

CS640: Introduction to Computer Networks

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Lecture 22 -
Wireless Networking

Wireless Challenges

- Force us to rethink many assumptions
- Need to share airwaves rather than wire
- Mobility
- Other characteristics of wireless
 - Noisy → lots of losses
 - Slow
 - Interaction of multiple transmitters at receiver
 - Collision, capture, interference
 - Multipath interference

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The Road Ahead

- Internet mobility
- TCP over noisy links
- Link layer challenges

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Routing to Mobile Nodes

- Obvious solution: have mobile nodes advertise route to mobile address/32
 - Should work!!
- Why is this bad?
 - Consider routing tables on backbone routers
 - Would have an entry for each mobile host
 - No aggregation
 - Not very scalable
- What are some possible solutions?

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Handling Mobile Nodes: Addressing

- Dynamic Host Configuration (DHCP)
 - Host gets new IP address in new locations
 - Problems
 - Host does not have constant name/address → how do others contact host
 - What happens to active transport connections?

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Handling Mobile Nodes: Naming

- Naming
 - Use DHCP and update name-address mapping whenever host changes address
 - Fixes contact problem but not broken transport connections

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Handling Mobile Nodes: Transport

- TCP currently uses 4 tuple to describe connection
 - <Src Addr, Src port, Dst addr, Dst port>
- Modify TCP to allow peer's address to be changed during connection
- Security issues
 - Can someone easily hijack connection?
- Difficult deployment → both ends must support mobility

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Handle Mobile Nodes: Link Layer

- Link layer mobility
 - Learning bridges can handle mobility
 - Encapsulated PPP (PPTP) → Have mobile host act like he is connected to original LAN
 - Works for IP AND other network protocols

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Handling Mobile Nodes: Routing

- Allow mobile node to keep same address and name
- How do we deliver IP packets when the endpoint moves?
 - Can't just have nodes advertise route to their address
- What about packets from the mobile host?
 - Routing not a problem
 - What source address on packet? → this can cause problems
- Key design considerations
 - Scale
 - Incremental deployment

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