



Leveraging Social Links for Trust and Privacy

Antonio Cutillo, Refik Molva, Melek Önen, Thorsten Strufe

EURECOM

Sophia Antipolis

refik.molva@eurecom.fr





Some side effects

facebook Home Profile Friends Inbox 159 Angela Merkel Settings Logout


View Photos of Me (81)

Angela Merkel

Wall Info Photos Boxes +

Ich bin Angela Merkel! wie gehts?

Attach:     ▼

Share

Options

 Silvio Berlusconi

facebook Home Profile Friends Inbox 159 Angela Merkel Settings Logout


View Photos of Me (81)

Angela Merkel

Wall Info Photos Boxes +

Ich bin Angela Merkel! wie gehts?

Attach:     ▼

Share

Options

 Silvio Berlusconi



Side effects, cont'd



CBCnews

Home World Canada Politics Health Arts & Entertainment Technology & Science Money Cons

BC Calgary Edmonton Saskatchewan Manitoba Thunder Bay Sudbury Windsor Toronto Ottawa

LICENSE | EMAIL | PRINT | Text Size: S M L XL | REPORT TYPO | SEND YOUR FEEDBACK | SHARE

Depressed woman loses benefits over Facebook photos

Last Updated: Saturday, November 21, 2009 | 12:11 AM ET Comments

CBC News

A Quebec woman on long-term sick leave is fighting to have her benefits reinstated after her employer's insurance company cut them, she says, because of photos posted on Facebook.



Nathalie Blanchard, 29, has been on leave from her job at IBM in Bromont, Que., for the last year and a half after she was diagnosed with major depression.

The Eastern Townships woman was receiving monthly sick-leave benefits from Manulife, her insurance company, but the payments dried up this fall.

When Blanchard called Manulife, the company said that "I'm available to work, because of Facebook," she told CBC News this week.

She said her insurance agent described several pictures Blanchard posted on the popular social networking site, including ones showing her having a good time at a Chippendales bar show, at her birthday party and on a sun holiday — evidence that she is no longer depressed, Manulife said.

Nathalie Blanchard, shown here on a beach holiday during her sick leave. (Facebook)

<http://www.cbc.ca/canada/montreal/story/2009/11/19/quebec-facebook-sick-leave-benefits.html>

Blackmailing StudiVZ works

3 Comments

schülerVZ studiVZ meinVZ

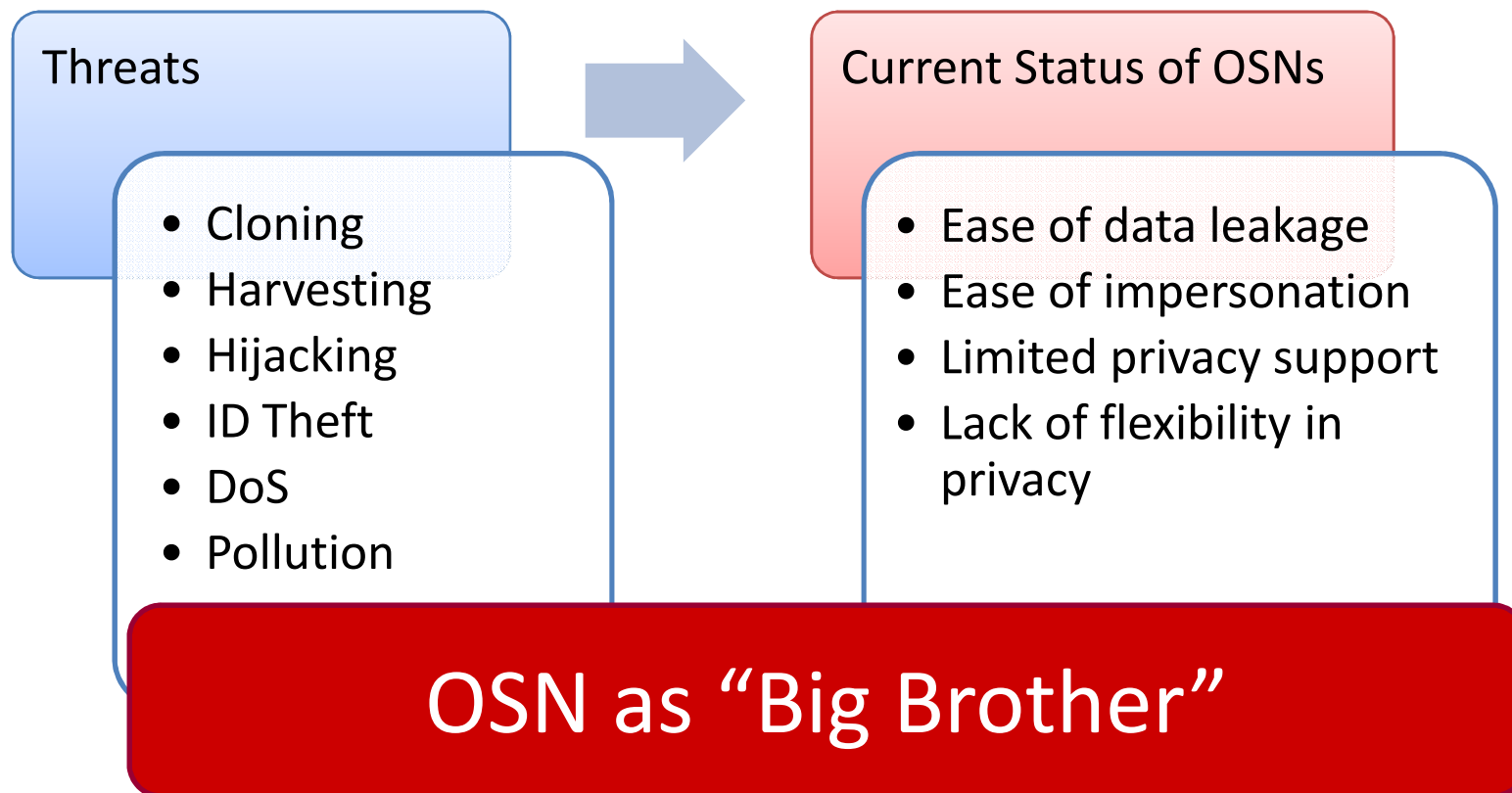
...d user information (residence, date of favourite movie, ...) **not only only from** d MeinVZ, but also from Germany's year old man asked for €90,000. Kind of a

0/21/hacker-arrested-er-social-networks/





Security and privacy issues in OSNs





The “Big Brother” problem with OSN

- Privacy protection against
 - Intruders
 - Crawlers
 - Third parties

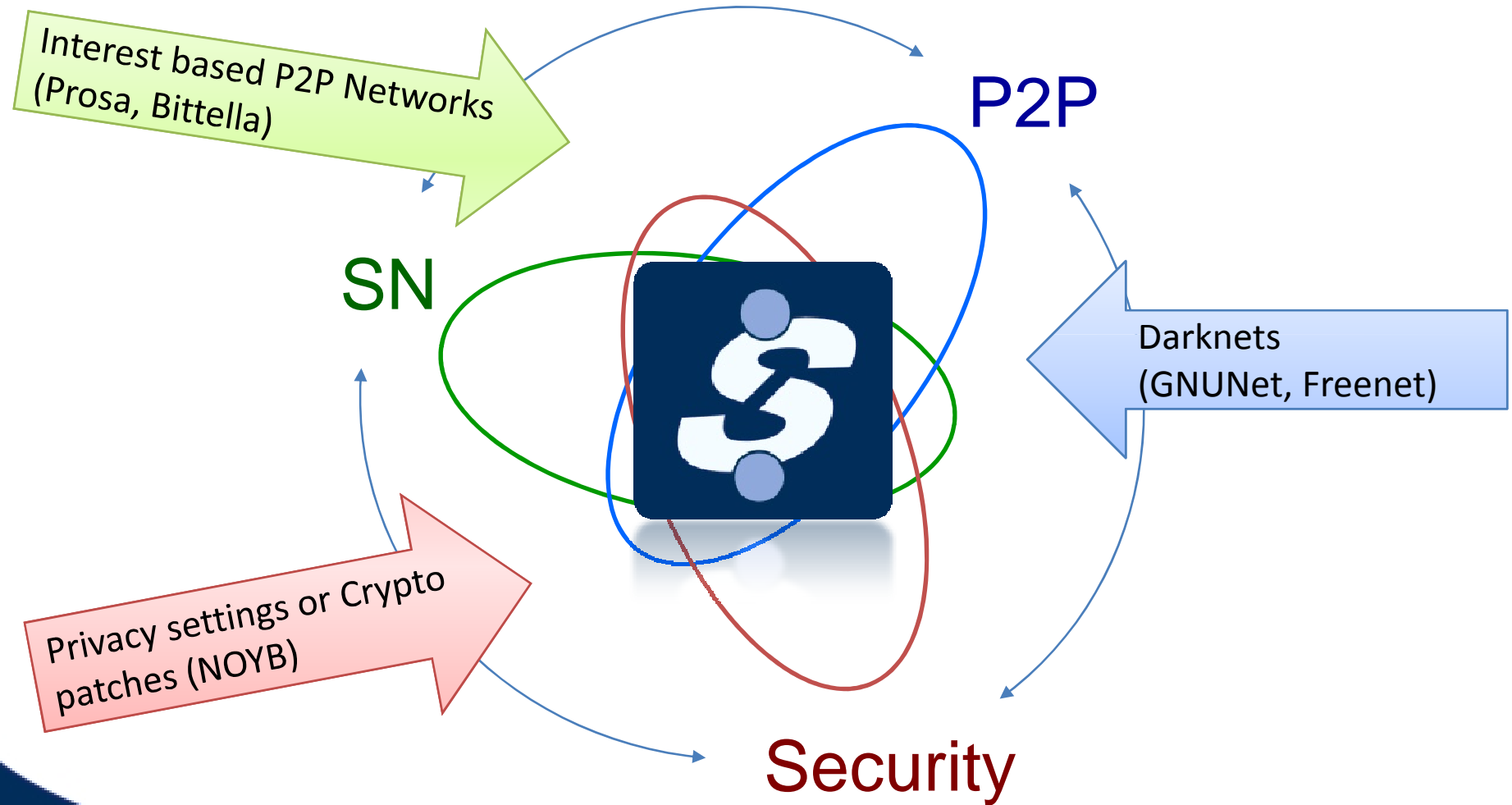
Does not prevent Application Server
from disclosing/exploiting your data

All existing OSN suffer from it!



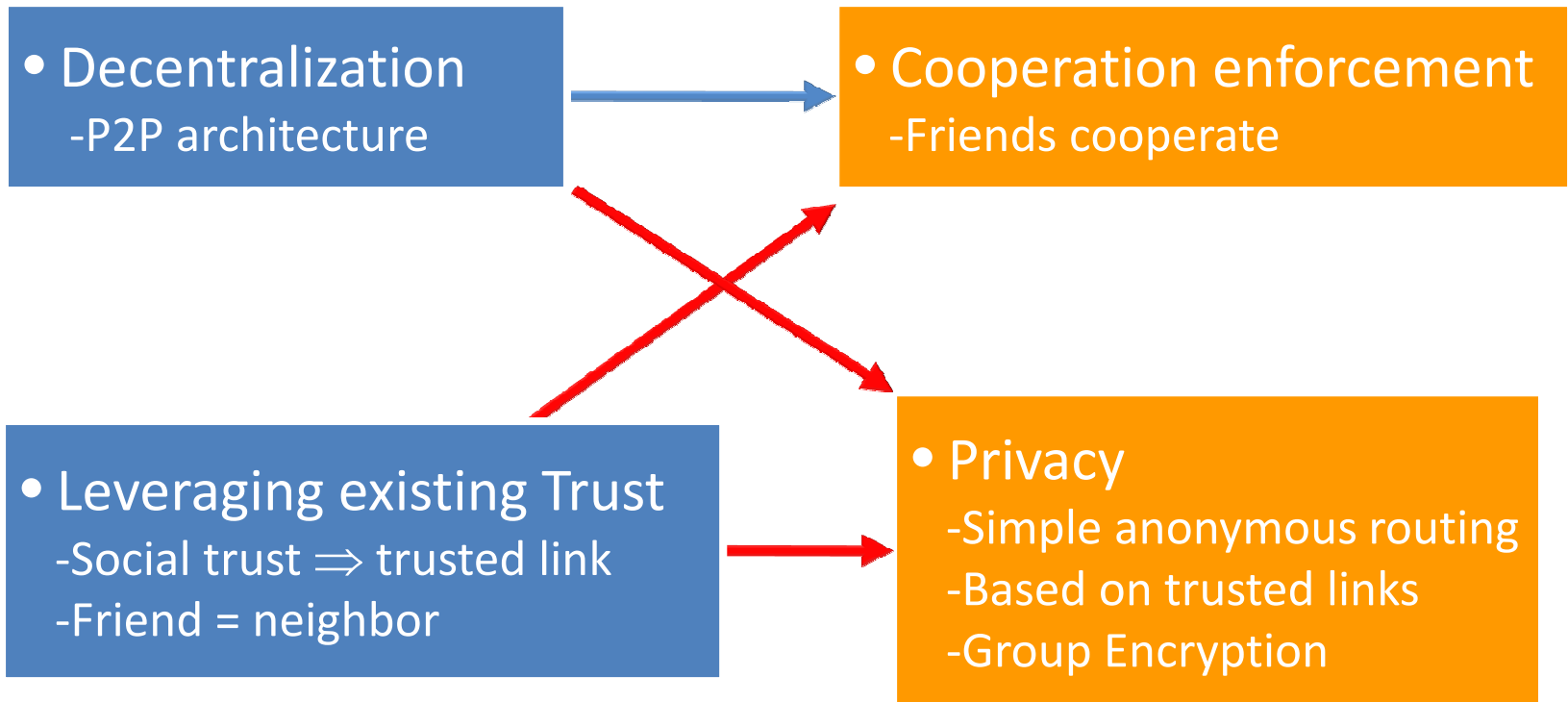


Current solutions



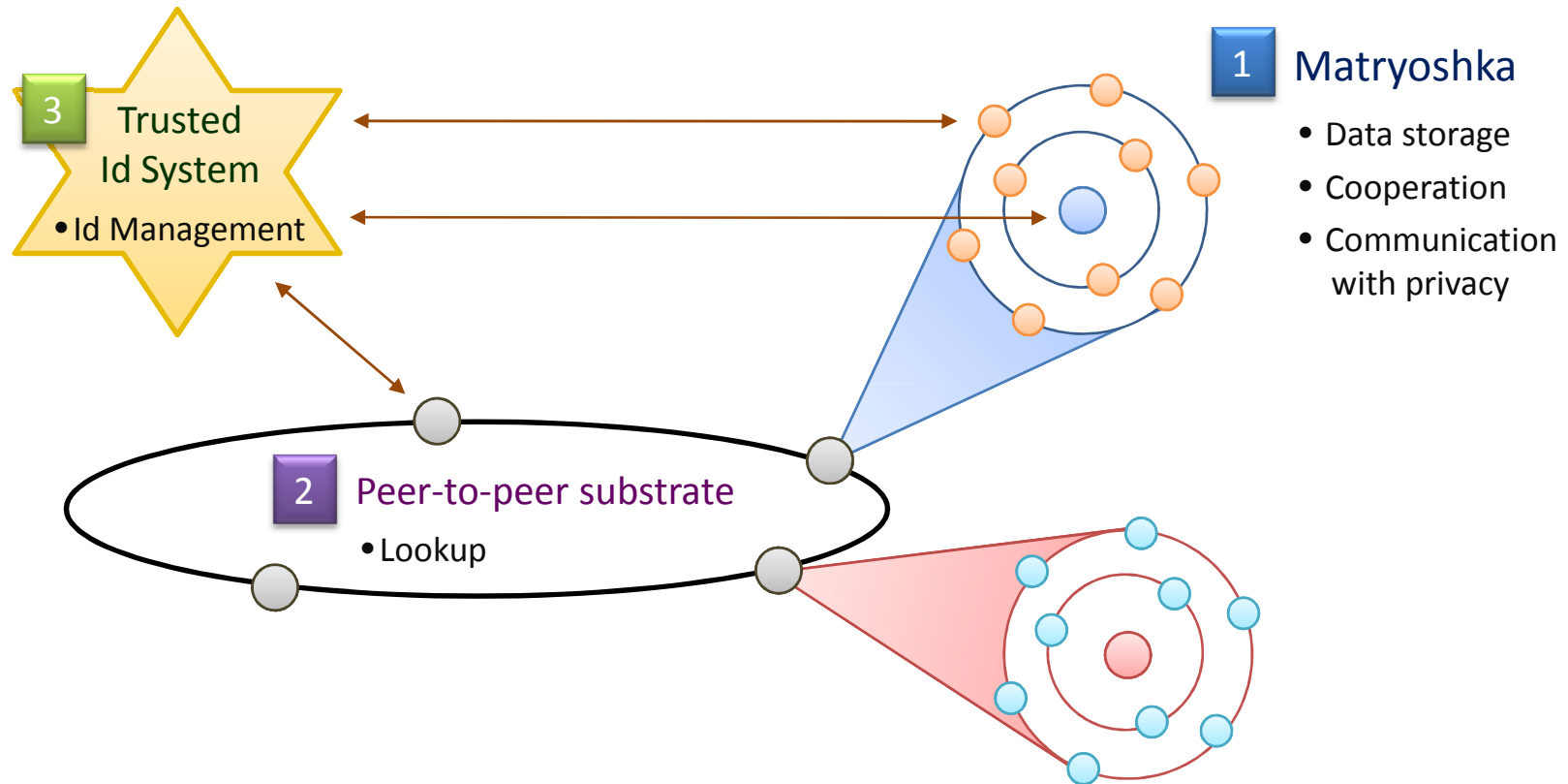


Safebook - Design Principles



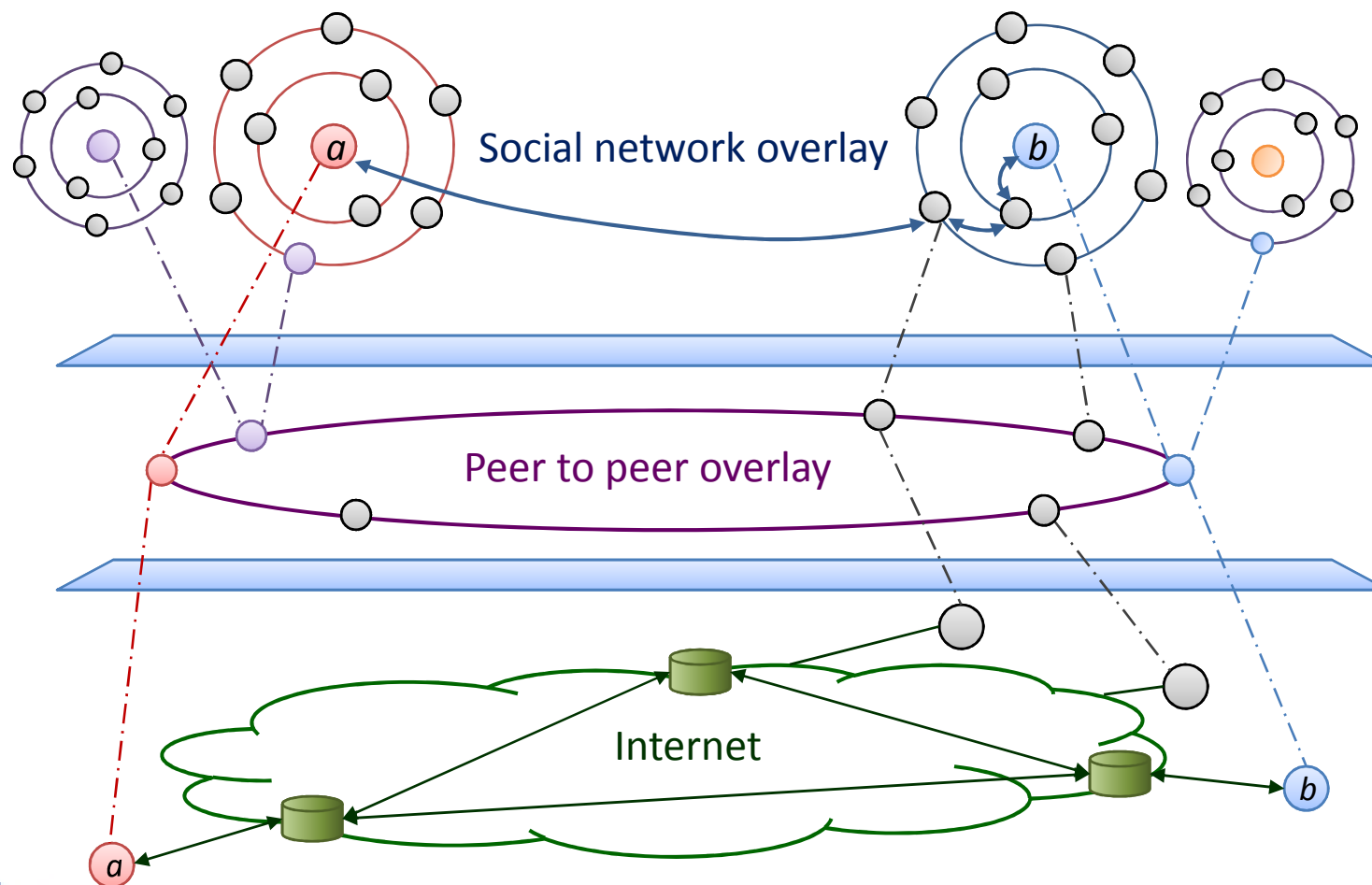


Safebook - Components



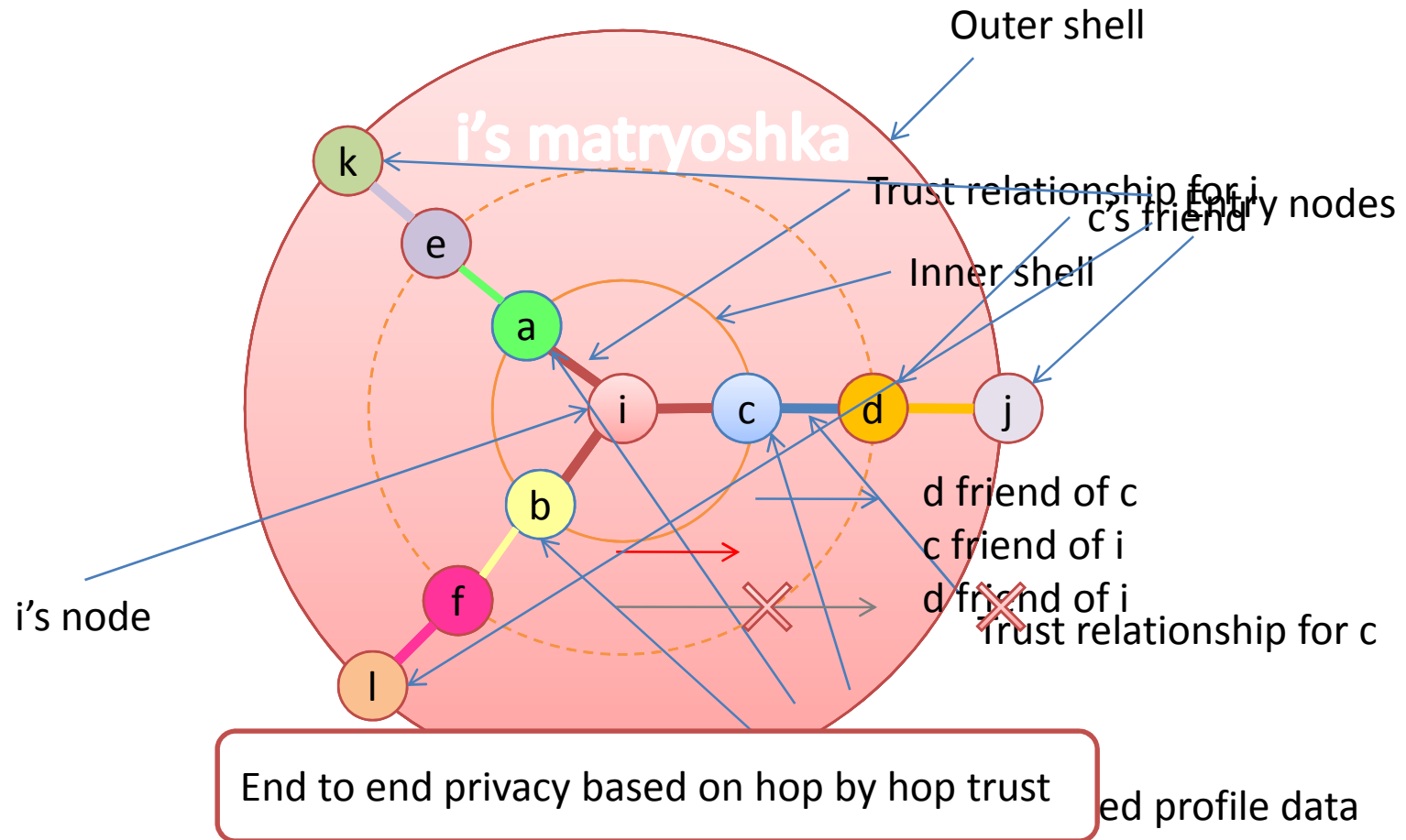


Safebook - Overlays



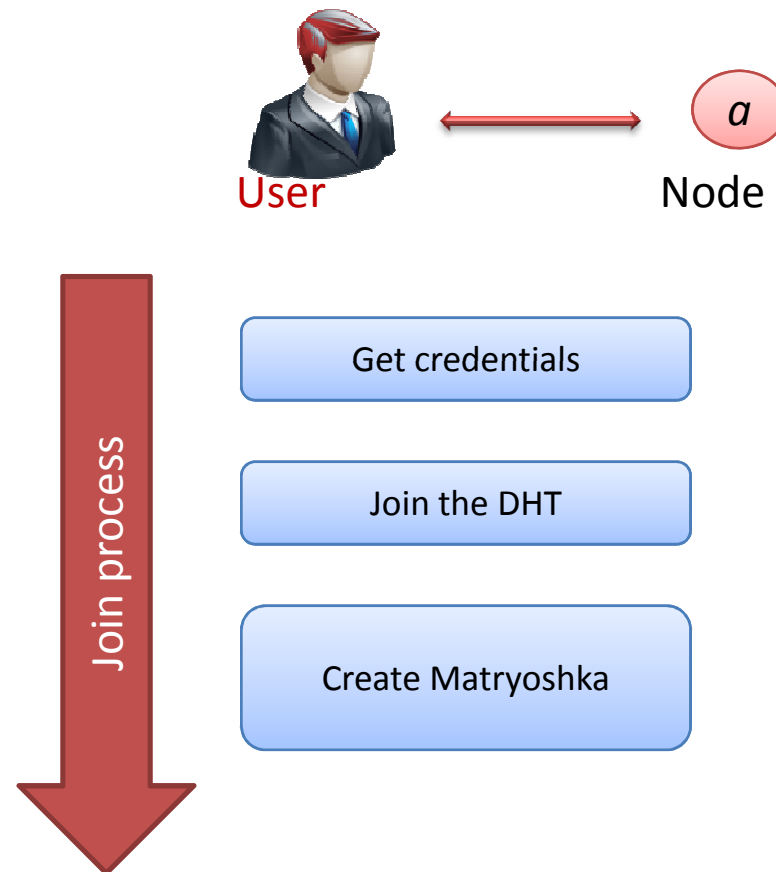


Safebook - Matryoshka



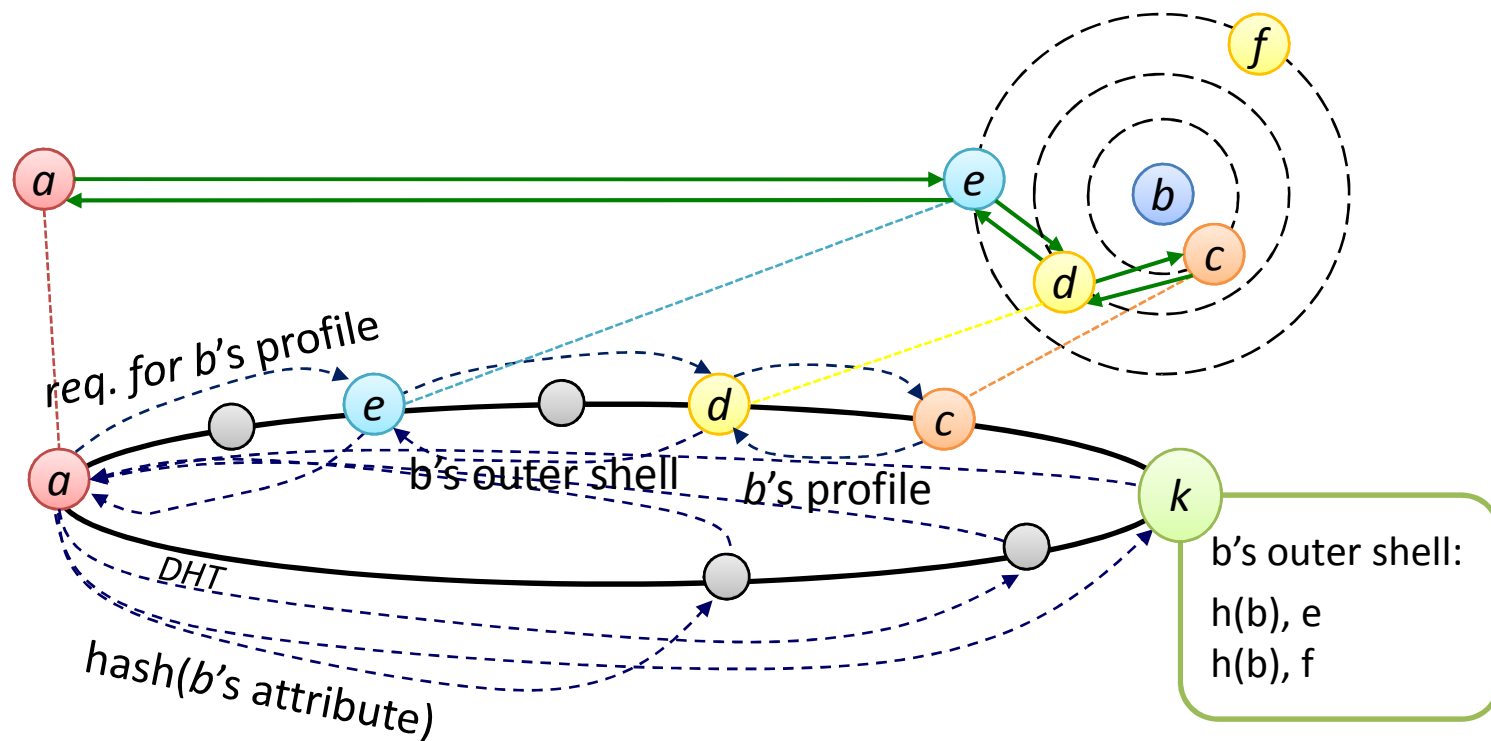


User Registration





a looks for b



lookup

- a looks for b 's entry nodes
- k provides b 's outer shell nodes

data request

- a sends profile data request to an entry node serving b

Data reply

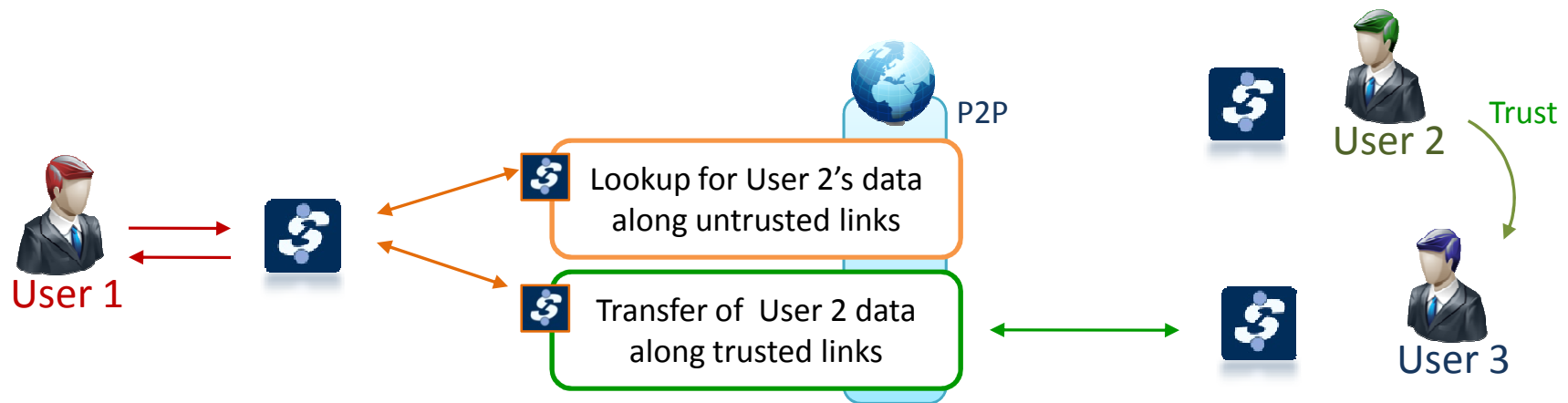
- One of b 's inner shell nodes answers





Data retrieval

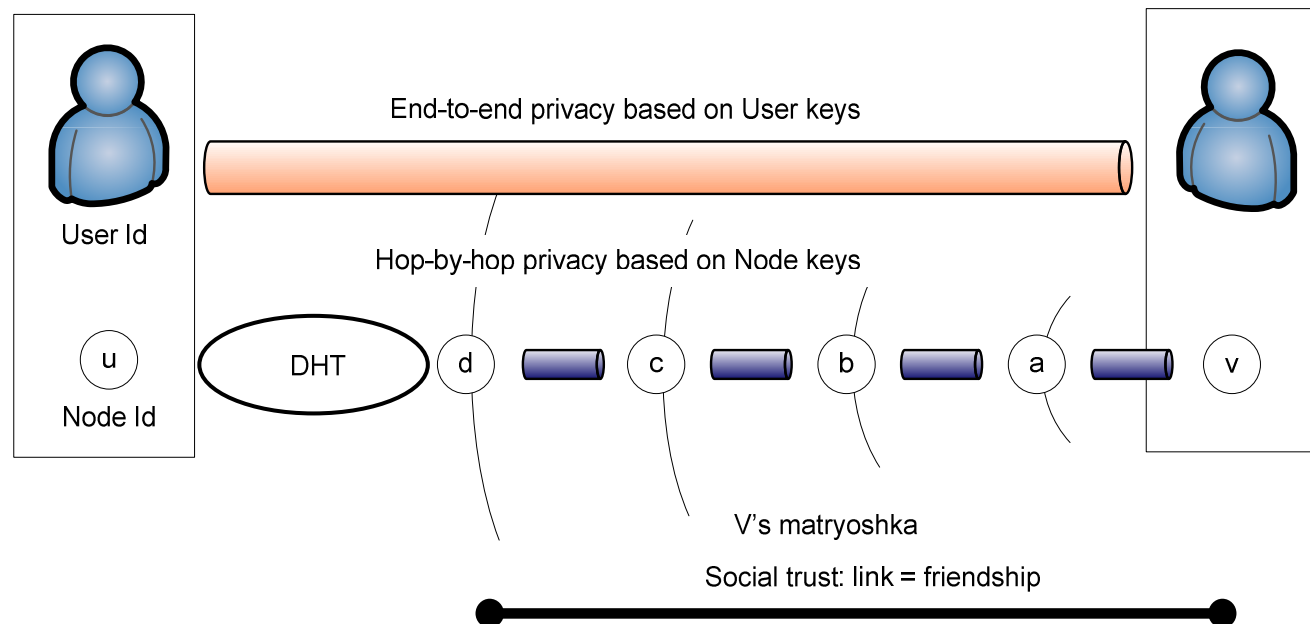
- User 1 wants to get User 2's profile data
- User 2's data is stored by User 3





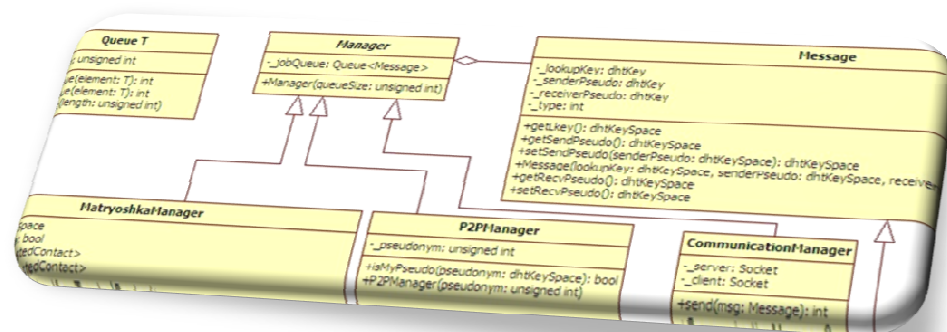
Privacy by Design

- Privacy through layering
- Unlinkability of IDs across layers
- Anonymous communication in matryoshkas



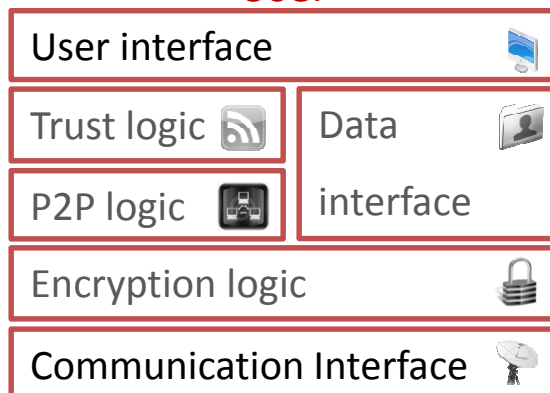


Safebook Prototype



Safebook = Resident Program

User



<http://localhost:8080>





Evaluation of the scheme (1)

Privacy



Friendship relations hidden through Matryoshkas



Untraceability through pseudonymity
and anonymous routing

Cloning prevention



ID management

Dos prevention



Access control



Key management

Availability

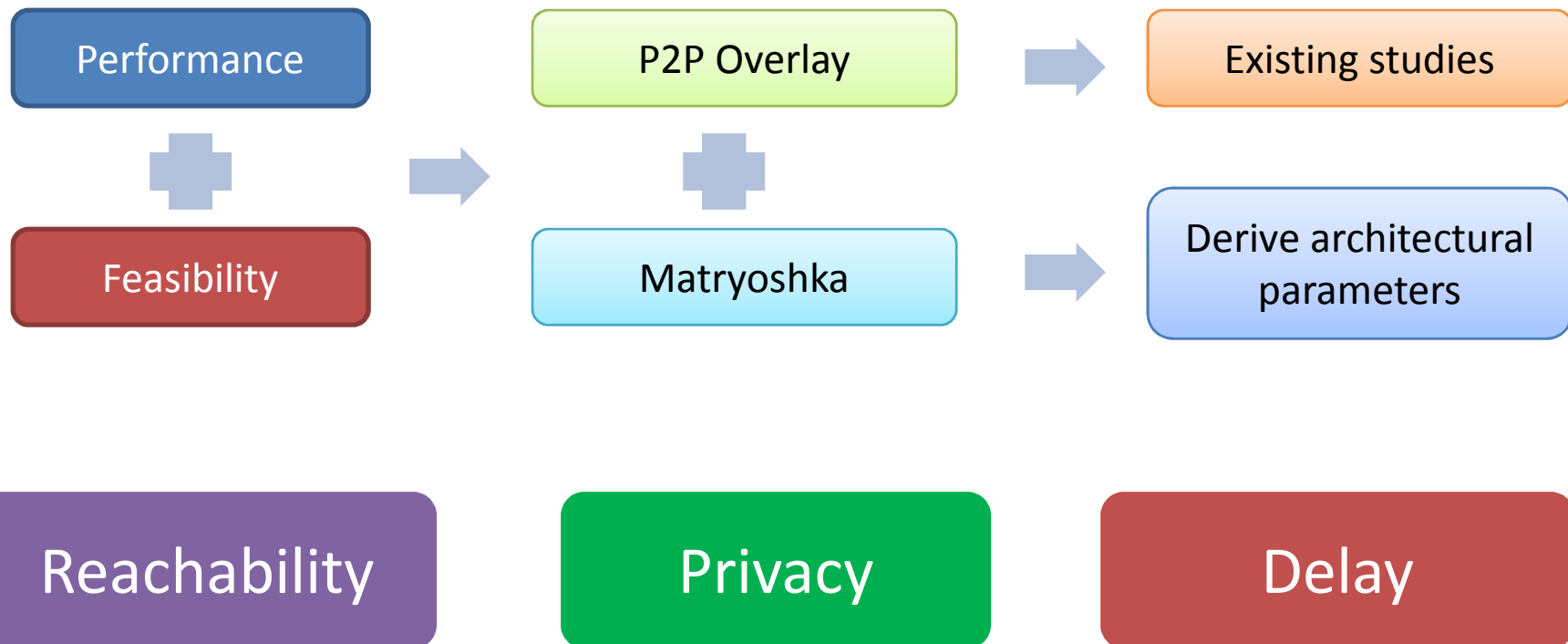


Data replication at friends' nodes



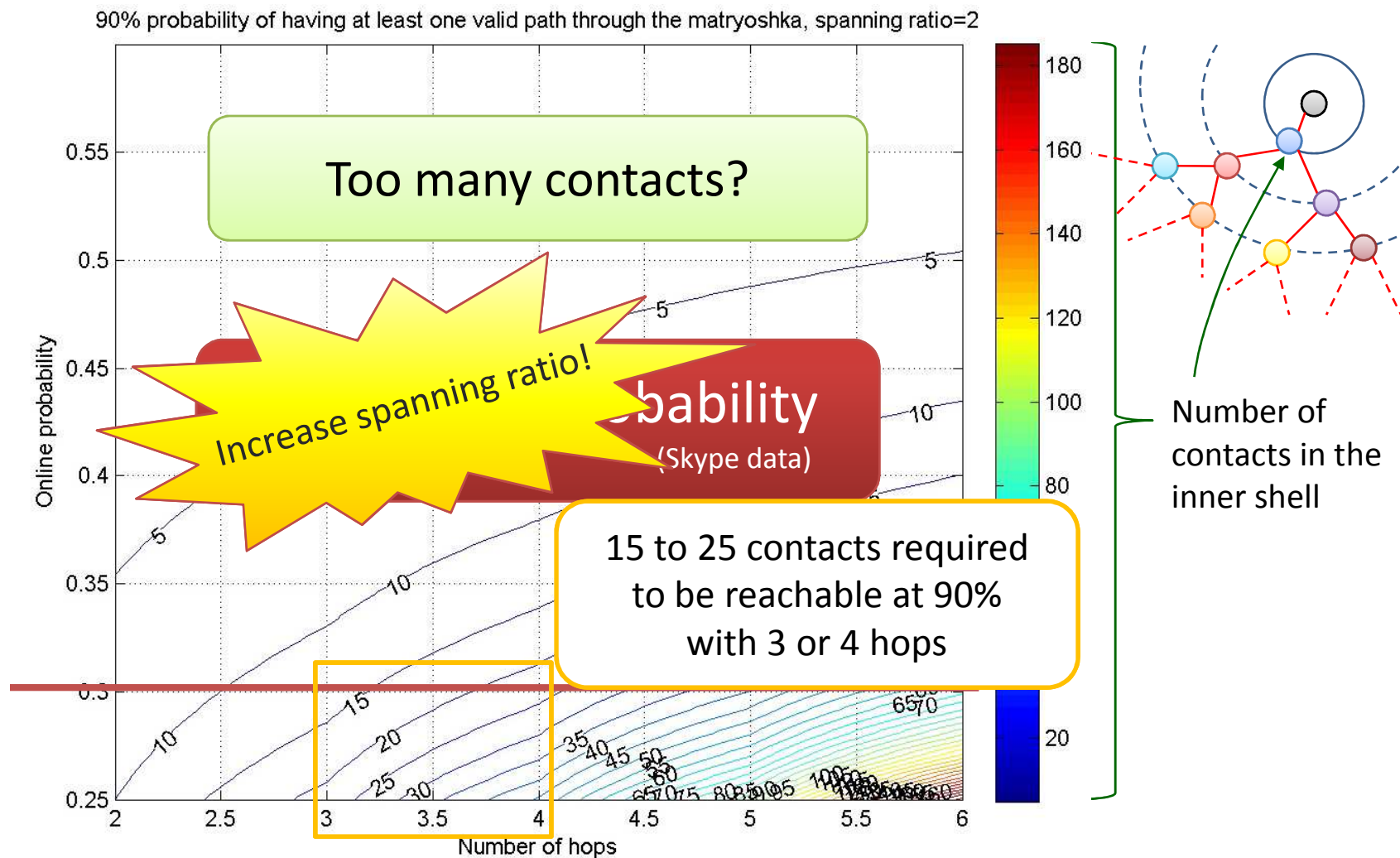


Evaluation of the scheme (2)



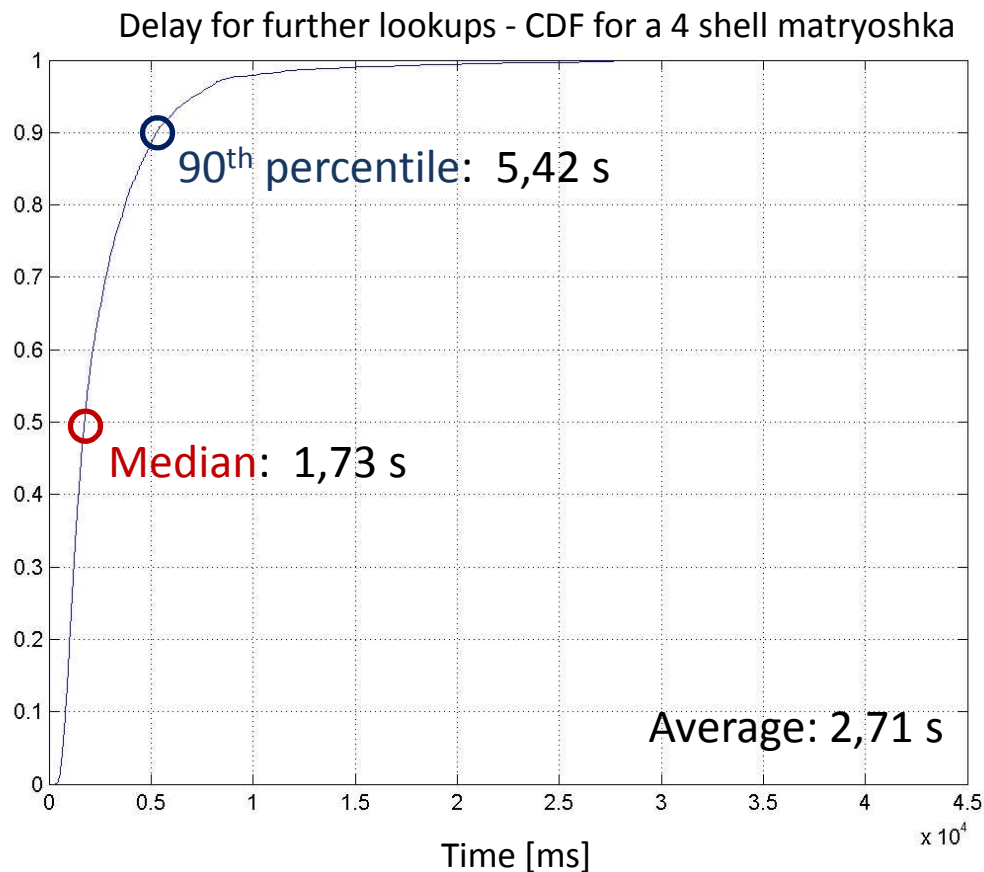


Reachability





Delay



Total lookup time:

$$T_{dl} = T_{DHT} + T_{Mat}$$

- Further lookups: $T_{DHT} = 0$ thanks to caching

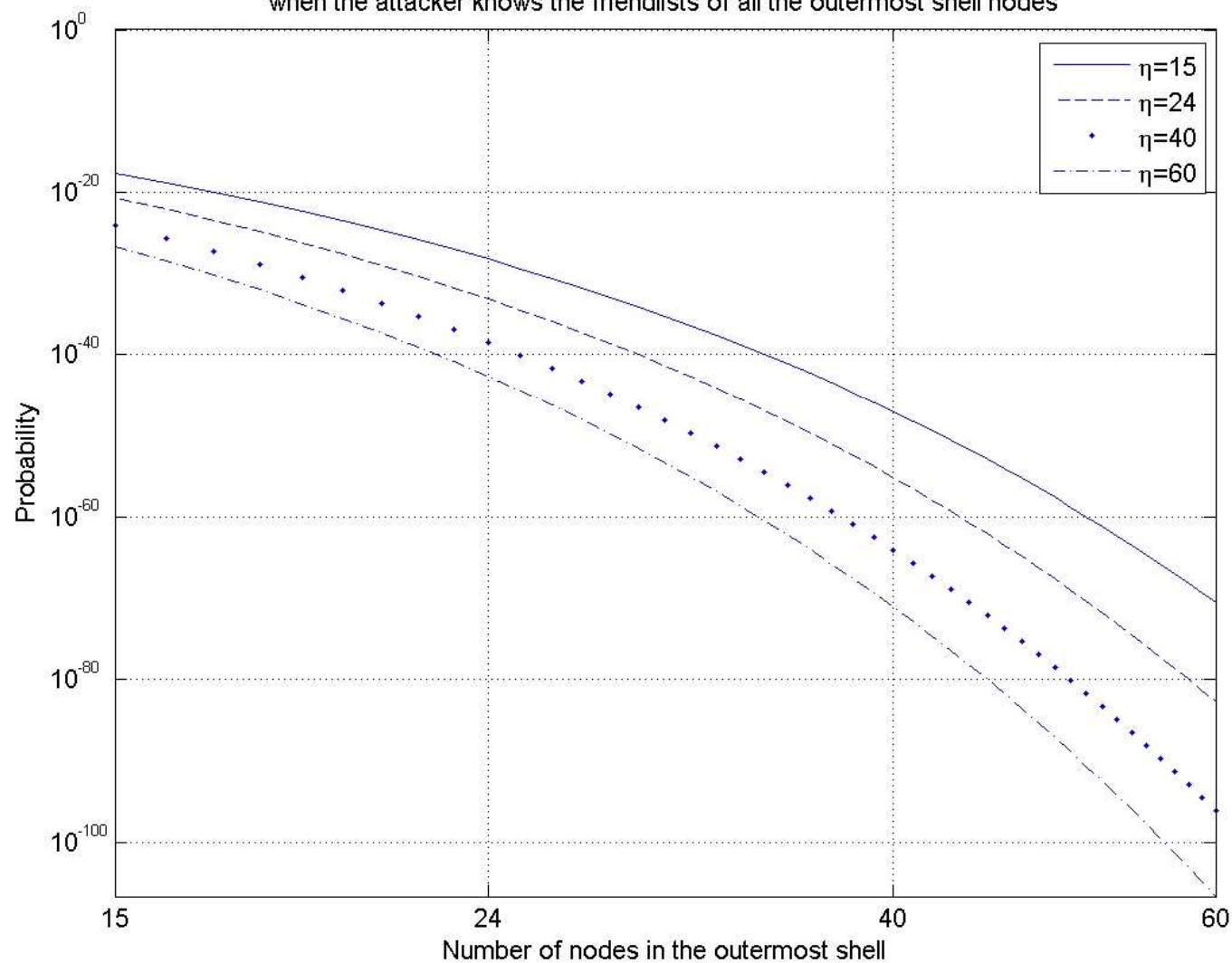
(*) Data computed by applying the montecarlo sampling technique on single hop delay measurements and on delay measurement for a successful DHT key lookup in KAD





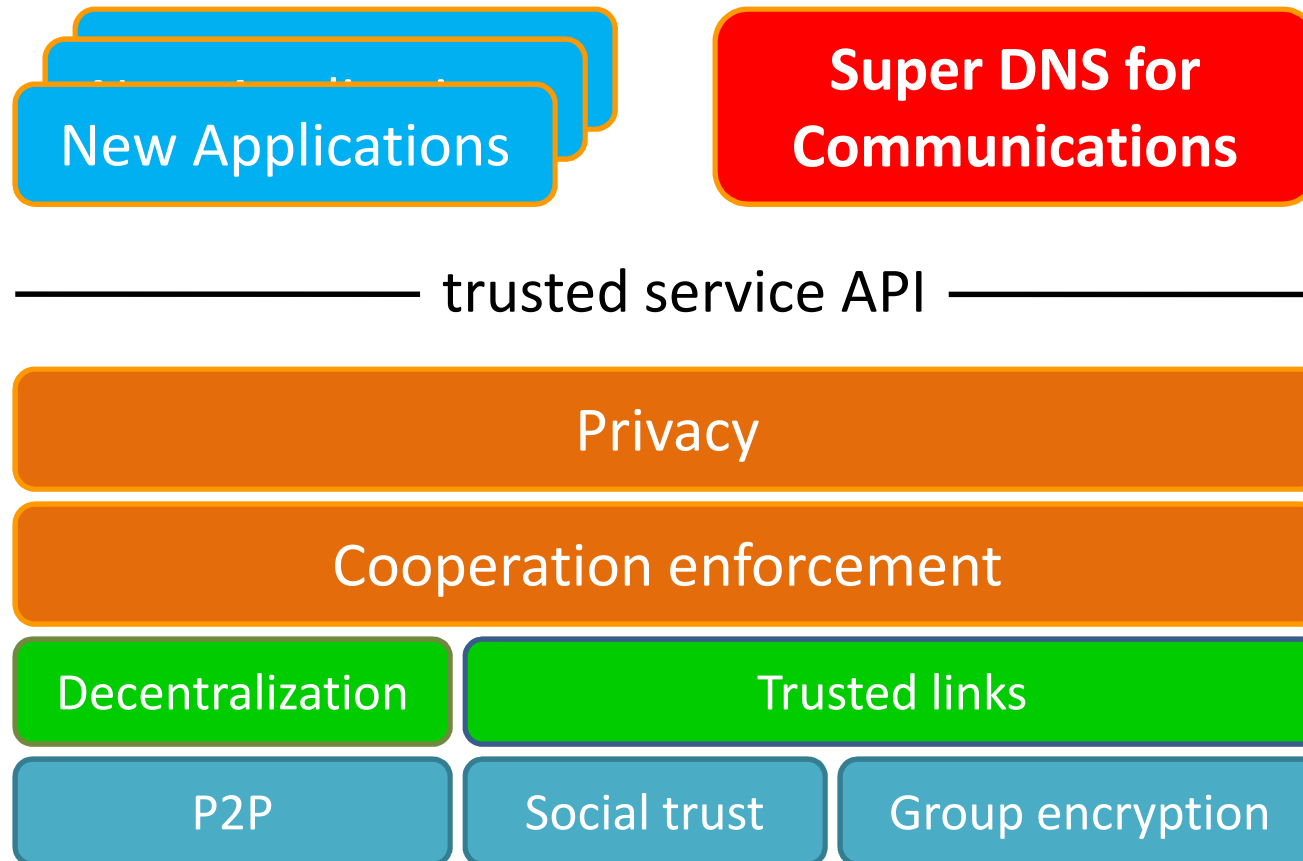
Privacy

Probability of disclosing the shell behind the outermost one with span=1
when the attacker knows the friendlists of all the outermost shell nodes





Safebook Summary





Publications

- Leucio Antonio Cutillo, Refik Molva, Thorsten Strufe: **Safebook: a Privacy Preserving Online Social Network Leveraging on Real-Life Trust**, IEEE Communications Magazine, Consumer Communications and Networking 2010
- Alessandro Sorniotti, Refik Molva, **Secret Interest Groups (SIGs) in Social Networks with an Implementation on Facebook**, ACM SAC 2010
- Leucio Antonio Cutillo, Refik Molva, Thorsten Strufe
Privacy preserving social networking through decentralization
WONS 2009, 6th International Conference on Wireless On-demand Network Systems and Services, February 2-4, 2009, Snowbird, Utah, USA ,
- Leyla Bilge, Thorsten Strufe, Davide Balzarotti, Engin Kirda
All your contacts are belong to us : automated identity theft attacks on social networks
WWW'09, 18th Int. World Wide Web Conference, April 20-24, Madrid, Spain
- Leucio Antonio Cutillo, Refik Molva, Thorsten Strufe
Leveraging Social Links for Trust and Privacy in Networks
INetSec 2009, Open Research Problems in Network Security, April 23-24, 2009, Zurich, Switzerland
- Leucio Antonio Cutillo, Refik Molva, Thorsten Strufe
Safebook: Feasibility of Transitive Cooperation for Privacy on a Decentralized Social Network
3rd IEEE WoWMoM Workshop on Autonomic and Opportunistic Communications

