Event	Segment 1	Segment 2	Frame Travels
Bridge boots	–	–	–
A sends to B	A	–	Both Segments
B sends to A	A, B	–	Segment 1 only
X broadcasts	A, B	X	Both Segments
Y sends to A	A, B	X, Y	Both Segments
Y sends to X	A, B	X, Y	Segment 2 only
C sends to Z	A, B, C	X, Y	Both Segments
Z sends to X	A, B, C	X, Y, Z	Segment 2 only

Figure 17.4 Example of a learning bridge with computers A, B, and C on one segment and computers X, Y, and Z on another.

We can summarize:

An adaptive bridge uses the source MAC address in a packet to record the location of the sender, and uses the destination MAC address to determine whether to forward the frame.

17.7 Why Bridging Works Well

It is important to know that once a bridge learns the locations of all computers, a bridged network can exhibit higher overall performance than a single LAN. To understand why, it is important to know that a bridge permits simultaneous transmission on each segment. In Figure 17.3, for example, computer A can send a packet to computer B at the same time computer X sends a packet to computer Y. Although it receives a copy of each packet, the bridge will not forward either of them because each packet has been sent to a destination on the same segment as the source. Thus, the bridge merely discards the two frames without forwarding them. We can summarize:

Because a bridge permits simultaneous activity on attached segments, a pair of computers on one segment can communicate at the same time as a pair of computers on another segment.

The ability to localize communication makes it possible to bridge between buildings on a campus or between a residence and an ISP. Most communication is local (e.g., a computer communicates with a printer in the same location more often than it communicates with a printer in a remote location). Thus, on a campus, a bridge can