Design and Simulation of a Cyber Café Networking System Using Cisco Packet Tracer

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ARTICLE INFORMATION

ABSTRACT

n today's digital world, cyber cafés still play an important role by providing internet access and computer services to the public. A cyber café needs a well-organized and reliable computer network to serve multiple users at the same time. This project focuses on the design and simulation of a Cyber Café Networking System using Cisco Packet Tracer. The network is designed using a star topology, where all client systems are connected through switches to a central router. Two servers are included for monitoring and café management purposes. IP addressing is handled through a structured approach, and connectivity between all devices is tested using basic network tools such as the ping command. The simulation results show that all devices are connected successfully with stable communication. This project proves that Cisco Packet Tracer is an effective tool for designing and testing cyber café networks before real-world implementation

1. INTRODUCTION

Cyber cafés are public places where people use computers and internet services for browsing, online work, gaming, and communication. To support multiple users smoothly, a cyber café must have a proper computer networking system that ensures fast access, stability, and easy management. Without a well-designed network, users may face slow performance, connection failures, and security problems.

Designing a physical network directly can be expensive and risky if errors occur during configuration. Therefore, network simulation tools are widely used to plan and test networks before actual installation. Cisco Packet Tracer is one such tool that allows users to design, configure, and test networks in a virtual environment.

This project aims to design a simple and practical Cyber Café Networking System using Cisco Packet Tracer. The design includes multiple client computers, servers, switches, and a router. The goal is to create a network that is easy to manage, reliable, and suitable for small to medium-sized cyber cafés.

2. RESEARCH METHODS

This project uses a simulation-based engineering approach. The entire network is designed and tested using Cisco Packet Tracer software. The steps followed in this project include understanding basic networking concepts, identifying cyber café requirements, designing the network topology, configuring devices, and finally testing the network connectivity.

2.1. Computer Network Concept

A computer network is a group of connected devices that share data and resources such as internet access and servers. In a cyber café environment, networks allow many users to work at the same time while being connected through a central system.

The main components of a cyber café network include client computers, switches, a router, servers, and Ethernet cables. These components work together to provide a smooth and reliable network experience for users.

2.2. Star Topology

The star topology is one of the most commonly used network topologies in small organizations and cyber cafés. In this topology, all client devices are connected to a central device, usually a switch or router.

The main advantage of star topology is its simplicity. If one computer fails, it does not affect the rest of the network. It is also easy to add or remove devices, making it suitable for environments where the number of users may change.
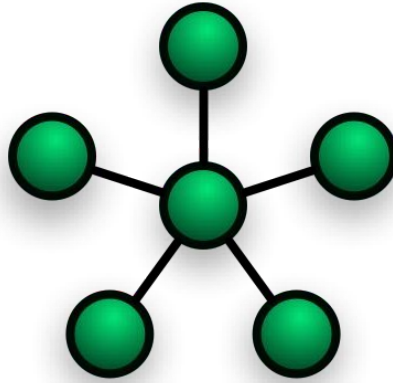

Figure 1. Star topology

2.3. Identify Network Needs

Before designing the network, the basic requirements of the cyber café were identified.

Devices used in the network include:

- 12 client PCs for customers

- 1 central router

- 3 switches

- 2 servers (café server and monitoring server)

Network needs include:

- Stable internet connectivity

- Centralized monitoring and management

- Easy expansion for future systems

- Reliable communication between all devices

2.4. Network Design

The cyber café network is designed using a star topology. All client PCs are connected to switches, and all switches are connected to a central router. The router acts as the main gateway of the network and handles communication between all devices.

Two servers are directly connected to the router. One server is used as the café server, while the other is used for monitoring purposes. This arrangement ensures fast and secure access to services.
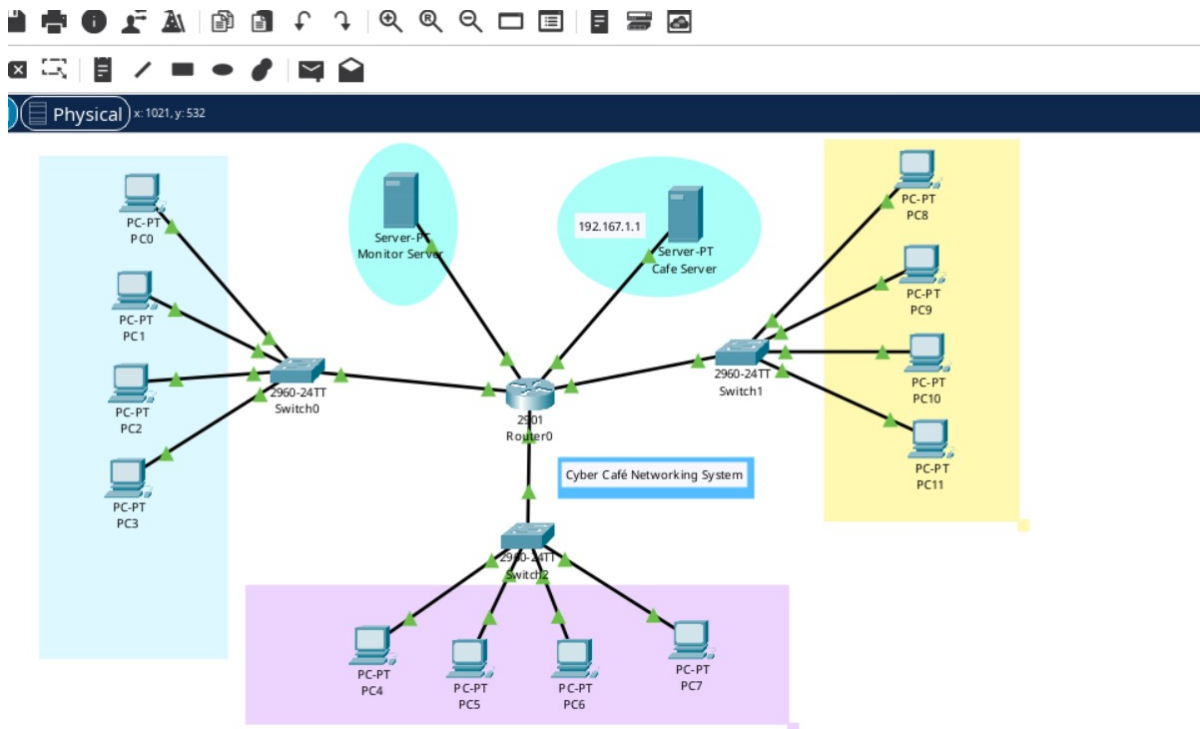
Figure 2. Network design

In the topology that we created, each router has several network IDs, which are explained as follows:
1. Main Router: This router acts as the central device connecting other routers, and communication between them must pass through it. In a real-world implementation, this router will also act as a bridge or gateway to the Internet Service Provider. This router manages the Network ID for the server room.
2. Router 2 manages two network IDs: the Lecturer's Room and the Administration Room. The entire network uses wired media, with no wireless connections.
3. Router 3 is the router that has the most Network IDs, there are 3 Network IDs, namely the Network for the Computer Laboratory, Building A, and Building B. The network on router 3 has 2 networks that are distributed using wireless media, namely the network in Building A and Building B.

2.5. Network Configuration

After completing the network design, device configuration is performed in Cisco Packet Tracer. Each device is configured according to its role in the network.
Client PCs receive IP addresses automatically, while servers use fixed IP addresses for consistency. The router is configured as the default gateway to allow communication between different network segments.

2.5.1 Client Network

The client network includes all customer PCs connected through switches. Each PC is configured to receive network settings automatically.

2.5.2 Server Network

The server network includes:

- Café Server for management services

- Monitoring Server for tracking network activity

Both servers are connected directly to the router to ensure reliable access from all client systems.
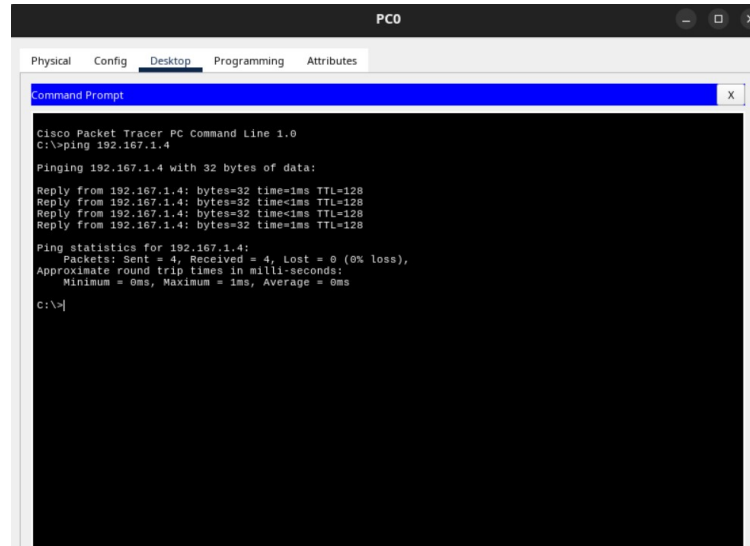
3. RESULTS AND DISUSSION

After configuration, the network was tested using basic connectivity checks. The ping command was used to test communication between client PCs, servers, and the router.

All tests were successful, showing that:

- All devices are properly connected

- There is no packet loss

- The network is stable and responsive

These results confirm that the cyber café network is functioning correctly in the simulation environment.

4. CONCLUSION

This project successfully designed and simulated a Cyber Café Networking System using Cisco Packet Tracer. The use of star topology made the network simple and reliable. All devices were able to communicate properly, and the simulation results showed stable network performance.

This design can be used as a basic model for real cyber café networks. In the future, additional features such as security controls, bandwidth management, and user authentication can be added to improve the system.

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