Understanding computer networks

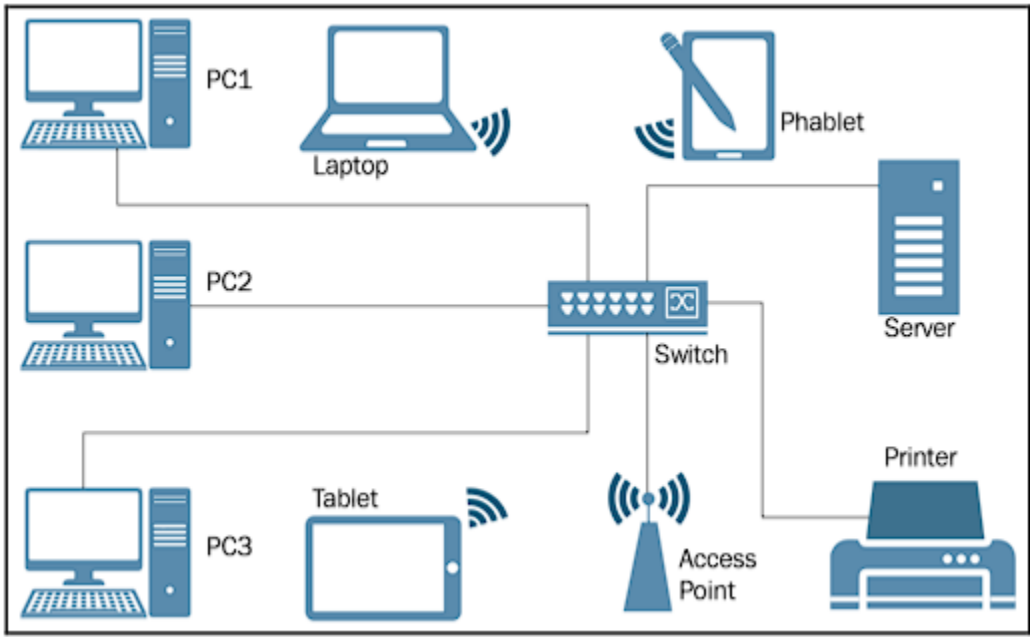
It all began many years ago when the need for sharing resources became a necessity. As time went by and demands increased, the development and advancement of computer network technologies also took place. With that, more computers were connected to computer networks and geographical distances were diminished in terms of communication. It created a need for well-defined terms and concepts to describe computer networking. Because of that, different types of computer networks, network topologies, architectures, and components have emerged.

Let's begin by understanding what a computer network is.

What is a computer network?

From my experience, people often confuse what a computer network is with what a computer network does. While the first explains what constitutes a computer network, the latter shows the benefits of a computer network. In Figure 1.1 we can see that a computer network is a group of computers connected to each other in order to share resources. The resources are usually data, network services, and peripheral devices:

Figure 1.1: A typical computer network



A computer network is divided into different types. Let's take a look at each of them individually.

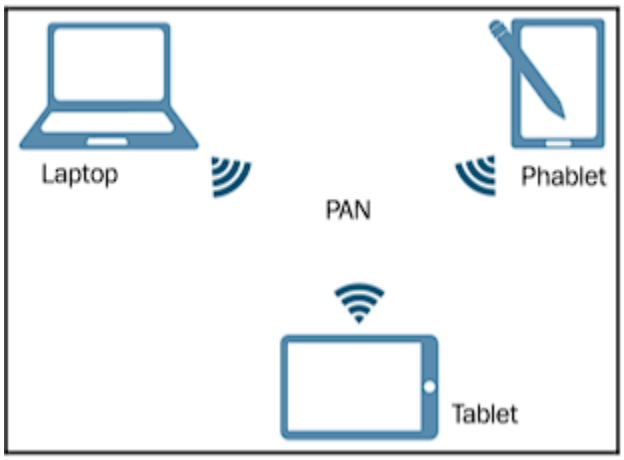
Types of computer networks

In general, the categorization of computer networks consists of the area they cover and the purpose they serve. Some of the most popular types of computer networks nowadays are described in the following subsections.

Personal Area Network (PAN)

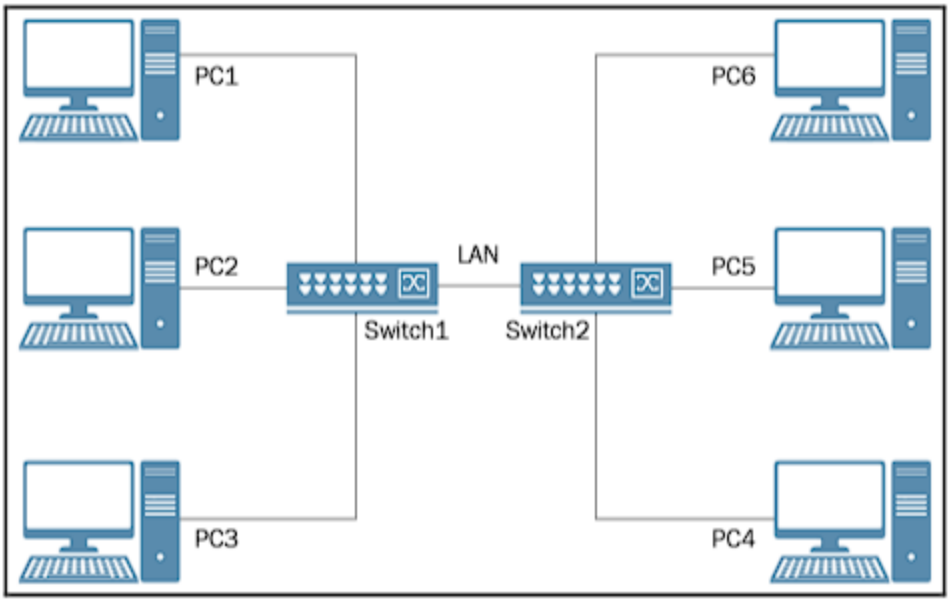
A Personal Area Network (Figure 1.2) is a computer network that is used to connect and transmit data among devices located in a private area that is partially or completely protected from external access. Bluetooth and Wi-Fi are the most common communication technologies used to interconnect devices in a PAN. Often, a PAN is also known as a Home Area Network (HAN):

Figure 1.2: A PAN



Another type of network is local area network (LAN). However its coverage is far greater than a PAN. Let's learn more about it next section.

LAN



A LAN (Figure 1.3) is a computer network that connects two or more computers in a local area. Try to understand a local area as one single room, a floor, several floors, a building, or several buildings adjacent to each other at a distance that Ethernet communication technology permits. A LAN usually utilizes a central device that uses twisted pair, coaxial, or fiber optic cables as a networking media to interconnect computers:

Figure 1.3: A LAN

The next type of network that we are going to look at is the Metropolitan Area Network (MAN).Its coverage is even greater than a LAN.

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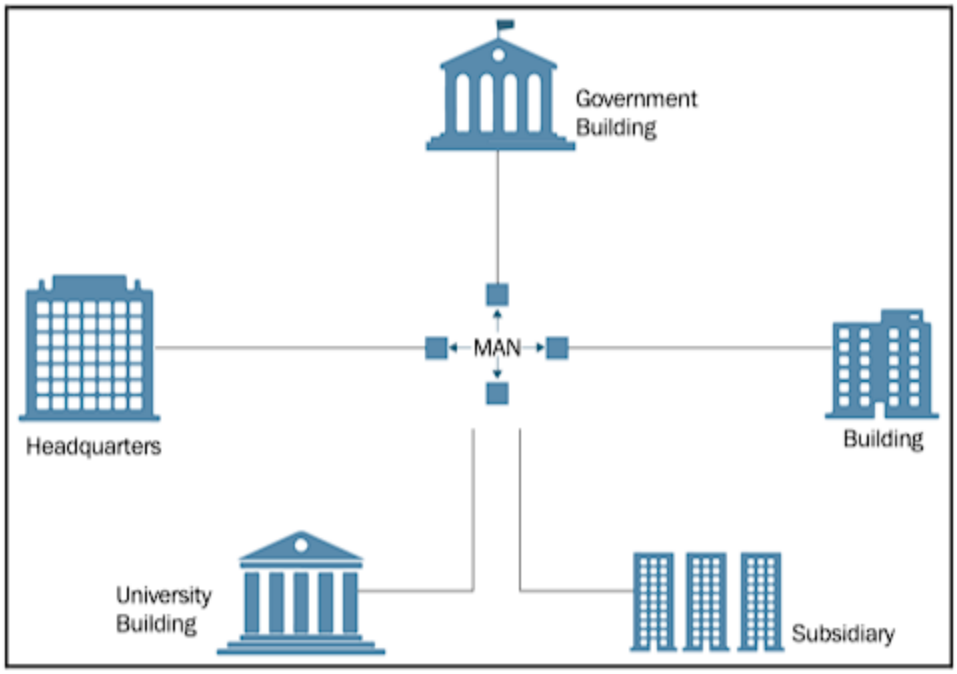
MAN

In contrast to a LAN, a MAN (Figure 1.4) represents a group of LANs interconnected within the geographical boundary of a town or city. Nowadays, fiber optics and gigabit layer 3 switches are used to interconnect LANs and route the traffic among them, as seen in the following figure:

Figure 1.4: A Metropolitan Area Network



Finally, we will understand what is a wide area network (WAN) which has the greatest coverage.

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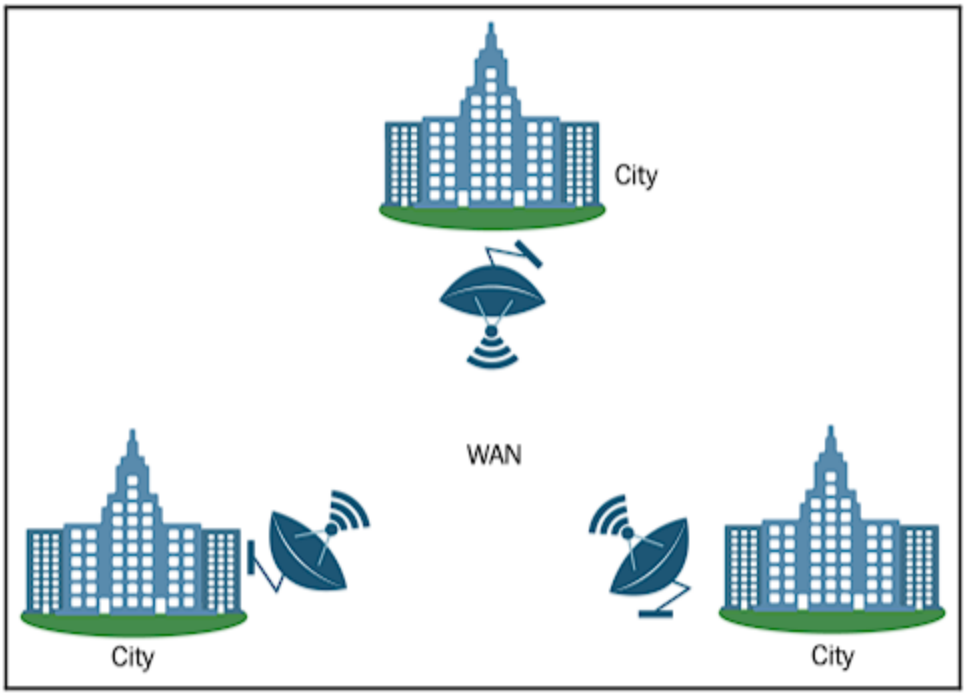
WAN
Unlike a MAN, a WAN (as shown in Figure 1.5) is a computer network that covers a wide geographic area using dedicated telecommunication lines such as telephone lines, leased lines, or satellites. WANs cover large geographic areas and, as such, they do not have geographic restrictions. The internet is the best example of a WAN:

Figure 1.5: A Wide Area Network



Now that we've understood the different types of computer networks, let's take a look at the underlying components that make up these networks.