Routing in Ad Hoc Networks

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Contents

- distributed Bellmann-Ford and problems (Leon-Garcia and Widjaja)
- reactive and proactive routing protocols in ad hoc networks (Royer and Toh)

Distributed Bellman-Ford (Ford-Fulkerson)

- Distance vector routing
- based on the idea that if B is in the shortest path of A and C, A and B is a shortest path and so is B and C
- old protocol for wired networks

DBF problems

- good news propagate fast, bad news slow
- count-to-infinity
- examples presented on whiteboard

Table-driven protocols

- proactive
- all nodes keep routing information for all nodes
- one or more routing tables
- change in topology → updates propagated throughout network
- differences?

Destination-Sequenced Distance-Vector

- table: all destinations, number of hops + sequence number from the destination
- table updates: broadcast full dump and incremential
- examples presented on whiteboard

Clusterhead Gateway Switch Routing

- hierarchical, modified DSDV
- clusters: nodes, gateways, cluster heads
- tables: cluster member table – destination cluster for each mobile node in network, routing table – next hop in order to reach the destination
- routing: cluster-head-to-gateway
- examples presented on whiteboard

Source-Initiated On-Demand Routing

- reactive
- routes created when desired by the source node
- route discovery, completed once a route is found or all possible routes examined
- route maintained until either destination becomes inaccessible or route is not desired anymore

Ad Hoc On-Demand Distance Vector Routing 1/2

- builds on DSDV, typically minimizes required broadcasts
- unicast, multicast, broadcast
- unicast routing RREQ: source broadcast ID + 1, source IP, source sequence number, destination sequence number, destination IP
- receiver checks if seen (unique ID + IP) → reverse path

AODV 2/2

- when RREQ reaches destination or intermediate node with fresh enough route → RREP
- RREP is routed back the reverse path and nodes along the path setup forward route entries
- examples presented on whiteboard

Left out (Royer and Toh)

- The Wireless Routing Protocol
- Dynamic Source Routing
- Temporally Ordered Routing Algorithm
- Associativity-Based Routing
- Signal Stability Routing

Conclusion

- reactive and proactive
- flat and hiearchical (cluster)
- also a hybrid framework reactive/proactive
  – ZRP

References

- Leon-Garcia Alberto and Widjaja Indra – Communication Networks: Fundamental Concepts and Key Architectures, McGraw-Hill Higher Education, 2000
- Royer Elizabeth M. and Toh Chai-Keong - A Review of Current Routing Protocols for Ad Hoc Mobile Wireless Networks, *IEEE Personal Communications 6* (April 1999), 46-55