Computer Network

Experiment - 2

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AIM:
Study of Socket Programming and Client – Server model.

THEORY:
SOCKET PROGRAMMING
Socket Programming is a way of connecting two nodes on a network to communicate with each other. One socket (node) listens on a particular port at an IP, while the other socket reaches out to that IP and port to establish a connection. It's essential in client-server models for network communication.

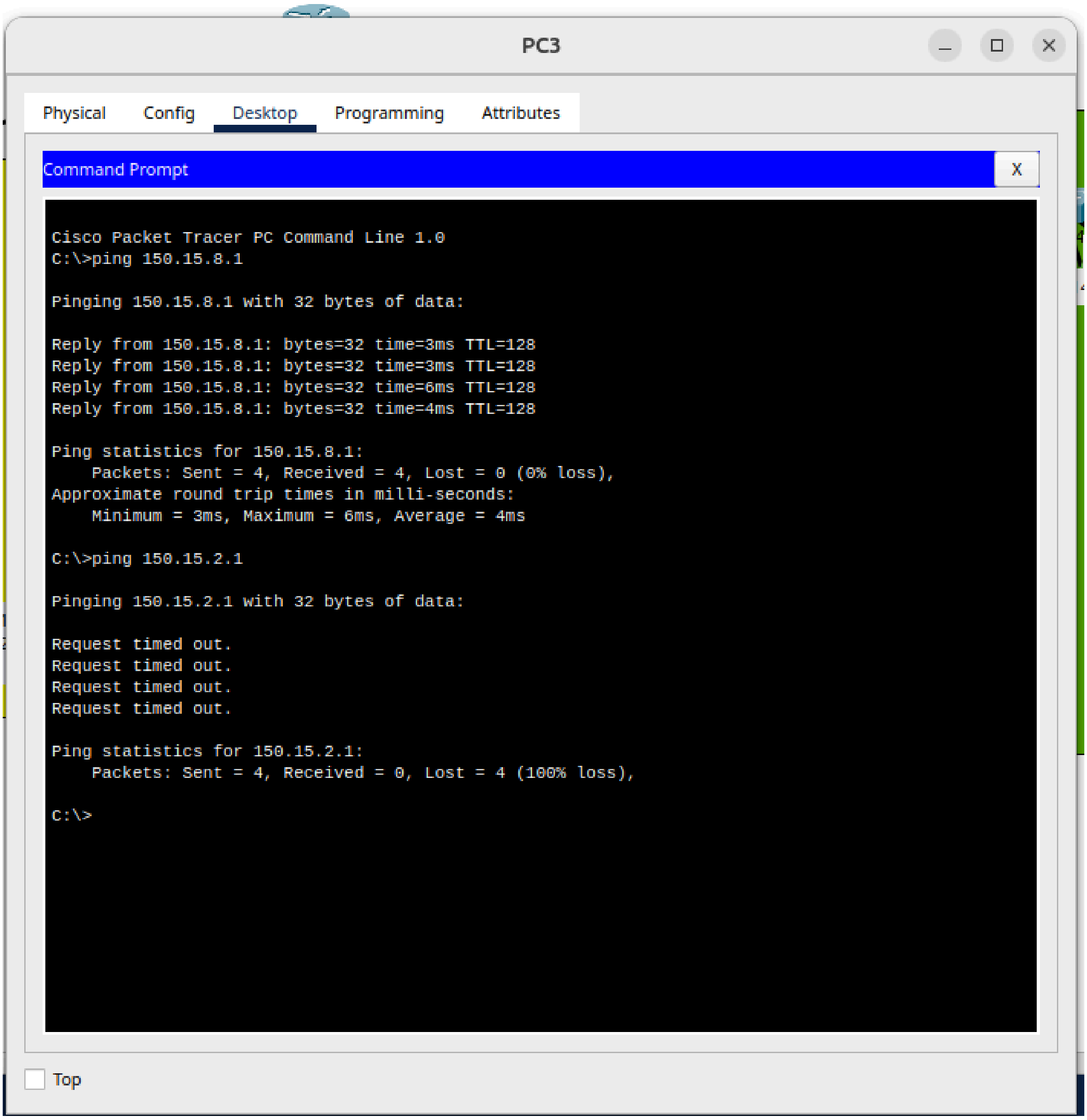
CLIENT SERVER MODEL
Client: Initiates a request and waits for the response.
Server: Waits for incoming requests, processes them, and sends back a response.
This model is widely used in web servers (HTTP), email systems (SMTP), database systems, etc.
This model forms the basis for network communication, with sockets being used in almost all modern networking applications.

KEY FEATURES OF SOCKET PROGRAMMING
Socket: An endpoint for sending or receiving data. It's bound to a port number so that the TCP layer can identify the application that data is destined for.

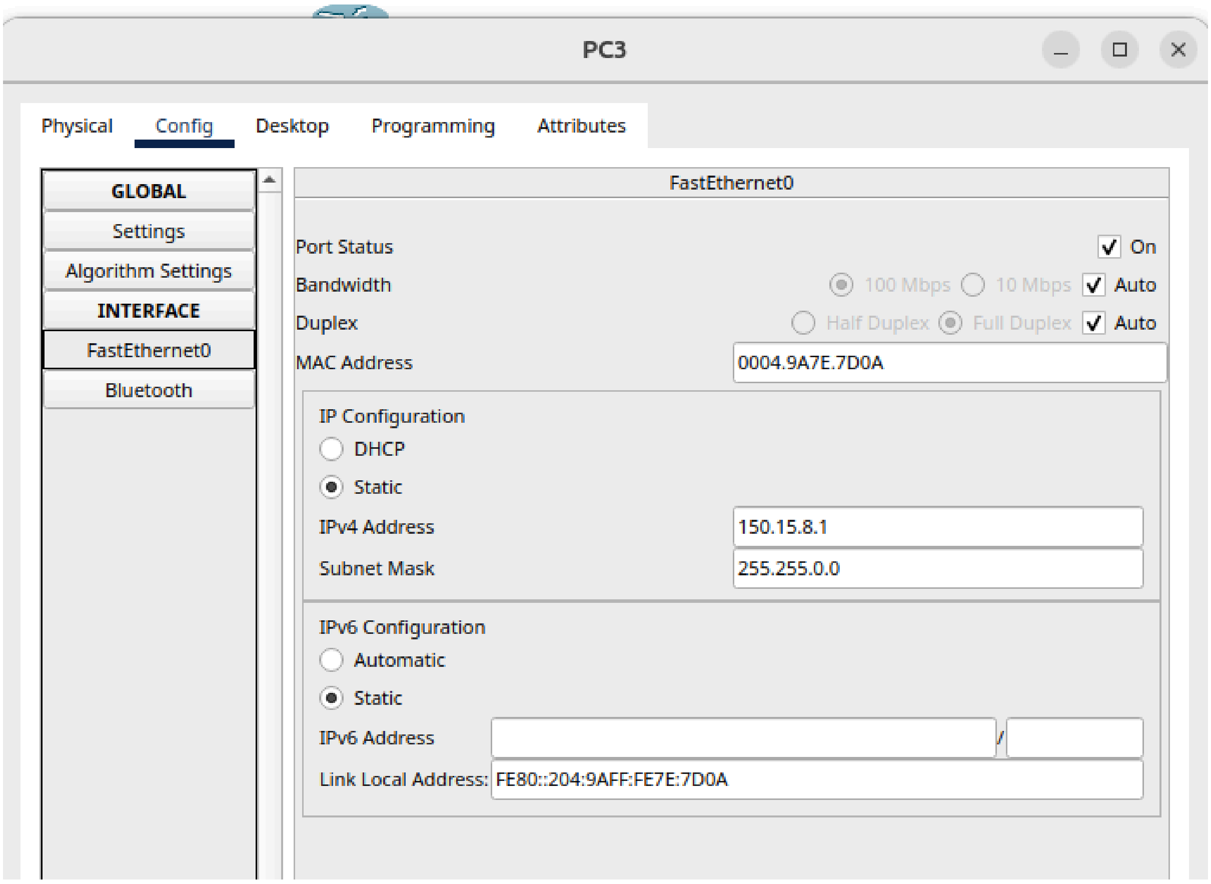
● Types:
  ○ Stream Socket (TCP): Reliable, connection-oriented socket.
  ○ Datagram Socket (UDP): Connectionless, faster but unreliable.

Server: The server is a program that waits for incoming requests from clients. It listens for connections and processes data from clients.
Client: The client requests a connection to the server and sends or receives data once connected.

Output:



```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 150.15.8.1

Pinging 150.15.8.1 with 32 bytes of data:

Reply from 150.15.8.1: bytes=32 time=3ms TTL=128
Reply from 150.15.8.1: bytes=32 time=3ms TTL=128
Reply from 150.15.8.1: bytes=32 time=6ms TTL=128
Reply from 150.15.8.1: bytes=32 time=4ms TTL=128

Ping statistics for 150.15.8.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 3ms, Maximum = 6ms, Average = 4ms

C:\>ping 150.15.2.1

Pinging 150.15.2.1 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 150.15.2.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```



FastEthernet0

Port Status ☑ On

Bandwidth ● 100 Mbps ○ 10 Mbps ☑ Auto

Duplex ○ Half Duplex ● Full Duplex ☑ Auto

MAC Address 0004.9A7E.7D0A

IP Configuration

○ DHCP

● Static

IPv4 Address 150.15.8.1

Subnet Mask 255.255.0.0

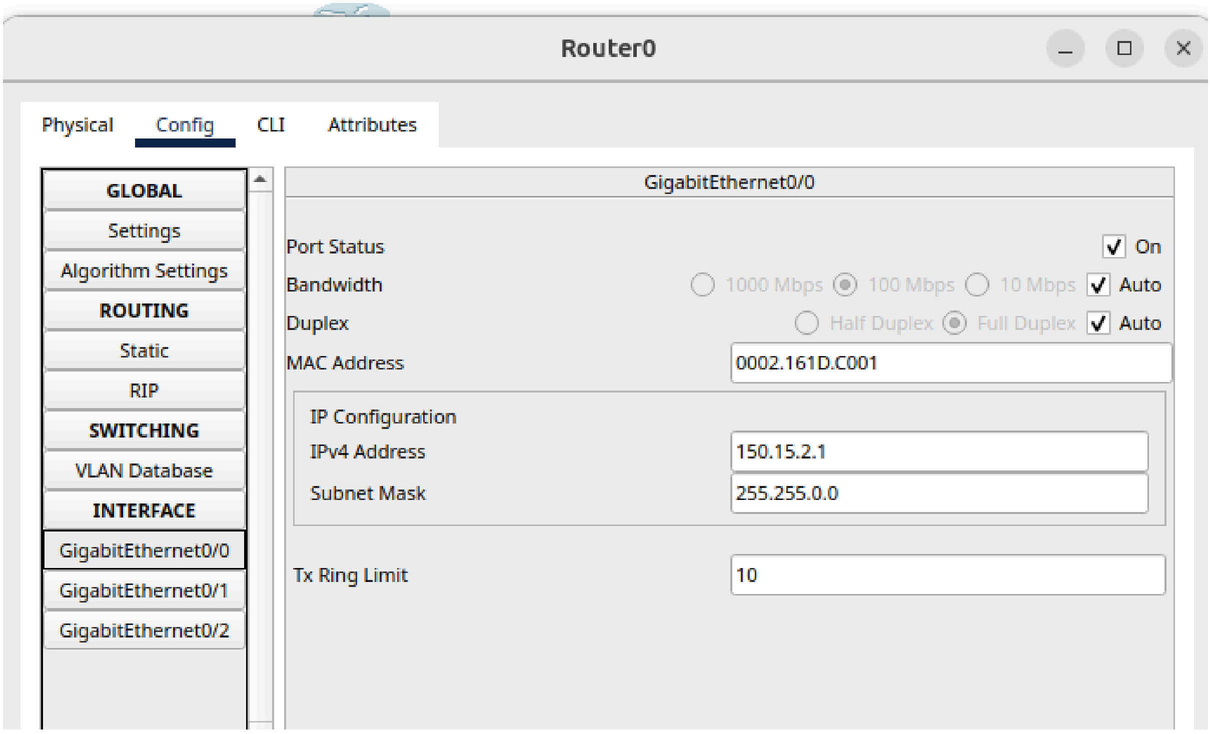
IPv6 Configuration

○ Automatic

● Static

IPv6 Address /

Link Local Address: FE80::204:9AFF:FE7E:7D0A



GigabitEthernet0/0

Port Status ☑ On

Bandwidth ○ 1000 Mbps ● 100 Mbps ○ 10 Mbps ☑ Auto

Duplex ○ Half Duplex ● Full Duplex ☑ Auto

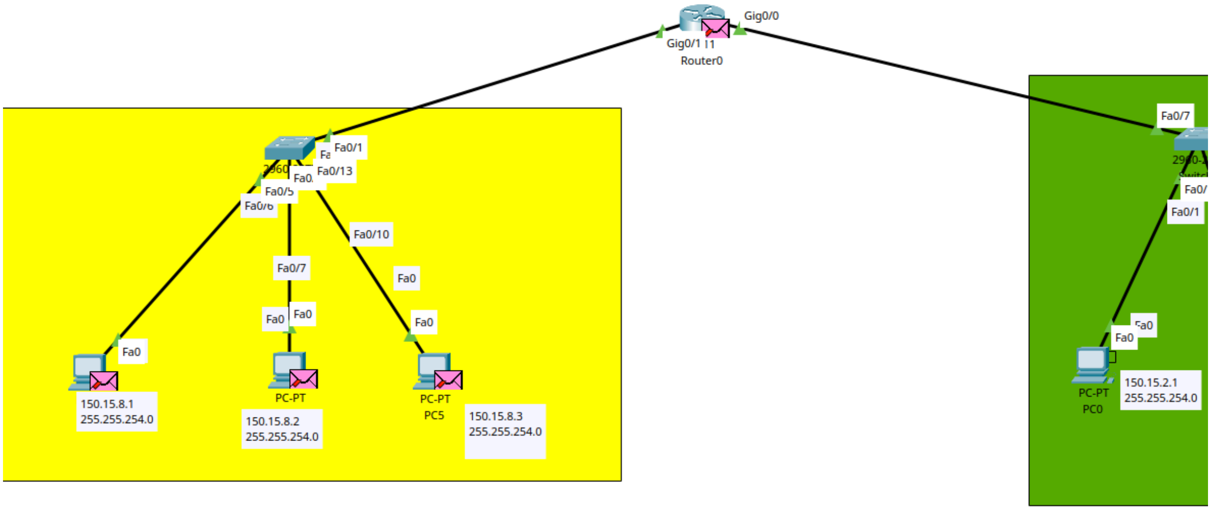
MAC Address 0002.161D.C001

IP Configuration

IPv4 Address 150.15.2.1

Subnet Mask 255.255.0.0

Tx Ring Limit 10



CONCLUSION :

I have learned about socket programming, including its key concepts like socket creation, binding, sending, and receiving data. Additionally, I explored how to work with socket programming in client-server models, key features such as stream and datagram sockets, and IP addresses and their configurations. This understanding is essential for building reliable network communication systems.