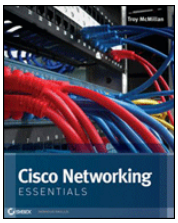

Chapter 1 - Networks
Cisco Networking Essentials
by Troy McMillan
Sybex © 2012 *Citation*

Recommend? yes no

Previous Next

Classifying Networks by Function

Networks can be classified according to a number of different characteristics. They can differ based on location, and they can differ in the security relationship that the computers have with another. These are not the only ways networks can differ, but they are commonly used distinctions. In this section, the distance factor is examined in a discussion of LANs and WANs. After examining LANs and WANs, you will take a closer look at defining networks by security relationships in the "Defining Network Architectures" section.

Understanding LANs

If you survey networking books, you will find that the distinction between a local area network (LAN) and a wide area network (WAN) differs from one text to the next. In some treatments of this subject, the difference lies in physical location, while in others the distinction is discussed in terms of the speed of the connection. Because this text is designed to prepare you to manage Cisco routers and switches, a Cisco perspective is appropriate.

Cisco defines a *LAN* as a high-speed data network covering a small geographical area. For the purposes of this discussion, a LAN is a single physical location, which could be a part of a building, an entire building, or a complex of buildings.

In the vast majority of cases, the network will use a networking technology called Ethernet. Other technologies do exist (such as one called Token Ring), but Ethernet has become the de facto standard technology that is used for connecting LANs.

> **Note** Ethernet is discussed in more detail in Chapter 2 and Chapter 5, "Physical and Logical Topologies."

> **Standards**
>
> As stated earlier in this chapter, a standard is an agreed upon way of doing things. In the networking world, there are two types: official and de facto. An *official standard* is one that all parties agree to and is usually adopted by a body formed to create standards, such as the International Organization for Standardization (ISO). A *de facto standard*, on the other hand, is one that becomes the standard simply by being the method that all parties gradually choose to use over a period of time, without a formal adoption process.

Ethernet networks are typically built, owned, and managed by an organization. It is impractical for the organization to connect offices in two cities with Ethernet cabling (for many reasons that will be discussed later, one of which is a limit on cable length of about 100 ft.).

In a LAN, all of the computers are connected with a high-speed connection. *High speed* is a relative term, but in this case, it indicates at least 10 Mbps. In most cases today, the connection will be either 100 Mbps or 1,000 Mbps. The location may contain multiple buildings; it could even be an entire complex, but if the buildings are connected with a high-speed connection, they would still collectively be considered a single LAN.

> **Note** Cables are discussed in Chapter 9.

Understanding WANs

A *wide area network (WAN)* is a collection of LANs connected to one another with a WAN technology or with the Internet, allowing it to function as one large network. In the previous section, the impracticality of a company strung together by private Ethernet lines from one office to another was mentioned. Above and beyond the cable length issue, there would be issues of where to place the cables and how to maintain them.

The solutions that are available are as follows:

- Leasing a WAN connection from a telecommunications company
- Using the Internet

When a WAN connection is leased from a telecommunications provider, the company offloads all maintenance and simply uses the existing network that the telecommunication provider built. The advantage to this approach is that your connection is dedicated, meaning there is no other traffic on it. WAN technologies do not use Ethernet. There are a variety of WAN connection types, such as Frame Relay, Integrated Services Digital Network (ISDN), and Point-to-Point Protocol (PPP), and each has advantages and disadvantages.

Note WAN technologies are beyond the scope of this book. For more information, simply search for WAN methods on the Internet.

Another available option is to use the Internet. When this approach is taken, the company creates a logical connection called a *virtual private network (VPN)* between the offices by using the Internet as the physical medium. It is called private because the information that crosses the Internet from one office to another is typically encrypted so that if it is intercepted, it cannot be read.

Regardless of the underlying details, a WAN is used to connect LANs. The relationship between the two network types is illustrated in Figure 1.6. The figure depicts three LANs in different cities using the wide area connection to form a WAN.

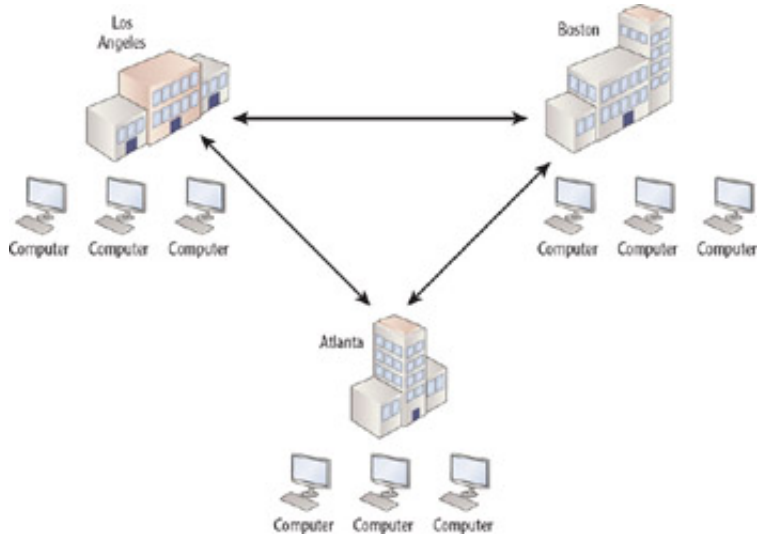

Figure 1.6: A wide area network (WAN)

Previous Next

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