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Mobile Private Contact Discovery

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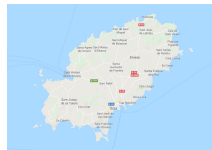

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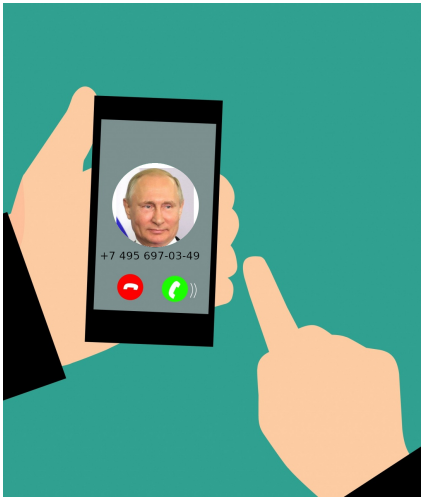
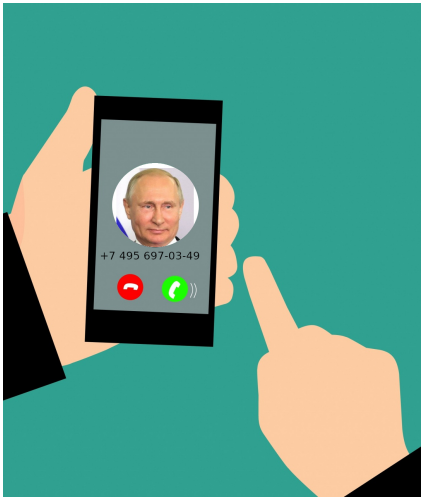
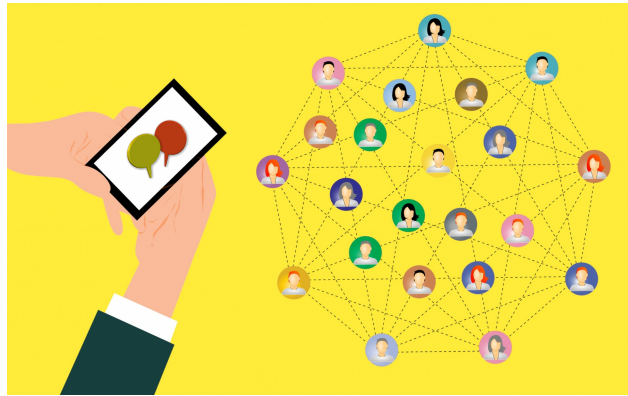


Mobile Private Contact Discovery





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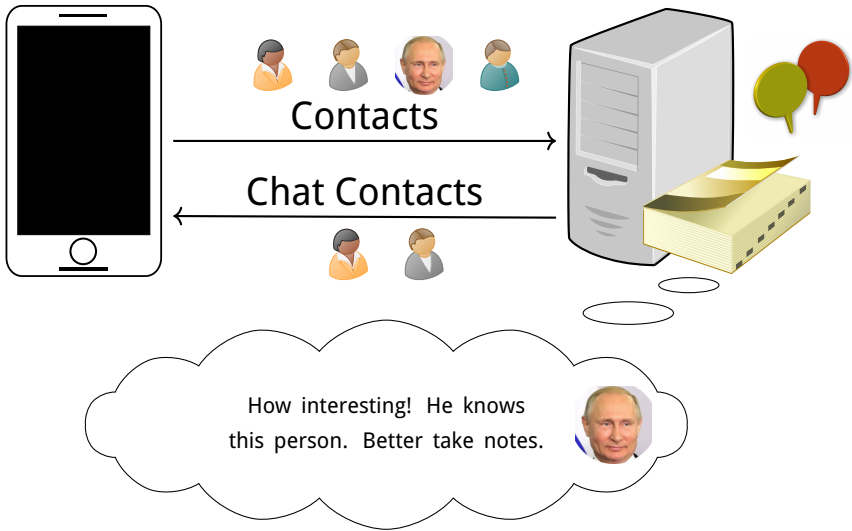


Mobile Contact Discovery

- Current Solution: Naive Hashing
  - Employed by some existing messengers
  - Vulnerable to brute-force
  - Salting only marginal help

Messenger	Hashed	Salted
Confide	✓	✗
Dust	✗	✗
Eleet	✗	✗
Signal (legacy)	✓	✗
SIMSme	✓	✓
Telegram	✗	✗
Threema	✓	✗
Viber	✗	✗
WhatsApp	✗	✗
Wickr Me	✓	✗
Wire	✓	✗

Mobile Contact Discovery

- Heavy tools: Multiparty Computation
- Private Set Intersection
  - Previously deemed too slow for smartphones
  - But: Smartphones get stronger and stronger!
  - Protocols get better!

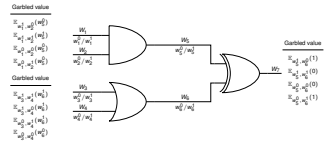
Results

D. Kales and C. Rechberger and M. Senker and T. Schneider and C. Weinert
Mobile Private Contact Discovery at Scale
USENIX Security Symposium 2019

https://contact-discovery.github.io/

https://ia.cr/2019/517

Results



- Multiple OPRF-based Protocols
  - Garbled Circuits using LowMC
  - Naor-Reingold
- Malicious Clients
- Implementation and Evaluation
  - Real smartphones (ARMv8 Cryptographic Extensions)
  - Fast online phase (2s for 1000 contacts over LTE)
  - Large one-time setup communication (1 GB for 2^{28} clients)

Wishes of large Messenging Services

- 1B+ monthly active users
- An address book with 10k users
- Latency: lookup time of < 2 seconds
- No large communication

Still a lot of improvement needed