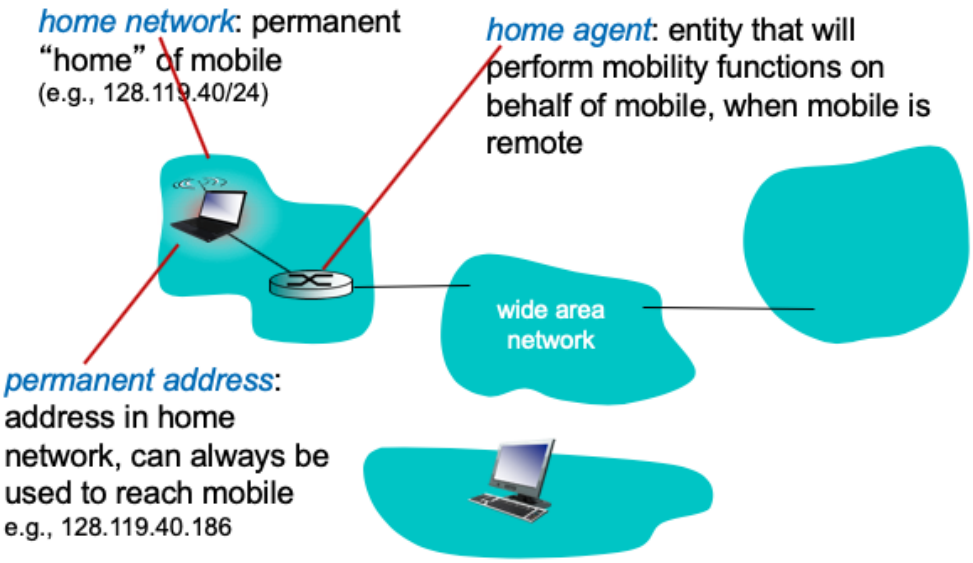
Exploration: Mobile Networking Introduction

Introduction

In this lecture we introduce the concept of wireless mobility. Just as wireless introduced a whole new level of complexity to networking, mobility introduces a whole new level of complexity to wireless. This lecture will cover how much there is to learn about mobility, what kinds of issues there are, and where the research is going.

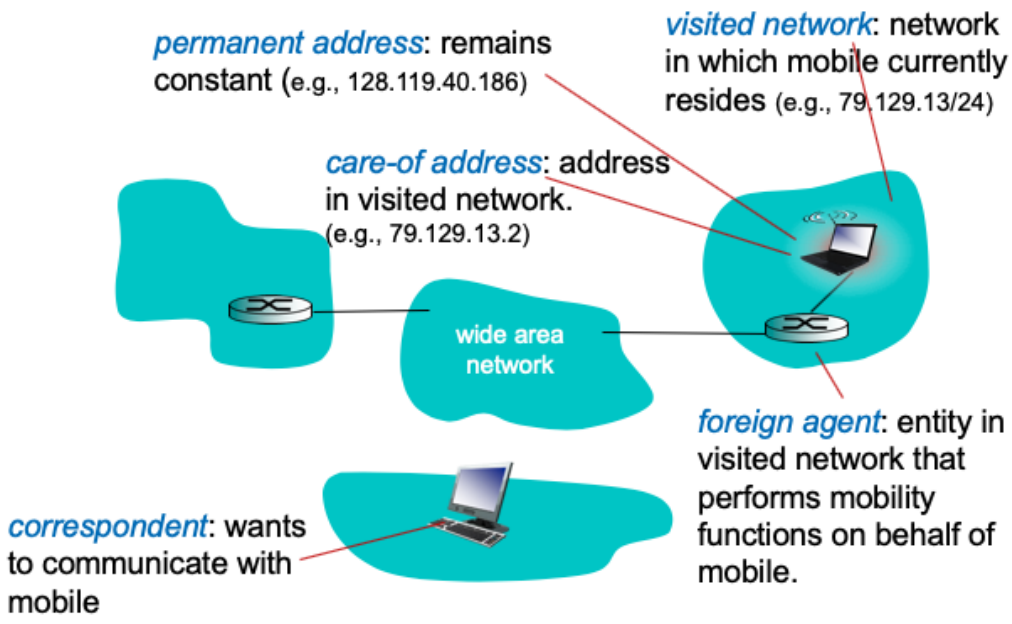
When we talk about wireless mobility, what we are really concerned with is changing wireless access points. A high-degree of mobility involves passing through multiple access points while maintaining connectivity (transparent to user).



The Home Network of the wireless device.

We are going to look at the various components that can enable a wireless device to have high mobility. The wireless device has to have a home network, and within that network, a permanent address that can always be used to reach that device…

There also needs to be a "home agent" that will perform actions on behalf of the mobile device, when the device is remote.



The Visited Network

When the device IS outside the home network, it will be connected with a different network (the 'visited network'). The visited network will assign a "care-of address", which is just an address local to that network. The foreign agent is what takes care of mobility functions on behalf of the mobile device or devices in that network. The correspondent is simply another device somewhere on the edge that wants to communicate with our mobile device.

Approaches to Mobility

There are two broad approaches to the mobility problem.

- Let the routers handle it.
  - Routers will advertise the permanent address of mobile-nodes-in-residence via the usual routing table exchange. Thus routing tables indicate where each mobile device is located.
    - No changes to end-systems would be required.
    - This system is NOT scalable to the billions of wireless devices in the world. Therefore it is unsuitable
- Let the end systems handle it. There are two possibilities:
  - Indirect routing is where all packets from the mobile go through the home agent.
  - Direct routing is where the correspondent gets the foreign address of the mobile, and then sends directly to it.

Indirect Routing

With indirect routing, the mobile has two addresses: It's permanent one on its "home network", and a temporary one, the "care-of" address. The home agent back in the home network receives datagrams and forwards them to the "care-of" address of the mobile.

This triangle routing is inefficient, especially if the correspondent and mobile are in the same network.

Whenever the mobile moves to a new network:

- The user's mobile registers with the new foreign agent
- The new foreign agent registers with the user's home agent
- The user's home agent updates the care-of address for the mobile
- The correspondent's packets continue to be forwarded to the mobile
  - But with the new care-of address

Direct Routing

Direct routing also uses two addresses, but it uses them one at a time. The correspondent goes to the permanent address, and the home agent has the care-of address and returns that to the correspondent to be used directly. This overcomes the triangle problem of Indirect routing.

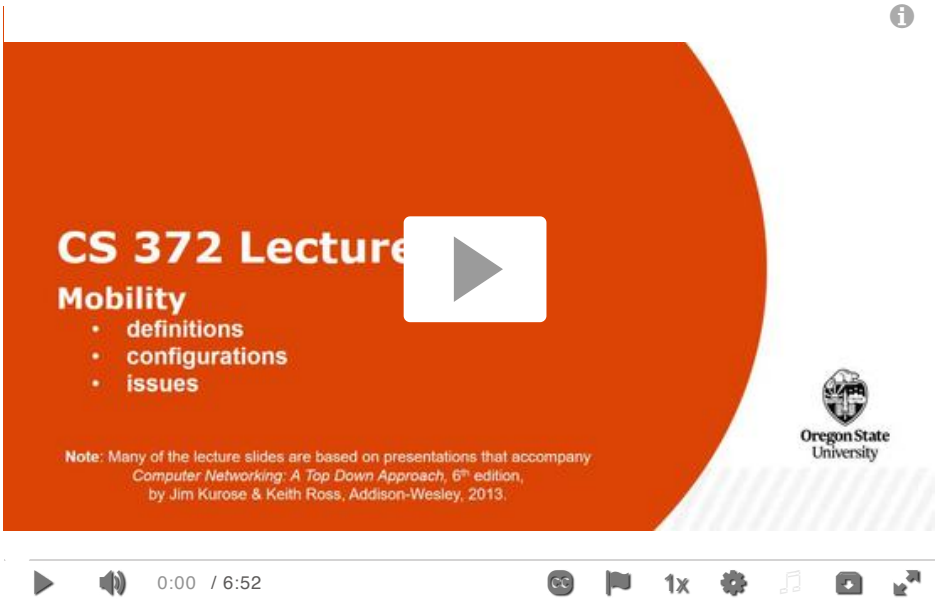
Whenever the mobile moves to a new network:

- The new foreign agent gets the user's home agent from the former foreign agent
- The new foreign agent assigns a new care-of address for the mobile
- The new foreign agent notifies the correspondent and the user's home agent of the new care-of address
- The user's home agent updates the care-of address for the mobile
- The correspondent continues direct communication with the mobile
  - But with the new care-of address

This concludes our discussion of Mobile Networking. Be sure to watch the video lecture below for more details, including a discussion of the impact mobility has on higher order protocols. Then test your knowledge with the included Self-Check exercises.

Video Lecture

Mobility



(PDF (https://oregonstate.instructure.com/courses/1798856/files/83165095/download?wrap=1) (https://oregonstate.instructure.com/courses/1798856/files/83165095/download?wrap=1) |PPT (https://oregonstate.instructure.com/courses/1798856/files/83165051/download?wrap=1) (https://oregonstate.instructure.com/courses/1798856/files/83165051/download?wrap=1))

Self-Check Exercises

Why is “letting the routers handle it” not feasible for mobility?

Turn

Card 1 of 1

Drag the words into the correct boxes

With regard to wireless mobility, please describe each of the following terms.

a. The registered “home network” in which the home agent resides.

b. The entity in the home network which performs mobility functions for the device.

c. Address in home network, which will always correspond to the device.

d. Network which mobile device is currently in (assuming it is not in the home network).

e. Entity in the visited network which performs mobility functions for the device.

f. Address in the visited network which is registered to the mobile device.

g. Entity attempting to communicate with the mobile device