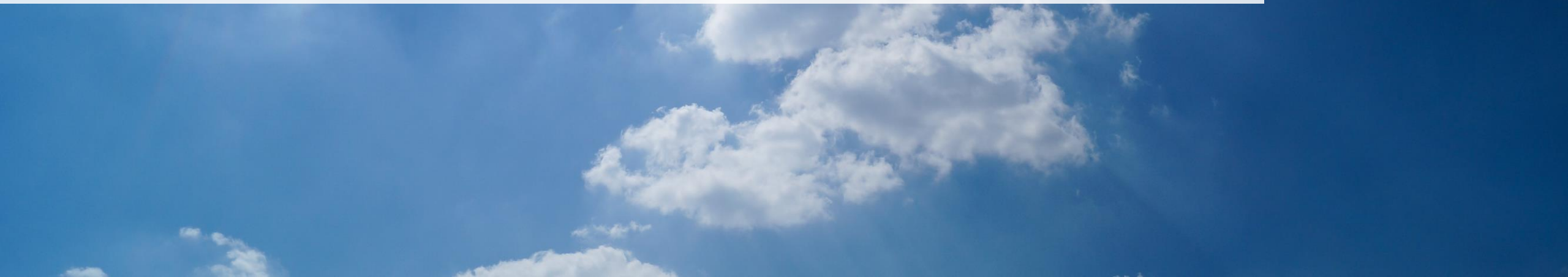
Interoperable Messaging

Panel 2: Secure Communication Protocol

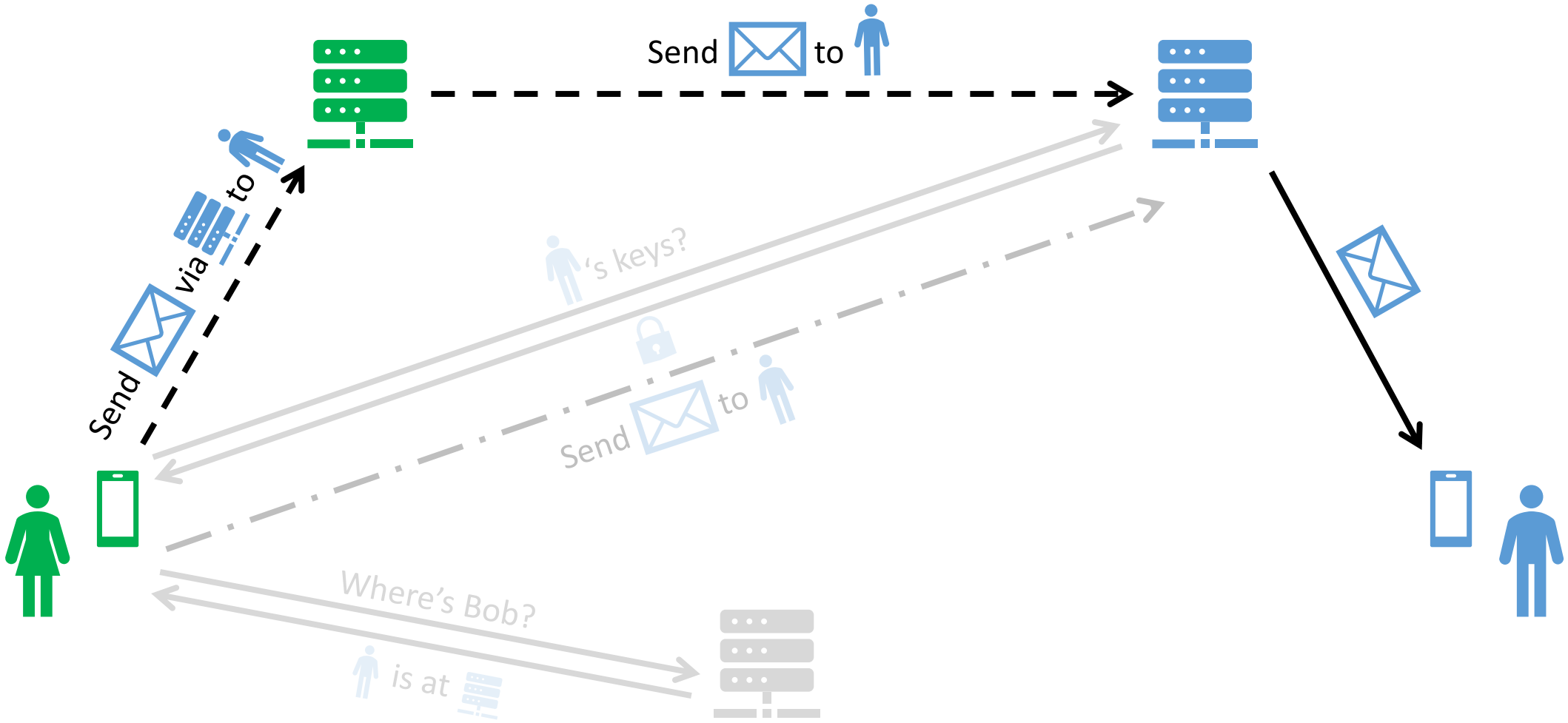
23-02-27

Real-World Cryptography Group
FAU Erlangen-Nürnberg, Germany

Paul Rösler



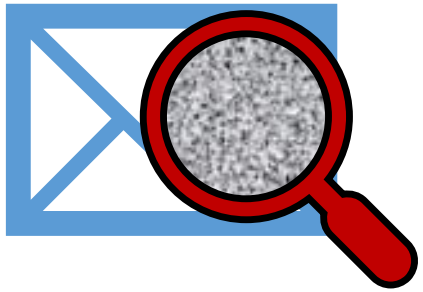
Overview of Setting



Requirements

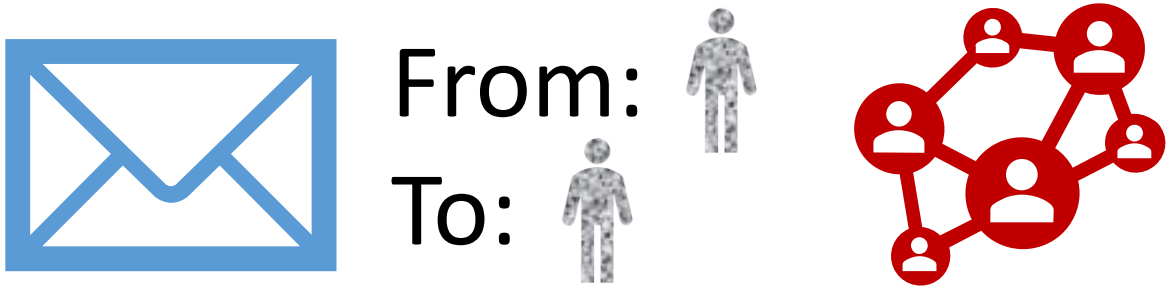
End-to-End Confidentiality:

"*The **level of security**,*
*including the **end-to-end encryption**, [...]*
***shall be preserved** across the interoperable services.*" §3



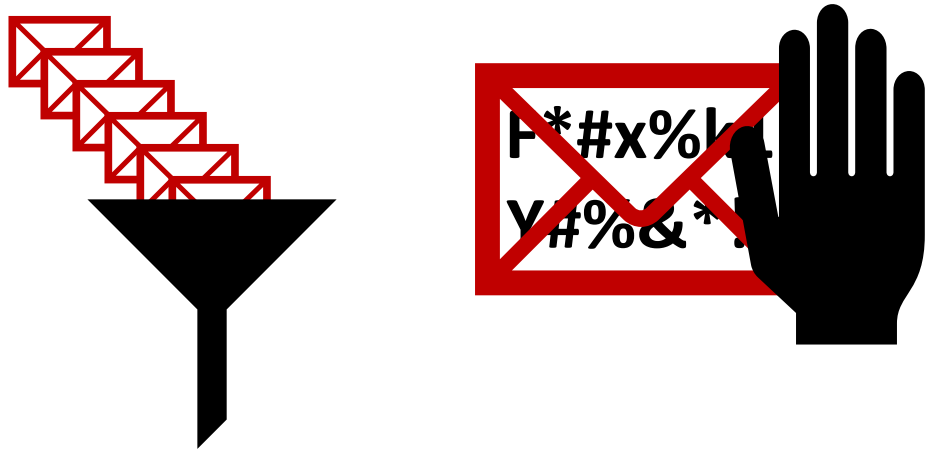
Metadata Protection:

"*The gatekeeper shall **collect and exchange** [...]*
*only the **personal data** of end users*
*that is **strictly necessary** [...].*" §8



Abuse Prevention:

"*The gatekeeper [should be able to **take**] **measures***
*to [...] **not endanger***
*the **integrity, security and privacy** of its services [...].*" §9



Communication Protocol

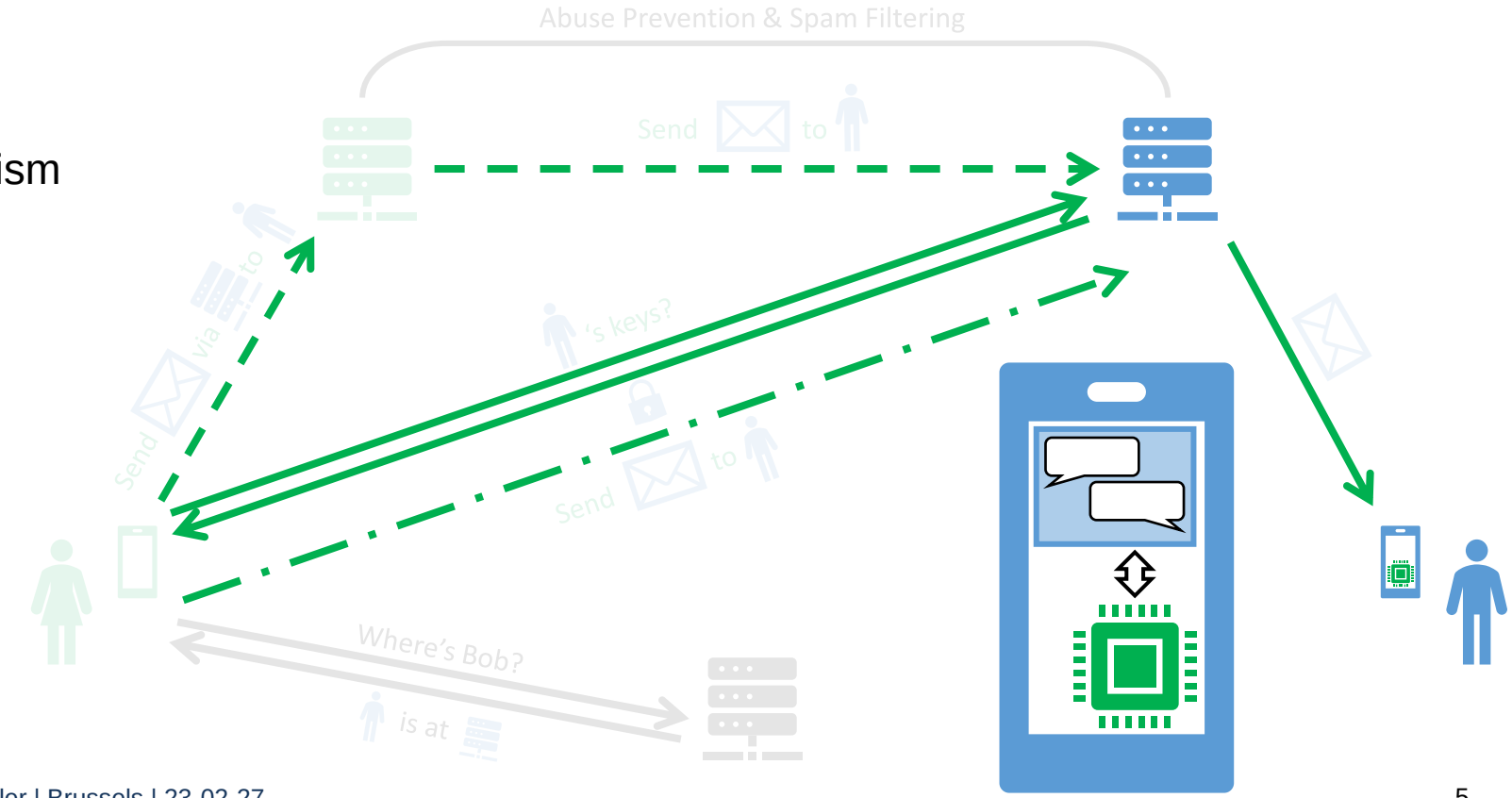
1. Gatekeeper‘s Core Protocol + X

2. Standardization of Protocol
   → More in Alissa Cooper‘s talk

→ More in Matthew Hodgson’s talk

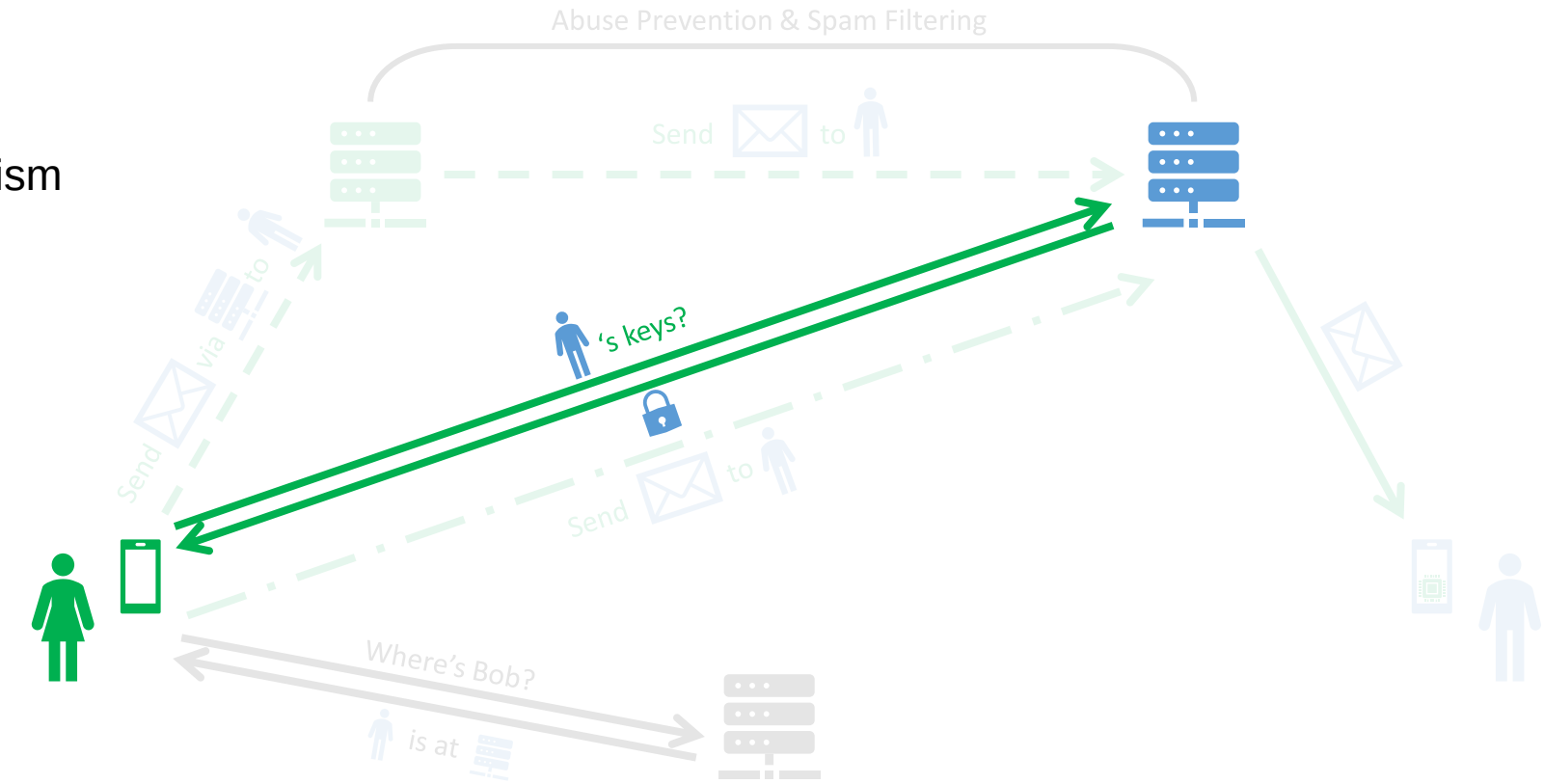
Communication Protocol

1. Gatekeeper‘s Core Protocol + X
   - API + Documentation
   - Client: Library?
   - Server:
     - Replicate key distribution
     - Forwarding service
     - Abuse prevention (interactively)
     - Reporting and blocking mechanism
2. Standardization of Protocol



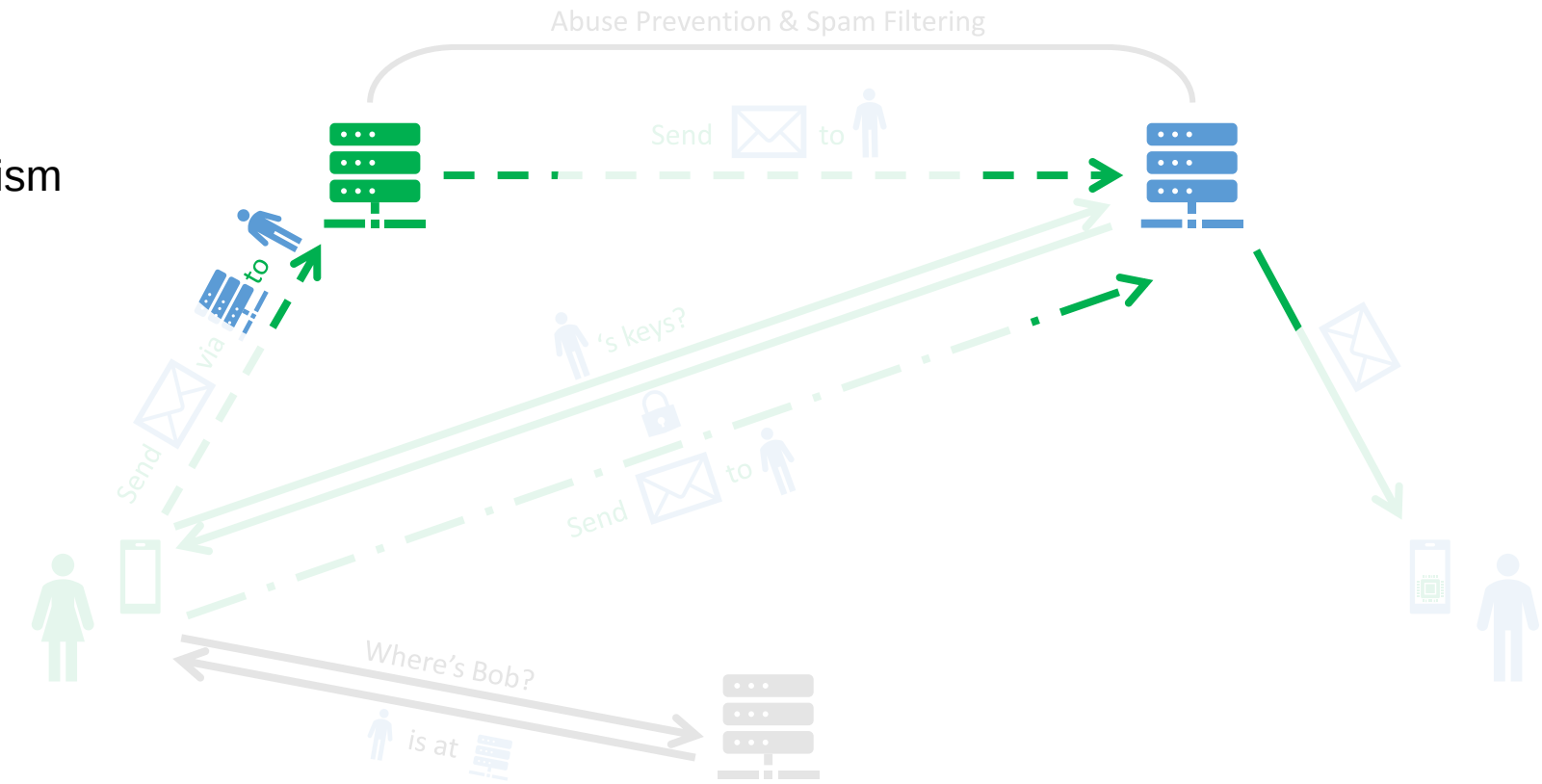
Communication Protocol

1. Gatekeeper‘s Core Protocol + X
   - API + Documentation
   - Client: Library?
   - Server:
     - Replicate key distribution
     - Forwarding service
     - Abuse prevention (interactively)
     - Reporting and blocking mechanism
2. Standardization of Protocol



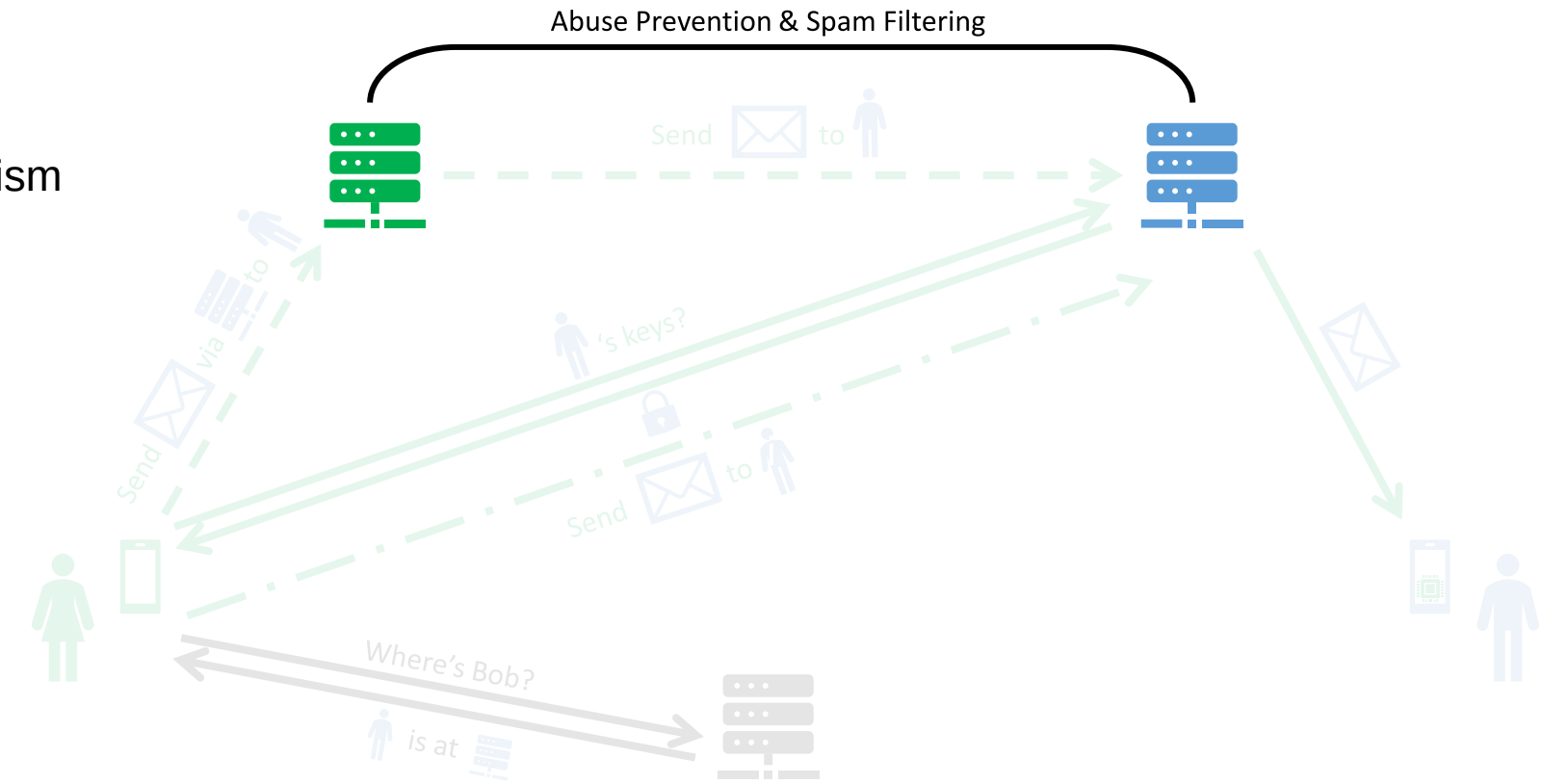
Communication Protocol

1. Gatekeeper‘s Core Protocol + X
   - API + Documentation
   - Client: Library?
   - Server:
     - Replicate key distribution
     - Forwarding service
     - Abuse prevention (interactively)
     - Reporting and blocking mechanism
2. Standardization of Protocol



Communication Protocol

1. Gatekeeper‘s Core Protocol + X
   - API + Documentation
   - Client: Library?
   - Server:
     - Replicate key distribution
     - Forwarding service
     - Abuse prevention (interactively)
     - Reporting and blocking mechanism
2. Standardization of Protocol



Communication Protocol

1. Gatekeeper‘s Core Protocol + X
   - API + Documentation
   - Client: Library?
   - Server:
     - Replicate key distribution
     - Forwarding service
     - Abuse prevention (interactively)
     - Reporting and blocking mechanism
2. Standardization of Protocol
   - New protocol
   - ≥ Best gatekeeper
   - Simple standard update
   - Individual abuse prevention

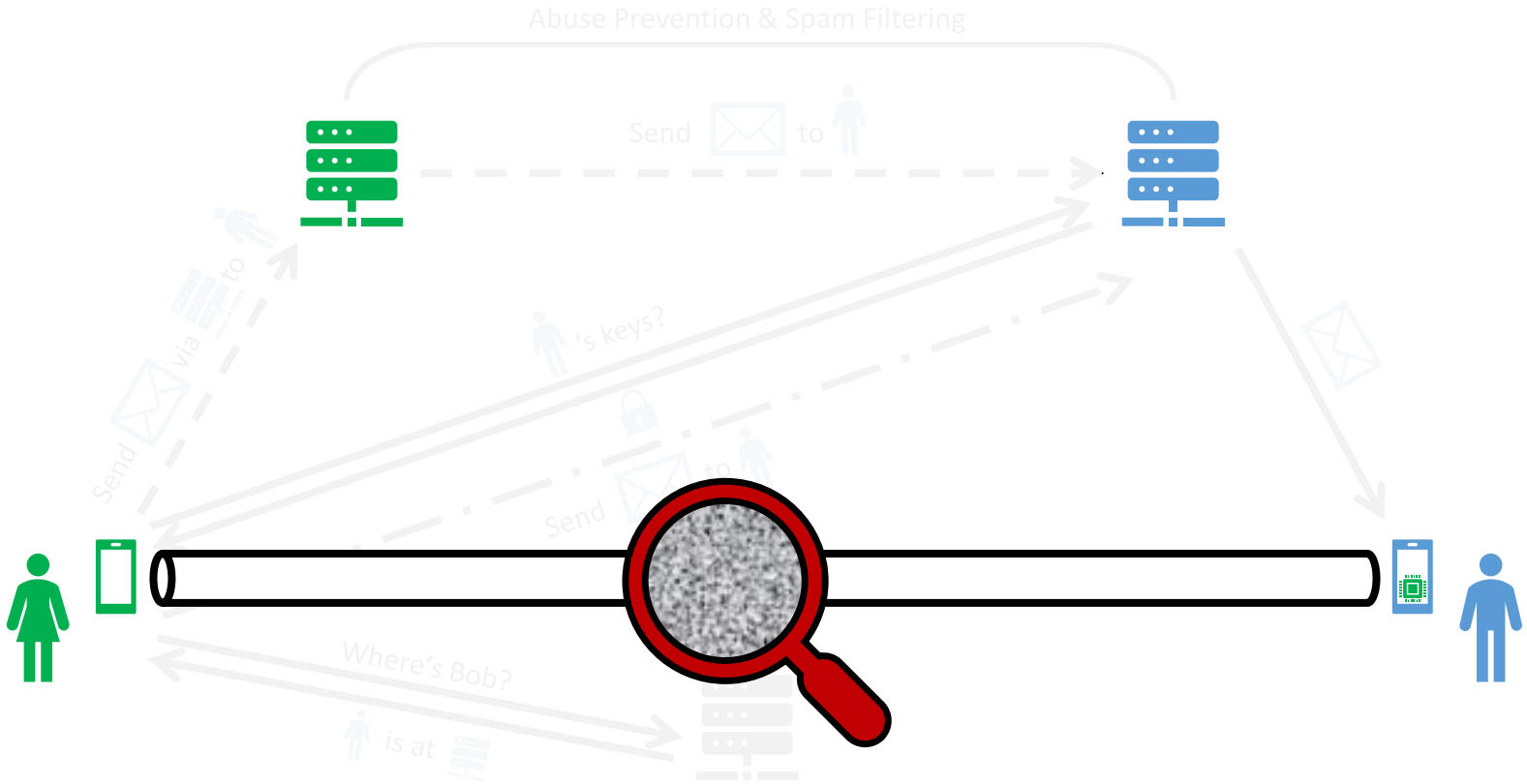
   → Don‘t start with solution

Confidentiality, Privacy & Abuse Prevention

Aka. “+ X”

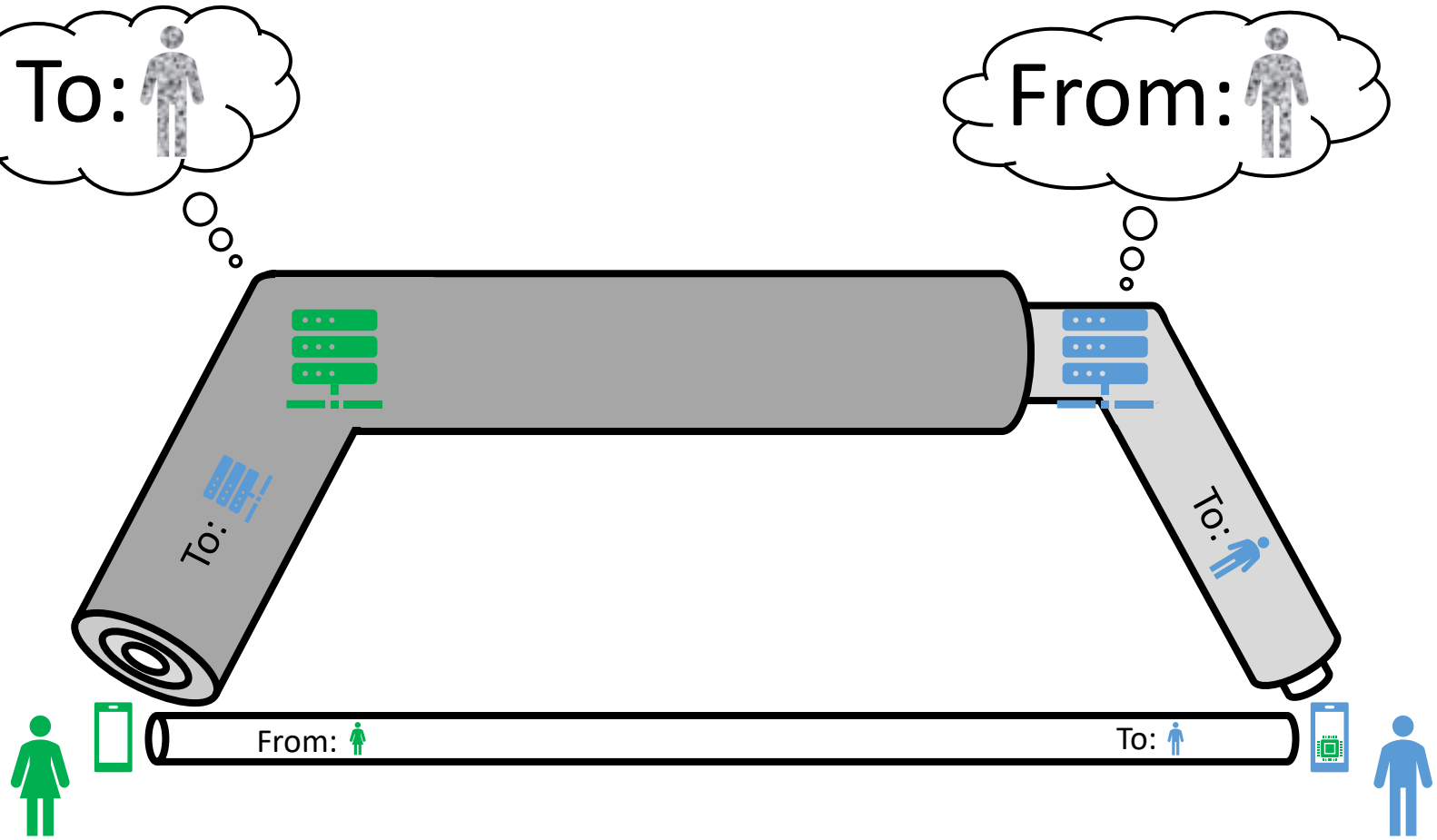
Confidentiality, Privacy & Abuse Prevention

- Message Delivery
  - Confidential + Y



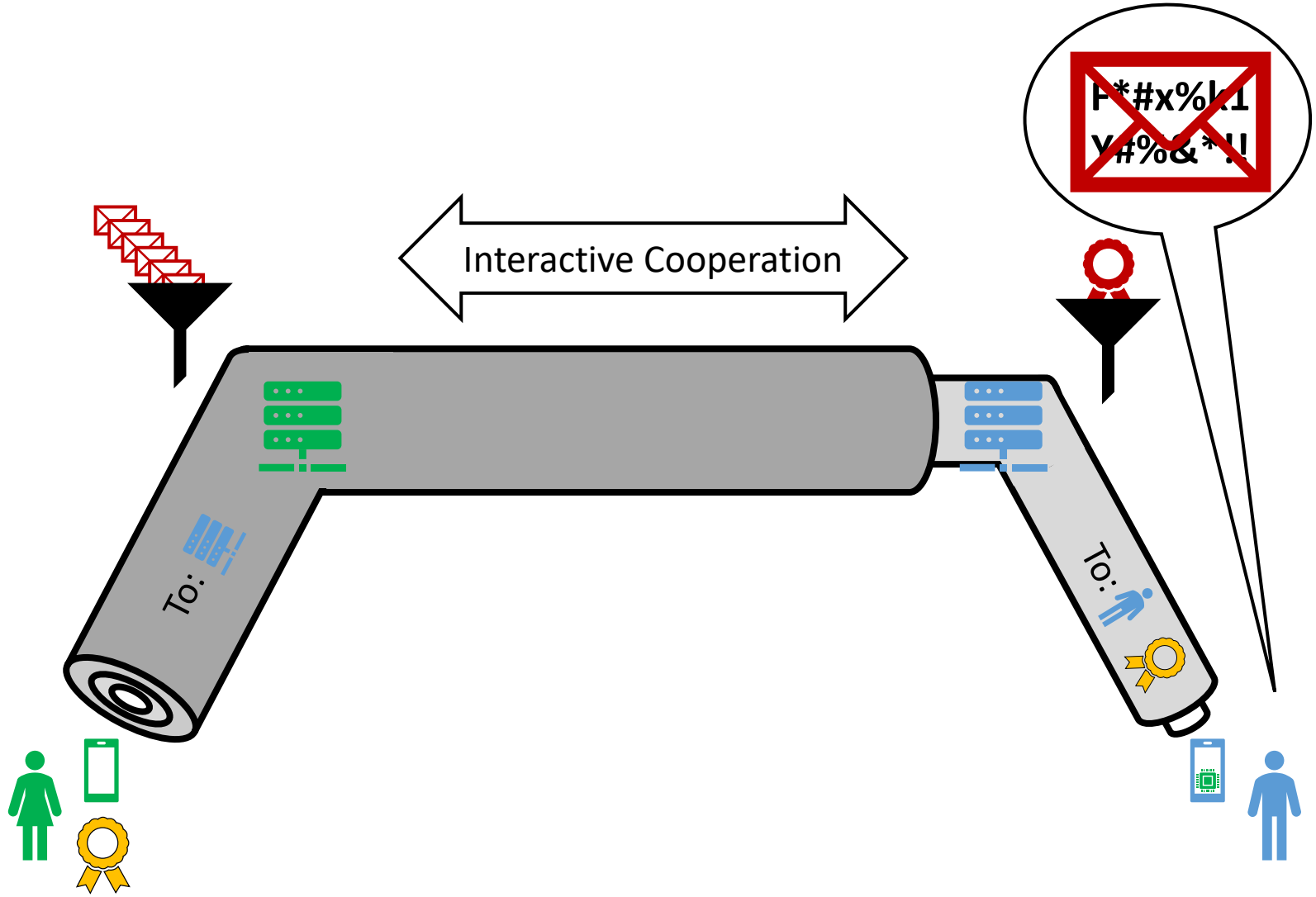
Confidentiality, Privacy & Abuse Prevention

- Message Delivery
  - Confidential + Y
  - Private



Confidentiality, Privacy & Abuse Prevention

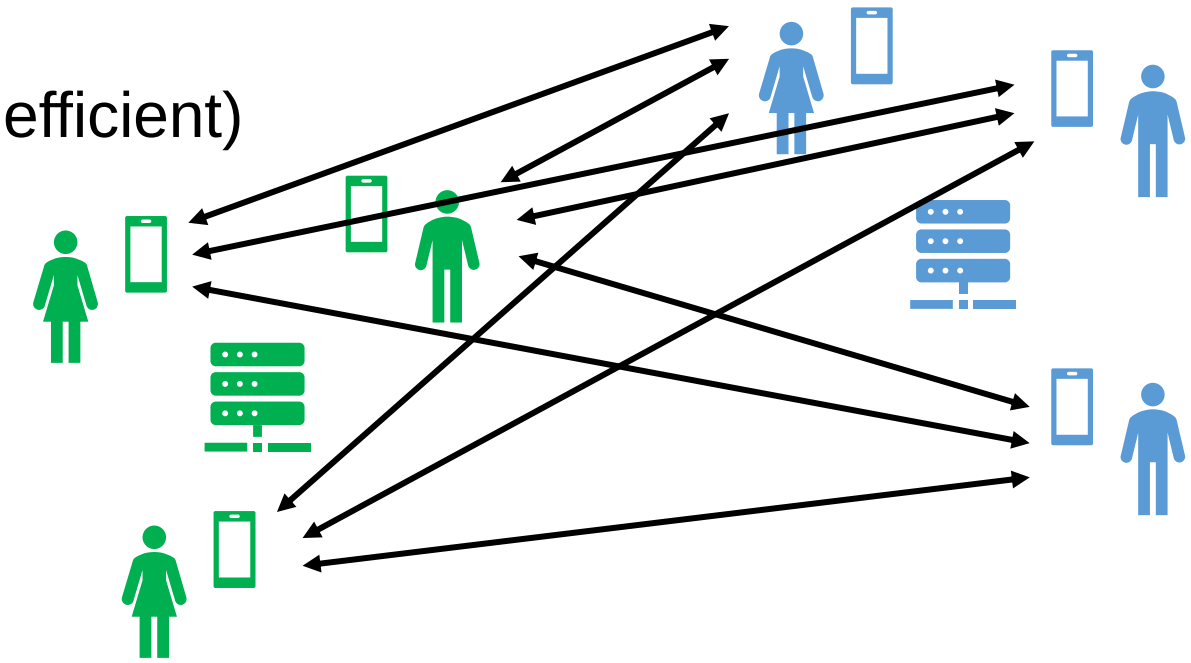
- Message Delivery
  - Confidential + Y
  - Private
- Abuse Reporting
- Effective User Blocking
  - For Individuals
  - From Platform
- Spam Filtering



Group Messaging

Alternatives:

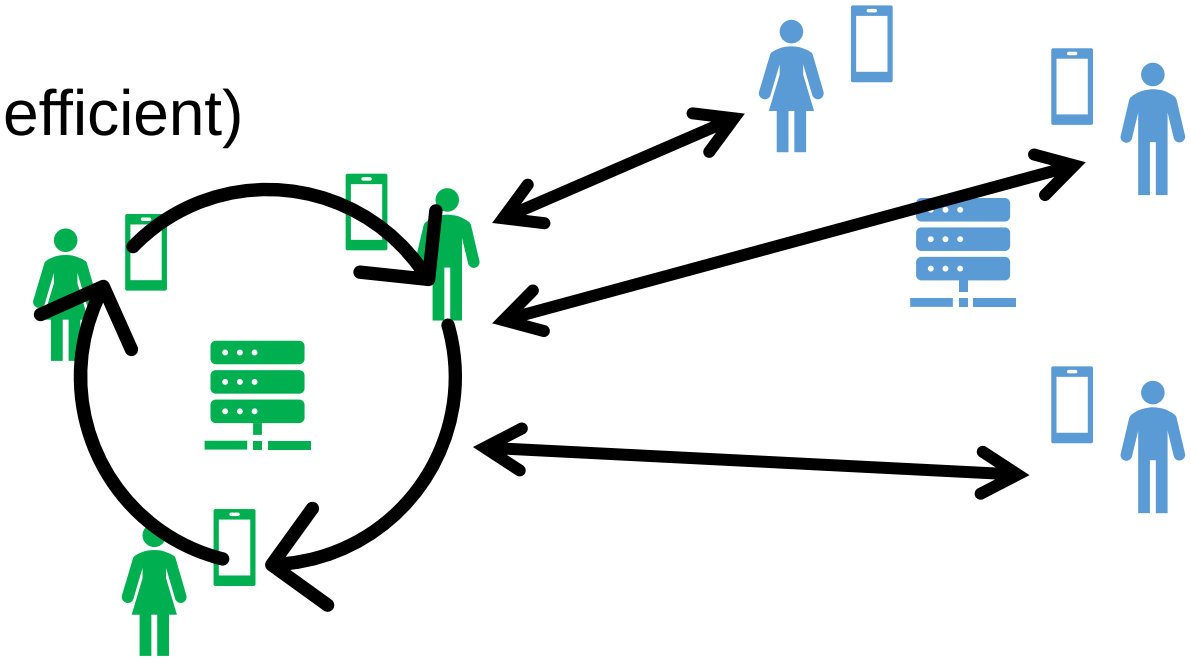
1. Via Pair-Wise Channels (Simple but Inefficient)
2. Gatekeeper's Core Protocol
3. Connect Providers' Subgroups
4. Standardize Group Protocol



Group Messaging

Alternatives:

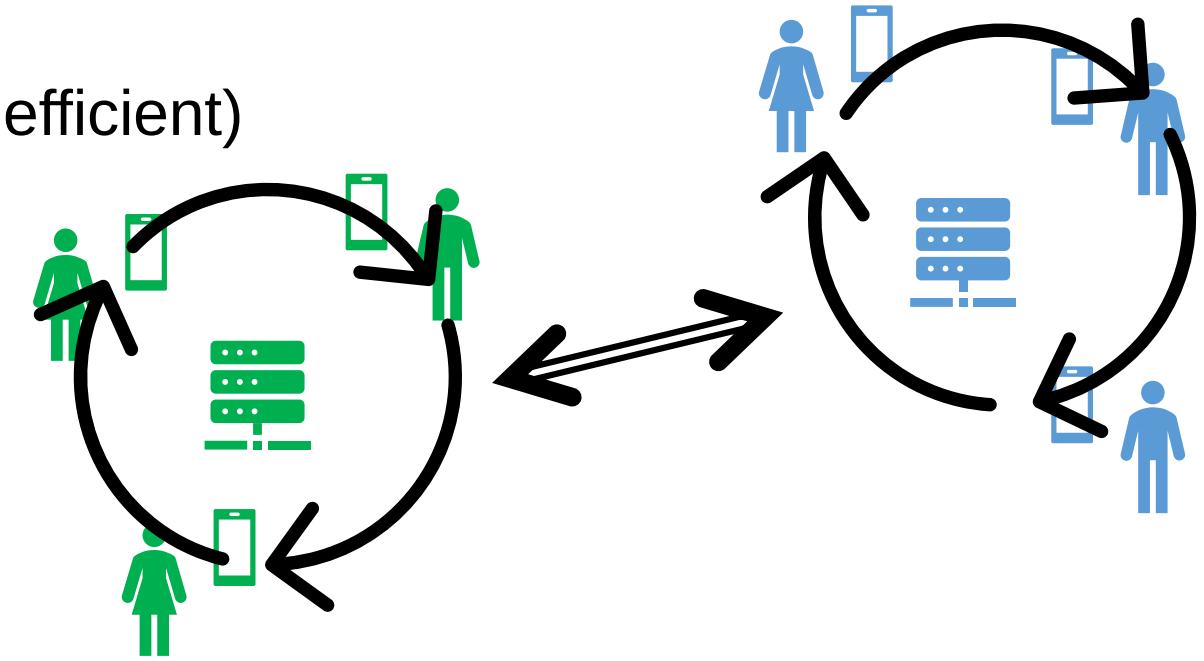
1. Via Pair-Wise Channels (Simple but Inefficient)
2. Gatekeeper's Core Protocol
3. Connect Providers' Subgroups
4. Standardize Group Protocol



Group Messaging

Alternatives:

1. Via Pair-Wise Channels (Simple but Inefficient)
2. Gatekeeper's Core Protocol
3. Connect Providers' Subgroups
4. Standardize Group Protocol



Group Messaging

Alternatives:

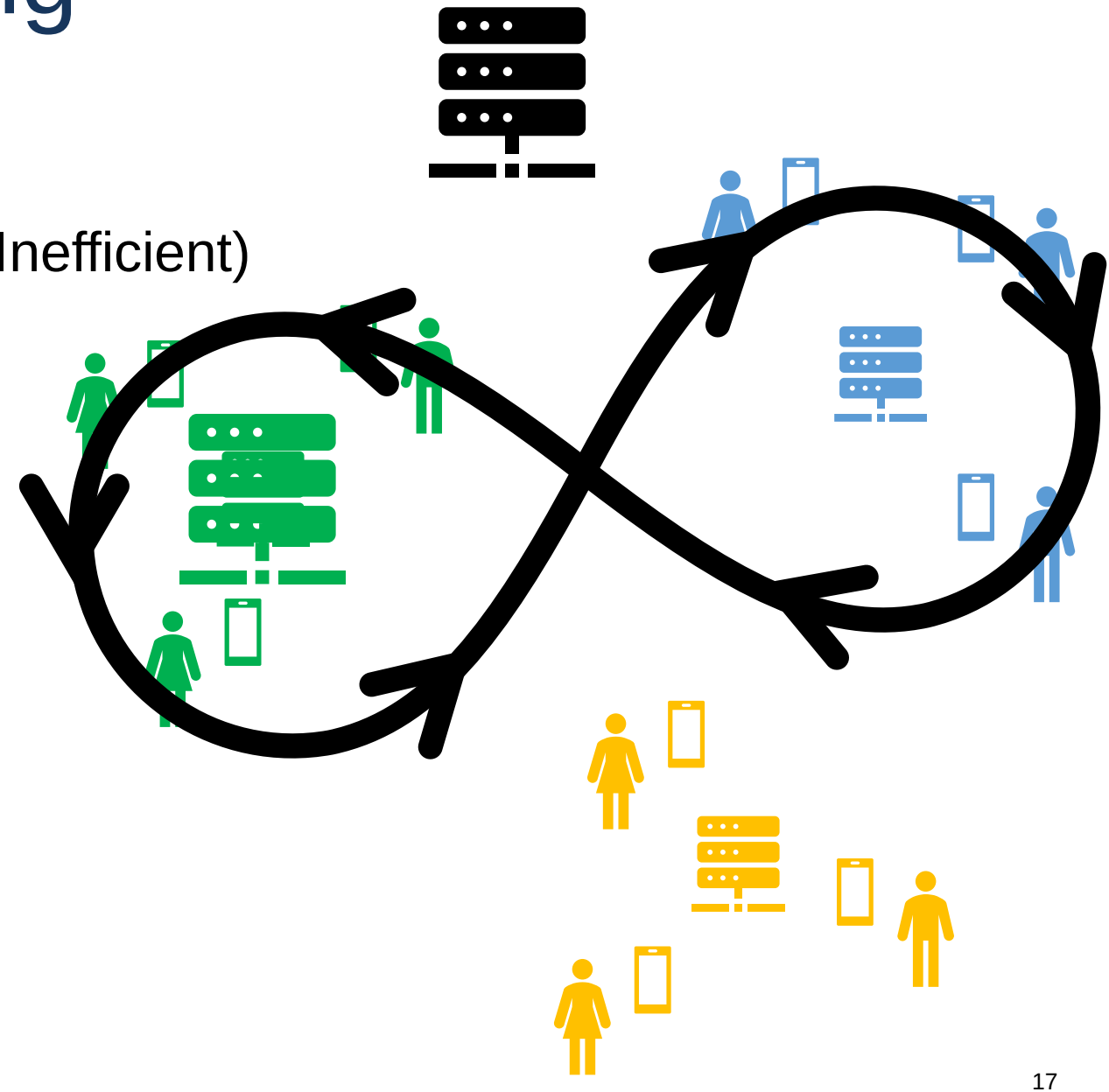
1. Via Pair-Wise Channels (Simple but Inefficient)
2. Gatekeeper's Core Protocol
3. Connect Providers' Subgroups
4. Standardize Group Protocol

Problems and Solutions:

- Consistent Group Management:

→ Centralized?
→ Where?

- Multiple Gatekeepers & Non-Gatekeepers



Conclusion

- Confidentiality, Privacy & Abuse Prevention:
  - Required!
  - Practical ✓
- Gatekeeper‘s vs. Standard Protocol
  - Tradeoffs:
    - Replication & Implementation Overhead
    - Standardization Overhead
    - Agility
    - Group Efficiency
- Standard Tools Deployed

Interoperability in End-to-End Encrypted Messaging

Julia Len, Esha Ghosh, Paul Grubbs, Paul Rösler

Cornell Tech, Microsoft Research, University of Michigan, FAU Erlangen-Nürnberg

Thank you!

Questions & Comments?

paul.roesler@fau.de *@roeslpa*