Safeguarding and Charging for Information on the Internet

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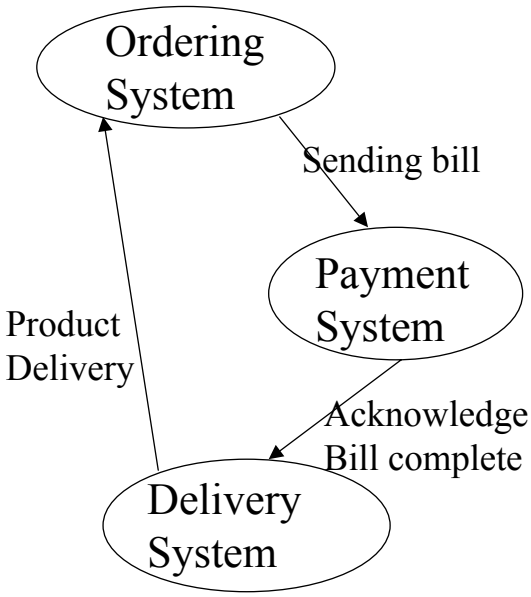
Introduction

- Main Components of electronic commerce (E-Commerce) system
- Stanford Research Projects
  - Payment Mechanism Independence
  - Shopping Model Architecture
- Content Delivery Problem and Possible Solution
  - Delivery Dilemma
  - Copy Protection & Detection
- Conclusion

Components to Build up E-Commerce (Slide 1)

- **Ordering System**
  - General purpose web browser
- **Payment System**
  - Mid-1990's several payment provider turn up
    - **CyberCash**
    - **e-cash from DigiCash**
    - **Visa**
  - Credit-based or Debit-based
  - Common Goal transfer money from buyer's account to seller's account



Components to Build up E-Commerce (final)

- **Delivery System**
  - Two approaches
    - Delivery products *electronically* or *physically* to buyer
- **Problem**
  - Ordering, Payment & Delivery System are stand alone services
- **Solutions**
  - Three Approaches
    - Commerce Servers: The "Buy" Approach
    - Universal Protocol: The "Build" Approach
    - Outsourcing: The "Rent" Approach

Stanford Research Projects (Slide 1)

- **Payment Mechanism Independence**
  - Many payment providers exits nowadays
  - Standardized payment interface is highly desirable
  - Stanford developed a standardized interface to isolate different & complexity named as *U-PAI*
  - U-PAI stand for Universal Payment Application Interface

Stanford Research Projects (Slide 2)

- **Advantage of U-PAI**
  - Reduce complexity of payment system
  - Neither customer's nor buyer's code need to change
  - Compatibles with old payment
  - All remote calls are asynchronous and non-blocking
  - Callback are implement

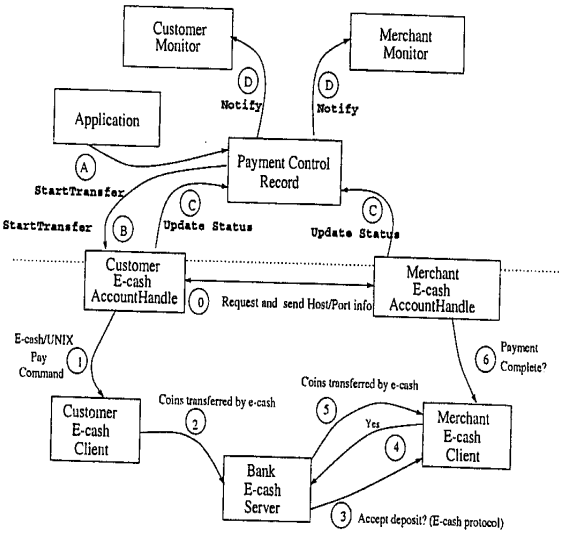


Figure 1: An E-cash Transaction using U-PAI

Stanford Research Projects
(final)

- **Shopping Model Architecture**
  - Style of Shopping
    - Pay First then Delivery Later
    - Delivery First then Pay Later
  - The Goal of shopping model architecture allow customer and seller's to agree upon on shopping style

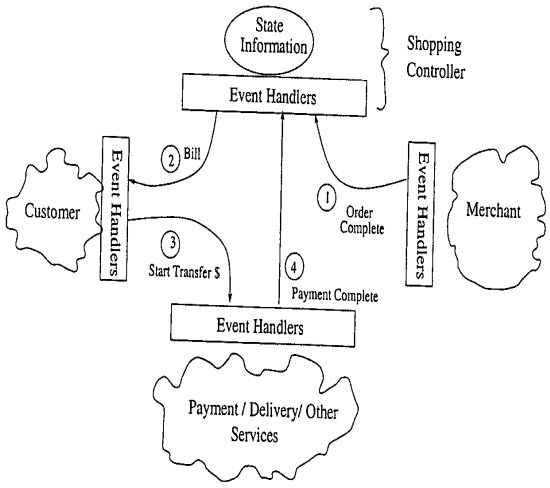


Figure 2: A high level view of a shopping model

Content Delivery Problem

- **Dilemma**
  - *Positive on E-Commerce*
    - Attract more buyers on market
    - Lower delivery costs
  - *Negative on E-Commerce*
    - Illegal copies can be make easier relatively

Possible Solutions
(Slide 1)

- *Copy Protection*
  - Placing information on stand-alone CD-ROM
  - Using encryption to protect product
  - IBM introduced Cryptolopes
- *Still impossible to avoid illegal copy*
  - Once customer buy a product, he/she can reproduce

Possible Solutions
(Slide 2)

- *Watermarks*
  - Use steganographic techniques to hide additional information into digital content
  - Say put customer's credit card no on the image, so who make illegal copies can be detect
  - Watermarks can be remove by Reverse engineer
  - More efficient than Copy Protection

Possible Solutions (Slide 3)

- *Copy Detection System*
  - Register all original copy to database
  - Using similarity matching to detect whether the found copy is illegal
  - Accuracy is very important, not matter the how the illegal copy changed

Possible Solutions (final)

- *Stanford Copy Analysis Mechanism (SCAM)*
  - *Chunking*
    - Chunk documents into parts & save to database
    - So matching copy will be easier
  - *Filtering Expensive Tests*
    - Use a cheaper detection first
    - Applied a expensive filter to do a test again
  - *Selecting Text Databases and Extracting Documents*
    - Find out original copy out of database using query or statistics
  - *Indexing Data Windows*
    - Owner's interested in when their work copied
    - Using index to keep track of period

Conclusion

- This paper introduction solution on different payment mechanisms
- Protection on product study in this paper is still no enough