MODULE-1: Introduction to Networking

VIT | Vidyalankar Institute of Technology

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Module 1 Introduction to Networking

COMPUTER NETWORK

Definition

A computer network is a group of computer systems and other computing hardware devices that are linked together through communication channels to facilitate communication and resource-sharing among a wide range of users.

Fig: Computer Network

TYPES OF COMPUTER NETWORK

A **computer network** is mainly of **four types**:

- LAN(Local Area Network)
- PAN(Personal Area Network)
- MAN(Metropolitan Area Network)
- WAN(Wide Area Network)

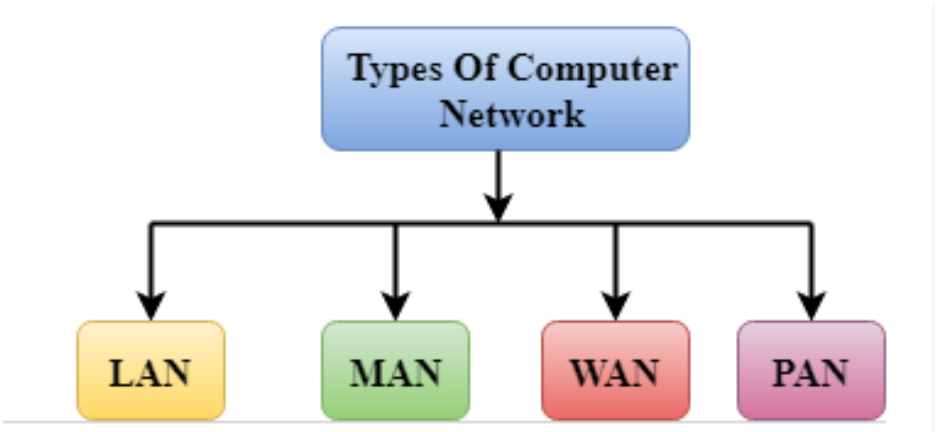


Figure: Types of Network

LAN(Local Area Network)

- Local Area Network is a group of computers connected to each other in a small area such as building, office.
- LAN is used for connecting two or more personal computers through a communication medium such as twisted pair, coaxial cable, etc.
- It is less costly as it is built with inexpensive hardware such as hubs, network adapters, and ethernet cables.
- The data is transferred at an extremely faster rate in Local Area Network.
- Local Area Network provides higher security.

Figure: LAN

MAN(Metropolitan Area Network)

- A metropolitan area network is a network that covers a larger geographic area by interconnecting a different LAN to form a larger network.
- Government agencies use MAN to connect to the citizens and private industries.
- In MAN, various LANs are connected to each other through a telephone exchange line.

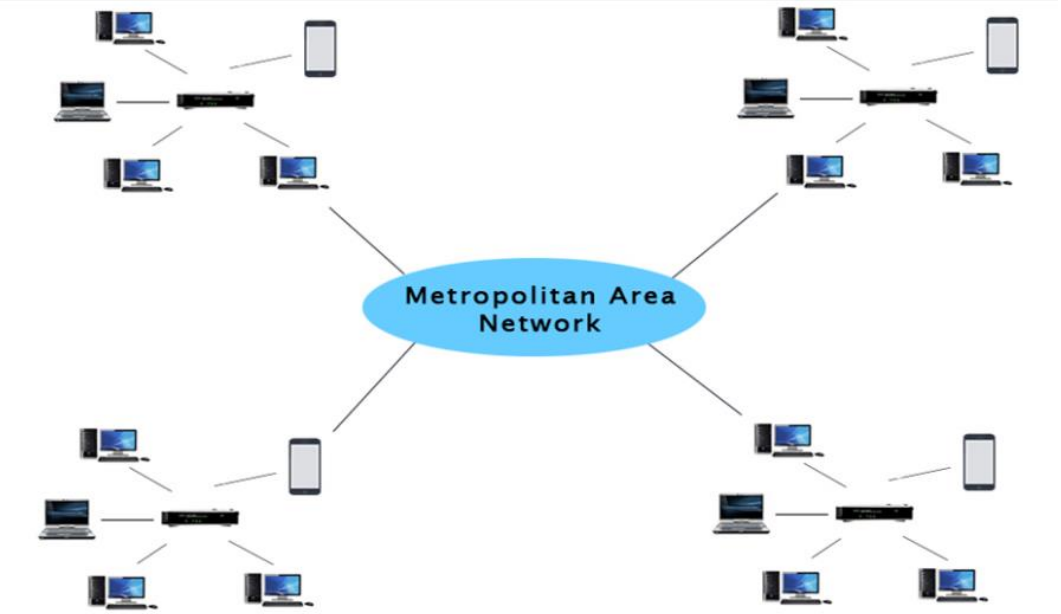


Figure: MAN

WAN(Wide Area Network)

- A Wide Area Network is a network that extends over a large geographical area such as states or countries.
- A Wide Area Network is quite bigger network than the LAN.
- A Wide Area Network is not limited to a single location, but it spans over a large geographical area through a telephone line, fibre optic cable or satellite links.
- The internet is one of the biggest WAN in the world.

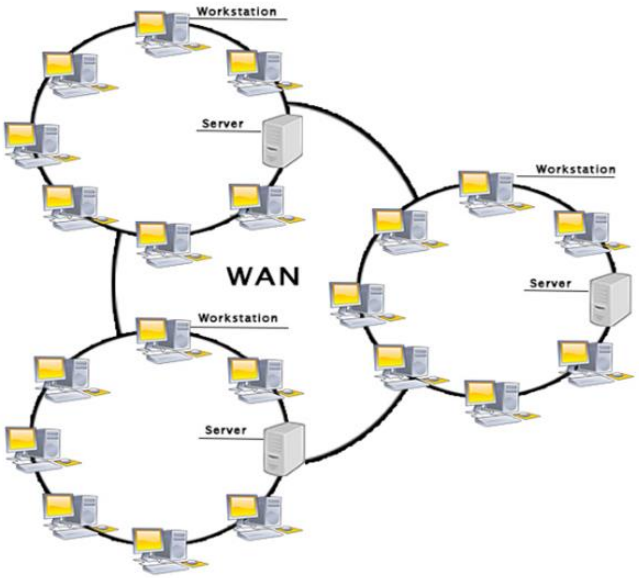


Figure: WAN

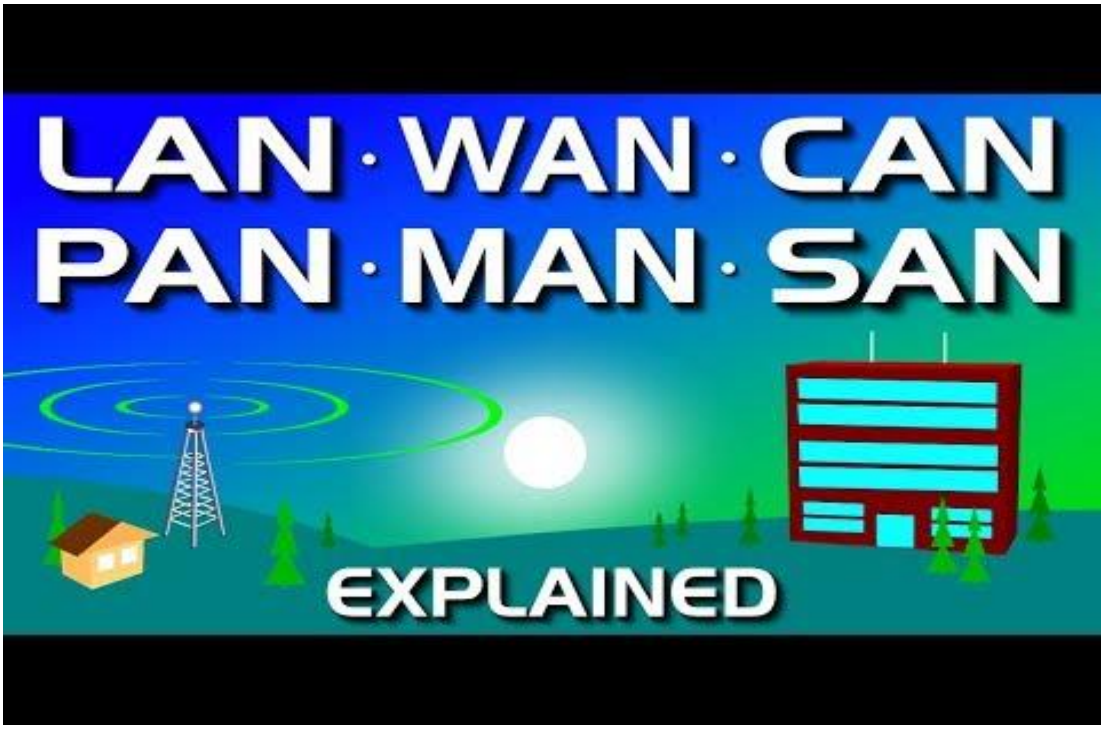
PAN(Personal Area Network)

- Personal Area Network is a network arranged within an individual person, typically within a range of 10 meters.
- Personal Area Network is used for connecting the computer devices of personal use is known as Personal Area Network.
- **Thomas Zimmerman** was the first research scientist to bring the idea of the Personal Area Network.
- Personal Area Network covers an area of **30 feet**.
- Personal computer devices that are used to develop the personal area network are the laptop, mobile phones, media player and play stations.

Figure: PAN

Videos

Network Types: LAN, WAN, PAN, CAN, MAN, SAN, WLAN



Comparison:

Parameter	LAN	WAN	MAN
1. Ownership of network	Private	Private or public	Private or public
2. Area covered	Small	Very large (states or countries)	Moderate (City)
3. Design and maintenance	Easy	Not Easy	Not Easy
4. Communication medium	Coaxial cable	PSTN or Satellite links	Coaxial cables, PSTN, Optical filer cables, wireless
5. Data rates	High	Low	Moderate
6. Mode of communication	Each station can transmit and receive	Each station cannot transmit	Each station can transmit or receive

INTERNET, INTRANET, EXTRANET

Internet: Internet is a worldwide, publicly accessible computer network interconnected computer networks (internetwork) that transmit data using the standard Internet Protocol (IP). Largest Internetwork in the world is Internet.

Intranet: An intranet is a private network that is contained within an enterprise. The main purpose of an intranet is to share company information and computing resources among employees. Intranet is a private Internetwork, which is usually created and maintained by a private organization

Extranet: An extranet can be viewed as part of a company's intranet that is extended to users outside the company like suppliers, vendors, partners, customers, or other business associates.

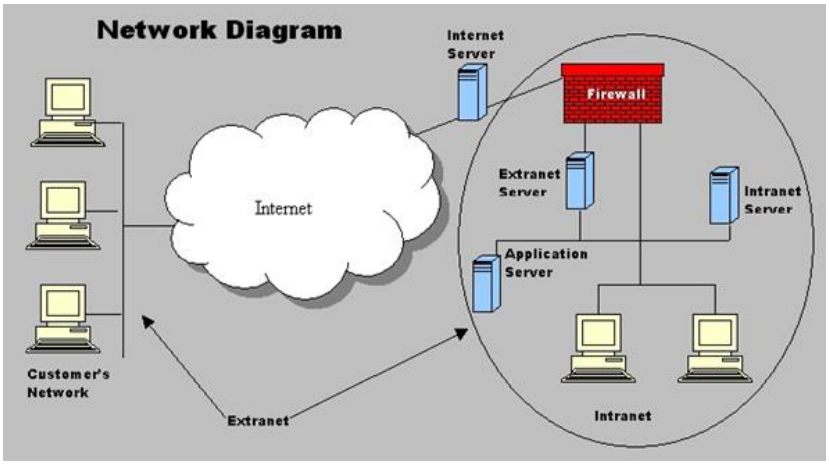
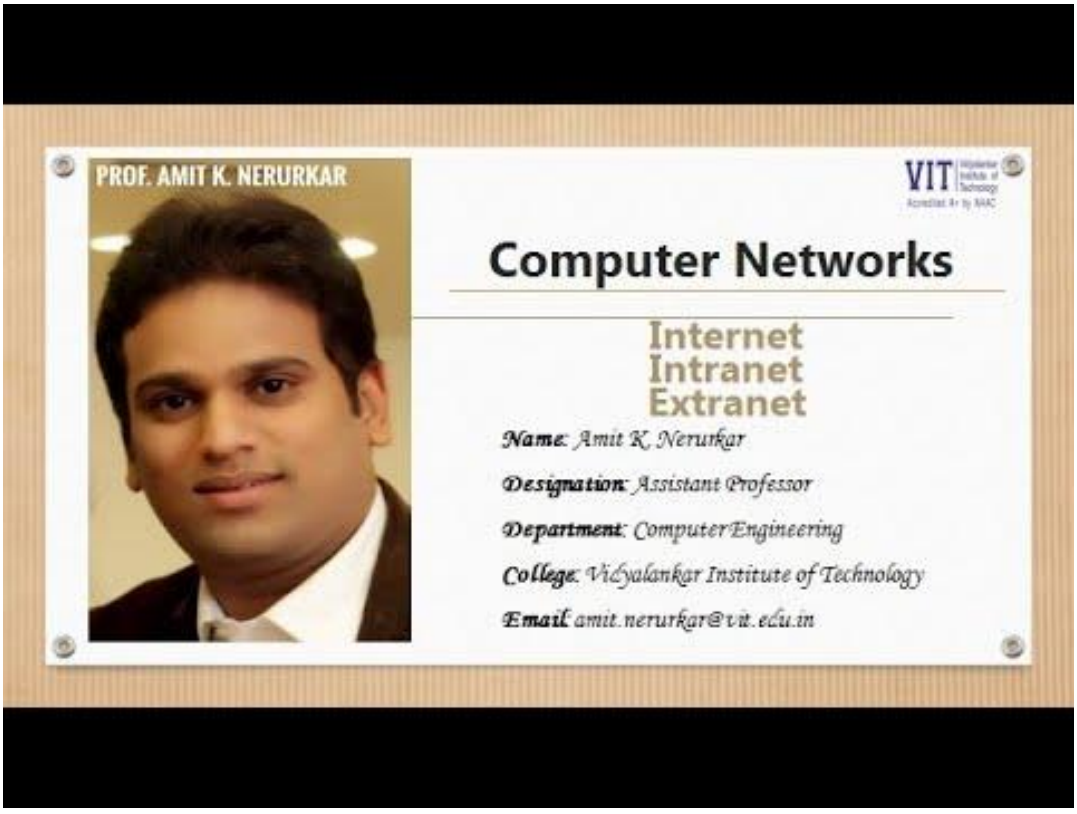


Fig: Intranet, Internet and Extranet

Videos:

Internet Intranet and Extranet by Prof. Amit K. Nerurkar (AKN)



NETWORK APPLICATIONS & GOALS

Network application:- Some of the network applications in different fields are the following.

1. Marketing and sales
2. Financial services
3. Manufacturing. CAD, CAM etc.
4. Information services
5. Cellular telephone
6. Cable television
7. Teleconferencing
8. Email

Network goals:- The main goals of network as follows.

Resource sharing:- This is the main aim of a computer network. It means to make all programs peripherals and data available to any one computer on the network to all other computers in the network without regard to the physical locations of them. Thus user at large distances can share the resources or can see data of a computer in the same way that a local user uses them. Another aspect of resource sharing is load sharing. That is if required, a job can be performed using various computers in network by portioning it which reduces time consumption and load both for a particular computer.

High reliability:- A second goal is to provide high reliability by having alternative sources of supply. For example, all files could be replicated on two or three machines, so if one of them is Unavailable, the other copies could be available.

Cost Reduction:- Another goal of networking is reduction of cost. Resource sharing automatically reduces cost and hence money can be saved.

Improve Performance:- Another closely related goal is to increase the systems performance. The performance of a computer can be improved by adding one or more processors to it as the work load on it grows. For example if the system is full instead of replacing it buy a larger one at large expansive it is better to add more processors to it on less cost and less disruption to the user.

Communication Medium:- Computer networks provide a powerful communication medium. A file that was updated/modified on a network can be seen by the other users on the network immediately.

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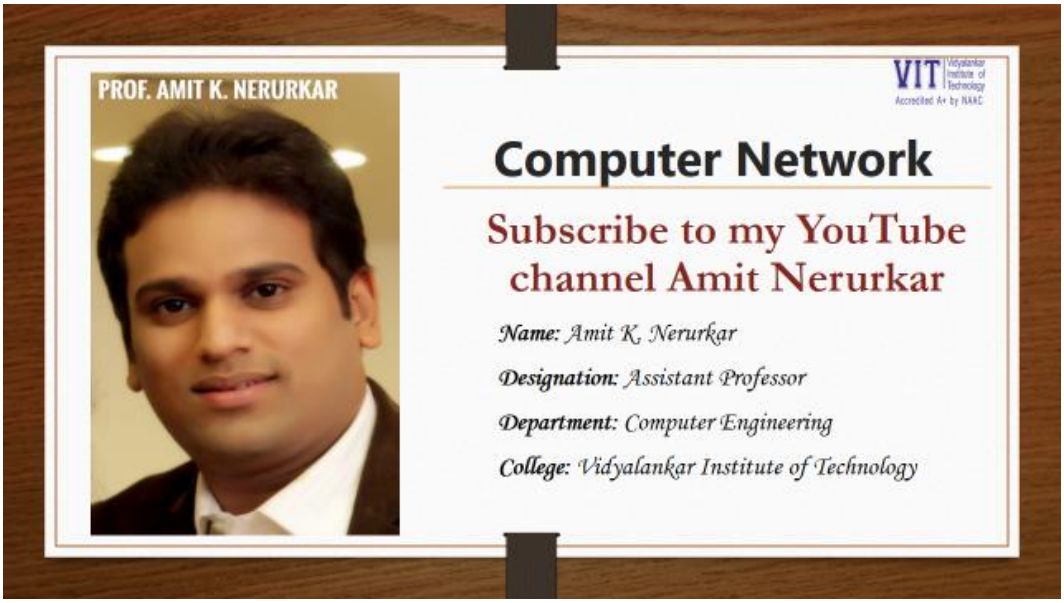

Subjects Taught by Amit K. Nerurkar

1. C programming
2. Data Structure
3. Computer Network
4. Network Security
5. Artificial Intelligence
6. Soft Computing
7. Distributed Systems
8. Internet of Things
9. Linux Administration
10. Database Management System