

RE: Reliable Email

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Paper Presentation

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Current Spam Protection

Content
filtering/rejection

- What the computer thinks

Central database
(DNSBL, human labour)

- What someone else says

DNS Records
(SPF/SenderID)

- What the domain owner says

Digital signing /
Computational Puzzle

- What the email says

The Fight Against Spam



- PGP
- Computational puzzle



SP Machine learning



DNS Server



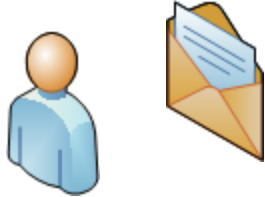
DNS Blacklists



Content filtering

Getting the User Involved

- Leverage existing social networks
- What's necessary?



Design Goals



Prevent sender address forging



Prevent attestation forging

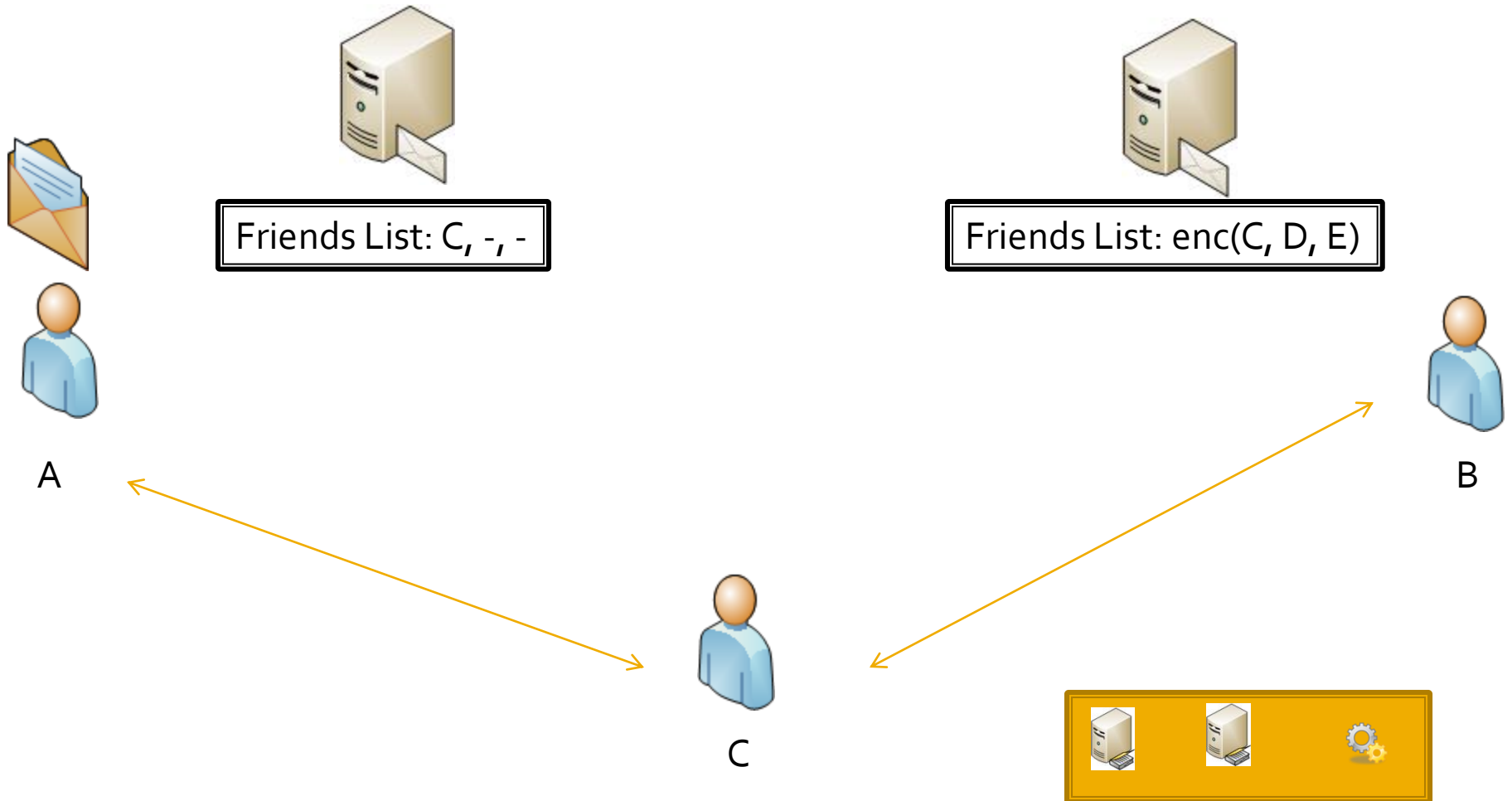


Maintain privacy while determining
white list intersections



Incremental deployability

RE: System Design



Results

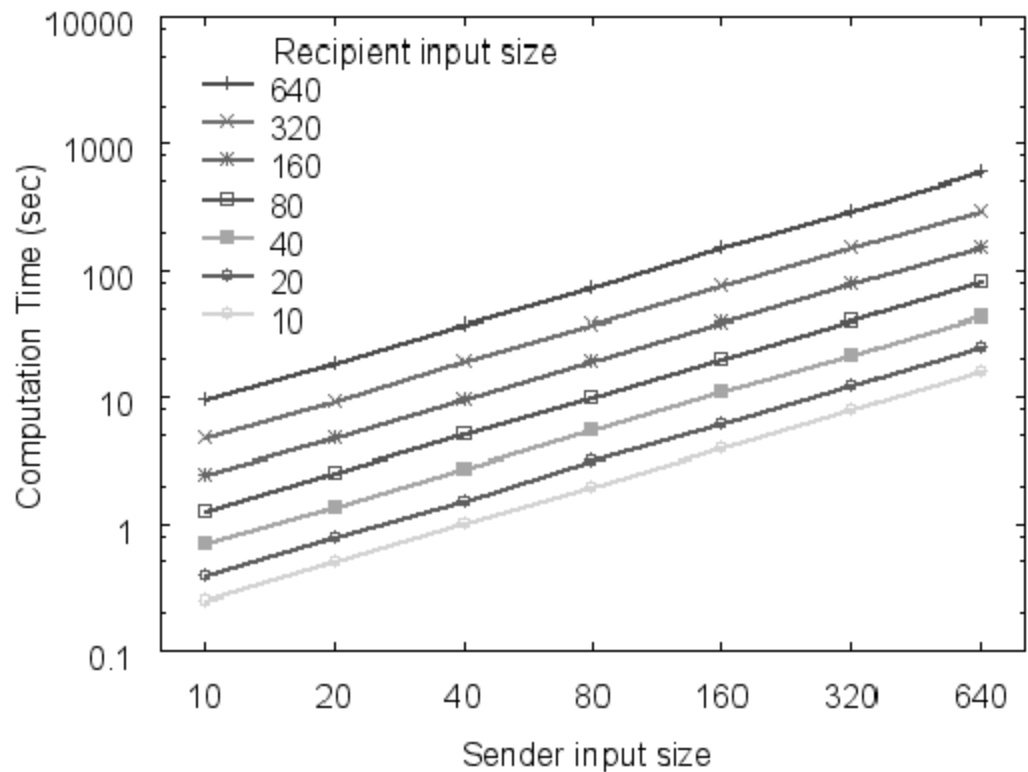
Accuracy Rate

- 20 million messages, 172 identified false positives
- Direct RE would reduced to 28 false positives (84%)
- With FoF would reduced to 19 false positives (additional 5%)

Results

Processing time of FoF

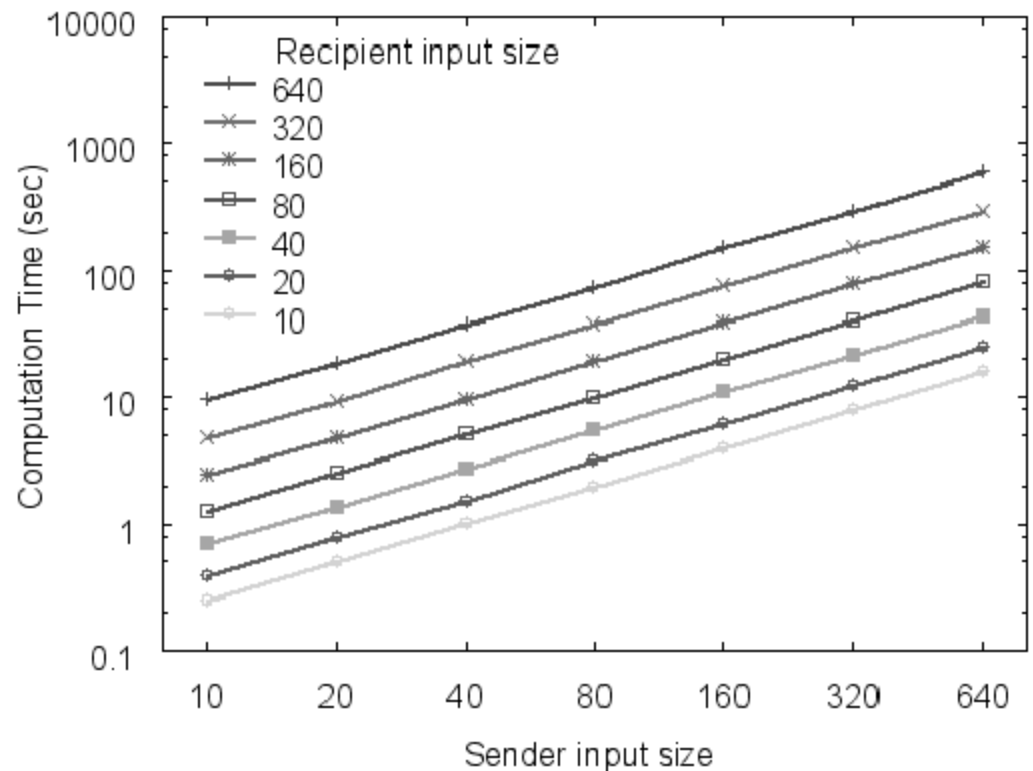
- Intersection of two sets of 160 = 40S computation
- Most processing done by sender



Results

Worst case

- “3 GHz Xeon in 64-bit” ?
RAM? Disk I/O? Email queue lengths?
- Hotmail: 12 billion emails daily, over 130,000 servers
- Assume half are sent emails, requiring FoF $40s \times 6$ billion emails over 130k servers = 21.36 days of processing per server



Limitations

Mailing lists or emails to multiple recipients

- Token to each recipient
- List moderation

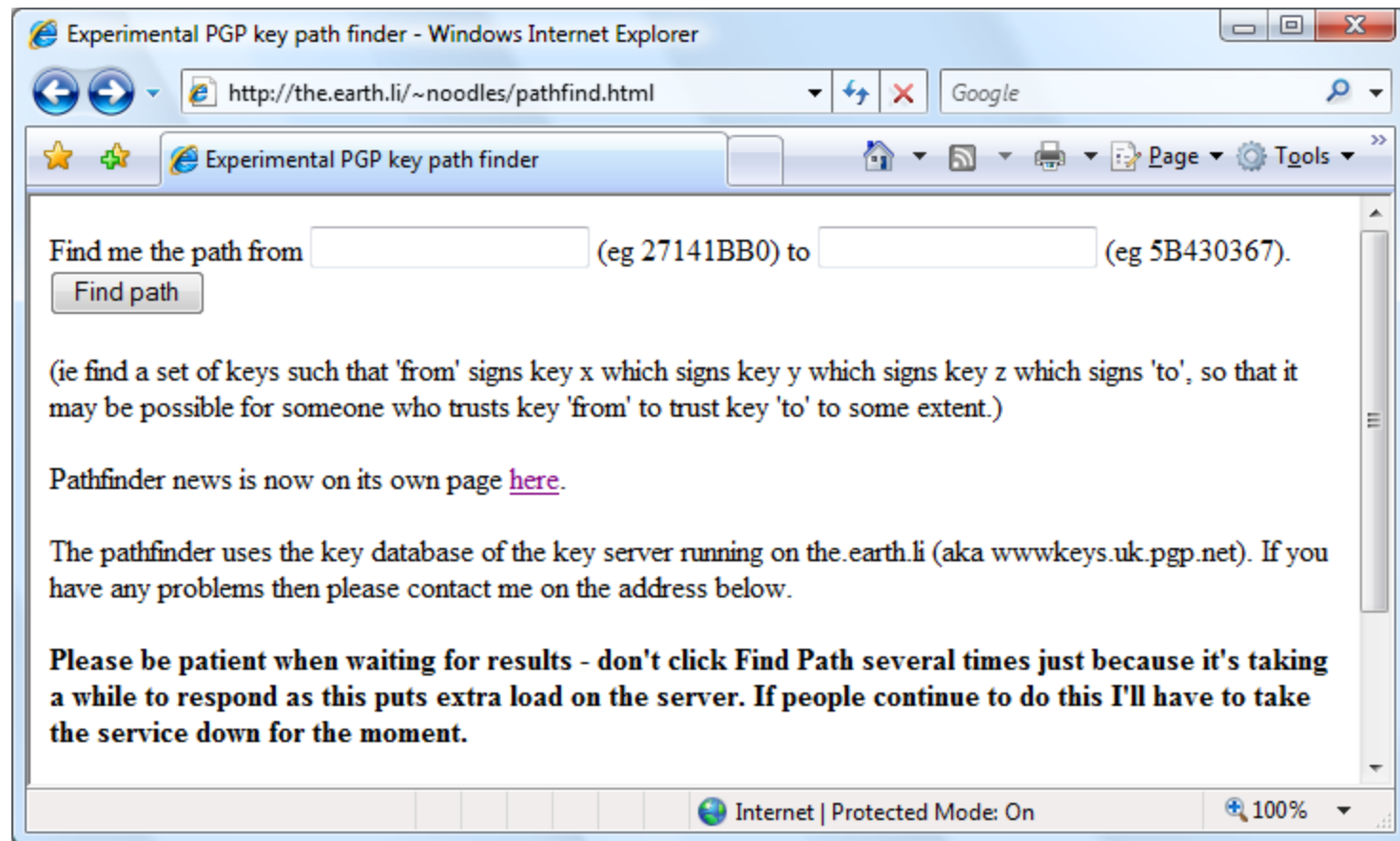
False attestations cause false negatives

- Require password to generate attestation?

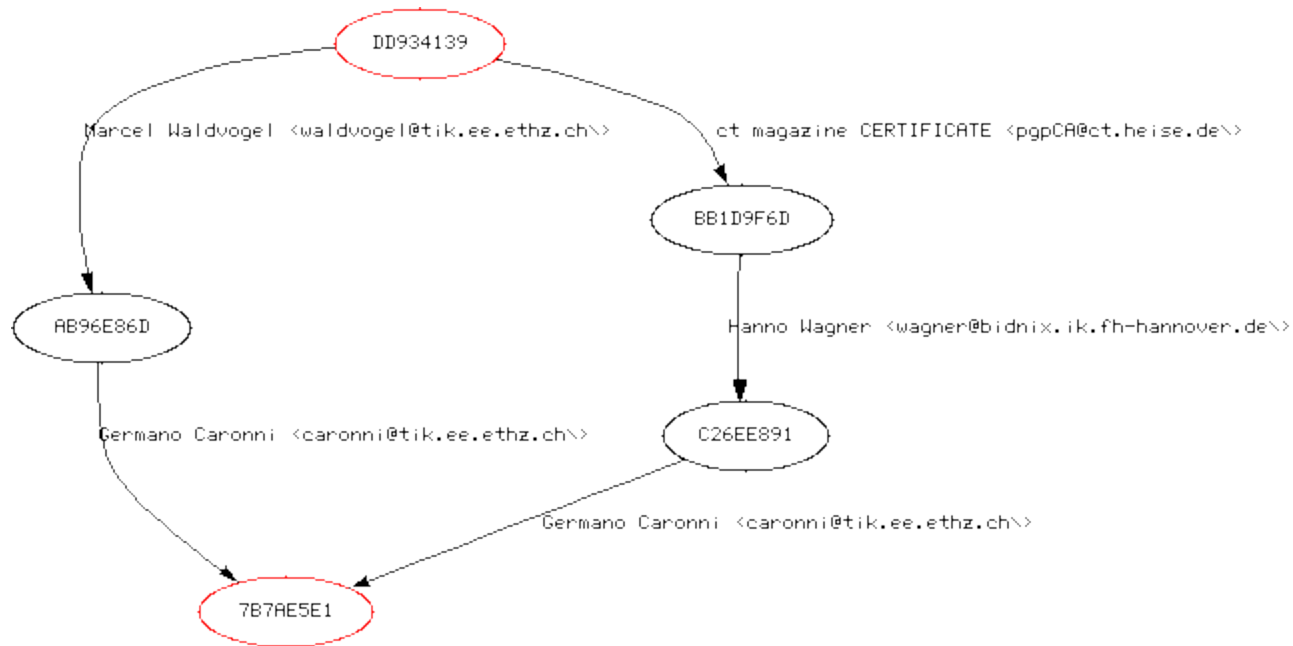
Friend-Of-Friend Only

- How to move beyond 2 degrees of separation?

What's Wrong with PGP?



What's Wrong with PGP?



Paths from Key 0xDD934139 to Key 0x7B7AE5E1

Limitations

Email forwarding and multiple addresses



Unknown User

jho@cs
AS, bad spam filter



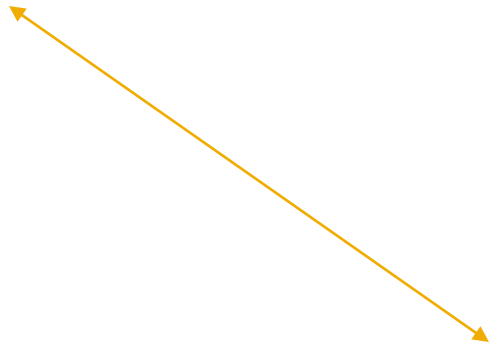
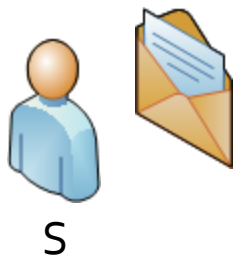
user@gmail.com
AS, good spam filter



Justin

Limitations

Privacy Problems?



RE: Reliable Email?

- Authentication implies reputation which allows for spam protection
 - PGP already provides web of trust - RE just allows decentralization
- Discussion about revocation was vague
- Cost of processing is too high
- Other works have cited privacy problems