

# Security of Online Social Networks

## Roundup and View into the Future

Lehrstuhl IT-Sicherheitsmanagement

Universität Siegen

July 12, 2012

# Overview Lesson 12

Physical Objects Sneaker Transport

Resumé

Past

Present

Future

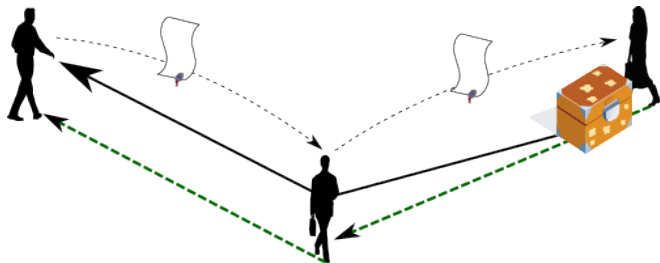
# Utilise Online Social Networks!?

- ▶ ...beyond targeted adverts
- ▶

# Physical Objects Sneaker Transport

Moving things while moving

## Idea

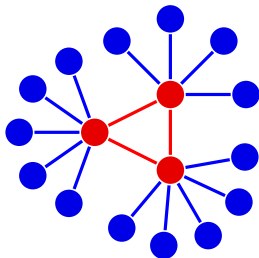


Physical Objects Letters, Memory Sticks, Data,...

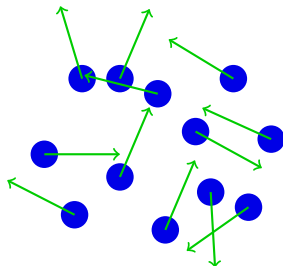
Sneaker Transport using existing movement

# Ephemeral Transport

Standard Post Transport:

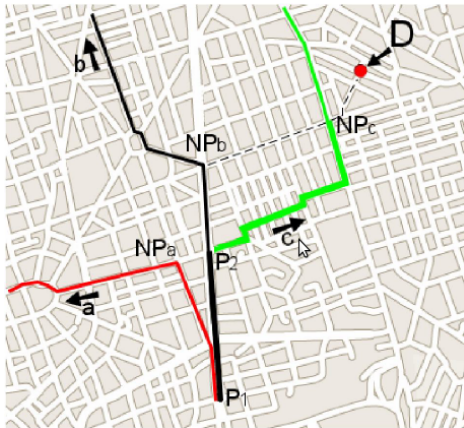


Ephemeral Transport:



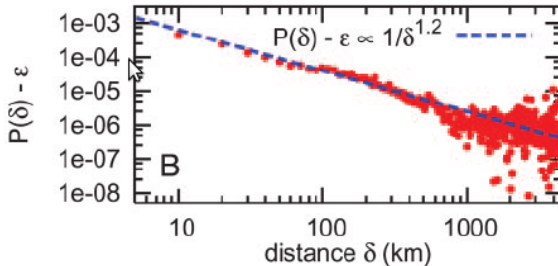
## Opportunistic Routing

- ▶ moving routers
- ▶ meet eventually
- ▶ projected path decision
- ▶ closest path to dest



(source: Leontiadis, Mascolo 2007:  
GeOpps: Geographical Opportunistic Routing for Vehicular

## Social Routing



- ▶ “Geographic Routing in Social Networks”  
[Liben-Nowell et al., 2005]
  - ▶ Friendship correlates with closeness
- ▶ *small world* Stanley Milgram  
[Travers and Milgram, 1969, Milgram, 1967]



# Probabilistic Routing

- ▶ Network of Mobile Nodes
- ▶ Predictable Movement Patterns
  - ▶ Based on Persons
  - ▶ Based on Locations
- ▶ Distance Vector on Contacts
  - ▶ Delivery Predictability Metric
- ▶ [Lindgren et al., 2003]

# Necessary Parts of POST I

- ▶ Carrier Detection
- ▶ Routing Decision
  - ▶ Movement/Contact Prediction
  - ▶ Handling Restrictions
    - ▶ Size of Objects
    - ▶ Carrier Requirements
  - ▶ Theft Prevention (e.g. Sinkhole Attack)
- ▶ Secure Handover (Receipts)
- ▶ Delivery

# Necessary Parts of POST II

- ▶ Communication Protocol
  - ▶ Identification/Authentication
  - ▶ Location Privacy
  - ▶ Non-Repudiability
  - ▶ Accounting(?)
  - ▶ Logging/Tracing

# Routing Negotiation

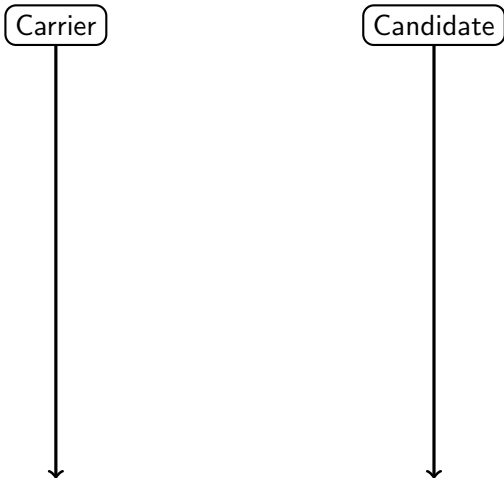
**Carrier** currently holding a packet

**Candidate** offering to take packet

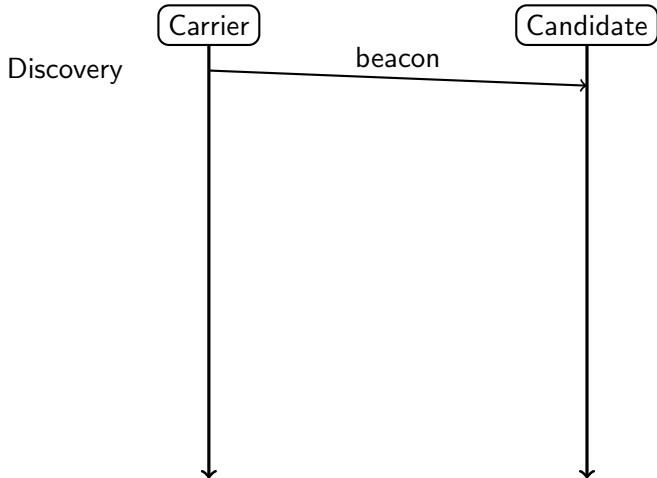
- Objectives:**
- ▶ Packet Propagation
  - ▶ Sinkhole Prevention
  - ▶ Minimum Precision Disclosure
  - ▶ User Determined **Privacy**

- Solution:**
- ▶ Routing Negotiation
  - ▶ Incremental Precision Disclosure
  - ▶ Carrier in Control, Carriee offers

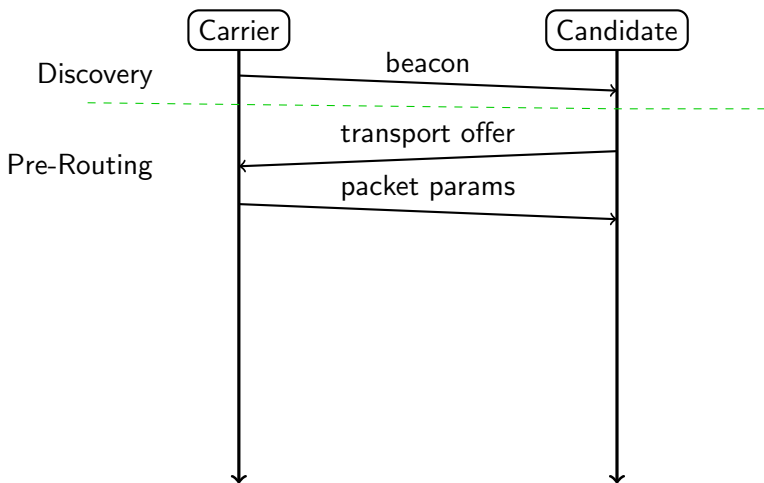
# Routing Protocol



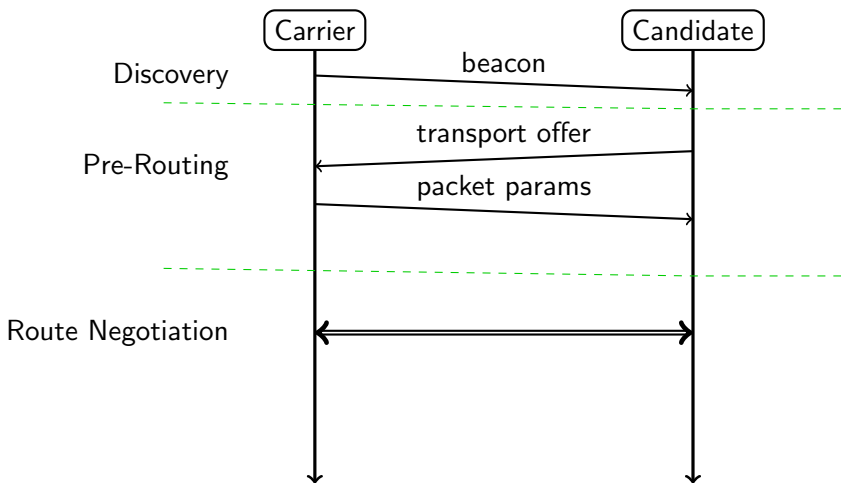
# Routing Protocol



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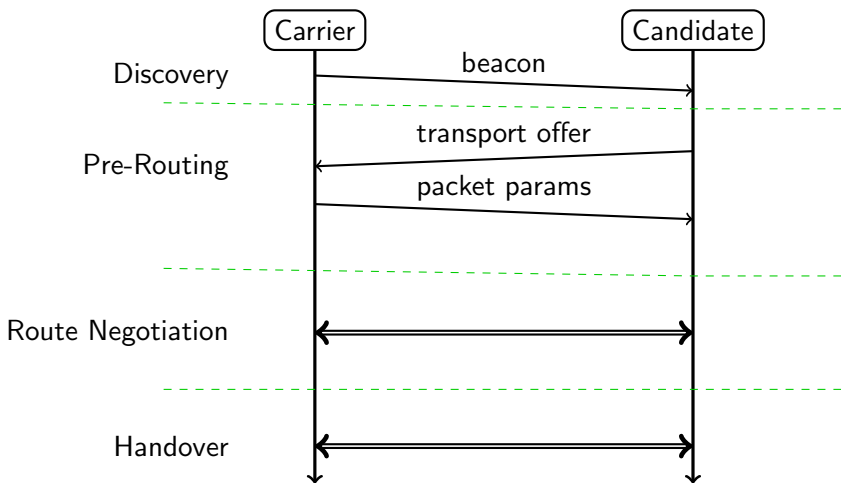


# Routing Protocol

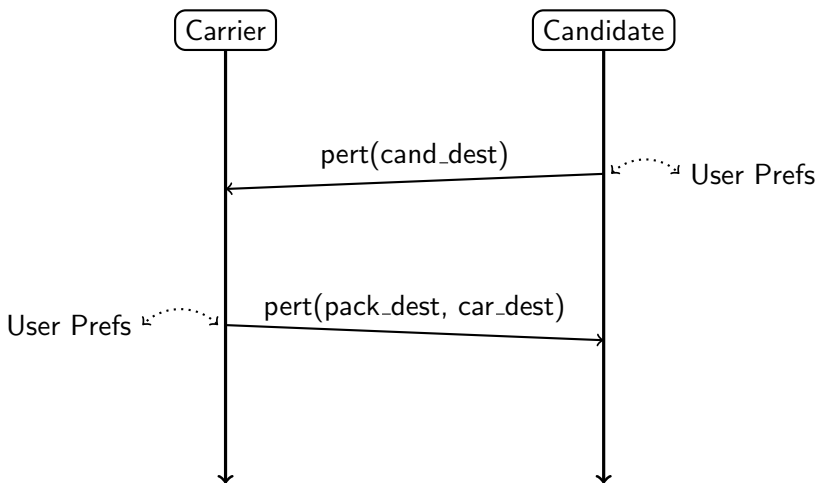




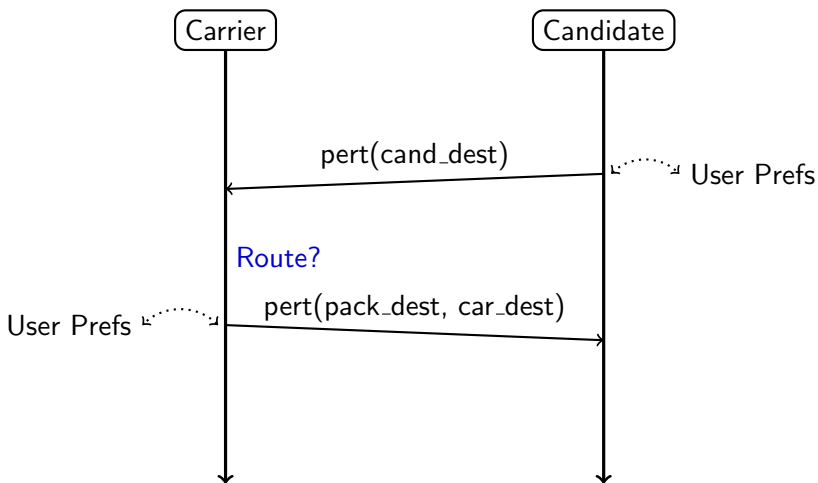
# Routing Protocol



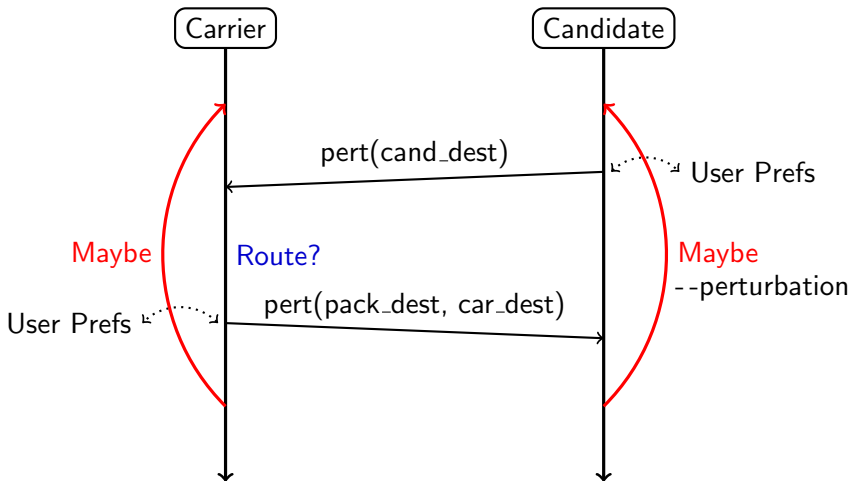
## Negotiation Protocol



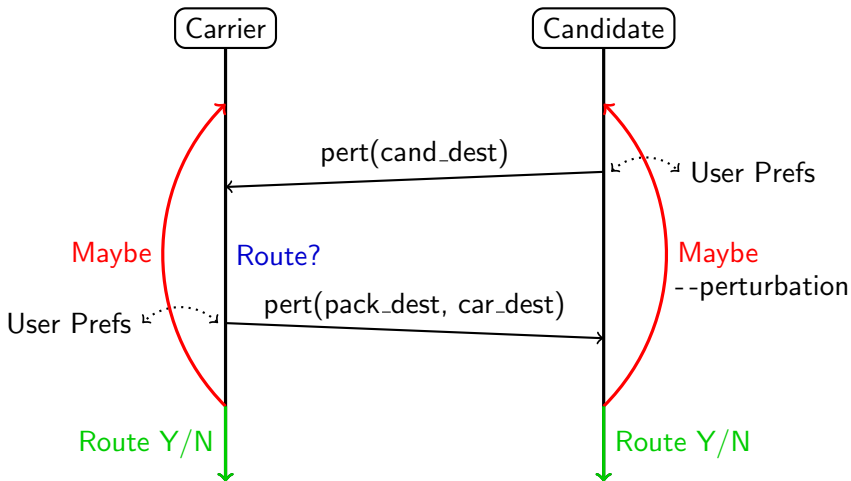
## Negotiation Protocol



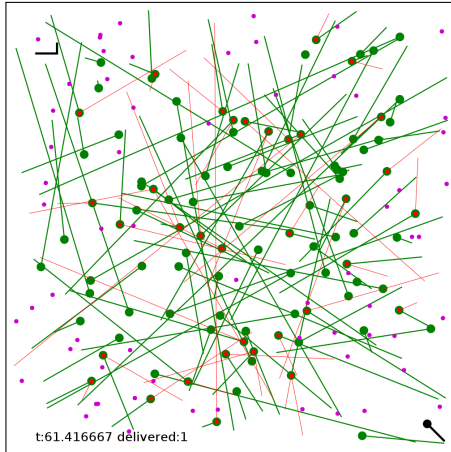
## Negotiation Protocol



## Negotiation Protocol



# Simulation

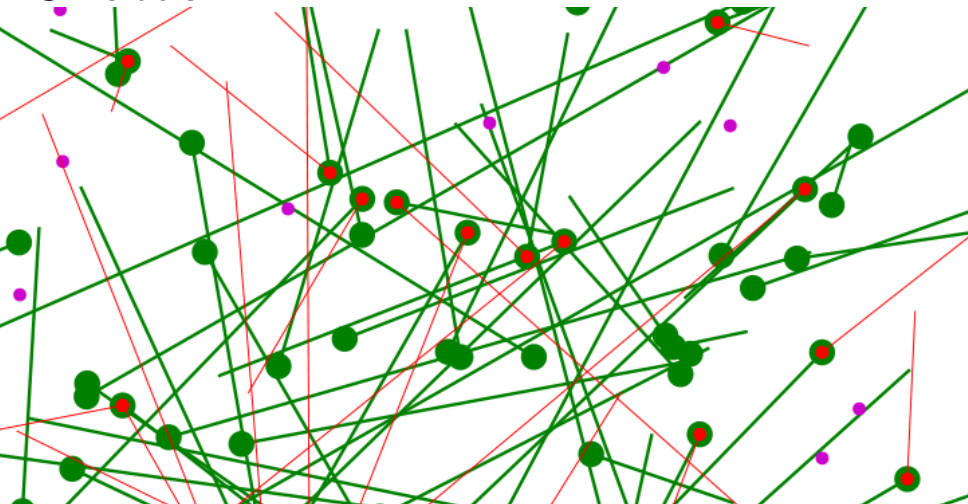


**Carrier**

**Objects** (in transit)

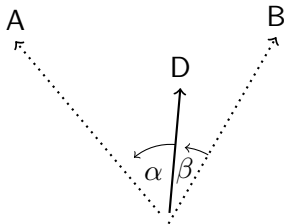
**Objects** (vacant)

# Simulation



# Simulated Routing

Destination Angle based Routing

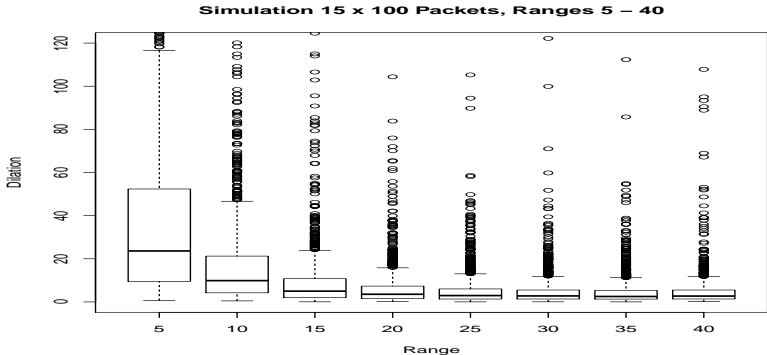


$\alpha > \beta \longrightarrow$  B carries next



## Simulation, Expected Results

- ▶ Efficiency:



- ▶ Reachability by location  $P(a \rightarrow b)$

## Conclusion and Future Work

- ▶ Might be working (+)
- ▶ Open Questions to work on
  - ▶ Routing Decision (?)
  - ▶ User Motivation (?)
  - ▶ Transport Security (?)
- ▶ Yes, illegal goods

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### Call for participation:

- ▶ Refine Simulation
- ▶ Protocol Implementation
- ▶ Position Prediction
- ▶ Cooperation Partners / Funds
- ▶ `git+http://larsipulami.de/projects/post`

# A Semester's Resumé

Past — Present — Future

## The Past Semester

1. Einführung OSN: Graphmodell, REST, FoaF, Identity
2. Authentifikation
3. Authentication II, OpenID
4. Protocols, OAuth, OpenSocial
5. Access Control
6. Social Network Analysis
7. Social Network Analysis II
8. Privacy, Database Anonymity, Linkability, Pseudonyms
9. Network Privacy, Mixes
10. Location Privacy
11. Decentralisation, Peer-2-Peer
12. Censorship, Circumvention, Social Impact

# What has been the Topic?

- ▶ Web Security
  - ▶ Authentication, Identity
- ▶ Privacy
  - ▶ Anonymity Measures
  - ▶ Location (Anonymisation Box)
  - ▶ Mix Zones, Clique Cloak
- ▶ SNA
  - ▶ Graph Attributes
  - ▶ De-Anonymisation

# Practise

## Mandatory:

- ▶ Profile Webpage
- ▶ foaf,RDF “Backend”
- ▶ WebID Authentication
- ▶ “Add me to your Friends” -Button
- ▶ Open Social API
  - ▶ Create Person/Relationship
- ▶ Send a Message (even Mail)

## Optional Freestyle:

(earn your grade)

- ▶ Design
- ▶ Open Social API
  - ▶ Activity Streams
  - ▶ Create a Message
  - ▶ ...
- ▶ Nice Picture
- ▶ Running on real server
- ▶ known by Berners-Lee

**Finish and apply for exam until September!**

# Exam

- ▶ Oral Exam
  - ▶ Starting Point: Your Implementation
  - ▶ Topic: Concepts from lectures
  - ▶ Placement of topic in OSN
- ▶ What is necessary to build an OSN?
- ▶ How could you provide access control in your network?
- ▶ What would be different if you would use OAuth?

“Fair is foul, and foul is fair: Hover through the fog and filthy air”



# The Next Semester

## Student Projects in Designing, Crafting and Securing dOSN

- ▶ Co-Project to DNT
- ▶ Building the Distributed Social Web
- ▶ Open Social, WebID
- ▶ Applications using Social Networks

# Social Networks 2022

# Literatur I



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All's well that ends well.