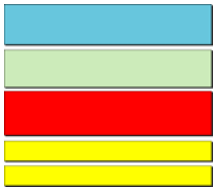


Chapter 24

Mobile IP

Objectives

Upon completion you will be able to:

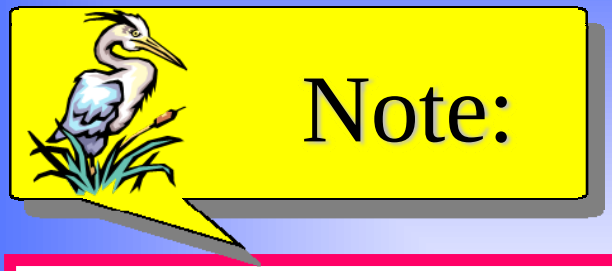
- ***Understand the addressing scheme for mobile hosts.***
- ***To define home, care-of, and co-located care-of addresses***
- ***Understand the interactions between a home and a foreign agent***
- ***Know the three phases involved in mobile communication***
- ***Understand why mobile IP communication can be inefficient***

24.1 ADDRESSING

The main problem that must be solved in providing mobile communication using the IP protocol is addressing.

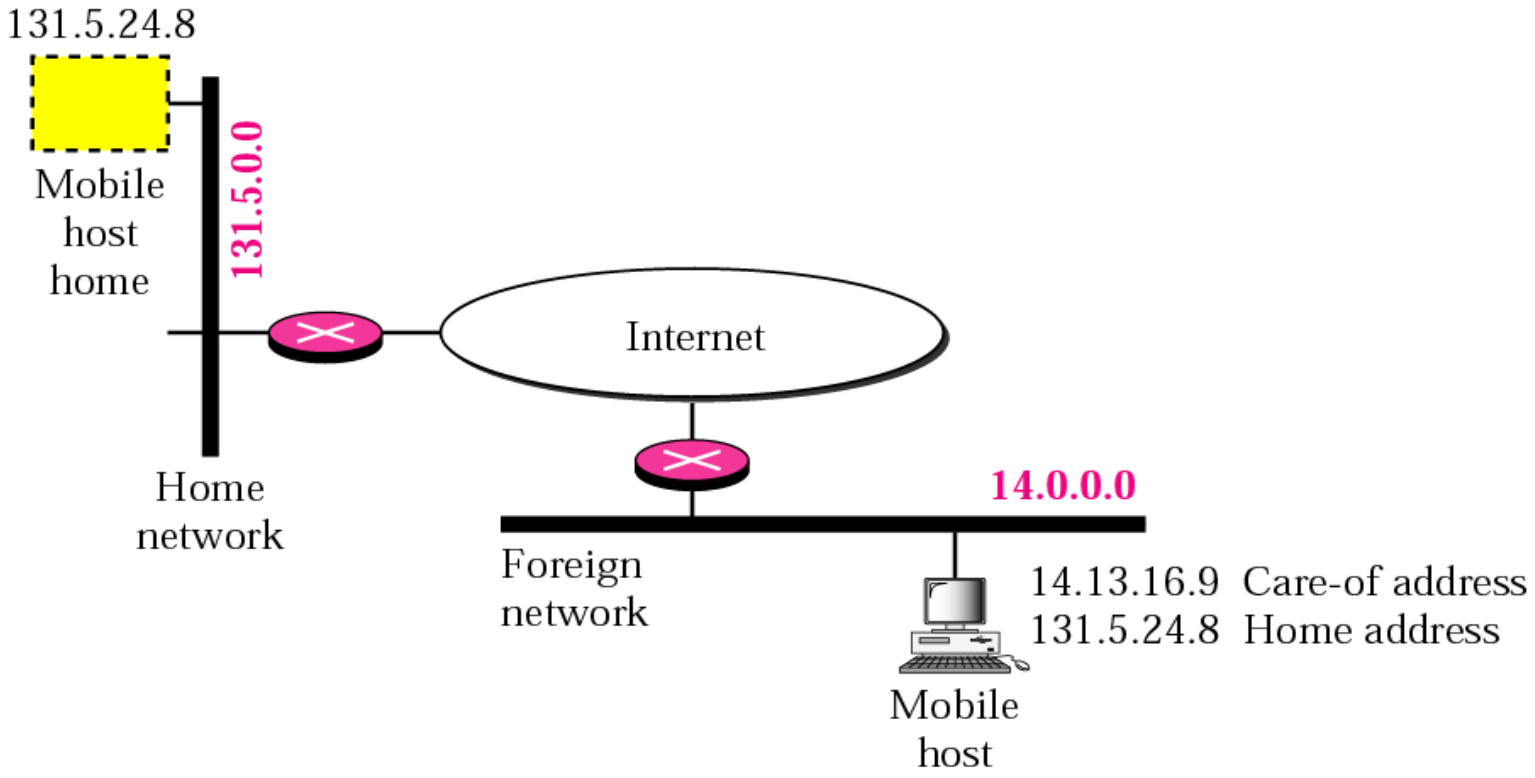
The topics discussed in this section include:

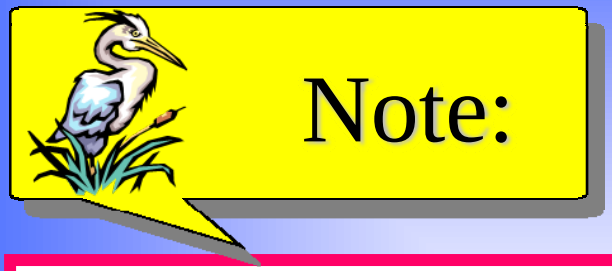
Stationary Hosts
Mobile Hosts



The IP addresses are designed to work with stationary hosts because part of the address defines the network to which the host is attached.

Figure 24.1 *Home address and care-of address*





Mobile IP has two addresses for a mobile host: one home address and one care-of address. The home address is permanent; the care-of address changes as the mobile host moves from one network to another.

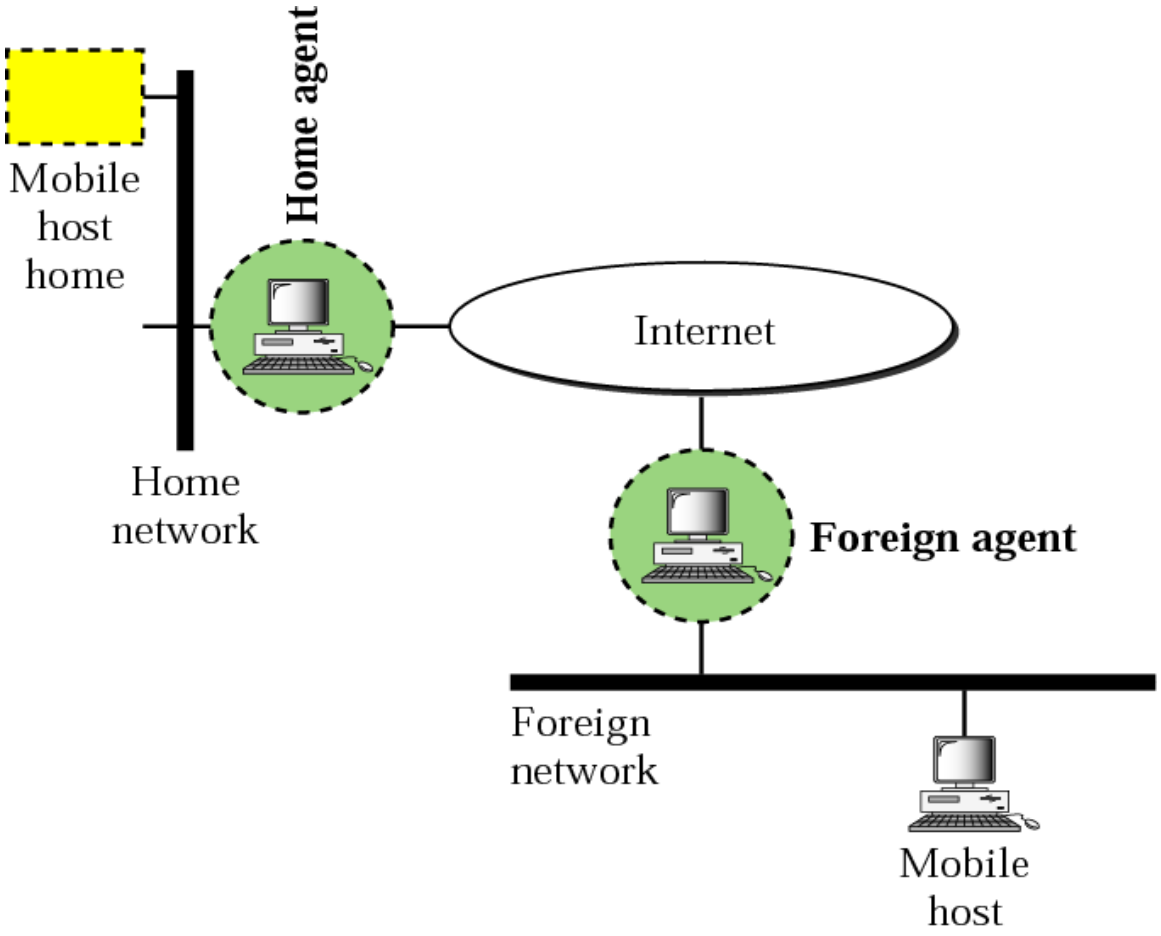
24.2 AGENTS

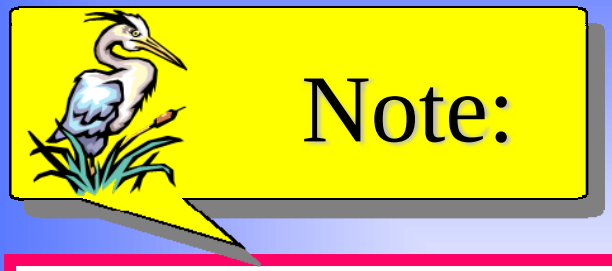
To make the change of address transparent to the rest of the Internet requires a home agent and a foreign agent. The specific function of an agent is performed in the application layer.

The topics discussed in this section include:

Home Agent
Foreign Agent

Figure 24.2 *Home agent and foreign agent*





When the mobile host and the foreign agent are the same, the care-of address is called a co-located care-of address.

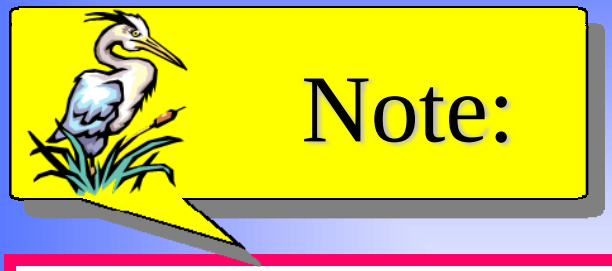
24.3 THREE PHASES

To communicate with a remote host, a mobile host goes through three phases: agent discovery, registration, and data transfer.

The topics discussed in this section include:

Agent Discovery
Registration
Data Transfer

Figure 24.3 *Remote host and mobile host communication*



Mobile IP does not use a new packet type for agent advertisement; it uses the router advertisement packet of ICMP, and appends an agent advertisement message.

Figure 24.4 *Agent advertisement*

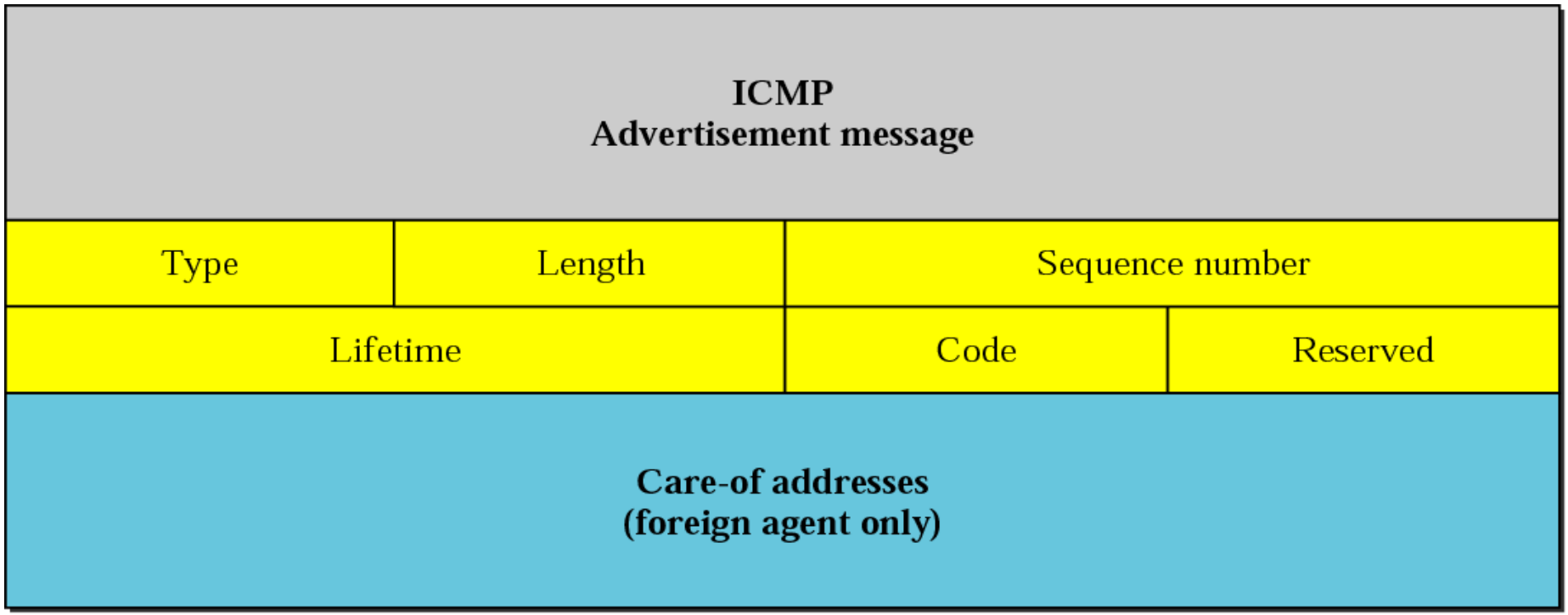
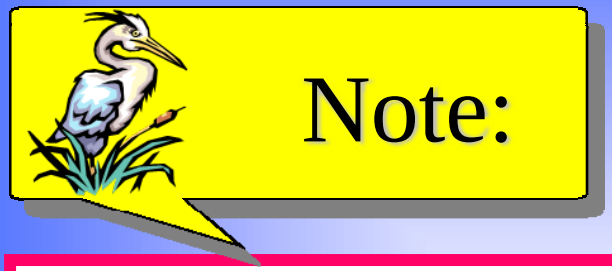


Table 24.1 Code bits

Bit	*Meaning*
0	Registration required. No co-located care-of address.
1	Agent is busy and does not accept registration at this moment.
2	Agent acts as a home agent.
3	Agent acts as a foreign agent.
4	Agent uses minimal encapsulation.
5	Agent uses generic routing encapsulation (GRE).
6	Agent supports header compression.
7	Unused (0).



Mobile IP does not use a new packet type for agent solicitation; it uses the router solicitation packet of ICMP.

Figure 24.5 *Registration request and reply*

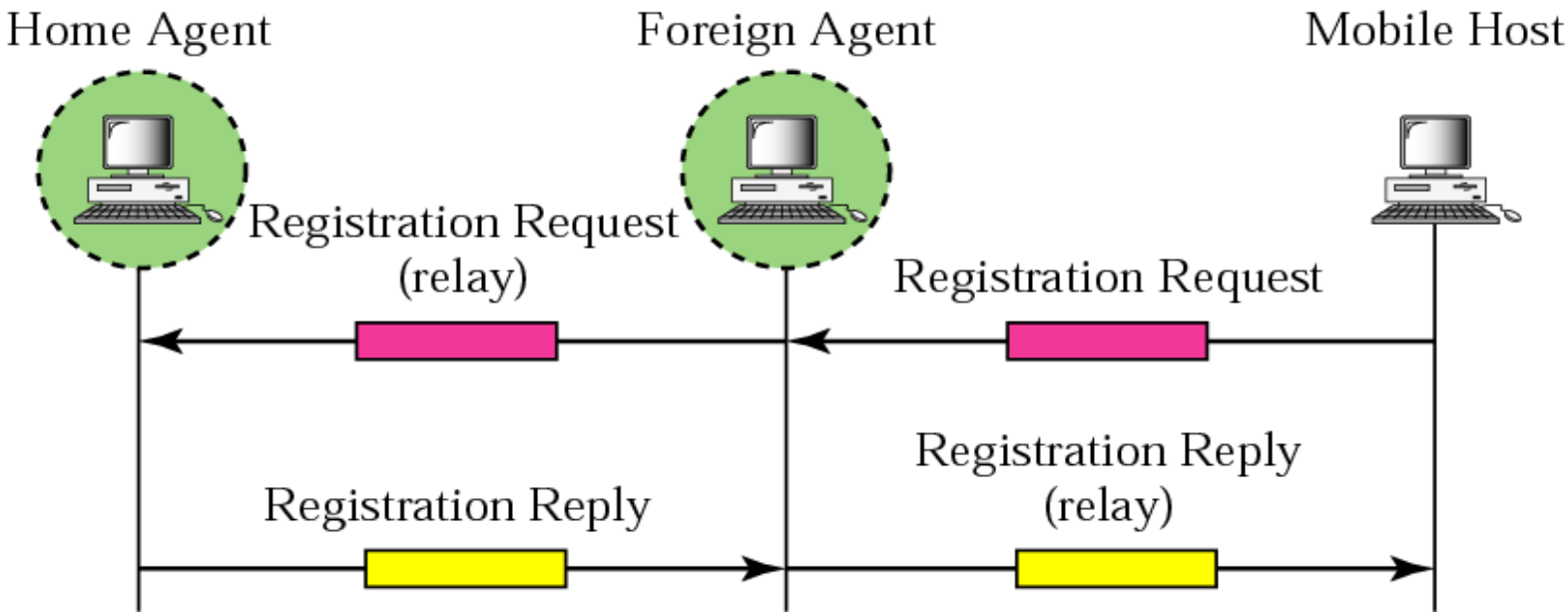


Figure 24.6 *Registration request format*

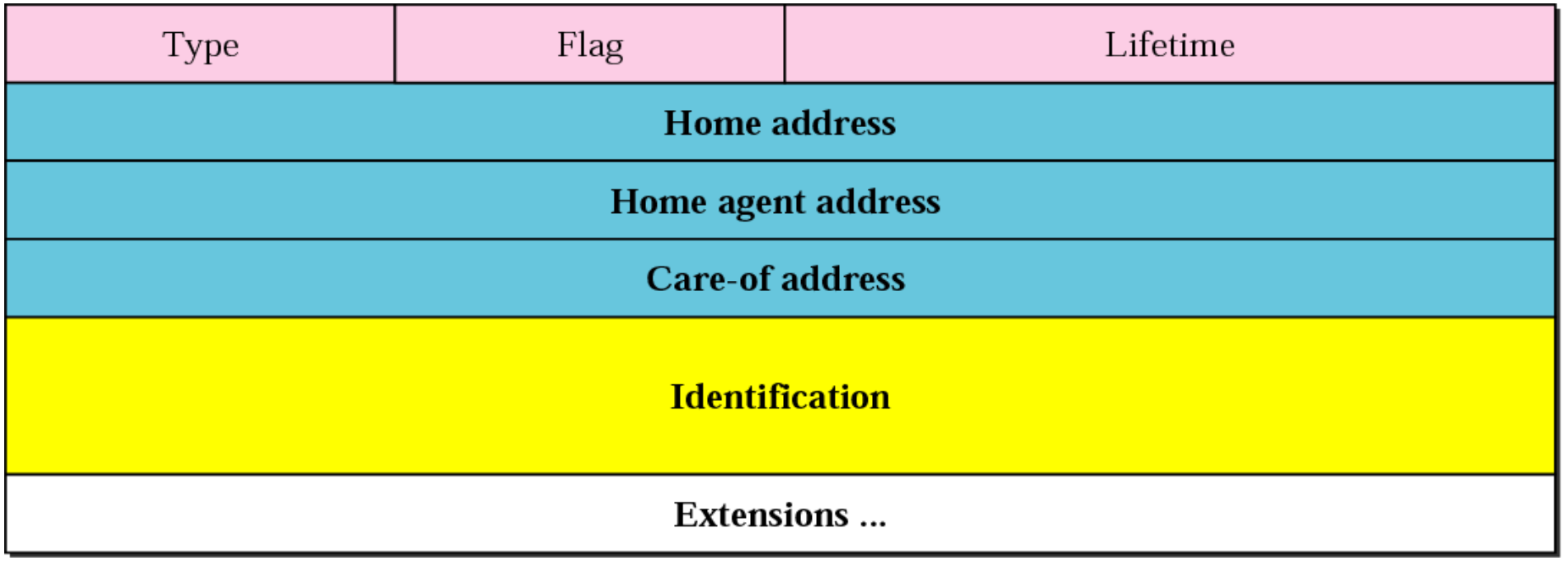
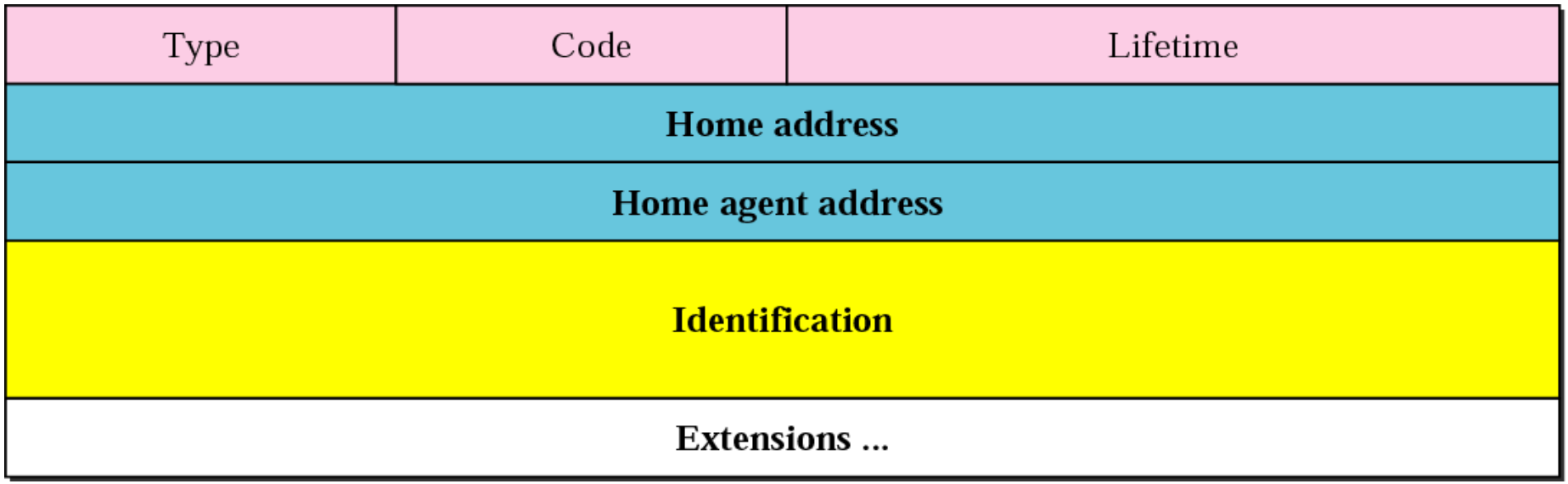


Table 24.2 *Registration request flag field bits*

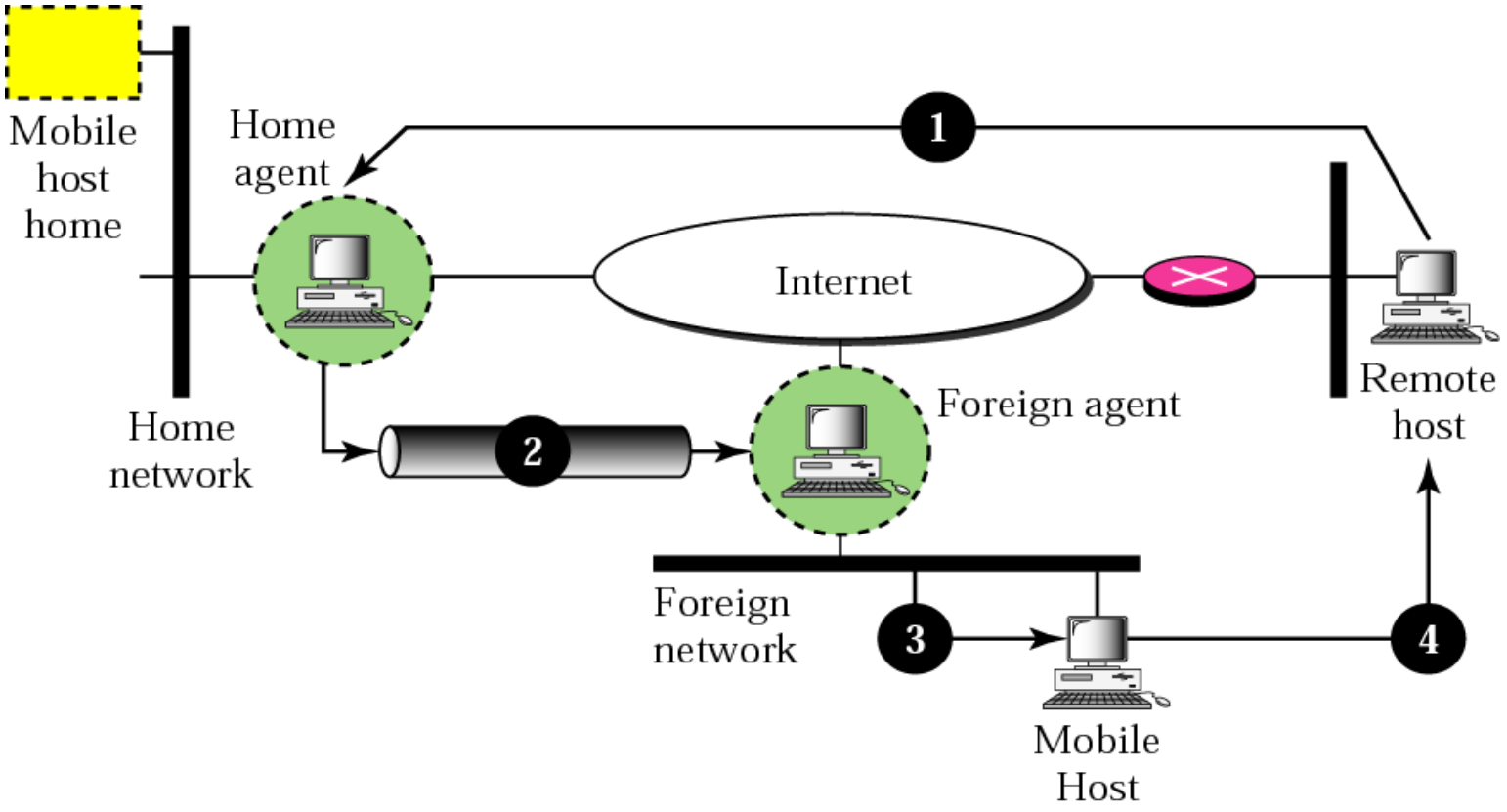
Bit	*Meaning*
0	Mobile host requests that home agent retain its prior care-of address.
1	Mobile host requests that home agent tunnel any broadcast message.
2	Mobile host is using co-located care-of address.
3	Mobile host requests that home agent use minimal encapsulation.
4	Mobile host requests generic routing encapsulation (GRE).
5	Mobile host requests header compression.
6–7	Reserved bits.

Figure 24.7 *Registration reply format*



A registration request or reply is sent by UDP using the well-known port 434.

Figure 24.8 *Data transfer*



The movement of the mobile host is transparent to the rest of the Internet.

24.4 INEFFICIENCY IN MOBILE IP

Communication involving mobile IP can be inefficient. A severe case is called double crossing or 2X. A moderate case is called triangle routing or dog-leg routing.

The topics discussed in this section include:

Double Crossing
Triangle Routing
Solution

Figure 24.9 *Double crossing*

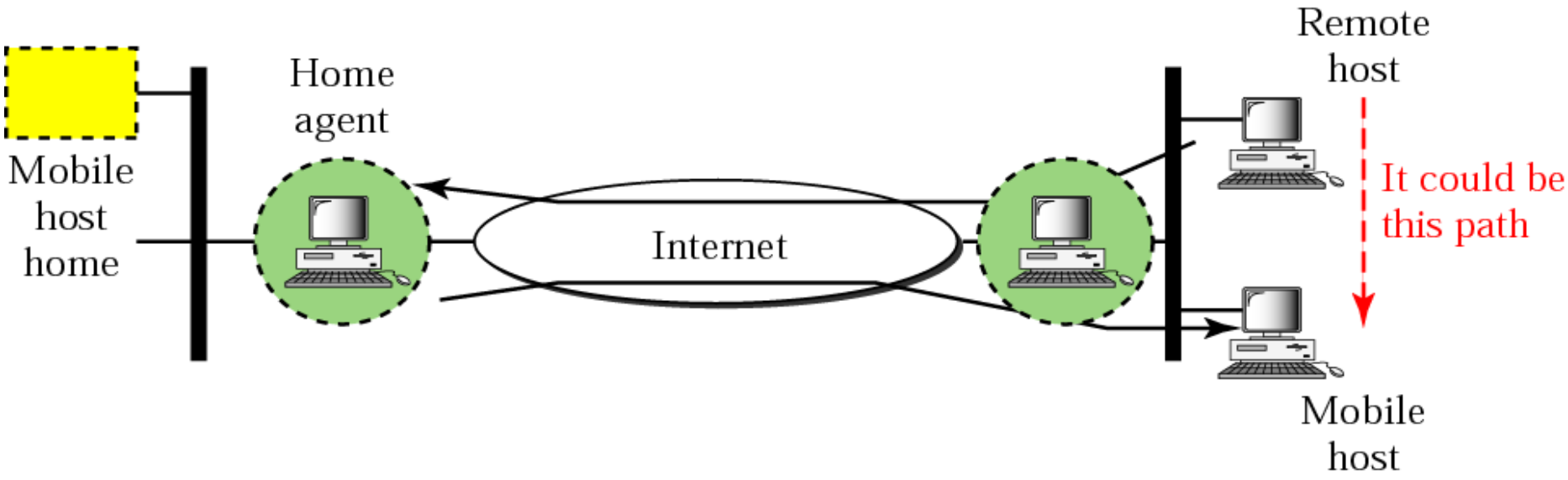


Figure 24.10 *Triangle routing*