

# Networking principles 18277

[Technology](#), [Computer](#)



## INTRODUCTION OF NETWORKING

One problem that I see with people today is that they are unaware what a computer network is. They might have heard of a computer network, but they are clueless as to how it works or why it works. People have basic questions that need to be answered. My goal is to give basic network information that will hopefully answer those questions.

To give people an understanding about computer networks there are several areas that I must focus on. I will give definitions of some network jargon. Many people may have heard or seen these words, but never knew what they meant. Another part that is important is the history of networking. By giving a brief history of networking, this will give the reader a good foundation to start on. They need to know how networking came around and why it is such a big part of our lives today. Also, I will explain why it is important to understand networking. I will then explain what a network is made up. There is a lot of confusing hardware in a network, but it is relatively simple. Finally, I will tie everything together and explain how the network works.

## NETWORKING - WHAT DOES THAT MEAN?

Before I go into detail about networking and all the hardware that networks are made up, I must define a few terms. I want people to know what a word means when they see it. Here are a few terms that I will have in my report as well as several other important ones. You can find these terms in the glossary of this report.

## THE HISTORY OF NETWORKS

The next thing that I am going to talk about is the history of networking. I am going to tell how networking came about and who was the first to experiment with it. I will also show some statistics about the Internet and its growth.

In the 1950s, there was no interaction between the users and their programs while they were running on the computers. No direct communications were involved. Jobs were brought to the machine to be run in a batch.

## THE BEGINNING

In the 1960s, time-sharing brought about the first interactive access to computers. This was a mix of data transmission technology and a teletypewriter. The result was an interactive terminal. These terminals were connected to a server with low-speed lines, allowing the users to interact with the computer and take advantage of its resources. Time-sharing gave multiple users the ability to use the computer at the same time, for completely separate tasks, and provided them with interactive feedback about what their programs were doing. Demand for the services of these large computers increased which meant upgrades had to be made frequently to keep the processing power ahead of the user need. These systems, called Mainframes, had been designed to provide computing power, but did not have the flexibility to satisfy the growing set of applications.

## MILITARY ACTION

Also, in the 1960's the military used networks to communicate to one another. It worked like the time-sharing network. They needed this network to communicate between cities, bases, and states. There was also a concern about a nuclear war. If there was a nuclear war how would people communicate? There needed to be a network that would be able to work after a nuclear strike. They came up with a "hot potato network." Basically the information would be tossed like a hot potato from user to user until it reached its destination. The actual route it took was not important. This meant that if big parts of the network were destroyed the message would try another route. As you can probably see this was not as efficient compared to the traditional telephone system.

## THE ALTAIR

During the 1970's and 1980's, networking was continuously being upgraded. Businesses, schools, and the government needed faster networking capabilities to handle all the people that were using the basic "time-sharing" network. In 1975, the first personal computer was marketed in kit form. This computer was called the Altair. The Altair features 256 bytes of memory. Bill Gates, with others, wrote a BASIC program for the machine so it could perform small tasks. The next year Apple began to market its PC's, also in kit form. It included a monitor and keyboard. In 1976, Queen Elizabeth went online with the first royal email message.

## PUBLICITY

During the next few years the personal computer gained the interests of many people. Microsoft, Apple, and many smaller PC related company's formed. By 1977 stores begin to sell PC's. Continuing today, companies strive to reduce the size and price of PC's while increasing capacity. IBM introduced its PC in 1981(it's actually IBM's second attempt, the first failed miserably).

## THE INTERNET

The Internet as we know today as the Information Superhighway was introduced in 1989. It was formed through a long chain of networks. It was a lot smaller back then. There was only a handful of people that had a computer, and some of these people were not familiar with a modem. In 1989 the Internet had about 3900 domains and 130, 000 hosts. Today there are over 3 million domains and 36 million hosts. In reality the Internet formed through the formation of the ARPANET. The ARPANET was the first stage of networking, and the second stage was BITNET. These two early networks were the start of the Internet. It can be said that the Internet is the third step of the network process.

## BIGGER AND BETTER

You can see that ever since networking was first introduced people have been constantly trying to improve it and make it faster. This is going to continue for thousands of years. It is important to understand that networking plays an important part in your life. Networking does a lot of your banking. An ATM machine is connected to network. When you insert your

ATM card or credit card to withdraw money, the ATM is checking to see if you have enough funds available. It does this by sending information to your credit card bank or your local bank. It then confirms that there is money in your account and out comes your money. What people might not understand is that when they get a loan it is done by a computer network. Cash is not sent to the person in which you bought the product, the banks basically connect to one another and your lender sends them the money in the form of electronic cash.

## HARDWARE IN A NETWORK

A network is made up of several pieces of hardware. Each piece of hardware plays an important role in the network. There are 5 basic pieces of hardware that are in a LAN and WAN. Both LAN's and WAN's have network cards, hubs, cable, and a server. A WAN has one more thing than a LAN. This is a router. In the next section of my report I will explain how all this hardware works.

In order to explain how everything works, people must know what I am talking about. Here are pictures of the pieces of hardware that I will be talking about.

## NETWORK CARD (NIC)

The network card is installed on a computer that wishes to be connected to a LAN or a WAN. After it is connected it allows a connection to a hub and then data can be shared amongst several computers.

## HUBS

Hubs work directly with a network card. If a computer has a network card plugged into it, then cable can be ran from the hub to the card. This will make the sharing of data between two or more computers possible. This hub has 8 ports on it. That means that it is possible to connect up to 8 computers together. Hubs come in different sizes. You can find 4, 6, 8, 12, 16, and 25 port hubs. There are larger ones, but they would be used for big businesses with many computers connected to the network.

## ROUTERS

The router enables several hubs to be connected together from several LAN's. This would make the network a WAN. It has ports on it just like a hub does. The router will enable data to be sent from LAN to LAN in the WAN. It is like a big relay station. It gets a signal from LAN1 and finds out that the signal needs to be sent to LAN2. It does so fast it is instantaneous.

## CABLE

No picture available.

The cable that is the "highway" for networks is fairly basic. It is known as CAT5. Which means it is a Category 5 class cable. There are different Categories for cables. The lower the Category generally means a decrease in how much data can travel through it, which means slower speeds for the network. The cable has 8 strands of wire inside it. Each strand has a different color and either sends or receives information. A magnetic shield located in the housing of the cable protects the strands from outside interference.

## NETWORKING IN ACTION

Now that you know a little about the history of networking and the hardware that is in a network, I can explain how it all fits together. There are many steps that a network goes through to complete a task that was issued by an end user. I will explain each step of the process and give a schematic of the process.

## THE LOCAL AREA NETWORK

The schematic that I am showing you is one of a LAN. It is a small network with six workstations and a server. Due to the fact that this is a LAN, there is no need for a router. However, you still see hubs, workstations, and servers. The network is complete when all pieces of hardware are connected to one another. For instance, the workstations are connected to hubs via their network cards. The hubs are then connected to server hubs, which then leads to the server. It is a big chain, and if the chain gets broken anywhere down the line, the network will not function properly. The cable serves as the links to the chain. Sometimes, the cable can break, which will cause a fault. The picture below will show this in greater detail.

## THE WIDE AREA NETWORK

A WAN is really similar to the LAN. It looks basically the same except that there are more workstations and there would be a router connected to the file server hub. Without the router, data could not be shared between two networks. This is because each network has its own "fingerprint" which is called tcp/ip. This fingerprint enables only users who are properly configured



for the network to use it. If I were to try to log on to Kettering's network from my house, I could not do it. Even if I ran a cable from my house to Kettering, the task could not be completed. The only way for me to connect to their network is if I configured my computer to recognize Kettering's "fingerprint." That is why a router is needed. It will allow two networks to properly identify each other, and thus allow data to be shared between them. Although the schematic below only shows a few workstations, it still gives a basic idea of the networking concept.

### SAMPLE NETWORK (LAN)

#### The Benefits of Understanding Networking

Now you are going to ask why all this is important to know. I will give a few reasons why I think it is important. One thing that people misinterpret is that networks are complicated. This in turn will intimidate them. This is the wrong approach to take. Networking is not too complicated. The big problem is remembering all the technical jargon. That is something that will take a little time, but learning the concept of networking is fairly simple.

#### More Money for your Company

There are quite a few reasons why networks are important to understand. The first reason is that understanding them will help you at your job. There are a lot of times when people are using files off the network and they run into a problem. Usually, the person will have to call the network administrator for help. Sometimes the administrator is too busy to help you right away, or he/she may be gone for the day. This means that you would

have to either find something else to do, or cancel your plans on the project for that day. This will cost the company money, and money is really important (especially to your boss). If you knew how a network functions, you could solve the problem on your own. This means that you would save the company money.

### Beneficial for School

Understanding networking can also be beneficial in school. During the beginning of this term there was a new network installed. Kettering did not give any information to the students on how to connect to this network from the dorm area. If you wanted to connect your computer to the network, you had to call computer services and they took you through a bunch of confusing steps. There were a few people that knew a lot about networks, so they helped everyone in the dorms connect to the network. This was really helpful to people that did not know anything about networking. However, if they knew how to do it on their own, they could connect themselves to the network and save time. These are only a couple of explanations why it is important to understand networks. I will give a bulleted list of several other reasons to learn about networks.

- resource sharing
- reliability
- cost savings
- communications

- Employees can share information, such as inventory information, customer records, or accounting data.
- Employees can swap files without printing them or passing around disks.
- Employees who are traveling or telecommuting are able to access files and applications on the network from remote computers.
- All employees have access to both the Internet and e-mail.
- Employees can use devices, such as printers and fax machines, without leaving their desks.

## GLOSSARY OF TECHNICAL TERMS

### LOCAL AREA NETWORK (LAN)-

A data communications network which is geographically limited to a 1 km radius allowing easy interconnection of terminals, microprocessors, and computers within adjacent buildings. Ethernet is an example of a standard LAN.

### WIDE AREA NETWORK (WAN)-

A network usually constructed with serial lines extending over distances greater than one kilometer. A wide area network acts just like a LAN, but it covers a larger area.

### HUB-

It is used to connect several computers together. It enables computers to share data by being a relay station for the computers.

#### NETWORK CARD-

Hardware connected to the motherboard of a computer. It will then be used to provide a physical connection to a network.

#### ROUTER-

A device connected to a WAN that enables information to be sent to other computers on the WAN.

#### HOST-

A computer which is connected to a LAN or a WAN.

#### DOMAIN-

On the Internet, " domain" is most commonly used to refer to a group of computers whose hostnames share a common suffix, the domain name.

#### iNTERNET (not capitalized)-

A set of networks that are interconnected with one another by a router.

#### INTERNET (capitalized)-

The Internet is the largest internet in the world. It is a three level hierarchy composed of several networks. These include commercial (. com), university (. edu) and other research networks (. org, . net), and military (. mil)

networks. They span over many different physical networks around the world.

#### SERVER-

The server is the mainframe computer in a network. It stores all data and runs the operating system for the network. All computers on a network have access to this computer.

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