On the Interaction between Business Models and Software Architecture in Electronic Commerce

How can E-commerce business models profit from designing a software architecture?

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Agenda
The development of an e-commerce application: a cyclic approach
An example application: the Yellow Pages:
the initial business model and architecture
evaluation on committing a fraud
solutions to avoid fraud
changes in business model and architecture
re-evaluation of the architecture
Conclusions
Developing an e-commerce application: a cyclic approach

Business model
• actors
• exchange of values
• constraints

Software architecture
• components
• relations between components

A business model for a directory service

Buyer (Listener)

1. Hits

2a. Payment
2b. Music

Seller (Musicshop)

3. Payment only for mediated transactions

Directory service (Yellow Pages)
A basic architecture for a directory service

Buyer (Listener) –> Seller (Music shop)

1a. Query –> Directory service (Yellow Pages)
1b. Hits

2a. Order
2b. Payment
2c. Music

2d. Mediation report

3a. Invoice
3b. Payment

Is committing a fraud possible -1?

Construct a fraud tree (based on the fault tree)

Too few matches
(fraud by seller)

The seller changes log entries
The directory service receives wrong or no matches

The seller conceals matches
The seller denies matches
Possible solutions

Architectural change:
Avoid denial of mediation reports by sellers
signing a report with an electronic signature

Business model change:
Avoid concealment of mediation reports
introducing a bonus system

Solution 1: Change architecture

Buyer (Listener)  
1a. Query  
1b. Hits  

Directory service (Yellow Pages)

Seller (Music shop)  
3a. Invoice  
3b. Payment

2a. Order  
2b. Payment  
2c. Music

2d. Mediation report (signed)
Solution 2: Change business model

1. Hits

Buyer (Listener) → 2a. Music → 2b. Payment

2d. Bonus

2c. Mediation Report

3. Payment

Seller (Musicshop)

Directory service (Yellow Pages)

Solution 2: and thus the architecture

1a. Query

Buyer (Listener) → 1b. Hits

2a. Order

2b. Payment

2c. Music

2d. Bonus

2d. Mediation Report (signed)

3a. Invoice

Seller (Musicshop)

Directory service (Yellow Pages)
Re-assess the new architecture

Now, a customer can be a party in committing a fraud also:
- the seller gives the customer money rather than bonus points

Business wise, this will not happen because:
- the customer wants to collect points from multiple sellers

There is no architectural measure necessary to prevent commitment of such a fraud

Conclusions

When you develop e-commerce applications be careful to:
- Design a software architecture to assess the technical feasibility of a business model;
- Design an electronic commerce application in cyclic processes of business model design and software architecture design