

Class 4

Communication and Computer Networks

Lesson 2....Transmission Technology and Scale

Abstract

In this lesson the student will have an overview about the technology that is used in network connections and the types of such connections in terms of wire or wireless connections.

Key points;

Introduction

There is no generally accepted **taxonomy** into which all computer networks fit, but two dimensions stand out as important: **transmission technology** and **scale**. We will now examine each of these in turn.

There are two types of **transmission technology** that are in widespread use: **broadcast** links and **point-to-point** links.

Point-to-point links connect individual pairs of machines. To go from the source to the destination on a network made up of point-to-point links, short messages, called **packets** in certain contexts, may have to first visit one or more intermediate machines. Often multiple routes, of different lengths, are possible, so finding good ones is important in point-to-point networks.

Point-to-point transmission with exactly one sender and exactly one receiver is sometimes called **unicasting**.

In contrast, on a **broadcast network**, the communication channel is shared by all the machines on the network; packets sent by any machine are received by all the others. A wireless network is a common example of a broadcast link, with communication shared over a coverage region that depends on the wireless channel and the transmitting machine.

An alternative criterion for classifying networks is by **scale**. Distance is important as a classification metric because different technologies are used at different scales.

Q\ “What are the main criteria for networks classification? List and explain with examples? “

In Fig. below, the systems are classifying by their rough physical size. At the top are the **personal area networks**, networks that are meant for one person. Beyond these come longer-range networks. These can be divided into local, metropolitan, and wide area networks, each with increasing scale. Finally, the connection of two or more networks is called an **internetwork**. The worldwide Internet is certainly the best-known (but not the only) example of an internetwork.

Interprocessor distance	Processors located in same	Example
1 m	Square meter	Personal area network
10 m	Room	Local area network
100 m	Building	
1 km	Campus	Metropolitan area network
10 km	City	Wide area network
100 km	Country	
1000 km	Continent	The Internet
10,000 km	Planet	

Figure 1-6. Classification of interconnected processors by scale.

Personal Area Networks (PANs)

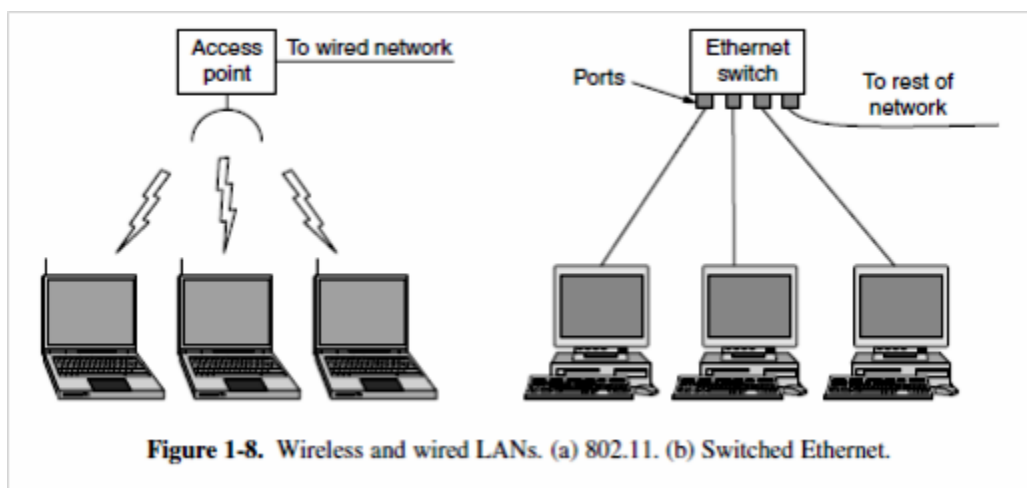
Let devices communicate over the range of a person. A common example is a wireless network that connects a computer with its peripherals. Without using wireless, this connection must be done with cables. A short-range wireless network called Bluetooth to connect these components without wires. The idea is that if your devices have Bluetooth, then you need no cables.

Local Area Networks

LAN is a privately owned network that operates within and nearby a single building like a home, office or factory. LANs are widely used to connect personal computers and consumer electronics to let them share resources (e.g., printers) and exchange information. When LANs are used by companies, they are called enterprise networks.

There is a standard for wireless LANs called IEEE 802.11, popularly known as **WiFi**, a device called **wireless router** (or access point (AP)) are used with this networks.

The topology of many wired LANs is built from **point-to-point links**. IEEE 802.3, popularly called **Ethernet**, is, by far, the most common type of wired LAN. Fig. below shows a sample topology of switched Ethernet and WiFi.



Metropolitan Area Networks

A MAN (Metropolitan Area Network) covers a city. The best-known examples of MANs are the cable television networks available in many cities. In fact, Cable television is not the only MAN, though. Recent developments in high speed wireless Internet access have resulted in another MAN, which has been standardized as IEEE 802.16 and is popularly known as WiMAX.

Wide Area Networks

A WAN (Wide Area Network) spans a large geographical area, often a country or continent. WANs, using the example of a company with branch offices in different cities.

The machines that use WAN connection will be called as hosts. The rest of the network that connects these hosts is then called the communication subnet, or just subnet for short. The job of the subnet is to carry messages from host to host, just as the telephone system carries words (really just sounds) from speaker to listener.

The cellular telephone network is another example of a WAN that uses wireless Technology Each cellular base station covers a distance much larger than a wireless LAN, with a range measured in kilometers rather than tens of meters. The base stations are connected to each other by a backbone network that is usually wired. The data rates of cellular networks are often on the order of 1 Mbps, much smaller than a wireless LAN that can range up to on the order of 100 Mbps.

Internetworks

A collection of interconnected networks is called an **internetwork or internet**. These terms will be used in a generic sense, in contrast to the worldwide **Internet** (which is one specific internet), which we will always capitalize. The Internet uses **ISP networks** (Internet Service Provider) to connect **enterprise networks** (LAN), home networks, and many other networks.

Note: A network is formed by the combination of a subnet and its hosts. The term “subnet” makes the most sense in the context of a wide area network, where it refers to the collection of routers and communication lines owned by the network operator. A network is formed by the combination of a subnet and its hosts.