



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



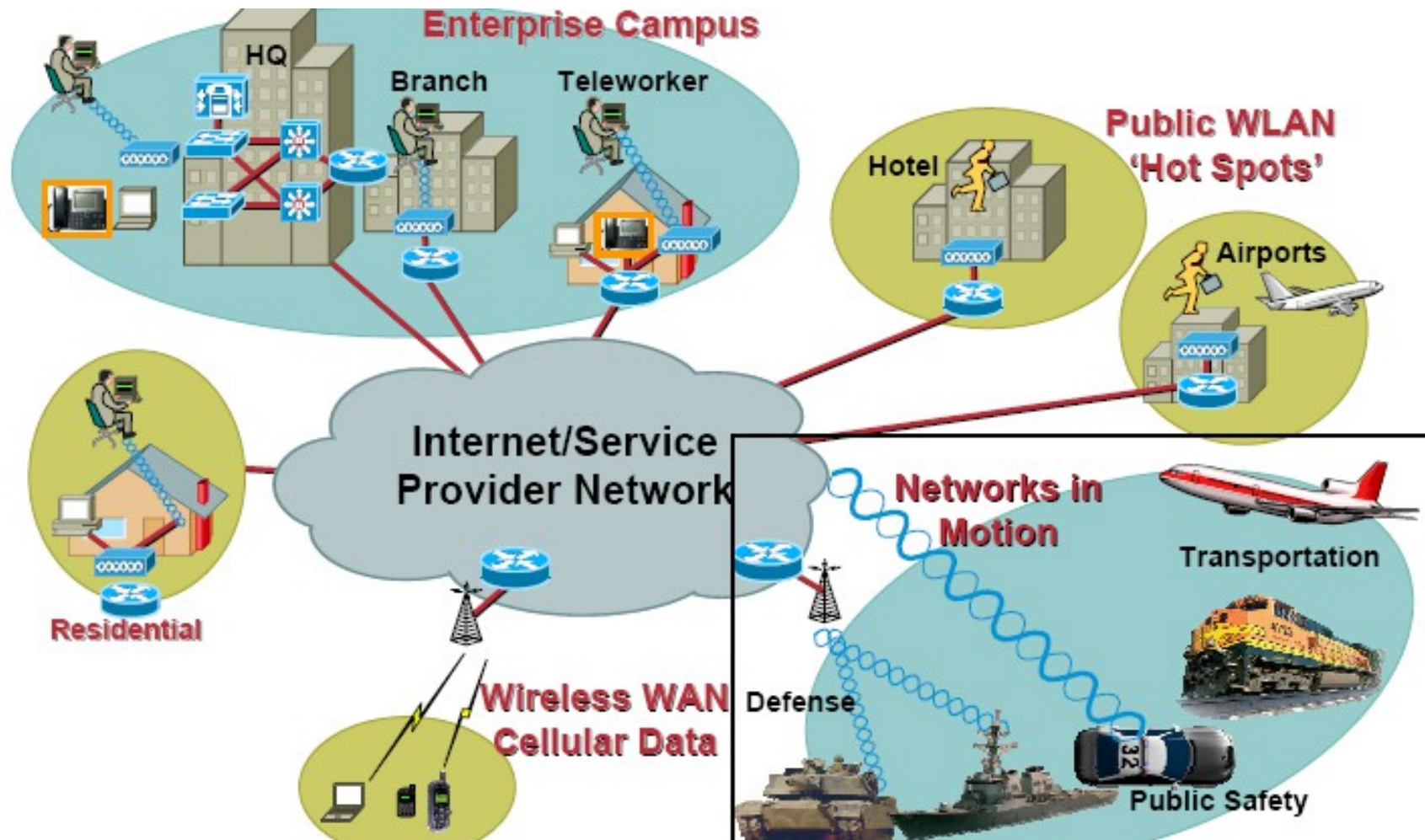
Mobile Router

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?

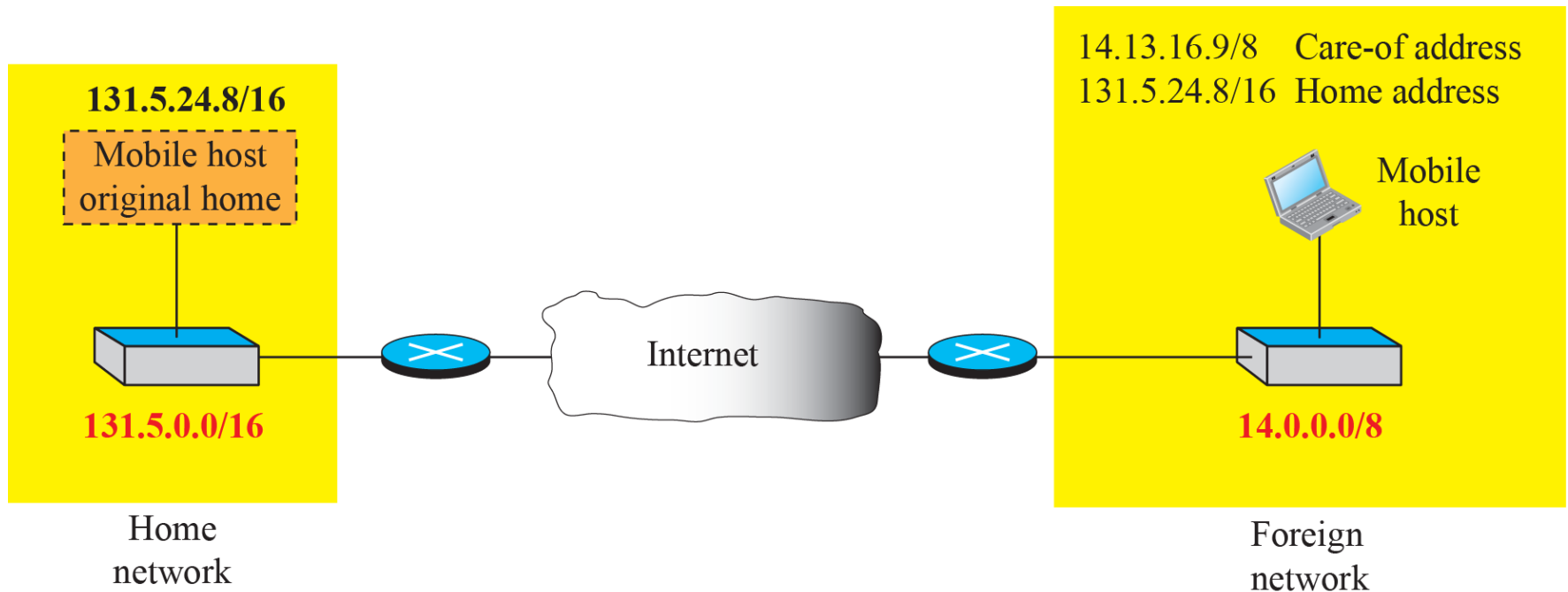


Consider a friend frequently changing addresses, how do you find her?

- 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



Type=10	code	checksum
reserved		

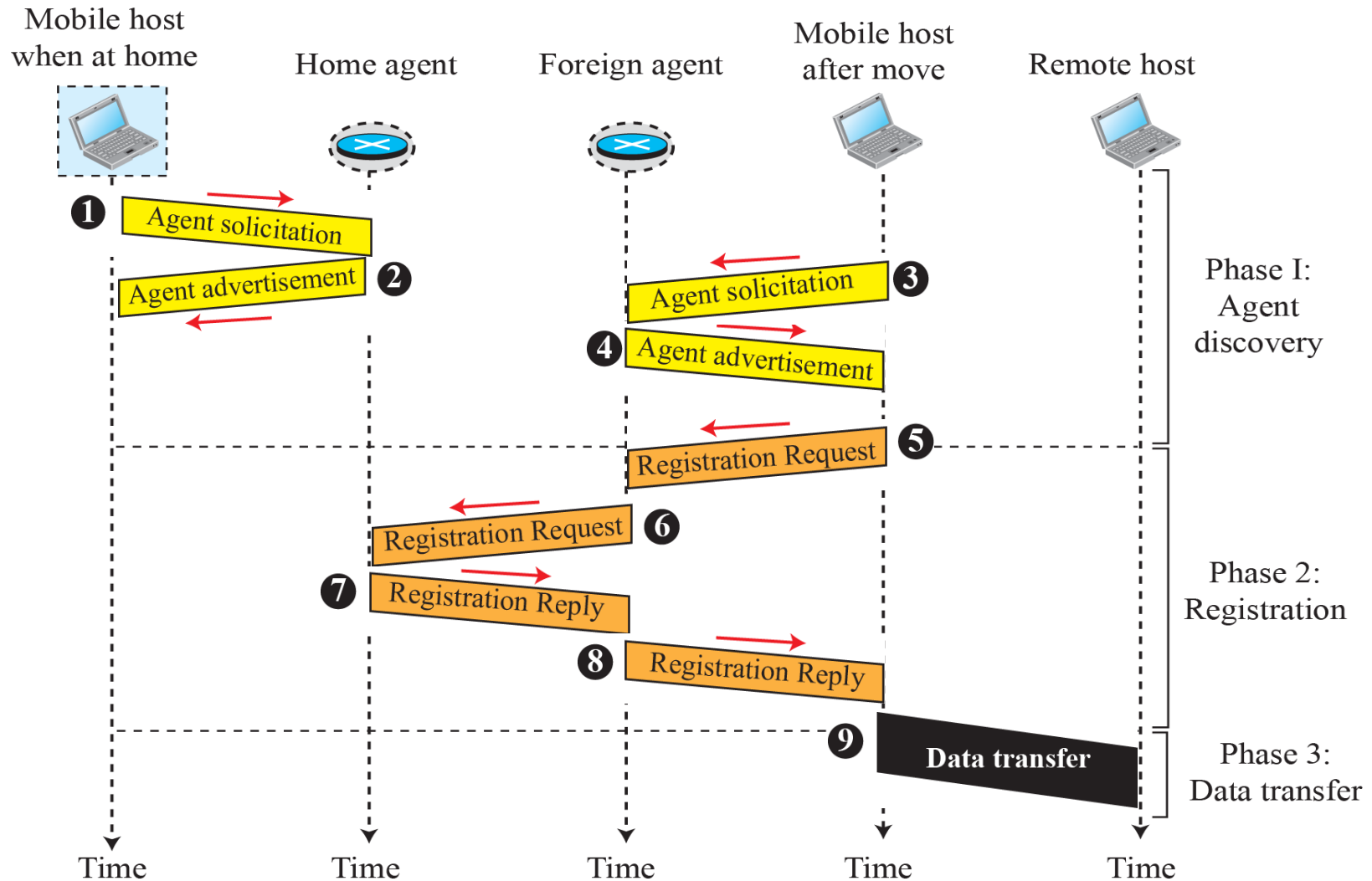
Registration request



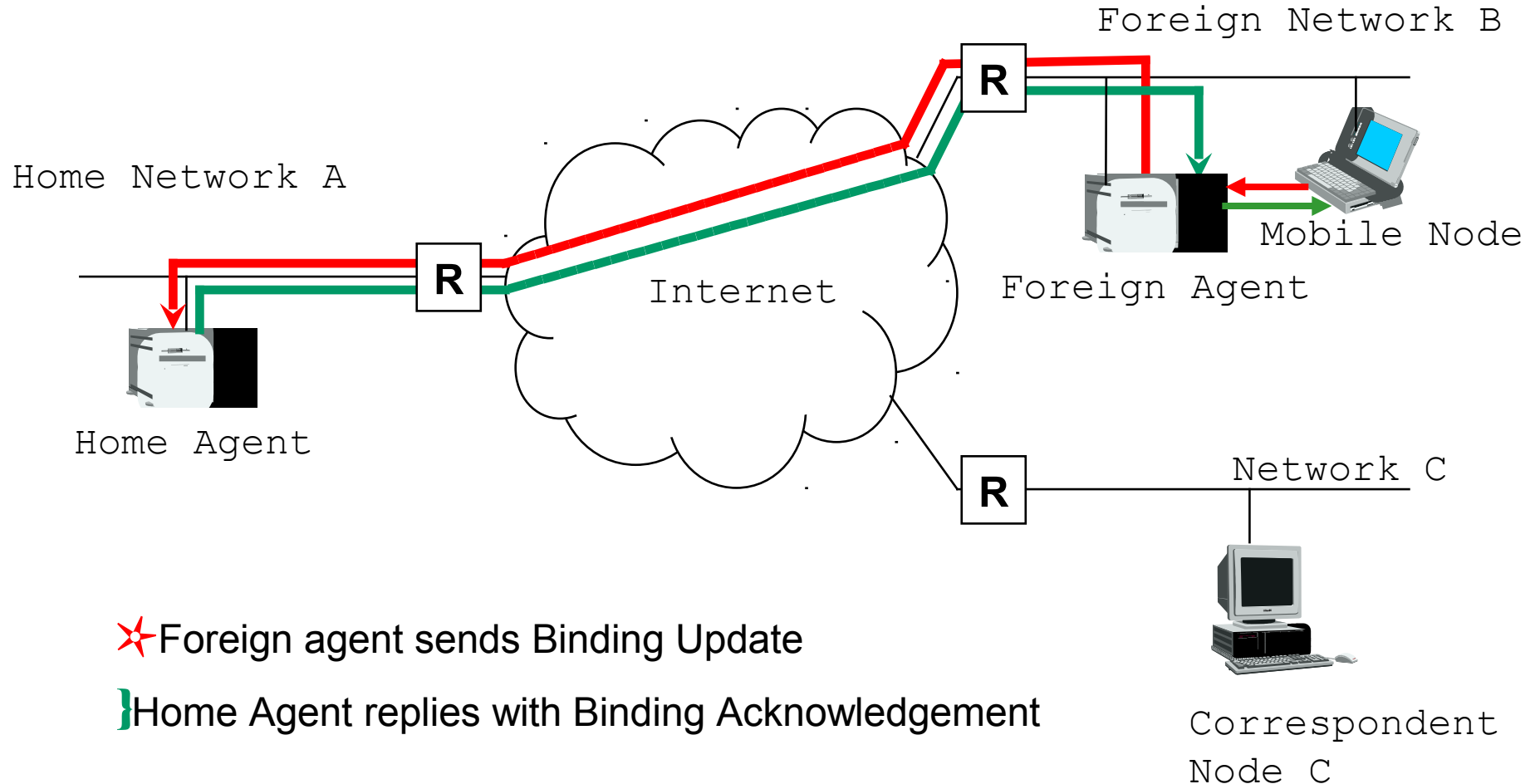
Type	Flag	Lifetime
Home address		
Home agent address		
Care-of address		
Identification		
Extensions ...		

<i>Bit</i>	<i>Meaning</i>
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



Registration example



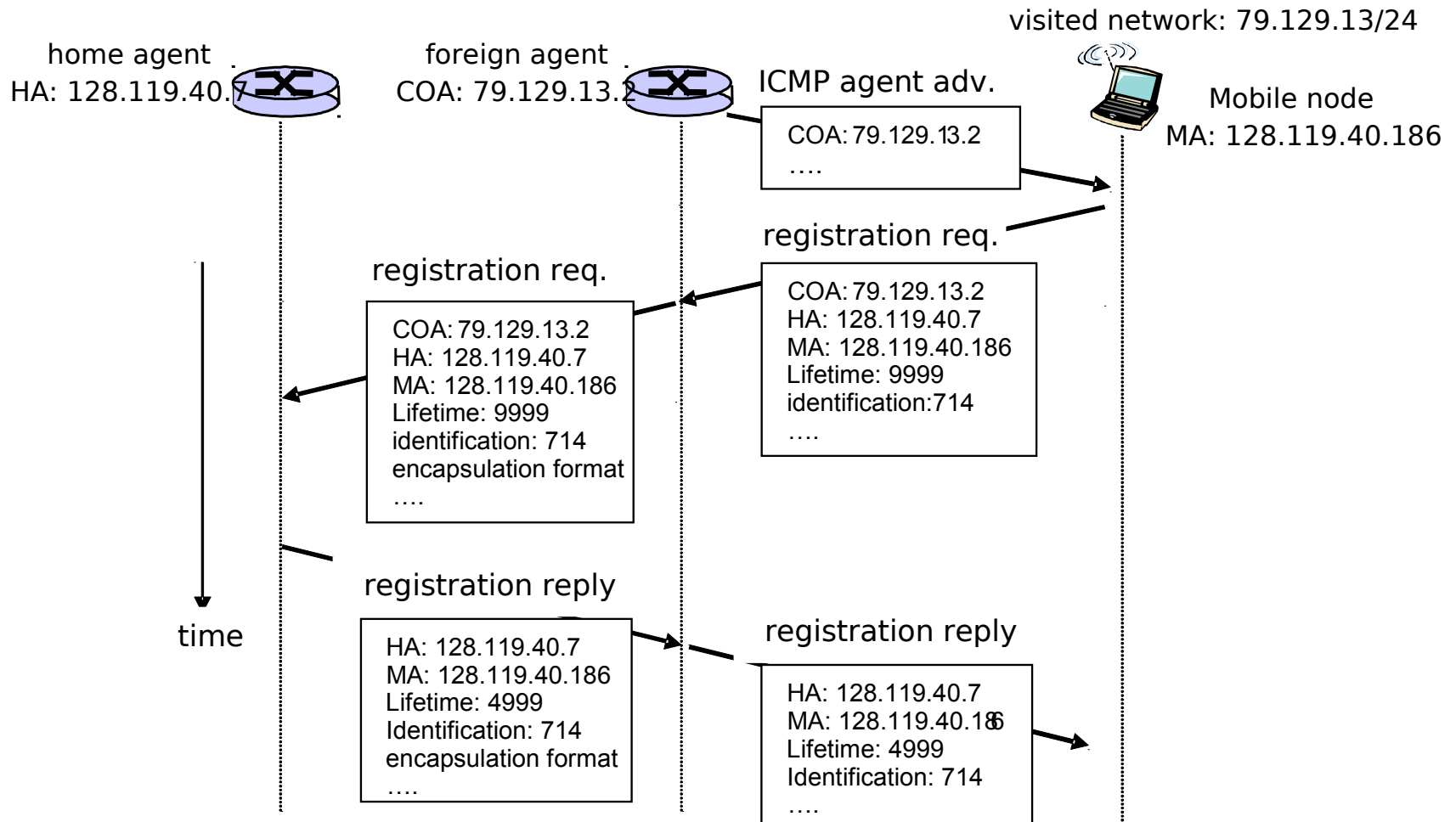
Mobility binding table at Home Agent

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

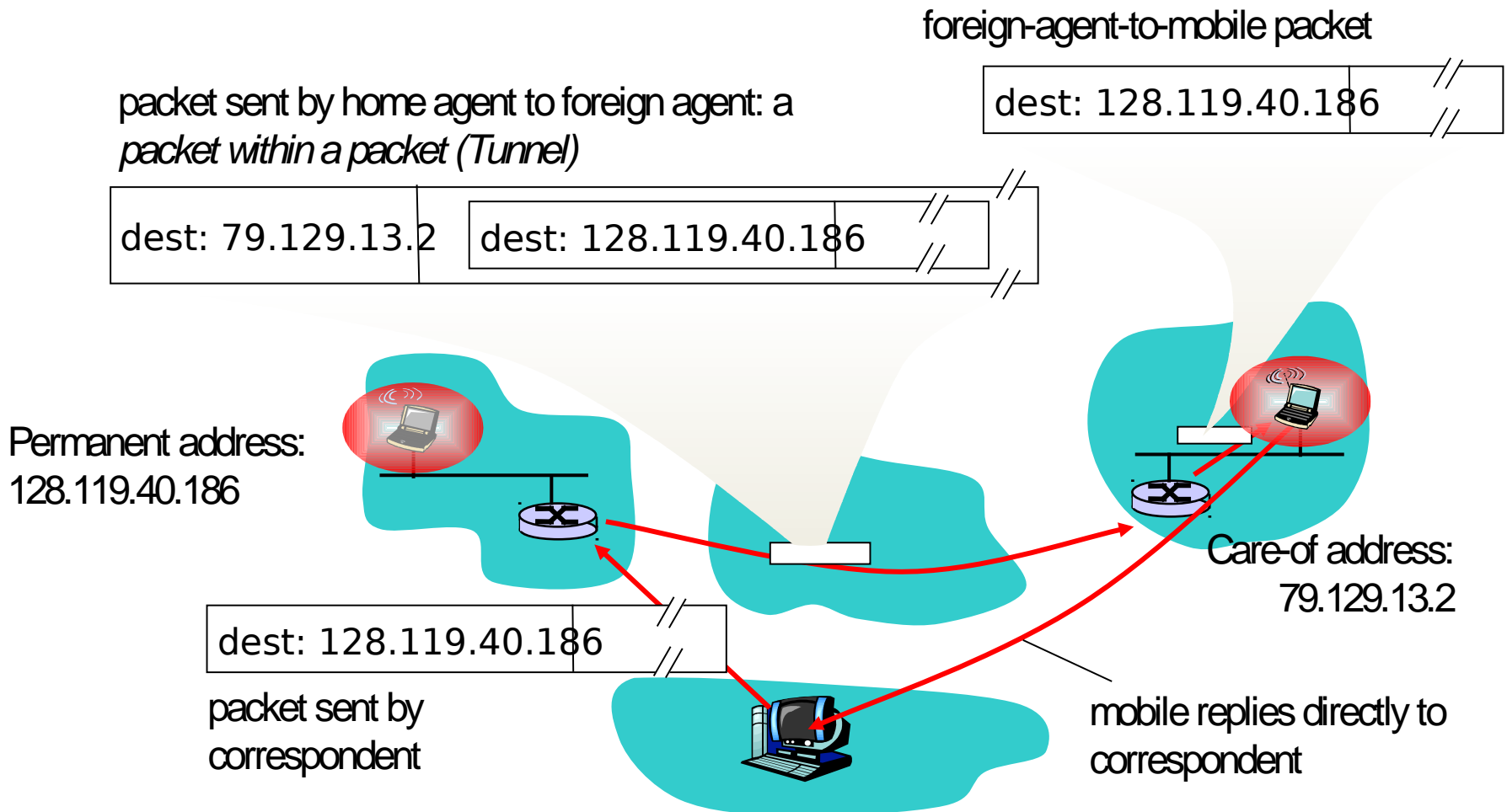
Visitor List at Foreign Agent

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

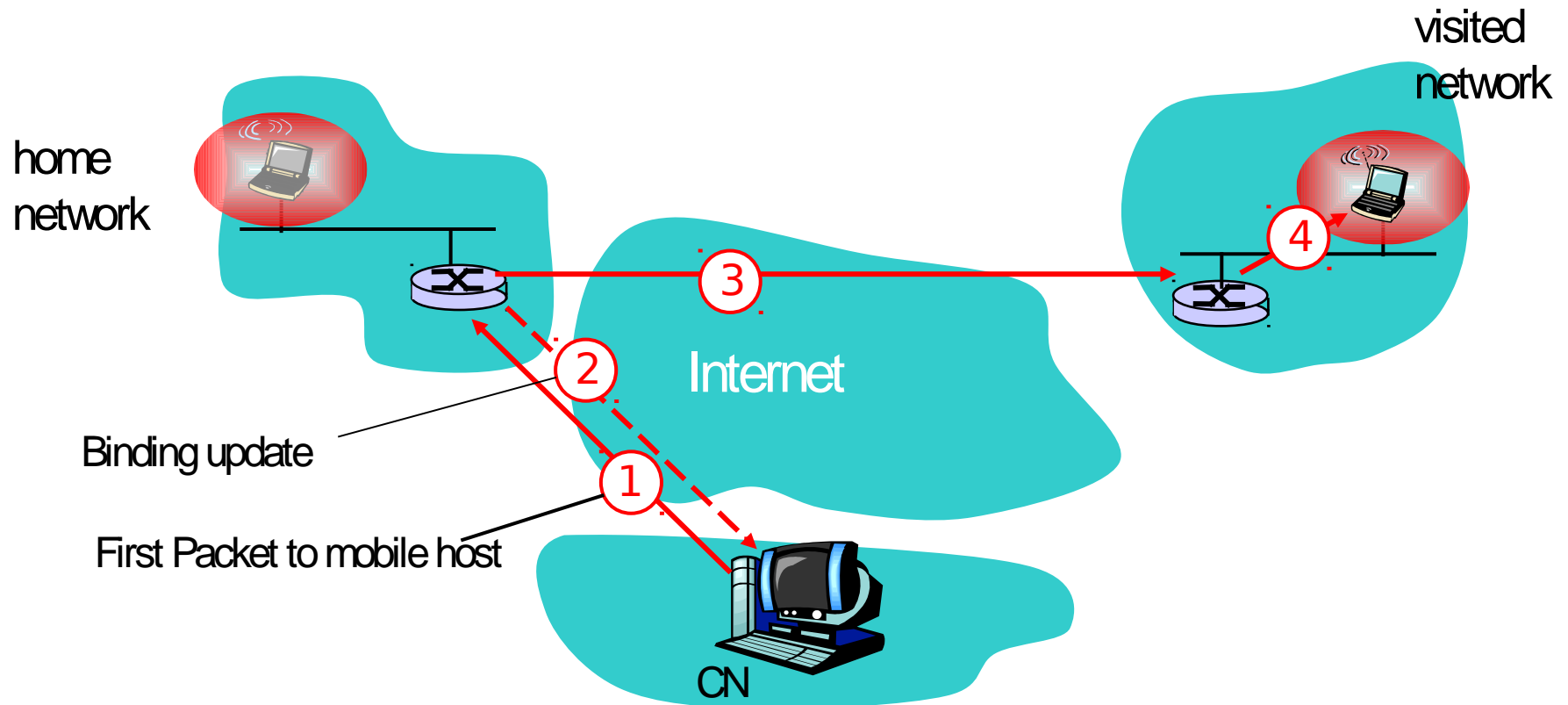
Continued...



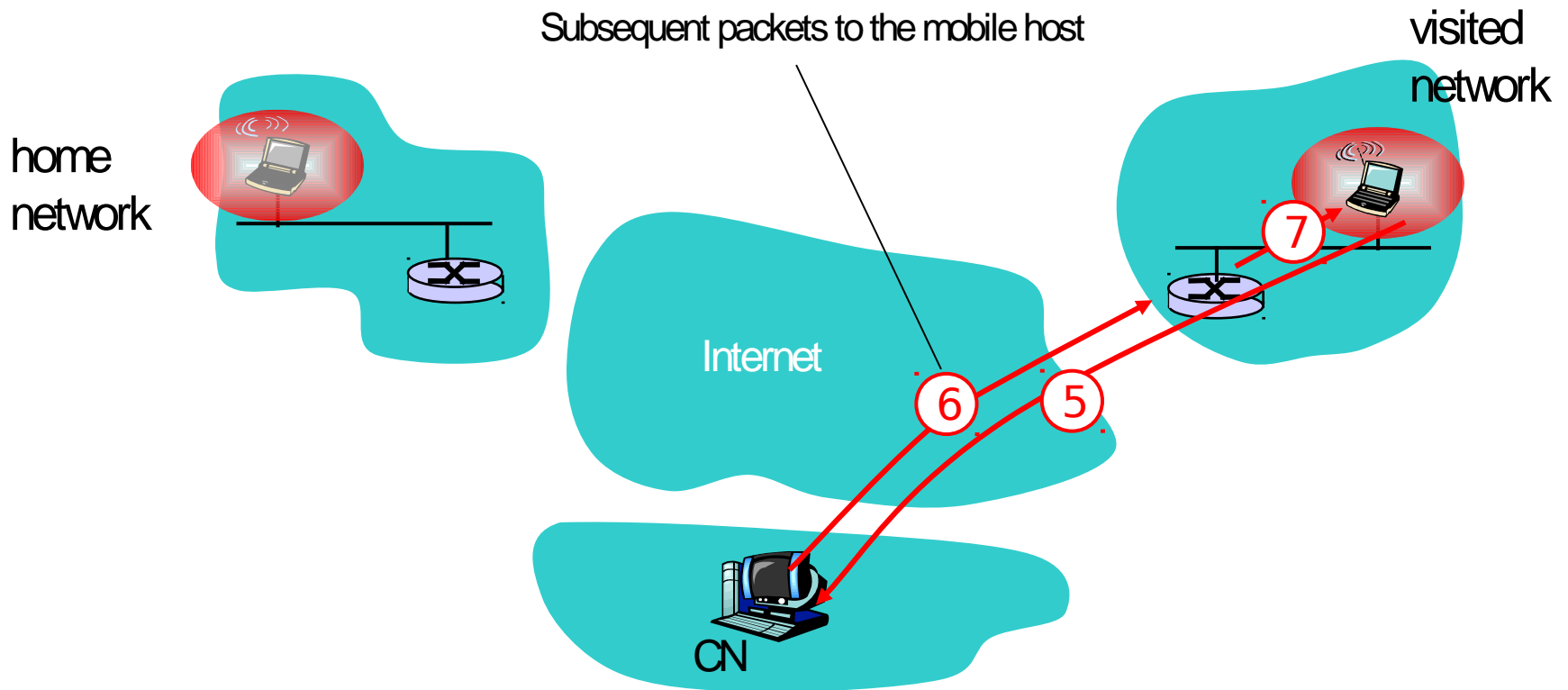
Indirect routing via tunneling



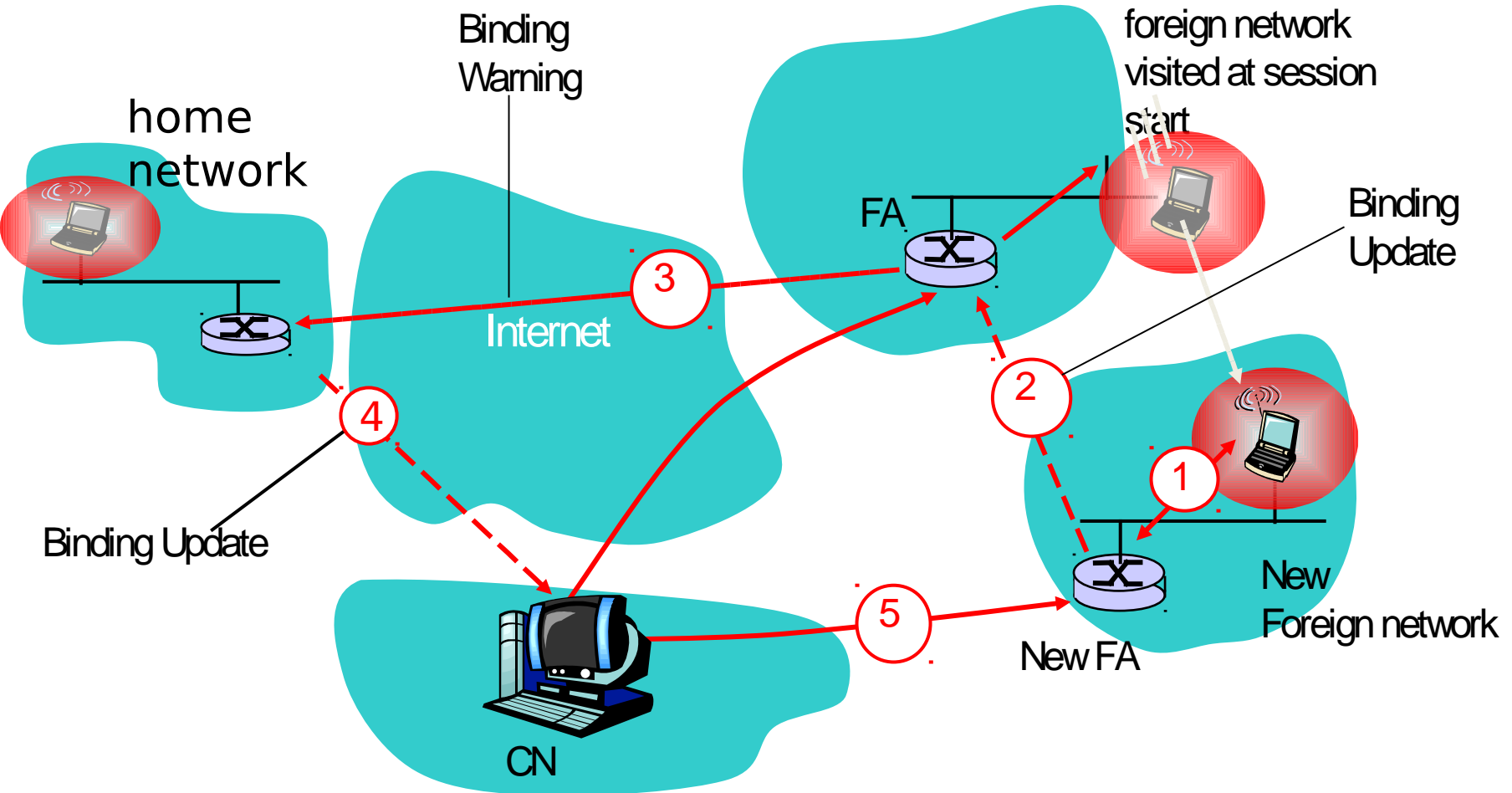
Route optimization(Opt1:binding cache)



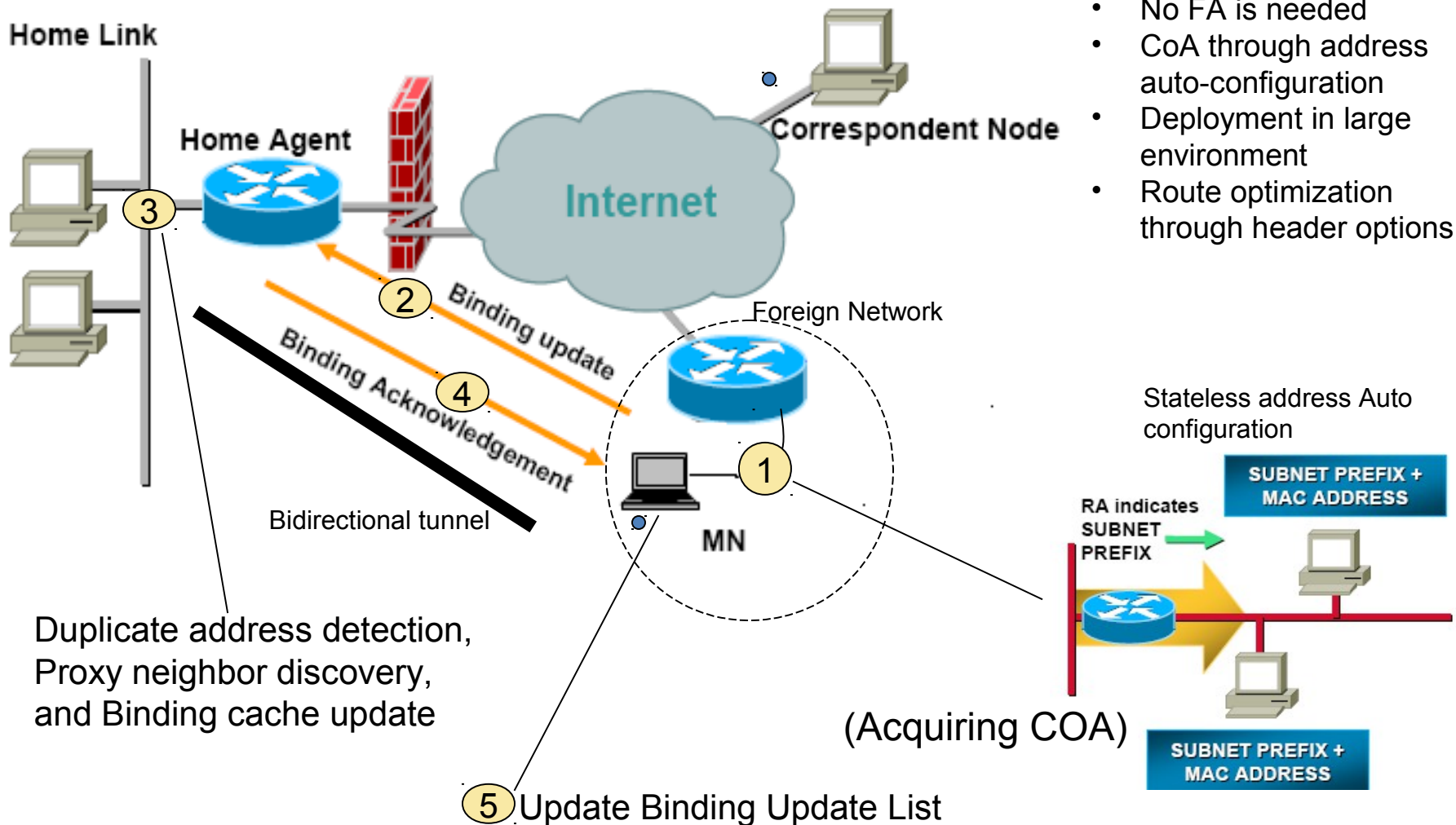
Continued...



Route optimization(Opt2:Smooth handoff)



MIPv6: Mobile on a foreign network



- No FA is needed
- CoA through address auto-configuration
- Deployment in large environment
- Route optimization through header options