Selfish Misbehavior in Wireless Networks


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MISBEHAVIOR SCENARIO

- Nodes are required to follow Medium Access Control (MAC) rules
- Misbehaving nodes may violate MAC rules - e.g., by modifying wireless card driver

PROBLEM DEFINITION

- Selfish misbehavior in IEEE 802.11 MAC is considered
- Misbehaving nodes may obtain higher throughput, or suffer lower delay
- Sender node backs off for a random interval, based on a specified distribution, before accessing the channel

PROPOSED SOLUTION

- Receivers detect sender misbehavior
- Example: Access point can monitor each sender’s behavior

POSSIBLE SOLUTIONS

1. Monitor throughput obtained by each sender
2. Monitor distribution of per-packet backoff for each sender
   - Both solutions take time to converge, and cannot detect a node cheating to obtain lower delay
   - Since sender chooses a random backoff, it is difficult to detect sender misbehavior quickly

DISCUSSION

- Misbehaving sender has two options
  1. Ignore assigned penalty ➔ Easier to detect
  2. Follow assigned penalty ➔ No throughput or delay gain
- Possible strategies when misbehavior is detected
  1. Inform higher layer
  2. Drop packets at MAC layer
- Extending misbehavior detection - use multiple observers that collaboratively detect misbehavior

RESULTS

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