A Reverse AODV Routing Protocol in Ad Hoc Mobile Network

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Outline

- Introduction
- R-AODV protocol
- Performance Result
- Conclusion

Introduction

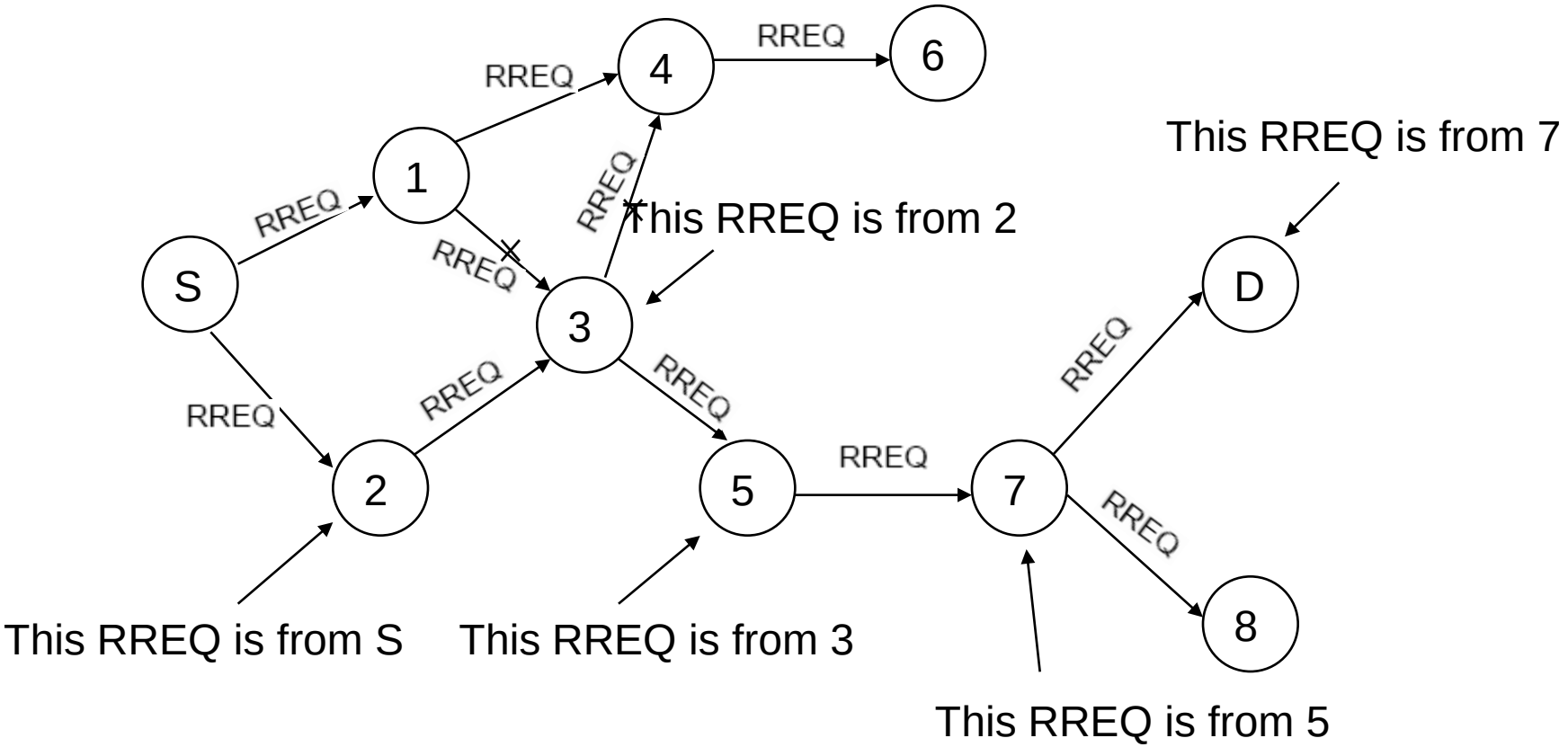
- Mobile ad hoc network
  - Formed by wireless hosts which may be mobile
  - Rapid change of topology
- Two kinds of protocol
  - Proactive
  - Reactive

Introduction

- A drawback of existing on-demand routing protocols is that the routing are not well concerned about a route reply message loss.
- Most of today's on-demand routing is based on single route reply message.
- In R-AODV, route reply message is not unicast.

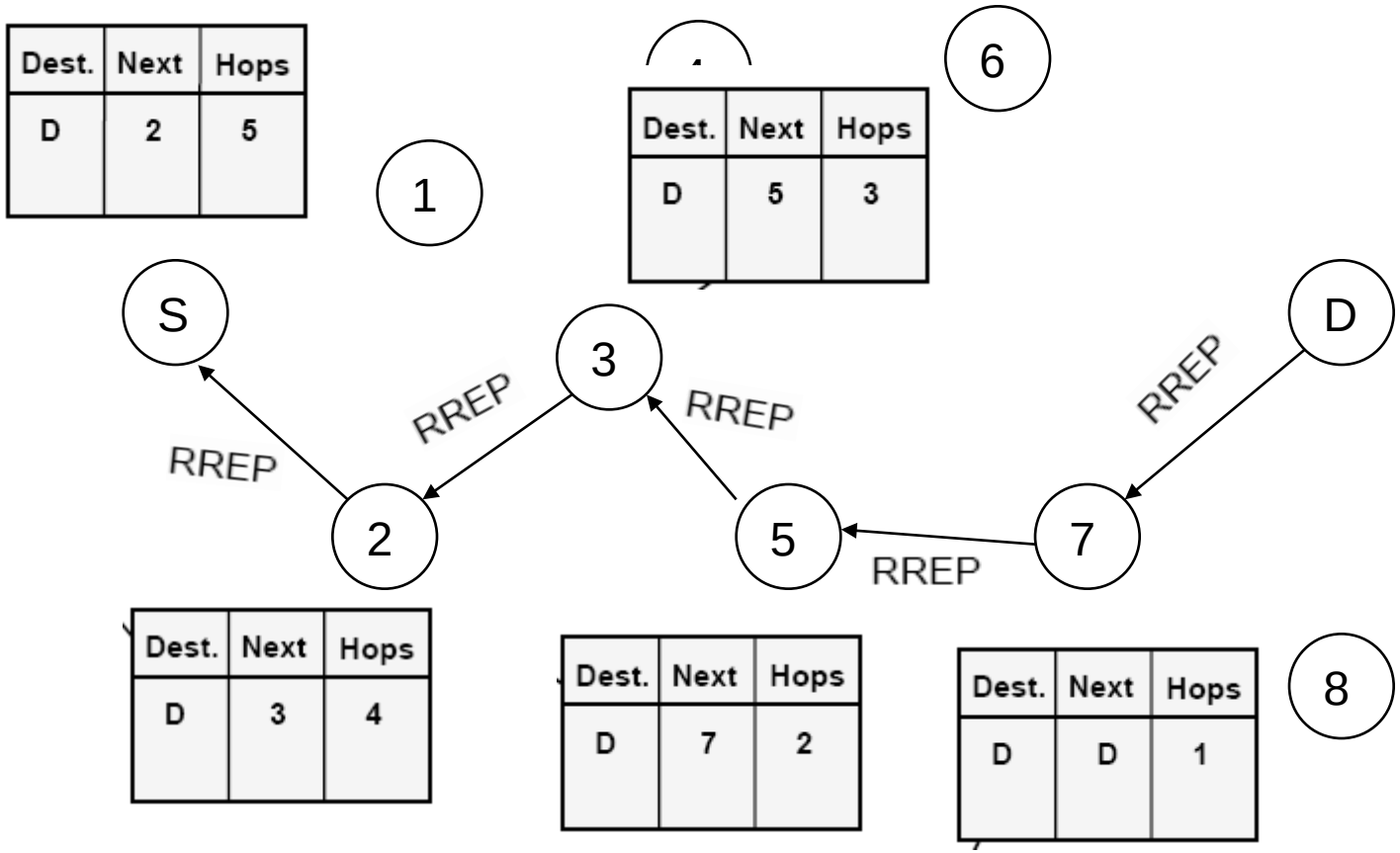
Introduction(cont.)

- AODV routing protocol



Introduction(cont.)

- AODV routing protocol



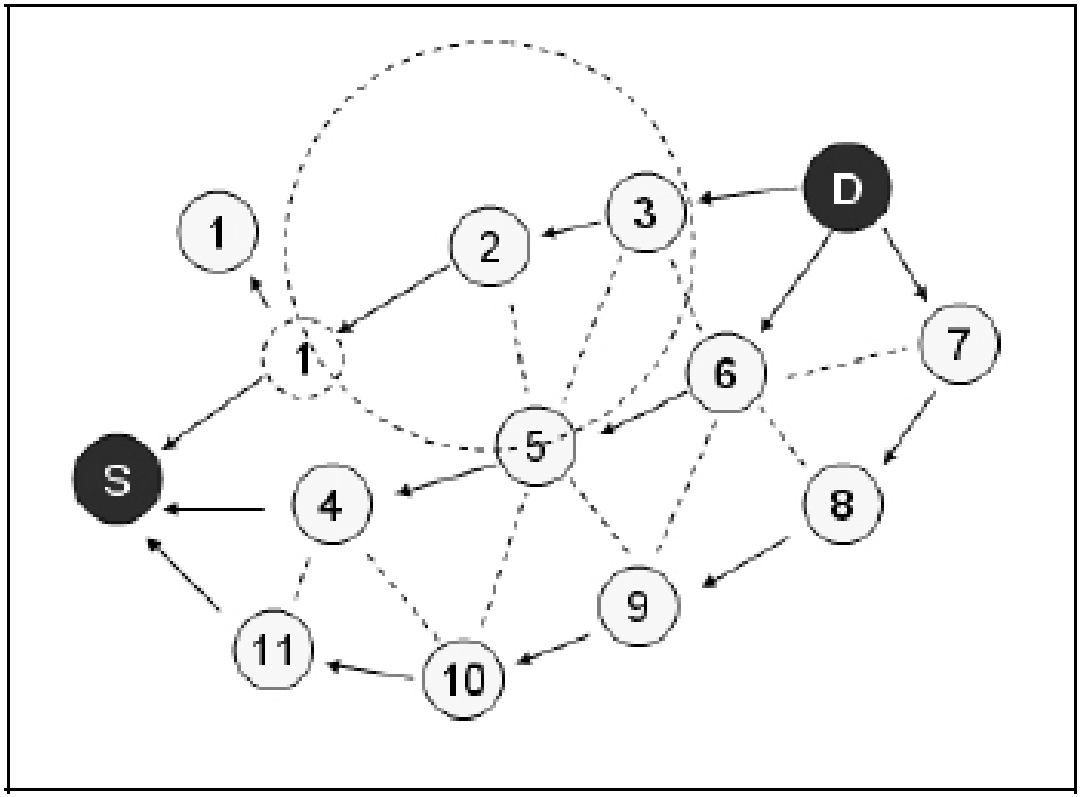
R-AODV

- R-AODV
  - Sending RREQ like AODV
  - After receiving RREQ message, destination node floods *reverse request* (R-RREQ), to find source node
  - Node stores or updates information of routing table

R-AODV

- Source node receives first R-RREQ message, it starts packet transmission.
- late arrived R-RREQs are saved for future use

R-AODV



D->3->2->1->S ; D->6->5->4->S ; D->7->8->9->10->11->S

R-AODV

- Route Maintenance
  - The source node can select alternative route or trigger a new route discovery procedure.
  - first the node compares sequence numbers, higher sequence numbers mean recent routes.
  - second node compares number of hops up to destination
  - If fail occurs closer to destination node, RERR received nodes can try local-repair

R-AODV

- The RREQ and R-RREQ message contains
  - Source ip address
  - Destination ip address
  - Broadcast id
  - Hop count

R-AODV

- Routing table contains
  - Destination node address
  - Source node address
  - Hop up to destination
  - Sequence number
  - Route expiration time
  - Next hop to destination

R-AODV

- Control Packet Overhead

$$AODV(m) = (m - 1 + t)$$

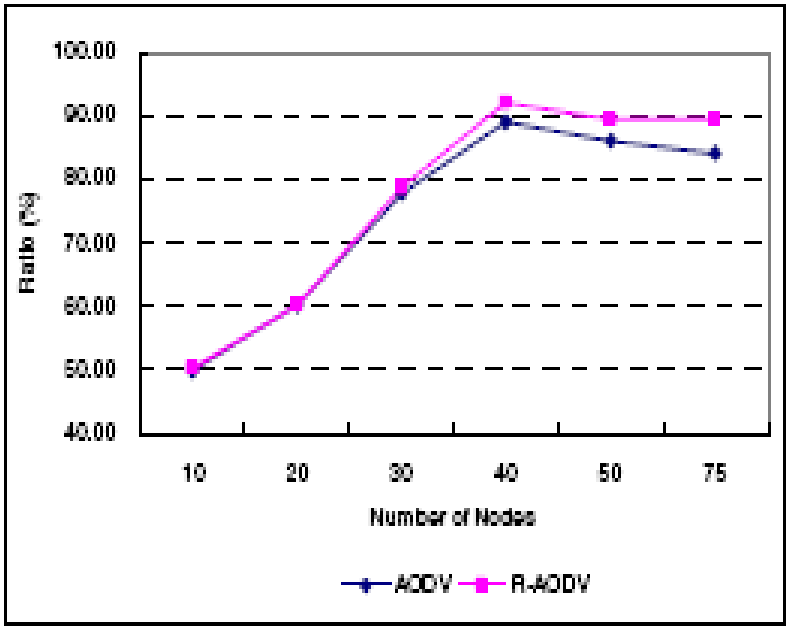
$$AODV(m) = c(m - 1 + t)$$

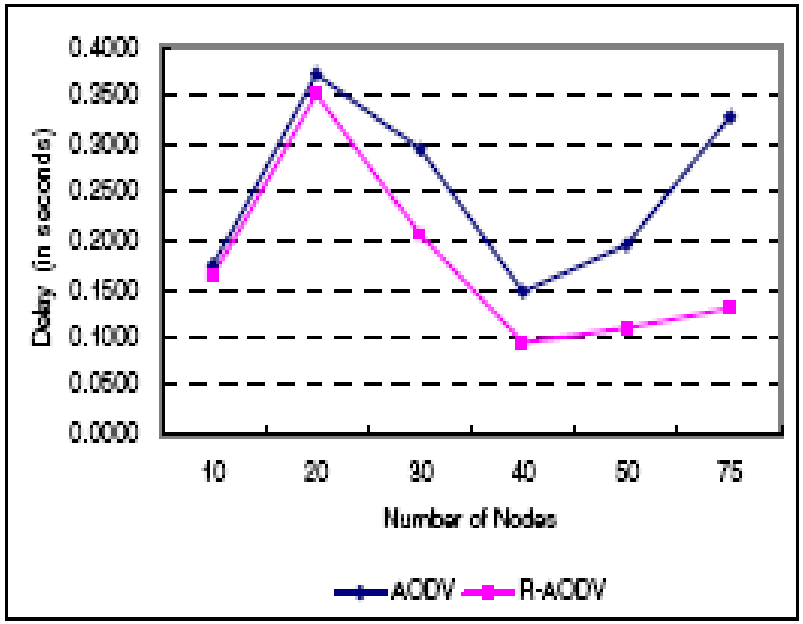
$$RAODV(m) = O(2m - 2)$$

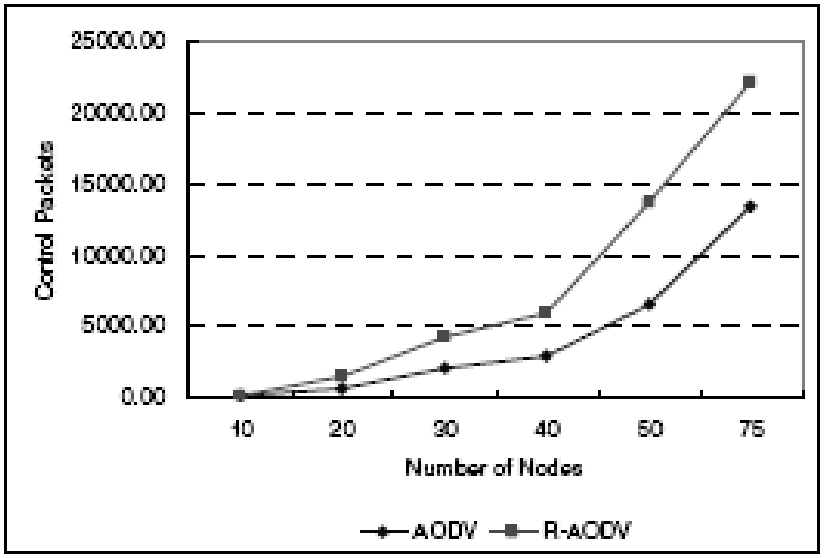
Performance Result

- Setup
  - The simulations were implemented on NS2
  - Number of nodes: 10, 20, 30, 50,75
  - Area: 1000m*1000m
  - Transmissionrange: 250m
  - Mobile speed:0~maxspeed (2,5,10,25,50,75m/s)
  - Run for 100 s

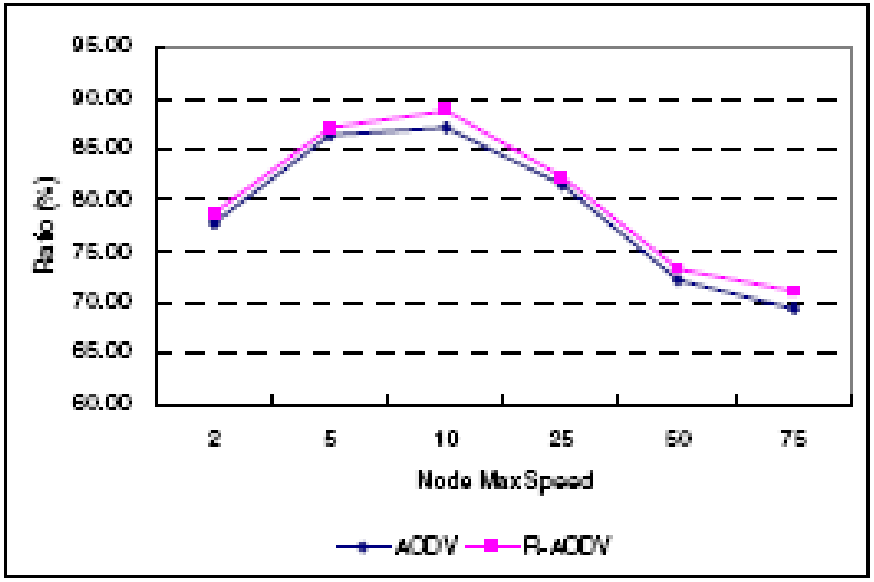
Performance Result

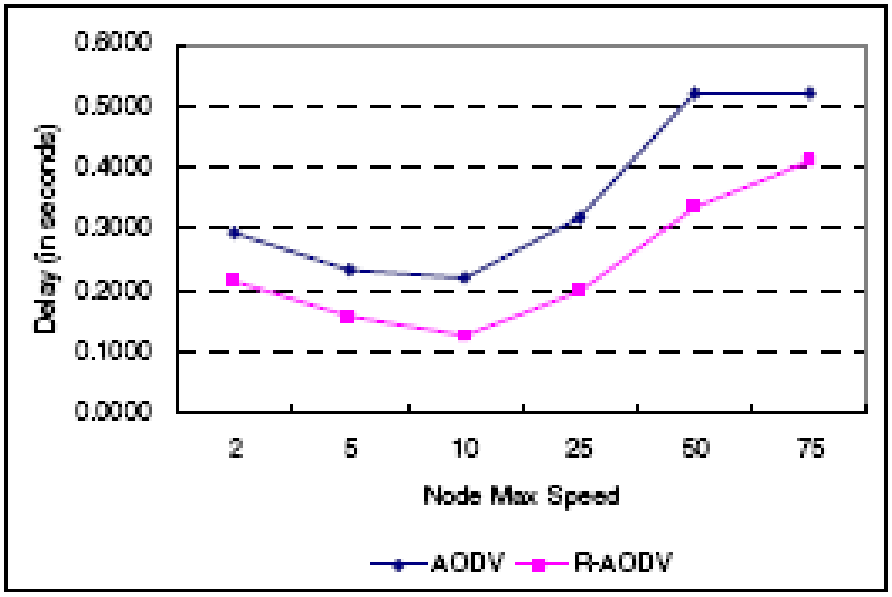






Performance Result





Conclusions

- Successful delivery of RREP messages are important in on-demand routing protocols for ad hoc networks.
- R-AODV route discovery succeeds in fewer tries than AODV and improves the performance of AODV.