

Routing in Networks of Varying Connectivity

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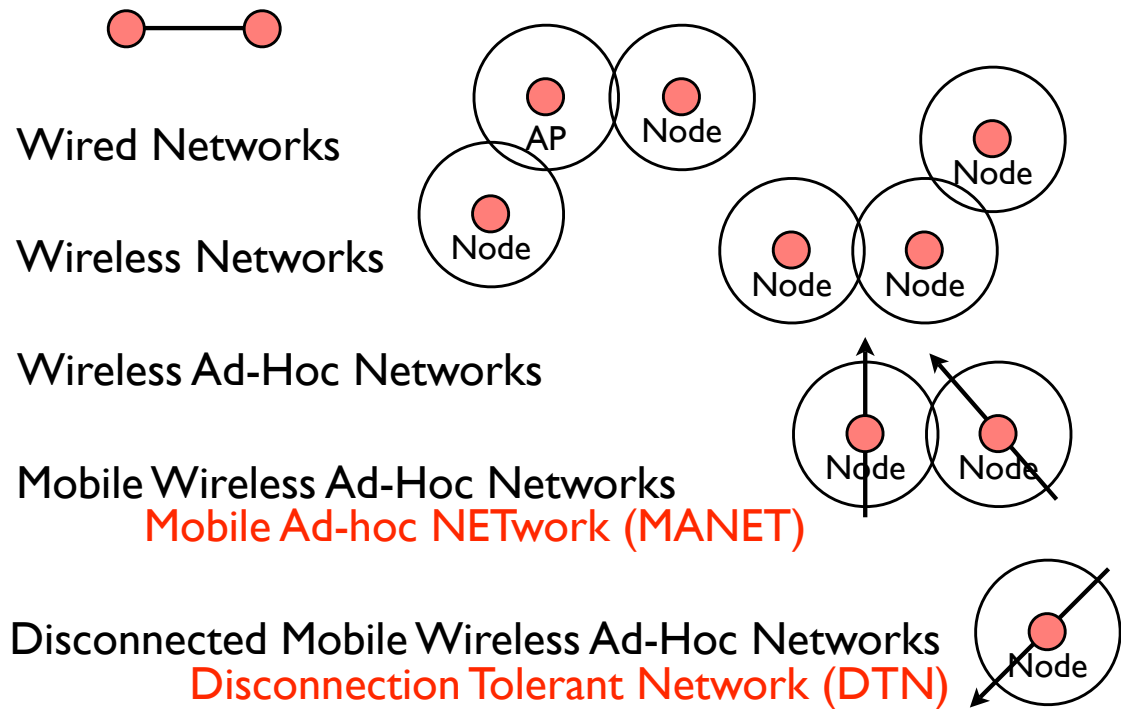
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Overview

- The Problem Domain
- Existing Solutions
- The Work
- The Evaluation
- Questions

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The Problem Domain



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The Problem Domain

Mobile Ad-hoc NETWORK (MANET)

- End-to-end connectivity is assumed
- Topology is not Fixed
- One-hop set (neighboring nodes) may change

Disconnection Tolerant Network (DTN)

- End-to-end connectivity is not assumed
- Topology is not Fixed
- One-hop set is likely to vary considerably over time

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Existing Solutions

MANET Routing

Pro-active

Attempt to keep an up to date view of the entire network.

Re-active **Source Routing**

Acquire a route to a destination at the point you need to send them data.

DTN Forwarding

Wait

Hold onto a packet, until you become connected to the destination.

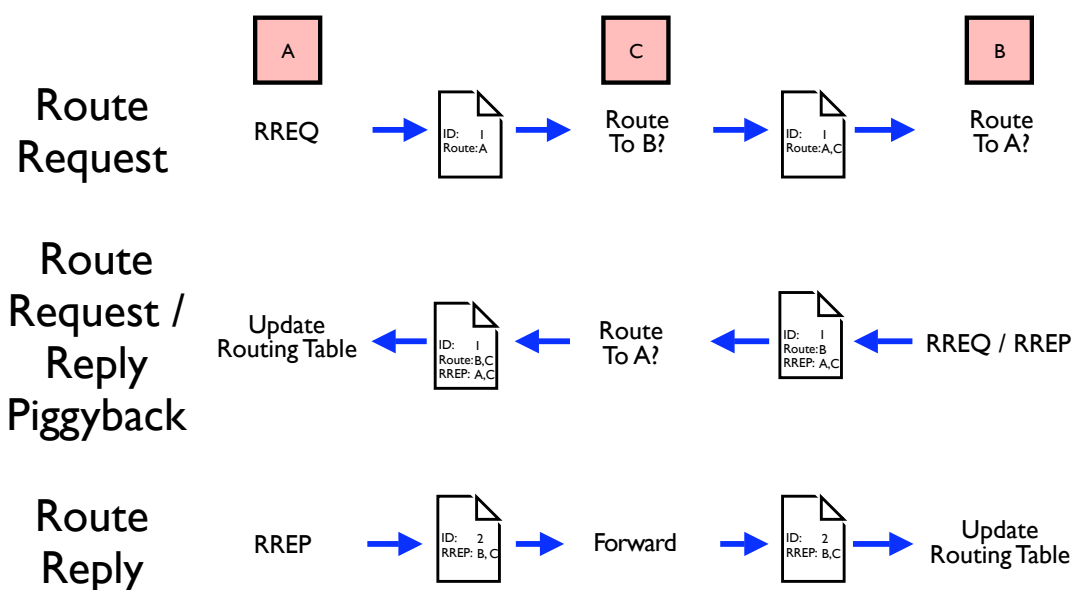
Restricted Flood

Beacon the packet hop by hop for the duration of the time to live.

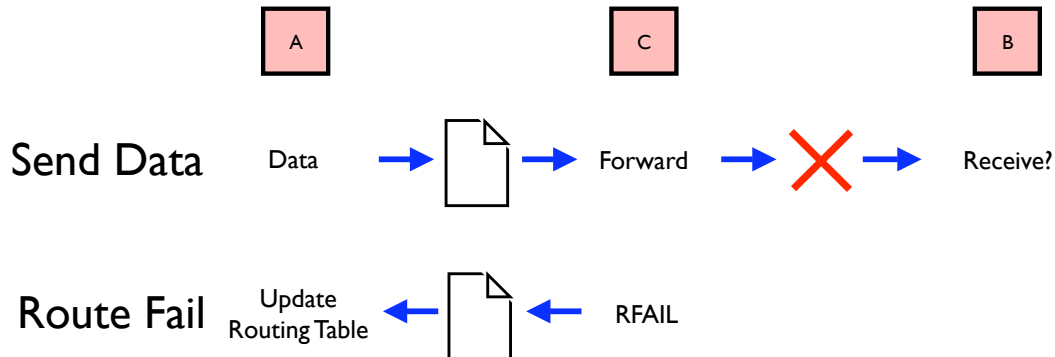
Controlled Flood

Only forwarding to a subset of nodes, selected based on our experience forwarding packets to them.

Dynamic Source Routing (DSR) Route Acquisition



Dynamic Source Routing (DSR) Route Failure



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The Work

Why Source Routing?

- Route Acquisition - Source Routing for Disconnected Environments

What are the assumptions?

- Disconnection Tolerant Data Forwarding

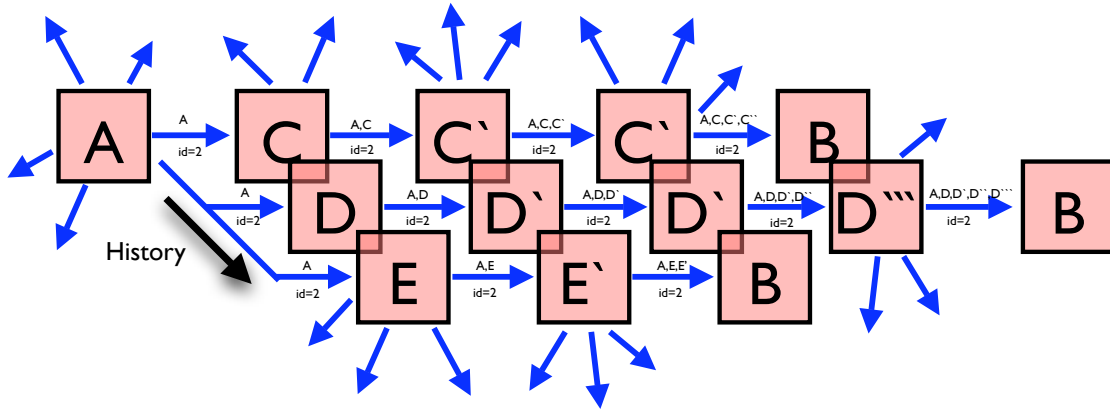
Why not TCP?

- Packet Scheduling / Duty Cycling

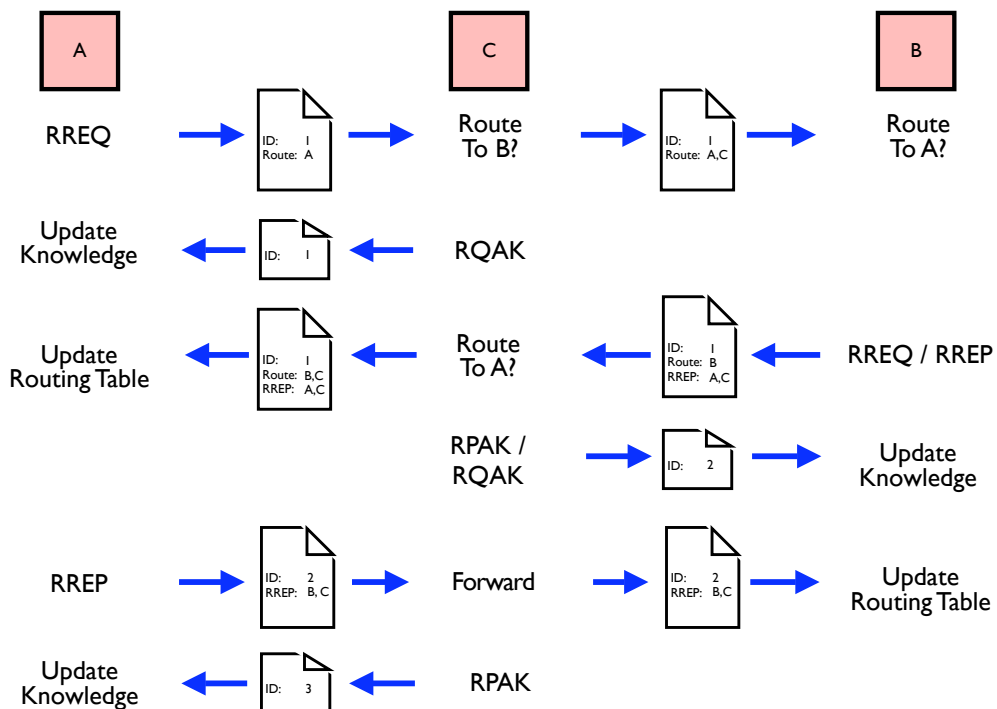
Why is this needed?

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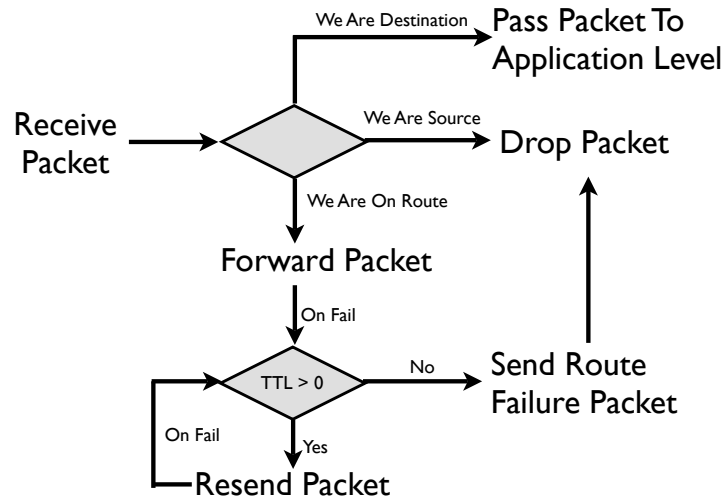
Route Acquisition Over Time



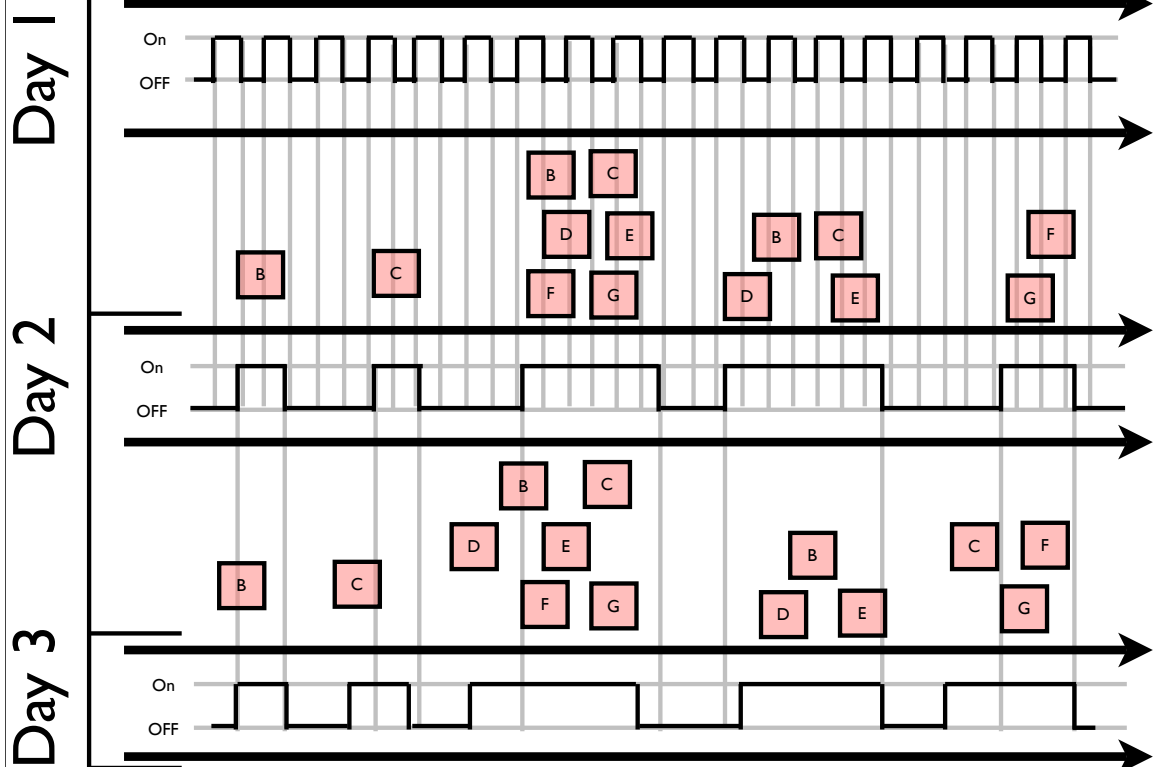
Route Acquisition - Acknowledgement



Disconnection Tolerant Data Forwarding



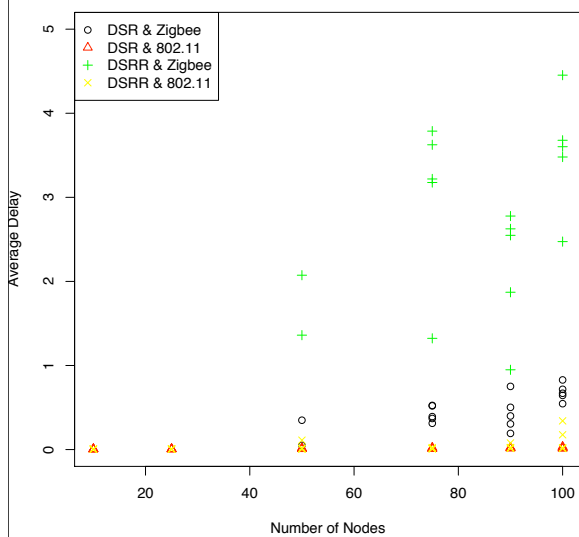
Packet Scheduling / Duty Cycling



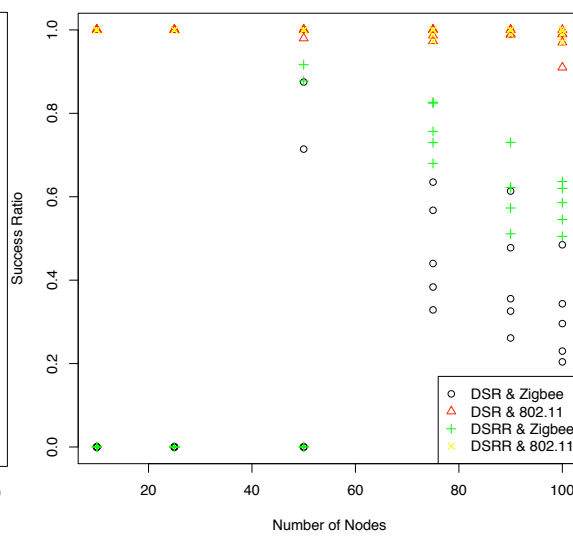
The Evaluation

The Evaluation

Average Delay (Seconds)



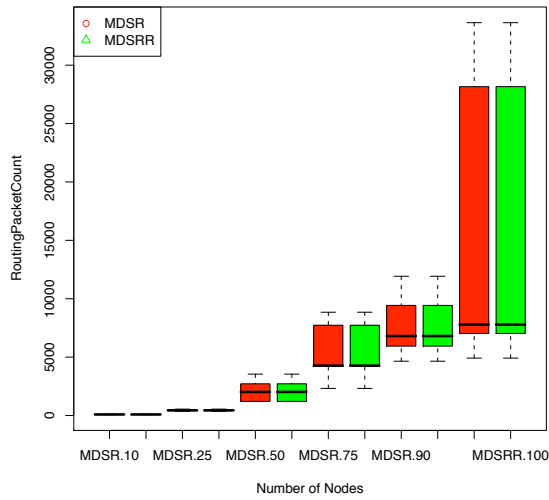
Success Ratio (%)



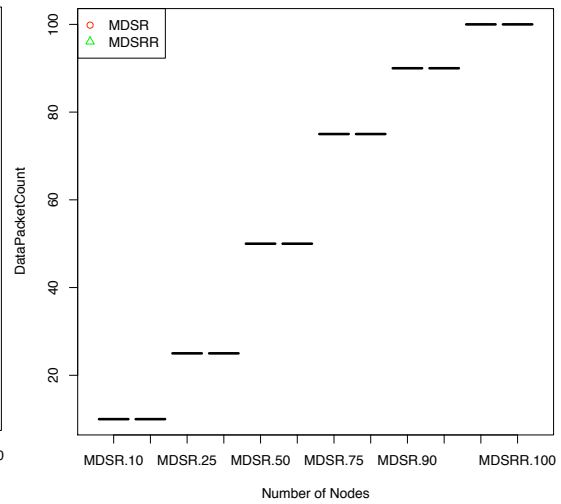
The Evaluation

802.11

Routing Packet Count



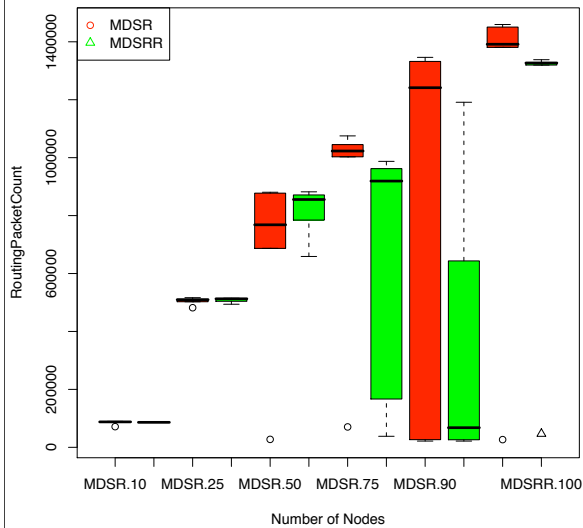
Data Packet Count



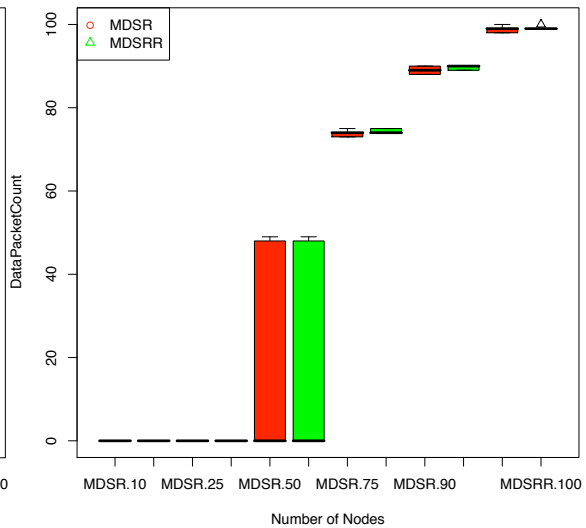
The Evaluation

Zigbee

Routing Packet Count



Data Packet Count



Questions?