



LAB REPORT
on

COMPUTER NETWORKS

Submitted by

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in partial fulfillment for the award of the degree of
BACHELOR OF ENGINEERING
in
COMPUTER SCIENCE AND ENGINEERING



B.M.S. COLLEGE OF ENGINEERING

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B. M. S. College of Engineering,

Bull Temple Road, Bangalore 560019

(Affiliated To Visvesvaraya Technological University, Belgaum)

Department of Computer Science and Engineering



CERTIFICATE

This is to certify that the Lab work entitled “LAB COURSE COMPUTER NETWORKS” carried out by OM BHANDANKAR(1BM20CS101), who is bona fide student at B. M. S. College of Engineering. It is in partial fulfillment for the award of Bachelor of Engineering in Computer Science and Engineering of the Visvesvaraya Technological University, Belgaum during the year 2022. The Lab report has been approved as it satisfies the academic requirements in respect of a Computer Networks - (20CS5PCCON) work prescribed for the said degree.

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1. 10/11/22 Creating a topology and simulate sending a simple PDU from source to destination using hub and switch as connecting devices.
- 2 24/11/22 Configuring IP address to Routers in Packet Tracer. Explore the following messages: Ping Responses, Destination unreachable, Request timed out, Reply.
- 3 01/12/22 Configuring default route to the Router.
- 4 15/12/22 Configuring DHCP within a LAN in a packet Tracer.
- 5 08/12/22 Configuring RIP Routing Protocol in Routers.
- 6 15/12/22 Demonstration of WEB server and DNS using Packet Tracer.
- 7 29/12/22 Write a program for error detecting code using CRC-CCITT (16-bits).
- 8 12/01/23 Write a program for distance vector algorithm to find suitable path for transmission.
- 9 12/01/23 Implement Dijkstra's algorithm to compute the shortest path for a given topology.
- 10 05/01/23 Write a program for congestion control using Leaky bucket algorithm.
- 11 02/02/23 Using TCP/IP sockets, write a client-server program to make client sending the file name and the server to send back the contents of the requested file if present.

1 2	02/02/23	Using UDP sockets, write a client-server program to make client sending the file name and the server to send back the contents of the requested file if present.	
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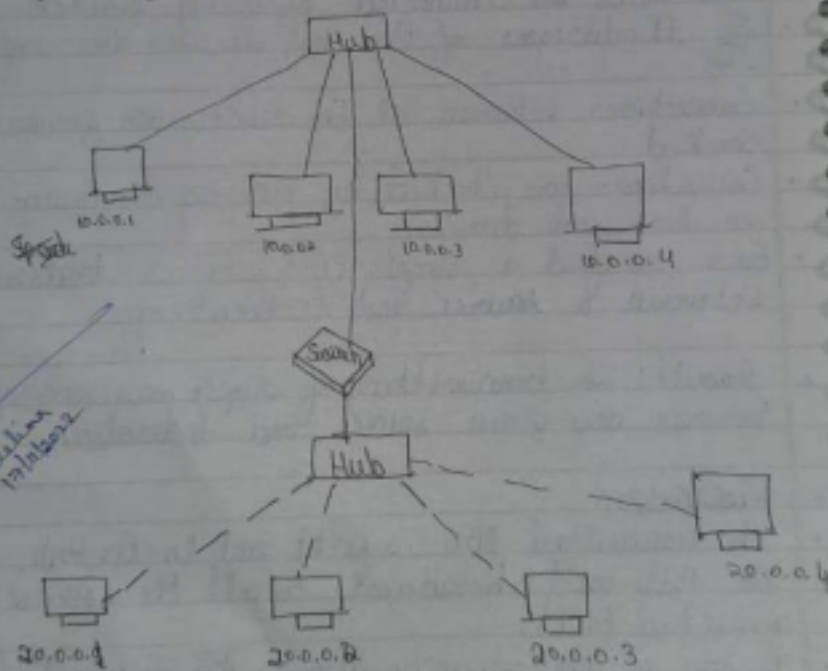
Experiment-1

- Aim: To simulate sending a simple PDU from source to destination using hub and switch as connecting devices.
- Topology: Star topology
- Procedure:
 - End devices are connected through the hub.
 - The hubs are connected by using switch.
 - IP addresses of the end devices are configured.
 - Connections between all the devices are formed and checked.
 - Connections are checked by pinging a message between two end devices.
 - Once verified a simple PDU file is transmitted between a source and destination.
- Result: The transmitting of simple was successful between any given source and destination.
- Observation:
 - The transmitted PDU is first sent to the Hub.
 - The Hub will broadcast to all the devices connected to it.
 - If any of the receiving devices is the destination device, then transmission stops, else the wait.

The switch will initially broadcast to the hubs connected to it and devices connected to it. A ping message is sent by the destination device giving details about its mac address to the switch, which is stored for further transmissions.

The transmission is said to be successful if the PDU file returns through the network and a ✓ appears at the source.

Topology diagram:-



File Edit Options View Tools Windows Help

Logical [Real] New Cluster New Cluster New Cluster New Cluster Background Viewport

Simulation Panel

Event List

No.	Timestamp	Last Device	All Device	Type	Info
0.001	10.0.0.1	10.0.0.1	10.0.0.1	ICMP	
0.002	10.0.0.2	10.0.0.2	10.0.0.2	ICMP	
0.003	10.0.0.3	10.0.0.3	10.0.0.3	ICMP	
0.004	10.0.0.4	10.0.0.4	10.0.0.4	ICMP	
0.005	10.0.0.5	10.0.0.5	10.0.0.5	ICMP	
0.006	10.0.0.6	10.0.0.6	10.0.0.6	ICMP	
0.007	10.0.0.1	10.0.0.1	10.0.0.1	ICMP	
0.008	10.0.0.2	10.0.0.2	10.0.0.2	ICMP	
0.009	10.0.0.3	10.0.0.3	10.0.0.3	ICMP	
0.010	10.0.0.4	10.0.0.4	10.0.0.4	ICMP	
0.011	10.0.0.5	10.0.0.5	10.0.0.5	ICMP	
0.012	10.0.0.6	10.0.0.6	10.0.0.6	ICMP	

Filter: [Switch] [Control Delay] [Capture Delay]

File Controls: [Back] [Auto Capture / Play] [Capture / Forward]

Event List: [Event List] [Show All] [Show Filtered]

Simulation

Time: 00:00:00.000 [Power Cycle Devices] [Run Controls] [Back] [Auto Capture / Play] [Capture / Forward]

Connections: [Connections] [Automatic Power Forwarding Test]

Simulation Log

No.	Last Status	Source	Destination	Type	Color	Timestamp	Periodic	Num	Info	Details
1	Successful	10.0.0.1	10.0.0.2	ICMP		0.000	N	0	10.0.0.1	(Details)

- A ping is sent from end device to the connected router. Request is timed out. Hence gateway is set.
- A ping is sent from end device to a router not connected to it. We get destination host not reachable. So we go to each router and route it to all other networks, using command
ip route 30.0.0.0 255.0.0.0 20.0.0.2
- A ping is sent from end device to other end device.
- Result: A successful ping message is transmitted from one end device to another end device.

Observation:

- A ping doesn't cross the interface until a gateway has been set to the connected interface/router.
- Once gateway has been set, the ping will not cross over to another router as the routers are not connected to other networks and they won't know which route to take or where the next hop of the signal is to be done.
- The routers are configured with ip route where the network name, subnet mask and the next hop to reach the network is given to all the networks not ^{directly} connected to it.
- After routing, the router will know the path in which ping travels.

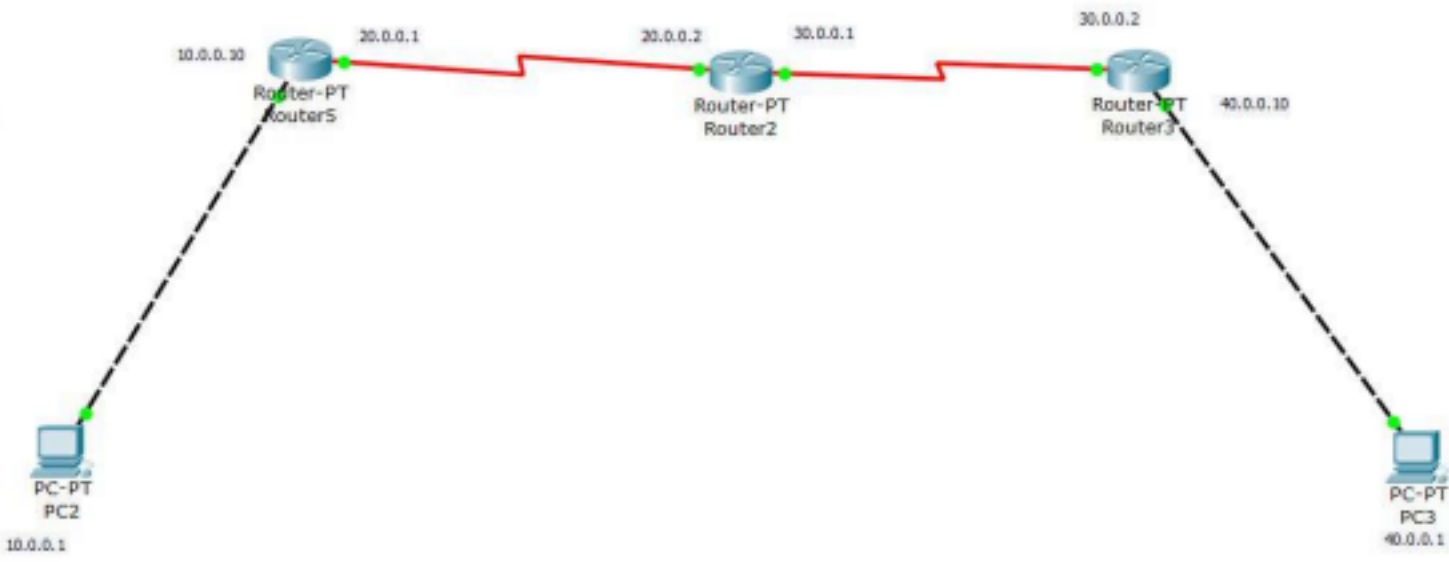
Experiment-2

Aim: To configure IP address to Routers in Packet Tracer. Explore the following messages: Ping responses, Destination unreachable.

Topology: See topology

Procedure:

- End devices are connected to a router.
- The IP addresses are configured for the end devices.
- The CLI of router is opened and following commands are entered:
 enable
 config terminal
 interface Fa0/0
 ip address ipaddress subnetmask
 no shutdown
 exit
- The above commands are used to set IP address of interface of the router.
- A ping is sent from end devices to the router interface to which it is connected.
 → The ping is accepted and received.
- A ping is sent. A ping is sent to the other end device.
- The gateway for the end devices are set.
- A ping sent from between the end devices.



Output:

1) PC > ping 20.0.0.1 (from 10.0.0.1)
Pinging 20.0.0.1 with 32 bytes of data:
Request timed out
Request timed out
Request timed out
Request timed out
Ping statistics for 20.0.0.1:
Packets: Sent=4, Received=0, Lost=4 (100% Loss)

2) PC > ping 30.0.0.1
Pinging 30.0.0.1 with 32 bytes of data:
Destination host not reachable: error

3) PC > ping 40.0.0.1
Pinging 40.0.0.1 with 32 bytes of data:
No reply from 40.0.0.1: bytes=32 time=8ms TTL=125
Reply from 40.0.0.1: bytes=32 time=8ms TTL=125
Reply from 40.0.0.1: bytes=32 time=8ms TTL=125
Reply from 40.0.0.1: bytes=32 time=8ms TTL=125
Ping statistics for 40.0.0.1:
Packets: Sent=4, Received=4, Lost=0 (0% Loss)

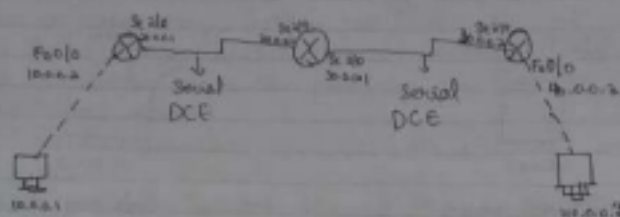
*Machine
entire 2012*

24/11/22

LAB-Experiment-3

4. Given: To configure static IP route to the routers

• Topology:



- Procedure:
 - The end devices are connected to routers.
 - The routers are connected to each other by using another router.
 - The IP addresses and gateway is set for the end devices.
 - The CLI of router is opened and the interfaces and IP addresses for each interface is set.
 - The connection is valid if there is a green light on the connection.
- Following commands are written for configuring a router:
 - enable
 - config terminal
 - interface Ser0/0
 - ip address 20.0.0.2 255.0.0.0
 - no shutdown
 - exit



Reply from 40.0.0.1: bytes=32 time=20ms TTL=253
Packets: Sent=4, Received=4, Lost=0 (0% loss)

Alaina
11/12/2011

Request timed out
Request timed out
Request timed out

Ping statistics for 30.0.0.1: Packets: Sent=4, Received=0, Loss=100% (0ms)

2) Gateway setup route not configured

PC > ping 30.0.0.1

Pinging 30.0.0.1 with 32 bytes of data:

Reply from 10.0.0.3: Destination host unreachable

Reply from 10.0.0.3: Destination host unreachable

Reply from 10.0.0.3: Destination host unreachable

Reply from 10.0.0.3: Destination host unreachable

Ping statistics for 30.0.0.1:

Packets: Sent=4, Received=0, Loss=100% (0ms)

3) Gateway set, ip route configured:

PC > ping 40.0.0.3

Pinging 40.0.0.3 with 32 bytes of data:

Request timed out

Reply from 40.0.0.3: bytes=32 time=11ms TTL=253

Request timed out

Reply from 40.0.0.3: bytes=32 time=11ms TTL=253

Ping statistics for 40.0.0.3:

Packets: Sent=4, Received=2, Loss=50% (0ms)

4) PC > ping 40.0.0.1

Pinging 40.0.0.1 with 32 bytes of data:

Reply from 40.0.0.1: bytes=32 time=20ms TTL=253

Reply from 40.0.0.1: bytes=32 time=20ms TTL=253

Reply from 40.0.0.1: bytes=32 time=20ms TTL=253

Reply from 40.0.0.1: bytes=32 time=20ms TTL=253

Router(Config)# ip route 0.0.0.0 0.0.0 30.0.1

→ Connections are checked by pinging packets from one end-device to another via interfaces.

• Observation:

- The packets suffer a loss when the gateway of the end devices aren't set (request timed out)
- When a default route isn't set, but gateway is set, the packets pinged from a PC will not recognize an interface router (results in destination host unreachable)
- Only 50% of the packets are transferred to a router in the middle. The end-device will receive all the packets. ~~As~~ The middle routers will have two default routes, 50% of packets are sent in both direction. Hence 50% of packet is lost, because those packets aren't returned.
- While pinging to destination and device one of the packets sent first via the switch, the switch receives the destination ip address of required end device. The rest of the packets are sent to the required end device. Therefore the first packet will get timed out.

• Output:

i) Gateway not set / ip route not configured

PC > ping 30.0.0.1

Pinging 30.0.0.1 with 32 bytes of data:

Request timed out

















































