



Research Consortium in Speckled Computing

Passive Channel Sampling

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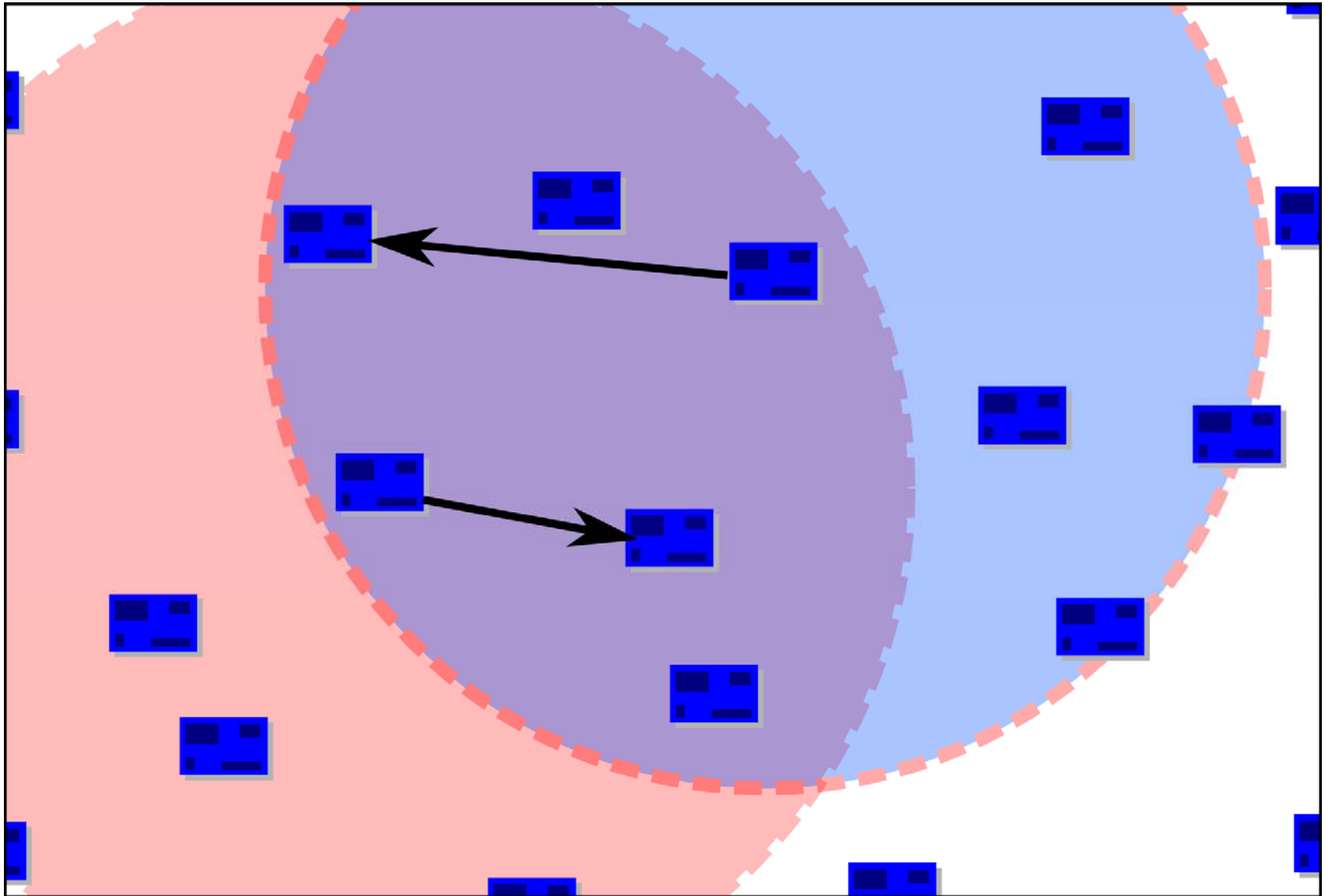
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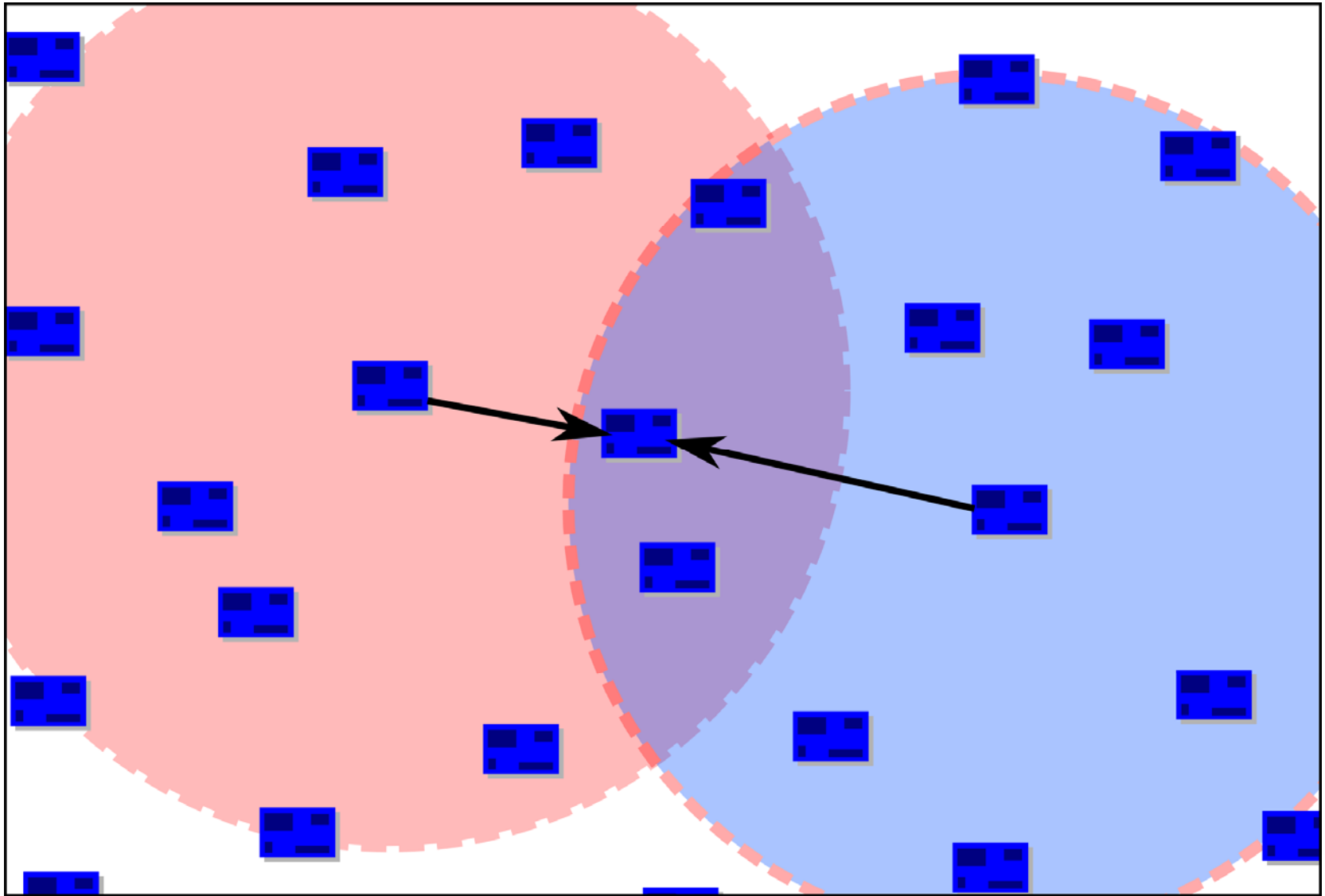
Introduction

- scheduling while avoiding hidden terminal collisions
- new receiver-focused approach to transmission scheduling
- based on radio features like RSSI, carrier sense

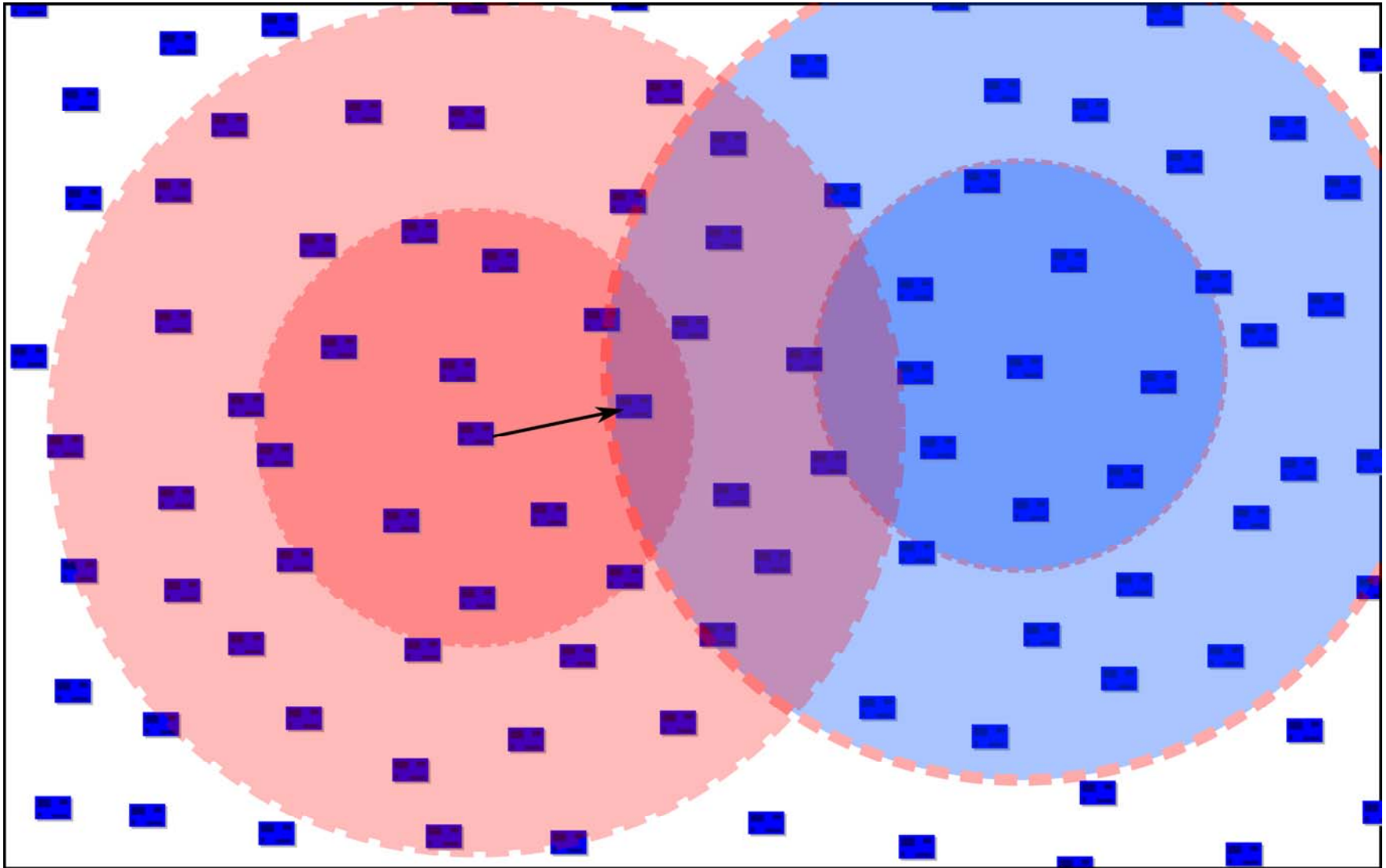
Collisions in radio networks



Hidden Terminals



The Scheduling Problem

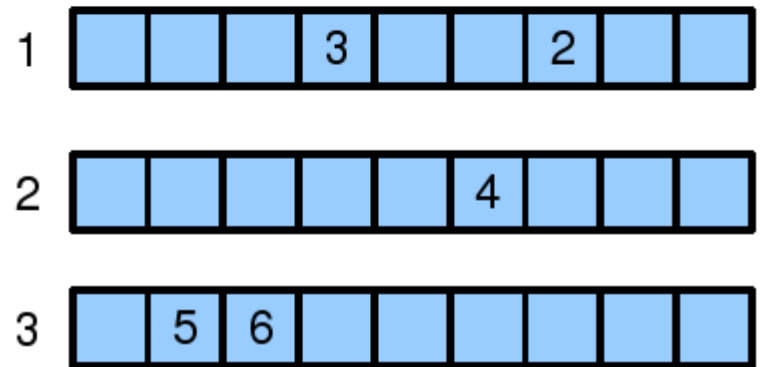
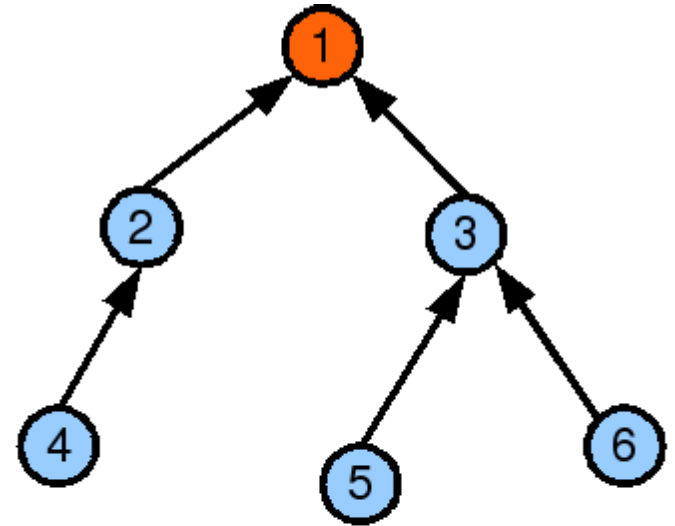


Receiver-Centric Approach

- interference affects reception at the receiver
- information about sources of interference is available at the receiver
- making scheduling decisions at the transmitter is more costly
- however, cross-layer approach required

Data Gathering Application Scenario

- Common Scenario for Specknets / WSN
- Good match for PASCHA approach
- Can be optimised for latency

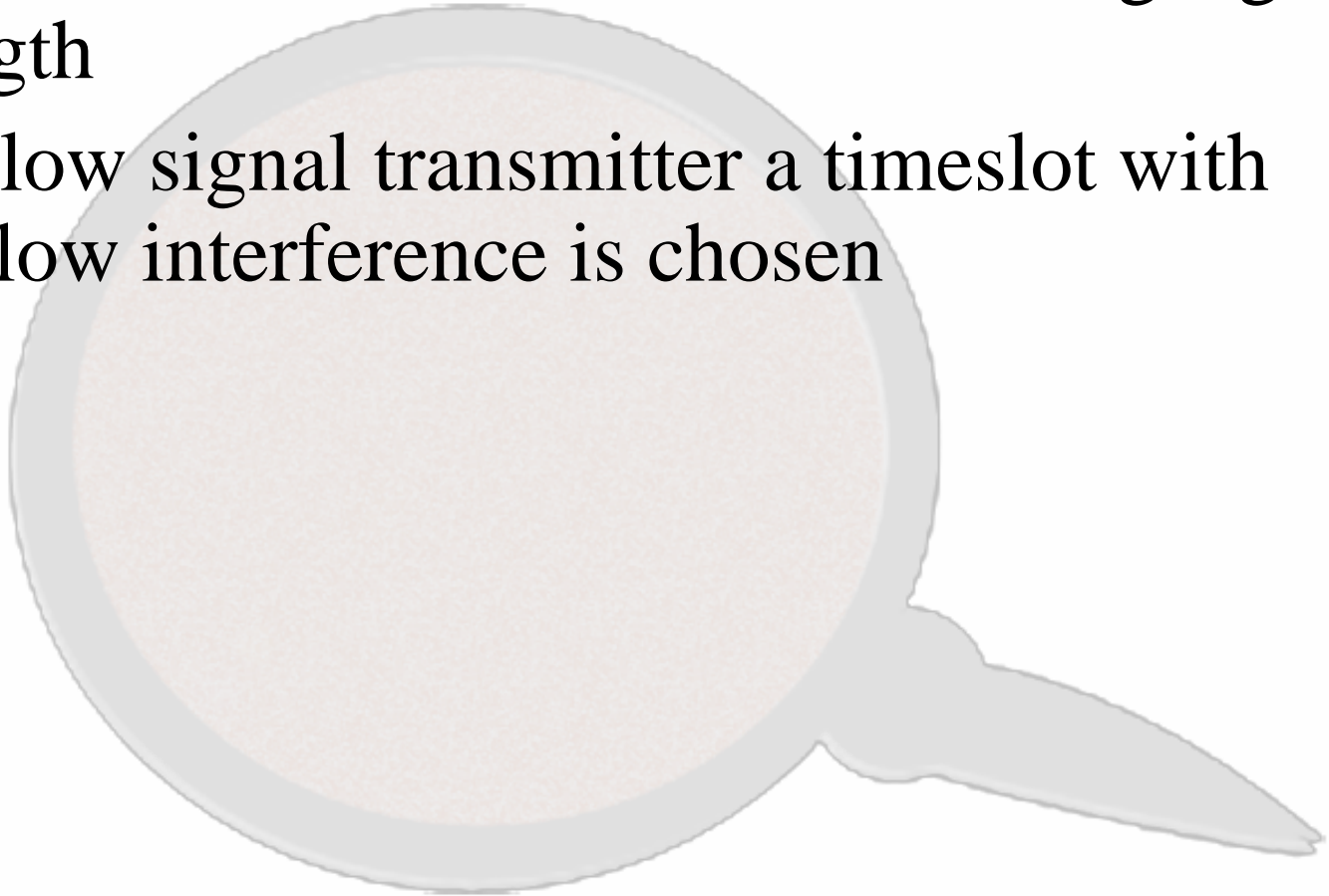


Channel Sampling

- assume periodic transmissions to nodes that have selected a timeslot
- listen to the channel to determine expected interference
- pick timeslot providing good SNR for chosen transmitter

Picking Transmitters

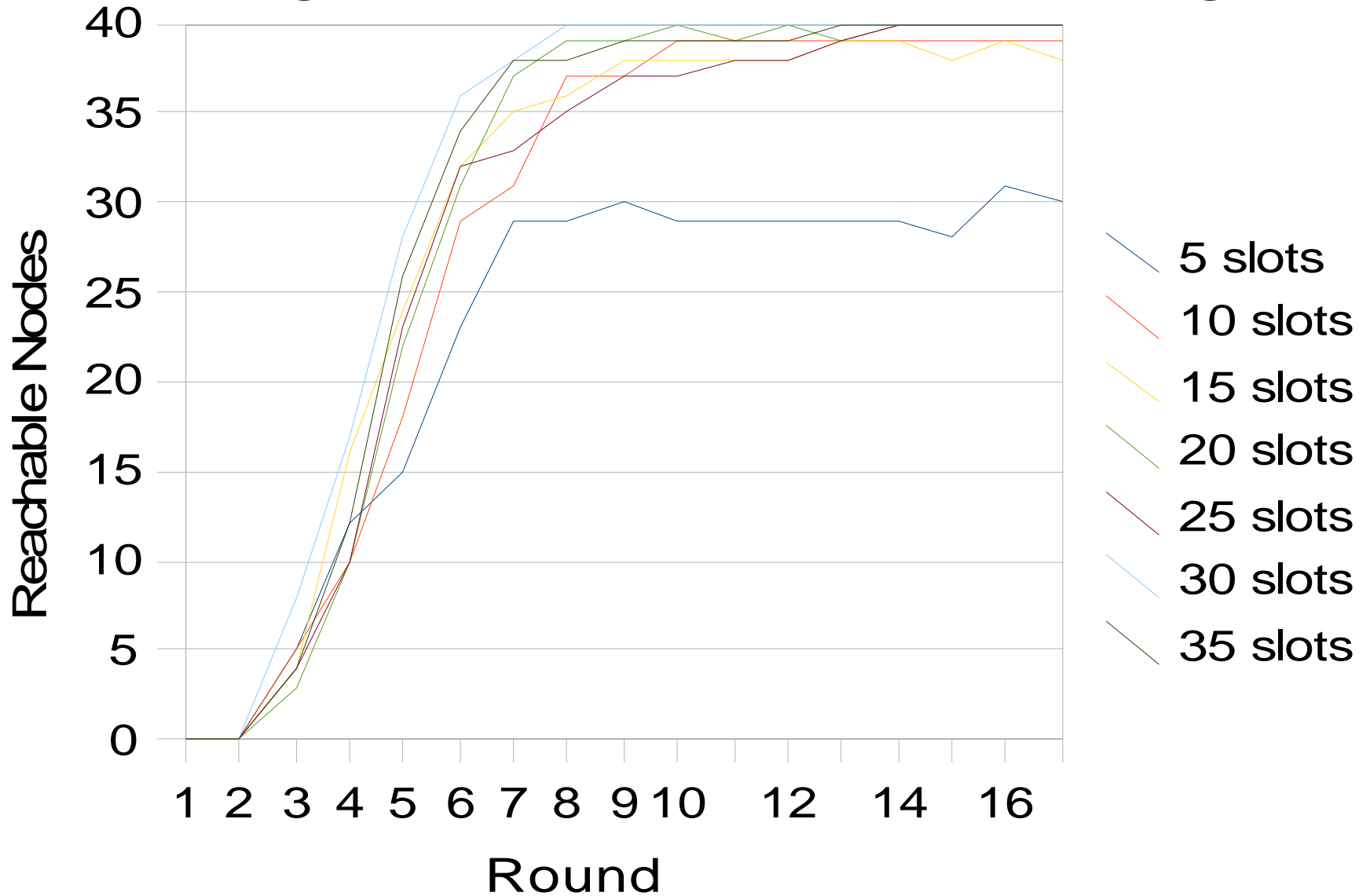
- transmitters are chosen based on strong signal strength
- for a low signal transmitter a timeslot with very low interference is chosen



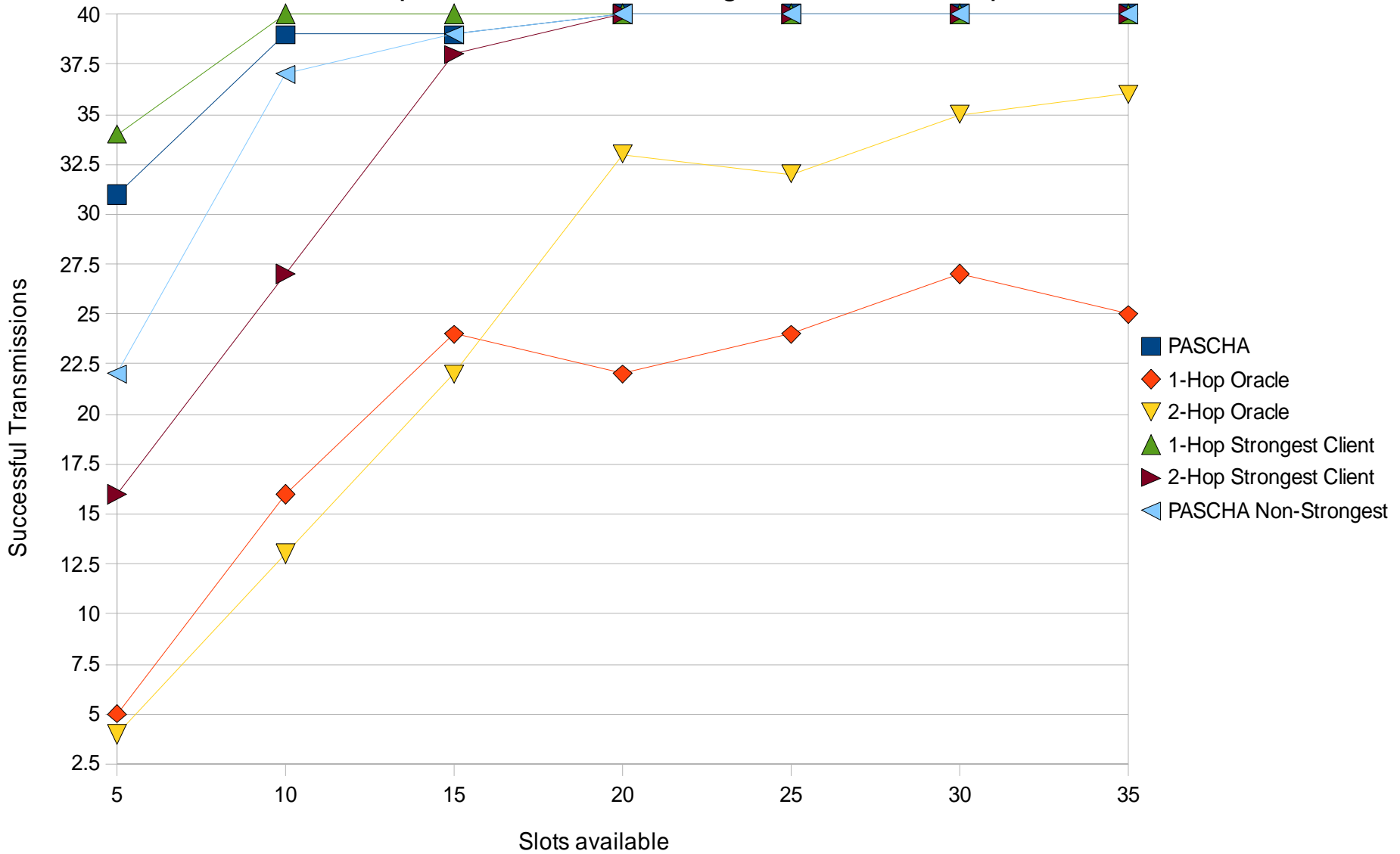
Simulations

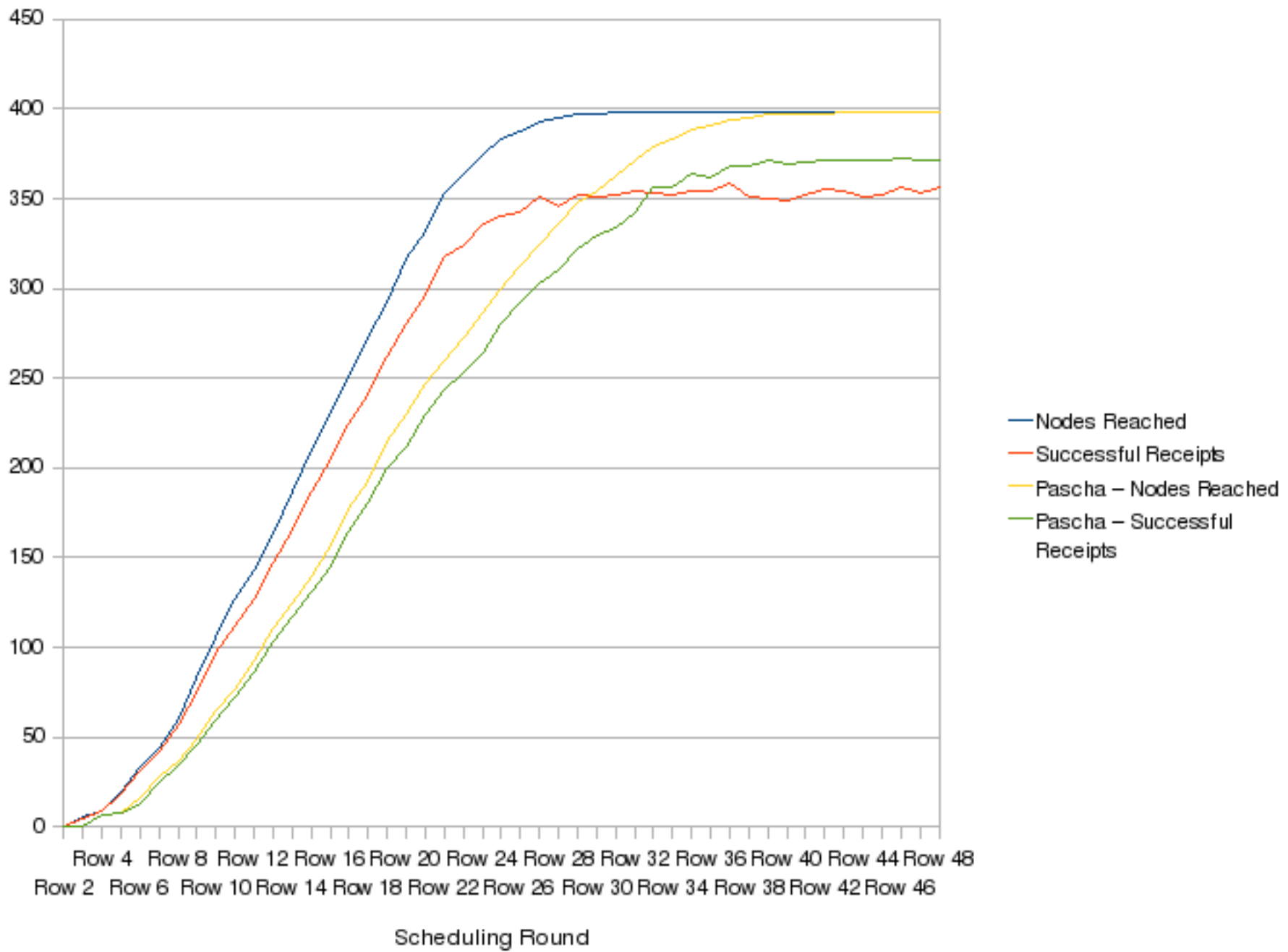
- relatively detailed channel model required
- currently assuming synchronisation
- comparison against scheduling based on oracle of 1-hop and 2-hop neighbourhood information
- picking random transmitter, strong transmitter, strongest transmitter

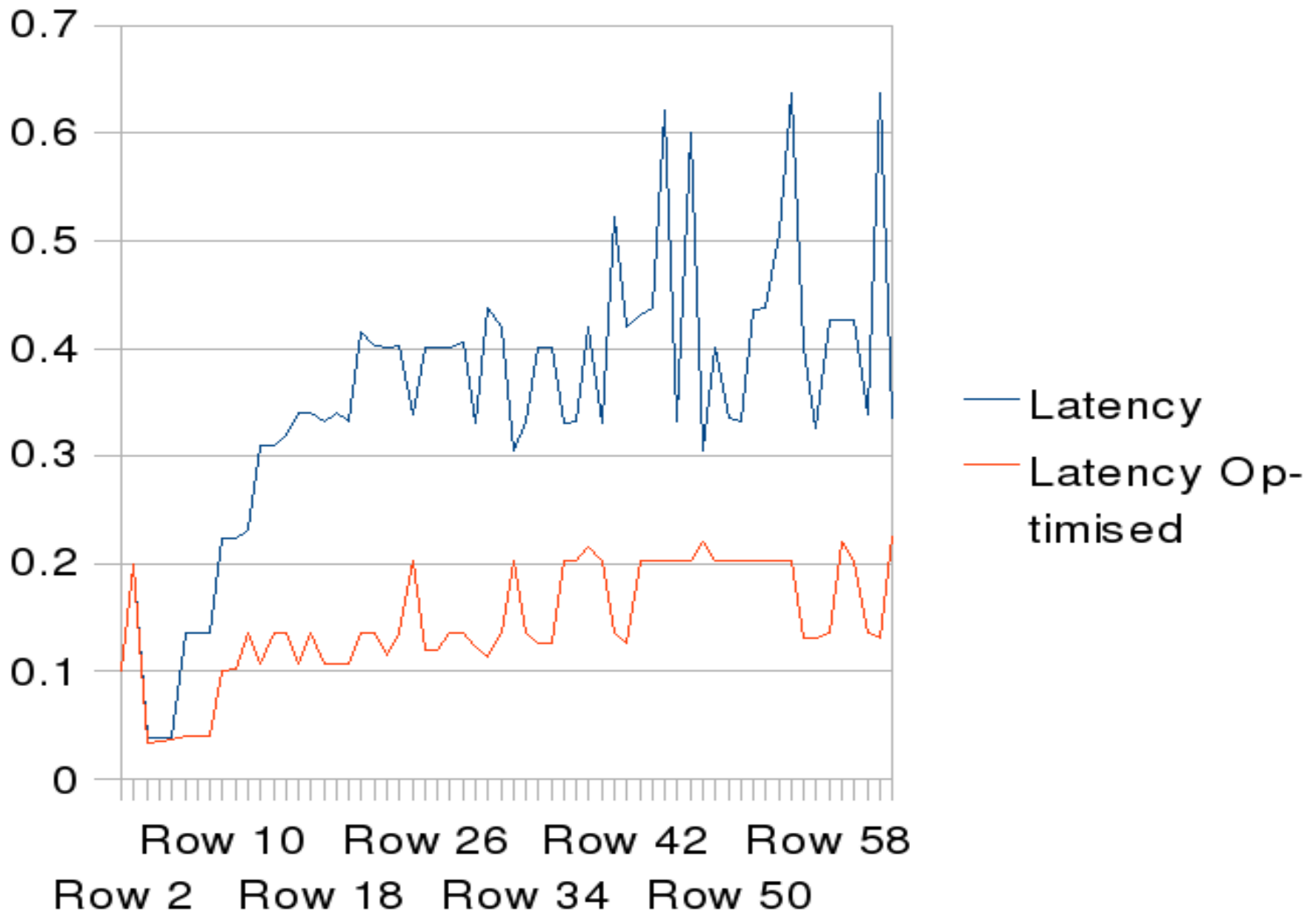
Convergence of Schedule Assignmer



Comparison of PASCHA against 1 and 2-Hop Oracle







Cross-Layer Integration

- needs support from higher layers as scheduling decisions are made at the receiver
- not optimal for non-periodic communication patterns
- good match for data aggregation
- can be extended to for example diffusion