

Routing Stability in Static Wireless Networks

The slide features several decorative circles. A large, light purple circle is positioned behind the title text. Below the title, there are three more circles: a solid light purple circle on the left, a solid light purple circle in the middle, and a hollow light purple circle on the right.

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in cooperation with

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Motivation



- Wireless links are unstable
 - Multipath fading
 - External interference
 - Other factors
- What is the impact on routing ?
 - Stability in typical n/w deployments
 - Impacts network management
 - Channel assignment
 - Re-computation interval
 - Routing design

Likely Questions



- Is there a clear choice of high throughput route between nodes ?
- If not, how often do routes change ?
- How much benefit do route flaps provide ?
- How often do route flaps occur ?

Experimental Networks



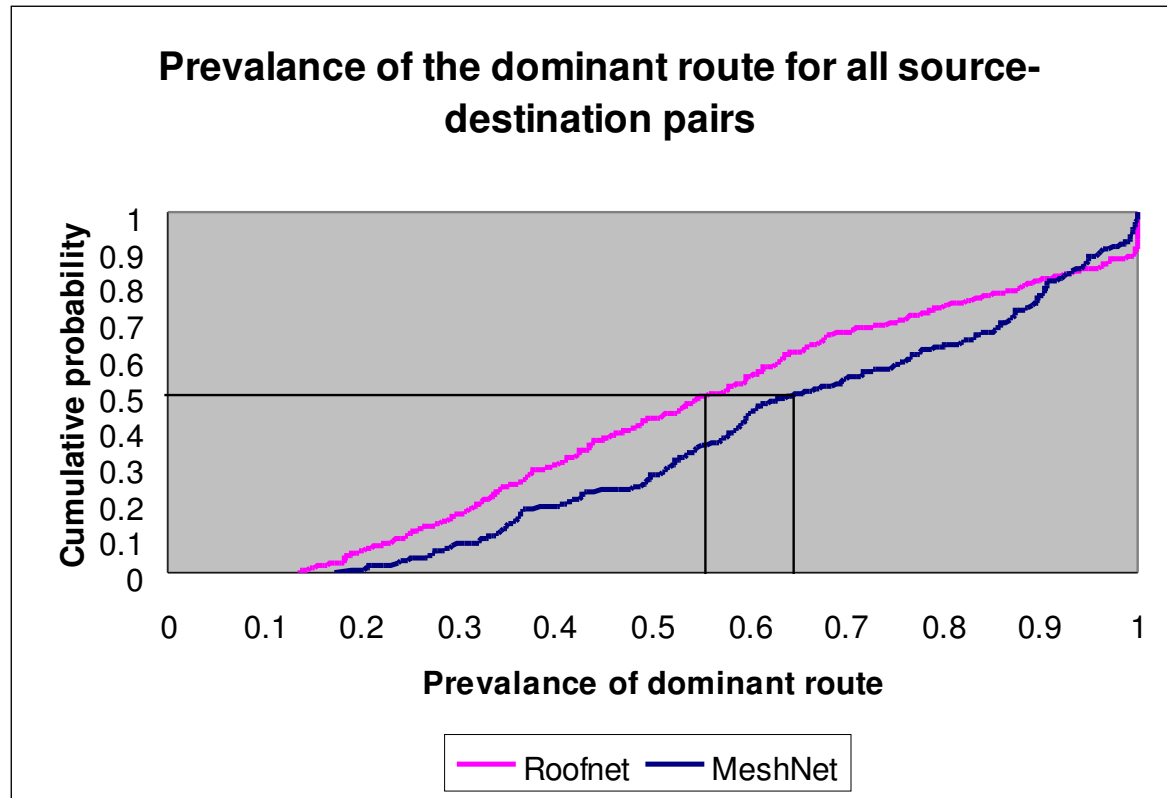
- MIT Roofnet
 - Outdoor mesh network
 - 22 node rooftop nodes
- UCSB MeshNet
 - Multi-radio indoor network
 - 20 nodes on five floors

Limitations

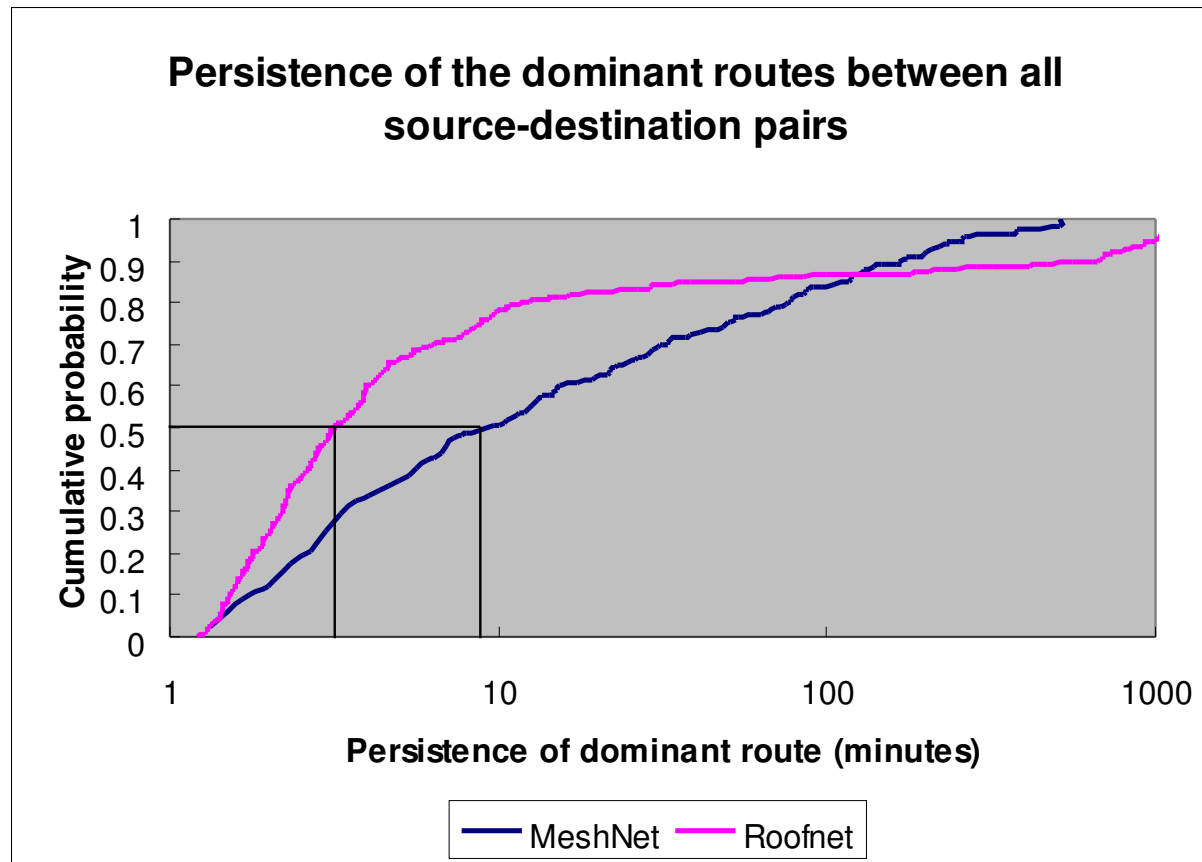


- Link quality information
 - Predicted throughputs
 - External factors
 - Traffic on the network
- Time of day patterns
- Heterogeneous system
 - Radio configuration

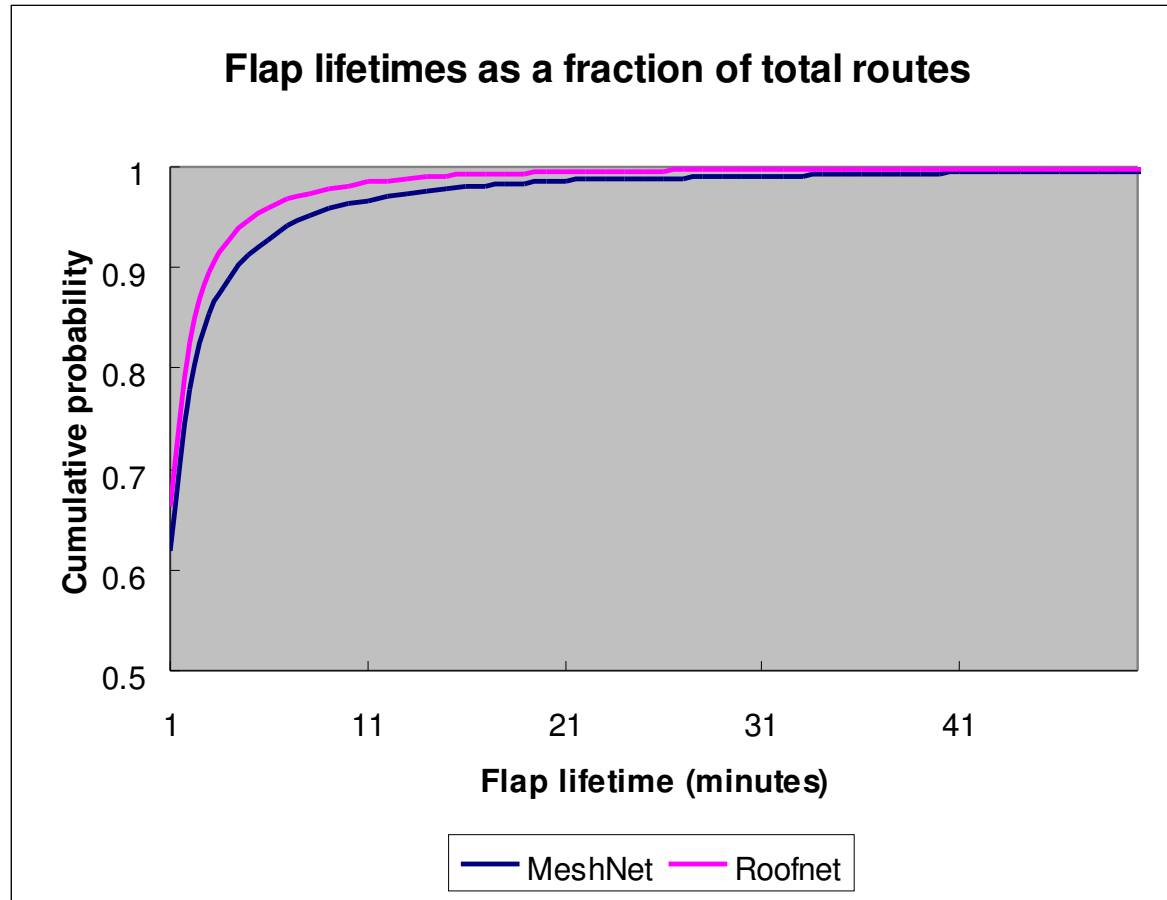
Prevalance



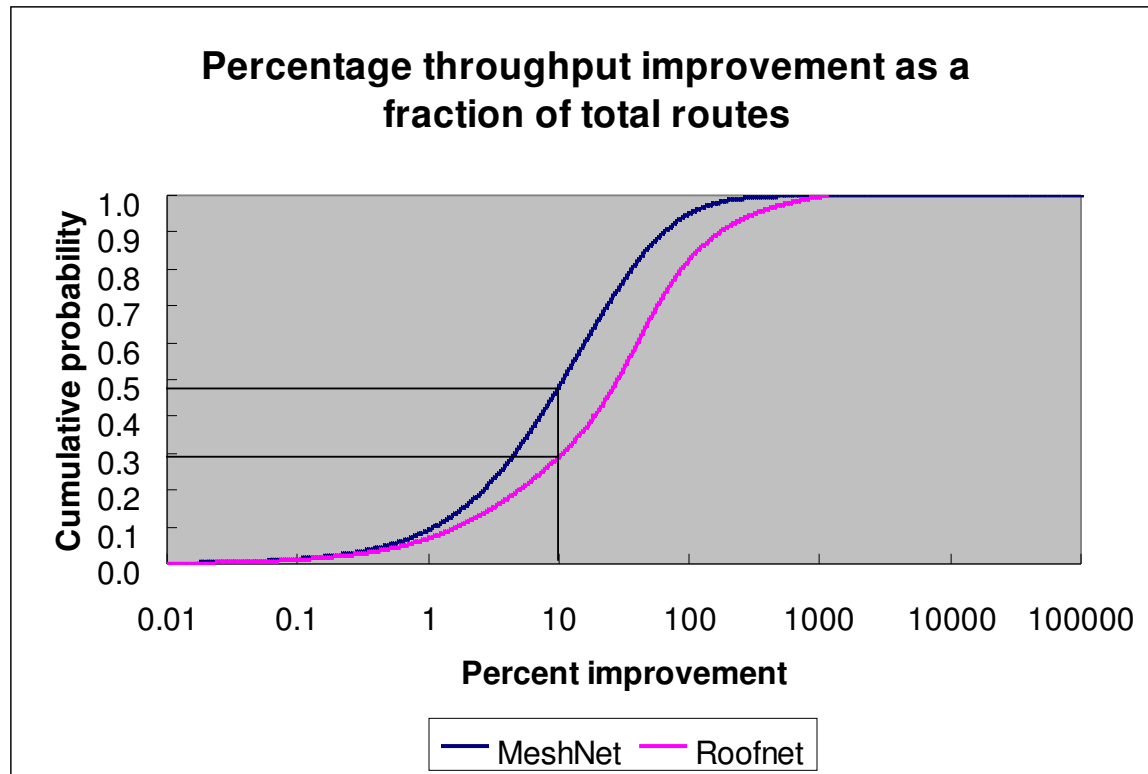
Persistence



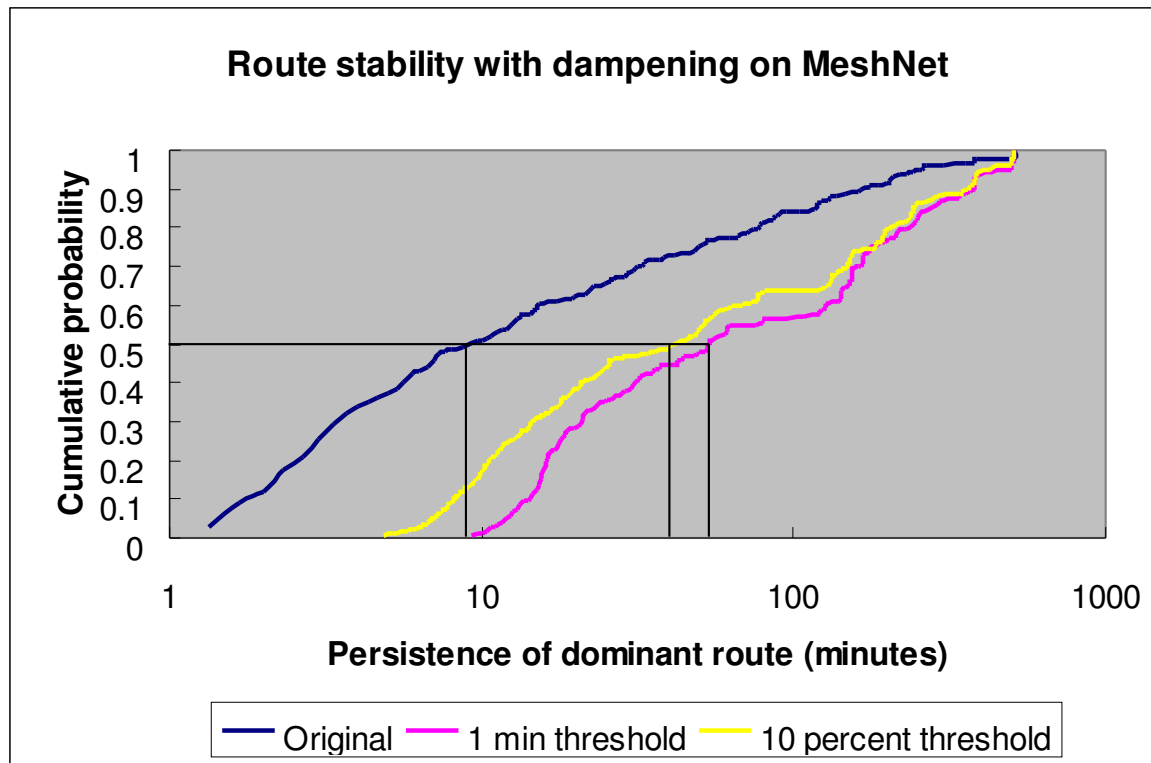
Route Lifetime



Throughput Improvement



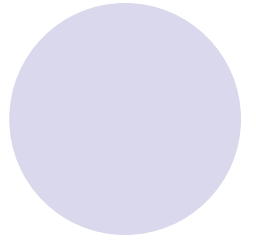
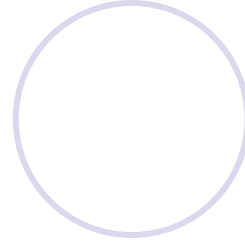
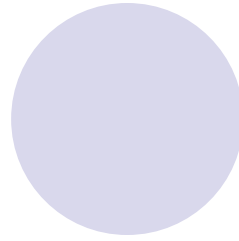
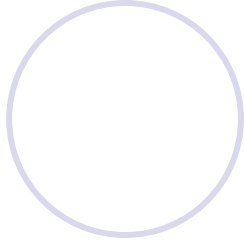
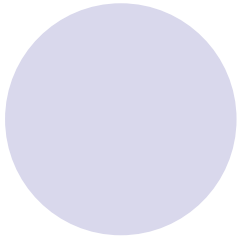
Dampening Effect





Findings

- Weak dominance of a single route
- Dominant route are short lived
 - Median lifetimes of 10 minutes on MeshNet and 3.5 minutes on Roofnet
- Majority of flaps provide marginal improvement
 - 50% of MeshNet and 27% of Roofnet provide less than 10% improvement
- Simple stability metrics can improve route persistence



Thank You