



## Unit 5

# Mobile Network Layer

# Mobile IP – Entities and Terminology

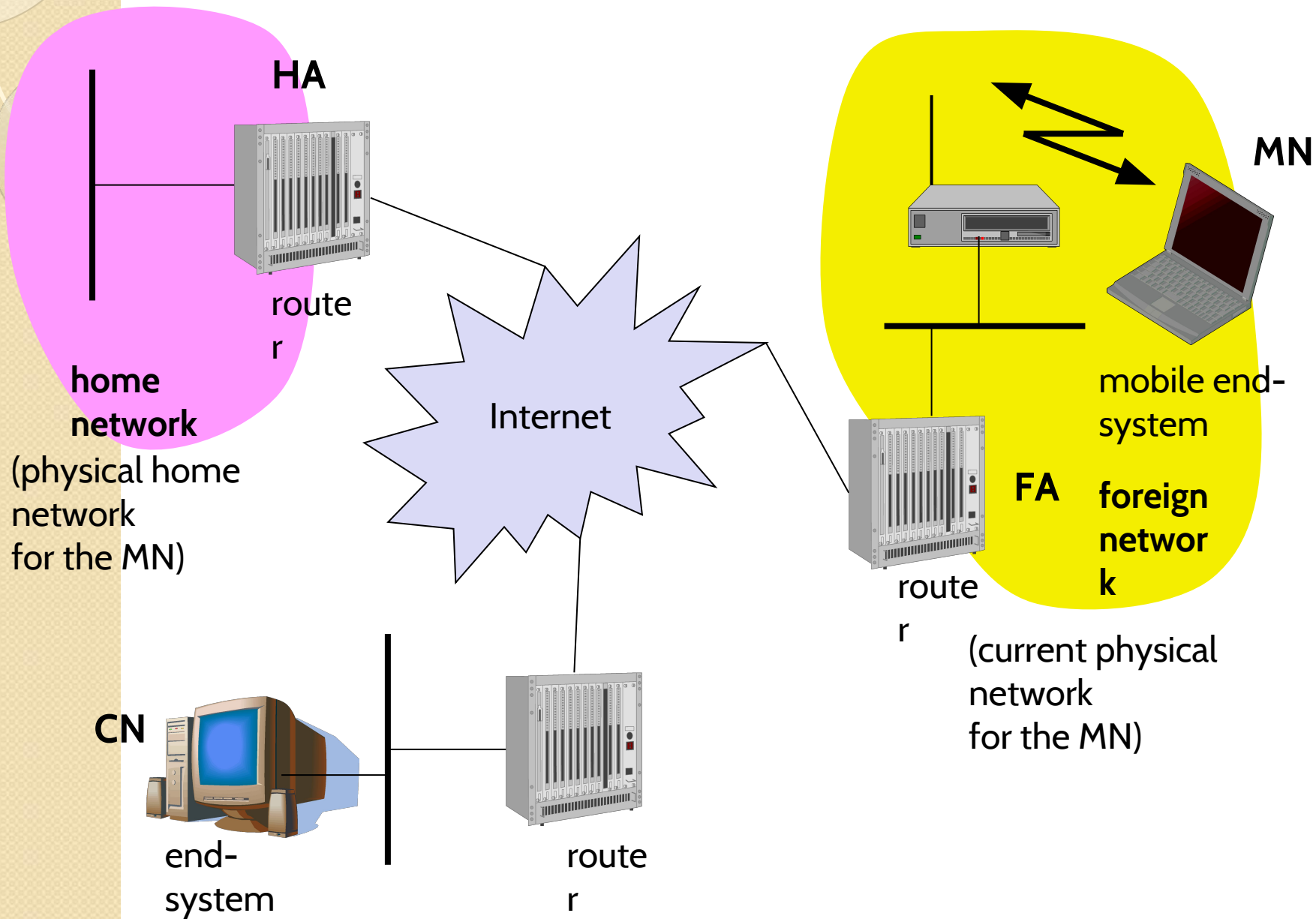
- **Mobile Node (MN)**
  - End system or router that can change it's point of attachment to the internet using mobile IP.
- **Correspondent Node (CN)**
  - Represents partner of MN which can be a fixed or multiple node.
- **Home Network**
  - Subnet to which MS belongs to w.r.t it's IP address.
- **Foreign Network**
  - Current (Visited) network of MN which is not it's home network.

# Mobile IP – Entities and Terminology

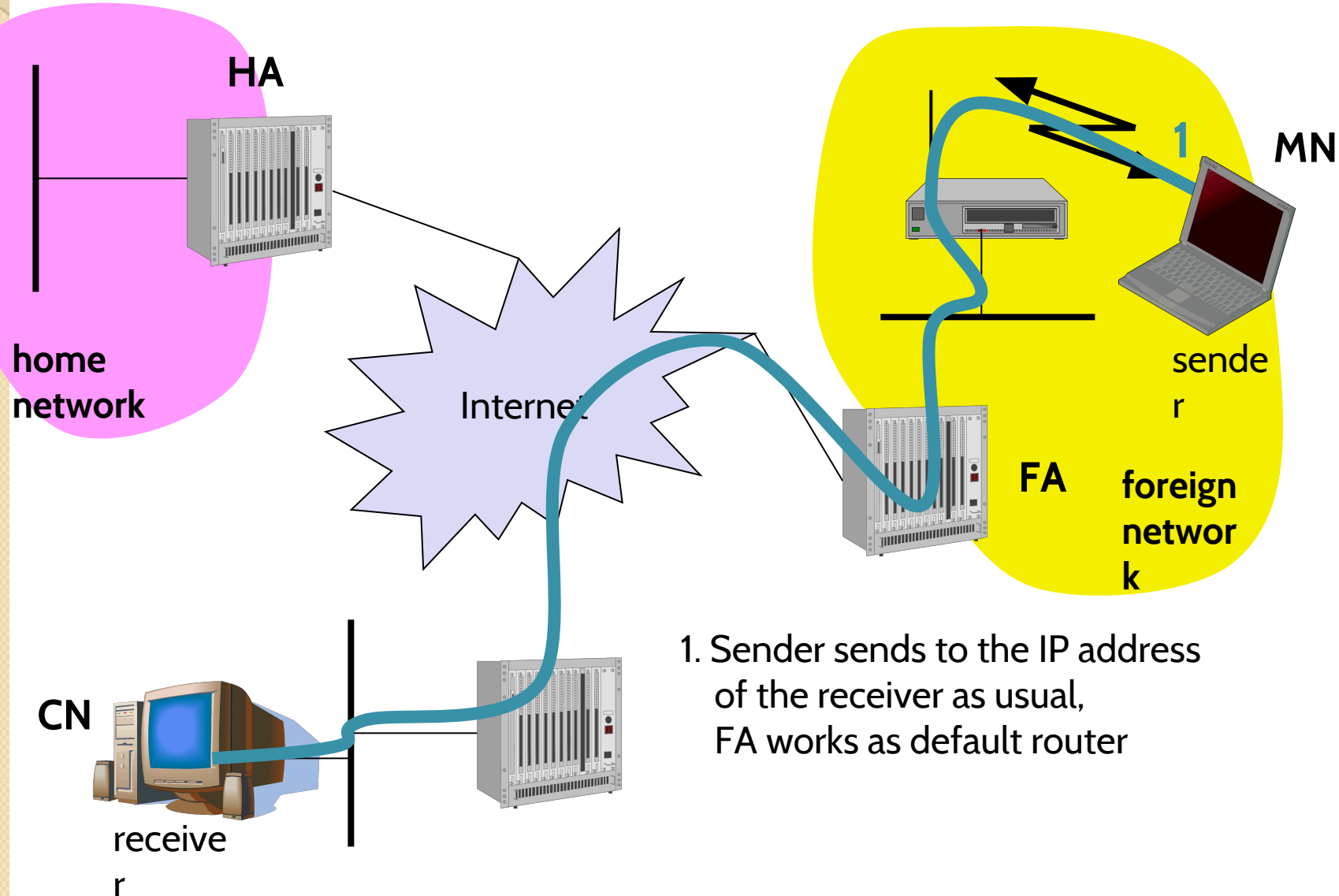
- **Foreign Agent (FA)**
  - Provides several services to MN during visit to foreign network.
  - FA have COA acting as tunnel end point and forwards packets to MN.
- **Care-of-Address (COA)**
  - COA defines current location of MN at foreign network.
  - All IP packets sent to MN are delivered to COA, not directly to MN.
  - COA marks **tunnel end point**.

# Mobile IP – Entities and Terminologies

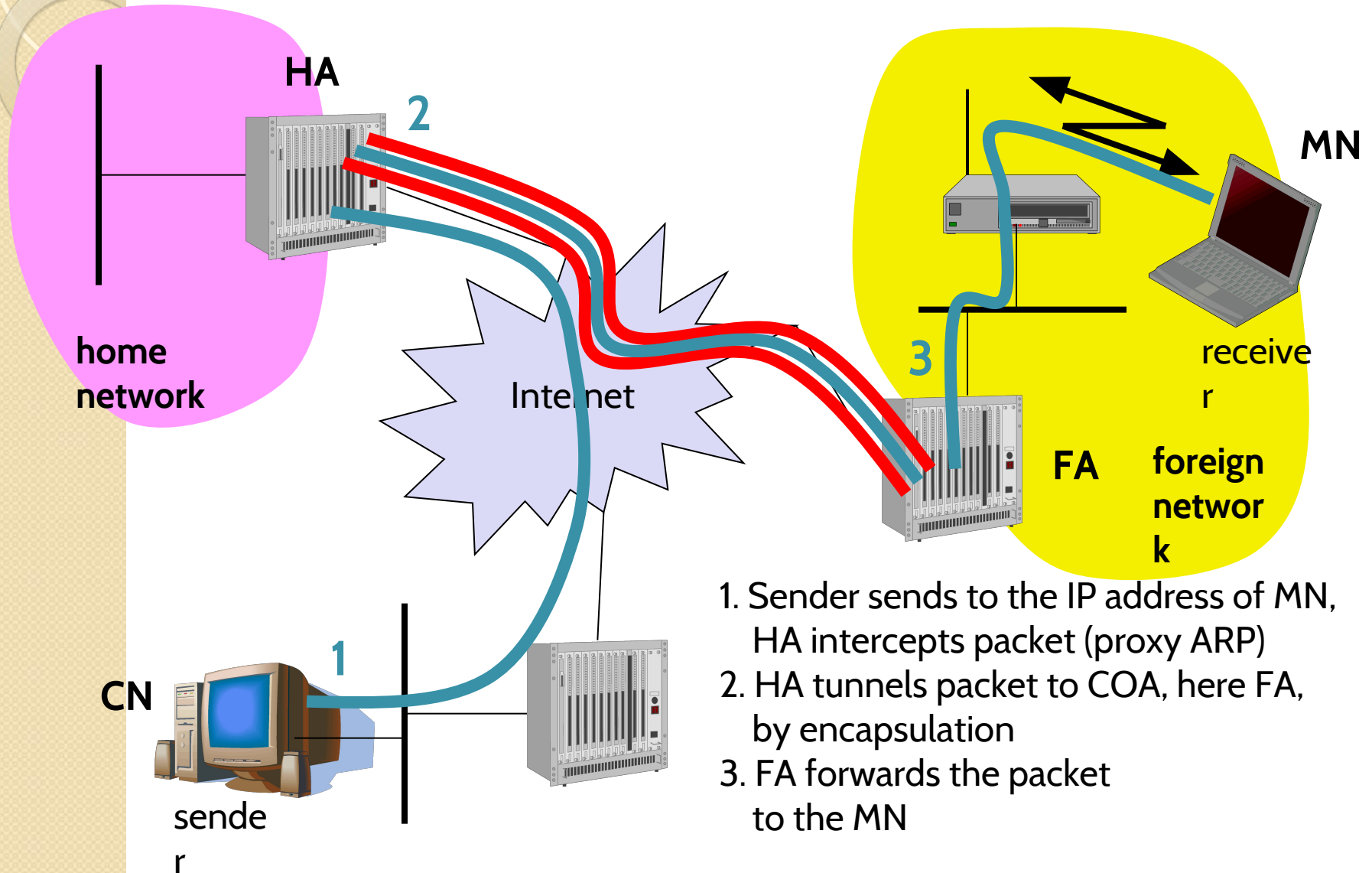
- Two possible locations of COA
  - a) **Foreign Agent COA** – COA located at FA (IP of FA).
  - b) **Co-Located COA** – Temporarily assigned new IP to MN.
- **Home Agent (HA)**
  - Provides several services to MN in Home Network.



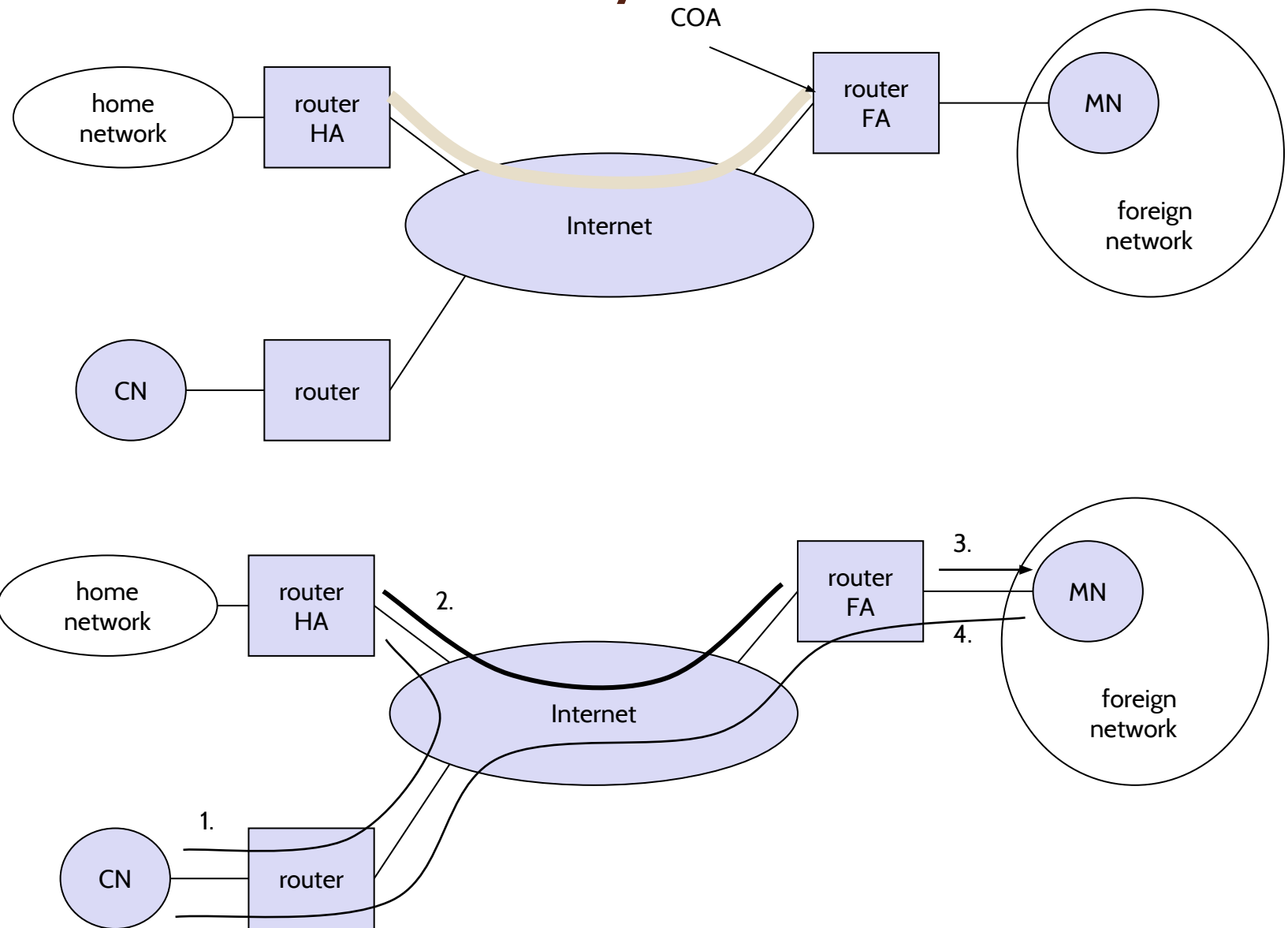
# IP Packet Delivery – Data Transfer From MN



# IP Packet Delivery – Data Transfer to MN



# IP Packet Delivery - Overview





# Agent Discovery – Agent Advertisement

0	7	8	1	1	2	2	3
type		code		6	checksum		1
addr. size		addr. size			lifetime		
router address 1							
preference level 1							
router address 2							
preference level 2							

...

type = 16

length = 6 + 4 \* #COAs

R: registration required

B: busy, no more registrations

H: home agent

F: foreign agent

M: minimal encapsulation

G: GRE encapsulation

r: =0, ignored (former Van Jacobson compression)

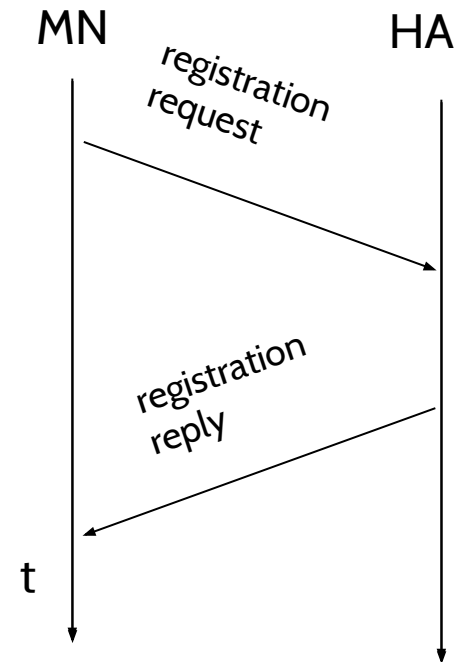
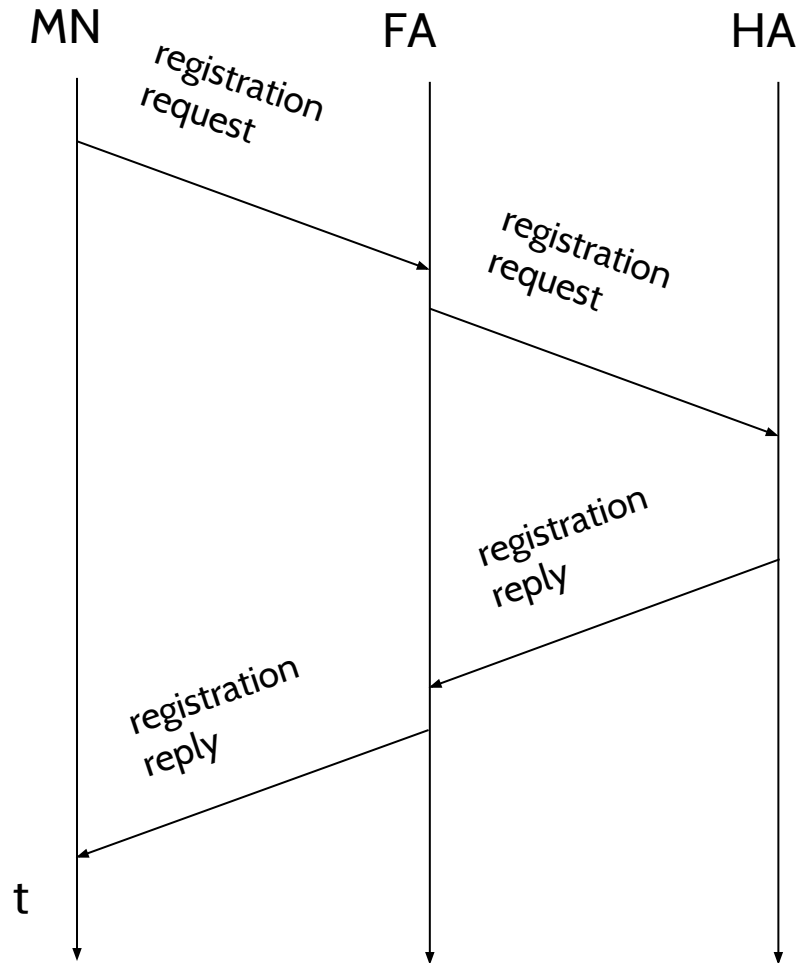
T: FA supports reverse tunneling

reserved: =0, ignored

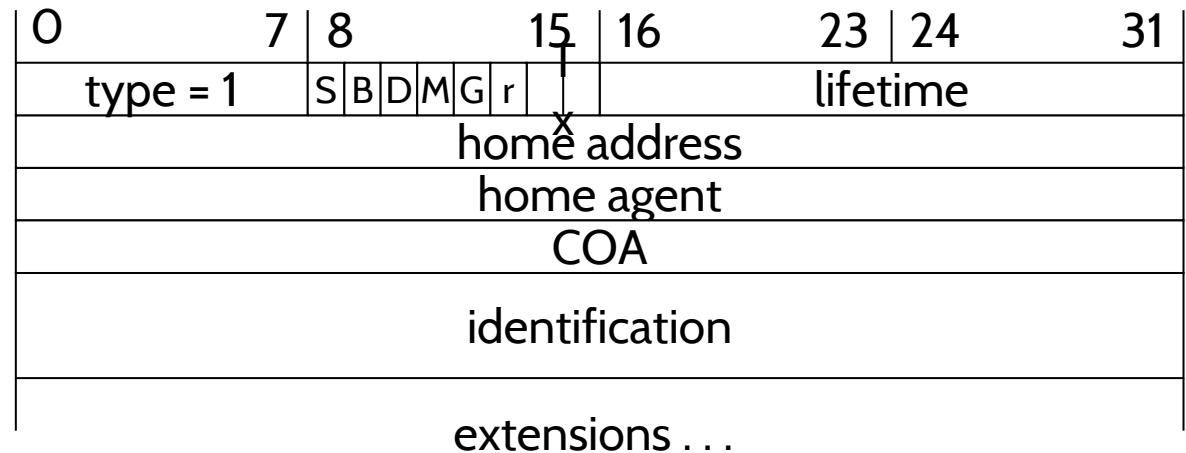
type = 16		length		sequence number								
registration lifetime				R	B	H	F	M	G	r	T	reserve
COA 1												d
COA 2												

...

# Registration



# Registration Request



S: simultaneous bindings

B: broadcast datagrams

D: decapsulation by MN

M: minimal encapsulation

G: GRE encapsulation

r: =0, ignored

T: reverse tunneling requested

x: =0, ignored

# Registration Reply

0	7	8	15	16	31
type = 3		code		lifetime	
home address					
home agent					
identification					
extensions . . .					

## Example codes:

registration successful

- 0 registration accepted

- 1 registration accepted, but simultaneous mobility bindings unsupported

registration denied by FA

- 66 insufficient resources

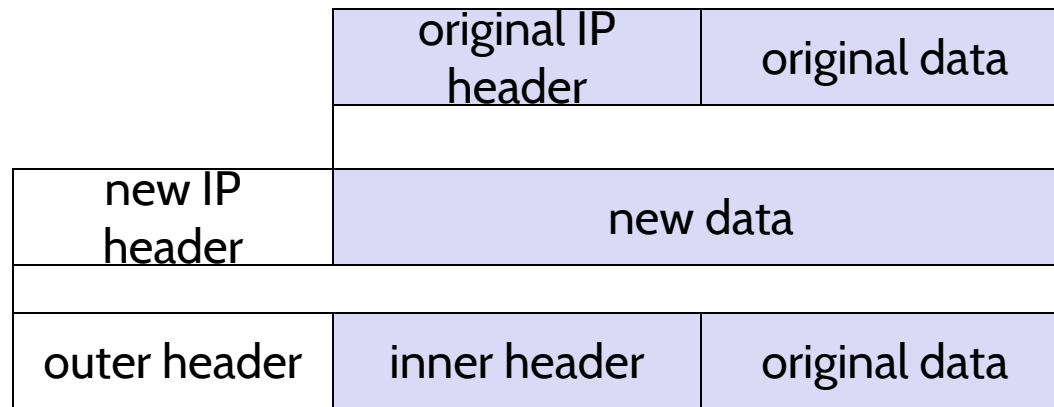
- 67 mobile node failed authentication

registration denied by HA

- 131 mobile node failed authentication

- 135 too many simultaneous mobility bindings

# Encapsulation



# IP-in-IP Encapsulation

ver.	IHL	DS (TOS)	length	
IP identification			flags	fragment offset
TTL		<i>IP-in-IP</i>	IP checksum	
IP address of HA				
Care-of address COA				
ver.	IHL	DS (TOS)	length	
IP identification			flags	fragment offset
TTL		lay. 4 prot.	IP checksum	
IP address of CN				
IP address of MN				
TCP/UDP/ ... payload				

# Minimal Encapsulation

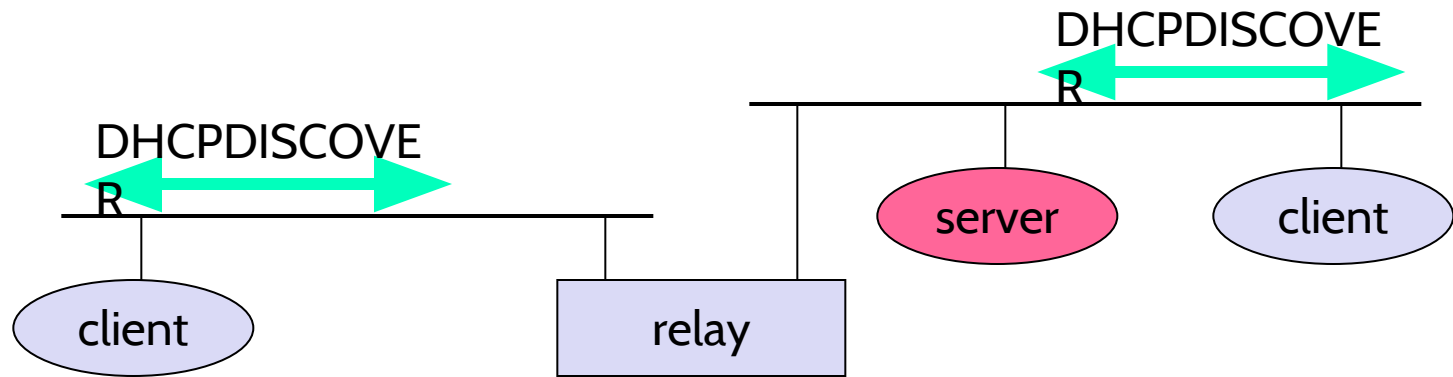
ver.	IHL	DS (TOS)	length	
IP identification			flags	fragment offset
TTL		<i>min. encap.</i>	IP checksum	
IP address of HA				
care-of address COA				
lay. 4 protoc.	S	reserved	IP checksum	
IP address of MN				
original sender IP address (if S=1)				
TCP/UDP/ ... payload				

# Dynamic Host Configuration Protocol

- Application
  - simplification of installation and maintenance of networked computers
  - supplies systems with all necessary information, such as IP address, DNS server address, domain name, subnet mask, default router etc.
  - enables automatic integration of systems into an Intranet or the Internet, can be used to acquire a COA for Mobile IP



# DHCP



# DHCP

