Introduction To Networking

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Module Code: ELEE1157

Module Name: Network Routing Management

Credits: 15

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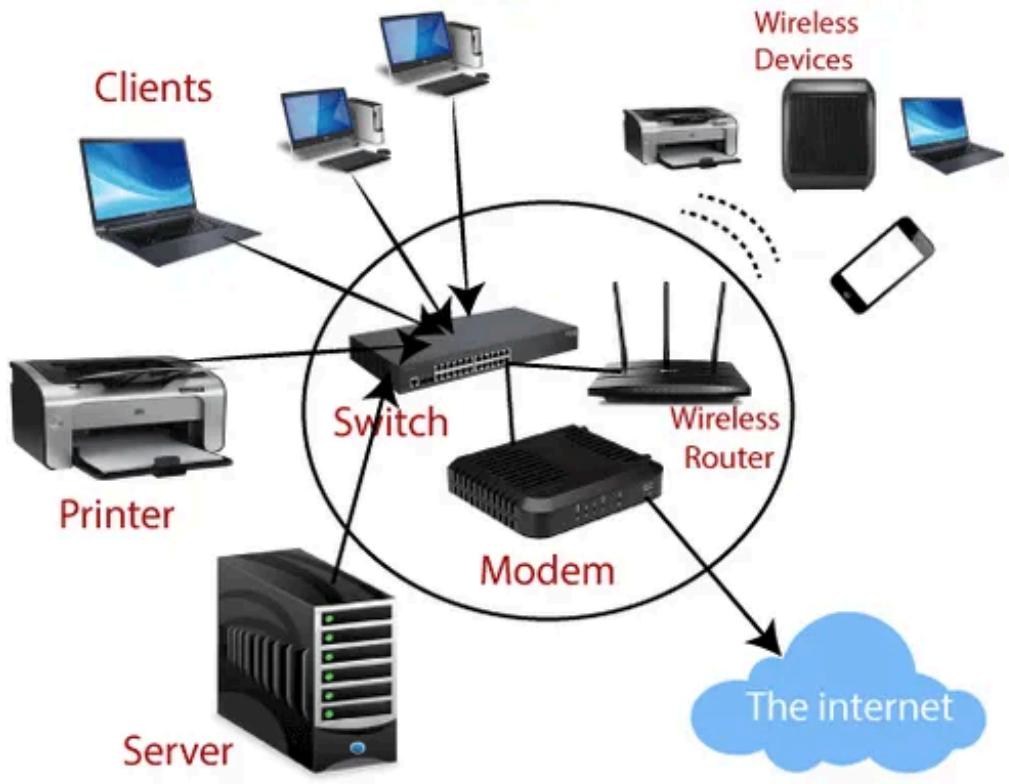
What is A COMPUTER NETWORK?

Computer networking refers to connected computing devices (such as laptops, desktops, servers, smartphones, and tablets) and an ever-expanding array of IoT devices (such as cameras, door locks, doorbells, refrigerators, audio/visual systems, thermostats, and various sensors) that communicate with one another.

Examples of CNs

- Networks are collections of computers, software, and hardware that are all connected to help their users work together.
- A network connects computers by means of Wired systems or Wireless connectivity, specialised software, and devices that manage data traffic.
- A network enables users to share files and resources, such as printers, as well as send messages electronically (e-mail) to each other.



Specialised devices 1

Specialised devices such as **switches**, **routers**, and **access points** form the foundation of computer networks

- Switches
  - Switches connect and help to **internally secure** computers, printers, servers, and other devices to networks in homes or organisations
- Access Points
  - Access points are switches that connect devices to networks without the use of cables
- Switches/Access Points identify a connected computer by its Media Access Control (MAC) address.
  - MAC 12-digit hexadecimal numbers (48 bits in length) – MM:MM:MM:SS:SS:SS
    - 00:0a:95:9d:68:16 this is the Network Interface Card (NIC)

Specialised devices 2 - Routers

- Connect networks to other networks and act as dispatchers.
    - They **analyse data** to be sent across a network, choose the **best routes** for it, and send it on its way.
    - **Connect** your **home** and **business** to the **world** and help **protect** information from outside **security threats**
- Identify a connected computer by is network assignedInternet Protocol (IP) address.
    - IPv4 addresses are usually represented in dot-decimal notation, consisting of four decimal numbers, each ranging from 0 to 255
        - xxx.xxx.xxx.xxx -> 192.168.1.0

Types of computer networks 1

While similar in their overall objectives, various types of networks fulfil different purposes.

Here are two:

- LAN
- WAN

Types of computer networks 2

LAN

- is a collection of connected devices in one physical location, such as a home or an office.
- can be small or large, ranging from a home network with one user to a large enterprise network with thousands of users and devices, with a limited area.
- may include both wired and wireless devices.

Types of computer networks 3

WAN

- extends over a large geographical area and connects individual users or multiple LANs, the Internet ∴ can be considered a WAN.
- large organisations use WANs to connect their various sites, remote employees, suppliers, and data centres so they can run applications and access necessary data.
- physical connectivity in WANs can be achieved by leased lines, cellular connections, satellite links, and other means.