CH 1:-

INTRODUCTION TO NETWORKING

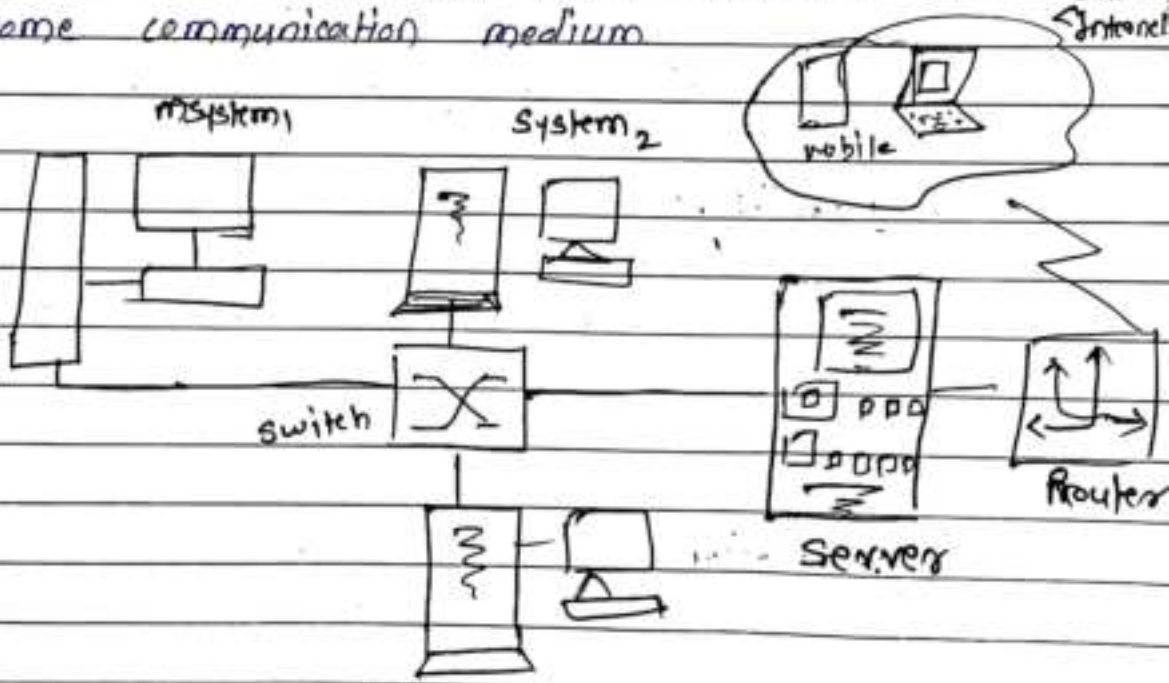
* Introduction

Network :- It is a group of systems or people that are connected together to complete some (task) work via some medium

Eg Railway Lines
Nervous System
Tele-Phone Ntw etc.

Computer Network :-

A computer network is a system in which multiple computers are connected to each other to share information and resources via some communication medium



Computer Network

Goals of Computer Network:

1) **Resource Sharing :-**
In a computer nlw we can share resources like printers, scanners, softwares. It saves cost of having more resources. Eg In an office instead of having 10 different printer for 10 different users using nlw single printer can be shared between 10 users.

2) **High Reliability :-**
Nlw should always be reliable. If we have nlw established in office and even if any one particular system fails we can access files or data using nlw.

3) **Security :-**
Nlw gives us important feature of security. It protects our data from unauthorized access. eg firewalls, antivirus

4) **Scalability :-**
Computer nlw must be designed to scale up or down as per requirements. It means if number of users increase, it should be easy to add or remove any user from nlw.

5) **Communication :-** Users can communicate with each other irrespective of their location.

Components of Computer Nlw

We have 3 major components of computer n/w. They are as follows:

1) Nodes :-

Node is an entity or machine which is participating in communication. Or in another words we can say that its system connected with another system via communication medium. There are two types of nodes

a) End Nodes :- These are computers, mobile, web camera, desktops machines, laptops, Printers etc.

b) Intermediary Nodes :- They are also known as n/w hardwares 'devices'. These nodes helps in establishing n/w. Eg Hubs, switches, Bridges etc.

2) Medium / Media :-

for n/w designing media is very important. It is physical path through which data is transmitted between (users) a sender and receiver.

There are two types of medium

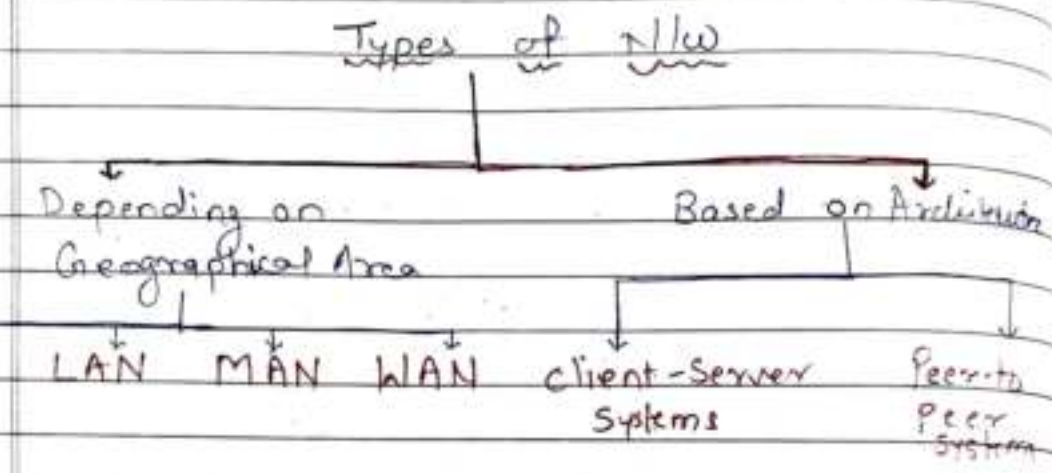
a) Guided Medium :- Also known as Wired medium. In this we make use of cables to connect two users. Data is transmitted using cables such as Co-axial, fiber Optics.

b) Un-Guided Medium :- Also known as Wireless medium. Data is transmitted using radio waves, Infra-red waves etc. In this we Sender and receivers use Bluethooth, wifi technologies.

3) Services :-

Computer network provides us many services such as email, voice over call, video telephony, Instant messaging, file sharing, storage, online gaming etc.

Types of Network :-

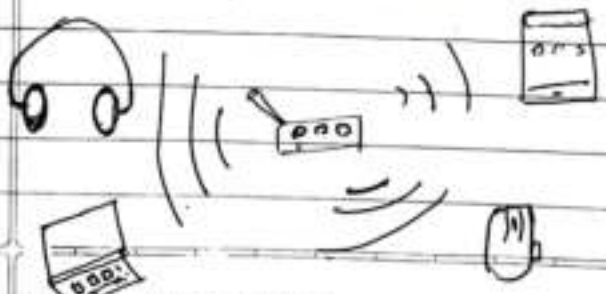


Based on Geegraphical Area covered by nlw we have following 4 types of nlw.

1) Personal Area Network (PAN) :-

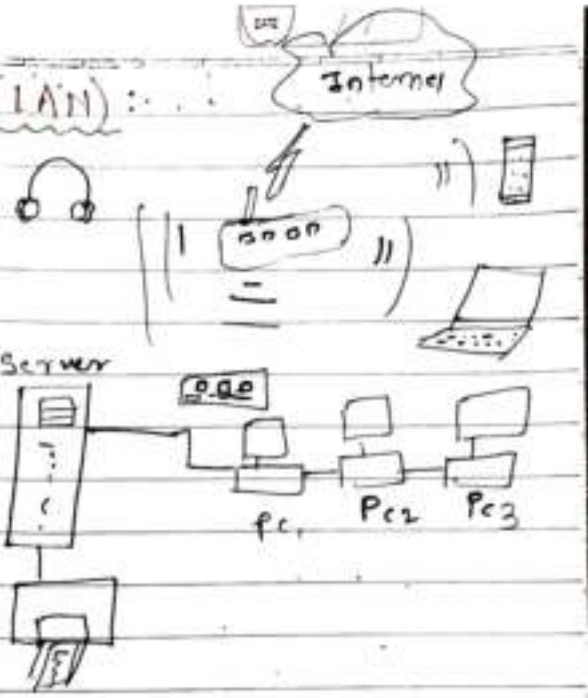
⇒ It is very small type of nlw. Area covered in this type of nlw is approx 10 meters

⇒ This nlw are created at personal home nlw or small office. we can connect phone, Laptop, Speaker, bluetooth mouse with wifi.



we can create PAN using wifi or USB cables

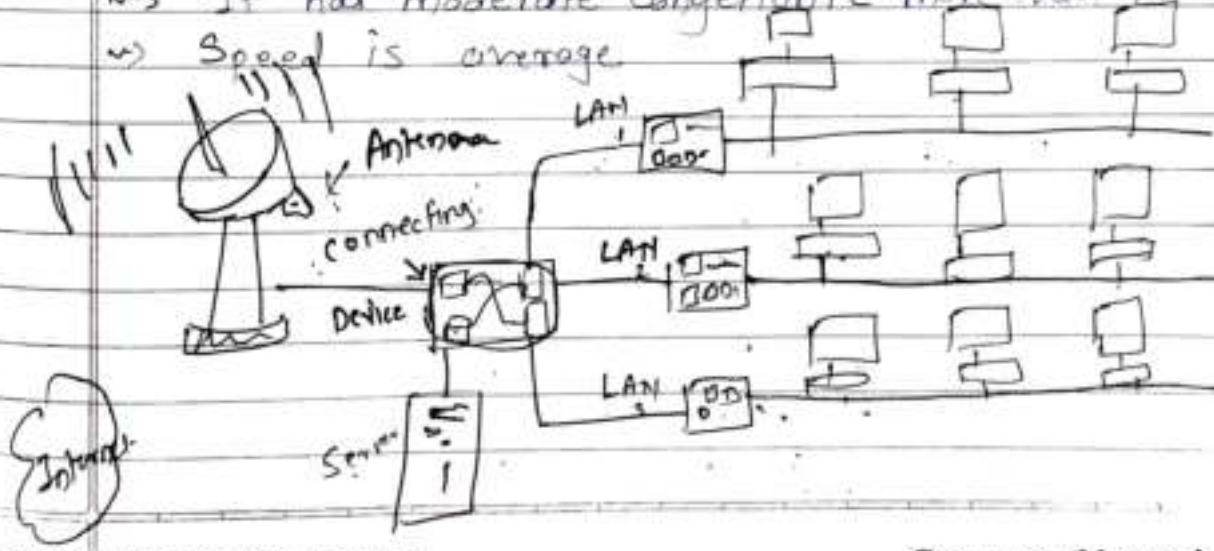
2) Local Area Network (LAN):



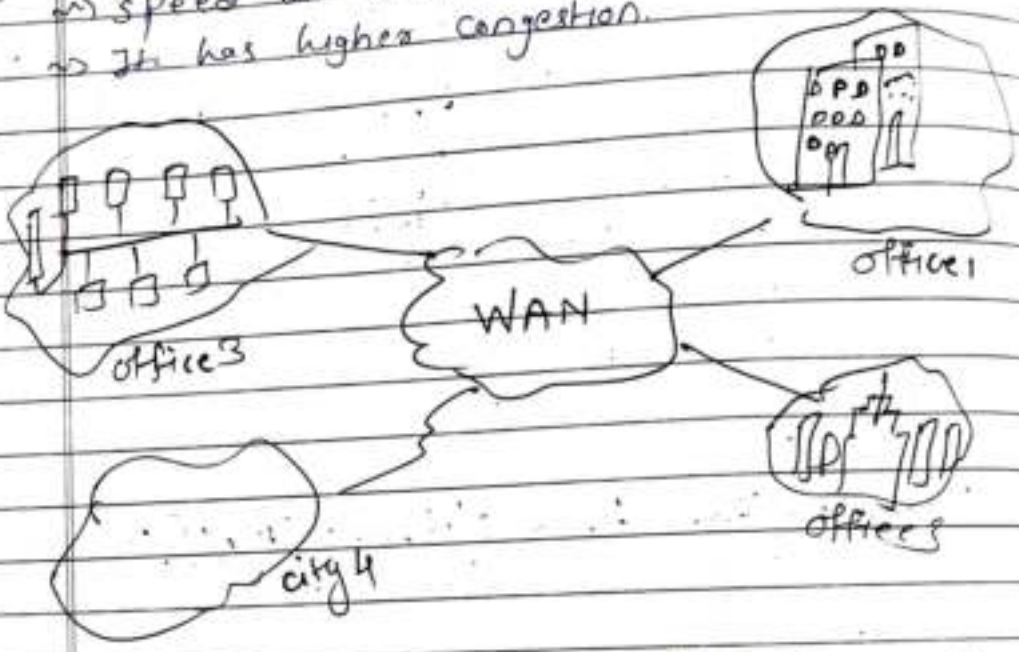
- A LAN is privately owned nlw that operate within and nearby a single building like home, office, or factory
- The speed of LAN is quiet high
- It has low congestion
- The range of LAN's is more than PAN few It can cover distance of few kilometers
- LAN's can be used to connect two PAN's
- They can be designed using cables or wifi technology

3) Metropolitan Area Network (MAN):-

- MAN networks are formed by connecting multiple LAN's.
- Thus range of MAN's is wide & it can cover distance upto campus or city
- Cable TV nlw is best example of MAN.
- It has moderate congestion more than LAN
- Speed is average

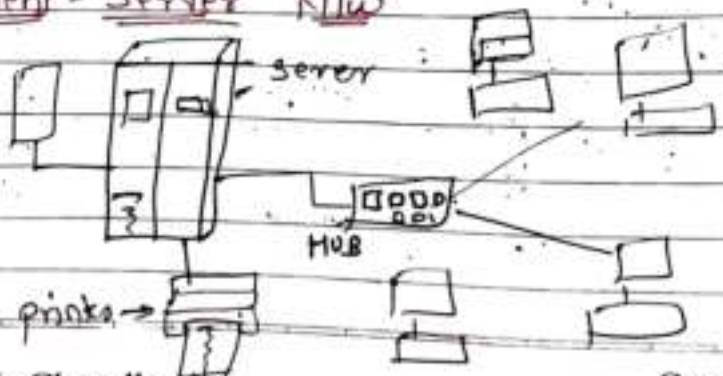


4) Wide Area Network (WAN) :-
→ It covers very large geographical are such as a region, a country, a continent.
→ The best example of WAN is Internet.
→ WAN's can be public, leased or privately owned networks.
→ speed of WAN's is slower than LAN & MAN.
→ It has higher congestion.



Based on Architecture OR Role played by node we have two categories of Nlw :-
1) client Server Nlw
2) Peer - to - Peer Nlw

Client - Server Nlw



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client Server architecture is a type of computer network where clients request and server serves it.

In this client machine request services resources, files etc & server grants permission clients receives services & files from centralized server over local or internet connection.

This model works in 3 basic steps

1) clients connects to network using medium
2) client sends a request to server in order to submit, retrive modify data located on server.
3) The server processes each client request

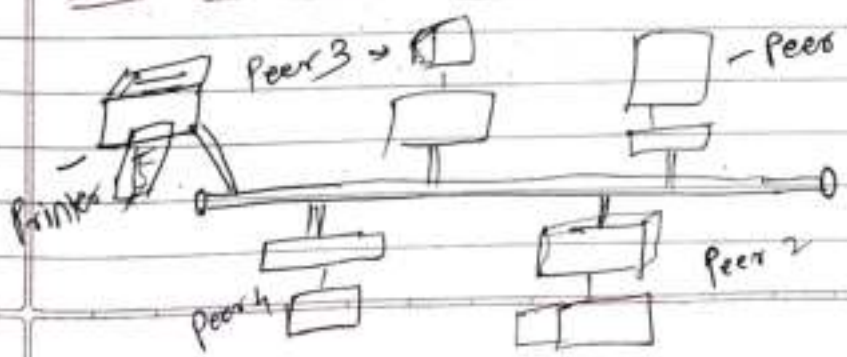
Pros

- Centralized mgmt
- Security
- Using this we can have scalability with respect to b/w
- This type is suitable for small & large n/w.

Cons

- Costly than P2P n/w
- Server failure cause entire n/w to go down
- Servers can get overloaded

Peer to Peer N/w



In peer to peer nlw, each node in nlw acts as a server as well as client. These nodes are called as Peer.
There are no dedicated server required to provide diff services to clients
Each node is capable of requesting services and they can also provide services to another node

Pros
- This nlw is easy to implement
- saves cost as no ~~extra~~ extra h/w & s/w needed.
- Useful for small nlws.
- If any any peer fails doesn't effect the entire nlw

Cons.
- No Central authority to control entire nlw
- Security is big issue.

HARDWARE COMPONENTS

1) **HUB** :- It is connecting device. It is also known as multipoint repeater. It is used in Star topology. Hub works in broadcasting technique. Data received on a port is broadcasted to all ports.
It works in physical layer of OSI model