UNIT -3
Mobile IP Network Layer

VIII SEMESTER

Mobile Computing

ETIT-402

IP and Mobile IP Network Layer-

- Introduction
- Packet delivery and Handover Management
- Location Management

Book to be Referred

1) Mobile Computing by Rak kamal ,Chapter 5, Page No.-236-263

2) Mobile Communication By Jochen Schiller,Chapyer 8, Page No. 304-321

Motivation For Mobile IP

Routing

- based on IP destination address,
- network prefix (e.g. 129.13.42) determines physical subnet
- change of physical subnet => change of IP address to have a topological correct address (standard IP)

Solution: Temporarily change routing table entries for mobile host

Problem: does not scale if many mobile hosts or frequent location changes

Solution: Change mobile host IP-address

- adjust the host IP address depending on the current location
- DNS updates take to long time
- Old TCP connections break

Requirements to Mobile IP

Transparency

- mobile end-systems keep IP address
- Continuous service after link interruption
- point of connection to the fixed network can be changed

Compatibility

- No changes to current hosts, OS, routers
- mobile end-systems can communicate with fixed systems security
- authentication of all registration messages

Efficiency and scalability

- only few additional messages to mobile system (low bandwidth)
- Global support for large number of mobile systems

Mobile IP Entities

- Mobile Node (MN)
  - The entity that may change its point of attachment from network to network in the Internet
    - Detects it has moved and registers with “best” FA
  - Assigned a permanent IP called its *home address* to which other hosts send packets regardless of MN’s location
    - Since this IP doesn’t change it can be used by long-lived applications as MN’s location changes
- Home Agent (HA)
  - This is router with additional functionality
  - Located on home network of MN
  - Does mobility binding of MN’s IP with its COA
  - Forwards packets to appropriate network when MN is away
    - Does this through encapsulation

Mobile IP Entities contd.

- Forward's MN's registration request
  - Decapsulates messages for delivery to MN

Care-of-address (COA)

- Address which identifies MN's current location
- Sent by FA to HA when MN attaches
- Usually the IP address of the FA

Correspondent Node (CN)

- End host to which MN is corresponding (eg. a web server)

Home Network

- Mobile radio subsystem's network within an area known as paging area.

Paging Area

- Area in which MN of Home as well as Foreign Network can be approach through single or set of MSC

Foreign Agent (FA)

- Another router with enhanced functionality
- If MN is away from HA the it uses an FA to send/receive data to/from HA
- Advertises itself periodically

Working of Mobile IP

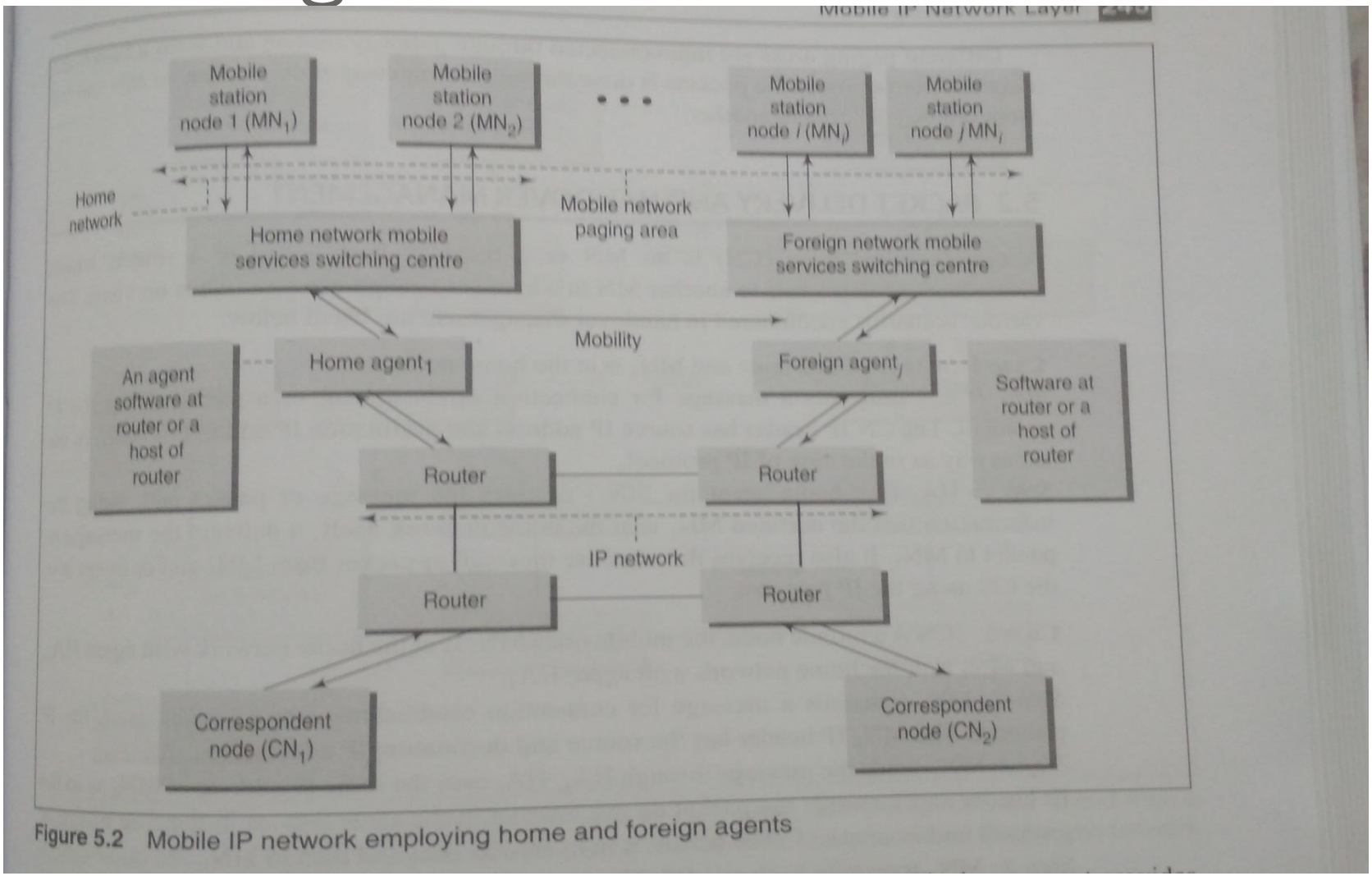
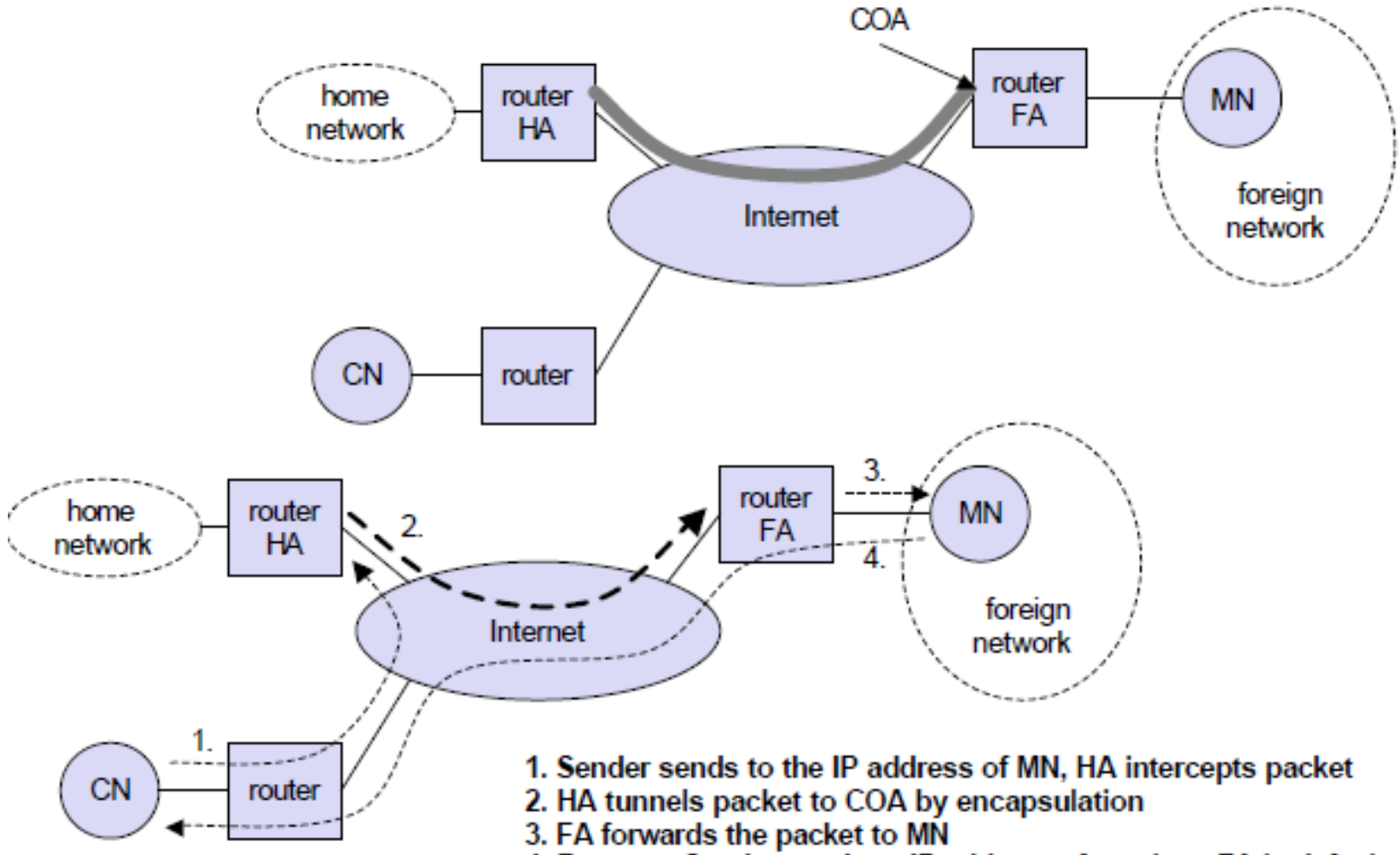


Figure 5.2 Mobile IP network employing home and foreign agents



1. Sender sends to the IP address of MN, HA intercepts packet
2. HA tunnels packet to COA by encapsulation
3. FA forwards the packet to MN
4. Reverse: Sender sends to IP address of receiver, FA is default router

Packet Delivery and Handover Management

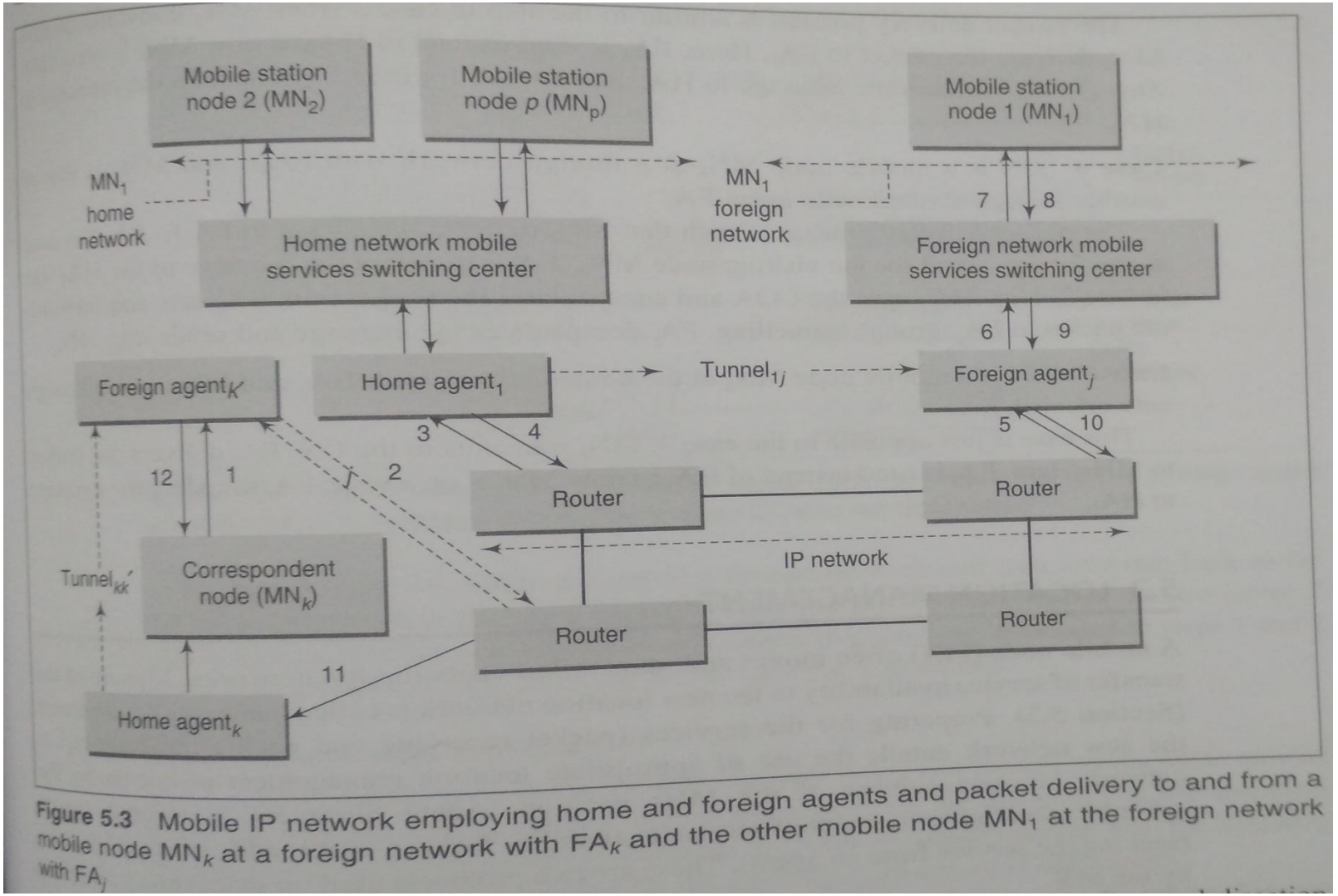


Figure 5.3 Mobile IP network employing home and foreign agents and packet delivery to and from a mobile node MN_k at a foreign network with FA_k and the other mobile node MN_1 at the foreign network with FA_j

Corresponding Node (CN) Is MN which communicates IP packet to other MN. Various Scenario in Hand over management

Case 1:- CN is Fixed and MN_1 is at Home Network

Case 2:- CN is Mobile Node MN_k is at Home Network with agent HA_k and MN_1 is at home network with agent HA_i .

Case 3: - CN is Fixed node and MN1 is at a Foreign Network

Case 4:- CN is Mobile Node MN_k is at Foreign Network with agent FA_k and MN_1 is at home network with agent HA_i

Case 5:- CN is Mobile Node MN_k is at Foreign Network with agent FA_k E and MN_1 is at another foreign network with agent FA_j

Case 6:- CN is Mobile Node MN_k is at Home Network with HA_k and MN_1 is at foreign network with agent FA_j

- **Refer Page No:- 245-248** for detailed study in Mobile Computing By Raj kamal

Location Management

- MN often Visits Foreign Network.
- Handover Management:- Managing the transfer of service availability to the new Location Network
- Preparing for services at new networks require proper Location Management Protocol.
- Agent Discovery is through agent advertisement and agent solicitation

Agent Discovery:-

- In FN , FN must discover FA

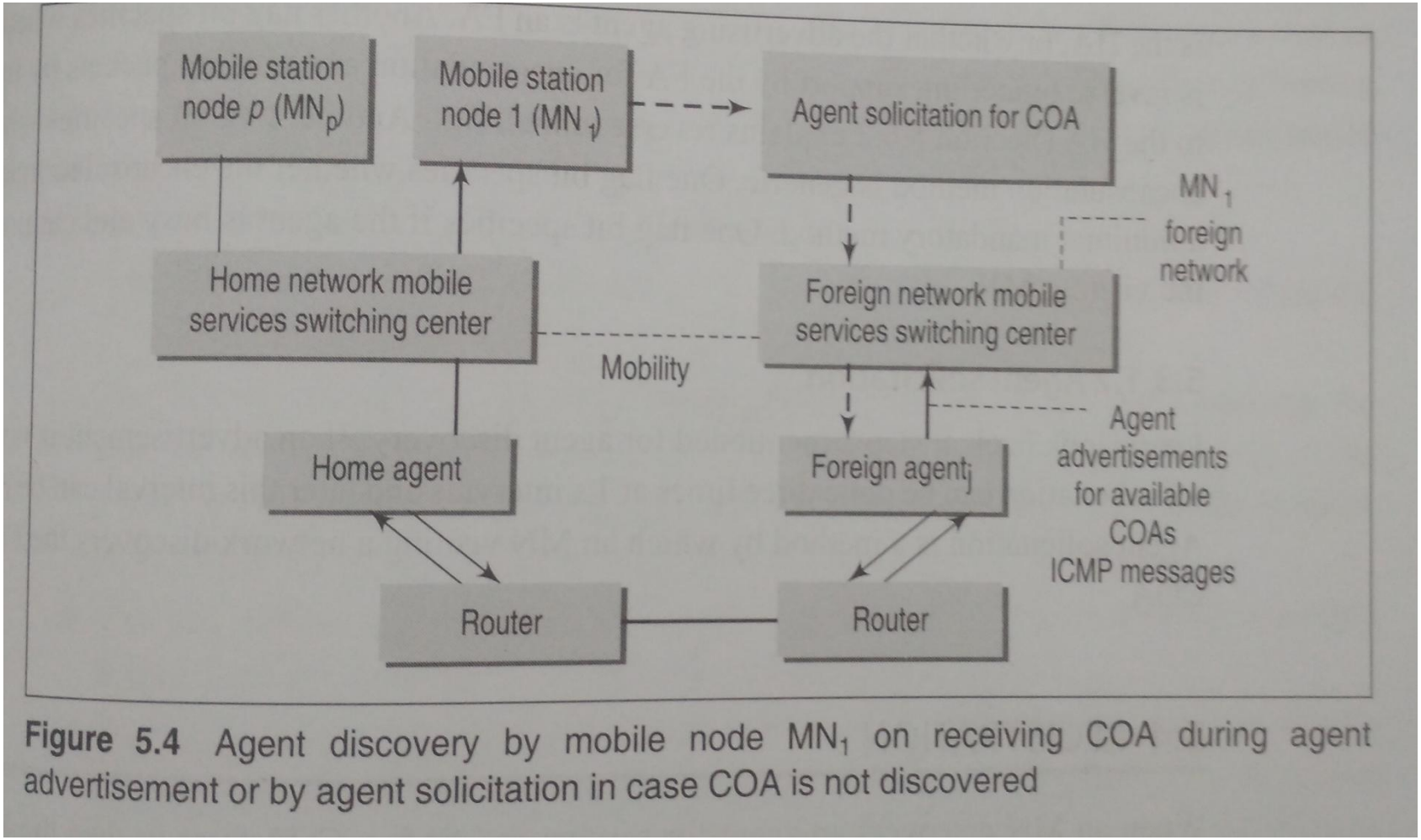
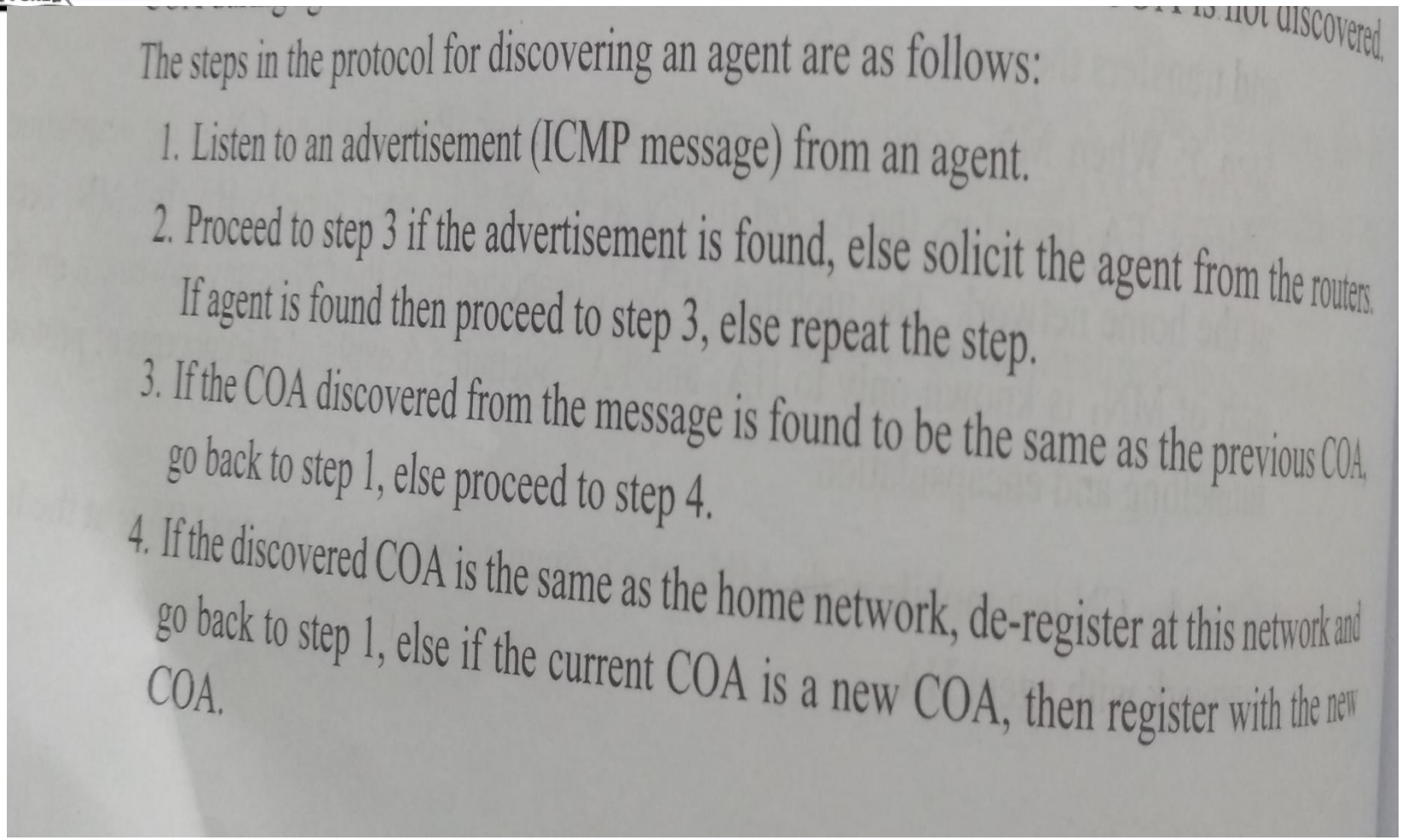


Figure 5.4 Agent discovery by mobile node MN_1 on receiving COA during agent advertisement or by agent solicitation in case COA is not discovered



The steps in the protocol for discovering an agent are as follows:

1. Listen to an advertisement (ICMP message) from an agent.
2. Proceed to step 3 if the advertisement is found, else solicit the agent from the routers. If agent is found then proceed to step 3, else repeat the step.
3. If the COA discovered from the message is found to be the same as the previous COA, go back to step 1, else proceed to step 4.
4. If the discovered COA is the same as the home network, de-register at this network and go back to step 1, else if the current COA is a new COA, then register with the new COA.

❖**Refer Page No:- 248-250** for detailed study in Mobile Computing By Raj kamal