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

Jaap Gordijn (gordijn@cs.vu.nl)
Yao-Hua Tan (ytan@feweb.vu.nl)
Free University Amsterdam (VUA)

vrije Universiteit   amsterdam

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, …**

vrije Universiteit   amsterdam

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:**
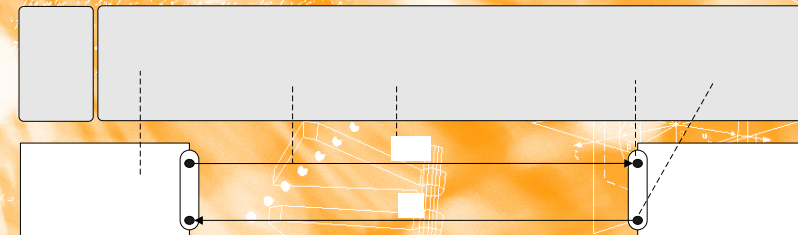 - *Value web* **perspective**
  - *Trust* **perspective**

vrije Universiteit   *amsterdam*

Primary Value Web: Exchanging Goods for a Fee

- **An ideal world: Atomicity of value interfaces:** *all* **connected exchanges** *occur* **or** *none at all*
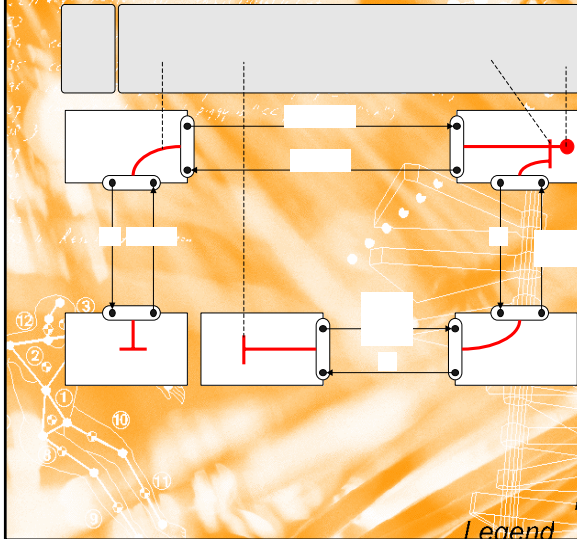
vrije Universiteit   *amsterdam*

Secundary Value Web: Letter of Credit

- **Guarantee of atomicity: Letter of Credit**

- **A value web *itself*!**

- **Customer guarantees payment, and pays for this guarantee**

vrije Universiteit   *amsterdam*

Legend   *Dependency path*   *Termination bar*

Supplier   Good~guaranteed~

guaranteed

Trust Modelling: Basic Statements

- **BoL $\Rightarrow_P$ 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_ip, which denotes that actor i believes p**
  - **K_ip, which denotes that actor i knows p**

- **Examples:**
  - **B_i(BoL): actor i believes BoL**
  - **B_i(Shipped): actor i believes that shipment took place**

vrije Universiteit   *amsterdam*

Handling
of
Payment
fee

Trust Modelling: Advanced Statements

- $K_i(B_iBoL \Rightarrow_P B_iShipped)$: 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*:

  - $O_iK_i(B_iBoL \Rightarrow_PB_iShipped)$, for all actors i

- The seller *knows* that all other parties accept the BoL as proof of shipment:

  - $K_s(O_jK_j(B_jBoL \Rightarrow_PB_jShipped))$, 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**

vrije Universiteit   *amsterdam*