

**Engineering**

Semester	T.E. Semester VI – EXTC Engineering
Subject	Computer Communication Network (CCN)
Laboratory Teacher:	Prof. Beena R Ballal

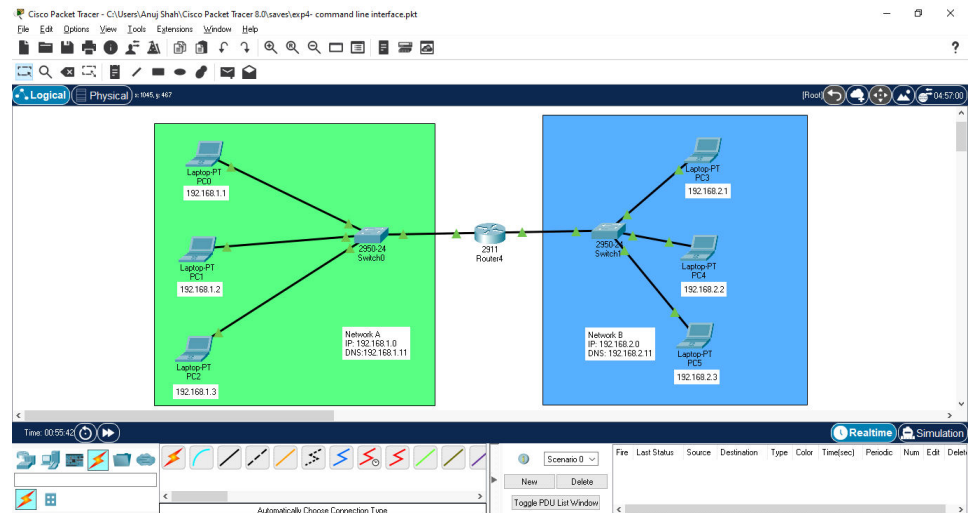
Student Name	Anuj Shah
Roll Number	18104B0024
Grade and Subject	
Teacher's Signature	

Experiment Number	04
Experiment Title	To set up connection between two networks using router with CISCO packet tracer using CLI
Aim	To set up connection between two networks using router with CISCO packet tracer using CLI .Establish internetwork transmission of packets from one node to the other node and verify it with Ping command
Resources / Apparatus Required	Hardware: Internet Connected PC      Software: Cisco Packet Tracer
Theory:	<p>Packet Tracer is a cross-platform visual simulation program designed by Cisco Systems that allows users to create network topologies and imitate modern computer networks. The software allows users to simulate the configuration of Cisco routers and switches using a simulated command line interface. Packet Tracer makes use of a drag and drop user interface, allowing users to add and remove simulated network devices as they see fit.</p> <p>Router is a network device present on Network layer. It is an intelligent device which uses logical and physical addressing to interconnect two or more logically separate networks. The main function of router is to find possible route for the packet and built the routing table.</p>
Procedure :	<ol style="list-style-type: none"> <li>1. Open cisco packettracer.</li> <li>2. Select the required end devices and switch(2950) to connect the network A</li> <li>3. Select the required end devices and switch (2950)to connect the network B</li> <li>4. Connect Network A using Copper straight through cables. Similarly connect Network B using Copper straight through Connections.</li> <li>4. Observe that the red connections have turned green automatically.</li> <li>5. Select the Router 2911 from the library of routers. Connect it to the switch by using gigabitethernet ports</li> <li>5 Click on end devices and configure its IP by selecting its IP addresses and their default gateways.</li> <li>6. In order to configure router go to CLI(command line interface) and configure gi0/0 and gi0/1 ports using series of commands</li> <li>7. Observe that the entire network has turned from red to green.</li> <li>7. Choose the packet from tools and select its source and destination..</li> <li>8. Click Start simulation.</li> <li>9. Packet will be transmitted from source to destination and response will be given from</li> </ol>

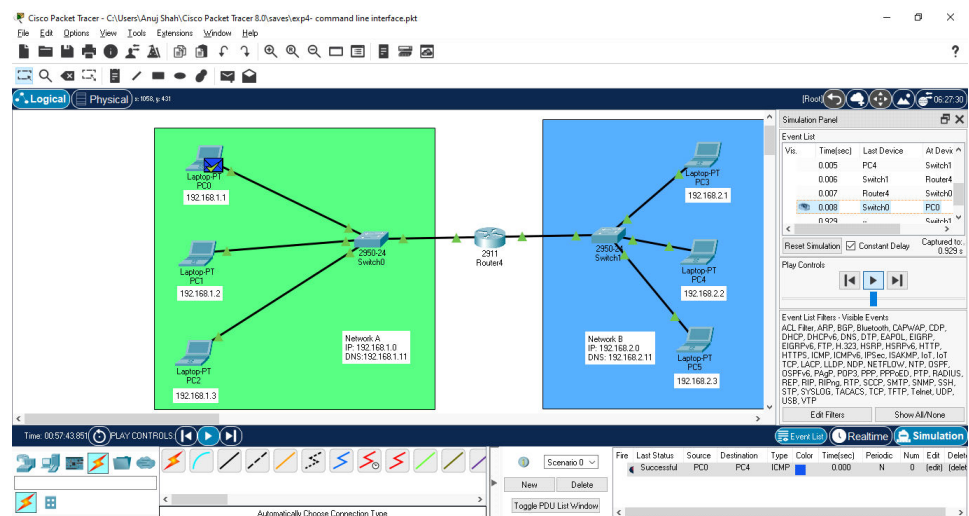
- destination to source(acknowledgment) in the form of tick mark
10. observe the internetwork transmission of packets from one node to the other node
  11. From the end devices, ping onto other end device and see the reply. If ping is responded means, successful network is configured.

Screenshots of  
the  
Output(Response  
)

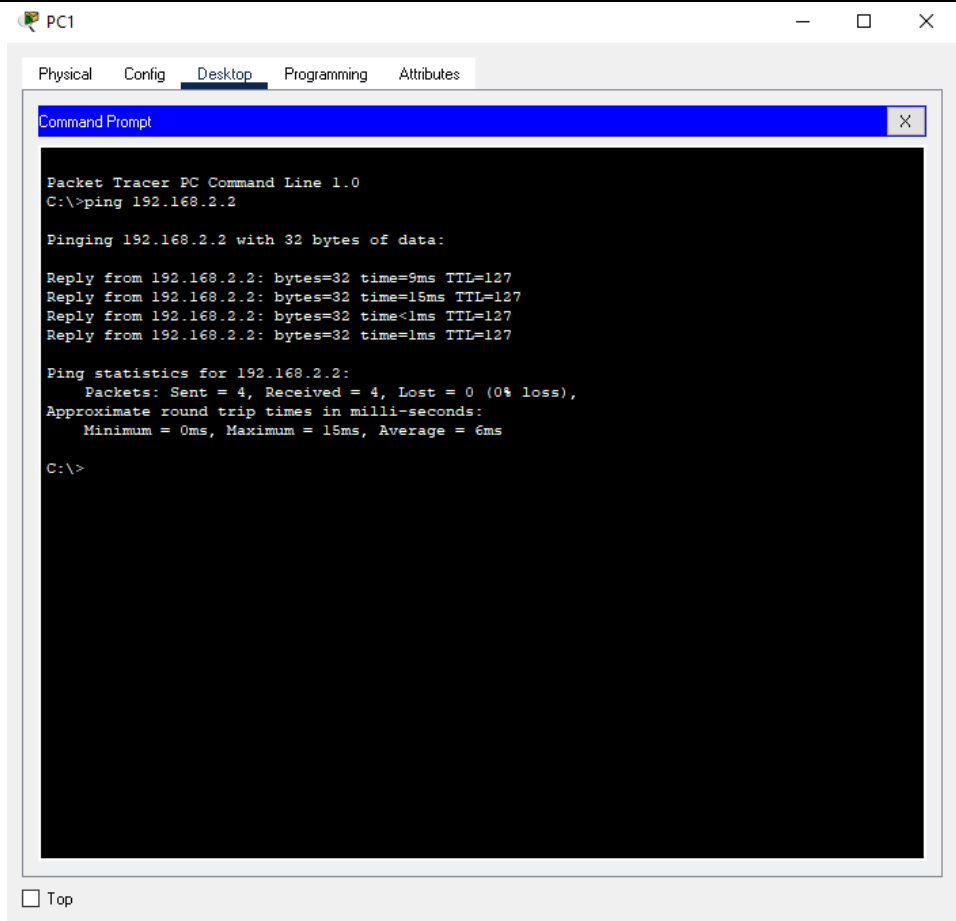
### NETWORK A AND NETWORK B CONNECTED VIA ROUTER



### SUCCESSFUL TRANSMISSION OF PACKET FROM SOURCE TO DESTINATION WITH ACKNOWLEDGMENT RECEIVED



### SUCCESSFUL TRANSMISSION ESTABLISHED BETWEEN TWO NETWORKS VERIFIED USING PING COMMAND



### COMMAND LINE INTERFACE(CLI) WITH COMMANDS

Router4

Physical

Config

CLI

Attributes

IOS Command Line Interface

249856K Bytes of AIA System CompactFlash 0 (Read/Write)

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System Configuration Dialog

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Would you like to enter the initial configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable

Router#

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#interface GigabitEthernet0/0

Router(config-if)#ip address 192.168.1.11 255.255.255.0

Router(config-if)#ip address 192.168.1.11 255.255.255.0

Router(config-if)#no shutdown

Router(config-if)#

%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

Router(config-if)#exit

Router(config)#interface GigabitEthernet0/1

Router(config-if)#ip address 192.168.2.11 255.255.255.0

Router(config-if)#ip address 192.168.2.11 255.255.255.0

Router(config-if)#no shutdown

Router(config-if)#

%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

Ctrl+F6 to exit CLI focus

Copy

Paste

Top

## IN REAL TIME MODE MESSAGE OF SUCCESSFUL TRANSMISSION OF PACKET BETWEEN TWO NETWORKS

The diagram illustrates a network setup in Cisco Packet Tracer. It features two distinct networks, Network A and Network B, connected via a central router (2911 Router4). Network A, highlighted in green, includes three PCs (192.168.1.1, 192.168.1.2, 192.168.1.3) connected to a 2950-24 Switch0. Network B, highlighted in blue, includes three PCs (192.168.2.1, 192.168.2.2, 192.168.2.3) connected to a 2950-24 Switch1. The two switches are connected to the central router. The bottom status bar shows a successful packet transmission from PC0 to PC4, indicating connectivity between the two networks.

Conclusion:	In this experiment, we learned how to set up two different networks, and connect them using a router. We also learned how to use the CLI (command line interface) to configure the router.		
Post Questions:	Lab	1.	List the functions of the Router
		2.	At which layer of OSI is a Router present?

3. Compare Gateway and Router
4. List the network addresses used for the two networks in this experiment

### Router

A router is a networking device that forwards data packets between computer networks.

- Routers may provide connectivity within enterprises, between enterprises and the Internet, or between internet service providers' (ISPs') networks.
- A router may have interfaces for different types of physical layer connections, such as copper cables, fiber optic, or wireless transmission. It can also support different network layer transmission standards.
- Routers may also be used to connect two or more logical groups of computer devices known as subnets, each with a different network prefix.
- Distribution routers are often responsible for enforcing quality of service across a wide area network (WAN)
- In enterprises, a core router may provide a collapsed backbone interconnecting the distribution tier routers from multiple buildings of a campus, or large enterprise locations.
- A router may include a firewall, VPN handling, and other security functions, or these may be handled by separate devices.

Wikipedia: [https://en.wikipedia.org/wiki/Router\\_\(computing\)](https://en.wikipedia.org/wiki/Router_(computing))

### OSI model

Routers operate on the third layer of the OSI model, the network-control layer.

### Gateway and Router

PARAMETER	ROUTER	GATEWAY
<b>Terminology</b>	Network device that forwards packets from one network to another. Based on internal routing tables, routers read each incoming packet and decide how to forward it. Routers work at the network layer (layer 3) of the protocol	Device that converts one protocol or format to another. A network gateway converts packets from one protocol to another. The gateway functions as an entry/exit point to the network.
<b>Primary Goal</b>	Route traffic from one network to other.	Translate from one protocol to other
<b>Feature support</b>	Routers provide additional features like DHCP server, NAT, Static Routing, and Wireless Networking/IPv6 address, Mac address	Protocol conversion like VoIP to PSTN or Network Access Control etc.
<b>Dynamic Routing</b>	Supported	Not supported
<b>Hosted on</b>	Dedicated Appliance (Router hardware)	Dedicated/Virtual Appliance or physical Server
<b>Related terms</b>	Internet Router, Wireless Router	Proxy server, Gateway Router, Voice Gateway
<b>OSI layer</b>	Works on Layer 3 and 4	Works upto Layer 5
<b>Working principle</b>	Works by installing routing information for various networks and routes traffic based on destination address	Works by differentiating what is inside network and what is outside network

<https://ipwithease.com>

Source: <https://ipwithease.com/difference-between-router-and-gateway/>

### Network addresses:

- Network A: 192.168.1.0  
That is why all the devices in the network A had similar IP addresses (192.168.1.1, 192.168.1.2, 192.168.1.3) and also shared a similar DNS (192.168.1.11)

	<ul style="list-style-type: none"><li>• Network B: 192.168.2.0</li></ul> <p>That is why all the devices in the network A had similar IP addresses (192.168.2.1, 192.168.2.2, 192.168.2.3) and also shared a similar DNS (192.168.2.11)</p>
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