# Lecture 9 (Jan 17, 2004)

Outline IP Mobility

# Portable Networking Technology · Cellular systems - Cellular Digital Packet Data (CDPD) - 3G Bluetooth - Low cost, short range radio links between mobile devices Wireless Ethernet (802.11)

#### - Widely used wireless MAC layer technology

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Mobility and Standard IP Routing

- · IP assumes end hosts are in fixed physical locations What happens if we move a host between networks?
- IP addresses enable IP routing algorithms to get packets to the correct network
  - Each IP address has network part and host part
     This keeps host specific information out of routers
  - DHCP is used to get packets to end hosts in networks · This still assumes a fixed end host
- What if a user wants to roam between networks?
  - Mobile users don't want to know that they are moving between networks
  - Why can't mobile users change IP when running an application?

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3



### Mobile IP Entities

- Mobile Node (MN)
  - The entity that may change its point of attachment from network to network in the Internet
    - · Detects it has moved and registers with "best" FA
  - Assigned a permanent IP called its *home address* to which other hosts send packets regardless of MN's location Since this IP doesn't change it can be used by long-lived applications as MN's location changes

  - Home Agent (HA)
  - This is router with additional functionality
  - Located on home network of MN
  - Does mobility binding of MN's IP with its COA
  - Forwards packets to appropriate network when MN is away · Does this through encapsulation

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## Mobile IP Entities contd.

- Foreign Agent (FA)
  - Another router with enhanced functionality
  - If MN is away from HA the it uses an FA to send/receive data to/from HA
  - Advertises itself periodically
  - Forward's MN's registration request \_
  - Decapsulates messages for delivery to MN
- Care-of-address (COA)
  - Address which identifies MN's current location
  - Sent by FA to HA when MN attaches
- Usually the IP address of the FA
- Correspondent Node (CN)
- End host to which MN is corresponding (eg. a web server)

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6













- Random numbers on request reply packets are optional
- HA and FA do not have to share any security information.

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13

### Problems with Mobile IP

#### • Suboptimal "triangle" routing

- What if MN is in same subnetwork as the node to which it is communicating and HA is on the other side of the world?
  It would be nice if we could directly route packets
- Solution: Let the CN know the COA of MN
  - Then the CN can create its own tunnel to MN
  - CN must be equipped with software to enable it to learn the COA
  - Initiated by HA who notifies CN via "binding update"
  - Binding table can become stale

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14

