

STUDY GUIDE FOR MODULE NO. 1

Unit 1 – Basics of Computer Networking



MODULE OVERVIEW

In this module we will introduce you to the concept of a network. A network is a group of interconnected computers and other devices that are able to share information with each other. In order for any network to function, there are several key components that have to be in place



MODULE LEARNING OBJECTIVES

At the end of this, students are expected to:

1. Define computer networking
2. Enumerate the different advantages of computer network.
3. Explain the different components of computer network.



LEARNING CONTENTS (Computer Network)

What is a Computer Network?

- A computer network is a group of two or more interconnected computer systems.
- A computer network is defined as the interconnection of two or more computers. It is done to enable the computers to communicate and share available resources. Types of resources are:
 1. Hardware: A network allows users to share many hardware devices such as printers , modems, fax machines, CD ROM, players, etc.
 2. Software: sharing software resources reduces the cost of software installation, saves space on hard disk.

Applications:

- Sharing of resources such as printers
- Sharing of expensive software's and database
- Communication from one computer to another computer
- Exchange of data and information among users via network
- Sharing of information over geographically wide areas.

Advantages of a Computer Network

- Helps you to connect with multiple computers together to send and receive information when accessing the network.
- Helps you to share printers, scanners, and email.



- Helps you to share information at very fast speed
- Electronic communication is more efficient and less expensive than without the network.

Computer Network Components

Switches

Switches work as a controller which connects computers, printers, and other hardware devices to a network in a campus or a building.

It allows devices on your network to communicate with each other, as well as with other networks. It helps you to share resources and reduce the costing of any organization

Routers

Routers help you to connect with multiple networks. It enables you to share a single internet connection with multiple devices and saves money. This networking component acts as a dispatcher, which allows you to analyze data sent across a network. It automatically selects the best route for data to travel and send it on its way.

Servers

Servers are computers that hold shared programs, files, and the network operating system. Servers allow access to network resources to all the users of the network.

Clients

Clients are computer devices which access and uses the network as well as shares network resources. They are also users of the network, as they can send and receive requests from the server.

Transmission Media

Transmission media is a carrier used to interconnect computers in a network, such as coaxial cable, twisted-pair wire, and optical fiber cable. It is also known as links, channels, or lines.

Access points

Access points allow devices to connect to the wireless network without cables. A wireless network allows you to bring new devices and provides flexible support to mobile users.

Shared Data

Shared data are data which is shared between the clients such as data files, printer access programs, and email.

Network Interface Card

Network Interface card sends, receives data, and controls data flow between the computer and the network.

Local Operating System

A local OS which helps personal computers to access files, print to a local printer and uses one or more disk and CD drives which are located on the computer.

Network Operating System

The network operating system is a program which runs on computers and servers. It allows the computers to communicate via network.

Protocol



A protocol is the set of defined rules that allows two entities to communicate across the network. Some standard protocols used for this purpose are IP, TCP, UDP, FTP, etc.

Hub

Hub is a device that splits network connection into multiple computers. It acts a distribution center so whenever a computer requests any information from a computer or from the network it sends the request to the hub through a cable. The hub will receive the request and transmit it to the entire network.

LAN Cable

Local Area Network(LAN) cable is also called as Ethernet or data cable. It is used for connecting a device to the internet.



LEARNING CONTENTS (Unique Identifiers)

Unique Identifiers of Network

❖ Hostname:

Every device of the network is associated with a unique device, which is called hostname.

❖ IP Address:

IP (Internet Protocol) address is as a unique identifier for each device on the Internet. Length of the IP address is 32-bits. IPv6 address is 64 bits.

❖ DNS Server:

DNS stands for Domain Name System. It is a server which translates URL or web addresses into their corresponding IP addresses.

❖ MAC Address:

MAC (Media Access Control Address) is known as a physical address is a unique identifier of each host and is associated with the NIC (Network Interface Card). General length of MAC address is : 12-digit/ 6 bytes/ 48 bits

❖ Port:

Port is a logical channel which allows network users to send or receive data to an application. Every host can have multiple applications running. Each of these applications are identified using the port number on which they are running.

Other Important Network Components

❖ ARP:

ARP stands for Address Resolution Protocol which helps network users to convert the IP address into its corresponding Physical Address.

❖ RARP:

Reverse Address Resolution Protocol gives an IP address of the device with given a physical address as input.



Uses of Computer Networks

Here are some common application of computer networks

- ❖ Helps you to share resource such as printers
- ❖ Allows you to share expensive software's and database among network participants
- ❖ Provides fast and effective communication from one computer to another computer
- ❖ Helps you to exchange data and information among users via a network.



LEARNING CONTENTS (Disadvantages)

Disadvantages of using Computer Networks

Here are drawbacks/ cons of using computer networks:

- ❖ Investment for hardware and software can be costly for initial set-up
- ❖ If you don't take proper security precautions like file encryption, firewalls then your data will be at risk.
- ❖ Some components of the network design may not last for many years, and it will become useless or malfunction and need to be replaced.
- ❖ Requires time for constant administration
- ❖ Frequent server failure and issues of regular cable faults



LEARNING ACTIVITY 1 (Quiz)

Direction. Read each item carefully. Choose and encircle the correct answer.

1. It is done to enable the computers to communicate and share available resources.
 - a. Hub
 - b. Computer Network
 - c. Server
 - d. Routers
2. Two devices are in network if
 - a. a process in one device is able to exchange information with a process in another device
 - b. a process is running on both devices
 - c. PIDs of the processes running of different devices are same
 - d. none of the above
3. A _____ is a device that forwards packets between networks by processing the routing information included in the packet.
 - a. Bridge
 - b. Firewall
 - c. Router
 - d. all of the above
4. Which of the following is TRUE, with regards to computer networking?
 - a. Helps you to share resource such as printers.
 - b. It doesn't allow you to share expensive software's and database among network participants .
 - c. Provides slow and effective communication from one computer only.
 - d. All of the above.
5. In respect of Unique Identifiers of Network, which of the following is **NOT** correct?
 - a. Every device of the network is associated with a unique device, which is called hostname.
 - b. IP address is as a unique identifier for each device on the Internet.
 - c. MAC is known as a physical address is a unique identifier of each host and is associated with the NIC.
 - d. None of the above
6. It allows the computers to communicate via network.
 - a. Hub
 - b. Servers
 - c. Routers
 - d. Network Operating System
7. It is also known as links, channels, or lines.



Study Guide in (Net 101 – Networking1(Fundamentals of Networking))

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|-----------------------|------------|
| a. Transmission Media | c. Servers |
| b. Routers | d. NIC |
8. ARP stands for
- | | |
|--------------------------------|-----------------------------|
| a. Address Resolution Protocol | c. Address Reverse Protocol |
| b. Address Resolution Plan | d. Address Resolution Port |
9. Every device of the network is associated with a unique device, which is called _____
- | | |
|-----------------|-------------|
| a. Address | c. Hostname |
| b. Access point | d. Protocol |
10. It is the set of defined rules which that allows two entities to communicate across the network.
- | | |
|------------------|---------------------|
| a. Access Points | c. Protocol |
| b. Switches | d. computer network |

**SUMMARY**

- ❖ A computer network is a group of two or more interconnected computer systems
- ❖ Computer networks help you to connect with multiple computers together to send and receive information
- ❖ Switches work as a controller which connects computers, printers, and other hardware devices
- ❖ Routers help you to connect with multiple networks. It enables you to share a single internet connection and saves money
- ❖ Servers are computers that hold shared programs, files, and the network operating system
- ❖ Clients are computer device which accesses and uses the network and shares network resources
- ❖ Hub is a device that split a network connection into multiple computers.
- ❖ Access points allow devices to connect to the wireless network without cables
- ❖ Network Interface card sends, receives data and controls data flow between the computer and the network
- ❖ A protocol is the set of defined rules which that allows two entities to communicate across the network
- ❖ Hostname, IP Address, DNS Server, and host are important unique identifiers of computer networks.
- ❖ ARP stands for Address Resolution Protocol
- ❖ RAR Reverse Address Resolution Protocol gives an IP address of the device with given a physical address as input.
- ❖ Computer network helps you to share expensive software's and database among network participants
- ❖ The biggest drawback of installing computer network is that its initial investment for hardware and software can be costly for initial set-up.

REFERENCES**E-SOURCES:**

<https://www.guru99.com/basic-computer-network.html>

