A Design Methodology for Trust and Value Exchanges in e-Business Models

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E-Business Models

• An E-Business model describes an IT-enabled business case
  • Often multiple enterprises (actors involved); a value web
• E-Business: Truly trans-disciplinary
  • So, multiple perspectives are needed. E.g: value, process, IT, trust perspectives
• A goal of e-Business modeling:
  • Common understanding of a value web’s business case
• Expressed by conceptual, (semi) formal models
  • Allow for analysis, evaluation,
Case study: Letter of Credit

- Procedure to facilitate the exchange of valuable objects between actors (enterprises) who do not trust each other on forehand
  - Payment by bank of buyer when seller can prove that he shipped the goods
  - When goods are received by carrier from seller he issues a Bill of Lading, which is proof of shipment

- The Letter of Credit is a commercial trust service. Therefore two perspectives:
  - Value web perspective
  - Trust perspective

Primary Value Web: Exchanging Goods for a Fee

- An ideal world: Atomicity of value interfaces: all connected exchanges occur or none at all
Secondary Value Web: Letter of Credit

- Guarantee of atomicity: Letter of Credit
- A value web itself!
- Customer guarantees payment, and pays for this guarantee

Trust Modelling: Basic Statements

- $\text{BoL} \Rightarrow_p \text{Shipped}$: The Bill-of-Lading (BoL) reliably indicates that the goods are shipped, in the context of procedure $P$.

- For trust, subjective statements (e.g. beliefs) are first class citizens:
  - $B_i(p)$, which denotes that actor $i$ believes $p$
  - $K_i(p)$, which denotes that actor $i$ knows $p$

- Examples:
  - $B_i(\text{BoL})$: actor $i$ believes BoL
  - $B_i(\text{Shipped})$: actor $i$ believes that shipment took place
Trust Modelling: Advanced Statements

- \( K_i (B_i \text{BoL} \Rightarrow_p B_i \text{Shipped}) \): Actor i knows that: if he believes the BoL, then (given procedure P) he believes the goods are shipped

- Many legal systems (in fact P) suppose that actors ought to know the norms:
  - \( O_i K_i (B_i \text{BoL} \Rightarrow_p B_i \text{Shipped}) \), for all actors i

- The seller knows that all other parties accept the BoL as proof of shipment:
  - \( K_s (O_j K_j (B_j \text{BoL} \Rightarrow_p B_j \text{Shipped})) \), for all actors s and j

Design of Trust services

- Formal analysis shows how people reason about the trustworthiness of controls in a trade situation

- Formal analysis can be used to design trust service

- Extend primary value webs with secondary value webs of trust services
  - Most high-value exchanges require controls
Conclusions

- Value models and trust models are two complementary perspectives on an e-business case.
- The value model assumes that value exchanges simply occur and are atomic (fair exchanges).
- Trust models can be used to increase confidence in fair exchanges.
- To model trust, we need to represent at least two parts:
  - The business perspective of the trust proposition itself (trust as a commercial e-service).
  - The trust procedures and logics.