

PRACTICAL 01

Aim :- To study LAN using Star topology

Software required :- CISCO packet tracer.

Theory :-

Star Topology :-

In the star LAN topology, each station is directly connected to a common control node. Typically, each station attaches to a central node via two point-to-point links, one for transmission and one for reception. In general, there are two alternative for the operation of these central nodes to operate in a broadcast fashion.

A transmission of a frame from one station to the node is retransmitted on all of the outgoing links. In this case, the central element is referred to as a hub. Another approach is for the central node to act as frame-switching devices. An incoming frame is buffered in the node and then retransmitted on outgoing link to the destination.

n station .

Advantages of Star topology :-

- ① Easy to add new computer without disturbance.
- ② Easy to install and maintain.
- ③ Fault diagnose is easy .
- ④ One station failing doesn't break network .
- ⑤ Different cable can be used in same network with hub that can accommodate multiple type .

Disadvantage of Star topology :-

- ① If central network fails everything fails .
- ② Requires device at central point to rebroadcast as switch network traffic .
- ③ The cable cost is more since cable must be pulled from all computer to central hub .

Procedure :-

Open CISCO PACKET TRACER

Select Switch [drag and drop]

Drag & drop PC's you want to connect to
switch and connect all PC's via copper straight

hand - L cable .

Procedure to set IP address & subnet mask.

- a) Click on PC
- b) Go to Desktop tab
- c) Set IP and Subnet mask.

Select simulation tab

Send packets from one PC to another

Click on autoplay / capture to start simulation. Devices & component used are

- a. Laptop
- b. PC
- c. Switch
- d. Cables

Conclusion :- Thus, we have studied implementation of star topology using CISCO PACKET TRACER.

Aim :- To study LAN using Bus Topology

Software Requirement :- CISCO PACKET TRACER.

Theory :-

Alternatively referred to as a line topology, a bus topology is a network setup in which each computer and network device are connected to single cable or backbone. Depending on the type of network cable is used to connect them together.

If the backbone is broken, the entire segment fails. Bus topologies are relatively easy to install and don't require much cabling compared to alternate

Bus topology uses one main cable to which all nodes are directly connected. The main cable acts as a backbone for the network and one of the computer in the network typically acts as the computer server.

Advantages of Bus topology :-

- ① It works well when we have small network.
- ② Easiest way to connect computers in linear fashion.
- ③ It requires less cable length than star topology.
- ④ low cost as compared to star topology.

Disadvantages of Bus topology :-

- ① It's difficult to identify the problem when whole network goes down.
- ② Hard troubleshooting individual devices.
- ③ Not great for large networks.
- ④ Terminals are requires for both ends of main cables.
- ⑤ If a main cables is damaged, the network fails or splits into two.

Procedure :-

- ① Open CISCO PACKET TRACER
- ② Select Four Switch [Drag & Drop]
- ③ Drag and drop four PC's.
- ④ Connect each PC to one switch using copper straight through cable. [ports used are either port 1]

- ⑤ Connect each switch to adjacent switch via straight through cable.
- ⑥ Set IP address and subnet mask to each PC.
 - ⑦ Procedure to set IP address
 - a) Click on PC
 - b) Go to desktop tab
 - c) Set IP and subnet mask.
 - ⑧ Select Packet from one PC to another PC.
 - ⑨ Select Simulation tab.
 - ⑩ Click on Autoplay capture button to start simulation.

Devices & components used :-

 - a) PC's
 - b) Switches
 - c) Cables : Copper straight

Conclusion :- Thus we have studied implementation of Bus topology using

Aim :- To study LAN using Ring Topology.

Software requirement :- CISCO PACKET TRACER.

Theory :-

A Ring topology is a network configuration in which devices connect to a circular path. Each networked device is connected to two devices in a ring topology and referred to as Ring topology.

In a ring network, packets of data travel from one device to the next until they reach their destination. Most ring topologies allow packets to travel only in one direction, called a unidirectional ring network. Other permit data to move in either direction.

Advantages to Ring Topology

- ① All data flows in one direction, reducing the chance of packet collision.
- ② A network sever is not needed to connect all network connectivity between each workstation.
- ③ Data can transfer between workstations at high speed.
- ④ Additional workstation can be added without impacting performance of the network.

Disadvantage of Ring topology

- ① All data being transferred over the network must pass through each workstation on the network which can make it slower than a star topology.
- ② The entire network will be impacted if one workstation shut down.
- ③ The hardware needed to connect each workstation to the network is more expensive than Ethernet cards & hubs.

Procedure :-

- 1) Open CISCO PACKET TRACER.
- 2) Select one switch for each PC.
- 3) Connect each PC to different Switch.
- 4) Connect all switches to adjust switch.
- 5) Set IP address & Subnet mask.
- 6) Click on simulation tab.
- 7) Select Packet from one PC to another.
- 8) Click on PLAY Button to start Simulation.
- 9) Devices & components used:
 - a) Switches
 - b) PC's
 - c) Cables : UTP CAT6

Conclusion :- Thus, we must have studied implementation of Ring topology.

Aim : To study different type of transmission medium.

Theory : In data communication, transmission medium is physical layer between transmitter and receiver. Transmission medium is broadly classify into two types

- a) Guided medium
- b) Unguided medium.

a) Guided medium :- It is also referred as wired or bounded transmission media. Signal being transmitted in a one direction and confined in a narrow pathway by using physical lines.

Features :-

- High Speed

Generally several such pairs wounded together in a protective sheath. There are the most widely used transmission media. There are 2 types :-

(a) Unshielded Twisted pair (UTP) :-

This type of cable has ability to block interference and doesn't depend on physical shield for this purpose. It is used for telephonic application.

Advantages :-

- least expensive, high speed capacity.
- Easy to install.

(b) Shielded Twisted Pair (STP) :-

This type of cable consists of special jacket to block external interference. This is used in fast interference. This is used in fast data rate ethernet & voice clarity channel or telephone line.

Advantages :-

- Better performance at high speed.
- Eliminates cross talk, comparatively faster.

2] Coaxial Cable :- It has an outer plastic covering containing two parallel conductors, each having separate insulation protected cover. Coaxial cable transmit info in 2 modes base-band & broad-band mode.

Advantage :-

- High Bandwidth, better noise immunity.
- Inexpensively and easy to install.

3] Optical fiber :- It uses concept of total internal reflection. The core is surrounded by less dense glass called cladding. It is used to transmit large volume of data.

Advantage :-

- Large bandwidth, less attenuation
- More to electromagnetic interference.

These are 3 major types :-

① Radiowaves :- They are easy to generate & can penetrate through building . Sending and received antennas need not be aligned frequency \Rightarrow 3KHz - 1GHz

② Microwave :- It is a line of sight transmission i.e. sending and receiving antennas need to aligned frequency \Rightarrow 1GHz - 300 GHz .

③ Infrared :- They are used short distance communication . They can't penetrate obstacle frequency \Rightarrow 300 GHz - 4THz

Conclusion :- In this way we have studied different mode of transmission .

Aim : To study various modulation technique and simulate.

Theory :- Modulation is a technique in which carrier signal varied with respect to message signal. Modulation technique is used to change signal character basically.

Modulation is two types :-

- ① Analog Modulation
- ② Digital Modulation

1] Analog Modulation :- In analog modulation, analog signal is used as carrier signal to modulate signal or data. The generated sine wave in which parameters can be altered to get modulation.

- Amplitude modulation.
- Frequency modulation.

(a) Amplitude Modulation :- In this, amplitude of carrier signal is varied with message signal & other factor remain same.

⑤ Frequency Modulation :- In this, type of modulation, frequency of carrier signal varies in accordance with message

Signal :- Other factor remain constant.

② Phase Modulation :- Phase of carrier signal varies in accordance with message signal. When phase change it affects frequency modulation.

③ Digital Modulation :- for a better quality and efficient communication this is employed. The main advantage of digital modulation over analog is - code available bandwidth, less noise, immunity etc. In digital communication a message is modulated using carrier wave. The most important digital communication technique are based on keying such as Amplitude Shift Keying such as ASK, FSK and PSK.

Conclusion :- Thus, different types of modulation is studied successfully

PRACTICAL NO. 6

Aim :- To study and simulate various multiplexing techniques.

Theory :- Multiplexing is the set of techniques that allows simultaneous transmission of multiple signals across a single data link. As data and telecommunication usage increased so does traffic.

We can accommodate increasing traffic by continuing to add individual links at each time a new channel is needed. There are 3 multiplexing techniques :-

- a) Frequency division
- b) Wavelength division
- c) Time division

(a) Frequency division multiplexing :- It is a analog technique that can be applied when combination bandwidth of switch to be transmitted.

(b) Wavelength division multiplexing :- It is designed to high-data rate route rate capability of fiber optic cable

- Time division multiplexing :-
 - Synchronous time - division :
 - Statistical time - division :
- It is division digital process that allows several connection to share the high bandwidth of link. Instead of sharing position of bandwidth as form, Time is shared , in each connection occupies a portion of time in link .

Aim :- To study serial interface of RS-232.

Theory :- All IBM PCs & compatibility connected RS are typically equipped with two serial port and one parallel port. Parallel one connects PC to printer. A serial port receives data one bit at a time over one node.

RS-232 stands for Recommended Standard number 232 & is the latest version of standard. The term serial port, and therefore the serial port, and designed to be compatible with it using serial cables.

It formally describes signal connecting between a data terminal equipment (DTE) & a data circuit terminating equipment (DCE). It gives brief info about fundamentals of RS-232 communication.

25 Pin Configuration is given on next pg :-

- Pin 1 - Ground Pin .
- Pin 2 - Transmit Pin .
- Pin 3 - Receiver data Pin .
- Pin 4 - Request to send Pin .
- Pin 5 - Clear to send Pin .
- Pin 6 - Data set pin .
- Pin 7 - Common reference Pin .
- Pin 8 - Carrier detector .
- Pin 9 - DTG serial connector .
- Pin 10 - Test Pin .
- Pin 11 - Select Pin .
- Pin 12 - Data carrier detect Pin .
- Pin 13 - clear to send pin .
- Pin 14 - Data transfer .
- Pin 15 - Transistor clock Pin .
- Pin 16 - receiver data Pin .
- Pin 17 - receiver clock .
- Pin 18 - Test Pin .
- Pin 19 - Request to send Pin .
- Pin 20 - Data terminal acquired ready pin .
- Pin 21 - Signal quality detector pin .
- Pin 22 - ring detector .
- Pin 23 - data signal rate detector .
- Pin 24 - external clock pin .

Applicable advantages :-

- Applicable for long distance
- low cost interface

Disadvantage :-

- Not Suitable for chip-to-chip device communication
- lower speed for longer distance.

Conclusion :- Thus, serial interface using RS - 232 studied successfully.

Aim :- To study configuration of Modem.

Theory :- Modem :

It stands for modulator and demodulator. Modulator convert info into digital code to analog code at transmitting end. A demodulator converts the same analog to digital at receiver receiving same analog to digital at receiver end. The process of converting analog signal of analog signal of another PC network so that they can be processed by a digital pc is referred to as digitalize.

When analog facility is used for two digital terminal equipment (DTE) modems are used at each other.

DTE can be terminal or PC modems are used for data transfer from one computer to another computer, network works in digital mode while analog technology is used for carrying message across phone line.

Step 3 Click on Setup tab at top
Click on connection on left.

Step 4 Configure your connection type,
Name, encapsulation, username
password, keep alive, Max fail, MTU,
MTU, Setup Route, PCR, SCR.

1 More useful in connecting LAN with the internet.

2 Speed is relatively speed.

3 Not expensive.

4 High transmission speed.

Disadvantage of Modem :-

1 Data transfer The only disadvantage of modem is that its not portable.

Conclusion :- Thus in this way we have studied modem.

Aim :- To study configuration of switch.

Software requirement :- CISCO PACKET TRACER

Theory :-

A network switch (also called as switching hub, bridging hub, officially MAC bridge) is a computer networking device that connects devices on a computer network by using packet switching to receive, process, and forward data to the destination device.

A network switch is multi port network bridge that uses hardware addresses to process and forward data at the data link layer (layer 2) of the OSI model. Some switches can also process data at the network layer (layer 3) by addition incorporating routing functionality. Such switches are commonly known as Layer-3 switches or multilayer switches.

Procedure in network devices

1) first go to Switch and select a switch you want to configure then left click & go to CLI, press enter.

- 2) Type "enable" in configure terminal
- 3) iii) Postname S1
- 4) iv) enable password : qweerty
- 5) v) service password-easyoption
- 6) vi) enable secret class
- 7) vii) banner motd "Warning authorize person only!"
- 8) xviii) Line console 0 [config → config-line]
- 9) ix) password qweerty x) login xi) exit [goes to config]
- 10) xxii) line vty 0 4 xiii) password cisco
- 11) xv) login xv) exit
- 12) xvii) interface vlan 1 x viii) ip add
- 13) xviii) ip address 192.168.0.1 255.255.0
- 14) xix) no shutdown (To open the ports)
- 15) xx) exit xxii) exit

Note: line vty 0 4 is for 5 ports, you can also use 0 15 for 16 ports, Now 5 other devices would use switch. After that password is for those devices. @xvi) to assign ip to the switch as well.

Conclusion :- Thus we have studied the configuration of switch in Cisco PACKET TRACER.

Software required :- Cisco Packet Tracer

Theory :- Wireless network is becoming more and more important in today's era. Then it is an essential part of communication involves transmission of info over a distance without the help of wire.

Features

- Transmission distance can be adjusted.
- Wireless communication can be used for cellular telephony, wireless access to internet, wireless house networks.

Procedure :-

- ① Drag and drop 2 PC's and one router
- ② Click on PC and remove LAN port and instead put wireless port.
- ③ Do this process for both PC.

- ④ Now click on router and in it configure wireless operation.
- ⑤ Do wireless setting by enabling IEEE.
- ⑥ Then click on GUI and set network name and save this setting.
- ⑦ Click on each laptop and Select desktop and in it select wireless PC.
- ⑧ Connect given network and enter key and connect.
- ⑨ Select command prompt and ping.
- ⑩ Hence we have set wireless network.

Conclusion :- This wireless network has been set & simulated success fully and also studied.

PRACTICAL NO. 11

Aim :- To study configuration of router.

Software required :- Cisco Packet Tracer

Theory :- A router is a networking device that forwards data packets between computer networks. Router performs the traffic directing function on the Internet.

The steps to configure a router are as follows :-

- ① Router > enable
⇒ Enter privilege mode
- ② Router > config
⇒ visits config mode .
- ③ Router > ip dhcp pool grace
⇒ assigning the address name to pool network.
- ④ Router > network 192.168.1.1
 255.255.255.0
⇒ Specifies subnet network address and mask of DHCP pool.

- ⑥ Router > dns Server 8.8.8.8
⇒ It is a computer server that contains a database of public IP address and their associated host-name & in most of cases server to resolve or translate those names to IP network as required.
- ⑦ Router > exit
⇒ It exit from current pool of server.
- ⑧ Router > ip dhcp excluded-address
192.168.1.2 192.168.1.20
⇒ Specifies the IP address or ranges of IP address not to be assigned by DHCP server clients
- ⑨ Router > interface for o/o
⇒ Enter configuration mode for fast connect interface on router

⑩ Router > IP address 192.168.1.21
⇒ Sets the ip address and subnet mask for specified fast ethernet.

⑪ Router > no shutdown
⇒ Enables the ethernet interface changing its state from administratively down to administratively up.

⑫ Router > exit
⇒ Exits router configuration mode enters privileged exit mode.

⑬ Router > show ip dhcp binding
⇒ Displays list of all binding created.

Conclusion :- Thus we have studied the configuration of Router.

