

THE BASICS BOOK

*of OSI and Network
Management*



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This chapter features a gaggle of acronyms, almost none of them pronounceable.

To begin, there's a group called the ISO, the International Organization for Standardization. This group consists of representatives of the many constituencies within the wide world of data communications and telecommunications—from vendors to users to carriers. Among other things, the ISO has a committee working on a set of standards that will permit communication between different network management systems. This **Open Systems Interconnection (OSI)** Committee has developed a **Basic Reference Model** that describes an architecture in which overall data com-

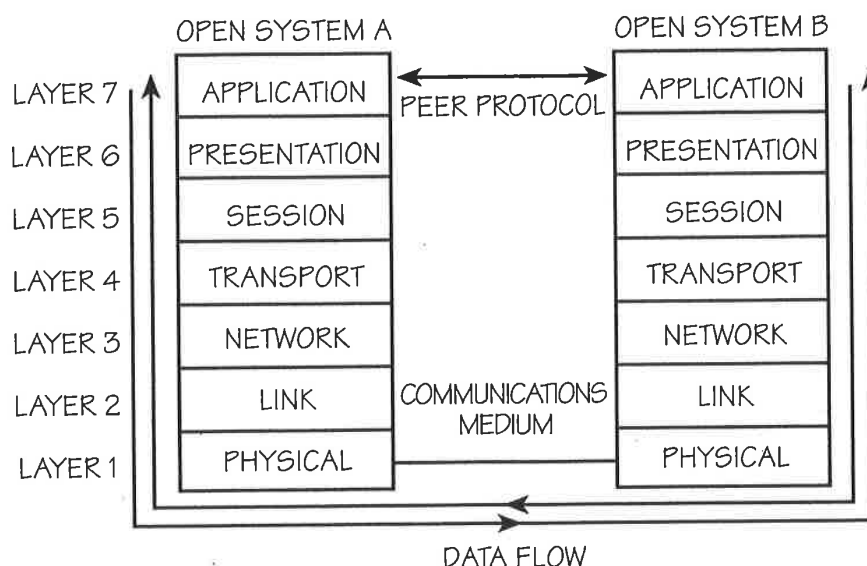
CHAPTER 3

The OSI Basic Reference Model subdivides overall data communications processes into seven functional layers.

munications activities are partitioned into seven functional layers (Figure 3).

Layers 1 through 3 (the *physical*, *data link*, and *network* layers) deal with getting data from Point A to Point B over a specific network technology (and,

figure 3



to a certain extent, also preparing the information for transport). Layers 4 through 7, in contrast, deal with communicating the data independent of the network used. The interface between adjacent layers standardizes access points so that hardware and software systems can be compatible with each other, regardless of manufacturer. Over the long run, this effort will make it possible for people to exchange data using products from multiple vendors, all of whom have made a commitment to *open* systems and standards, rather than *closed* (or *proprietary*) ones.

Each layer of the OSI Model performs a specific data communications task—a service to and for the layer that precedes it (e.g., the network layer provides a service for the transport layer). The process can be likened to placing a letter in a series of envelopes before it's sent through the postal system (Figure 4). Each succeeding envelope adds another layer of processing or overhead information necessary to process the transac-

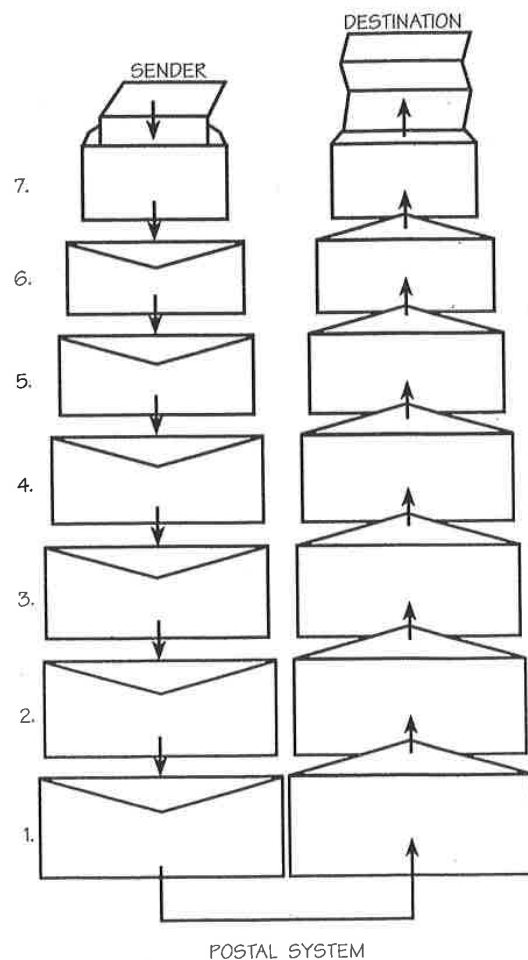
CHAPTER 3

tion. Together, all the envelopes help make sure the letter gets to the right address and that the message received is identical to the message sent. Once the entire package is received at its destination, the envelopes are opened one by one until the letter itself emerges exactly as written.

In a datacomm transaction, however, each end user is unaware of the envelopes, which perform their functions transparently. For example, we can track an automatic teller machine (ATM) transaction through our multilayer system. One multiple layer system (Open

The OSI Basic Reference Model can be likened to placing a letter in a series of envelopes; each envelope bears information necessary to ensure the letter arrives at its proper address exactly as written. Once the letter reaches its destination, the envelopes are opened one by one, until the letter itself emerges.

figure 4



CHAPTER 3

System A) provides an application layer that is an interface to the person attempting a transaction, while the other multiple layer system (Open System B) provides an application layer that interfaces with ATM applications software in the bank's host computer. The corresponding layers in Open Systems A and B are called peer layers and communicate through **peer protocols**. These peer protocols provide communication support for the user's application, performing transaction-related tasks such as debiting an account, dispensing currency, or crediting an account.

Actual data flow between the two open systems (Open System A and Open System B), however, is from top to bottom in one open system (Open System A, the source), across the communications line, and then from bottom to top in the other open system (Open System B, the destination). Each time user application data pass downward from one layer to the next in the same system, processing information is added. When that information is removed and processed by the peer layer in the other system, it causes various tasks (error correction, flow control, etc.) to be performed. You, the ATM user, are unaware of any of this, of course, but in fact that's what's happening while the words, "Please wait, your transaction is being processed" appear on the screen.

To date, the ISO has labored away on all seven layers, which are summarized below in the order in which the data actually flow as they leave the source:

- Layer 7, the *application* layer, provides for a user application (such as getting money from an ATM) to interface with the OSI application layer. That OSI application layer has a corresponding peer layer in the other open system, the bank's host computer.
- Layer 6, the *presentation* layer, makes sure the user information (a request for \$50 in cash to be debited from your checking account) is in a format (i.e., syntax or sequence of ones and zeros) the destination open system can understand.
- Layer 5, the *session* layer, provides synchronization control of data between the open systems (i.e., makes sure the bit configurations that pass through layer 5

CHAPTER 3

at the source are the same as those that pass through layer 5 at the destination).

- Layer 4, the *transport* layer, ensures that an end-to-end connection has been established between the two open systems (i.e., layer 4 at the destination “confirms the request for a connection,” so to speak, that it has received from layer 4 at the source).
- Layer 3, the *network* layer, provides routing and relaying of data through the network (among other things, at layer 3 on the outbound side an “address” gets slapped on the “envelope” which is then read by layer 3 at the destination).
- Layer 2, the *data link* layer, includes flow control of data as they pass down through this layer in one open system and up through the peer layer in the other open system.
- Layer 1, the *physical interface* layer, includes the ways in which data communications equipment is connected mechanically and electrically, and the means by which the data move across those physical connections from layer 1 at the source to layer 1 at the destination.

WHAT OSI MANAGEMENT IS (OR WILL BE)

OSI Management is a software application of the OSI application layer. Its mission is to manage the *managed objects* (a phrase we’ll return to shortly) that represent the OSI layer protocols and the communication services provided by those protocols.

As we stated in Chapter 2, open standards for network management are increasingly important. Why? Because users have an ever-growing need to build, service, expand, and *manage* a reliable and flexible network. These important tasks can’t be accomplished efficiently when one NMS is sitting cheek-by-jowl with another one, and each is managing a different proprietary system.

Standards facilitate both choice and integration, and they stimulate a healthy degree of competition among vendors. Standards, it turns out, are not necessarily vanilla.