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ASMONIA

Attack analysis and Security concepts for MObile Network infrastructures supported by collaborative Information exchAnge

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Methods for Collaborative Detection and Analysis

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Outline

- Problem
- Solution
- Prototype
- Conclusion
- Future Work

Problem

How can a member of an Information Sharing Network (ISN) exchange messages with others,

without revealing the origin of the message?

- Member:
  - Mobile network operators
- Message:
  - Warning message containing a current incident

Problem cont‘d

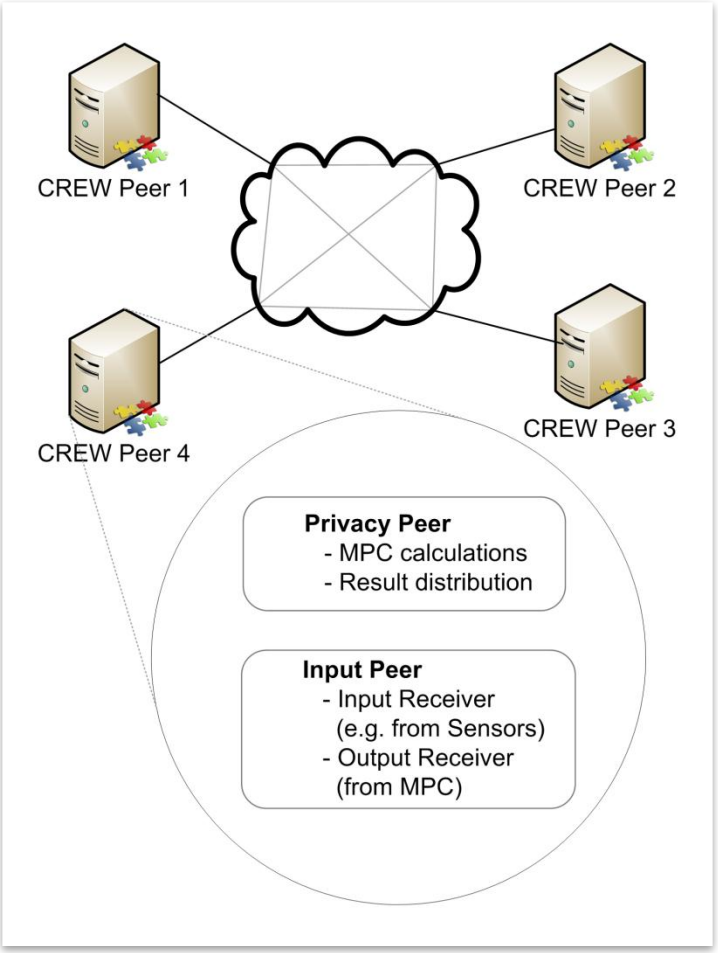
- Benefits:
  - Improving detection rate
  - Generation of overview of the global situation
  - Mitigating global threats

- Why do MNOs need a special system to share information?
  - Prevent reputation loss
  - Benefits from such a system

Solution

Collaborative **R**esilient **E**xchange of **W**arnings [4]

- Different system sizes possible for each party
  - E.g. 1 Privacy peer and 1 Input peer per MNO
- System internals:
  - MPC
  - P2P
  - Certificates (enabled for TACs)
- Disregarded technologies:
  - GNUNet Overlay network



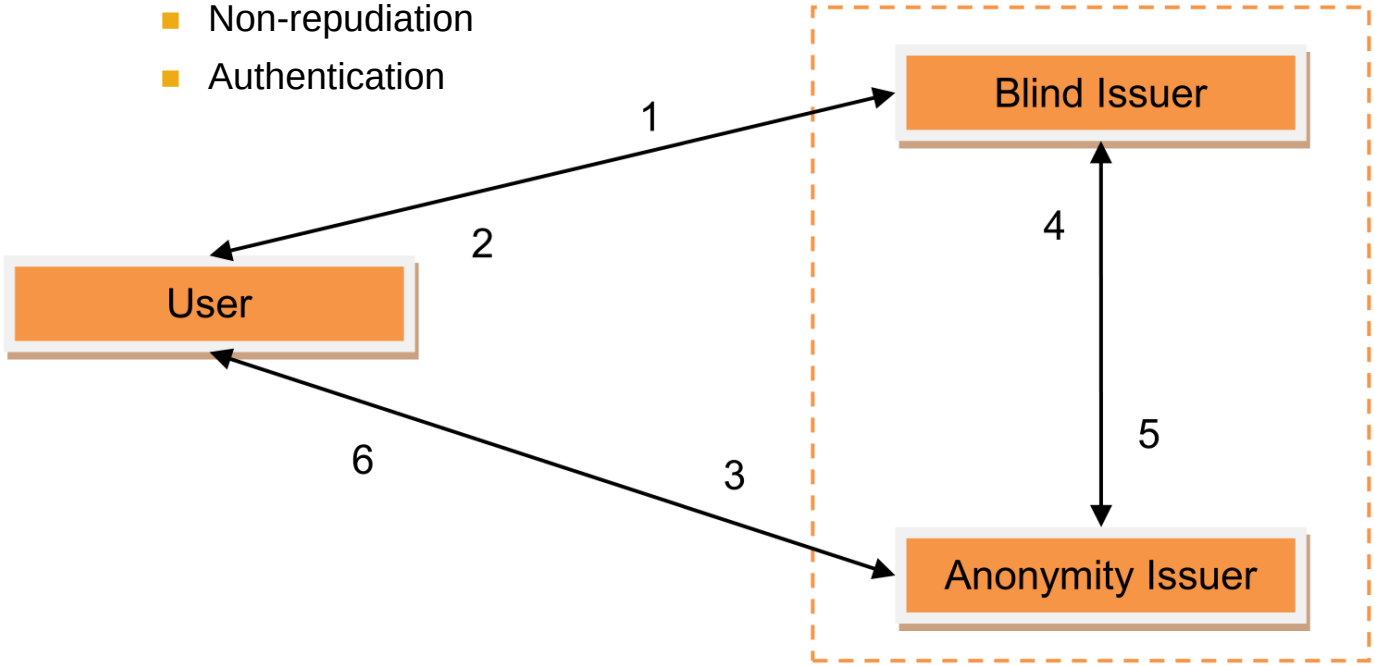
Solution: CREW

- CREW fulfills all requirements to the system
- Effort Estimation [3]
  - Organizational
  - Integration and Deployment
  - Operation, Administration and Management
- Self-Assessment of applied technology components
  - SEPIA and TAC (RFC5636) each not able to comply with the demanded objectives on their own
  - Combination satisfies the ASMONIA requirements

	CREW			
Component Requirement	TAC	P2P	MPC	Data Format
Anonymity	✓	✓		
Privacy			✓	
Non-repudiation	✓			
Interoperability				✓
Resilience		✓		
Authentication	✓			
Integrity	✓			
Confidentiality	✓			
Fairness		✓	✓	

Traceable Anonymous Certificates (TAC)

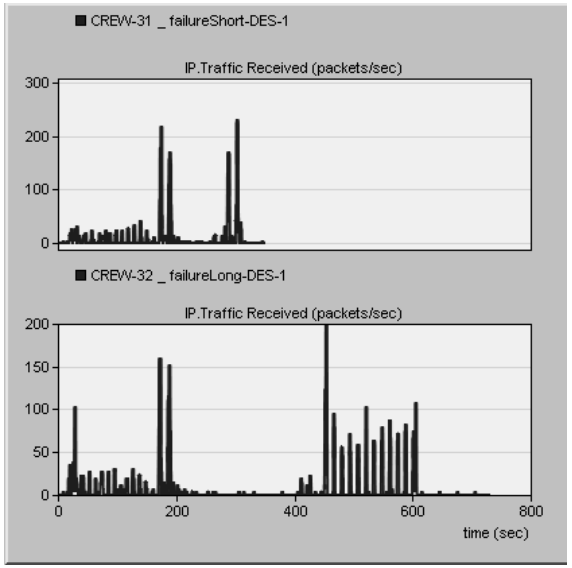
- Provide:
  - Message signing
  - Confidentiality
  - Non-repudiation
  - Authentication
- Without publication of ones identity



Prototype

- Evaluation:
  - Prototype can handle message collisions [1]
  - Prototype can handle attacks originating from the outside (e.g. DoS on one attached CREW peer) [2]

- Not considered in prototype:
  - No Service Discovery
  - No TACs
  - Only feasible for a limited number of peers/simultaneous messages

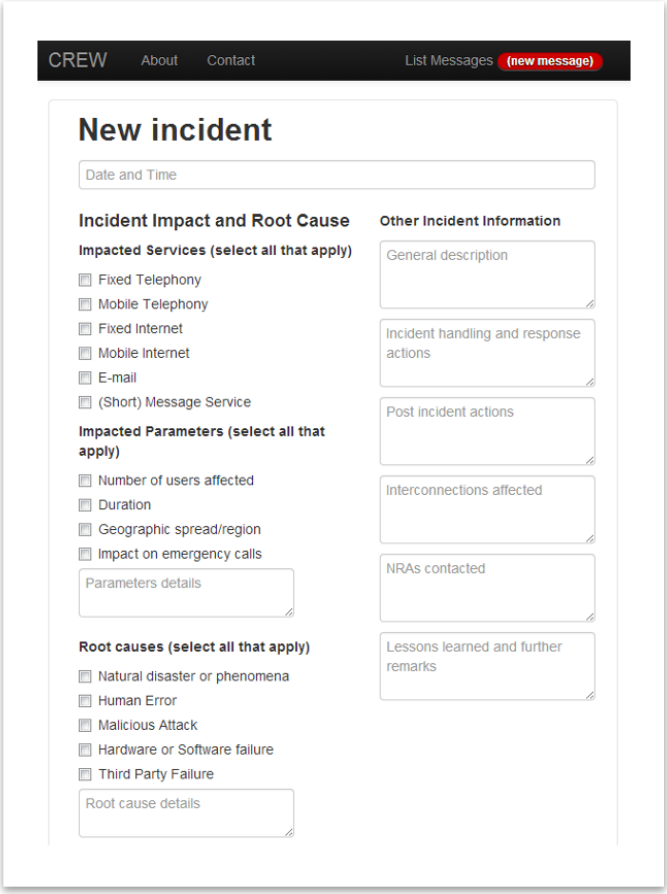


Transmitted traffic during node failure (60 and 180s)

Prototype cont'd

- Why no TACs?
  - Only organizational effort
  - Technological understanding already sufficient
  - Certificates are included in CREW. Efforts confined to creation of certs for every peer and including in the peer

- Capabilities
  - Distribution of arbitrary messages between n peers
  - Messages either automatically or manually created
  - Providing originator anonymity



Demonstrator will be shown after the talks

Conclusion

- Exchange messages with others, without revealing its origin possible

- Results:
  - Some of the functions required by ASMONIA must be completed and/or standardized before their introduction into the mobile network
  - No technology alone sufficient, but SEPIA + TAC satisfy requirements
  - Collaboration does not necessarily improve the detection rate
  - But can be crucial for
    - Generation of an overview of the global situation
    - Mitigating the threats

Questions?

References

[1] D. Titze, H. Hofinger, P. Schoo, Using Secure Multiparty Computation for Collaborative Information Exchange, accepted for publication at the 3rd IEEE International Symposium on Anonymity and Communication Systems, 2013

[2] M. Haustein, H. Sighart, D. Titze, P. Schoo, Collaboratively Exchanging Warning Messages Between Peers While Under Attack, submitted for publication, 2013

[3] ASMONIA, Deliverable D1.4, www.asmonia.de

[4] ASMONIA, Deliverable D4.3, www.asmonia.de