Implementation of MANET Routing Protocols for ns-3

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wiki.ittc.ku.edu/ MANET_Routing_Simulations

Routing Protocols in MANETs and ns-3

- Characteristics of MANETs
  - mobile ad-hoc networks: dynamic topologies
  - weak and intermittent connectivity
  - constrained bandwidth and energy
  - security concerns due to open channel

- Routing protocols
  - proactive: maintain topology, e.g. DSDV, OLSR
  - reactive: discover routes as needed, e.g. AODV, DSR

- ns-3 network discrete-event simulator
  - successor to ns-2 but not backward compatible
  - open source software for education and research
  - still lacking many models (OLSR part of distribution)

DSDV Routing Protocol

- DSDV: destination-sequenced distance-vector
  - proactive
  - periodic/incremental updates build forwarding tables
  - route selected based on
    - seq. # freshness
    - then better metric

- Advantages:
  - proactive: no delay before sending packet

- Disadvantages:
  - overhead of maintaining routes not needed
  - difficult to maintain topology under high mobility
  - tradeoff between update interval and mobility

DSR Routing Protocol

- DSR: dynamic source routing
  - on-demand reactive source routing
  - route discovery and maintenance only when needed
  - route discovery packet constructs source routes
  - routes cached for reuse

- Advantages:
  - route discovery only when needed
  - no overhead of maintaining unneeded routes

- Disadvantages:
  - overhead of route discovery before flow can begin
  - caching less useful as mobility increases

Simulation Results

- 25 nodes in 1km², RWP (10 m/s, 0 pause)
  - PDR increases with connectivity
    - OLSR slightly better than DSDV for this scenario
  - DSDV goodput and delay with decreasing density

- Status
  - DSDV to be submitted to ns-3 release
  - DSR currently under development