

CS155a: E-Commerce

Lecture 2: Sept. 11, 2001

Course Overview

Telephone Network

- Connection-based
- Admission control
- Intelligence is "in the network"
- Traffic carried by relatively few, "well-known" communications companies

Internet

- Packet-based
- Best effort
- Intelligence is "at the endpoints"
- Traffic carried by many routers, operated by a changing set of "unknown" parties

Business Question:

How to price Internet service?

Technical and Business Question(s):

How to provide different QoS levels and how to charge for them?

Technical, Business, and Policy Question:

Does "intelligence at the endpoints" make sense for a mass-market public infrastructure?

Shift to Internet Causes

- Changes in existing businesses
(e.g., telepresence)
- New ways to do old kinds of business
(e.g., WWW-based retail)
- New kinds of businesses
(e.g., Internet "infrastructure" providers)

As an infrastructure for communication, business, and almost all forms of human interaction, the Internet is new, rapidly changing, and inherently less manageable and controllable than older infrastructures.

Leads to questions about:

- Privacy
- Authenticity
- Accountability
- Jurisdiction

Co-Evolution of Technology and Business*

- "Information Economy"
- Network Effects
- Open-Source Movement
- Internet-Architectural Principle of "Layering"

* Robert Glushko, CommerceOne

Security Technologies

- Encryption
 - Symmetric Key
 - Public Key
- Signature
- PKI
- Rights Management
- Time Stamping
- Secure Containers

References

- D. Stinson, Cryptography: Theory and Practice, CRC Press, Boca Raton, 1995
- A. Menezes et al., Handbook of Applied Cryptography, CRC Press, Boca Raton, 1997
- * Chapter 5 and Appendix E of The Digital Dilemma, National Research Council, 2000 (http://books.nap.edu/html/digital_dilemma/)

Political Question:

Crypto export

Legal Question:

Do we have a right to use encryption?

To some form of "electronic privacy"?

Technical, Legal, and Policy Question:

"Anonymity" vs. "Privacy"

Business Question:

Can you make money selling security technology?

Changes in the Technology and the Economics of Publishing

- Computers and Digital Documents
- WWW-based Publication
- Internet Distribution

Technical Question:

Is copying, modification, and redistribution of copyrighted material now uncontrollable?

Business Question:

Is it possible to make money distributing copyrighted material (e.g., popular music) over the Internet?

Technical and Business Questions

To what extent do encryption, digital signature, and other well understood security technologies make Internet content distribution manageable and profitable?

- What other technology is needed?
- What is the role of "circumvention" in effective development and deployment of relevant technology?

Technical, Business, and Legal Questions

- Is current copyright law technically feasible to implement and deploy on the Internet?
 - "copy-centric"
 - "fair use is a defense, not a right"
 - DMCA
- To what extent is copyright compliance monitorable? To what extent should it be monitored?

Global Network vs. Local Expectations

- Intellectual Property Law
- Censorship
- Banking Law

WWW Searching

Technical Question: How to do it?
(short answer: Linear Algebra)

Business Questions:

How to make a business out of it?
What is the role of advertising?

Legal and Ethical Question:

What conclusions should be drawn about people (by, e.g., gov't, employers, insurance companies...) based on what they search for and what they find?

WWW-Based, B2C Retail

Business Question: What to sell?

Business and Technical Question:

How to capture and use customer information?

- Massive scale
- Variable quality
- Numerous formats and intermediaries

Business and Technical Question:

How to do online advertising?

Business, Legal, and Ethical Questions:

Who owns transaction data? To whom can it legally be sold? What can legally be done with it?

Technical and Business Question:

Is there an inherent tradeoff between personalization/efficiency and privacy?
(the "cookie" question)

WWW-Based, C2C Retail

Economics and **CS** challenge:

Auction Design

Technical Challenge: C2C payment systems, e.g., "Electronic Cash"?

Technical and **Legal** Question:
Distributed computing meets international law.

WWW-Based, B2B "Exchanges"

Economics and **CS** Challenge:
Market Design

Technical, **Business**, and **Legal** Question:
Do "industry-sponsored" electronic market
places promote monopoly and monopsony?

Technical Challenge: XML and other
language-design questions

Reading Assignment For September 13

- Appendix C of The Digital Dilemma
(http://books.nas.edu/html/digital_dilemma/)
- "How Domain Name Servers Work"
(<http://www.howstuffworks.com/dns.htm>)
- Section 1.2 of Computer Networks: A Systems Approach, Peterson and Davie, Morgan Kaufmann Publishers, 1999. (Available only in print form.)