Chapter 7

ARP and RARP

Objectives

Upon completion you will be able to:

- ***Understand the need for ARP***
- ***Understand the cases in which ARP is used***
- ***Understand the components and interactions in an ARP package***
- ***Understand the need for RARP***

Figure 7.1 *ARP and RARP*

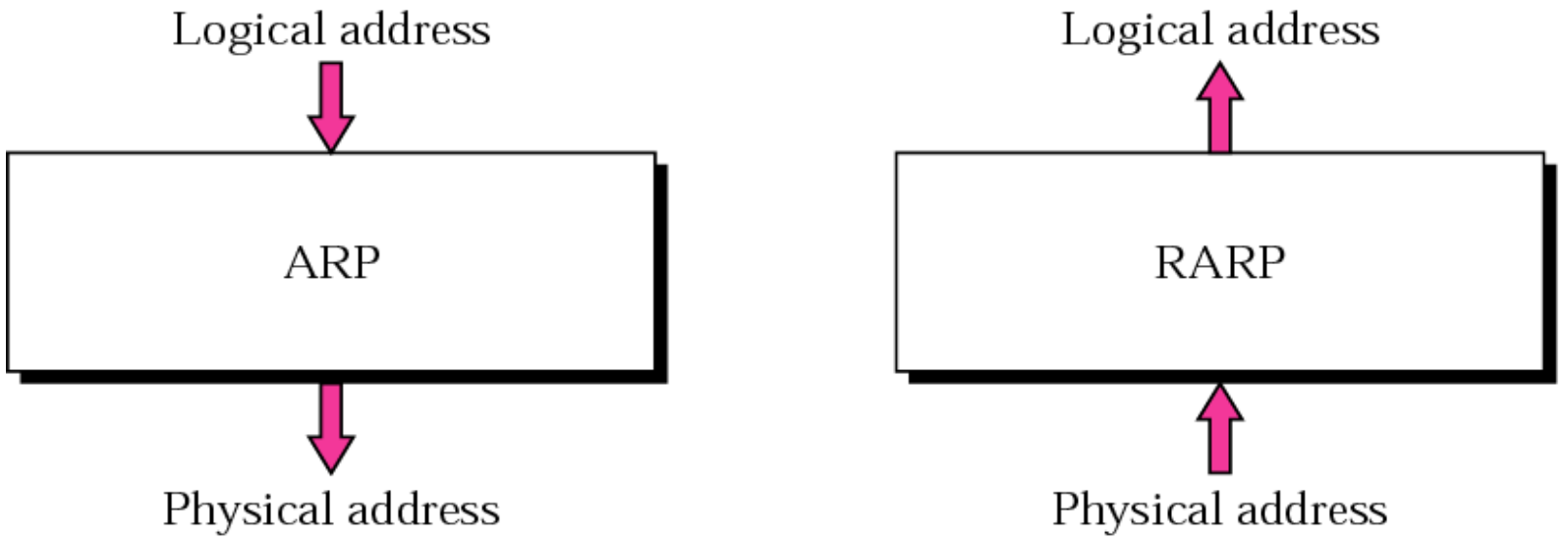
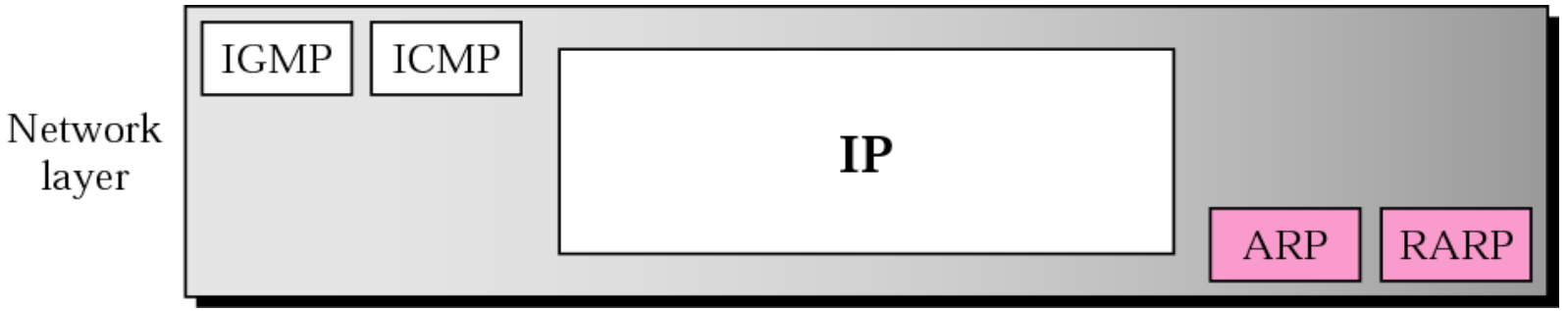


Figure 7.2 *Position of ARP and RARP in TCP/IP protocol suite*



7.1 ARP

ARP associates an IP address with its physical address. On a typical physical network, such as a LAN, each device on a link is identified by a physical or station address that is usually imprinted on the NIC.

The topics discussed in this section include:

Packet Format
Encapsulation
Operation
ARP over ATM
Proxy ARP

Figure 7.3 *ARP operation*

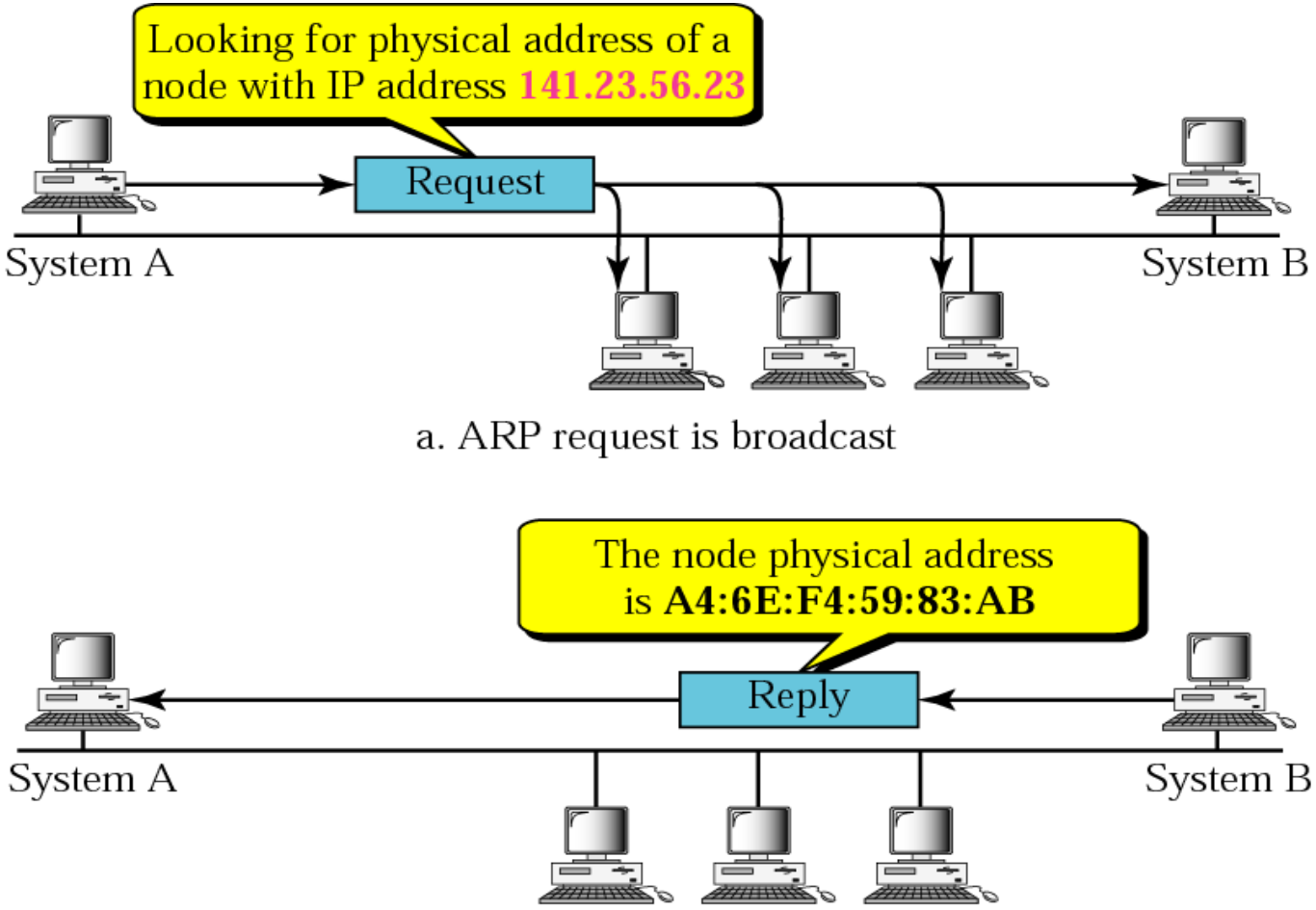


Figure 7.4 *ARP packet*

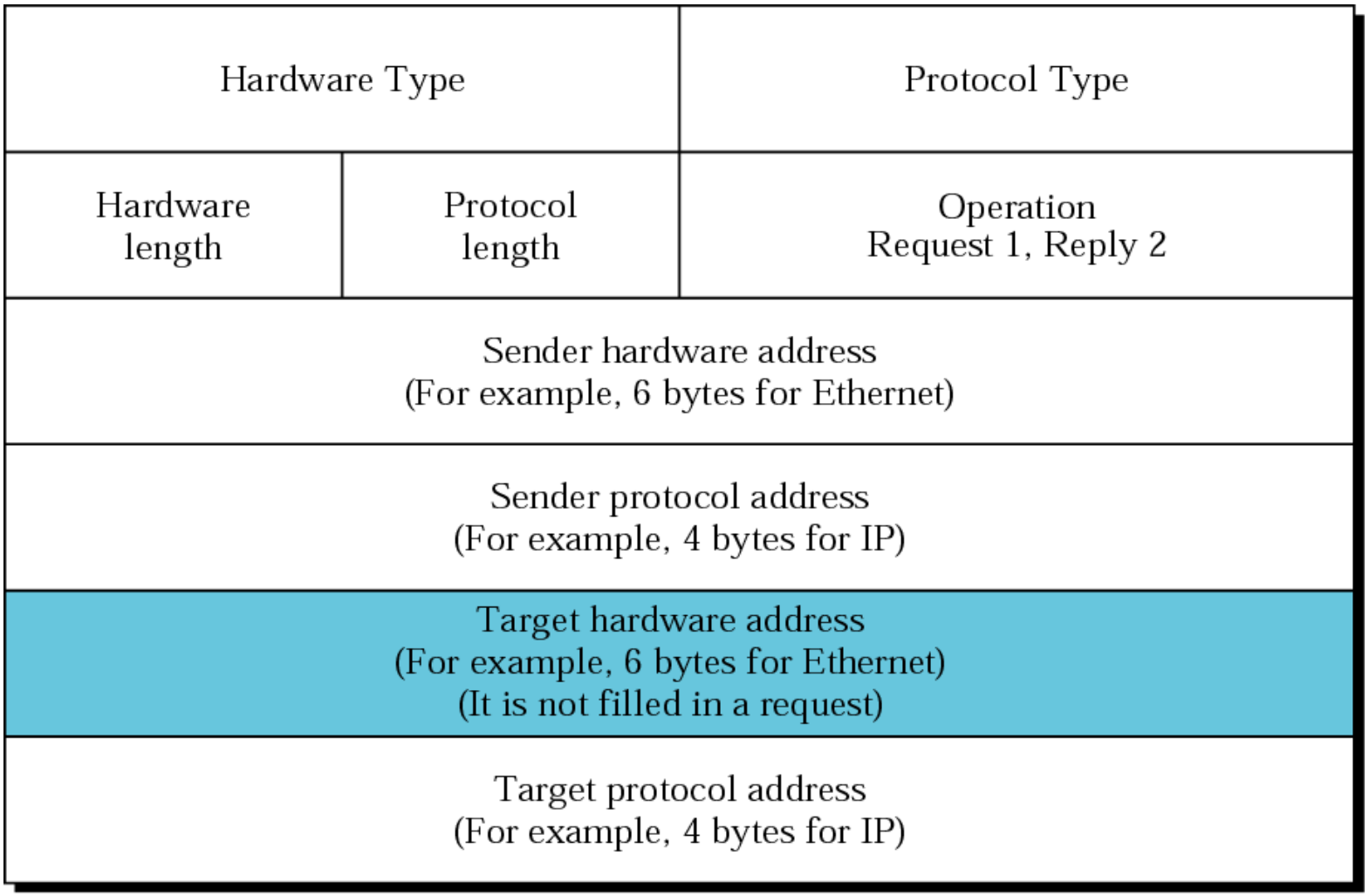


Figure 7.5 *Encapsulation of ARP packet*

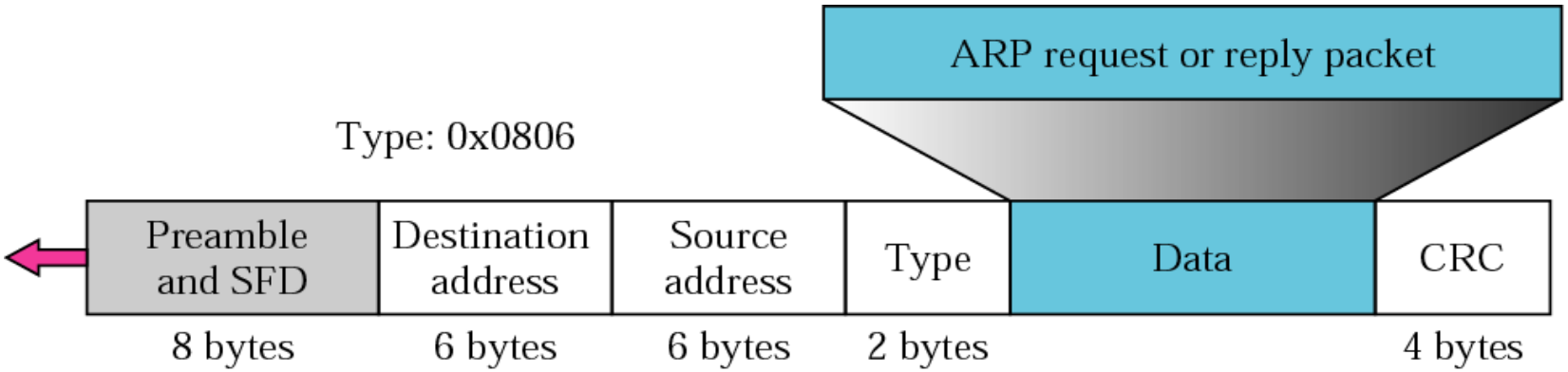
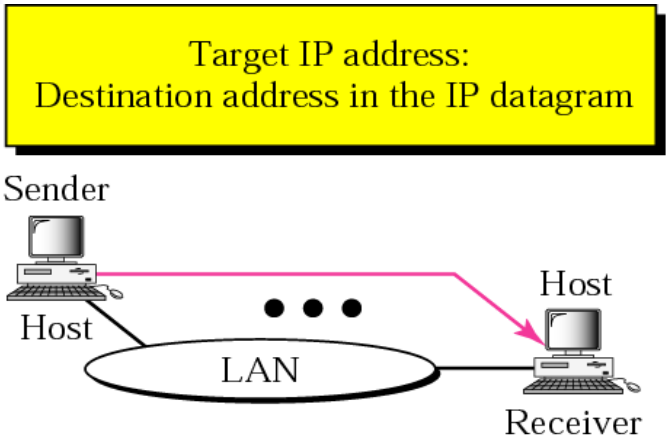
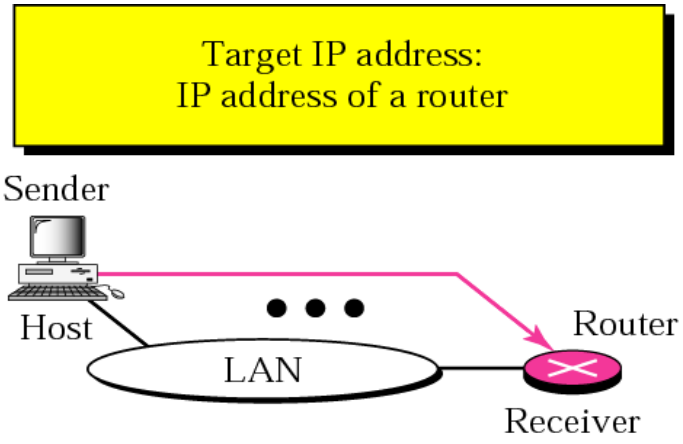


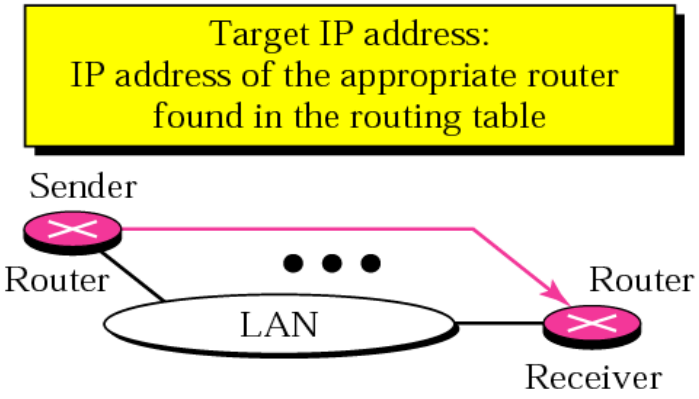
Figure 7.6 *Four cases using ARP*



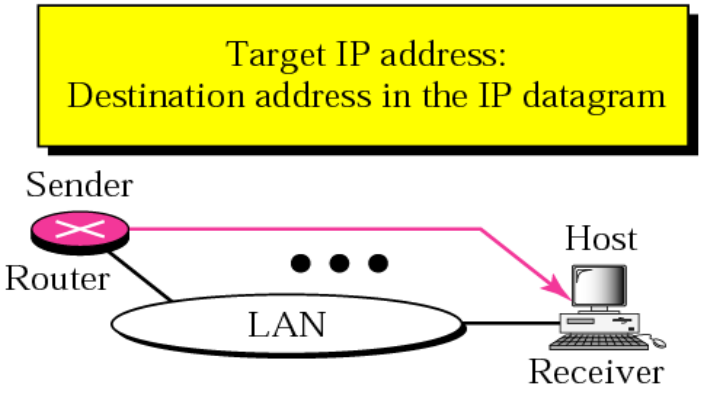
Case 1. A host has a packet to send to another host on the same network.



Case 2. A host wants to send a packet to another host on another network.
It must first be delivered to a router.



Case 3. A router receives a packet to be sent to a host on another network.
It must first be delivered to the appropriate router.



Case 4. A router receives a packet to be sent to a host on the same network.

An ARP request is broadcast; an ARP reply is unicast.

Example 1

A host with IP address 130.23.43.20 and physical address B2:34:55:10:22:10 has a packet to send to another host with IP address 130.23.43.25 and physical address A4:6E:F4:59:83:AB (which is unknown to the first host). The two hosts are on the same Ethernet network. Show the ARP request and reply packets encapsulated in Ethernet frames.

See Next Slide

Example 1 (Continued)

Solution

Figure 7.7 shows the ARP request and reply packets. Note that the ARP data field in this case is 28 bytes, and that the individual addresses do not fit in the 4-byte boundary. That is why we do not show the regular 4-byte boundaries for these addresses. Also note that the IP addresses are shown in hexadecimal. For information on binary or hexadecimal notation see Appendix B.

See Next Slide

Figure 7.7 *Example 1*

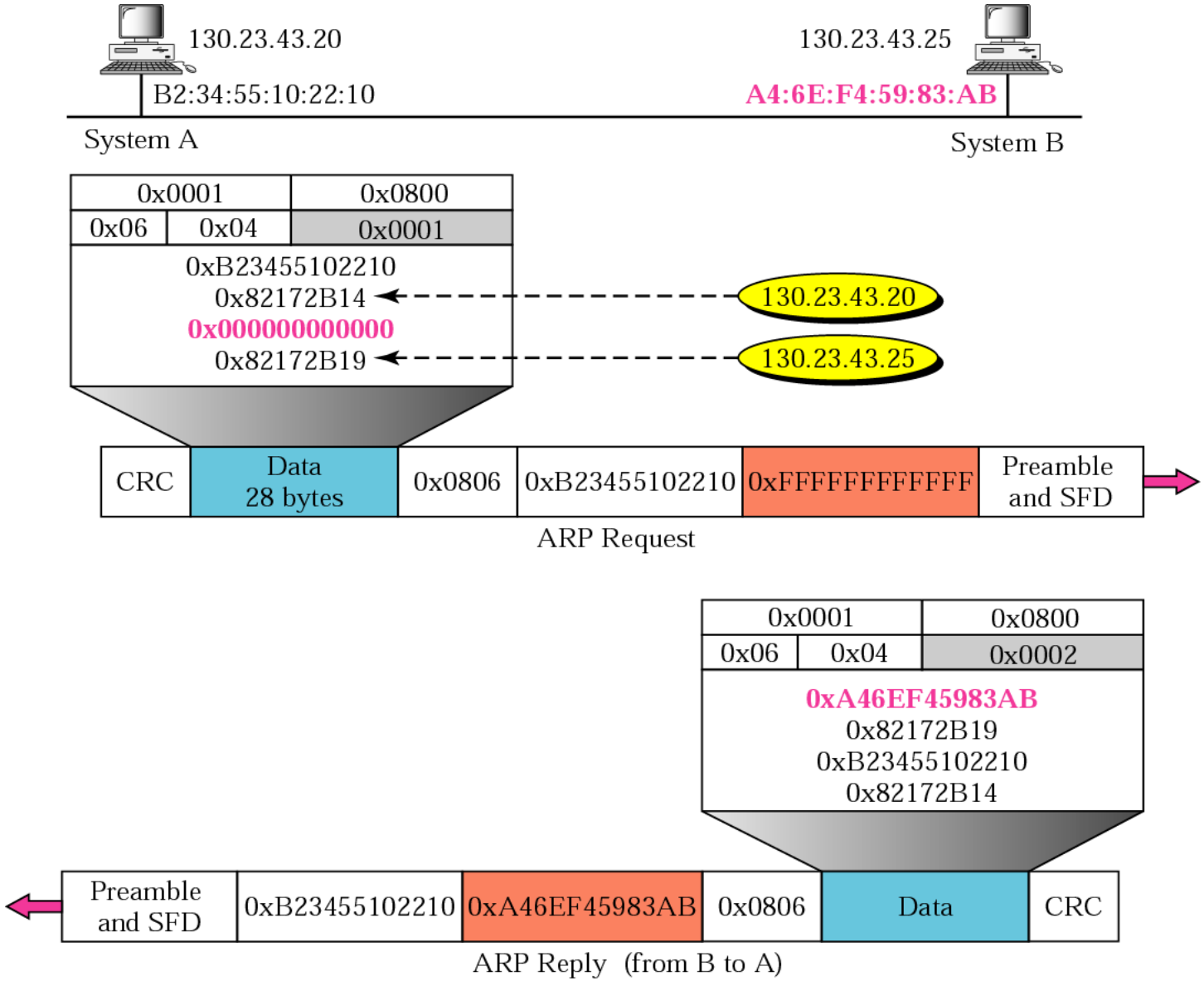
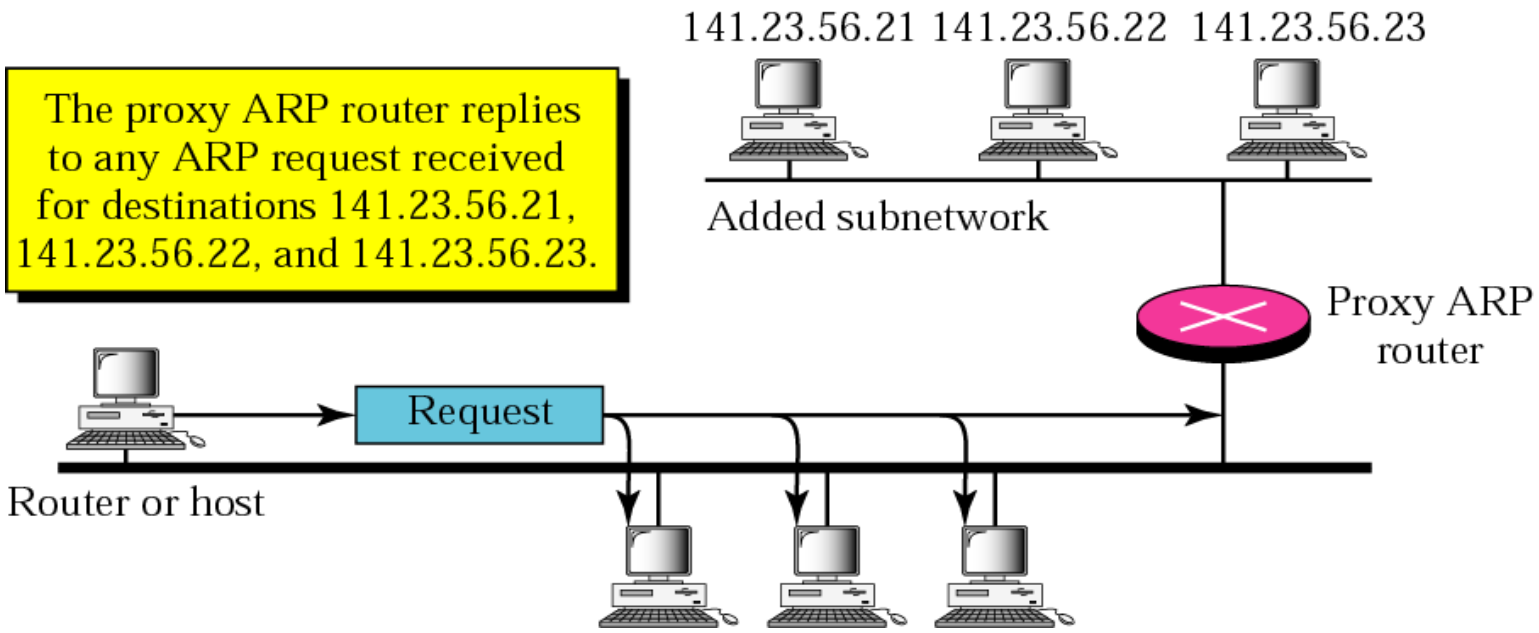


Figure 7.8 *Proxy ARP*



7.2 ARP PACKAGE

In this section, we give an example of a simplified ARP software package to show the components and the relationships between the components. This ARP package involves five modules: a cache table, queues, an output module, an input module, and a cache-control module.

The topics discussed in this section include:

Cache Table
Queues
Output Module
Input Module
Cache-Control Module

Figure 7.9 *ARP components*