

Delay-tolerant Networking

Routing Protocol Development With The One Simulator

Jonathan Humphrey

Introduction

- Routing Protocol Background
- Hybrid Routing
- ONE Simulator
- Test Results
- Further Work

Routing Protocol Background

- 1st generation - *Random* - Epidemic
- 2nd generation - *Probabilistic* - PROPHET
- 3rd generation - *Context-aware* - MaxProp/RAPID
- 4th generation - *Socially-aware* - BUBBLE
- 5th generation - ?...All protocols have downsides !

Hybrid Routing

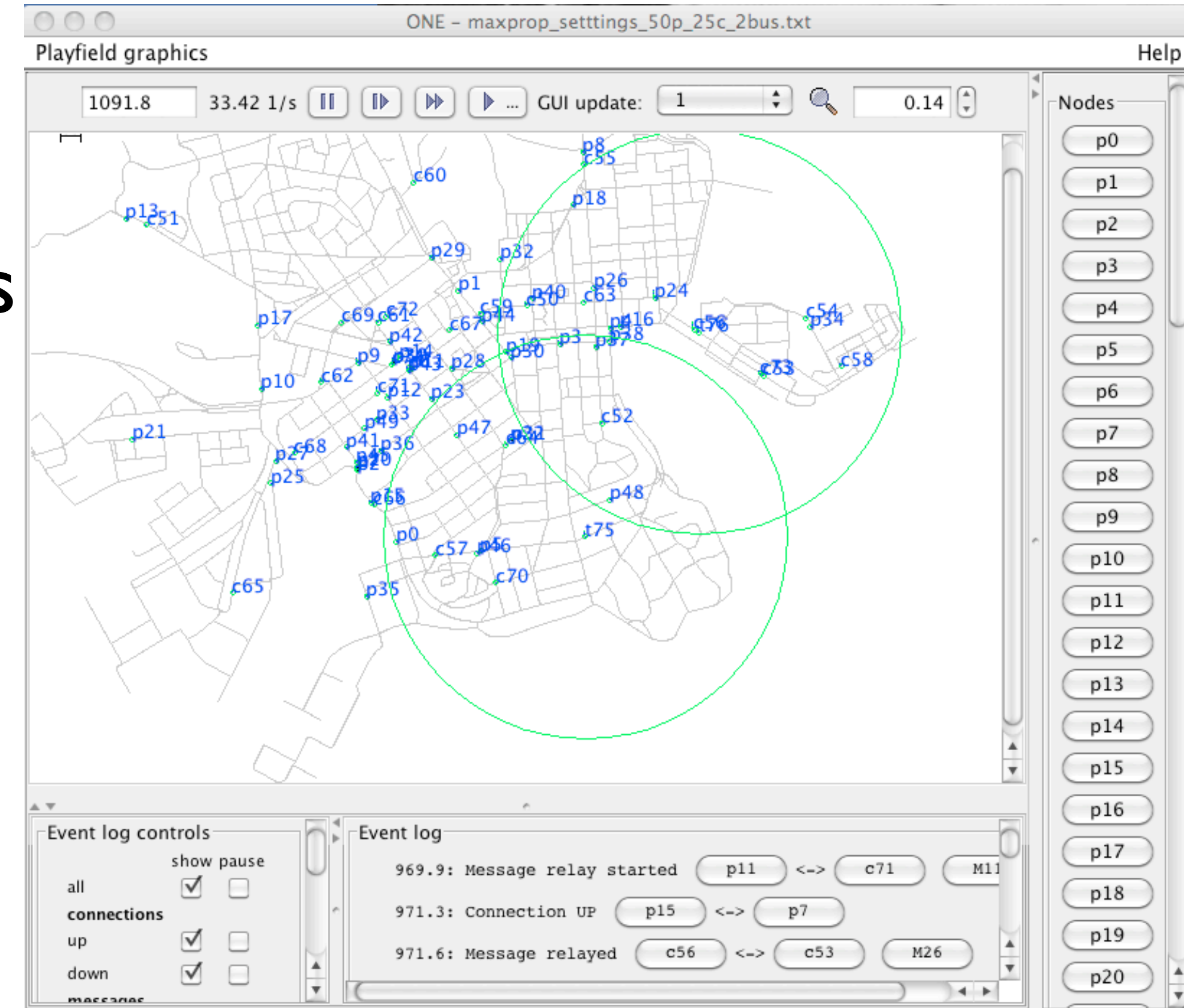
- Context, social & location-aware combinations
- Supplemental connectivity data can aid routing
 - Use of social network rank as probability weight
 - Use of geo-socio location to improve context-based routing

PROPHET

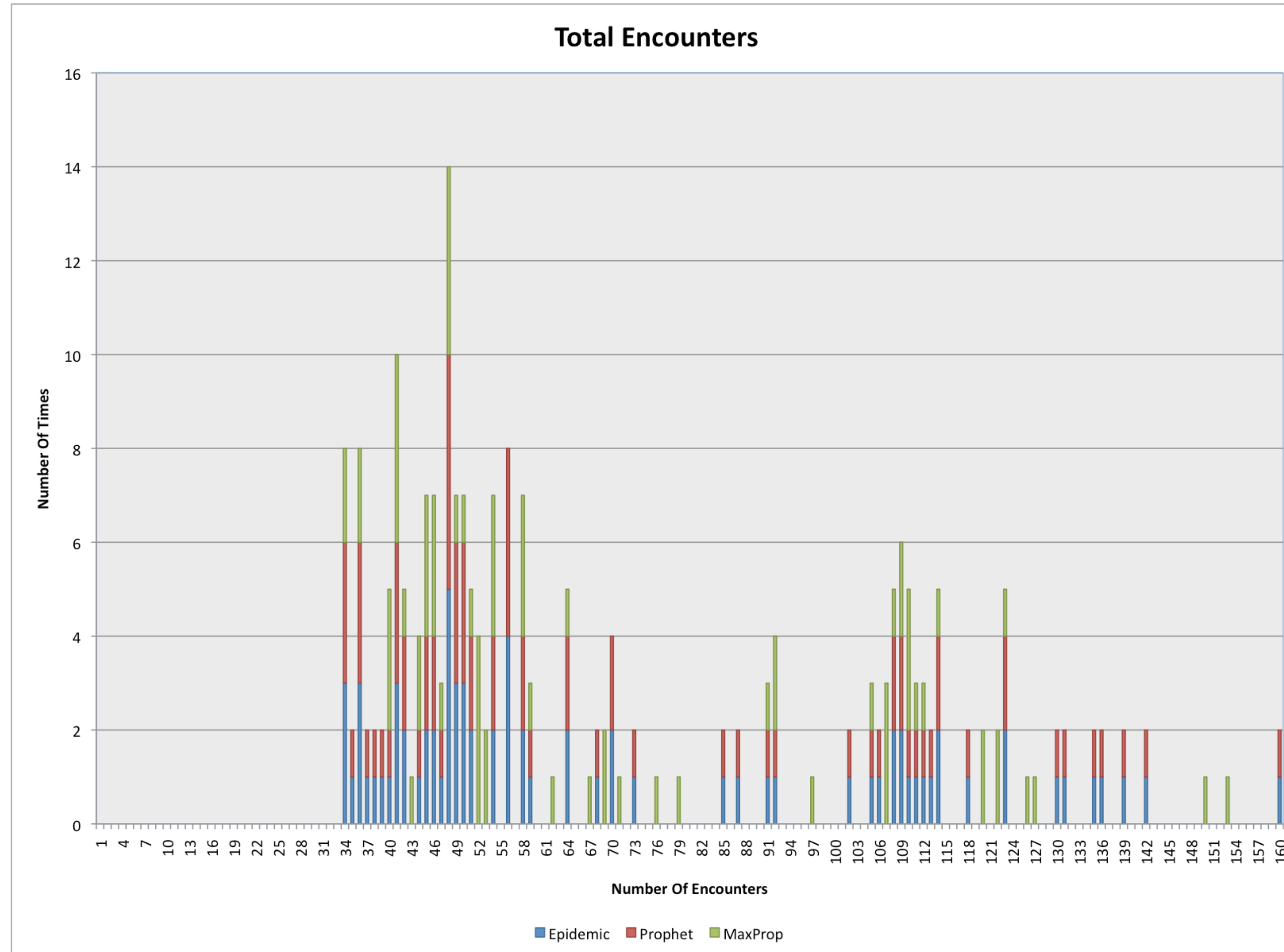
- *Encounter equation* - $P'_{xy} = P_{xy} + (1 - P_{xy}) \times P_{init}$
- *Ageing equation* - $P'_{xy} = P_{xy} \times \gamma^k$
- *Transitive equation* - $P'_{xz} = P_{xz} + (1 - P_{xz})P_{xy}P_{yz}\beta$
- **Static or dynamic N_{prob}**
 - $N_{prob} = N(prob) +/- (1 - N(prob)) / \text{tablesize}$
 - $N_{prob} = \text{constant value}$
 - $P'_{xy} = P_{xy} + (1 - P_{xy}) \times P_{init} + N_{prob}$

One Simulator

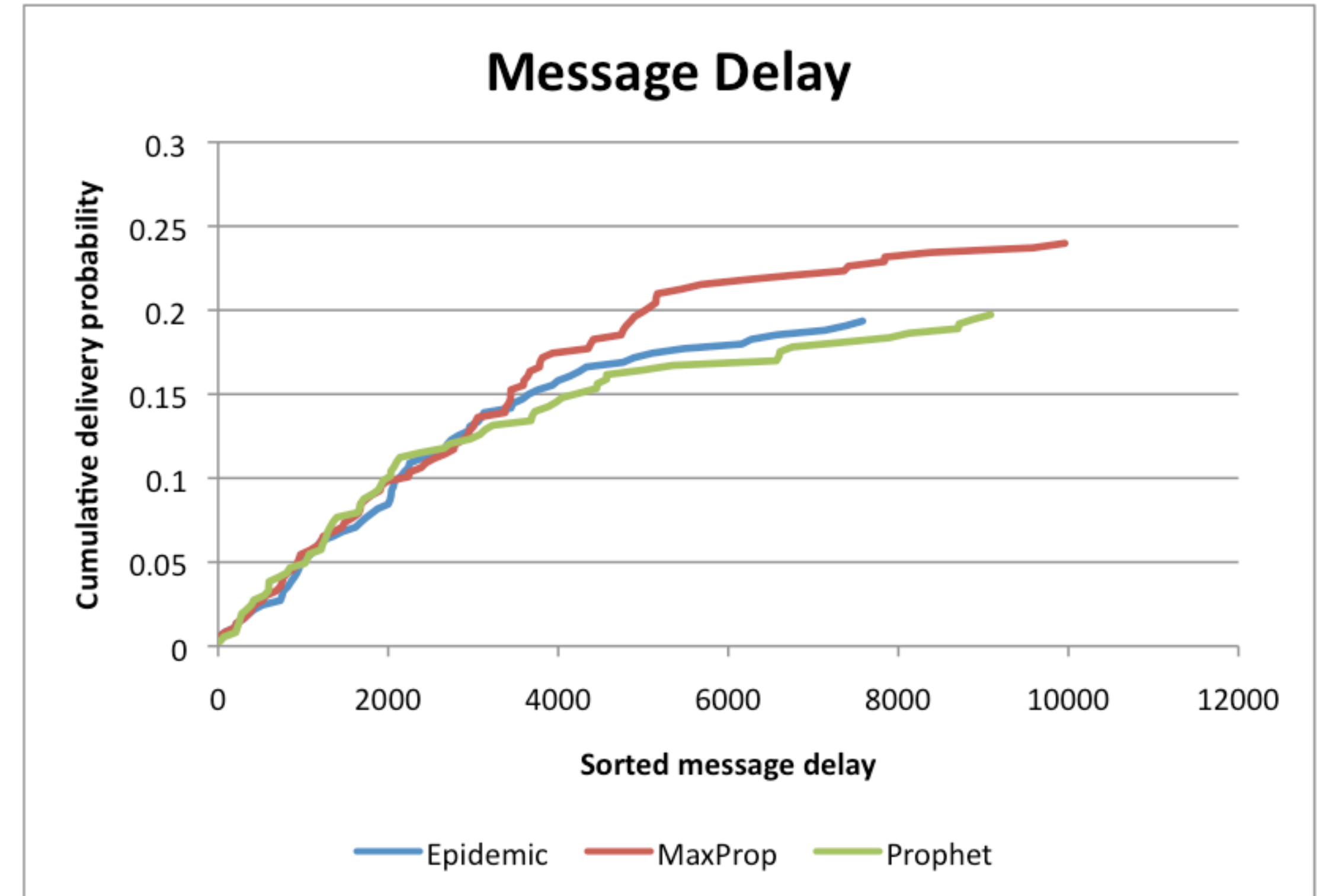
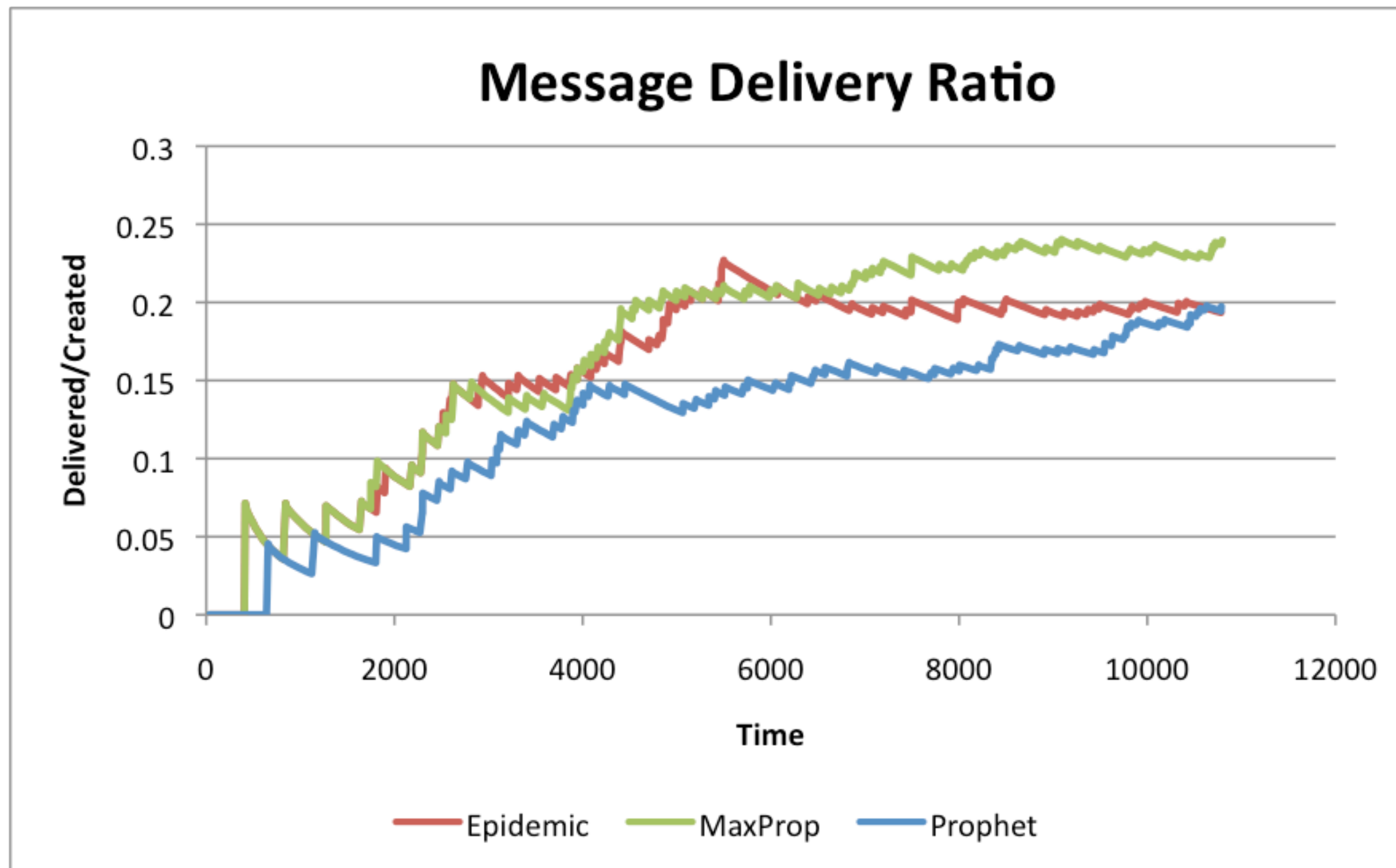
- Realistic, user-controlled DTN simulator
- Pedestrians, cars, buses, static nodes/hubs
- Scalable to thousands of nodes
- Support development of new protocols
- Supports external datasets & new maps
- Report framework for detailed analysis



Test Results



Test Results



Further Work

- Further protocol extension & implementation
- Longer simulations - 6+ hours
- Protocol selection via framework implementation
- Use of Area-specific DTN social networks

Thanks

- Any Questions?