

CO - 2

COURSE NAME : SYSTEM DESIGN AND INTRODUCTION TO CLOUD
COURSE CODE : 23AD2103A

TOPICS : TYPES OF AREA NETWORKS – LAN, MAN AND WAN

SESSION DESCRIPTION

- Types of area networks –
- LAN,
- MAN
- WAN

NETWORK TYPES

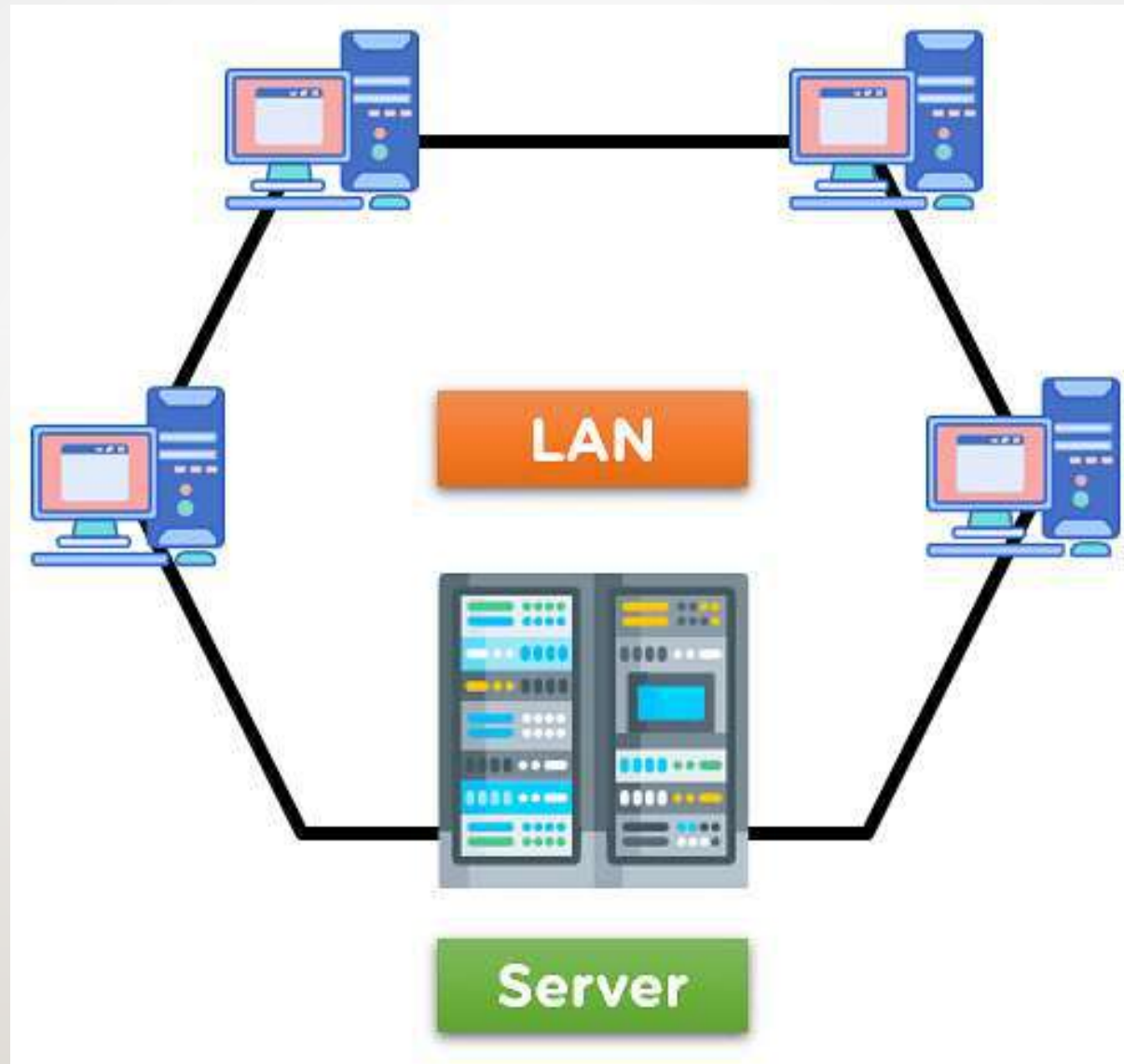
- The Network allows computers to connect and communicate with different computers via any medium. LAN, MAN, and WAN are the three major types of networks designed to operate over the area they cover.
- There are some similarities and dissimilarities between them. One of the major differences is the geographical area they cover, i.e. LAN covers the smallest area, MAN covers an area larger than LAN and WAN comprises the largest of all.

LOCAL AREA NETWORK (LAN)

- LAN or Local Area Network connects network devices in such a way that personal computers and workstations can share data, tools, and programs.
- The group of computers and devices are connected together by a switch, or stack of switches, using a private addressing scheme as defined by the TCP/IP protocol.
- Private addresses are unique in relation to other computers on the local network. Routers are found at the boundary of a LAN, connecting them to the larger WAN.

LOCAL AREA NETWORK (LAN)

- Data transmits at a very fast rate as the number of computers linked is limited. By definition, the connections must be high-speed and relatively inexpensive hardware (Such as hubs, network adapters, and Ethernet cables).
- LANs cover a smaller geographical area (Size is limited to a few kilometres) and are privately owned. One can use it for an office building, home, hospital, school, etc. LAN is easy to design and maintain.
- A Communication medium used for LAN has twisted-pair cables and coaxial cables. It covers a short distance, and so the error and noise are minimized.

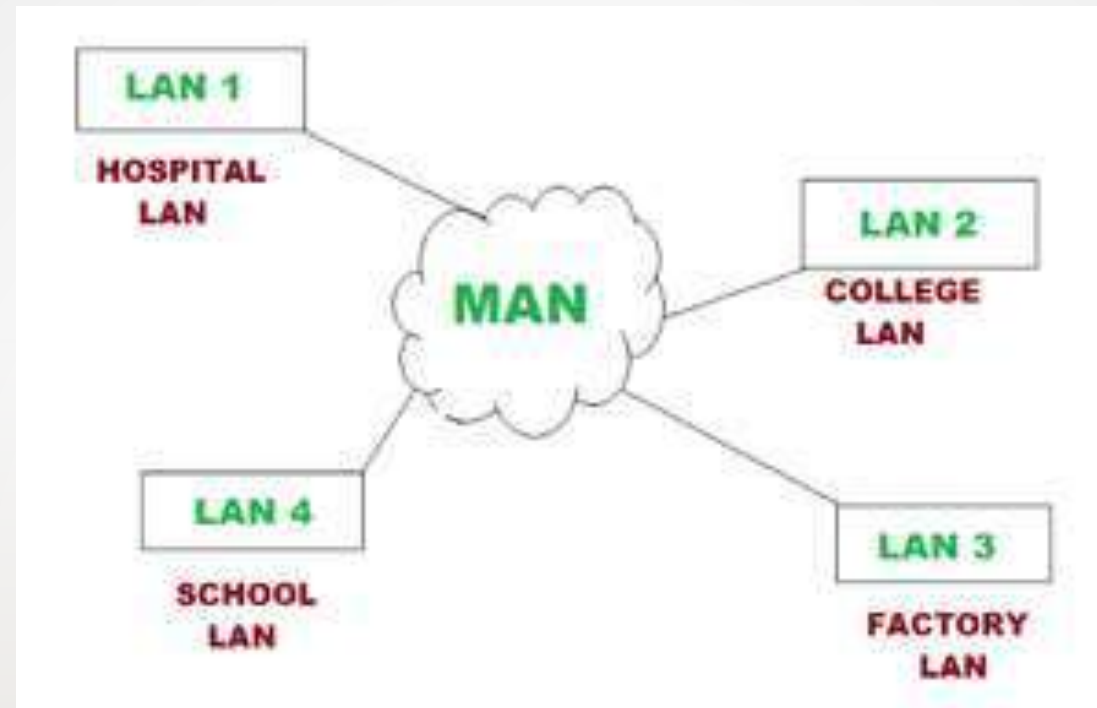


ADVANTAGES & DISADVANTAGES

- **Advantages:**
 - Provides fast data transfer rates and high-speed communication.
 - Easy to set up and manage.
 - Can be used to share peripheral devices such as printers and scanners.
 - Provides increased security and fault tolerance compared to WANs.
- **Disadvantages:**
 - Limited geographical coverage.
 - Limited scalability and may require significant infrastructure upgrades to accommodate growth.
 - May experience congestion and network performance issues with increased usage.

METROPOLITAN AREA NETWORK (MAN)

- MAN or Metropolitan area Network covers a larger area than that covered by a LAN and a smaller area as compared to WAN. MAN has a range of 5-50km.
- It connects two or more computers that are apart but reside in the same or different cities. It covers a large geographical area and may serve as an ISP (Internet Service Provider).
- MAN is designed for customers who need high-speed connectivity. Speeds of MAN range in terms of Mbps. It's hard to design and maintain a Metropolitan Area Network.



ATTRIBUTES OF MAN NETWORK:

- Attributes of MAN Network:
- Network covers an entire town area or a portion of a city.
- Data transmission speed is relatively high due to the installation of optical cables and wired connections.

ADVANTAGES & DISADVANTAGES

- **Advantages:**
 - Provides high-speed connectivity over a larger geographical area than LAN.
 - Can be used as an ISP for multiple customers.
 - Offers higher data transfer rates than WAN in some cases.
- **Disadvantages:**
 - Can be expensive to set up and maintain.
 - May experience congestion and network performance issues with increased usage.
 - May have limited fault tolerance and security compared to LANs.

WIDE AREA NETWORK (WAN)

- WAN or Wide Area Network is a computer network that extends over a large geographical area, although it might be confined within the bounds of a state or country.
- WAN has a range of above 50 km. A WAN could be a connection of LAN connecting to other LANs via telephone lines and radio waves and may be limited to an enterprise (a corporation or an organization) or accessible to the public. The technology is high-speed and relatively expensive.

TYPES OF WAN

- There are two types of WAN: Switched WAN and Point-to-Point WAN. WAN is difficult to design and maintain. Similar to a MAN, the fault tolerance of a WAN is less and there is more congestion in the network.
- A Communication medium used for WAN is PSTN(Public Switched Telephone Network) or Satellite Link. Due to long-distance transmission, the noise and error tend to be more in WAN.



- **Advantages:**

- Covers large geographical areas and can connect remote locations.
- Provides connectivity to the internet.
- Offers remote access to resources and applications.
- Can be used to support multiple users and applications simultaneously.

- **Disadvantages:**

- Can be expensive to set up and maintain.
- Offers slower data transfer rates than LAN or MAN.
- May experience higher latency and longer propagation delays due to longer distances and multiple network hops.
- May have lower fault tolerance and security compared to LANs.

S.NO.	LAN	MAN	WAN
1.	LAN is defined as a computer network that links the local areas like schools, universities, organizations, etc.	On the other hand, MAN is defined as a computer network that links the metropolitan areas.	On the other hand, WAN is defined as the telecommunications network that covers a large geographical area.
2.	The full form of the LAN is Local Area Network.	The full form of MAN is Metropolitan Area Network.	The full form of WAN is a Wide Area Network.
3.	LAN is a wired network, i.e., all the computers and printers are connected through wires.	The connections in MAN are connected through modem or cables/ wires.	The network of WAN is connected through broadband services, 3G or 4G internet services, etc.
4.	The ownership of LAN is private.	The ownership of MAN might be public or private.	The ownership of WAN might be private or public.
5.	The internet speed of LAN is very high, i.e., 1000 Mbps.	The speed of MAN is moderate, i.e., 44-155 Mbps.	The speed of WAN is relatively less than MAN and LAN, i.e., 150 Mbps.
6.	The maintenance cost of LAN is easy.	The maintenance cost of MAN is difficult.	The maintenance cost of WAN is difficult.
7.	The bandwidth of LAN is high.	The bandwidth of MAN is less.	The bandwidth of WAN is relatively low.
8.	<ul style="list-style-type: none"> •Examples: College •School •University •Hospital 	<ul style="list-style-type: none"> •Examples: City •Building 	<ul style="list-style-type: none"> •Examples: Broadband and internet throughout the country or continent.

THANK YOU



Team – System Design & Introduction to Cloud