



**Ministry of Higher Education and Scientific
Research Al-Mustaqbal University College
Department of Technical Computer Engineering**

Lecture Number: 1

Computer Networks 3rd Stage

Lecturer: Dr. Hussein Ali Ameen

hussein_awadh@uomus.edu.iq

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INTRODUCTION TO COMPUTER NETWORKING

Objective:

To be acquainted with:

- The definitions of networking
- Network topology
- Hardware, Software and Networks devices
- Components of Communication System
- Networking models
- IP address
- MAC address

DEFINITIONS

Network Definition

A network can be defined as two or more computers connected together in such a way that they can share resources.

The purpose of a network is to share resources.

DEFINITIONS (CONT..)

A resource may be:

A file

A folder

A printer

A disk drive

Or just about anything else that exists on a computer.

DEFINITIONS (CONT..)

A network is simply a collection of computers or other hardware devices that are connected together, either physically or logically, using special hardware and software, to allow them to exchange information and cooperate. Networking is the term that describes the processes involved in designing, implementing, upgrading, managing and otherwise working with networks and network technologies.

ADVANTAGES OF NETWORKING

Connectivity and Communication

Data Sharing

Hardware Sharing

Internet Access

Internet Access Sharing

Data Security and Management

Performance Enhancement and Balancing

Entertainment

THE DISADVANTAGES (COSTS) OF NETWORKING

Network Hardware, Software and Setup Costs

Hardware and Software Management and Administration Costs

Undesirable Sharing

Illegal or Undesirable Behavior

Data Security Concerns

FUNDAMENTAL NETWORK CLASSIFICATIONS

Local Area Networks (LANs):

A **local area network (LAN)** is a computer network covering a small geographic area, like a home, office, or group of buildings

Wide Area Networks (WANs):

Wide Area Network (WAN) is a computer network that covers a broad area (i.e., any network whose communications links cross metropolitan, regional, or national boundaries). Or, less formally, a network that uses routers and public communications links

The largest and most well-known example of a WAN is the Internet.

WANs are used to connect LANs and other types of networks together, so that users and computers in one location can communicate with users and computers in other locations

FUNDAMENTAL NETWORK CLASSIFICATIONS (CONT)

Metropolitan Area Network (MAN):

- A metropolitan area network (MAN) is a network that interconnects users with computer resources in a geographic area or region larger than that covered by even a large local area network (LAN) but smaller than the area covered by a wide area network (WAN). The term is applied to the interconnection of networks in a city into a single larger network (which may then also offer efficient connection to a wide area network). It is also used to mean the interconnection of several local area networks by bridging them with backbone lines. The latter usage is also sometimes referred to as a campus network.

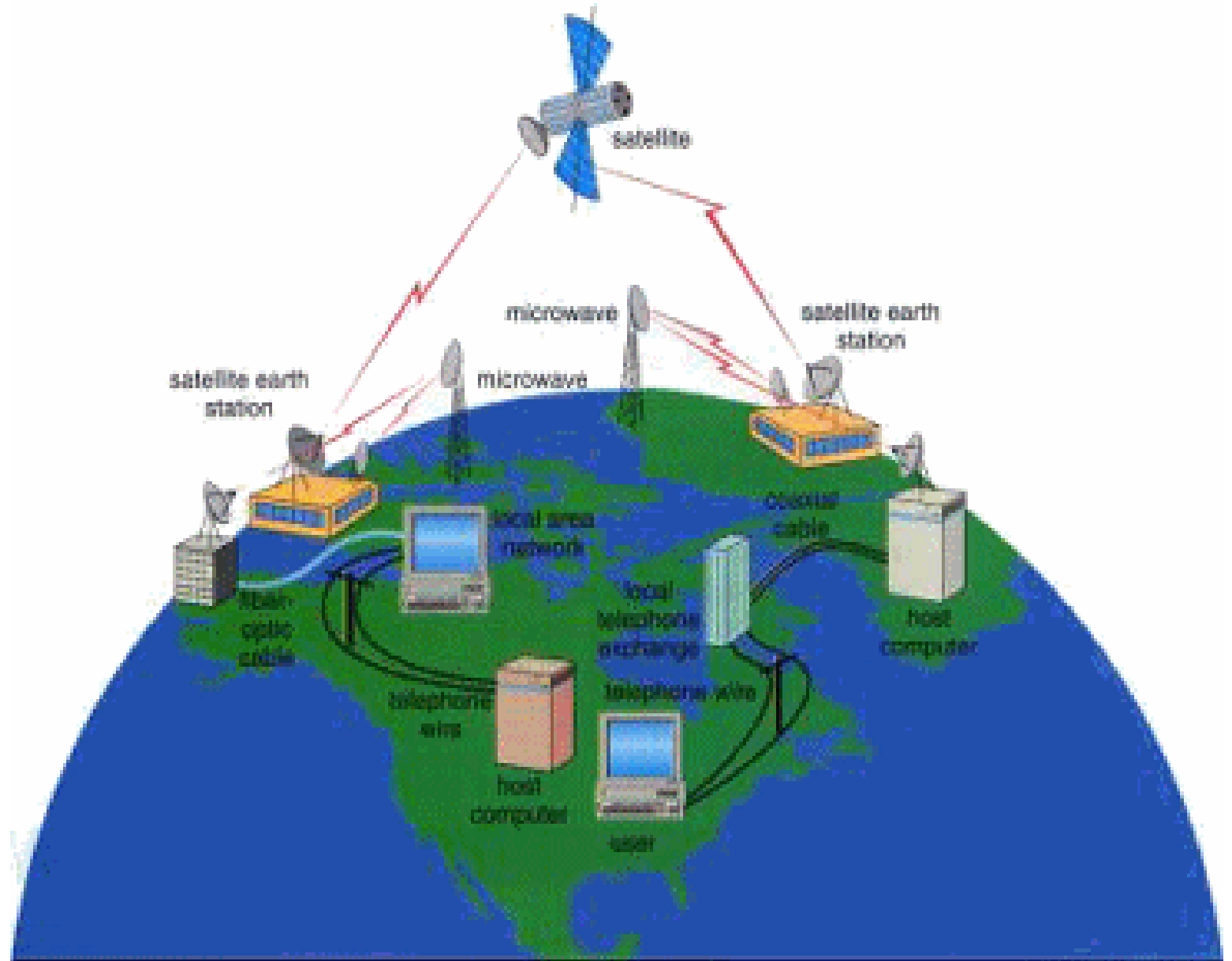
FUNDAMENTAL NETWORK CLASSIFICATIONS (CONT)

The Local Network (LAN)

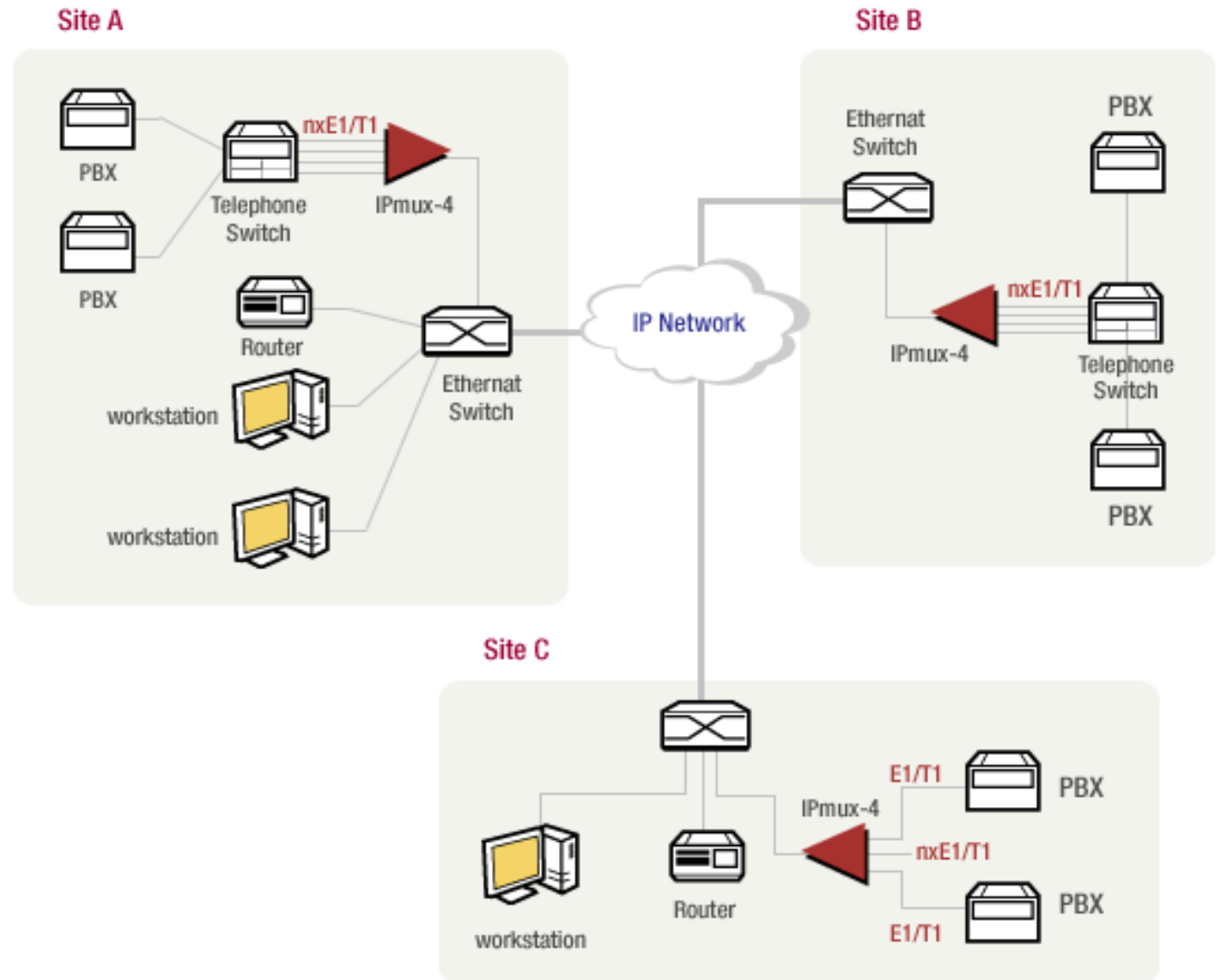


FUNDAMENTAL NETWORK CLASSIFICATIONS (CONT)

Wide Area Network



Fundamental Network Classifications (cont)



INTRANET AND INTERNET SPECIFICATIONS

Intranet: An intranet is a **private network** that is contained within an enterprise. It may consist of many interlinked local area networks and also use leased lines in the wide area network.

An intranet uses TCP/IP, HTTP, and other Internet protocols and in general looks like a private version of the Internet. With tunneling, companies can send private messages through the public network, using the public network with special encryption/decryption and other security safeguards to connect one part of their intranet to another.

Internet: is a worldwide system of computer networks - a network of networks in which users at any one computer can, if they have permission, get information from any other computer (and sometimes talk directly to users at other computers).

CLIENT AND SERVER COMPUTER ROLE IN NETWORKING

Server computer is a core component of the network, providing a link to the resources necessary to perform any task.

A server computer provides a link to the resources necessary to perform any task.

The link it provides could be to a resource existing on the server itself or a resource on a client computer.

Client computers normally request and receive information over the network *client*. *Client* computers also depends primarily on the central server for processing activities

PEER-TO PEER NETWORK

A peer-to-peer network is a network where the computers act as both workstations and servers.

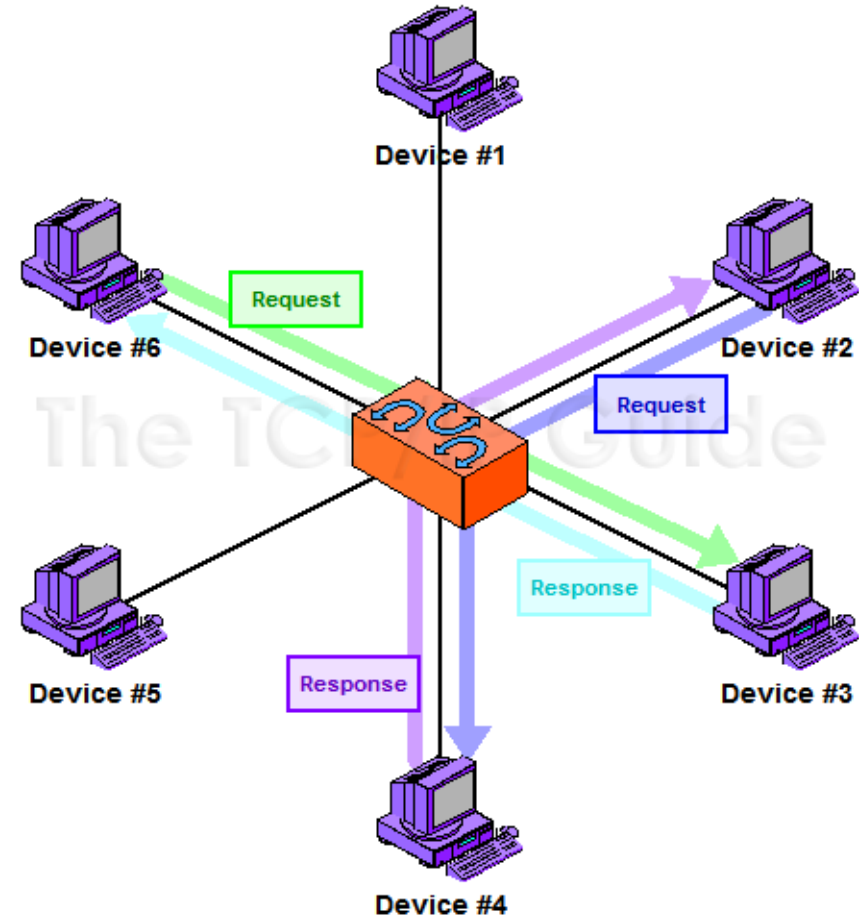
great for small, simple, and inexpensive networks.

In a strict peer-to-peer networking setup, every computer is an equal, a *peer* in the network.

Each machine can have resources that are shared with any other machine.

There is no assigned role for any particular device, and each of the devices usually runs similar software. Any device can and will send requests to any other.

PEER-TO-PEER NETWORK (CONT..)



CLIENT/SERVER NETWORKING

In this design, a small number of computers are designated as centralized *servers* and given the task of providing services to a larger number of user machines called *clients*