

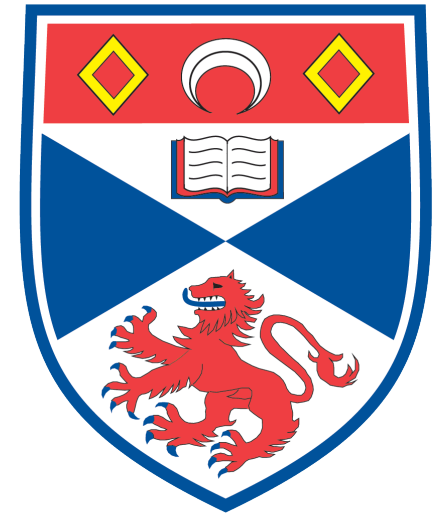
Privacy-Enhanced Social Routing

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Opportunistic Networks



Can use the mobile devices that people already carry around, forming an **opportunistic network**

Routing?

- Epidemic routing – high cost flooding
- **Social routing** – lower cost, but requires known network

Privacy

How can we protect people's social network privacy?

If we get it wrong...

- Social networks exposed
- Linkability to other sites – including pseudonymous websites

twitter → flickr

Brought to book

By Laura Schocker

The new chief of MI6, Sir John Sawers, has had his personal life made public thanks to his wife's Facebook page. It's another example of how the world's biggest social networking site can be used to reveal a bit too much information.

When the wife of MI6 chief Sir John Sawers, Lady Shelley Sawers, posted personal pictures of her family, the information became available to her "friends" - and several million people who are part of the London network on Facebook.



As the popular website has opened up communication between millions of users, it has also opened up opportunities for sharing a bit too much.

Sir John Sawers - humbled by Facebook

It seems like hardly a day goes by without another example. On Monday, the retailer Primark launched an investigation after complaints about employees using the site to refer to customers as, among other terms, "fat" and "pikneys".

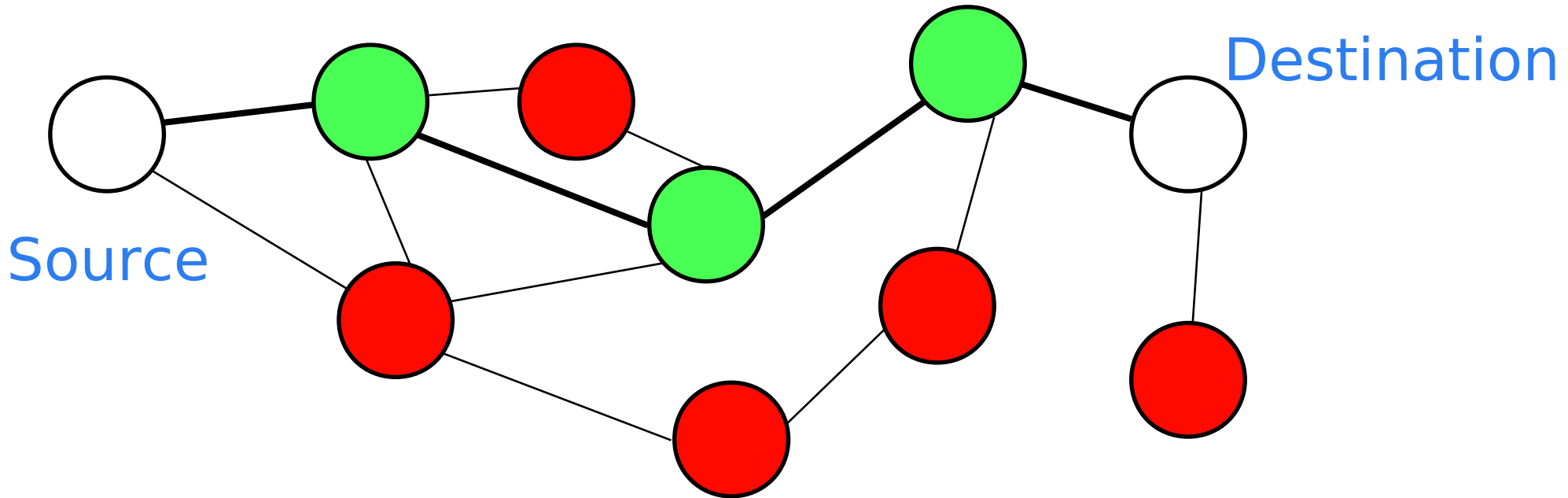
<http://news.bbc.co.uk/1/hi/magazine/8136395.stm>

Social Network Obfuscation

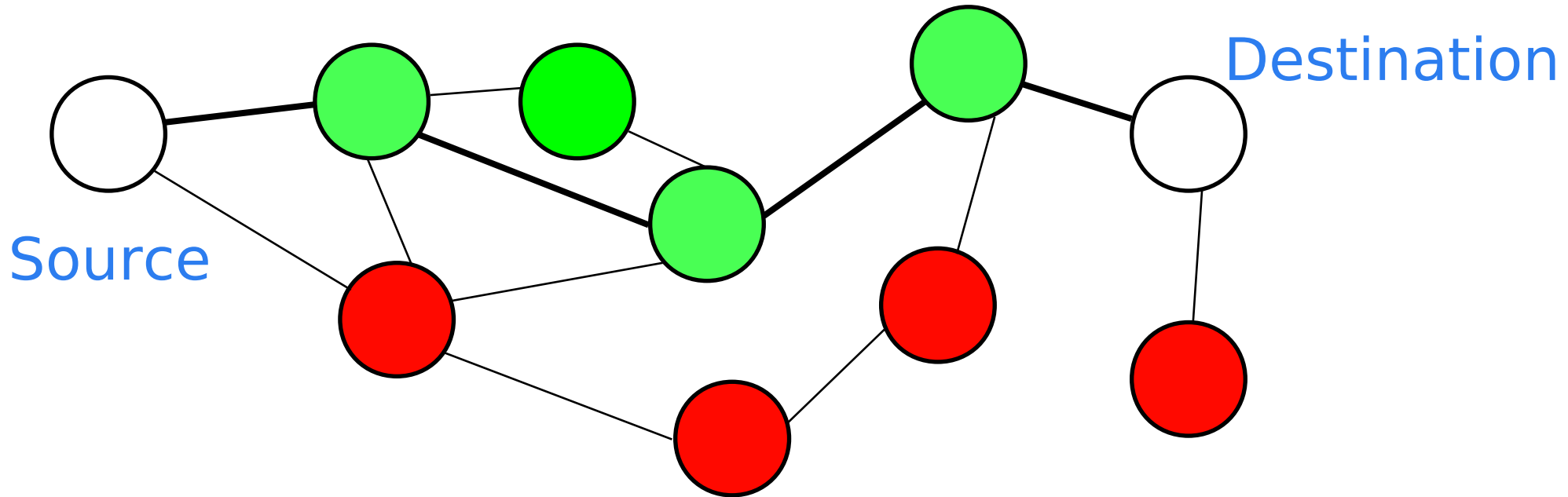
Our approaches

- **Add nodes** to the social network
- **Remove nodes** from the social network
- **Probabilistic querying** of whether encountered node is in the social network
 - Bloom filters? Challenge-response?

Obfuscation Example



Obfuscation Example



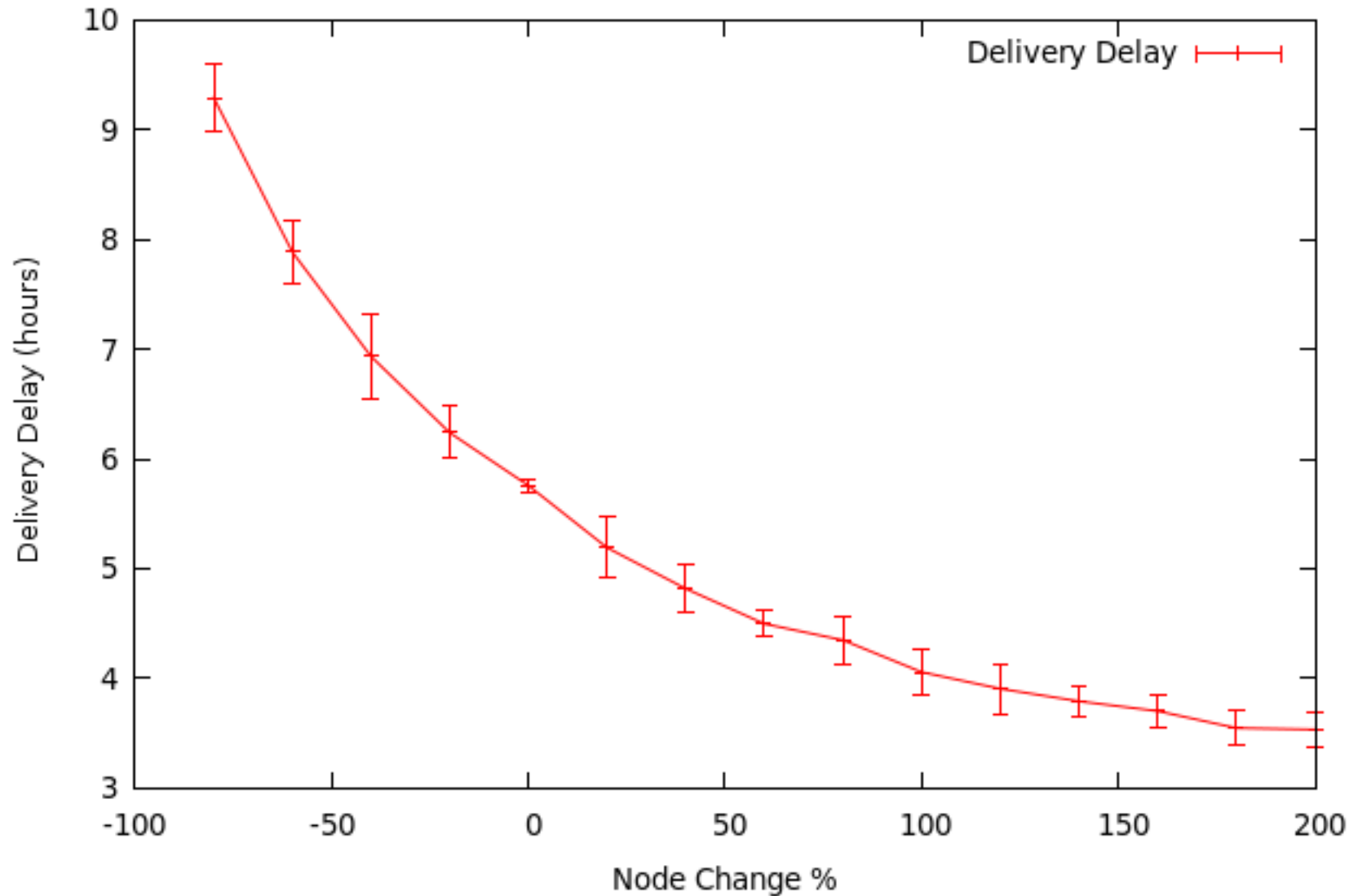
Routing Performance after Social Network Obfuscation

Trace driven simulation using **ns-2**

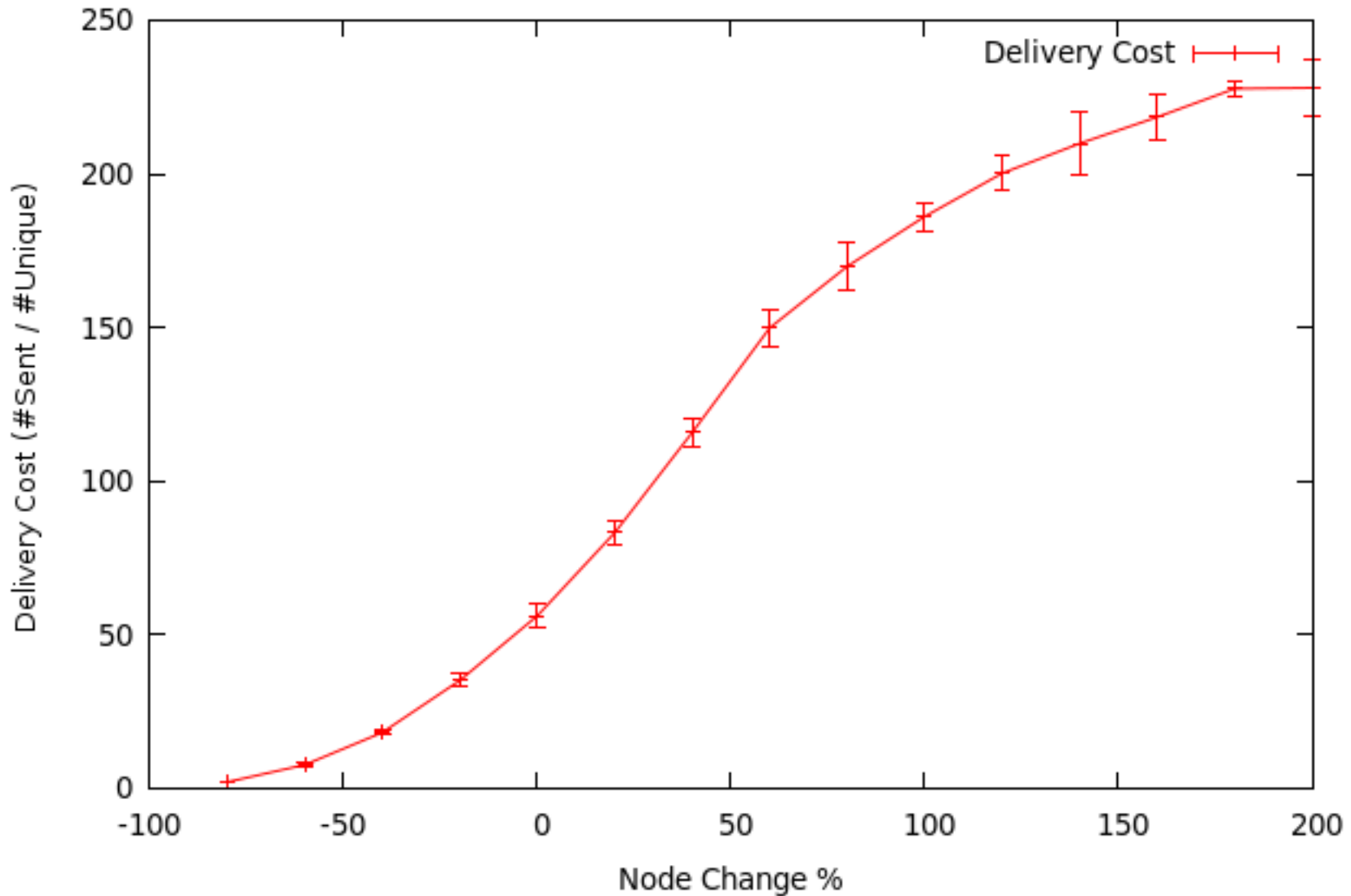
Each simulation

- **5 repeats** (so far)
- **30 days** simulated
- 30 messages/day, total: **900 messages**
- TTL of messages: **1 day**
- **25 nodes**

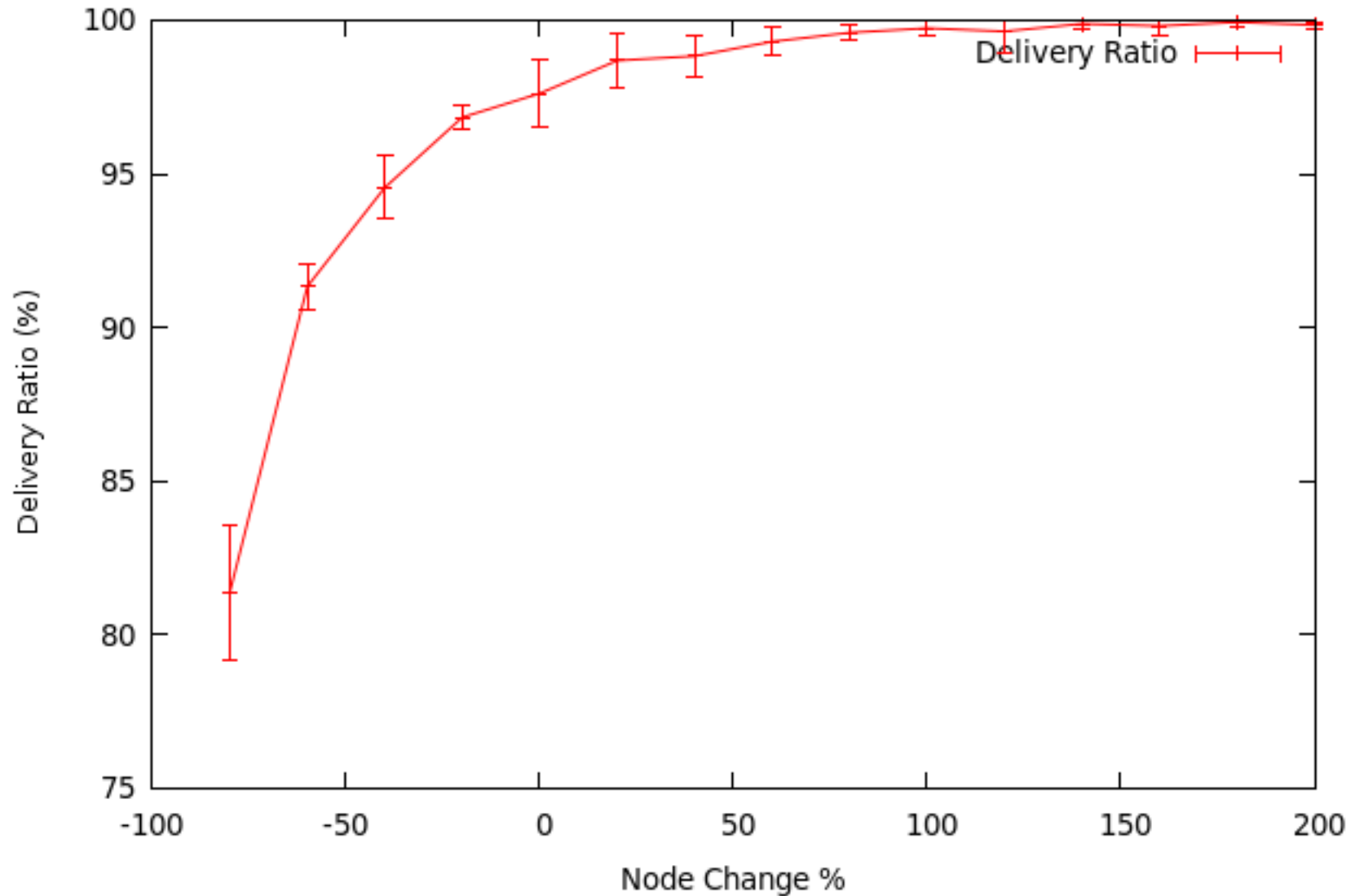
Preliminary Results



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Preliminary Results



What next?

Refining current approach

- More simulations
- Other data sets (reality mining, ...)

The big picture

- Is social network privacy really a big deal?
- What threats are people **worried about**? How worried? Willing to make performance trade-off?
- To find out: **user studies!**
- Studies to be part of the PVNets project
<<http://www.pvnets.org/>>



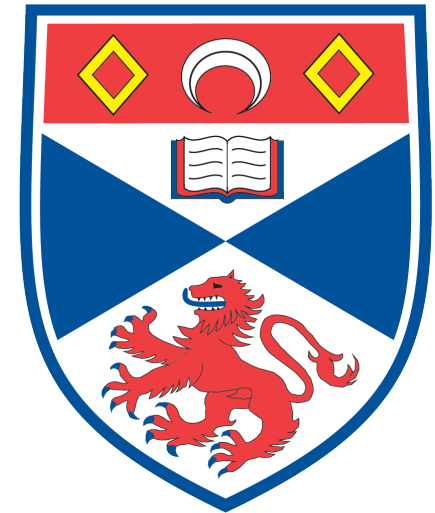
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Mobility Traces

