Earlier in the chapter, you encountered the concept that networks actually use not one but several protocols. But how many protocols does a network need? Can you mix and match protocols? Can you use Ethernet with TCP/IP? Ethernet with Token Ring? This TechTalk section delves into the realm of communications protocols to help you make sense of the dizzying array of protocols you might encounter as you set up networks and Internet connections.

Why does a network need more than one protocol? Sending data over a network requires many activities. As an analogy, consider the activities that take place when you send a gift to a friend. First, you wrap the gift in colorful paper and attach a card—"Happy Birthday!" or whatever. Next, you pack the gift in a shipping box, making sure it is securely taped on all sides. You then paste on a shipping label with destination and return addresses. You take the box to the post office or a Mailboxes, Etc. store, or you can call FedEx or UPS. The shipper then loads your box on a truck. Well, you get the picture. Just like shipping a package, shipping data requires many activities. Each activity is handled by a communications protocol.

Does more than one protocol exist for a particular network activity? Yes. One activity can be handled by one of many protocols. Just as you might use a different address label for a UPS letter than for a FedEx letter, a network that uses IP uses an addressing scheme that is different from a network that uses IPX. No one would deny that the number of communications protocols can be overwhelming. To help classify and organize these protocols, many technicians turn to the OSI model.

What is OSI? The Geneva-based International Standards Organization developed the OSI model to bring some standardization to data communications networks. The OSI model (Open System Interconnection model) basically specifies that a communications network uses seven layers, as shown in Figure 5-57.

The OSI model is generic and was originally supposed to apply to all network types, including the Internet and LANs. The model is like a layer cake, with a collection of communications protocols stacked one on top of the other. The top of the cake is the Application layer. That's where your data begins its journey. From the Application layer, your data passes through successive layers until it reaches the Physical layer and is transmitted. When data arrives at its destination, it ascends from the Physical layer up to the Application layer.

What happens at the Application layer? The OSI model's Application layer encompasses any communications-enabled software that you might use to transfer a file, read a message, or perform other network-related activities. It allows you to specify which files you want to send and the destinations for those files. Software applications, such as your Web browser, FTP client, and e-mail client, operate at the Application layer of the OSI model.