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EXPERIMENT 6

AIM: To study various Network Topologies using wired and wireless connections.

Objectives:

- To create BUS Topology
- To create RING Topology
- To create Mesh Topology
- To create STAR Topology

EQUIPMENTS REQUIRED:

Cisco packet Tracer, Network Devices (switches, Hubs, routers), ethernet cables, computer.

THEORY:

Network Topology is the arrangement of a communication Network's elements (links, nodes).

The study of Network Topology recognizes four basic Topologies: Bus, Ring, mesh, star.

BUS: nodes are directly connected to a common half-duplex link.

STAR: In This every host is connected to a central HUB

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~~RINGS~~: In This every host is connected. Each node connects to exactly two other nodes forming a single continuous Pathway for signals through each node of a ring.

MESH: Nodes connect dynamically to as many other nodes as possible.

Procedure:-

① BUS Topology:

In CPT, select hub & drag Three Hub PT, Align Horizontally.

Select End devices and drag Two PC-PT from the device specific

Select Connections, copper straight through cable. Connect Hub & PC using Fast Ethernet Ports

Setup IP configurations repeat for others.

② BUS Topology:

Select Hubs and drag Hub PT.

Select end device and drag 5 PC-PT

Select Connections copper straight through cable and connect HUB & PC using Fast Ethernet Port.

From Desktop Task, setup IP configuration
Add simple PDU.

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③ Ring Topology :-

- Select switches from n/w devices
- Select connections & connect via Fast Ethernet Port. Repeat such that a closed shape (ring) is formed
- Drag 4 PC-PT onto workspace.
- From Desktop Tab, setup IP configuration

④ MESH Topology :-

- Select switches under n/w devices
- Select end devices and drag 4 PC-PT
- Connect PCs to switches via Fast Ethernet ports
- Setup IP Configuration by clicking and going to Desktop Tab.

~~OBSERVATION :-~~

~~By packet transfer successfully in wired & wireless topologies. We demonstrate 4 n/w topologies bus, ring, star, mesh~~

~~CONCLUSION :-~~

~~This lab exp provides hands on experience in studying and creating various LAN Topologies~~

~~PRECAUTION :-~~

~~Ensure devices and cables are properly connected~~

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Through hubs and switches.

• Double check IP Addressing

• For wireless, check the conversion of ports from
wired to wireless.

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Experiment 7

Aim: To design a FTP Server on The client server architecture.

Objective :-

1. To create a network in The client server architecture.
2. To create, transfer the file from client to server & From server to client.

Theory:

The File transfer protocol is a Standard Network Protocol used for The transfer of computer files b/w a client and The server

FTP employs a client - server architecture whereby the client machine has an FTP client installed and establishes a connection to an FTP server running on a Remote Machine. After The connection has been established and The user is successfully authenticated The data transfer phase can begin.

Procedure :-

Step 1:- Configure Router

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Step 2 : Configure PC & Laptop

Step 3 : Configure Server

After config, go to services and open FTP server.
Go to user setup and create a username
and Password.

Select all The permissions and all The users.

Step 4 :- Configuring Switch and Marketing
connection. After This, we got the Network
Topology.

Step 5 :- Check Connections From PC0, PC1
to other hosts in the Network using Ping
Commands in The command Prompt.

Step 6 :- Create file text1.txt For writing
into FTP Server.

Step 7 :- Writing (uploading) the file named
colab.txt presents in FTP server From
PC0 using put command and verifying
This File Transfer using Dir command

Step 8 :- Reading (downloading) the file named
colab.txt presents in FTP server From PC1
using get to Colab.txt come and verifying

This file transfer using dir command.

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Conclusion: We have learnt the design of FTP server within a client-server architecture enabling the creation of a network and file transfer from client to server and from server to client.

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EXPERIMENT 8

Aim: To create email & FTP server with Fault Tolerance

Software: ~~WPS~~ Cisco packet Tracer

Theory:-

File Transfer Protocol is a Standard Network Protocol used to exchange & manipulate files over a TCP/IP based Network.

FTP is used with user based password authentication or with anonymous user access.

Fault Tolerance refers to system's ability to tolerate Faults & handle errors without data loss

It is the backbone of an operating system making sure that there is an uninterrupted operation despite failures in computer system.

Procedure:-

- ① Open CPT & select 3 PCs, two 2960 switches, one router and server.
- ② Connect all devices using straight through cable.
- ③ Set IP address for all devices.

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- (4) Now go to any PC and check connection by Pinging other PC.
- (5) Configure servers for FTP for a user.
- (6) Open the terminal & type commands.

Conclusion: We have created a Mailserver.

Physical Config CLI Attributes

iOS Command Line Interface

```
* Incomplete command
Router#copy tftp: running-config
Address or name of remote host []? 192.168.1.1
Source filename []? failure1
Destination filename [running-config]? recovery1
?Invalid argument

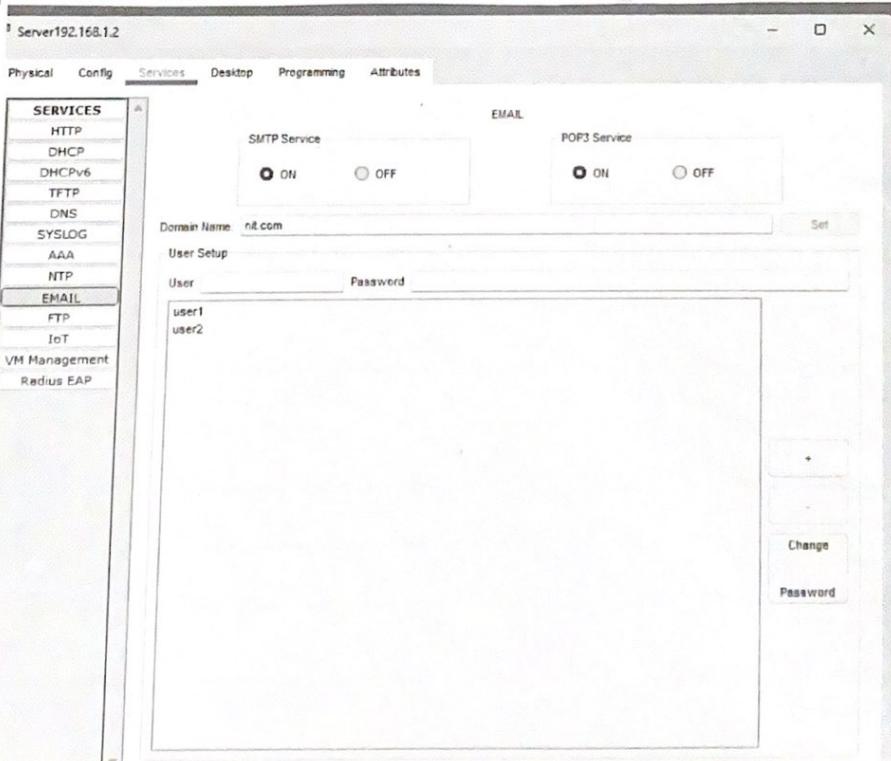
Router#copy tftp: running-config
Address or name of remote host []? 192.168.1.1
Source filename []? failure1
Destination filename [running-config]?

Accessing tftp://192.168.1.1/failure1...Translating "192.168.1.1"...
*Error opening tftp://192.168.1.1/failure1 (Cannot resolve domain
name)
Router#copy tftp: running-config
Address or name of remote host []? 192.168.1.2
Source filename []? failure1
Destination filename [running-config]?

Accessing tftp://192.168.1.2/failure1...
Loading failure1 from 192.168.1.2: !
[OK - 616 bytes]

616 bytes copied in 3 secs (208 bytes/sec)
ntrouter#
SYS-5-CONFIG_I: Configured from console by console
```

Crossed out



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EXPERIMENT 9

Aim: To understand various Network topologies using wired & wireless.

Software used: Cisco packet Tracer

Theory:

1. Bus : Nodes are directly connected to a common half Duplex link called a bus where a host on bus network is station.
2. Star : Implements spoke-hub distribution paradigm. Every host is connected to a central hub. One central hub acts as a conduit to transmit messages in its simplest form.
3. Ring : Here each node is connected to exactly two other nodes, forming a single continuous pathway for signals, through each node.
4. Mesh : A local network topology where infrastructure nodes connect dynamically & non-hierarchically to as many other nodes as possible

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5. Treel: Here a Tree structure in which all computers are connected like branches which are connected like branches which are connected with a tree. It is a combination of bus & other network topology.

6. Hybrid: combines two or more technologies in a way that the resulting network does not exhibit any of the Standard topologies.

Procedure :

- ① select switches from Network devices for respective topology & hub in case of bus or star topology.
- ② Select end devices & align them with respect to The hub or switch.
- ③ Select connections & connect the devices between devices in suitable connections.
- ④ click on one of The PCs, go to the desktop tab in dialogue box, click on IP Configuration & enter IP address. Repeat for others as well.
- ⑤ click on one of The PCs, go to desktop tab then open command prompt & ping another PC to check if Network is Ready using The command ping.

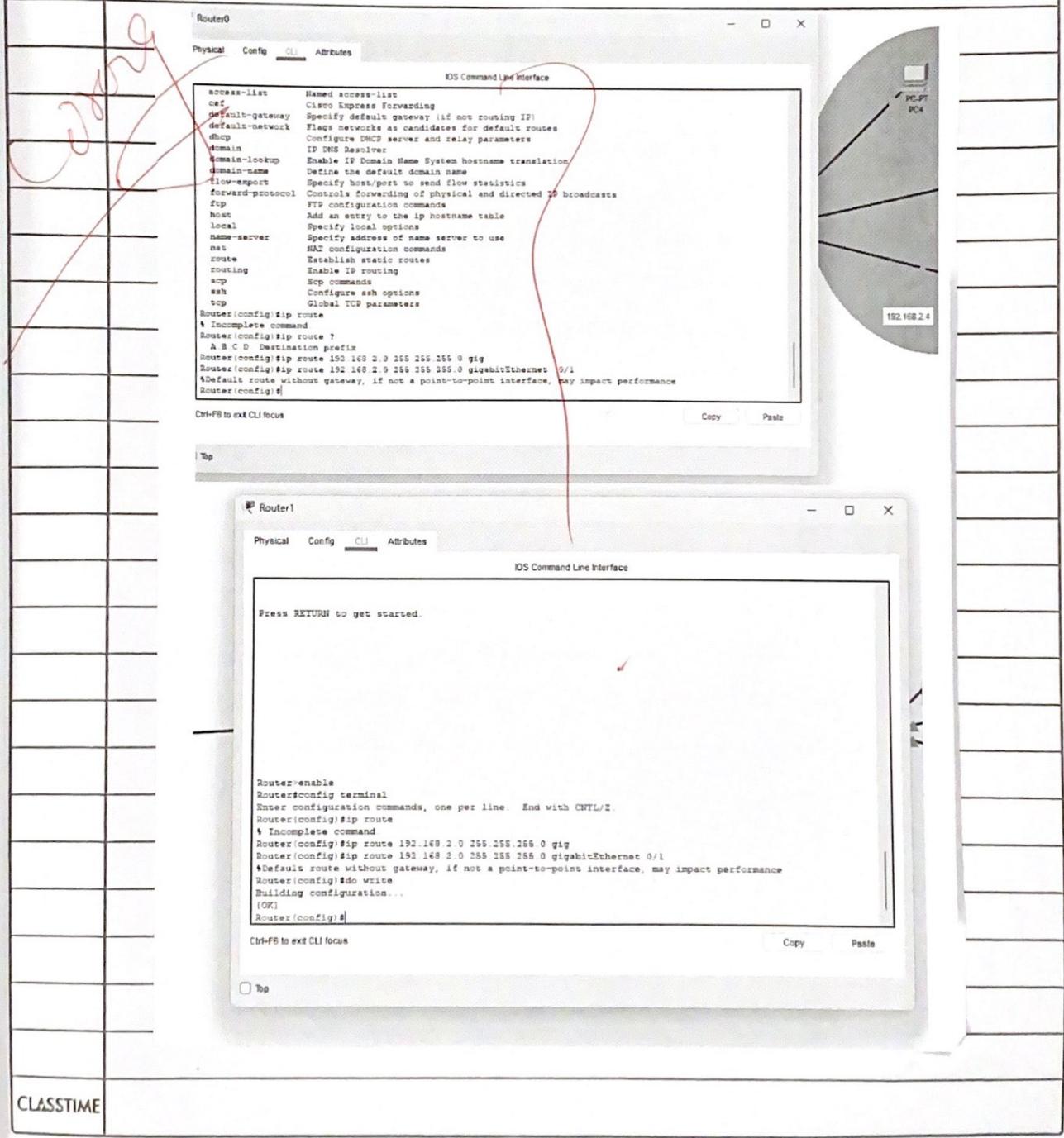
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Result: We have successfully created various network topologies using wired & wireless Networks.



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Experiment 10.

Aim: To study Routing protocols

Software used: Cisco packet tracer.

Theory:

Routing protocols are mechanism by which Routing Information is exchanged between Routers so that Routing Decisions can be made.

It specifies how routers communicate with each other to distribute information then enables them to select paths between nodes on a computer network.

A Subnet is a network inside of another network which makes a network efficient.

Fixed/Static Routing is a network routing method where paths for transmitting data are pre-determined and do not change.

Procedure:-

① Create a network with 3 PCs & a switch and create another Network with same configuration.

② Create a network consisting of 3 Routers

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where 2 Routers are connected to each of the 2 networks before and 3rd Router connects the other 2 routers.

Now configure routers of PCs IP configurations based on network addresses.

Create a static route from 1st student subnet to 2nd Subnet using ip route command in Router CLT.

Now send a ping From 1st subnet to 2nd Subnet PC to verify connection and routing.

Now add another Router to configuration to create an alternative routing in case if original Router fails with network address. Now turn off the Router on original route & ping from PC to verify alternate routing is working.

Conclusion: We have successfully studied Routing Protocols.

End

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Experiment-11

: TO create college server n/w

: cisco Packet Transfer.

:

- ① In this system we have to design a college server network for better use by providing effective learning & information sharing process.
- ② We also provide a network security in system for preventing unauthorised access to information.
- ③ The system uses network devices like switches, access points, servers & end devices like smartphones.
- ④ College server networks are complex & careful planning and implementation to ensure that they meet needs of a student.
- ⑤ This requires a hierarchical topology design, reliable & secure network infrastructure that can support diverse needs of a college community.

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1. Form connections b/w all network & devices
2. Configure servers, PC, wireless LAN controller
3. Power on and Configure all 3 access points: Hostel, ECE & CSE
4. Configure DHCP leases, Smartphones & Set gateway IPv6 config to static.
5. Open web browser in PC, set up controller by entering system name "NIT DELHI" and other details
6. Confirm settings and add new WLAN's & 3 AP groups
View controller summary and "MONITOR".

: Successfully created college server network that uses both wired & wireless topology.

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Experiment 12

:- To study the dynamic routing protocol for Internet

- :- (i) to create Subnet using routers and switches along with connected Networks
- (ii) to configure routers using distance vector RIP
- (iii) to configure the switches using link state OSPF protocol

:- CISCO packet tracer

:- Routers, switches, PC's and straight cables, cross-over cables

:-

A subnet is a network in a network, subnets make networks more efficient. Through subnetting, network traffic can level a shorter difference without passing through unnecessary routers to reach its destinations.

:- Routing Information Protocol is a distance vector protocol that uses hop count as its primary metric

RIP defines how routers should share information when missing traffic among all interconnected group of local area network.

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:- OSPF is a link-state protocol that uses the shortest path first algorithm to calculate the best route for data packets.

- :- ① Create a network with 3 PC's and a switch with IP address 192.168.1.0
- ② Create another network with 3 PC's and a switch with IP address.
- ③ Create a network consisting of 3 routers.
- ④ This creates 2 subnetworks with address 10.10.10.0 and 20.20.20.0
- ⑤ Configure routers and PC's IP configuration based on their network addresses
- ⑥ Configure routers using RIP and ping from PC
- ⑦ Port all connections and reconfigure the system using OSPF protocols and ping from PC.
- ⑧ Run traceroute command both the times to observe the difference.

:- We have successfully implemented dynamic routing protocols for internet.

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Experiment 13

:- to study the functioning of IOT systems.

:- (i) to create a registration server
(ii) to create a conditioning for functioning of various IOT devices

:- usco packet tracer

:-

IOT (Internet of Things) :- The Internet of Things devices with processing utility, software and other technologies that connect and exchange data with other devices and systems over internet or other communication networks

- :-
- ① Create a wireless network using a wireless Router.
 - ② Connect a Server and tablet to the wireless Router.
 - ③ Setup the process for DNS, DHCP and IOT services and give it to a static address of 192.168.0.10
 - ④ Have the DHCP service provide dynamic address to connected devices starting from 192.168.0.11.
 - ⑤ Setup the required IOT devices like server, Motion detector, camera and

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- ⑥ In the wireless router, set SSID of IOT with 1-2.4 GHz channel.
- ⑦ In the Tablet, open router and visit 192.168.0.10 address
- ⑧ Now create a new account with user as username and password
- ⑨ Now in IOT device, select config and enter the SSID and server address, username and password and connect the router and IOT server
- ⑩ Through Tablet browser, login and view connected IOT devices and create required device conditions, like if motion detector detects something ~~then~~, switch on the siren and close the door
- ⑪ Test it by pressing alt and clicking on IOT devices.

:- we have successfully studied the functioning of IOT systems.

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