Defending Against Man-in-the-Middle Attacks on AODV Routing

Andrew Fallgren
Aaron Pope
George Rush

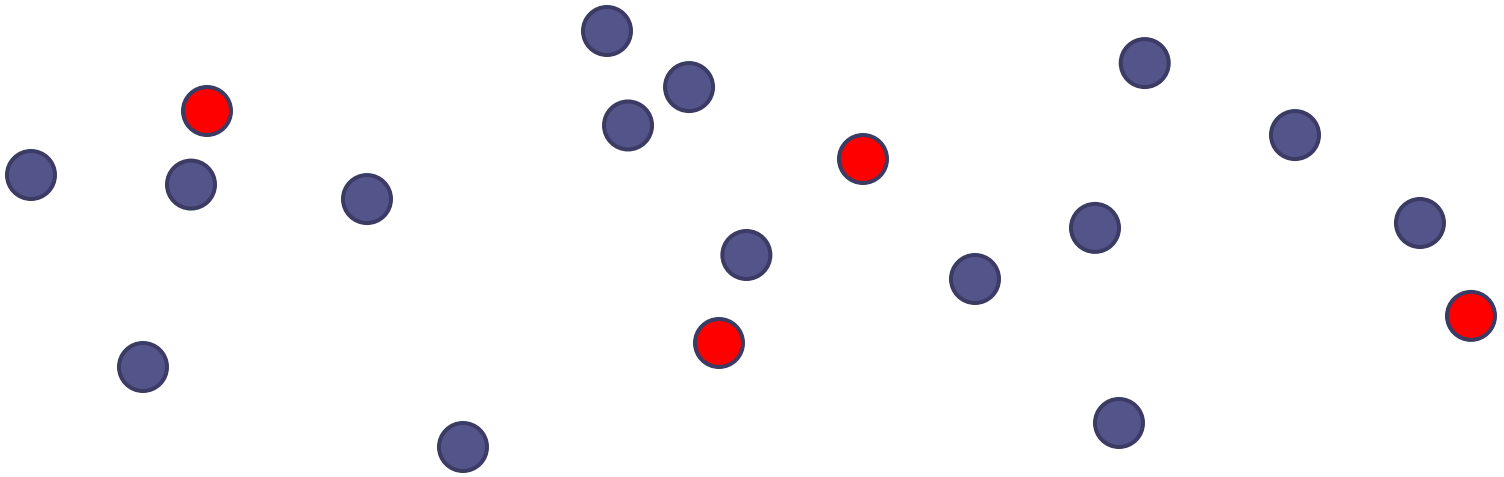
What is AODV Routing?

- Ad-hoc On Demand Distance Vector Routing (AODV)
- This is the routing protocol used in ZigBee, a popular standard for wireless mesh networks.
- A mesh network is a topology in which each node relays data for the network.

How does AODV work?

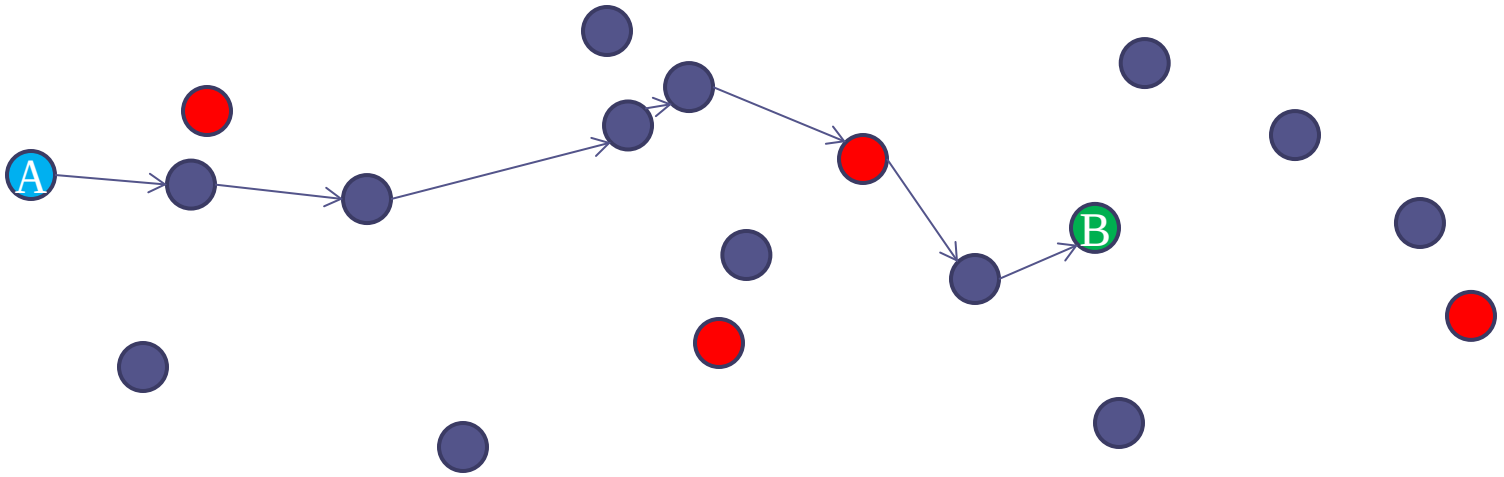
Attack Model (Initial Conditions)

- Of *n* deployed nodes, one or more are captured by an adversary.



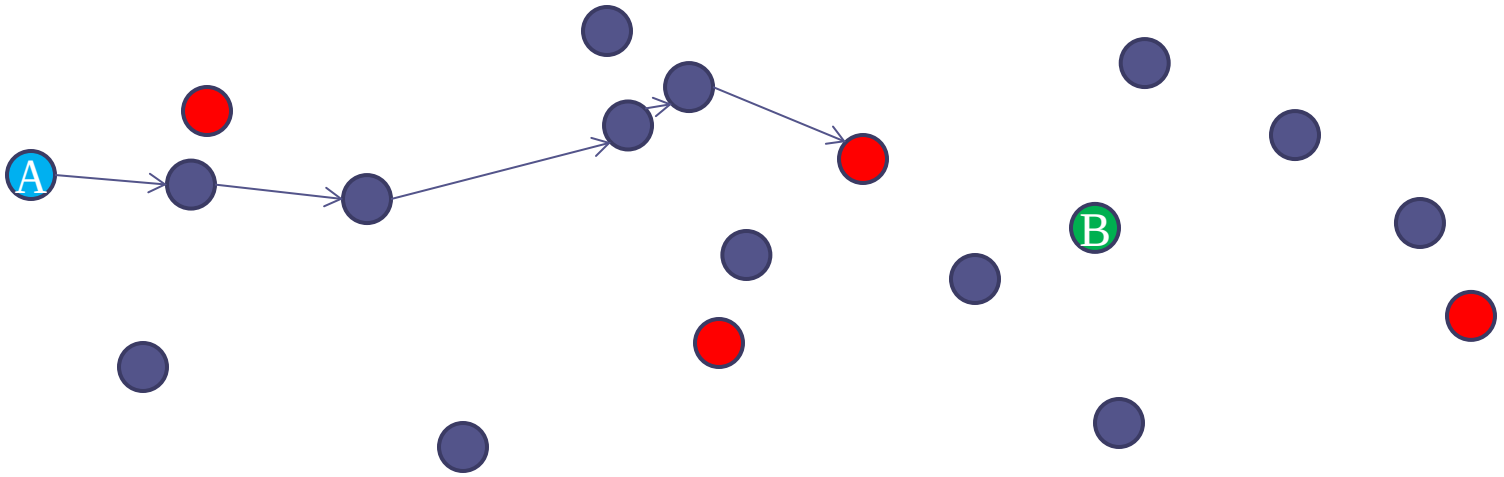
Attack Model (Exploitation)

- A captured node agrees to forward traffic on a route from Node A to Node B.



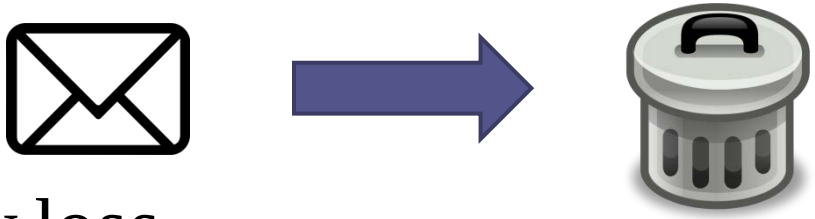
Attack Model (Exploitation)

- The captured node drops all packets rather than forwarding them.

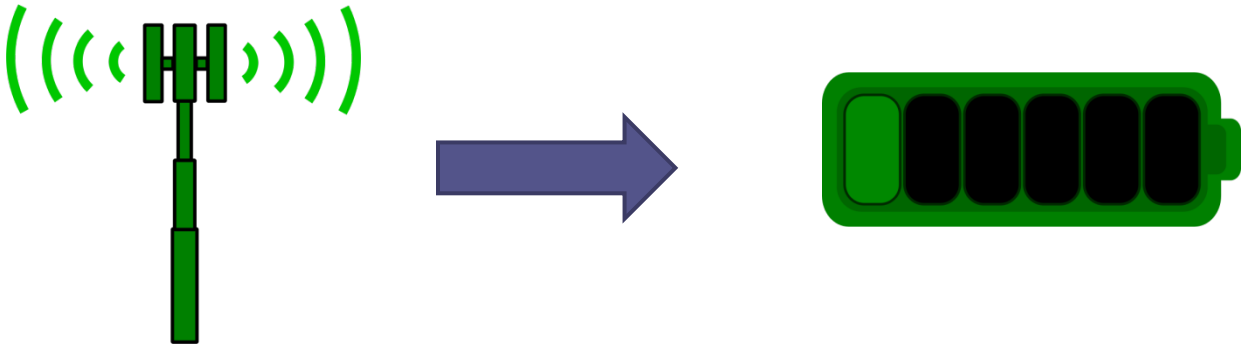


Attack Model (Results)

- Data loss
  - Packets never reach their destination.



- Energy loss
  - Nodes waste energy on radio communication.



Defensive Goals

- Primary Objective
  - Ensure that packets reach their destination if it is possible to do so.
- Secondary Objective
  - Minimize message complexity in order to reduce network transmissions.

Sources

- Perkins, Charles E., and Elizabeth M. Royer. "Ad-hoc on-demand distance vector routing." *Mobile Computing Systems and Applications, 1999. Proceedings. WMCSA'99. Second IEEE Workshop on*. IEEE, 1999.
- http://en.wikipedia.org/wiki/ZigBee
- http://en.wikipedia.org/wiki/Mesh_networking
- Images from openclipart.org