PC12 IP address be- 192.168.0.11

Step 8: at switch8 consists of 2 PCs and 1 router,

- Router3 IP address- 192.168.1.1
- PC13 IP address be- 192.168.1.10
- PC14 IP address be- 192.168.1.11

Step 9: at switch8 consists of 2 PCs and 1 router,

- Router3 IP address- 192.168.2.1
- PC15 IP address be- 192.168.2.10
- PC16 IP address be- 192.168.2.11

Step 10: Now we have to connect all three router to each other so,

- Router1 IP address – 198.186.0.1(out)
- Router2 IP address – 198.186.0.10 (in)
- Router2 IP address – 198.186.2.1 (out)
- Router3 IP address – 198.186.2.10 (in)

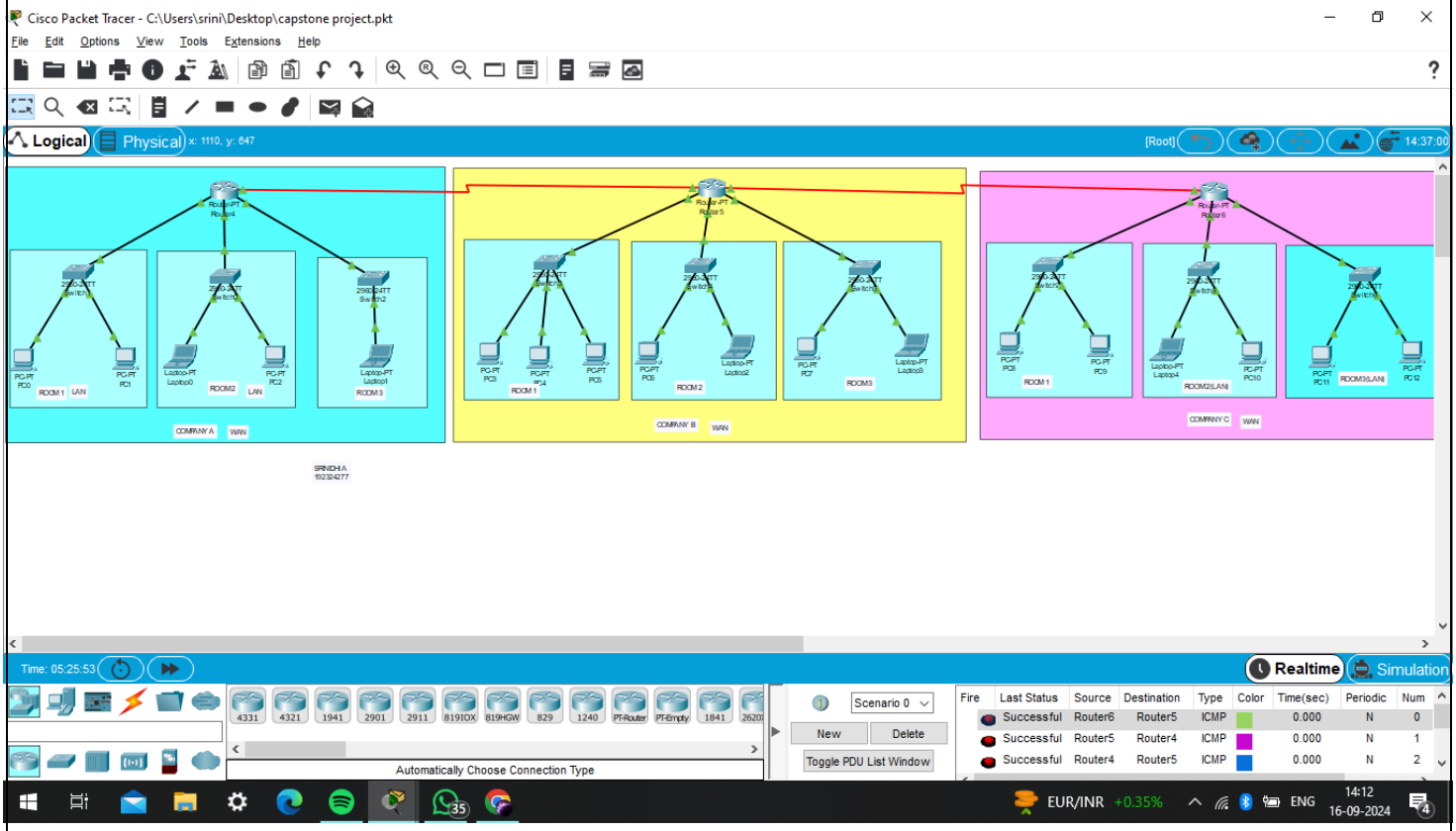
Step 7: at last assigns RIP for all three routers

Protocol: - HTTP

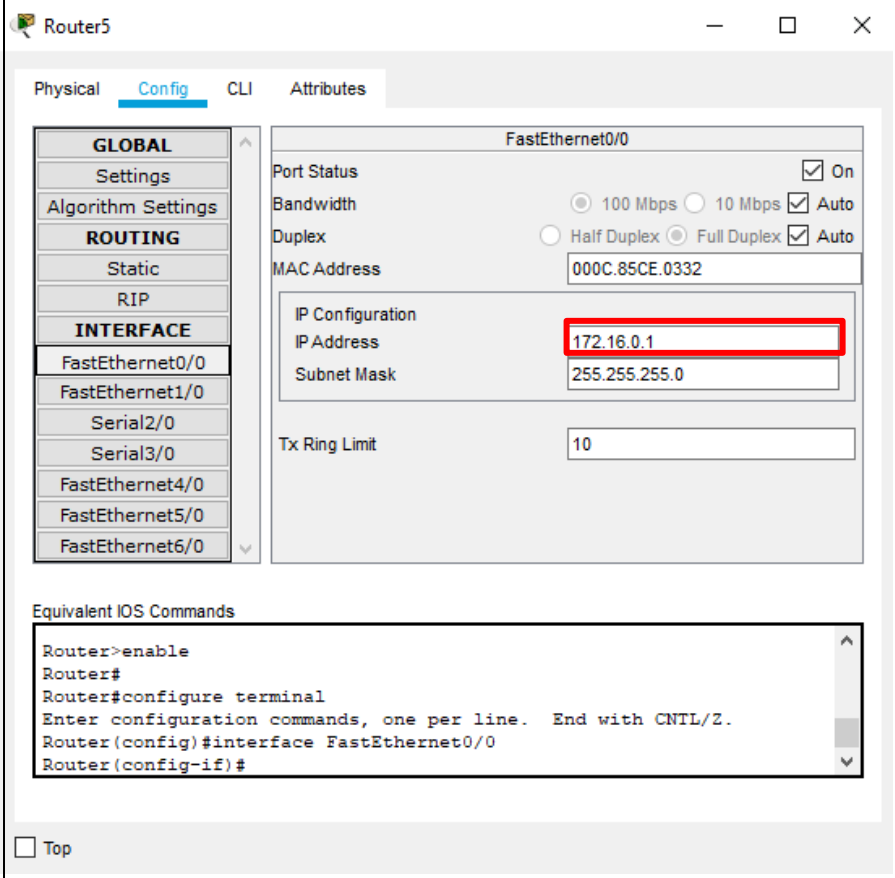
- HTTP is the communication protocol used on the World Wide Web.
- It specifies how communications (requests and responses) are prepared and sent between clients (such web browsers) and servers.
- Stateless protocol: Each request-response cycle is distinct; the server does not maintain information from prior encounters**.**

RESULT:

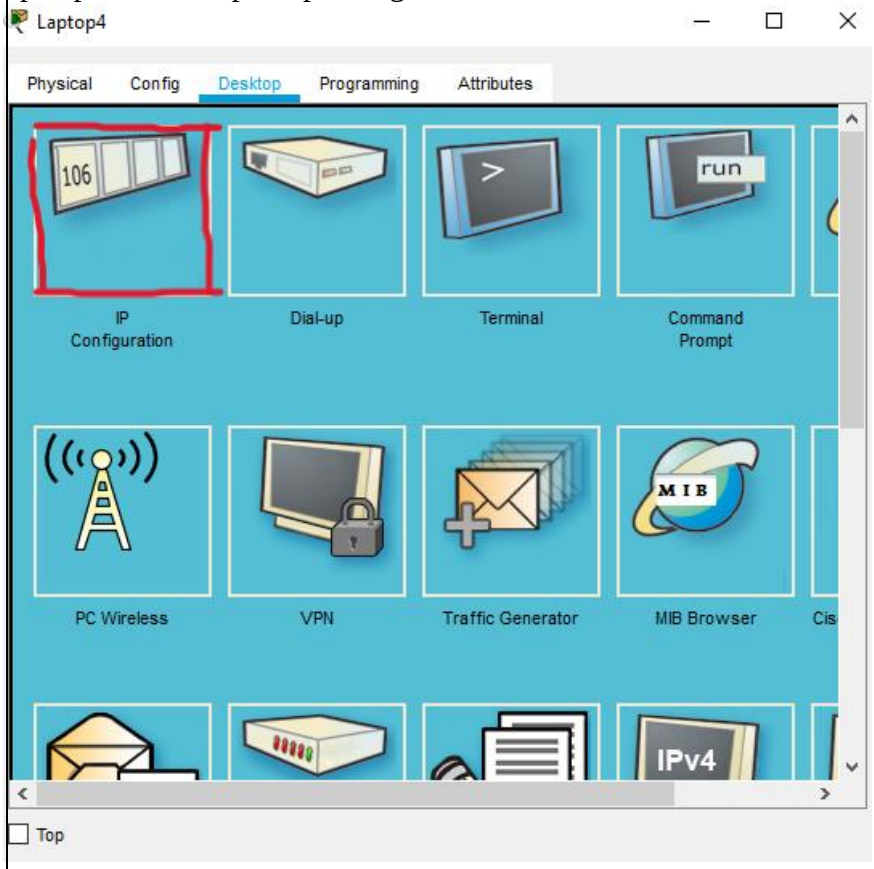
Network Design:



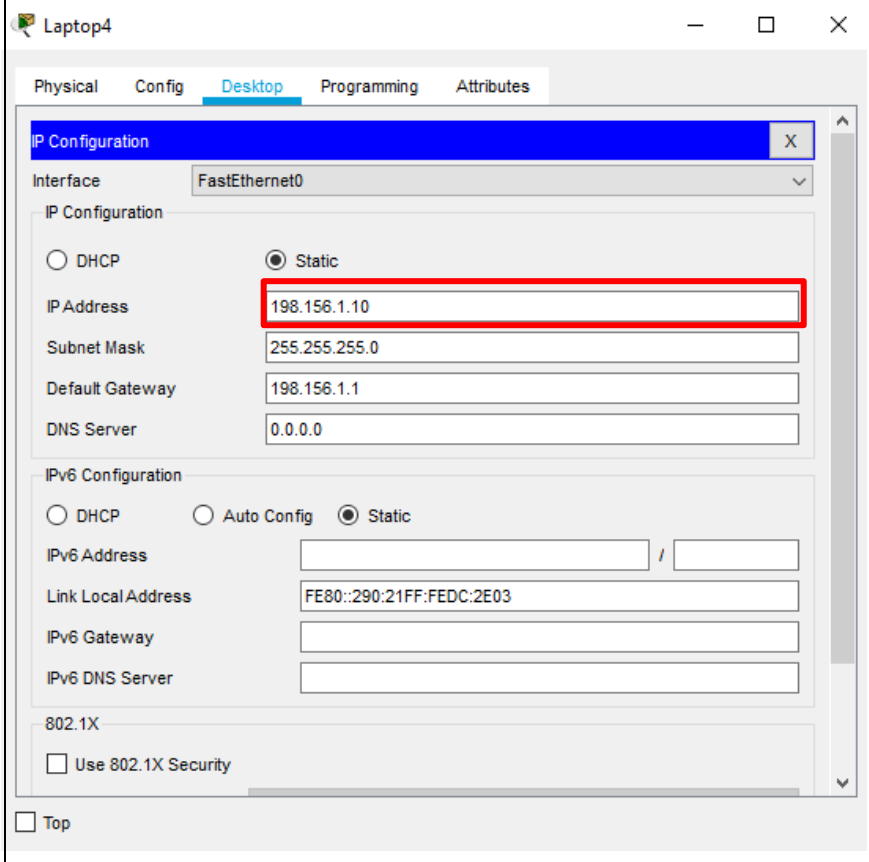
Open Router config- Assign the ip address



open pc -> desktop -> Ip conifguration



Assign IP address-



CONCLUSION:

Cisco Packet Tracer is a network simulation tool that is not intended to directly deploy online services, such as genuine web servers. However, it can be an effective tool for imitating and comprehending how web services work in a networked setting.

Here's a summary of what you can achieve with Cisco Packet Tracer regarding connecting lan and wan networks:

In summary, connecting LAN and WAN networks in Cisco Packet Tracer involves setting up routers, switches, and devices to simulate a network environment. By configuring IP addressing, routing protocols, and VLANs, one can create a robust and scalable network. The use of Packet Tracer allows for the testing and troubleshooting of network configurations, ensuring reliable communication between different network segments. This hands-on approach provides valuable insight into real-world networking concepts and best practices.