

Social Threats and the New Challenges for Requirements Engineering

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Outline

- Social computing: a viewpoint
- The new wave of social threats
- New challenges for Requirements Engineering

Social computing: a viewpoint

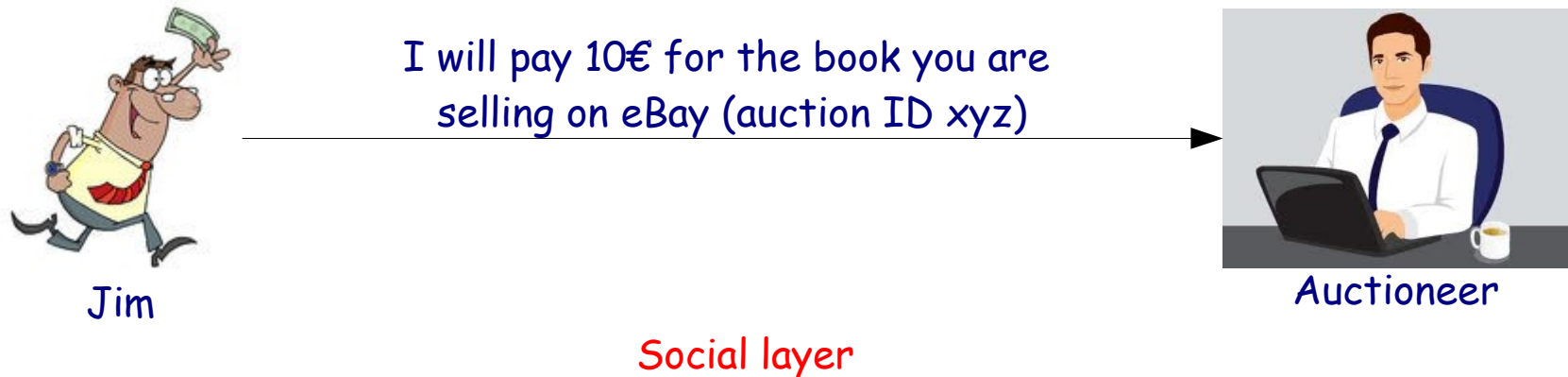
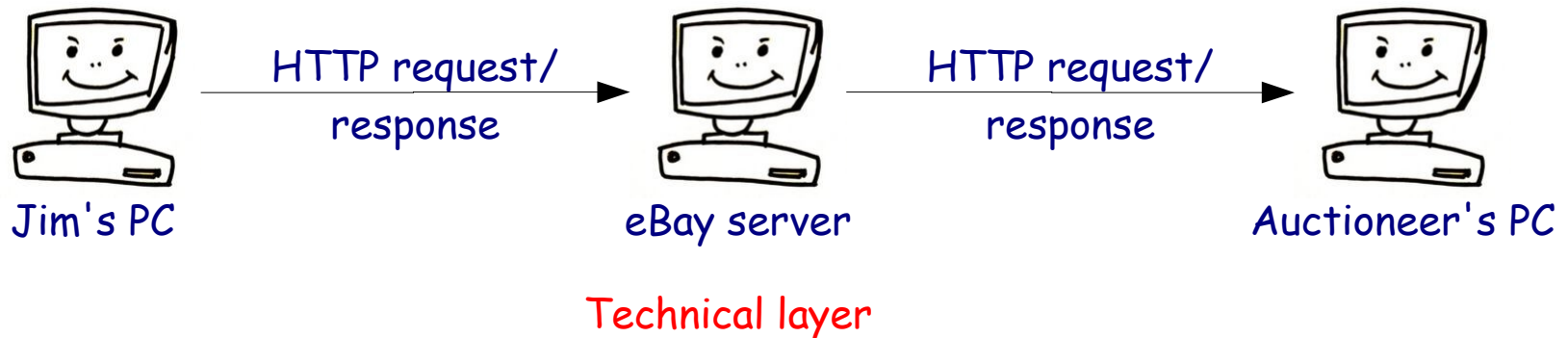


The social layer

- Computing heavily relies on **technical layers**
 - To simplify the engineering of complex computing artefacts
 - e.g. network stacks, architectures
- **People** use computing artefacts to **interact with other people**
 - A **social layer** virtually exists on top of technical layers!
 - However, such layer is not part of current computing paradigms

The social layer exemplified

Jim places a bid in an eBay auction



Social computing

- We understand social computing as a computing paradigm **founded upon the social layer**
- Social computing is conceived in terms of **social primitives**
 - Roles, agents, and commitments
 - Trust and reputation
 - Identity

Example: Agent Jim playing role buyer takes the commitment to sell a book by Mark, playing seller, only if Jim trusts Mark and has proofs of the authenticity of the seller's website

The new wave of social threats



Social threats

- Technical threats affect technical layers
 - By exploiting vulnerabilities: DDoS, virus & worms, etc.
- On the other hand, social threats
 - **Affect social relationships** and artefacts
 - Are **enacted via social mechanisms**

Many social threats are not new, but they will become of utmost importance with the advent of social computing!

Social threats (1)

Name	Affects	Example
T1. Fake reporting	Reputation	Jim rates Mike as a bad seller even if Mike has delivered the goods on time
T2. Decreasing reputation	Reputation	Jim is waiting for some service to be delivered by Mike; however, Mike's reputation is becoming lower and lower
T3. Lack of trust	Interaction	Mike offers a service to the general public. Jim decides to take such service; however, since Mike does not trust Jim, he does not want to interact with Jim

Social threats (2)

Name	Affects	Example
T4. Untrusted delegation	Trust	Jim delegates some service to Mike; Mike delegates such service to Laura. Jim does not trust Laura
T5. Dissolved redundancy	Reliability	Jim relies on Mike and Tony for the redundant delivery of a service. Both Mike and Tony delegate the task to Laura.
T6. Incompatible laws	Compliance	Mike deploys a service that complies with privacy laws. However, stricter laws are introduced and, now, the service is not compliant anymore

New challenges for RE



New challenges for RE

- Requirements Engineering (RE) is about eliciting, analysing, and specifying requirements for (software) artefacts
- Which are the artefacts these threats introduce?
 - Engineering requirements for these artefacts will be the challenge!
 - These challenges are not only for RE, but also for later stages in Software Engineering

Challenges for RE (1)

Challenge	Addressed threats	Description
Trustworthiness management systems	T1, T2	Robust mechanisms to compute trustworthiness of actors based on opinions by peers, compliance, certificates.
Service interface specification and monitoring	T4, T5	Represent the commitments the provider makes to the consumer while ensuring flexible negotiation, access control policies, accountability, compensation rules

Challenges for RE (2)

Challenge	Addressed threats	Description
Adaptation mechanisms	T2, T5	Logically distributed adaptation, from the perspective of a single agent; social threats trigger adaptation; incremental planning to deal with volatility
Early warning and response mechanisms	T2	Enable software to prevent bad events (e.g. via risk assessment) and switch to a different configuration

Challenges for RE (3)

Challenge	Addressed threats	Description
Law representation and compliance	T6	Software shall be able to understand and check compliance with laws (e.g. data confidentiality restrictions). Also, enforcement is a hot topic
Identity management systems	T1, T3	Develop robust identity management systems so unequivocally bind software systems to an accountable legal entity

Conclusions

- Social computing is centred around the **social layer**
 - The social layer captures the **business meaning of computing**
- **Social threats** will be pervasive
 - We presented/reviewed some of them
- These threats originate new challenges for RE
 - Resulting in **new artefacts to design**

Thank you!

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