

Computer Network

Work



Date ___/___/___

Def * What is network?

A network is an interconnected collection of autonomous computers. ^{stand alone}
Two computers are said to be interconnected if they are capable of exchanging information or messages.

The exchange of information of msg is controlled by communication protocol (TCP/IP)

* Need of networking

1) Resource sharing

2) Reliability:

3) Cost factor:

* Node → uti comp network se jodhi karne wala hai

Node/Workstation/terminal

* Server → Control & coordinate karta hai aur data ko store karta hai
→ data transfer karta hai

* Network Interface card (NIC/NIC/TAP)

→ A Network Interface unit is an interpreter that helps to establish communication b/w server & workstation. Without this interface workstation will not be able to share its resources with other workstations.

MAC address → 6 byte, colon-separated, both letter & number

IP

" → 4 byte, period-separated, only number

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The NIC manufacturer assign a unique physical address to each NIC card. This physical address is called MAC address.
(media access control)

- MAC address is 6 byte code, each byte separated by colon
- (physical chip ~~at~~ motherboard ~~in~~)

* IP

comp distributed in a

All networks follow a set of rules for communication (TCP/IP)
(Transmission control protocol / Internet protocol)

~~comp~~

Every comp on a TCP/IP network has a unique identifying network called IP address. Each IP address is a series of containing 4 numbers, separated by dots

* Types of comp network

~~Personal Area Network~~

Based on geographical spread (area). There are 4 categories of network

- ① Pan → a small network consisting of laptop, cell phone, ~~bt~~ ~~bluetooth~~ bt speaker etc.

→ Personal Area Network

- ② LAN → A computer network confined to a Relatively small area like school building

→ local area network



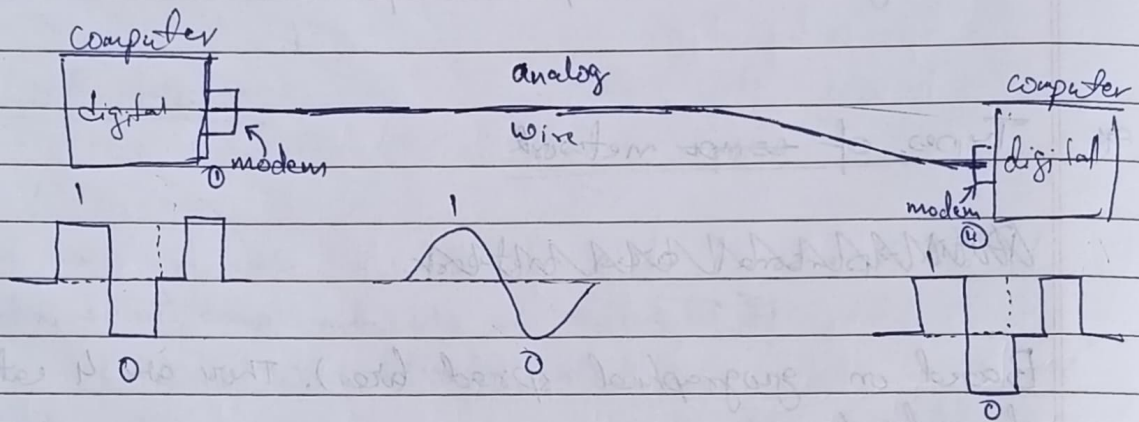
⑩ ↳ Man → Ln extended over a whole city.
→ ~~Metropolit~~ Metropolitan Area Network

⑪ ↳ WAN → Man extended over large geographical area like country, subcontinent
→ www; internet
→ Wide area network

⊕ Network devices

(hardware)

① Modem → MO: modulation, dem: demodulation



① → digital data in analog is convert into (modulate)

② → analog data in digital is convert into (demodulate)

def →

A modem is a device used to provide internet connectivity through telephone line. modem work through a process known as modulation & demodulation. Normally telephone line are incapable of carrying digital data. we need to convert digital data into analog data. It is what modem does.



The process of converting digital data into analog signal is known as modulation.

When the modulated data reach its destination, the modem convert analog data back into digital form known as demodulation.

② HUB

def

A hub is a hardware device that is used to connect several computer together in a network.

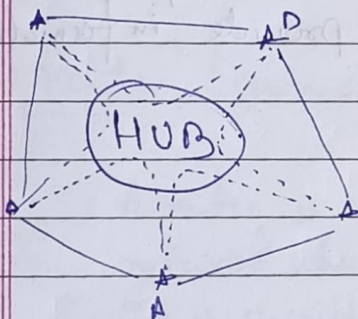
Two types

active Hub

- larger area
- amplify the network as it move from one connected device to another

Passive hub

- small area में लिखें
- does not amplify the signal
- allow the signal to move from one device to another without making any changes



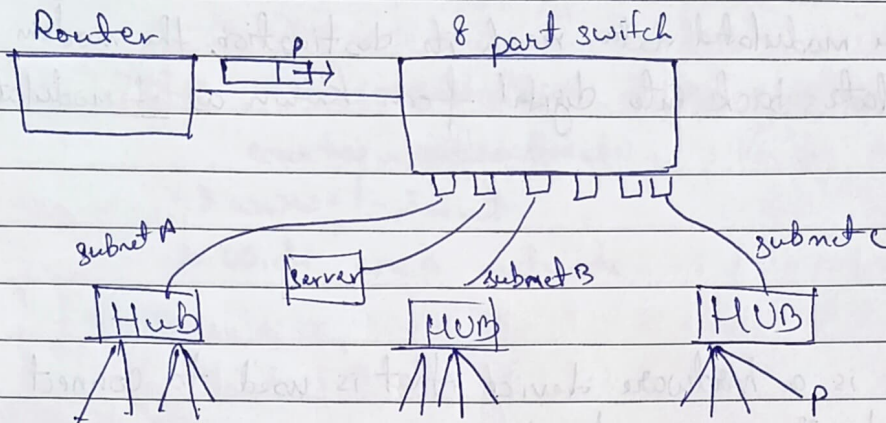
— connection
--- data transfer

अगर A से D में कुछ भेजना है तो सब में भेज के रखे करेगा, लेकिन deliver सिर्फ ~~सिर्फ~~ सिर्फ D को करेगा।

mecon cell द्वारा eg



Router' 3 Switch



data जो P में जाता है, switch देखकर subnet 'C' में भेज देता।

यस Hub होगा जो सब से भेज के तो करता

* Q) Why switch is called intelligent device

→ A switch is a hardware device that is used to connect different segment of network.

[Segmenting a network help to reduce traffic.]

switch (I) create connection dynamically & provide information only to the requested port

Router → IP address check करता | अलग अलग # protocol handle करे सके (LAN, WAN)

[Bridge] → MAC address check करता | एक ही protocol handle करे # ~~सकता~~

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(4) Repeater

def A network device that amplify a signal being transmitted on the network.

Used in long network line

Generally the transmitted data travel a limited distance over a network after which quality of its signal start to degrade. If the signal degrade too much, they fail to reach their destination. Therefore repeater are installed.

Not imp

types

→ Signal repeater → Only amplify the signal & filter out the noise signal. Therefore, only clear signal receive at the end

amp
→ amplifier repeater → amplify ~~data~~ signal including noise

*** ⑤ Router (gateway के अंदर आता)

def A router is a network device that connect multiple network which may or may not be same protocol. It is possible because a router is capable of handling different protocols

A router forward the data packets from one connecting device to another depending upon their IP address (not MAC address)

→ sist check करता & path blake



* 6) Gateway → जिससे ~~अन्य~~ IP से जाने के लिए जाता

* A network device that connect dissimilar network. It can be considered as a node on a network that serve as an entrance to an another external network

Does 4 tasks

- Proxy server
- Firewall
- router
- switch

In an organisation, the gateway node act as a proxy server (act as a server, जिससे server जाता है) and as a firewall (a system design to prevent unauthorised access)

The gateway is also associated with router & switch which provide the actual path ~~for~~ the data packets in & out of the gateway



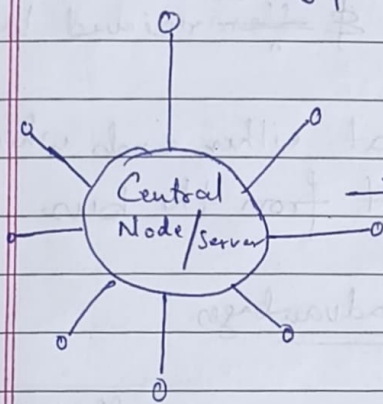
Network Topologies

def → Star topology: Pattern or layout in which computers are connected to each other on a network is known as Topology.

→ Things to keep in mind / factors to set up a network

- (i) Cost
- (ii) Flexibility
- (iii) Reliability

(i) Star Topology: Star topology consist of a central Node to which all other nodes are connected by a single path.



→ Advantages

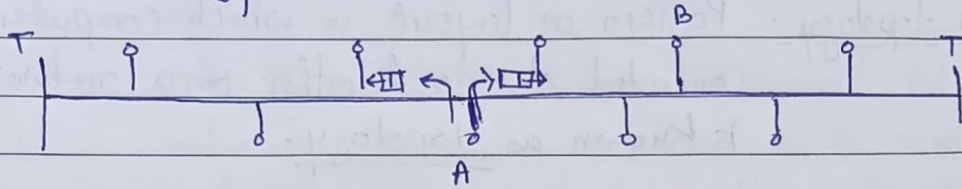
- Network management is easy.
 - ↳ plug in plug out
- Centralised control

→ Disadvantages

- Difficult to expand
- Long cable length
- ★ → If central Node fail, whole network fails



* (ii) Bus Topology: $A \rightarrow B$ ~~सारा को check करेगा, match करेगा~~
तो send करेगा



→ अगर कोई packet नहीं पहुँचा, तो destination due time तक wait करेगा फिर error देगा। तब नया copy भेजा जाएगा उस packet की।

→ Consist of single length of transmission medium on which various nodes are attached.

→ The transmission from A station travel the length of the bus in both direction & ^{can be} ~~then~~ received by all other stations.

→ The bus has 'Terminators' at either ends which absorb the signal removing it from the bus.

→ Advantages

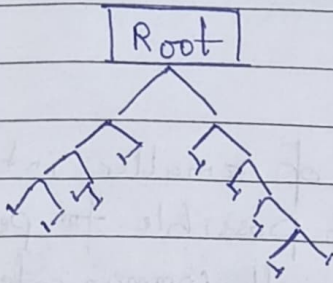
- Easy to expand
- Short cable length
- Simple wiring layout

→ Disadvantages

- fault Diagnosis is difficult
- fault isolation is difficult



⑫ Tree topology: → scalar chain ~~is~~ ~~other~~ with ~~it~~ /



~~Tree~~ → a variation of BUS Topology

→ In the tree ~~po~~ topology, the ~~spa~~ shape of the network takes the form of inverted tree. The central root ~~#~~ has branches & sub ~~the~~ branches run to the extreme end of the network

→ Advantages

↳ Uses point to point wiring for individual segment

Disadvantage

↳ Difficult to configure ~~than~~ & wire as compared to other topology

⑬ Mesh Topology: → long distance communication ~~it~~ use ~~etc~~

→ Ideal for long distance networking.

★ → It provide an alternative path for communication when host (local server) is too busy & or down

→ Advantages

↳ fault diagnosis is easy

Disadv

↳ cabling cost is more

