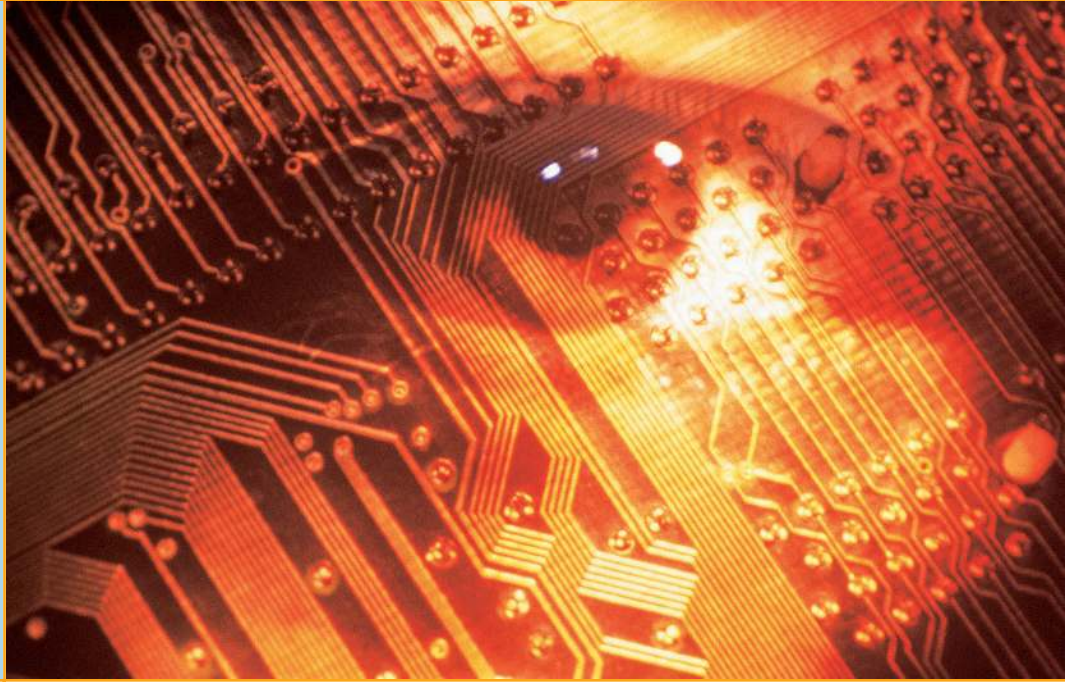


chapter
1

Introducing Basic Network Concepts

"In the beginning, there were no networks. Life was bad."

—MIKE MEYERS



In this chapter, you will learn how to:

- Identify human and computer networks
- Describe the benefits of networks
- Distinguish between the different types of networks

Networks are everywhere—or so it seems. You can hardly do anything with data that does not involve a network. Like the human networks that we are all part of, computer networks let us share information and resources. In business, the reliance on networks is even more pervasive than in homes or schools. Networks help individuals and businesses alike save money, but they also help create income. Without a doubt, networking within the home will catch on over the next few years as it has in business. Soon, nearly all individuals in even moderately developed nations will have networked components throughout their homes. Those that don't will be *netologically* disadvantaged because they will not be able to learn or to function at the same level as those who are networked.

In this chapter, you'll begin by relating networks to situations and concepts you already know. Once you have a basic understanding of what networks are and what they can do, it helps if you can actually begin working with them. In fact, it is so helpful to learn the ropes of networking through hands-on guided practice that that's what is planned for you here. You will play the role of an employee in a fictional company, and you'll have to learn on the job. The more you *become* the person, the more you will learn about the need for and operation of computer networks.

■ Understanding Networks

Although you are probably taking this class to learn about computer networks, and some of you probably already know how important networks are to businesses that want to survive, we will begin this discussion as though you are an employee in a netologically disadvantaged (my term for those who have minimal network awareness) company. You might actually be an employee working for such a company and trying to help it out of that predicament, or you may know of people or companies that are in this sort of struggle.

Lauren has recently been hired as the computer manager for SinkRSwim Pools. Lauren is a certified networking administrator, but her new company unfortunately has only outdated computers. The owner recognized that the company's lack of growth was directly tied to the employees' lack of computer skills, so in her first meeting after being hired, Lauren was given the authority to purchase the additional computers and create the network she had proposed to the owner in her initial job interview. The owner gave her a six-month timeline in which to implement networking at SinkRSwim Pools in such a way that the workers will understand its use and welcome the new knowledge it requires. She was also informed that the thought of learning new computer skills frightened some long-term SinkRSwim Pools employees. The owner expects Lauren to help them become more at ease with the computers so they will be more likely to learn the necessary skills.

Lauren's first goal is to ease the workers' fears by teaching them about computers and showing them how a need for networks develops naturally. Lauren knows that if her fellow employees understand the concept of networking, the computer network will more likely be successful in the company. Lauren has decided to review basic network concepts with her coworkers as she works with them on their new computers.

Human Networks

In its broadest sense, a **network** consists of two or more entities, or objects, sharing resources and information. Although this book is about computer networks, there are networks that don't involve computers, and those networks are everywhere. You have grown accustomed to working with them, possibly without even knowing it.

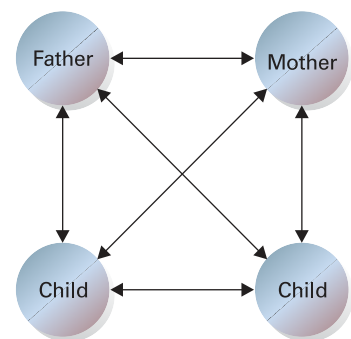
It may not matter to you that, in a basic sense, sharing (giving or getting) is a fundamental aspect of networking. You just know that you do it.

Family Network

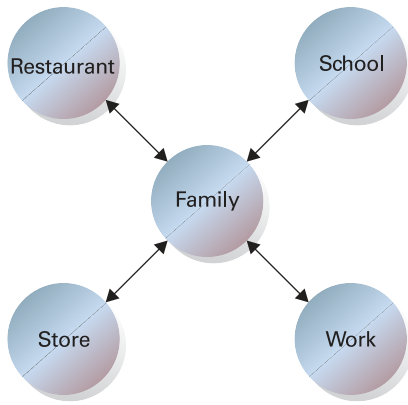
Most people belong to a family network in which related people share their resources and information. This sharing is bi-directional because even the youngest family members share information of some sort. As the family grows, so does the network.

Peer Network

Outside the family, there is a community that offers a wider array of resources than the typical family can provide. Naturally, it makes sense to



- A network connects members of a family together.

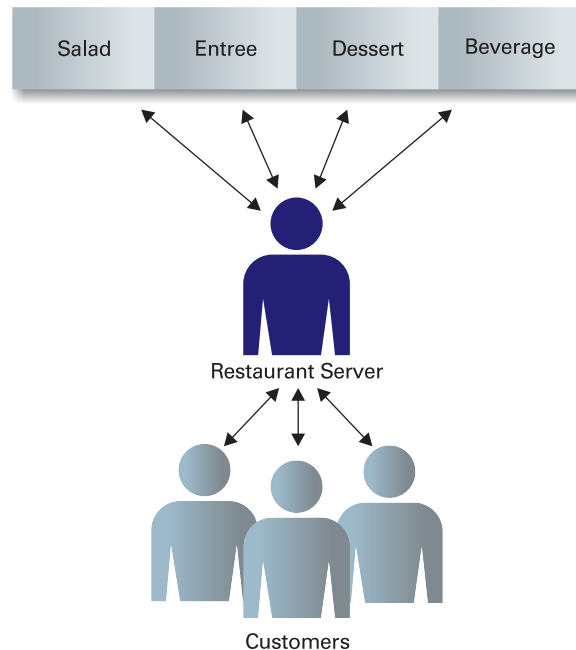


- The family network connects with the greater community.

connect the family to this community to take advantage of the wealth of resources available around town. This type of information/resource sharing can be as simple as loaning a hammer to a neighbor, car-pooling with work associates, or helping a friend with his or her homework. All of these activities involve sharing, or trading, resources. This kind of network is represented by a two-way relationship, a give and take among equals or peers.

Restaurant Network: The Client and the Server

So, in any type of human network, there's a lot of giving and taking. You're already more accustomed to the client/server perspective in networking than you realize. For instance, when you go to dinner at a restaurant, you become a customer, or **client**, enjoying the food and drink prepared and served to you by the restaurant. On the other hand, the waiter works as a **server**, controlling and providing his customers with access to resources in the form of placing orders for and delivering food items. The server knows that requests will be made of him (access is sought when an order is placed) and that he will service those making the requests (access is granted when the order is delivered).



- In a dining situation, it is easy to know whether you are supposed to be serving or being served.

Contact Network

Anyone who has looked for a job knows that one of the best ways to find a job is to network. That is, create a list of friends and associates who will help you find the perfect job. The more people you meet and get to know, the better your chances of obtaining work. As you develop and nurture your career, this contact network will serve you best because your role in it will



In sidebars and the end-of-chapter exercises throughout this coursebook, you will be working with a real-world company called Technology Education and Acquisition Center of Houston (TEACH) that is currently undergoing a sudden expansion. In fact, it has just posted an announcement in the local newspaper, listing several available management positions within the company. It seems there is an opportunity to acquire another highly successful facility in another part of the state, and all the current employees are moving. Later in the chapter, you will find yourself role-playing as one of the replacement candidates vying for one of the company's high-paying positions.

change as you gain more experience. Soon, you may be able to help the people who helped you. And as your personal and professional networks grow, so do your opportunities.

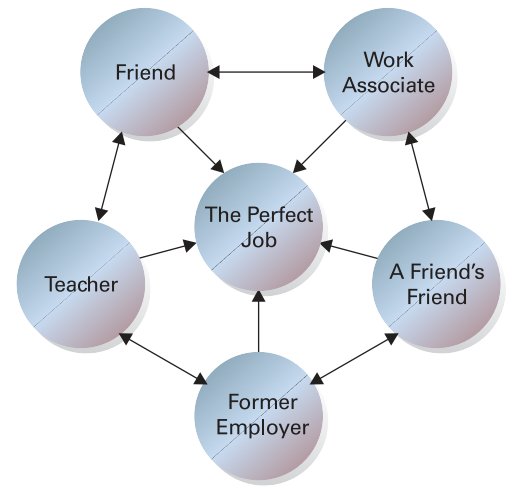
These examples of human networks should help you understand that networking is common between people and is not just an activity restricted to computers. However, this book will focus on computer networks—connecting computers and having them communicate with each other.

Computer Networks

A **computer network** consists of two or more computing devices that are connected in order to share the components of your network (its resources) and the information you store there, as shown in Figure 1.1. The most basic computer network (which consists of just two connected computers) can expand and become more usable when additional computers join and add their resources to those being shared.

The first computer, yours, is commonly referred to as your **local computer**. It is more likely to be used as a location where you do work, a **workstation**, than as a storage or controlling location, a server. As more and more computers are connected to a network and share their resources, the network becomes a more powerful tool, because employees using a network with more information and more capability are able to accomplish more through those added computers or additional resources.

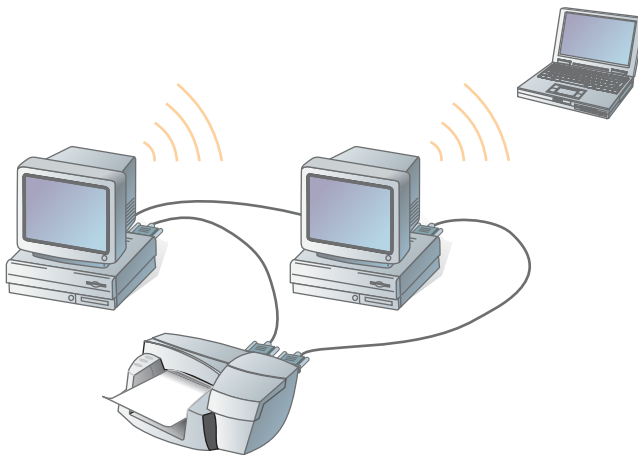
The real power of networking computers becomes apparent if you envision your own network growing and then connecting it with other distinct networks, enabling communication and resource sharing across both networks. That is, one network can be connected to another network and become a more powerful tool because of the greater resources. For example,



- The more people in your network, the better your chances of finding that perfect job.



For the remainder of this text, the term *network* will be used to mean *computer network*.



- **Figure 1.1** A computer network can be as simple as two or more computers communicating.



Cross Check

Identify Your Networks

You have already seen that you have been involved in networks for a long time and that computer networks are important tools for businesses. Use what you have learned as you answer the following questions:

1. Which basic human network best represents the interaction between you and your classmates in a discussion about your homework assignments?
2. If your lab had only stand-alone computers, what would be needed to convert it to a networked classroom?

you could connect the network you and your classmates develop for this course to similarly constructed networks from other introductory networking classes if you wanted them to share your information and networked resources. Those classes could be within your own school, or they could be anywhere in the world. Wherever that newly joined network is, the communication and resource sharing activities in that new network could then be shared with anyone

connected to your network. All you have to do is join that new network's community or allow its members to join yours.

In addition, a company's cost of doing business can be reduced as a result of sharing **data** (defined as a piece or pieces of information) and resources. Instead of having individual copies of the data at several locations around the company, and needing to keep all of them similarly updated, a company using a network can have just one shared copy of that data and share it, needing to keep only that one set of data updated. Furthermore, sharing networked resources (like printers) means that more people can use a particular resource and a wider variety of resources (like different printers) can be used by each network user. Any time a company can do more with less, or buy fewer items to do the same job, its total costs are reduced, and it is able to make more money per dollar spent.

Network Plan

Networking computers first and tracking the connections later can quickly become confusing and unmanageable as you try to find which computer communicates with and shares resources with which other computers. In your human network, do you share everything with your friends? In your family network, would you want your parents or guardians to know your every thought? You have your information-sharing plan in your head, and it is important to keep track of it so you don't make a mistake and share something where it was not intended.

Similar concerns must be considered while designing a computer network. Before you even connect your first computers together, you should have a plan. A **network plan**, therefore, is a formally created product that shows all the network's components and the planned connections between them. Such a plan is also used to manage the various types of information. Your plan should show what types of information are stored where, and who is allowed to use each type.

Information Management

Your network plan should help you manage the information gathered, stored, and shared between your users. If you were given an empty three-drawer filing cabinet and told to use it to organize your company's information, you would have an excellent (although manual) example of a filing system that needs a plan. Having an overall guide that tells you who will

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