HW1 - IT Fundamentals
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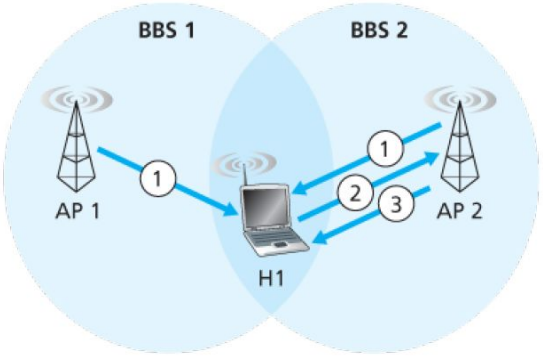
1 -

A = (1,1,1,1,1,1,1,1)
B = (1,1,1,1,-1,-1,-1,-1)
C = (1,-1,1,-1,1,-1,1,-1)

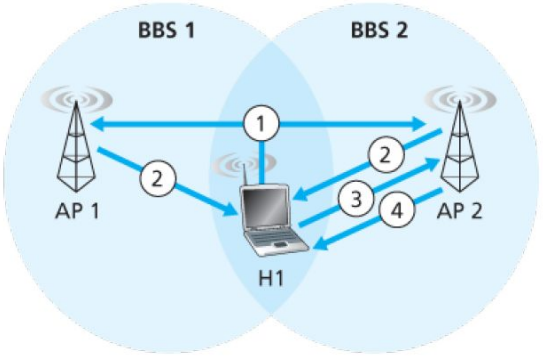
Encoding A's Message = ((1,1,1,1,1,1,1,1),(1,1,1,1,1,1,1,1))
Encoding C's Message = ((-1,1,-1,1,-1,1,-1,1),(1,-1,1,-1,1,-1,1,-1))
What Reciever has recieved = ((0,2,0,2,0,2,0,2),(2,0,2,0,2,0,2,0))
Decoding A's Message = ((0+2+0+2+0+2+0+2) / 8 , (2+0+2+0+2+0+2+0) / 8) = (1,1)
Decoding C's Message = ((0-2+0-2+0-2+0-2)/8 , (2+0+2+0+2+0+2+0) / 8) = (-1,1)

2-

a) APs transmit beacon frames. An AP's beacon frames will be transmitted over one of the 11 channels. The beacon frames permit nearby wireless stations to discover and identify the AP (In a passive scanning scheme). On the other hand, probe frames are requests from home agents trying to discover APs, and based on the probe response frames from APs, Home agent may choose its AP of interest (Active scanning).



a. Passive scanning
1. Beacon frames sent from APs
2. Association Request frame sent: H1 to selected AP
3. Association Response frame sent: Selected AP to H1



a. Active scanning
1. Probe Request frame broadcast from H1
2. Probes Response frame sent from APs
3. Association Request frame sent: H1 to selected AP
4. Association Response frame sent: Selected AP to H1

b)

i) **For a given modulation scheme, the higher the SNR, the lower the BER.** Since a sender can increase the SNR by increasing its transmission power, a sender can decrease the probability that a frame is received in error by increasing its transmission power.

c) Any ordinary Bluetooth node can be a master node whereas access points in 802.11 networks are special devices (normal wireless devices like laptops cannot be used as access points).

3-

a) Reciever B is in the radio coverage of both C and A, and since a node can receive only one message at a timeslot, B will receive either A's Message or C's Message (collision occurs), However, D will receive C's Message as planned.

b) Since the transmission radius of A and D are not overlapping, B and C will receive their messages as planned.

4-

a)

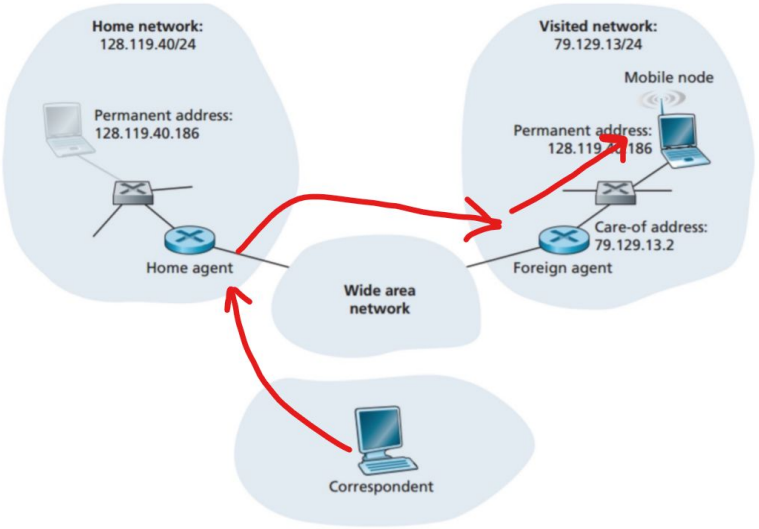
i) Indirect Routing:

1) The correspondent simply addresses the datagram to the mobile node's permanent address and sends the datagram into the network, unaware of whether the mobile node is resident in its home network or is visiting a foreign network. Such datagrams are first routed, as usual, to the mobile node's home network.

2) The home agent intercepts these datagrams and then forwards them forwarded to the foreign agent, using the mobile node's COA.

3) The foreign agent then forwards it to the mobile node.

4) For a response, the mobile node can address its datagram directly to the correspondent (using its own permanent address as the source address, and the correspondent's address as the destination address). Since the mobile node knows the correspondent's address, there is no need to route the datagram back through the home agent.



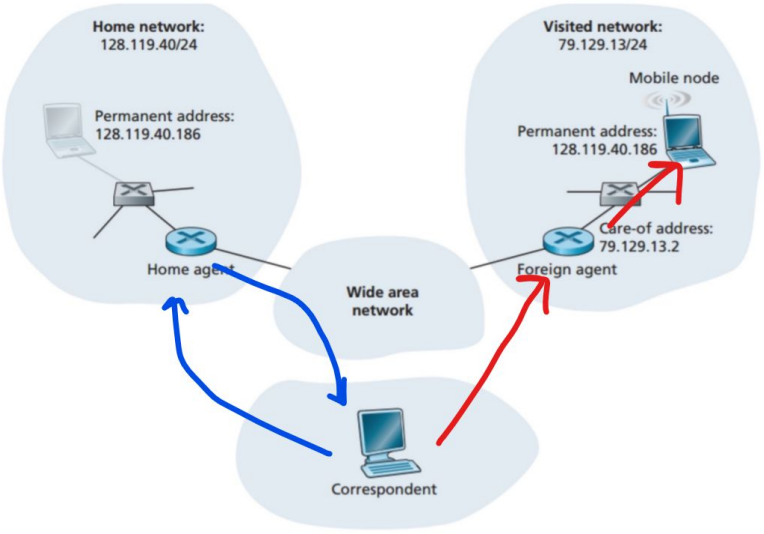
ii) Direct Routing:

1) A correspondent agent in the correspondent's network first learns the COA of the mobile node. This is done by sending a control message to the home agent, about the mobile node COA.

2) Then the home agent sends back the information about the COA, using a control message.

3) The correspondent agent then tunnels datagrams directly to the mobile node's COA, in a manner analogous to the tunneling

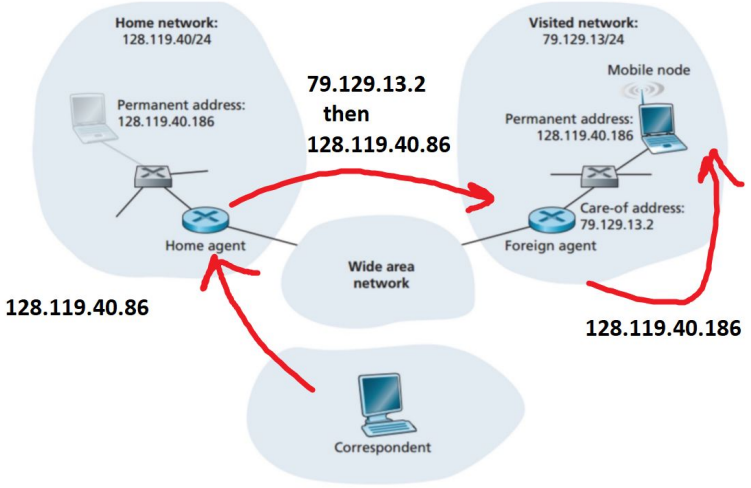
performed by the home agent, first to the foreign agent and then to the mobile node.



b)

i) Indirect Routing:

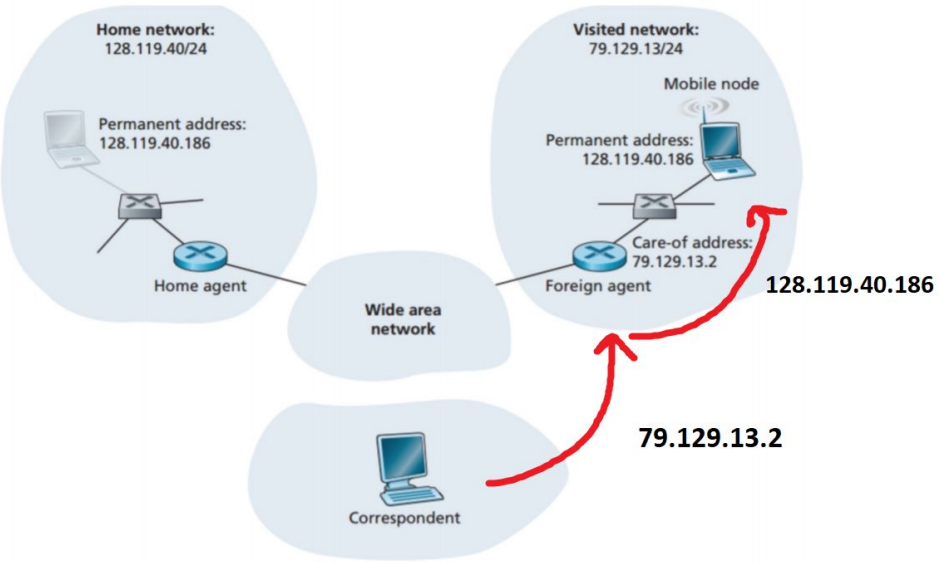
1) Datagram from the correspondent to the home agent's destination IP address: 128.119.40.86
2) Datagram forwarded from the home agent to the foreign agent's IP address: 79.129.3.12. Datagram including the message's IP address: 128.119.40.86
3) Datagram forwarded from foreign agent to the mobile node's IP address: 128.119.40.86



ii) Direct Routing:

1) Datagram from the correspondent to the Foreign agent's destination IP address: 79.129.3.12. Datagram including the message's IP address: 128.119.40.86

2) Datagram forwarded from foreign agent to the mobile node's IP address: 128.119.40.86



5- Two mobiles could certainly have the same care-of-address in the same visited network. Indeed, if the care-of-address is the address of the foreign agent, then this address would be the same. Once the foreign agent decapsulates the tunneled datagram and determines the address of the mobile, then separate addresses would need to be used to send the datagrams separately to their different destinations (mobiles) within the visited network.