

DCA 202 – Information Technology**LESSON** : 9**WEEK** : 9**TOPIC 1** : Computer networks.**OBJECTIVE :** To give the student an understanding of the use and purpose of computer networks**LEARNING OUTCOMES:**

After completing this chapter, you should be able to:

1. Know the basic components of a network.
2. Know data transmission methods, including types of signals, modulation and choices among transmission modes.
3. Differentiate the various kinds of communications links and appreciate the need for protocols.
4. Understand network configurations.
5. Know the components, types, and protocols of a local area network.
6. Appreciate the complexity of networking.
7. Become acquainted with examples of networking.

Chapter 9

Computer Networks

1. The Uses of a Network

- networks allow users simultaneous access to shared programs and data
- networks also allow users to share peripheral devices, such as printers and hard disks, and thereby prolong the usable life of many machines
- networks usually include the ability to send e-mail, and many e-mail systems let users attach files to their messages
- some networks also aid communication by providing tools for teleconferencing and video conferencing

2. Categories of networks

(a) Local Area Network (LAN)

- A LAN can consist of just 2 or 3 PCs connected together to share resources or it can include several hundred computers of different kinds
- A LAN allows all the computers connected to it to share hardware, software and data. The most commonly shared resources are disk storage devices and printers
- LANs cover short distances, usually one office or building or groups of building that are close together.

(b) Metropolitan Area Network (MAN)

- The next step up from the LAN might be the MAN – the *metropolitan area network*. These networks are used as links between office buildings in a city. *Cellular phone* systems expand the flexibility of MANs by allowing links to car phones and portable phones.

(c) Wide Area Networks (WAN)

- Wide Area Network (WAN) is a network of geographically distant computers and terminals
- Use satellites to read information e.g. headquarter and branch of a bank.

(d) File Server Network

- Large hard disk that is used for share storage is known as the file server, network server. Files used by more than one user (at different nodes) are generally kept on the server. One relatively simple implementation of a network with nodes and a file server is a file server network. This is a hierarchical arrangement in which each node can have access to the files on the server but not necessarily to files on other nodes. When a node needs information on the server, it requests the entire file containing the information. In other words, the file server is used simply to store and forward file.

(e) Client/Server Network

- Another approach for organizing nodes in a network is called client/server computing, a hierarchical strategy in which individual computers share the processing and storage workload with a central server.
- Administrator can control e.g. time schedule, file – read-only, printer linking, etc.

- E.g.: suppose the database is a list of customer purchases and the user needs to know the names of customers in the Website area who made purchases of more than RM 500. The user uses the client software to describe the information that's needed and sends the request to the server. The server software searches the database, collects the relevant customer names, and sends them back to the client software then presents the information to the user in a way that makes sense.

(f) Peer-to-Peer Computing

- Peer-to-peer network in which all nodes on the network have equal relationship to all others and all have similar types of software
- Peer-to-peer LANs are commonly set up in small organization (less than 50 employees) or in school, where the primary benefit of a network is shared storages, printers, and enhanced communication
- This type of computers has no control e.g.: time schedule, file folder control, hardware control, etc.

3. Network Topologies for LANs

(a) Star Topology

- a star network places a hub in the centre of the network node. Group of data are routed through the central hub to their destinations
- hub computer monitors traffic and prevents collisions
- when one computer connection is down it will not affect the rest; if the hub goes down, then the entire network fails.

(b) Ring Topology

- the ring topology connects the nodes of the network in a circular chain in which each node is connected to the next - information passes through 1 direction
- no danger of collisions because data always flows in one direction; if one connection is broken, the entire network fails.

(c) Bus Topology

- a bus network, like bus of a computer itself, is a single tube to which all the network nodes and peripheral devices are attached
- if one set of data happens to collide with another set of data transmitted by other nodes, each node will wait a small random amount of time and then attempt to retransmit the data
- one connection down will not affect the rest; if the connection is broken, the entire network fails.

4. Network Media and Hardware

(a) Twisted – Pair Wire

- consists of 2 (wire pairs) or 4 or 8 wires twisted together to form a cable
- noise → causes distortion in the signal system when it is received.

(b) Coaxial Cable

- can be pronounced “co-axe”
- sending a strong signal
- widely used for cable TV or networks

- a cable can be laid underground or undersea
- much faster than twisted pairs and less prone to noise

(c) Fibre Optic Cable

- instead of using electricity to send data, fibre optics uses light
- the cables are made of glass fibres, each thinner than a human hair, that can guide light beam for miles
- fibre optics is well suited for handling all types of data – voice, pictures, music, video at the same time.

Quiz

Fill in the Blanks

1. A system for transmitting written messages through a network is known as _____.
2. A(n) _____ is a network of computers that serves users located relatively near each other.
3. You can connect computers together to communicate and exchange information using a(n) _____.
4. The physical layout of the wires that connect the nodes of the network is the _____.
5. Copying a file from a remote computer is called _____.
6. A(n) _____ is a central computer that includes a large disk-storage device on a LAN.
7. The group of programs that manages the resources on the network is known as the _____.
8. A unit of measurement indicating how fast data is transmitted is called _____.
9. _____ are the individual computers on a network.
10. The act of sending a file to another user or to a network is called _____.