Astana Medical University

Presentation

Title: Computer Network

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- Introduction to Computer Networks
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What is Network?

- A network consists of two or more computers that are linked in order to share resources (such as printers and CDs), exchange files, or allow electronic communications.
- The computers on a network may be linked through cables, telephone lines, radio waves, satellites, or infrared light beams.
- A popular example of a computer network is the Internet, which allows millions of users to share information.

Every Network Includes:

1. At least two computers that have something to share.
2. A cable or wireless pathway, called Transmission Media, for computers to signal each other.
3. Rules, called Protocols, so that computers can use the unified principle of data communication.
4. Networking Interface Cards (NIC)

Networking

Computer networks have opened up an entire frontier in the world of computing called the **client/server model**

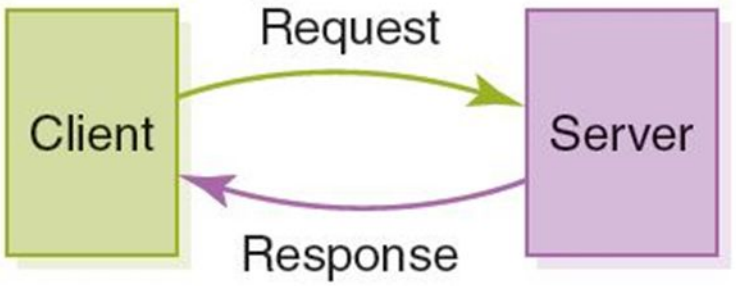


FIGURE 15.1 Client/server interaction

Advantages of Computer Networks

File Sharing: Networks offer a quick and easy way to share files directly.

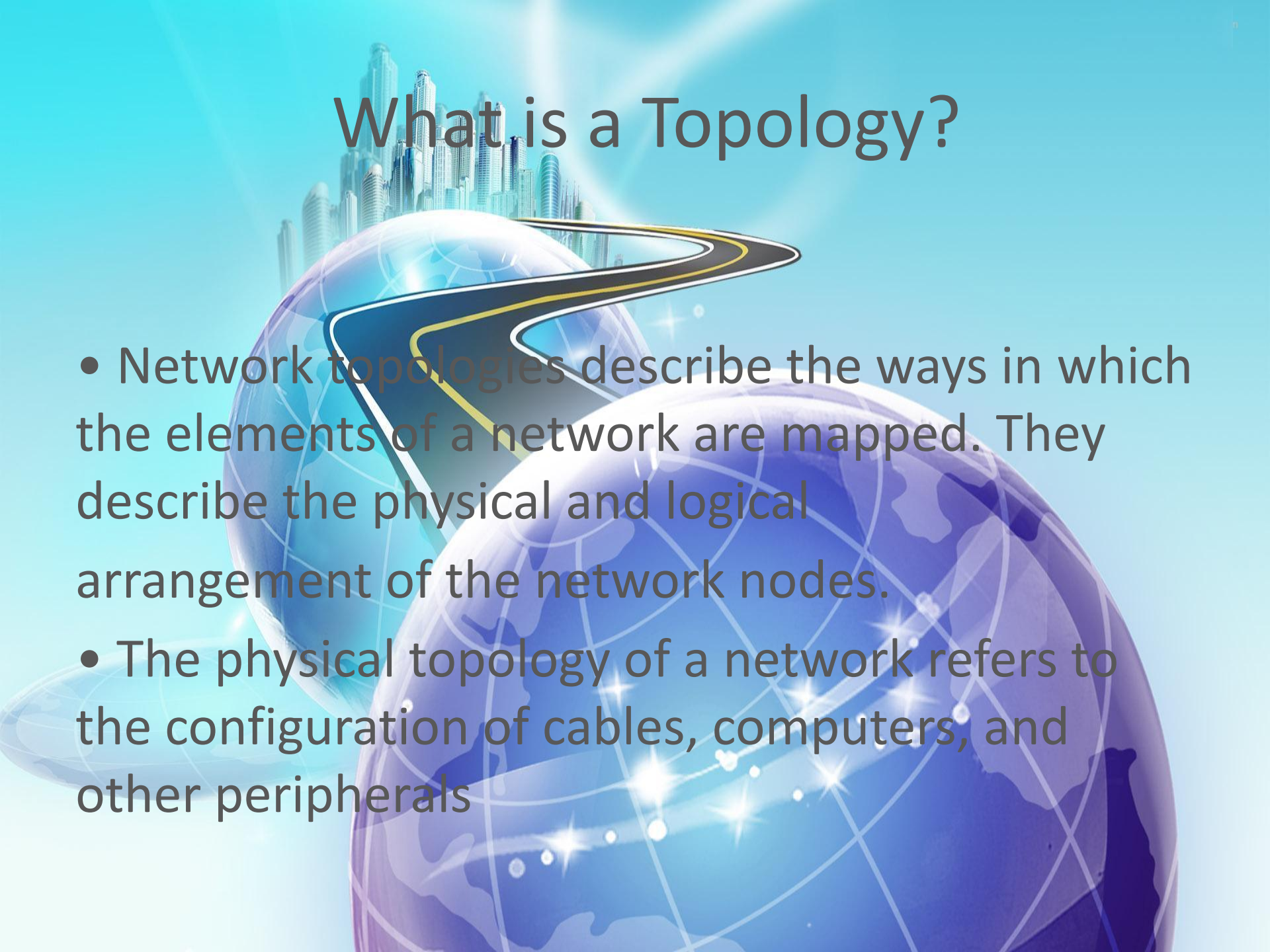
Resource Sharing: All computers in the network can share resources such as printers, fax machines, modems and scanners.

Communication: Those on the network can communicate with each other via e-mail, instant messages etc.

Flexible Access: Networks allow their users to access files from computers throughout the network.

Sharing of Information: Computer networks enable us to share data and information with the computers that are located geographically large distance apart.

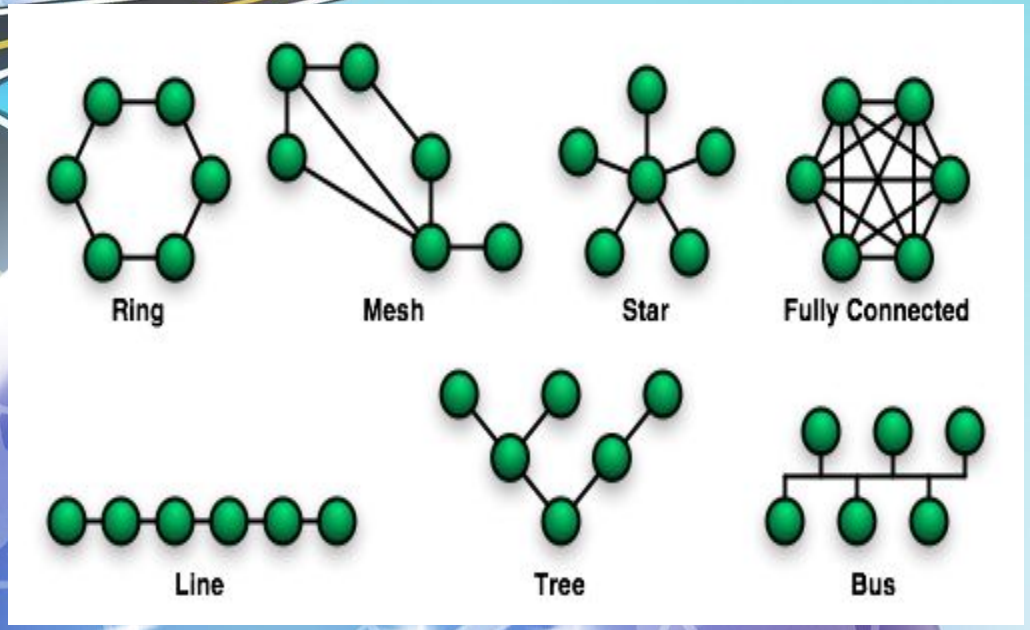
What is a Topology?



- Network topologies describe the ways in which the elements of a network are mapped. They describe the physical and logical arrangement of the network nodes.
- The physical topology of a network refers to the configuration of cables, computers, and other peripherals

Different Types of Topologies

- Bus Topology
- Star Topology
- Ring Topology
- Mesh Topology
- Tree Topology
- Hybrid Topology



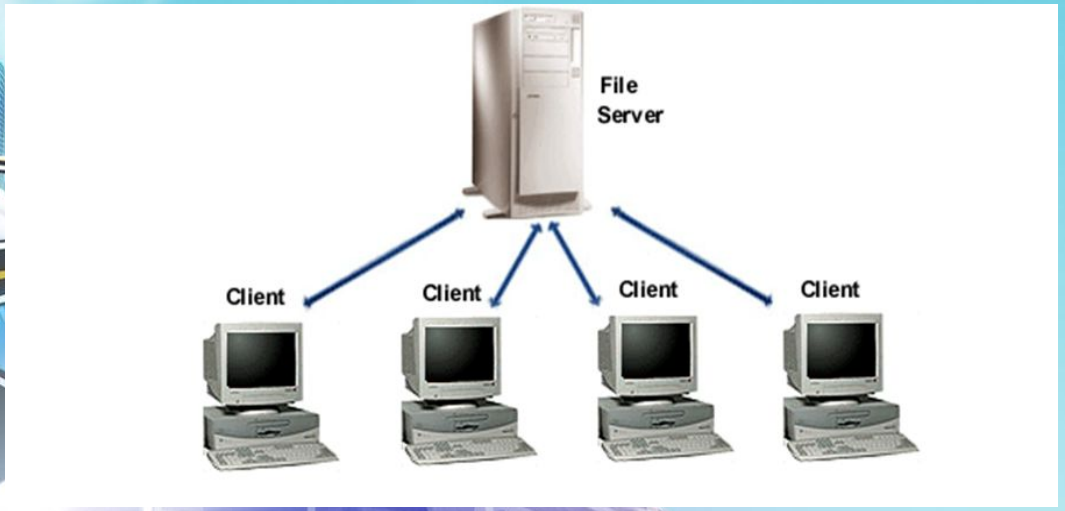
Network Computing Models

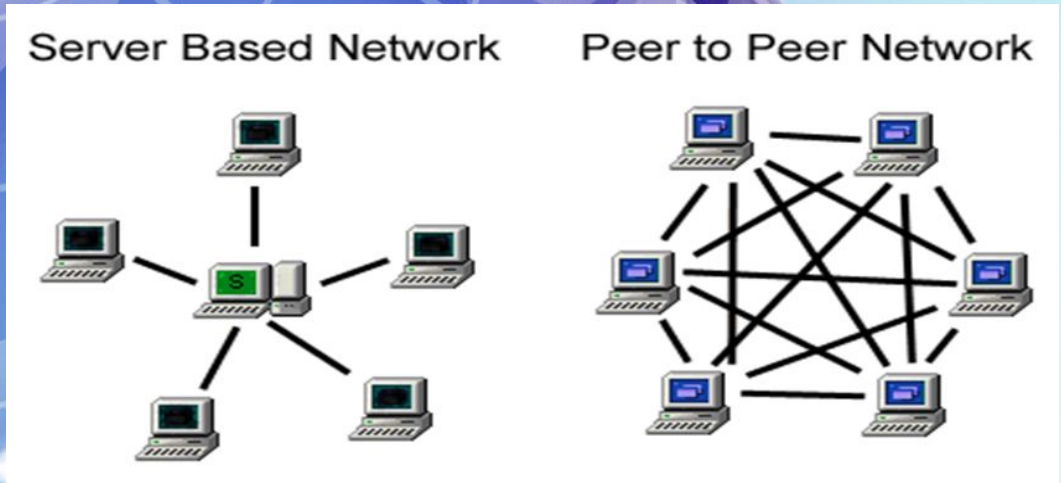
Centralized Computing(Client-Server Network)

- A client-server network is where every client is connected to the server .
- Server or mainframe computer has huge storage and processing capabilities

Distributed Computing (Peer-to-Peer Network)

- All devices have same power.
- It interconnects one or more computers.
- Centralized backup is not possible.





Different Types of Networks

- Depending upon the geographical area covered by a network, it is classified as:

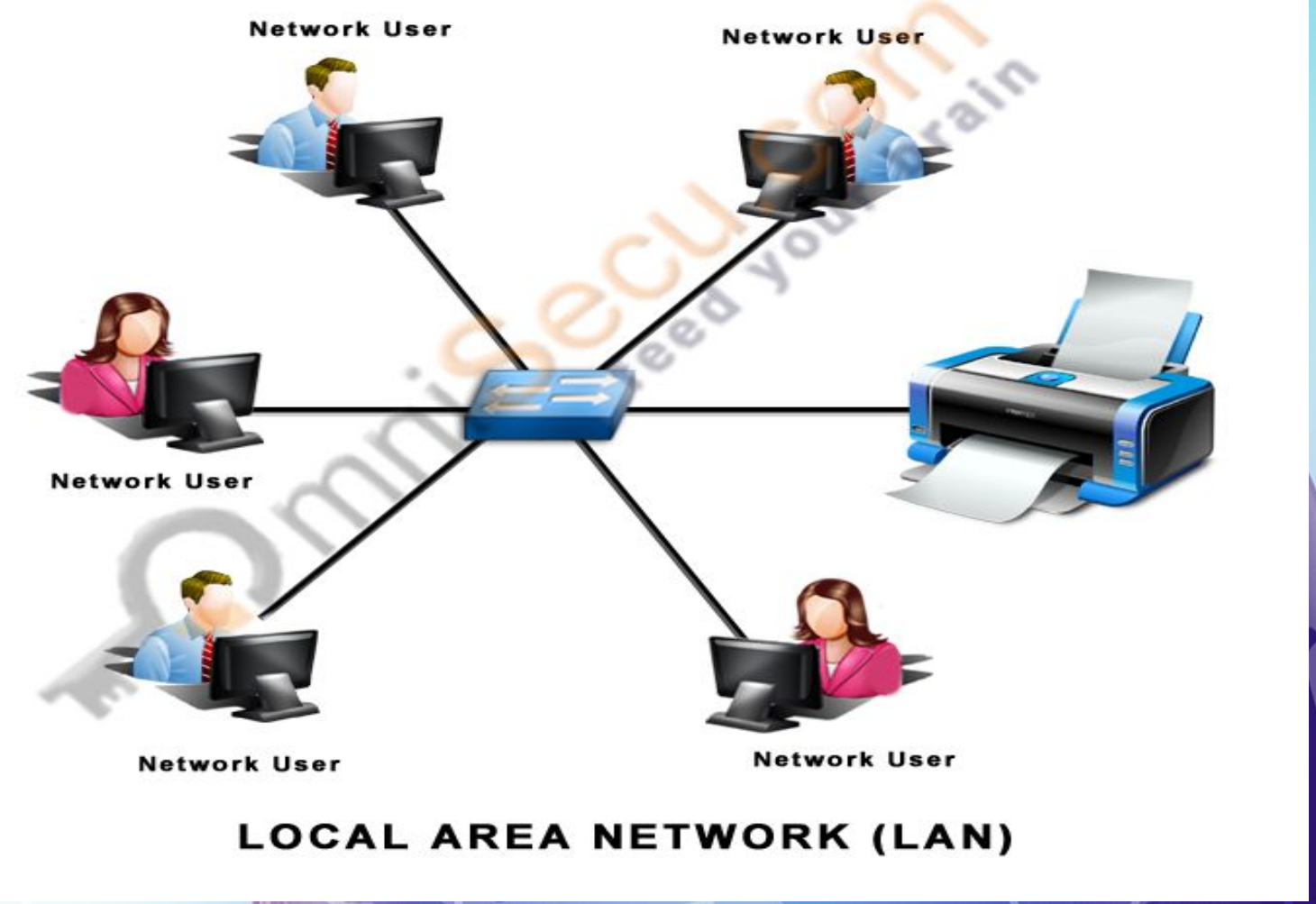
Local Area Network (LAN)

Metropolitan Area Network (MAN)

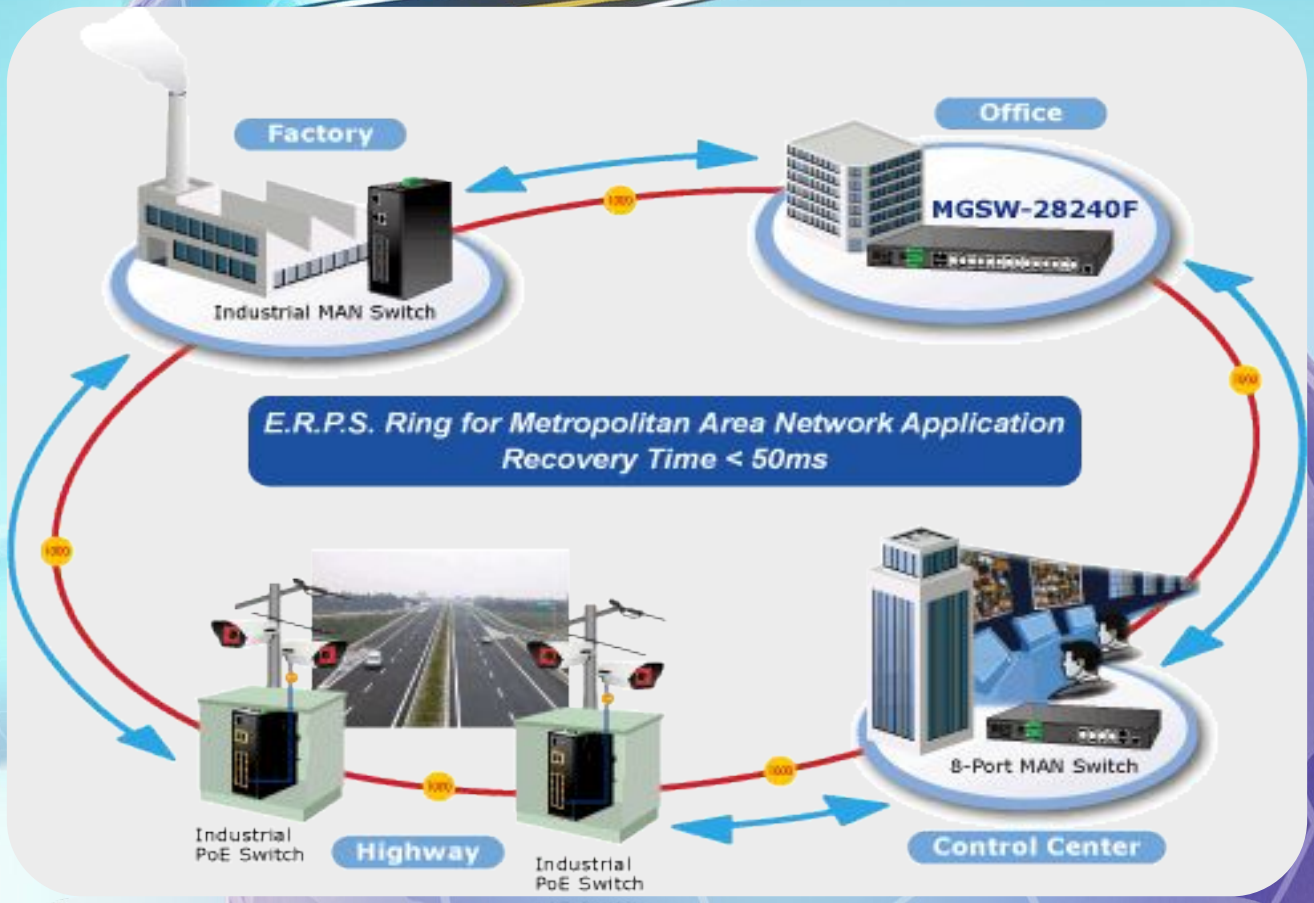
Wide Area Network (WAN

Personal Area Network (PAN)

A LAN is a network that is used for communicating among computer devices, usually within an office building or home.

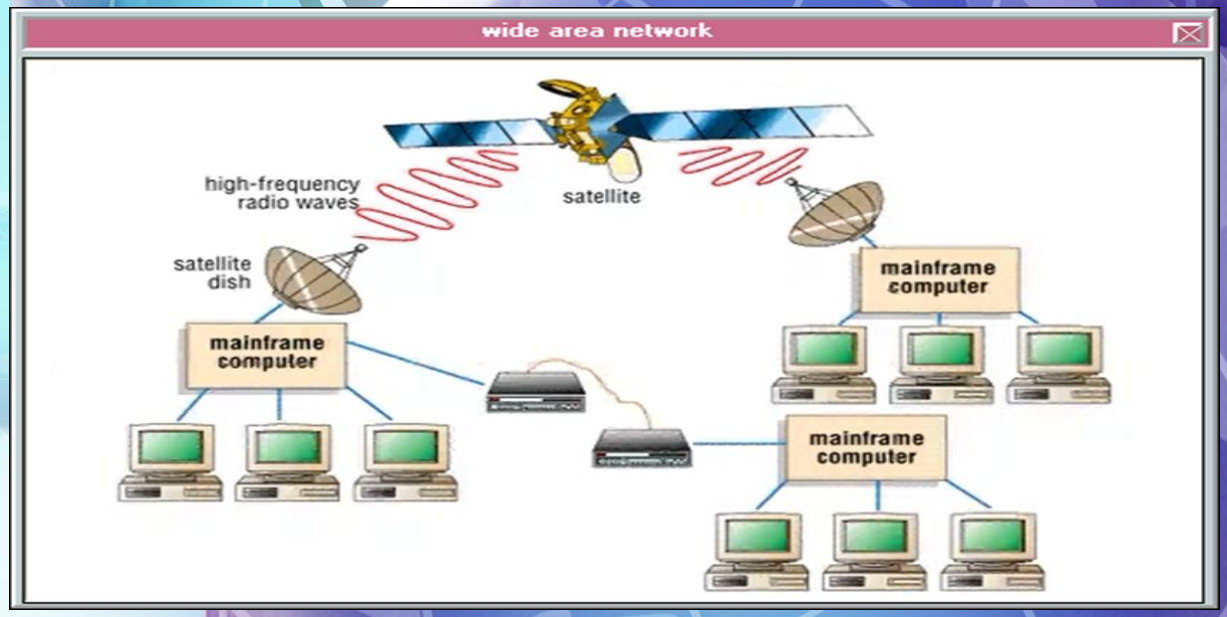


- **A metropolitan area network (MAN)** is a large computer network that usually spans a city or a large campus.



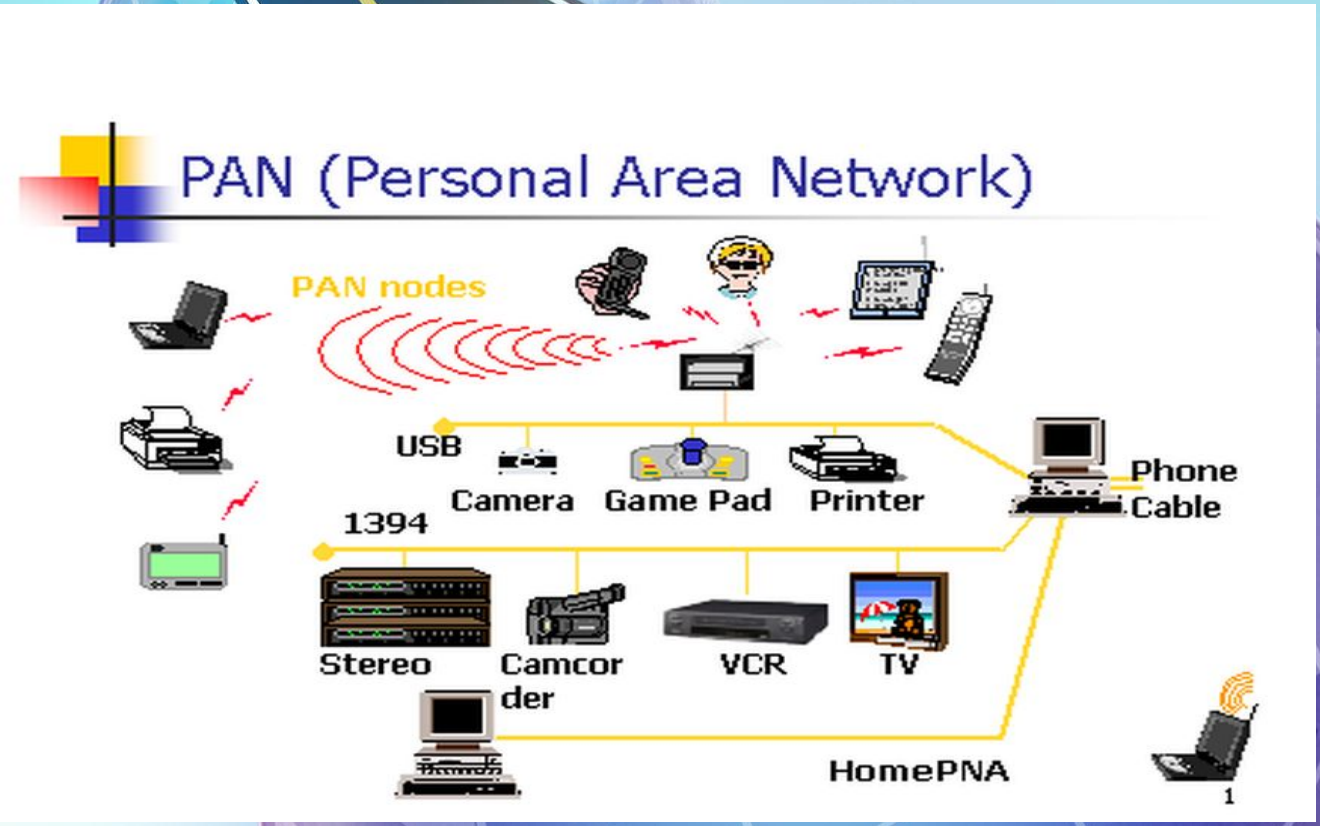
Wide Area Network (WAN)

- WAN covers a large geographic area such as country, continent or even whole of the world.
- A WAN is two or more LANs connected together. The LANs can be many miles apart.
- To cover great distances, WANs may transmit data over leased high-speed phone lines or wireless links such as satellites.



Personal Area Network (PAN)

• A personal area network (PAN) is a computer network used for communication among computer devices, including telephones and personal digital assistants, in proximity to an individual's body.



Multiple Access Protocols

1. Random Access Protocols

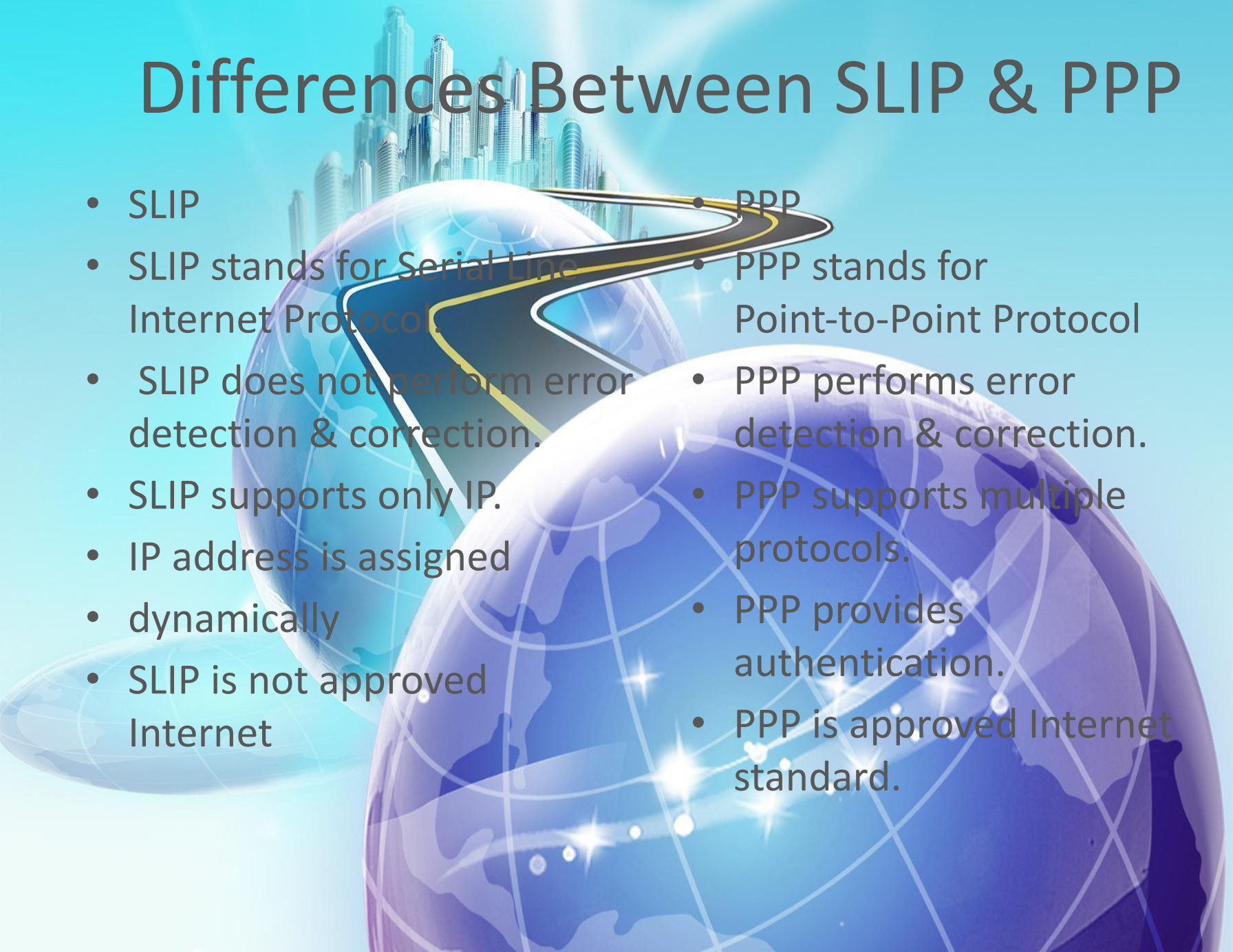
2. Channelization Protocols

3. Controlled Access Protocols

Data Link Layer in Internet

- We know that Internet consists of individual systems that are connected to each other.
- Basically, it is wide are network that is built up from point-to-point leased lines.
- In these point-to-point lines, two major data link protocols are used:
- Serial Line Internet Protocol (SLIP)
- Point-to-Point Protocol (PPP)

Differences Between SLIP & PPP

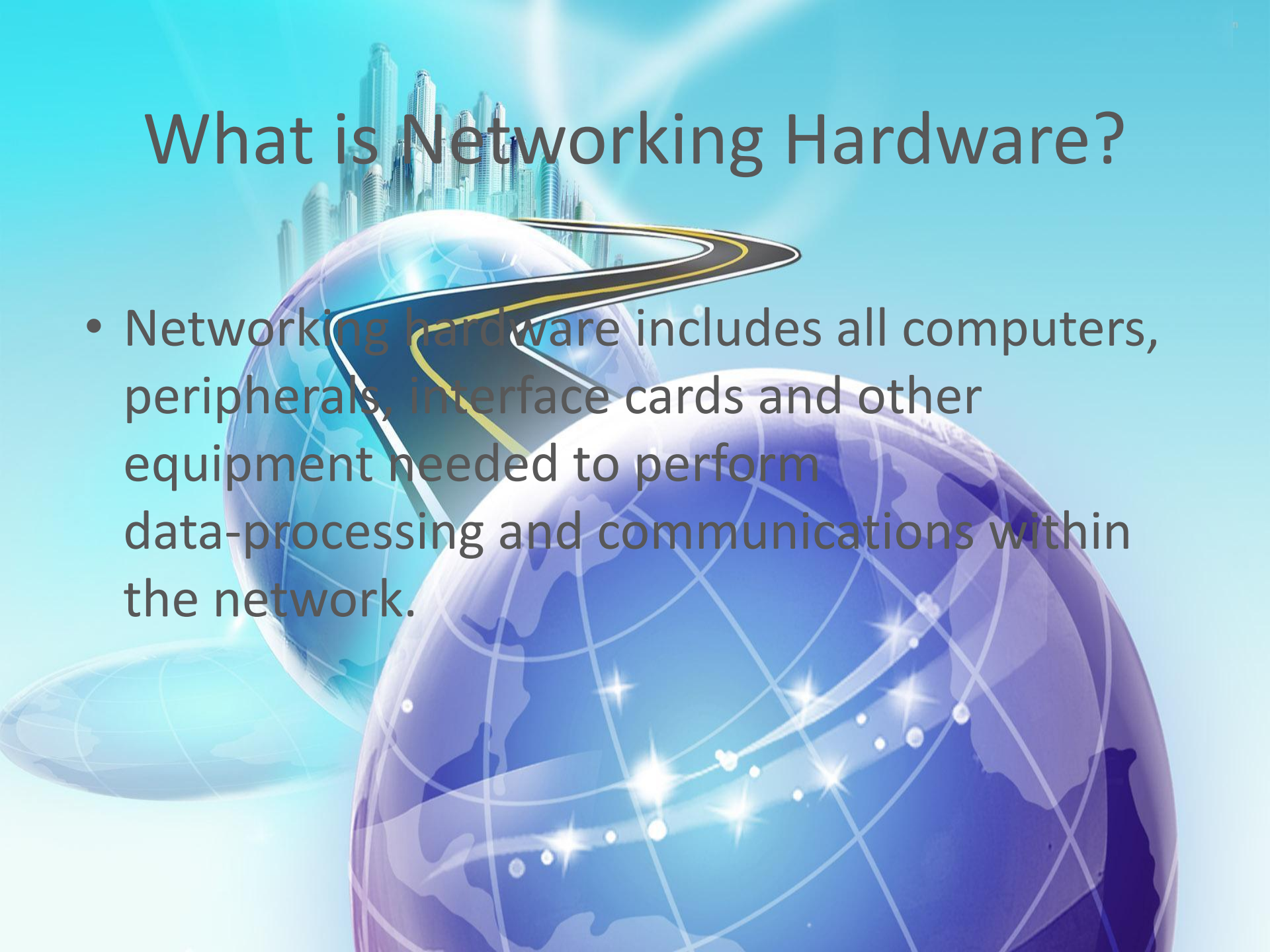


- SLIP
- SLIP stands for Serial Line Internet Protocol.
- SLIP does not perform error detection & correction.
- SLIP supports only IP.
- IP address is assigned
- dynamically
- SLIP is not approved Internet

- PPP
- PPP stands for Point-to-Point Protocol
- PPP performs error detection & correction.
- PPP supports multiple protocols.
- PPP provides authentication.
- PPP is approved Internet standard.

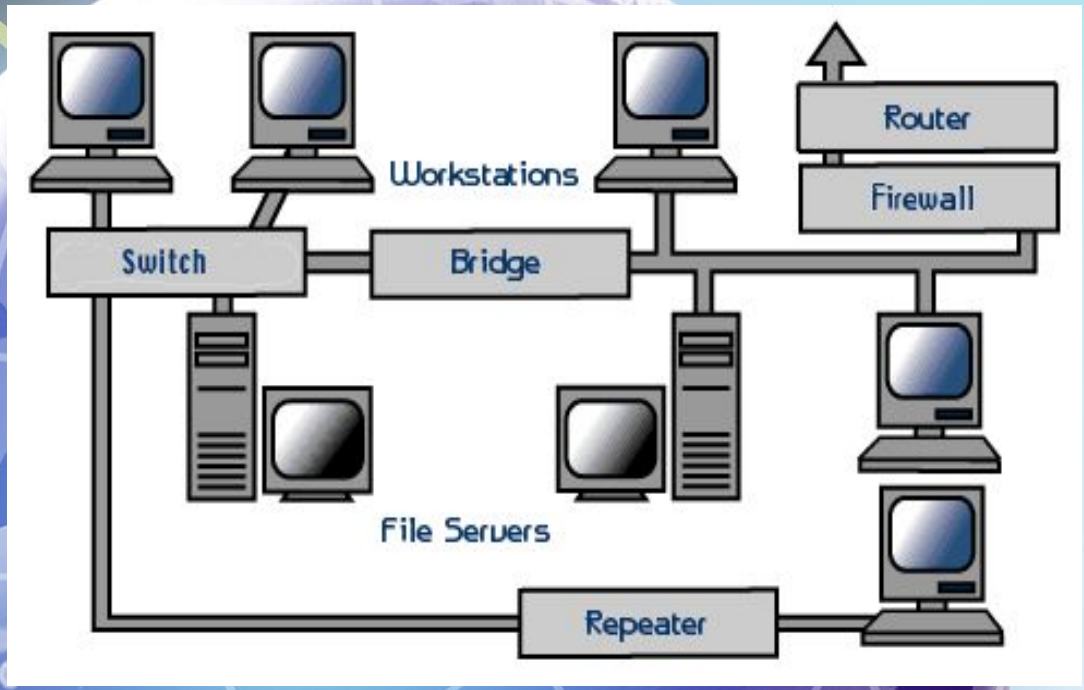
What is Networking Hardware?

- Networking hardware includes all computers, peripherals, interface cards and other equipment needed to perform data-processing and communications within the network.



Networking Hardware

- Network Interface Card
- Hub
- Repeater
- Bridge
- Switch
- Gateway



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