Towards a Human Trust Model for Mobile Ad-hoc Networks

Licia Capra
Dept. of Computer Science
University College London

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Outline

- Mobile Systems
  - ✓ Characteristics
  - ✓ Requirements
- Trust Management Model
  - ✓ Trust Formation
  - ✓ Trust Dissemination
  - ✓ Trust Evolution
- Future Work

Mobile Systems - Characteristics

1. Dynamic context
2. No central authority
3. Resource Constraints

Mobile Systems - Requirements

1. Decentralised
2. Selfish
3. Customisable

Middleware

Middleware

Middleware

Trust Management Model

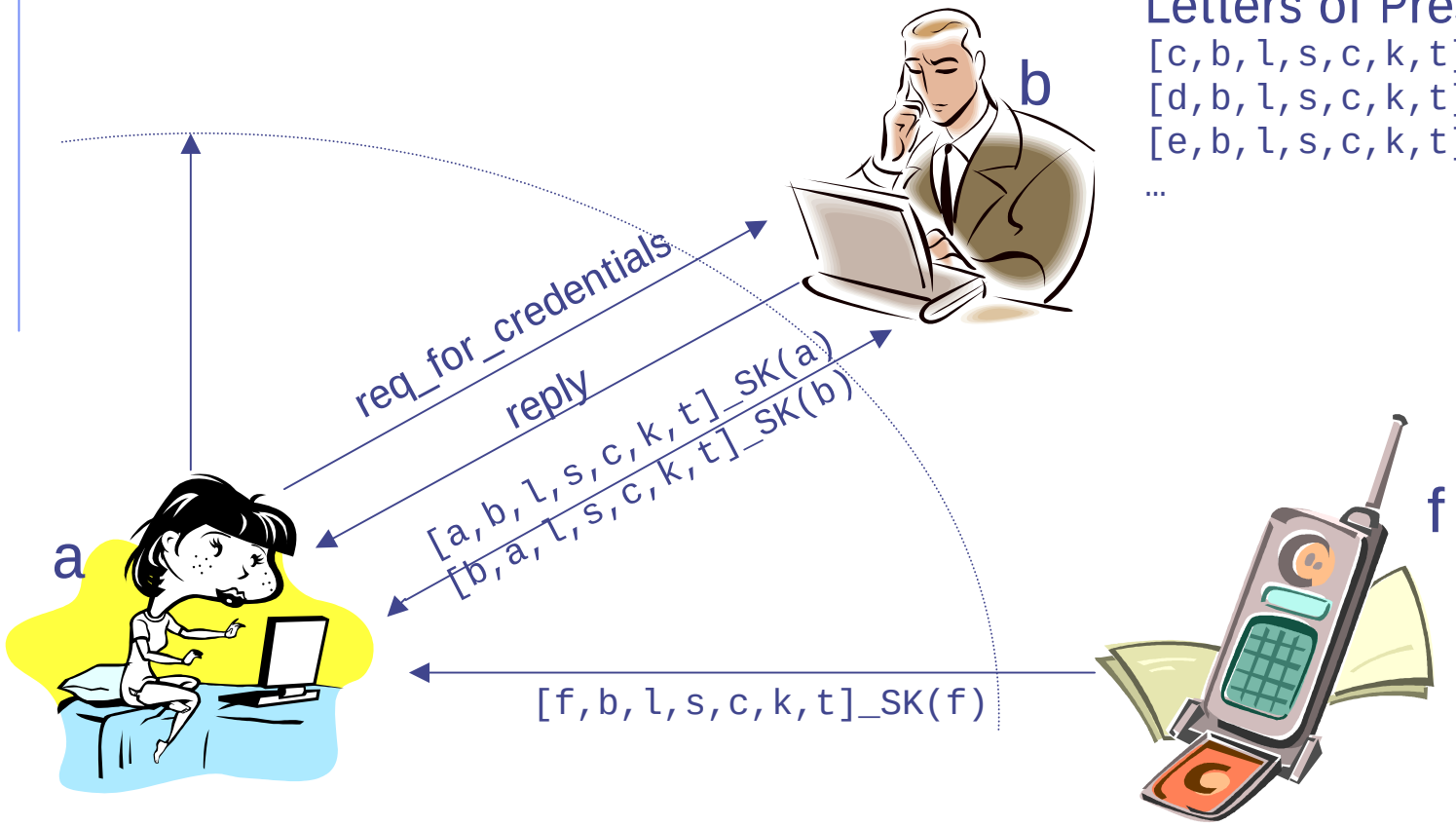
- Trust Formation
  - Local Trust Information [a,b,l,s,c,k,t]
  - Recommendations [c,b,l,s,c,k,t]_SK(c)
  - Local Tacit Information [a,c,l,s,c,k,t]

  - Trust Formation Function

    τ: O x $\mathcal{P}$(O) → $\mathcal{E}$ → [-1,1] x [-1,1]

Trust Management Model

- Trust Dissemination



Letters of Presentation

```
[c,b,l,s,c,k,t]_SK(c)
[d,b,l,s,c,k,t]_SK(d)
[e,b,l,s,c,k,t]_SK(e)
…
```

Trust Management Model

- Trust Evolution
  - Aggregation Function

$$\phi: \ [-1,1] \times \mathcal{P}(O) \rightarrow \mathcal{E} \rightarrow \mathcal{E}$$

  - Extraction Function

$$\psi: \ [-1,1] \times \mathcal{P}(O) \rightarrow \mathcal{E} \rightarrow \mathcal{E}$$

    - Malicious Agents Detection
      - Fake bad recommendations
      - Fake good recommendations

Ongoing and Future Work

- What we are doing:
  - Simulation
  - Integration with event-based middleware
- What we plan to do:
  - Run-time monitoring of transactions
  - Incentives to cooperate
  - Coalition formation
  - Analysis of context
- Long-term plan:
  - Integration of trust, risks and QoS