



Computer Networks: Mobile IP

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Outline

- Motivation for Mobile IP
- Mobile IPv4, Mobile IPv6
- Low level protocol details including message formats
- Comparison on the basis of location updates, handoff latency, and signaling overhead

Mobile Computing: Why?



Nokia E61

Home Security

E-learning

Streaming Movies

Gambling

Home medical care

Sports

Mobile Wireless Devices



Laptop



Smartphone



Media Player



Palmtop



Digital Camera



Personal Digital Assistant



Notebook



Pager



Gaming Console

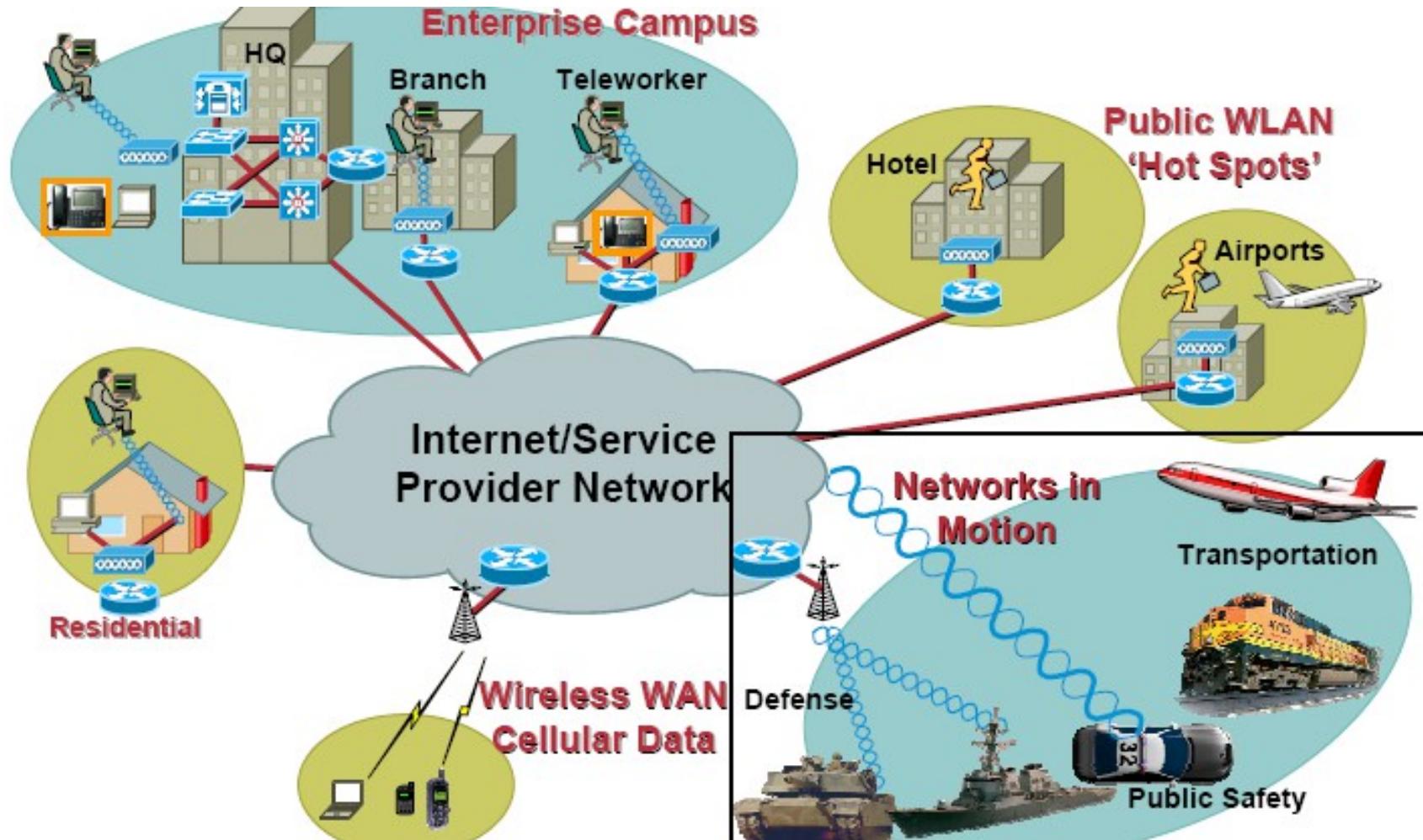


Mobile Router

Is it portable networking?

- Connection to same ISP
- Technologies
 - Bluetooth
 - Wireless Ethernet (802.11)
 - MAC Layer technology
 - Cellular
 - Cellular Digital Packet Data, 3G

Markets for IP Mobility



[Source: Cisco Systems]

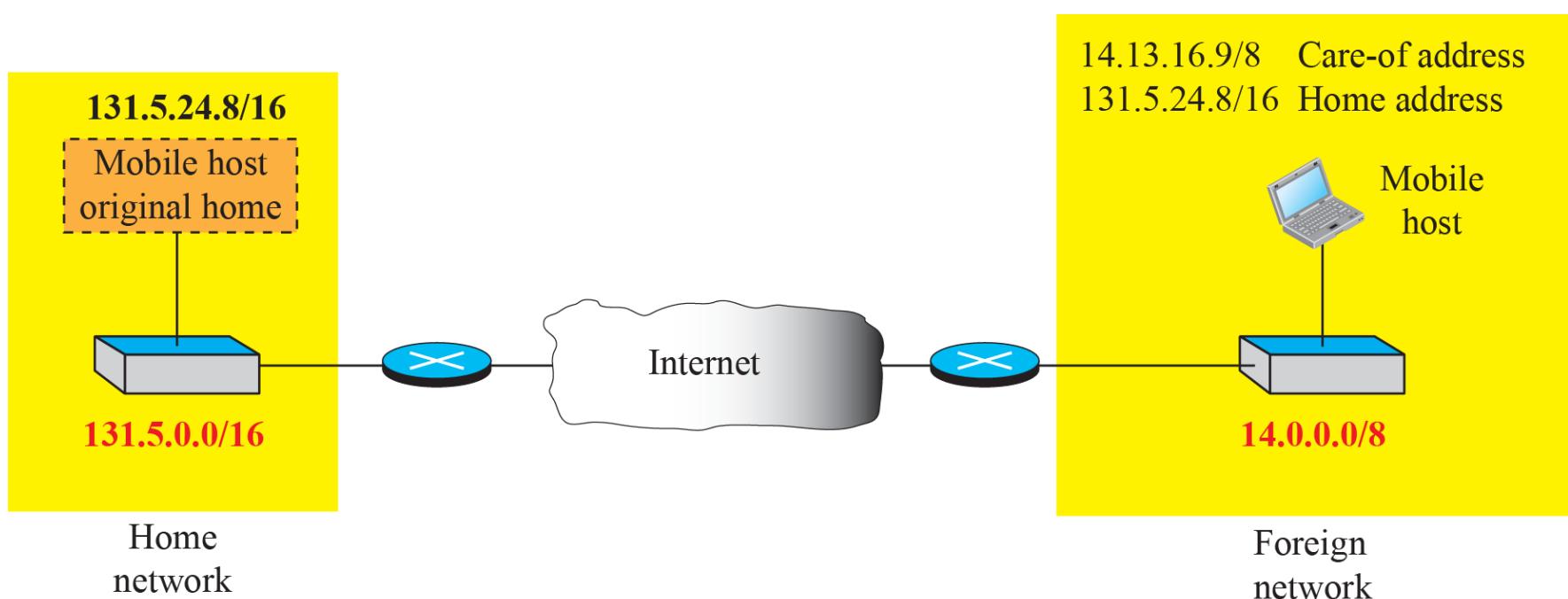
How do we contact a mobile friend?

Consider a friend frequently changing addresses, how do you find her?

- search all phone books?
- call her parents?
- expect her to let you know where she is?

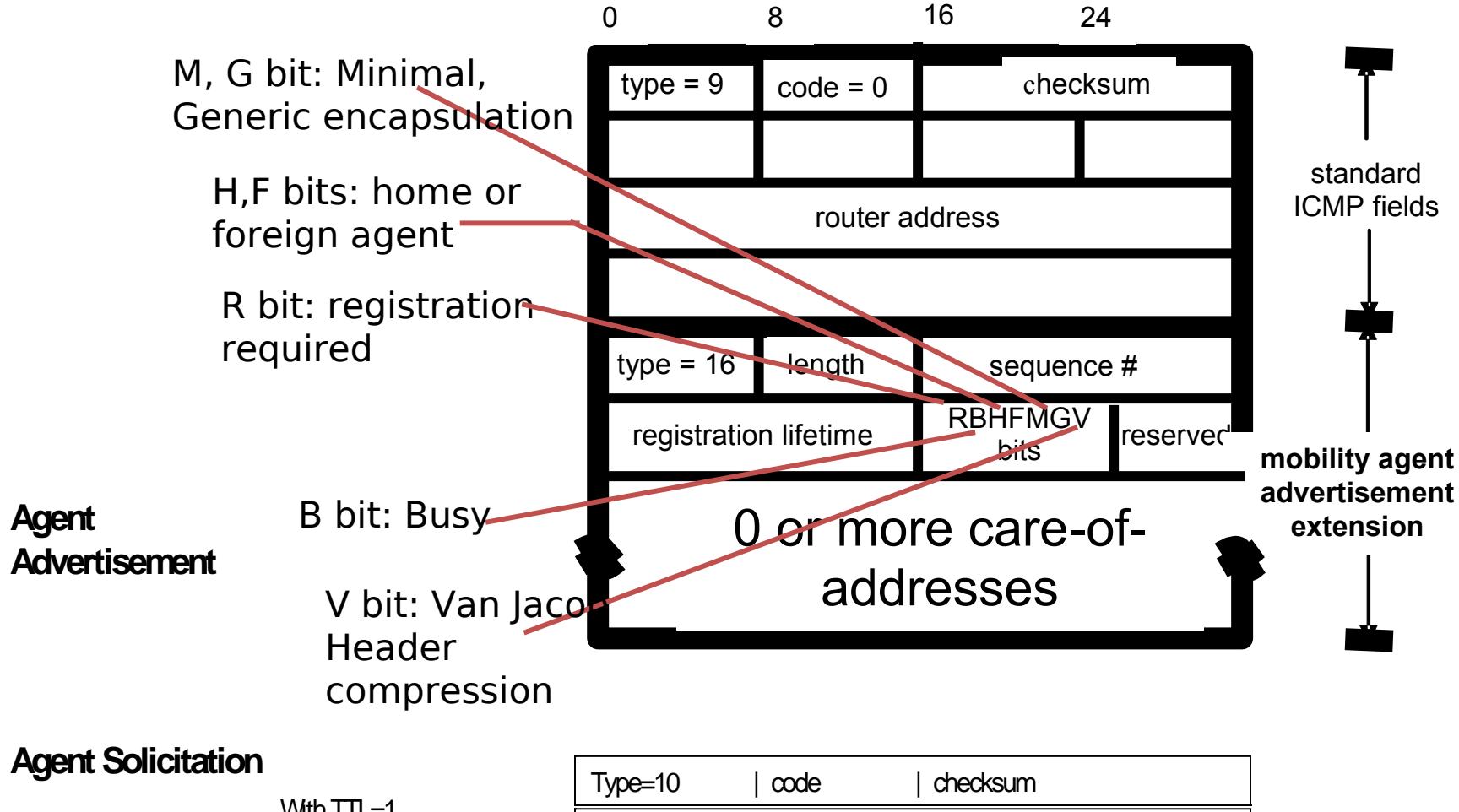


Home and Care-of addresses



[Source: McGH, Computer Networks, Forouzan, and Mosharraf]

Message Types

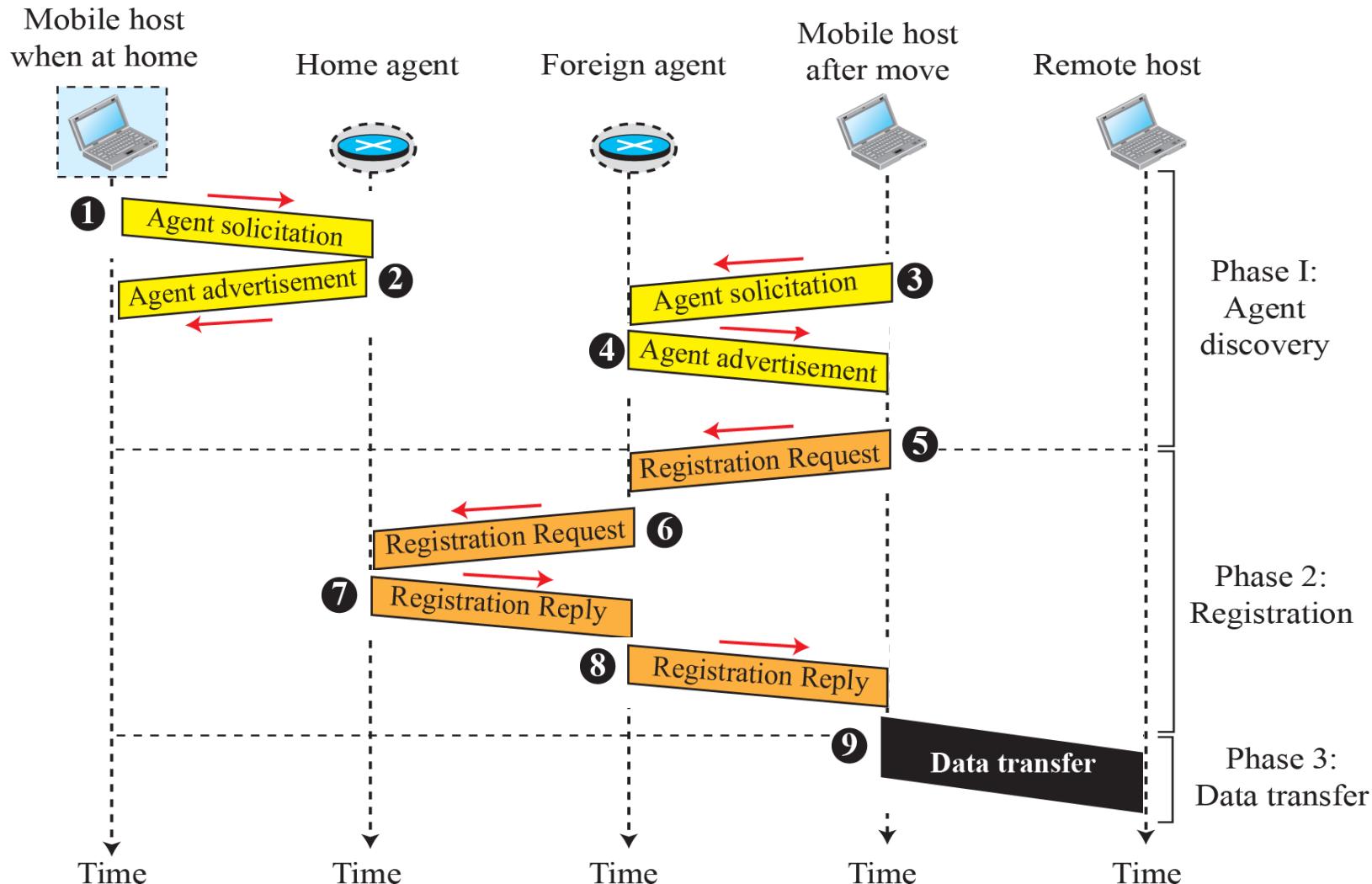


Registration request

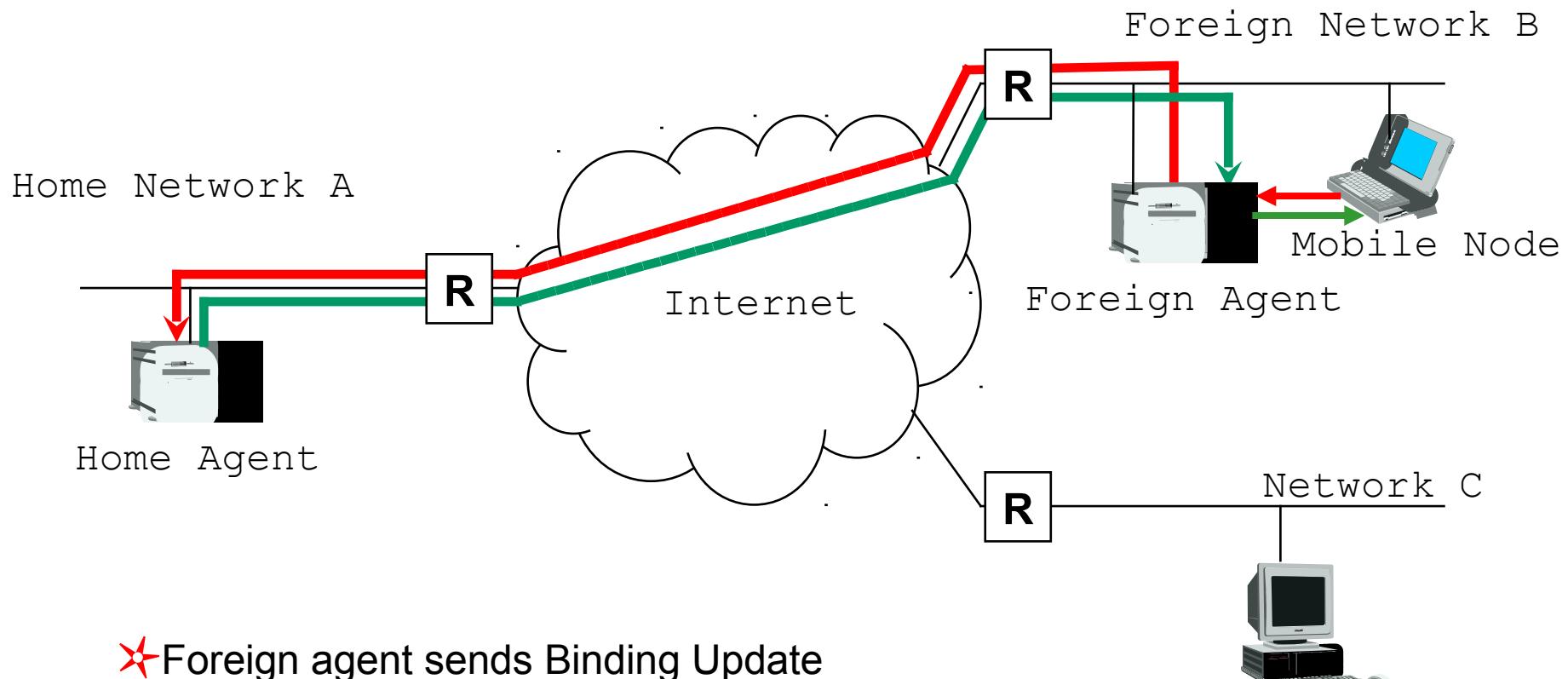
Type	Flag	Lifetime
		Home address
		Home agent address
		Care-of address
		Identification
		Extensions ...

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 collocated 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.

Remote host and Mobile host communication



Registration



★ Foreign agent sends Binding Update

} Home Agent replies with Binding Acknowledgement

Correspondent
Node C

Registration example

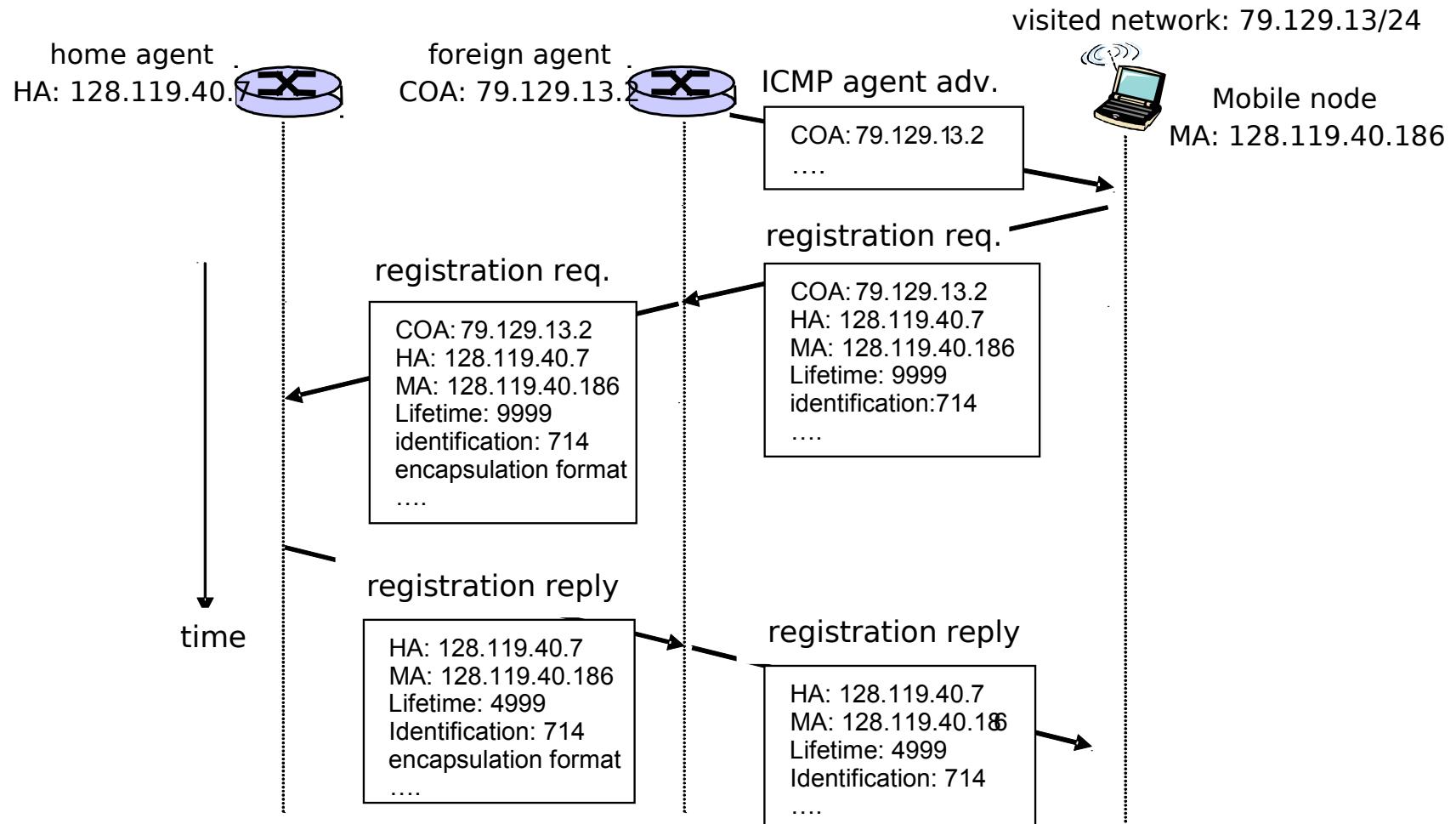
Mobility binding table at Home Agent

Home address	Care-of address	Lifetime (sec)
128.119.40.186	79.129.13.2	150
...

Visitor List at Foreign Agent

Home address	Home agent address	Media address	Lifetime
128.119.40.186	128.119.40.7	00-56-80-56-A1-E1	150

Continued...



Indirect routing via tunneling

innovate

achieve

lead

packet sent by home agent to foreign agent: a
packet within a packet (Tunnel)



foreign-agent-to-mobile packet

dest: 128.119.40.186

Permanent address:
128.119.40.186

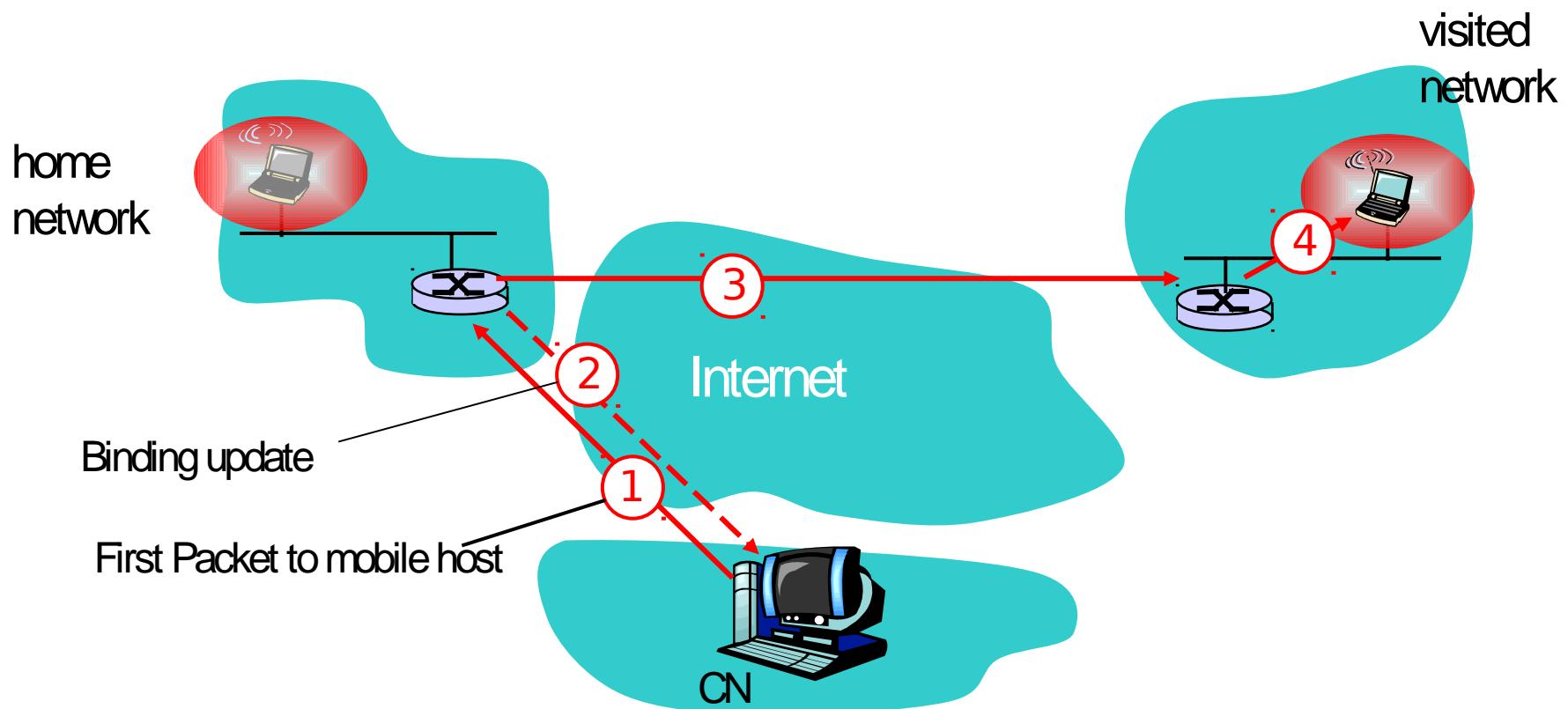
dest: 128.119.40.186

packet sent by
correspondent

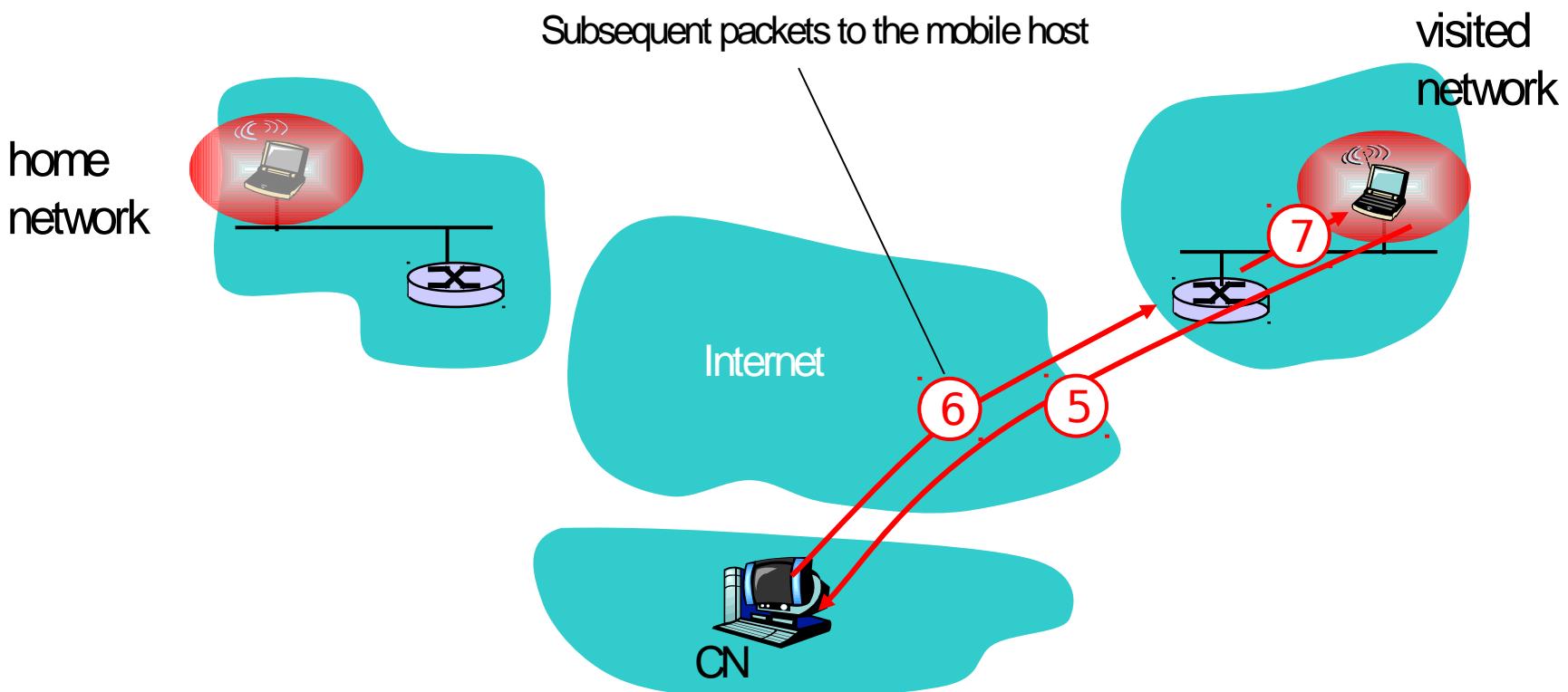
Care-of address:
79.129.13.2

mobile replies directly to
correspondent

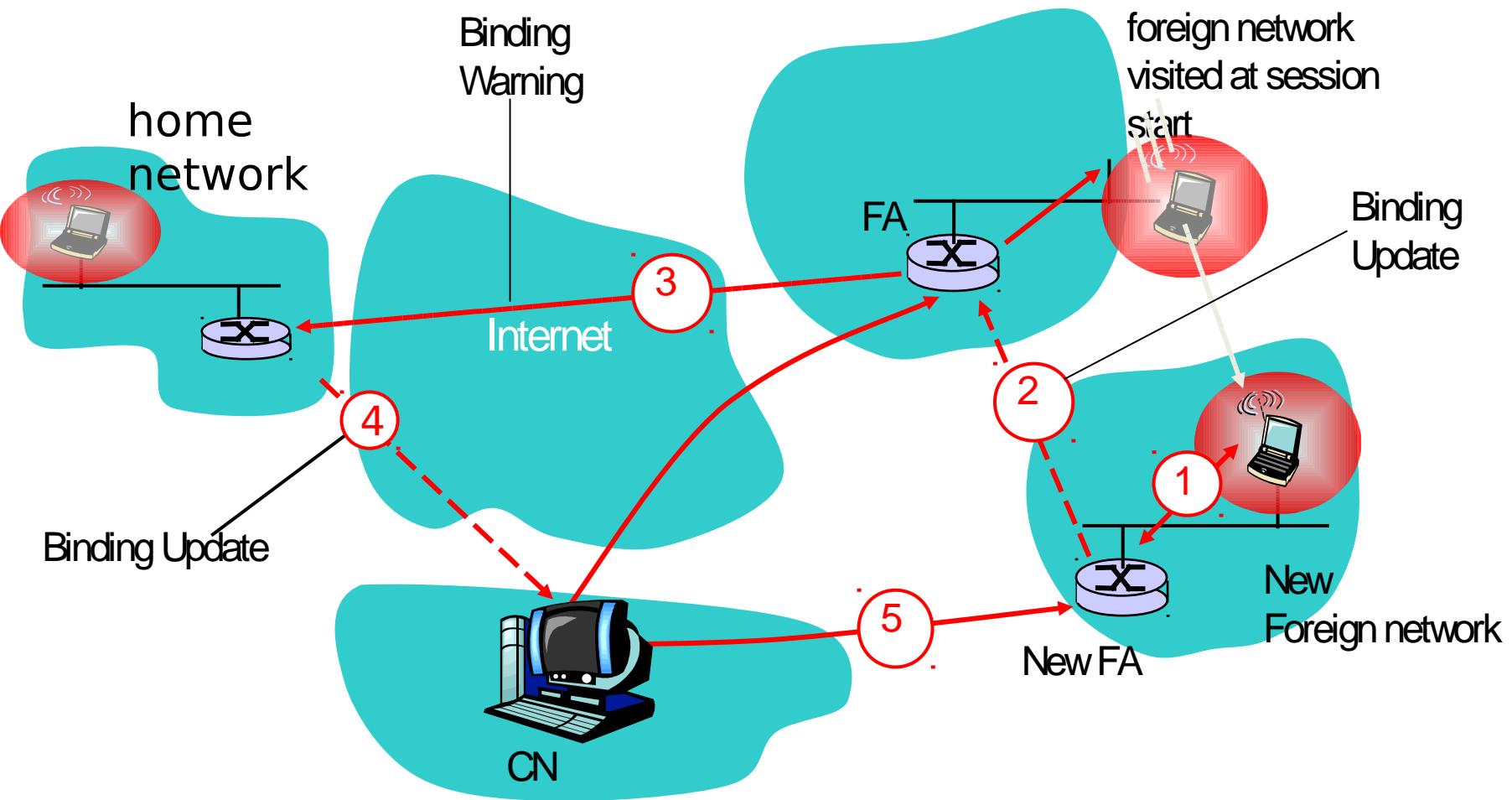
Route optimization(Opt1:binding cache)



Continued...



Route optimization(Opt2:Smooth handoff)



MIPv6: Mobile on a foreign network

