Ad hoc routing, Johnson and Maltz [Johnson96c]

CSci551: Computer Networks SP2006 Thursday Section John Heidemann

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Key ideas

- propose DSR (Dynamic Source Routing)
- routing in an ad hoc network
 - nodes come and go

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- no infrastructure
- ex: users with laptops walking around and wireless radios, vehicular networks, sensor networks
 - MANET: Mobile Adhoc NETwork

Mobile Routing Alternatives

- Why not just assume a base station?
 - want to deploy when you don't have instructurereduce cost? be distributed?
 - (if you can use base stations, why not?)
- Why not just use regular Internet routing?

 links are not very stable in wireless (movement, environment changes), convergence could be an issue
- Why not just flood the data to all nodes?
 very high overhead (interference, pkts you don't want, energy wastage)



General Ad Hoc Routing • assumptions: • approaches:

- *multi-hop* routing (all nodes forward data)
- wireless nodes
- typically mobiletypically trustworth (more or
- less) – want low energy consumption
- implications
 - cannot really use hierarchical addressing
 - should assume things will change
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- approaches:
 a priori protocols (DSDV, TORA) pre
 - compute routing tables on-demand protocols (DSR, AODV)

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- (DSR, AODV) compute routes *lazily* (only when needed) – (other researchers have
- proposed the obvious hybrid schemes, too)

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- Problems with traditional approaches
- Periodic (a priori) routing or LS updates are expensive
- Dynamic topology problems:
 - frequent LS updates
 - algorithm must converge very quickly to avoid blackholes
- Many "links" in wireless (many nodes can hear each other) => large rtg tables/msgs
- Not studied in the context of realistic radio propagation models, MAC layers and mobility patterns.
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- DV protocols may form loops
 - very wasteful in wireless: bandwidth, power
 - loop avoidance sometimes complex
- LS protocols: high storage and communication overhead

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