

The background features abstract, overlapping green geometric shapes, primarily triangles and polygons, in various shades of green, creating a modern and dynamic visual effect.

CS 176c

Discussion Section

4/17

Review Questions

- ▶ *Describe the role of the beacon frames in 802.11.*
- ▶ Beacon frames are transmitted by the APs.
- ▶ The beacon frames permit nearby wireless stations to discover and identify the AP.
- ▶ Transmitted over one of the 11 channels.

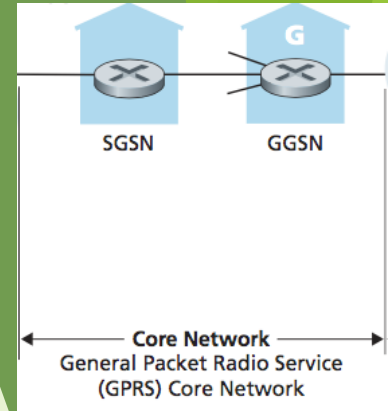
Review Questions

- ▶ *True or false: Before an 802.11 station transmits a data frame, it must first send an RTS frame and receive a corresponding CTS frame.*
- ▶ FALSE.
- ▶ It's optional. Mostly used to avoid Hidden Terminals.

Review Questions

- ▶ *What are the differences between a master device in a Bluetooth network and a base station in an 802.11 network?*
- ▶ 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

Review Questions



- ▶ *What is the role of the “core network” in the 3G cellular data architecture?*
- ▶ Serving GPRS Support Nodes (SGSNs) and Gateway GPRS Support Nodes (GGSNs)
- ▶ SGSN is responsible for delivering datagrams to/from the mobile nodes in the radio access network to which the SGSN is attached.
- ▶ The SGSN interacts with the cellular voice network’s MSC for that area, providing user authorization and handoff, maintaining location (cell) information about active mobile nodes, and performing datagram forwarding between mobile nodes in the radio access network and a GGSN.
- ▶ The GGSN acts as a gateway, connecting multiple SGSNs into the larger Internet.

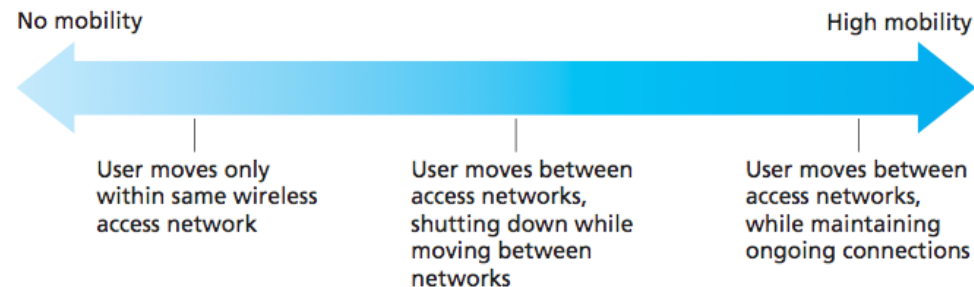
Review Questions

- *What are the three important differences between the 3G and 4G cellular architectures?*

3G	4G
Separate network components and paths for voice and data. (Public telephone n/w vs. public internet)	4G has a unified, all-IP network architecture
3G architecture doesn't have a clear distinction between data and control plane	The architecture clearly separates data and control plane
Uses radio access network UTRAN	Uses an <i>enhanced</i> radio access network E-UTRAN

Review Questions

- ▶ *If a node has a wireless connection to the Internet, does that node have to be mobile? Explain. Suppose that a user with a laptop walks around her house with her laptop, and always accesses the Internet through the same access point. Is this user mobile from a network standpoint? Explain.*
- ▶ No.
- ▶ A mobile node is the one that changes its point of attachment into the network over time.
- ▶ Since the user is always accessing the Internet through the same access point, she is not mobile.



Review Questions

- ▶ *What is the difference between a permanent address and a care-of address? Who assigns a care-of address?*
- ▶ A permanent address for a mobile node is its IP address when it is at its home network.
- ▶ A care-of-address is the one its gets when it is visiting a foreign network.
- ▶ The COA is assigned by the foreign agent (which can be the edge router in the foreign network or the mobile node itself).

Problems

- ▶ One proposed solution that allowed mobile users to maintain their IP addresses as they moved among foreign networks was to have a foreign network advertise a highly specific route to the mobile user and use the existing routing infrastructure to propagate this information throughout the network. We identified scalability as one concern. Suppose that when a mobile user moves from one network to another, the new foreign network advertises a specific route to the mobile user, and the old foreign network withdraws its route. Consider how routing information propagates in a distance-vector algorithm (particularly for the case of inter-domain routing among networks that span the globe).

Problems

- ▶ *Will other routers be able to route datagrams immediately to the new foreign network as soon as the foreign network begins advertising its route?*
- ▶ No.
- ▶ Distance Vector algorithm (as well as the inter-AS routing protocols like BGP) is decentralized and takes some time to terminate.
- ▶ While the algorithm is running, some of the routers may not be able to route datagrams to the destined node.

Problems

- ▶ *Is it possible for different routers to believe that different foreign networks contain the same mobile user?*
- ▶ Yes -> When one of the nodes has just left a foreign network and joined a new foreign network.
- ▶ Note that the routing entries from the old foreign network might not have been completely withdrawn when the entries from the new network are being propagated.

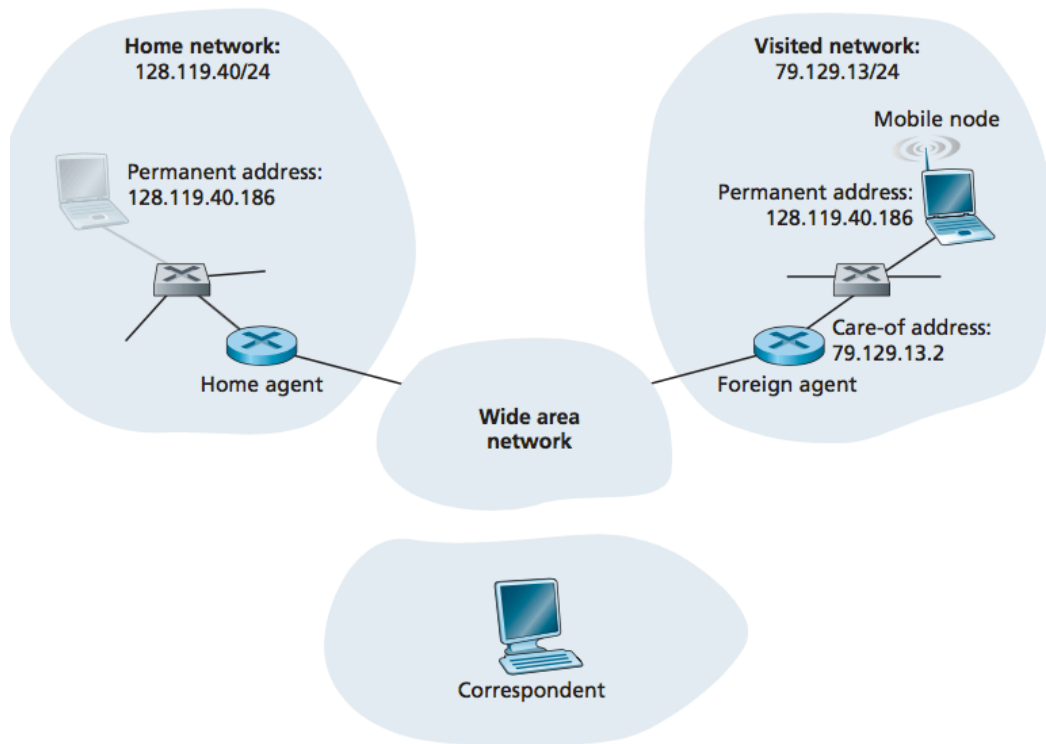
Problems

- ▶ *Discuss the time scale over which other routers in the network will eventually learn the path to the mobile users.*
- ▶ The time it takes for a router to learn a path to the mobile node depends on the number of hops between the router and the edge router of the foreign network for the node

Problems

- ▶ *In mobile IP, what effect will mobility have on end-to-end delays of datagrams between the source and destination?*
- ▶ Because datagrams must be first forward to the home agent, and from there to the mobile, the delays will generally be longer than via direct routing.
- ▶ It would depend on the delays on these various path segments.
- ▶ Indirect routing also adds a home agent processing (e.g., encapsulation) delay.
- ▶ Note that it *is* possible, however, that the direct delay from the correspondent to the mobile (i.e., if the datagram is not routed through the home agent) could actually be smaller than the sum of the delay from the correspondent to the home agent and from there to the mobile.

Problems



- Suppose the correspondent in Figure were mobile. Sketch the additional network-layer infrastructure that would be needed to route the datagram from the original mobile user to the (now mobile) correspondent. Show the structure of the datagram(s) between the original mobile user and the (now mobile) correspondent

